

THE UVIMA PROJECT

Uchambuzi wa Viumbe kwa Maendeleo Taxonomy for Development in East Africa

UVIMA Baseline Review Consultancy
Draft Report

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Countries Covered by Project: UGANDA

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1.0 EXECUTIVE SUMMARY

To be inserted last

2.0 INTRODUCTION

Taxonomy is the oldest science, having been created or come into existence with the beginning of human existence. Man has therefore used the gift of taxonomy to distinguish between objects, situations and prepositions to nurture his existence on earth. To create order, man has perfected or continues to do so, the naming and identification of all components of his environment. Man has therefore tried to give names to the plants, animals and other micro-organisms that he interacts with. He has also given various descriptions to them based on how they look like, their functions, what chemicals they contain, and what uses he could put them to.

Although taxonomy is literally learned instinctively at birth, the experience of its uses is sometimes taken for granted. For example, very little thought is usually given to the power of the ability to distinguish between good and bad, poisonous and non-poisonous, etc, and the chaos there would be if this ability were withdrawn. For example, some of the plants and animals may be considered edible or not edible, poisonous or not poisonous and so on. Even in training institutions that offer taxonomic training out of the values obtained from it, the subject is usually ranked very low. Budgetary allocations for taxonomic collections (museums, herbaria, zoos, etc) are usually very low or zero. This results into the field attracting very few well trained scientists and a high level of brain drain. This in turn undermines building up of experience and expertise in taxonomy.

Taxonomic barriers such as those mentioned above i.e. lack of skills, expertise and facilities make the tasks of understanding and describing biodiversity difficult. Before appropriate taxonomic resources can be made available, it is necessary to understand the taxonomic barriers so that they can be removed. This can only be done by the involvement of the users of taxonomy. A survey of institutions where taxonomic knowledge is held can reveal the hierarchy of taxonomic barriers from which appropriate planning can be made. To do this a baseline survey and needs assessment can be carried out to establish the status of the taxonomic institutions (museums, arboreta, herbaria, zoos, botanic gardens, etc) and the gaps manifesting out of lack of critical requirements to conduct taxonomic tasks.

As a result of this recognition, BioNET-INTERNATIONAL (BioNET) – the global network for taxonomy, in partnership with the Eastern Africa loop, EAFRINET, with funding from SwedBio, has embarked on the mobilisation of vital taxonomic information that will help to underpin research and develop and disseminate selected relevant products and tools. UVIMA - *Uchambuzi wa Viumbe kwa Maendeleo Afrika Mashariki* or Taxonomy for Development in East Africa is a BIONET-EAFRINET project whose purpose is to mobilize vital taxonomic information to support human well-being and ecosystem health in Eastern Africa. The project aims to consolidate and mobilize existing

taxonomic information for generating tools and products relevant to the environmental, food and poverty crises in East Africa, focusing on three areas: pollinators, invasive alien species (IAS) and pests. The project has five objectives:

1. To develop taxonomic knowledge bases on biodiversity in accessible formats for selected invasive species, pests and pollinators of African relevance, using East Africa as a case study. Focus will be put on consolidating the existing data.
2. To generate user friendly tools and products that mobilize scientific information in appropriate formats and packages for end users.
3. To disseminate taxonomic knowledge, tools and products in appropriate formats to end users and provide training in their use for users including farmers, local communities and decision-makers.
4. To strengthen institutional capacity in East Africa to help provide a sustainable platform for delivering timely and locally optimised taxonomic tools and products.
5. To develop a mechanism for up-scaling the project and sharing experiences at a pan African level”.

2.1 TERMS OF REFERENCE

In order to establish the status of taxonomic resources and gaps in Uganda, BIONET- International, in cooperation with the East African “Locally Owned and Operated Partnership (LOOP)” conducted a baseline survey with the following terms of reference:

1. To prepare the tools/methodologies for the review and discuss them with Project Team.
2. To document institutions, projects, experts, initiatives, programmes and databases involved in curation, management and use of IAS/pests/pollinators at national level in Kenya, Uganda and Tanzania; indicating the current status of the collections, their digitisation and associated databases and to determine future prospects for growth and use.
3. To document the expertise available and make recommendations on capacity needs at national level.
4. To identify potential partners, collaborations and linkages regionally and internationally relevant to the UVIMA project working on IAS /pests/pollinators.
5. To identify the gaps in handling IAS /pests/pollinators issues and provide recommendations as to how the UVIMA project can contribute to bridging the gaps.
6. To document current institutional mandates and sources of funding available, additional opportunities and potential for new funding and strategic partnerships to enhance effective delivery of the broader goals and objectives of the UVIMA project.
7. To document and address any other pertinent issues not outlined above, in the broader context of and relevant to the UVIMA project concerning baseline review for IAS /pests/pollinators at national level.

2.2 KEY DELIVERABLES

The baseline survey was focused on community, extension, research, educational institutions and management agencies that are end users of taxonomic products and tools. This included government institutions, individuals, non-government organisations and initiatives that utilise taxonomic products and tools. Emphasis was placed on the following deliverables:

1. Existing resources (institutional and personal) documented: in each case defining (i) what the resource is, (ii) where it is developed, (iii) maintained and (iv) disseminated (or not), (v) why it was developed and (vi) target audiences and how-approach/method/design/platform).
 - a) Collections and databases;
 - b) Secondary e.g. keys, literature, publications and tertiary;
 - c) Communication resources;
 - d) Other resources
2. Status of infrastructure for developing the resources documented and
3. New opportunities where they exist documented i.e.
 - a) technologies,
 - b) expertise,
 - c) hardware,
 - d) software;
 - e) programmes,
 - f) projects and partnerships,
 - g) etc
4. Current status and future plans of the above 1, 2 and 3
5. Existing communication strategies and dissemination channels (networks, partnerships, collaborations etc) documented to map where and how UVIMA should fit in.
6. Specific challenges, constraints, key gaps and opportunities for UVIMA defined

3.0 METHODOLOGY

The baseline survey was structured to cover the following aspects of taxonomic resources in Uganda. These included:

- Existing taxonomic knowledge and its availability to users. This included a review of existing reports, specimen data in collections, literature review, documents of various government ministries, training and research institutions, projects, etc.
- An assessment of the available taxonomic infrastructure mainly focusing on institutions including their mandates and sources of funding e.g. museums, herbaria, botanical gardens, research space, curatorial offices, security of collections against pests and fire,

- databases, catalogues, arboreta, zoos, budgetary support, libraries, etc.
- Technical and management support e.g. the availability of curatorial staff, computing facilities, communication capabilities, research equipment, etc

The following methods were therefore used to collect information covering the aspects mentioned above:

3.1 Stakeholder analysis

A stakeholder analysis was done through formal meetings with UVIMA project partners in Uganda, informal inquiries, discussions and email contacts. This led to the identification of many of the institutions and individuals involved in taxonomic work in Uganda. These are listed at the end of this document including their contacts and what they are currently doing.

3.2 Literature review (internet searches, project reports, published works)

A literature search was very instrumental in stakeholder analysis and extent of taxonomic work in the country. Among the documents reviewed were project reports, government position papers, and internet websites for existing IAS/Pollinator/Pest initiatives in the country. The internet searches were mainly geared at establishing IAS/Pollinator/Pest collection facilities in Uganda; museums, herbaria, zoos, botanical gardens, seed banks etc.; libraries with referenced taxonomic literature especially in Research Institutes, Universities and other training institutions.

3.3 Questionnaires

Responses from some of the individuals and institutions that were identified during the stakeholder analysis were sought by use of a questionnaire. The questionnaire was very useful in generating information regarding the mandates of the institutions, the status of the taxonomic resources, the staff establishment, and additional contact to any staff or individuals who may be undertaking activities related to taxonomy. Other information collected included security of the collections, availability of databases, catalogues etc., budgetary support, communication infrastructure, extent of holdings, communication capabilities, laboratory facilities, categories of human resources, computing facilities, research equipment (microscopes, vehicles, cameras etc)

3.4 Semi-structured Interviews

Both formal and informal interviews were conducted on both the current and future taxonomic needs. The self-administered questionnaire was used to generate list of questions for semi-structured interviews. Information generated through this method included gaps in taxonomic capacity, staff requirements, status of collections, etc.

4.0 INSTITUTIONS, PROJECTS, EXPERTS, INITIATIVES, PROGRAMMES AND DATABASES INVOLVED IN CURATION, MANAGEMENT AND USE OF IAS/PESTS/POLLINATORS

The following institutions were identified through the stakeholder analysis: National Forestry Resources Research Institute (NaFORRI), National Chemotherapeutics Research Laboratories (NCRL), National Forestry Authority (NFA), Uganda Wildlife Authority (UWA), Forestry Sector Support Department (FSSD), Wetlands Management Department (WMD), National Environment Management Authority (NEMA), Mbarara University of Science and Technology (MUST), Ndejje University (NU), Uganda Martyrs University, Nkozi (UMU), Nyabyeya Forestry College (NFC), IAS-GEF Project of the National Agricultural Research Organisation (NARO), Faculty of Forestry and Nature Conservation, Makerere University, Faculty of Science, Makerere University, Faculty of Agriculture, Makerere University, Ministry of Agriculture, Animal Industry and Fisheries, NACCRI, Namulonge, National Agricultural Laboratories and Research Institute (NaARLI), Kawanda, National Semi Arid Research Institute (NaSARI), Serere, National Livestock Research Institute (NaLIRI), Tororo, National Agricultural Advisory Services (NAADS), Uganda National Farmers Federation (UNAFFE), Vector Control Division, Ministry of Health, Wandegaya, Kyambogo University, Kampala, Gulu University, Bukalasa Agricultural College, Arapai Agricultural College, IPM/CRSP Project

4.1 *Current status of the collections and prospects for future growth and use*

4.1.1 Mbarara University of Science and Technology (MUST), (Mbarara, S. W. Uganda)

The university operates a fully fledged field research institute, the Institute of Tropical Forest Conservation (ITFC) in Bwindi Impenetrable Forest, south western Uganda. ITFC is a small research institute and has a small herbarium with a collection of over one thousand vascular plant species from the region. It also has a small living collection in the "ethnobotanical garden".

ITFC is hoping to improve the taxonomic quality of the herbarium through collaborations with Missouri Botanic Gardens. Although the collection is not fully databased, a basic list of specimens held is being developed.

The institute has developed an interest in fish taxonomy and the impact of alien crayfish in the region. As a research institute, ITFC has also hosted students who have previously worked on bees and *Lantana camara* (an invasive alien species). There has also been quite a lot of effort placed on larger animals that raid crops (may be defined as 'pests').

4.1.2 Nyabyeya Forestry College (near Masindi, W. Uganda)

This is a government training institute under the Ministry of Education and Sports (MoES) that trains technical level forestry professionals at certificate and diploma levels. It was formerly a departmental training institution under the Forest Department but was later transferred to the MoES after the divestiture of FD. Following a cabinet decision, discussions are under way to return the college to its mother ministry. The college was vandalised in the 1980s and was only renovated in the late 1990s through NORAD funding.

The college has a herbarium that was a sub-unit of the Forest Department herbarium (ENT) that was located at Entebbe, later Nakawa and moved more recently to Makerere (MHU). The college herbarium houses about 150 specimens of mainly Bunyoro flora, with some student collections from other parts of the country. The bulk of the specimens in the herbarium are not mounted nor properly identified. Curation is extremely poor as the specimens have now gathered dust in a small room.

The college also has an arboretum that was set up in 1948 as part of the Forestry Department efforts at trials of introduced tree species in the country. During the 1970s, 80s and early 90s, the arboretum was not maintained. It was rehabilitated with NORAD funding during the late 1990s with the re-demarcation of 52 plots of 9 trees each. The arboretum is currently overgrown and some of the trees have been harvested due to poor supervision.

As part of the shift in the training paradigm at the college, new courses were introduced including biodiversity conservation and management. A few butterfly collections were therefore made in the early 2000s as part of the training programme. These have also wasted away due to poor curation.

Funding for taxonomic collections and work at the college has now reduced to almost zero. The prospects for growth and use of these collections are immense but there is no commitment from the mother ministry to fund the curation of the collections, even though they are central training elements at the college.

4.1.3 National Forestry Resources Research Institute (NaFORRI)

The National Forestry Resources Research Institute (NaFORRI) is located 12 km along Mukono – Kayunga road at Kifu. The institute is one of the public research institutes of the National Agricultural Research Organization (NARO). It is mandated to conduct research in all aspects of forestry and other related natural resources in Uganda.

Establishment of a herbarium is under way at the institute. One room has been identified and herbarium cabinets have been procured. The room is however not adequate for proper curation of specimens and funds are limited for botanical collection expeditions. There is also need to train herbarium assistants/technicians to help in the curation of the specimens once a collections programme commences.

The institute also has a small entomological collection (including a small collection of bees). Some of the collections were inherited from the Forest Department which was divested into the National Forestry Authority (NFA). While some of the entomological specimens are rather old, the curation is fair enough, although there is inadequate technical capacity as the technician is not professionally trained.

4.1.4 National Forestry Authority (NFA)

The NFA is the successor of the Forest Department which was divested from the parent ministry of natural resources in 2004. The NFA was created with a mandate of meeting Uganda's vision 2025 of "a sufficiently forested, ecologically stable, and economically prosperous Uganda." The mandate of the NFA is to manage Uganda's Central Forest Reserves on a sustainable basis and to supply high quality forestry-related products and services to government, local communities and the private sector. The core business of the NFA is therefore to encourage tree planting while managing the country's forest reserves for maximum economic benefits.

With the divestiture of the Forestry Department which was preceded by the transfer of the research section to NARO, the NFA took a long time to start on scientific research. A research coordinator was however recruited in 2008 and together with the activities of NaFORRI, the NFA is involved in managing Uganda's forest biodiversity, especially in central forest reserves where many permanent sample plots are located.

4.1.5 Uganda Wildlife Authority (UWA)

The Uganda Wildlife Authority was established in 1996 through a merger of the Uganda National Parks and the Game Department. UWA is mandated to manage Uganda's wildlife and wildlife protected areas in partnership with neighbouring communities and other stakeholders. UWA operates a monitoring and research programme for the provision of relevant, accurate and timely information for planning, decision-making and evaluation in conservation of bio diversity and sustainable management of wildlife resources.

Currently, UWA has limited research facilities at Mweya in Queen Elizabeth National Park, Rabongo Forest in Murchison Falls National Park and in Kidepo Valley National Park. In its research programme, UWA is interested in ecology (species, habitat, fire, hydrobiology and diseases), biodiversity (including inventories, vegetation dynamics and mapping), socioeconomics (local communities, human-wildlife interactions and cost-benefit sharing), and development (policy, tourism, use rights and trade).

UWA hosts the Makerere University Biological Field Station (MUBFS) in Kibale National Park and the Institute of Tropical Forest Conservation of Mbarara University of Science and Technology (ITFC) in Bwindi Impenetrable

National Park. Apart from these, UWA operates a management information system, library and a research database at its headquarters in Kampala. However, UWA does not have a specimen collection facility of its own and operates in conjunction with other organisations e.g. ITFC and MUBFS.

4.1.6 Forestry Sector Support Department (FSSD)

The FSSD is a department under the Ministry of Water and Environment of Uganda. It was created from the most recent reforms in the Public Service of Uganda from the Forestry Inspectorate Division which was under the Department of Environmental Affairs.

The FSSD is mandated to provide policy, legal and institutional framework guidance to the Ministry of Water and Environment but also to collect and manage information, conduct policy analysis and support local governments.

The department inherited a fragmented infrastructure out of previous reforms of the public service in Uganda. Although the Forest Department possessed a herbarium in Entebbe and later at its Nakawa headquarters, all the specimens were moved to Makerere University herbarium (MHU) for safer keeping in view of the various transitions during the reform process. The entomological collection (ENT) which was also maintained with the Research section of the Forest Department was moved to NARO together with all aspects of forestry research.

In the wake of the sector reforms, there was a reduction of staff thus leaving a small staff at the Forestry Inspectorate and later FSSD. There is little taxonomic capacity at the department and with a few staff, the department usually works in partnership with other institutions like NaFORRI to undertake taxonomic tasks.

4.1.7 Wetlands Management Department (WMD)

The WMD is a department under the Ministry of Water and Environment of Uganda. The department is charged with planning and policy guidance for the management of Uganda's 30,000 square kilometres of wetlands. Wetlands are a habitat to many animals and plants. The unique diversity of fauna and flora of Uganda's wetlands are important in the survival of the wetlands themselves.

The department however has no established taxonomic infrastructure on its own for the study and documentation of this unique diversity

4.1.8 National Chemotherapeutics Research Laboratories (NCRL)

Details to be inserted

4.1.9 National Environment Management Authority (NEMA)

Details to be inserted

4.1.10 Ndejje University

Details to be inserted

4.1.11 IAS-GEF Project (NARO)

Details to be inserted

4.1.12 Faculty of Forestry and Nature Conservation, Makerere University

Details to be inserted

4.1.13 Uganda Martyrs' University, Nkozi

Details to be inserted

4.1.14 Faculty of Science, Makerere University

Details to be inserted

4.1.15 Faculty of Agriculture, Makerere University

Details to be inserted

4.1.16 Ministry of Agriculture, Animal Industry and Fisheries

Details to be inserted

4.1.17 NACCRI, Namulonge

Details to be inserted

4.1.18 National Agricultural Laboratories and Research Institute (NaARLI), Kawanda

Details to be inserted

4.1.19 National Semi Arid Research Institute (NaSARI), Serere

Details to be inserted

4.1.20 National Livestock Research Institute (NaLIRI), Tororo

Details to be inserted

4.1.21 National Agricultural Advisory Services (NAADS)

Details to be inserted

4.1.22 Uganda National Farmers Federation (UNAFFE)

Details to be inserted

4.1.23 Vector Control Division, Ministry of Health, Wandegaya

Details to be inserted

4.1.24 Kyambogo University, Kampala

Details to be inserted

4.1.25 Gulu University

Details to be inserted

4.1.26 Bukalasa Agricultural College

Details to be inserted

4.1.27 Arapai Agricultural College

Details to be inserted

4.1.28 IPM/CRSP Project

Details to be inserted

5.0 Expertise available

There are few experts in the areas of IAS/pests/pollinators. In many cases, practicing taxonomists are usually not trained as taxonomists but as ecologists, entomologists, pathologists, etc. In addition, there are few young taxonomists poised to replace the older taxonomists available. There is therefore need training in taxonomy, particularly among young scientists (Masters, PhD, etc). A list of current experts or persons involved in curation of taxonomic collections is given as Appendix 3.

6.0 Potential partners, collaborations and linkages

Details to be inserted

7.0 Gaps in handling of IAS/pests/pollinators

The following gaps have been identified as impeding the management and use of IAS/pests/pollinators and as such require attention:

- Low capacity in taxonomy of IAS/pests/pollinators
- Very little or no active collection currently going on
- No proper curation of collections
- Where there are many collections, there are proper databases
- Lack of laboratories and equipments
- Shortage of taxonomists and therefore dependence on ecologists, entomologists, pathologists, etc
- Few young taxonomists being trained due to low appeal of the profession
- No up-to-date species lists available
- No electronic plant identification keys
- Poor coverage of even the local or Ugandan flora

8.0 Current institutional mandates and sources of funding

Details to be inserted

9.0 Existing Resources (Institutional and personal)

CATEGORY	What the resource is	Where it is developed	Where it is maintained	Where it is Disseminated (or not)	Why developed	Target audience	How –approach /method /design /platform
Collections and Databases	Plant collections	Faculty of Forestry & Nature Conservation	Makerere University	Not disseminated	Training and research	Students and research scientists	Digitized live plant specimens from Budongo forest
		UFS herbarium	Nyabyeya Forestry College, Masindi	Listed in index herbarorium	Training and research	Students and research scientists	Pressed plant specimens
		UFS Arboretum	Nyabyeya Forestry College, Masindi	Not disseminated	Training and research	Students and research scientists	Live plant specimens
		NaFORRI herbarium	National Forestry Resources Research Institute, Mukono, Kifu	Not disseminated	Training and research	Students and research scientists	Pressed plant specimens
		ITFC herbarium	Institute of Tropical Forest Conservation, Mbarara University of Science & Technology	Not disseminated	Training and research	Students and research scientists	Pressed plant specimens
		ITFC ethnobotanical garden	Institute of Tropical Forest Conservation, Mbarara	Not disseminated	Training and research	Students and research scientists	Live plant specimens

			University of Science & Technology				
		KAW herbarium	National Agricultural Research Laboratories, Kawanda	Listed in index herbarorium	Training and research	Students and research scientists	Pressed plant specimens
		MHU herbarium	Makerere University herbarium	Listed in index herbarorium	Training and research	Students and research scientists	Pressed plant specimens
		Makerere University Botanic Garden	Makerere University	Not disseminated	Training	Students	Live plant specimens
	Entomological collections	Entomology laboratories (insectories)	Makerere University, Faculty of Agriculture, Faculty of Forestry and Nature Conservation	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation), digitized live specimens
		Entomology laboratories and research sample repositories	National Forestry Resources Research Institute	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation)
			National Agricultural Research Laboratories, Kawanda	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation)

			National Livestock Research Institute	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation).
			National Semi Arid Research Institute, Serere	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation).
			National Crop Resources Research Institute (NaCRRRI), Namulonge	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation).
	Museums	Makerere University Museum	Makerere University, Faculty of Science	Not disseminated	Training and research	Students and research scientists	Preserved insects (dry and alcohol preservation), digitized and pictorial specimens
		National history museum	NACCRI, Namulonge	Not disseminated	Research and training	Scientists, Public, Students	Preserved or curated
	Invasive Species Knowledge bases	IAS-GEF project	Alien invasive Species Project, NARO, Entebbe	Disseminated	Public consumption, policy direction, national planning and development	Policy makers, administrators, students, research scientists, general public	TV and radio talk shows, brochures, newsletters, workshops & seminars
	Secondary e.g. keys, literature, publications and tertiary	Journals / publications	African Crop Science Journal office	Faculty of Agriculture, Makerere University	African Crop Science conference proceedings and	Training, Research, Extension	Scientists, and students

				Journal			
	Newsletters	NaFORRI newsletter	Nationa Forestry Resources Research Institute	Distribution list	Public information & communication channel	General public, students, scientists, policy makers	Issues of the institute newsletter available
	Posters / identification kits	IAS-GEF project	Invasive Alien Species project, NARO, Entebbe	Local exhibitions, seminars & workshops	Invasive alien species	General public, farmers, students, scientists, policy makers	Posters, flyers, brochures, newspaper articles
		IPM-CRSP Parthenium weed project	Faculty of Agriculture	Local exhibitions, seminars & workshops	Parthenium weed identification & management	General public, Farmers and researchers	Posters and parthenium ID kits available
Other resources	Project reports, government positions papers and policies	Government Ministries, Student research and case studies	University faculties and government ministries	Theses and project reports, project websites, government ministry websites	Public consumption, policy direction, national planning and development	Policy makers, administrators, students, research scientists, general public	Project reports, theses, policy briefs, position papers, white papers, etc

10.0 Status of infrastructure for developing the resources

CATEGORY	Institutions Responsible (List all institutions you have come across in your country, including addresses, telephones and contact person(s))	STATUS Rank from 0-10 where 0 = not available and 10 = in good/excellent condition	PROGRESS Description of work undertaken to improve the resource	ISSUES Description of problems encountered; Issues that need to be addressed; Decisions / Actions that can be taken
Collections and Databases	Nyabyeya Forestry College Private Bag, Masindi Tel: 0392301114, 0392301258 Contact person: Dr. Wilson Kasolo (Principal) Telephone - 0772496986	2	Rehabilitation of herbarium & arboretum in the 1990s. Some determinations & identifications done in the 1990s for unnamed specimens.	Herbarium specimens & arboretum accessions not properly curated. No funding for the collections No track of exact number of specimens or accessions due to lack of curation and absence of a database. There is no technical human capacity – no trained personnel. Need for financial and technical (training) assistance. Need to salvage the deteriorating herbarium specimens
	National Forestry Resources Research Institute(NaFORRI) P. O. Box 1752, Kampala Tel: 0712161161, 0752161161 Contact person: Dr. David Hafashimana Telephone - 0782964358	3	Establishment of a herbarium is under way. The entomological collection is fairly curated with a small number of specimens	Room for the herbarium is inadequate. A separate building would be desirable. The insect collection is not very well curated and there are no technicians to manage it. Despite the availability of highly trained plant taxonomists, the herbarium requires technicians. There is need for extensive collection expeditions to build up the herbarium specimen holding
	Ndejje University P. O. Box 7088, Kampala Tel: 0392730321	0	This is a new university only established in 1992. A faculty of forestry has recently been introduced.	The university still relies on sister institutions for training of students in basic taxonomic work. An independent course of taxonomy is not available yet. There are no

	Contact person: Mr. Paddy Kityo Telephone 0772423555			taxonomists employed at the university. There is need to establish taxonomic training resources for the benefit of the students training, especially, in biological sciences.
	Nkozi University	0	This is a new university. There exists a faculty of agriculture.	Apart from Medicine and Agriculture, the university does not have courses in other biological sciences. Students of agriculture use resources in other sister institutions in the country.
	Gulu University	0	This is a new university. There exists a faculty of agriculture and Environment	The University offers a programme in Bachelor of Agriculture, in the Faculty of Agriculture and Environment as it builds its capacity
	Makerere University	3	There exists a Faculty of Agriculture but taxonomic facilities are lacking though taxonomy of pests and weeds are taught to students in lectures and field practical	Some crop pests and weeds are preserved but due to lack of proper curation facilities some of these specimens don't store for long periods of time. Also there are no trained taxonomists thus most taxonomy is taught by entomologists and weed scientists
	NACCRI, Namulonge	1	This is a research centre under national research organization, NARO	Mandated to do research on annual and perennial crops but have no trained insect or plant taxonomist. Most insect identification work done by Agricultural research centre, South Africa or the Natural History museum in the UK.
	National Forestry Authority (NFA)	0	The Forestry authority is the successor body of the Forestry Department. Herbarium and entomological specimen holdings that were held by the Forestry Department were moved to Makerere University herbarium and the National Forestry	There is inadequate knowledge in taxonomy although, apart from UWA, the NFA is one of the largest holders of biodiversity in Uganda. There is therefore need for training in taxonomy and technicians to help in documenting biodiversity in the NFA.

			Resources Research Institute respectively. NFA has recently recruited a full time Research Coordinator.	
	Uganda Wildlife Authority (UWA)	6	UWA has a fully fledged research division that coordinates and regulates research activities in the national park system of Uganda.	UWA research division does not have a programme of retaining some of the collections that are made from the protected areas. This would be good for the provision of a good duplicate copy repository and holding system
	National Chemotherapeutics Research Laboratory P. O. Box 4864, Kampala Tel: 414250488 Contact person(s): Dr. Grace Nambatya Telephone Ms. Sophia K. Apio Telephone 0772493081			
Secondary e.g. keys, literature, publications and tertiary				
Communication resources				
Other resources				

11.0 Documentation of new opportunities where they exist

CATEGORY	Name	Institution	STATUS	Detail	
	List all new opportunities you have come across in your country)	List the all institutions in your country where this new opportunity is	Rank from 0-10 where 0 = not available and 10 = in good/excellent condition	Details of the institutions including addresses, telephones and contact person(s)	
Technologies/Expertise	Integrated pest management programs	Faculty of Agriculture	8	Prof. S. Kyamanywa (Entomologist) Dr. H. Talwana (Nematologist) Dr. J. Karungi (Entomologist) Dr. Jenipher Bisikwa (Weed Scientist)	
		Faculty of Forestry and nature Conservation	8	Dr. G. Eilu (Forest Ecologist) Dr. P. Nyeko (Forest Entomologist)	
		NACCRI – Namulonge	8	Dr. M. Otim (Entomologist)	
		National Forestry Resources Research Institute (NaFORRI)	8	Mr. P. Kiwuso (Entomologist) Dr. J. S. O. Epila (Entomologist)	
		Gulu University	3	Dr. S. Kabi (Entomologist) Prof. Balidawa (Entomologist)	
	Botany/Plant Taxonomy/Ecology	National Forestry Resources Research Insitute (NaFORRI)		8	Dr. D. L. Hafasimana (Plant taxonomists/ecologist) Mr. Samson Gwali (Plant taxonomist/ecologist) Mr. Paul Okullo (Ecologist)
			National Chemotherapeutics Research Laboratories (NCRL)	8	Ms. S. K. Apio (Botanist)
		Institute of Tropical Forest Conservation (ITFC), Mbarara University of Science and Technology	8	Dr. D. Sheil (Forest ecologist) Mr. R. Bitariho (Forest Ecologist) Dr. D. Byarugaba (Forest Ecologist)	

12.0 Current status and future plans of 2, 3 and 4 above

CATEGORY	Current status	Gaps	Future plans
Collections and Databases	Few collections and databases	<p>There are no preserved collections of invasive alien species but only in pictorial forms. Thus there is need for facilities to preserve invasive plants and pests.</p> <p>No research has been done on pollinators though some studies have commenced on honey bees in Department of Animal Science, Faculty of Agriculture.</p>	More collections of invasive alien species and pests. Solicit for funding to manage and improve collections, acquire and manage databases
Secondary e.g. keys, literature, publications and tertiary	There are few species identification keys and some publications are available especially especially on pest management options.	Lack of trained taxonomists to document and process species lists and ID identification keys	More detailed studies for generation of publicly accessible/electronic identification keys Solicit for funding to train curators and taxonomists
Expertise	There are no trained plant and insect taxonomists. Most of the experts are entomologists and weed scientists dealing mainly	There is need for trained taxonomists to help in species identification and preservation	Training of young professionals in the taxonomy of IAS/pollinators/pests

with agricultural related
research.

13.0 Existing communication strategies and dissemination channels

CATEGORY	Name List all strategies and channels you have come across in your country)	Institution List the all institutions in your country where these are located	CONTACTS Give contact details of the Institution and focal person
Networks	Publications, media, oral communication, Newsletters, Newspapers	African Crop Science Journal African Crop science Conference Proceedings. These are based at Faculty of Agriculture, Makerere University Newspapers: Monitor ,New visions	Dr. J.S. Tenywa (Chief Editor of African Crop Science Journal)

14.0 Defining specific challenges, constraints, key gaps and opportunities for UVIMA

#	Issue/Category	Specific challenges	Constraints	Key gaps	Opportunities	Proposed Solution
	Invasive Alien species	Difficulty to distinguish invasive and non invasive species by the public	Lack of sufficient information on invasive species in Uganda	Documentation of invasive species		Building capacity in management of invasive species through production of booklets, brochures, leaflets,
	Pests	No trained taxonomists to identify and preserve pests				

15.0 Checklist of persons in the country with knowledge in Taxonomy including (Pollinators, Pests and IAS)

Please provide updated list of Taxonomists in your field (list the UVIMA members and specialists first): Prepare this in an Excel file

Name	Title	Courier Address	Phone-Desk	Phone-Mobile	Email1
David Hafashimana	Dr	P. O. Box 1752, Kampala	0712161161	0782964358	Davidhaf2000@yahoo.com
Samson Gwali	Mr	P. O. Box 1752, Kampala	0712161161	0772410665	gwalis@yahoo.co.uk
Robert Kajobe	Dr	NARO/NALIRRI, PO Box 96, Tororo			
Dominic Byarugaba	Ass. Prof.	Department of Biology, Mbarara University of Science and Technology, PO Box 1410, Mbarara, Uganda		0772405148	dbbyarugaba@yahoo.com
Grace Nambatya Kyeyune	Dr	The National Chemotherapeutics Research Laboratory (NCRL) P.O. Box 4864, Kampala , Uganda	0414235932 0414250488		NCRL@uga.healthnet.org
Samuel Kyamanywa	Prof.	Faculty of Agriculture, Makerere University, P.O. Box 7062, Kampala	0414531641	0772220000	kyamanywa@agric.mak.ac.ug
Jenina Karungi	Dr.	Faculty of Agriculture, Makerere University, P.O. Box 7062, Kampala	0414531641	0712804179	
Herbert Talwana	Dr	Faculty of Agriculture, Makerere University, P.O. Box 7062, Kampala	0414531641	0772521685	
Jenipher Bisikwa	Dr.	Faculty of Agriculture, Makerere University, P.O. Box 7062, Kampala	0414531641	0782682334	jbisikwa@agric.mak.ac.ug
Gerald Eilu	Dr	Faculty of Forestry and Nature Conservation, Makerere University, P.O. Box 7062, Kampala		0772642640	eilu@forest.mak.ac.ug
Phillip Nyeko	Prof	Faculty of Forestry and Nature		0772591450	nyeko@forest.mak.ac.ug

		Conservation, Makerere University, P.O. Box 7062, Kampala			
Joseph Onekot	Dr	Faculty of Science, Makerere University, P.O. Box 7062, Kampala		0757893287	

16.0 Related projects

Project Name	Implementing institution	Source of funding	Status (beginning, mid-term, ending)	Focal person	Contact details
BIOTA	Makerere University			Dr. Joseph Onekot	0757893287

17.0 Inventory of Outputs/Services (fill in as appropriately as you can)

a) Consultancy meetings

No	Meeting Type	Title	Venue	Dates	Convened by	Organized by	# of Participants	Report issued as doc no	Language	Dated
1.										
2.										
3.										

b) Electronic & Printed Materials

No	Type	Title	Author(s)/Editor(s)	Publisher	Symbol	Publication Date	Where to get it and / or contact person
1.							
2.							
3.							

Questionnaire

The UVIMA Project *Uchambuzi wa Viumbe kwa Maendeleo* Taxonomy for Development in East Africa

Baseline Review Questionnaire

UVIMA - *Uchambuzi wa Viumbe kwa Maendeleo Afrika Mashariki* or Taxonomy for Development in East Africa is a project that is mobilizing vital taxonomic information to support human well-being and ecosystem health in Eastern Africa. The project aims to consolidate and mobilize existing taxonomic information for generating tools and products relevant to the environmental, food and poverty crises in East Africa, focusing on three areas: pollinators, invasive alien species and pests. The purpose of this questionnaire is to document institutions, initiatives, experts, projects, networks and gaps in the management of pollinators, invasive alien species and pests in Uganda.

1. Institutional details

Name of Institution:

Address:

Telephone contacts:

Institutional mandate:

Sources of funding:

2. Taxonomic expertise (*List experts in IAS/Pollinators/Pests in your institution*)

Name	Area of expertise (IAS/Pollinators/Pests)	Qualification (Cert., Dip/BSc/MSc/PhD)	Phone Contacts

3. Resources for management and use of IAS/pests/pollinators (*indicate the number of accessions/collections/specimens held in the resource*).

Resource (<i>museum,</i>	Present status (<i>new, old,</i>	Dissemination (<i>www, networks,</i>	Target audience
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<i>herbarium, arboretum, aquarium, etc)</i>	<i>renovated, recently expanded, etc)</i>	<i>membership, society or club, etc)</i>	<i>(public, students, researchers, etc)</i>

4. Are your collections digitised? Yes No
5. What specialised software was used to digitise the collections? (*name*)
6. What are the specific challenges, constraints, gaps and opportunities faced by your institution in the management and use of IAS/pollinators/pests?
 - a. Challenges:
 - b. Constraints:
 - c. Gaps:
 - d. Opportunities:
7. Mention and briefly describe the existing and/or previous project, partnerships or networks your institution has/had for the management of IAS/pollinators/pests.
 - a. Projects:
 - b. Partnerships:
 - c. Networks:
8. What are your future plans for the curation, management and use of IAS/pollinators/pests?
9. Are there any other pertinent issues regarding IAS/pollinators/pests not covered above that your institution would like to share with other similar partners?

Experts

David L. N. Hafashimana (NaFORRI)

Peter Kiwuso (NaFORRI)

Samson Gwali (NaFORRI)

James Epila (NaFORRI)

Dominic Byarugaba (MUST)

Douglas Sheil (ITFC)

Robert Bitariho (ITFC)

Margaret Nyafwono (NFC)

Gift Okojia (NFC)

Robert Kityo (NU)

Sophie Apio Kerwegi (NCRL)

Gad Gumisiriza (NARO)