SFG1862

EASTERN AND SOUTHERN AFRICA HIGHER EDUCATION CENTERS OF EXCELLENCE PROJECT (ACE II) (P151847)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS (ESMPs)

February 22, 2016

The ESMPs from the following project institutions were disclosed on their respective institutional websites or bulletin boards available to the public by February 22, 2016.

Country	ACE
ETHIOPIA	Center for Innovative Drug Development and Therapeutic Trials for Africa (CDT – Africa) - AAU
	ACE for Water Management – AAU
	ACE for Climate Smart Agriculture and Biodiversity Conservation (Climate SABC) – Haramaya University
	African Railway Education and Research Institute (ARERI) - AAU
KENYA	Sustainable Use of Insects as Food and Feed – Jaramogi Odinga Oginga University of S&T
	Sustainable Agriculture and Agribusiness Management – Egerton University
	Phytochemicals Textiles and Renewable Energy – Moi University
MALAWI	Aquaculture and Fisheries Science (AquaFish) Center of Excellence – Lilongwe University (LUANAR)
	Center for Public Health and Herbal Medicine – Malawi College of Medicine
MOZAMBIQUE	Center of Studies in Oil and Gas Engineering and Technology (CS-OGET) – Universidade Eduardo Mondale
RWANDA	ACE for Data Sciences (ACE – DS) – University of Rwanda College of Business and Economics
	ACE in Innovative Teaching and Learning Mathematics and Science (ACEITLMS) – University of Rwanda College of Education
	ACE in Energy for Sustainable Development (ACEESD) – University of Rwanda College of S&T
	ACE in Internet of Things (ACEIoT) – University of Rwanda College of S&T
TANZANIA	Collaborating Centre for Research, Evidence Agricultural Advancement, Teaching Excellence and Sustainability – Nelson Mandela African Inst. Of S&T
	Center of Excellence in Water Infrastructure and Sustainable Energy (WISE) – Nelson Mandela African Inst. Of S&T
	ACE for Innovative Rodent Pest Management and Biosensor Technology Development (IRPM&BTD) – Sokoine University
	Southern Africa Center for Infectious Disease Surveillance (SACIDS) – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa - Sokoine University
UGANDA	Establishment of an East African Centre for Crop Improvement – Makerere University
	ACE for Materials, Product Development and Nano-Technology – Makerere University
	ACE for Agro-Ecology and Livelihood Systems (ACALISE) – Uganda Martyr's University
	Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC) – Mbarara University of S&T
ZAMBIA	ACE for Sustainable Mining – Cooper Belt University
	Center of Excellence for Infectious Diseases of Humans – University of Zambia

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Center for Innovative for Drug Development and Therapeutic Trials for Africa (CDT-Africa)

Environment and Social Management Plan

[INSTRUCTION]

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The EMP template format has two parts:

- Part I: constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.
- Part II: includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

PART I: Activity Description

1. **Project Development Objectives**

Poor access to safe and effective health interventions has been identified as a formidable development challenge in Africa. The African Union, the East African Community and Ethiopia have recently developed Pharmaceutical Manufacturing Plans to address this challenge and improve access to safe and effective medicines as well a technologies through local production and international partnerships. The proposed Centre for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa) seeks to support the implementation of these plans. The main objective of CDT-Africa is to support equitable access to interventions (medications, diagnostics and other interventions) and bring about sustainable development in Africa through high quality capacity development for innovative drug discovery in a regional platform.

2. **Project Description**

The core task of CDT-Africa will be to increase human and infrastructure capacity through high quality trainings, research and by strengthening the management of education and research. Training and research programs will support therapeutic discovery through the following activities: (1) establishment of a database of scientifically tested natural products, which will serve as resource for translational research and accelerate pharmaceutical innovation in Eastern and Southern Africa; (2) Conduct drug discovery studies using database; (3) Repurpose currently available interventions, formulation and reformulation; (4) Bioequivalence and pharmacogenetic studies of medicines to ensure safety and effectiveness; (5) Implementation of pharmaco-economic evaluations; (6) Build foundational skills and assets to innovative point-of-care diagnostics; (7) Support skill development for industrial manufacturing in the region; (8) Establish sustainable impact through medicinal plants conservation, public and policy engagement and sustainable financing. The total amount of fund being sought from the World Bank is $5,939,750 although the actual value of the project is much higher. The highest cost will be for direct capacity building through training for drug discovery ($1,707,500). Related cost for visiting professors ($300,000). Equipment upgrading and reagents ($1,578,850); upgrading of clinical trial facilities ($500,000); actual conduct of clinical trials through a clinical trials network and clinical trial staff ($960,000); costs related to governance, which include annual conferences of the CDT-Africa Consortium, Scientific Advisory Board Meetings, Public Advisory Board Meetings, communications, and financial management ($893,000).

3. **Project Location**

The center will be led by the College of Health Sciences (CHS) of Addis Ababa University (AAU). AAU is one of the leading institutions of higher education in Africa. It runs 70 undergraduate and 293 postgraduate programs, with a quarter of these programs housed at the CHS. The CHS has a large concentration of scientists with well-equipped laboratories and excellent collaborations with leading regional and international institutions. The center partners with five national universities (Bahir Dar, Debre Tabor, Mekelle, Gondar and Jimma Universities), four regional universities [(Makerere University (Uganda), Imbarara University (Uganda), University of Zambia (Zambia) and Muhimbili University of Health Sciences (Tanzania)]. The center also partners with national research institutions, local and international drug manufacturing industries and leading international universities academic institutions.

4. **Anticipated Environmental Footprint**

The overall environmental impact of implementing CDT-Africa will be either minimal or positive. Potential negative impacts, albeit minimal, may originate from biological specimens and waste (microbial, human and animal specimens) that need to be collected, stored and disposed; the left over investigational products to be used for clinical trials that might need to

be disposed; procedures for drug production, such as use of organic solvents and reagents; the limited facility refurbishment; travels within the country and internationally. However, CDT-Africa will bring to bear local best practices, and international standards not only to minimize the impact of the center activities but also to influence the work of the host and partner institutions. CDT-Africa will also be involved in identification and conservation of plant species with potential use for health, which will have a positive environmental impact. Will also explore the applicability of tissue culture and micro-propagation techniques, which have the potential to reduce depletion of plant species, particularly those endangered species [See discussion point in the public consultation document].

5. **Policy, Legal and Administrative Framework**
   The main responsibility of the management of environmental impact and risk is under the Federal Government of Ethiopia led by the Ethiopian Environmental Protection Authority [Proclamation No. 295/2002] (EPA; www.epa.gov.et/). The Ethiopian Food. Medicines, and Health Care Administration directives on medicinal waste disposals will be followed (http://www.fmhaca.gov.et/documents/Medicines_Waste_Management_Disposal_Directive_Final_prin.pdf; http://www.mfa.gov.et/docs/ENVIRONMENT%20POLICY%20OF%20ETHIOPIA.pdf). The CHS has hazardous waste disposal team and the waste management procedures of this team will also be followed. Projects that involve animals and humans will be vetted by the Review Board of the CHS (WHO-approved), and the National Research Ethics Committee as required. All clinical trials will be conducted in accordance with International Conference on Harmonization Good Clinical Practice (ICH-GCP) Guidelines.
6. **Relevant World Bank Policies**
   The project is anticipated to have minimal environmental impact. Thus, according to the World Bank guidance (OP 4.01), CDT-Africa will fall under Environmental Assessment *Category B.* The environmental impact of CDT-Africa will be limited and reversible. Appropriate mitigatory measures are proposed below to "prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance".
7. **Implementation Arrangements**
   Institutions or departments or individuals seeking funds from the CDT-Africa will be required to submit a full project proposal to the CDT-Africa Management for consideration and funding. Each submission will be accompanied by an Environmental Impact Assessment (EIA), Environmental Management Plan and the approval of the ethics committee.
8. **Environmental screening, assessment and management**
   CDT-Africa will collaborate with the Waste Disposal Team of the College of Health Sciences of Addis Ababa University and follow the standard procedures of the team. We will also establish an Environment Management Team for CDT-Africa, which would support environmental monitoring and management through periodic assessment and reporting to the Center Leader.

9. Potential environmental impacts

The environmental impacts of CDT-Africa are not expected to be significant but the Bank will have opportunity to review the EIAs and the proposed mitigation measures to ensure that the measures are in compliance with the World Bank operational Policies. Please see Part II for details.

10. Environmental management approach

As stipulated by the EPA, the environmental management approach of CDT-Africa will consider physical, biological as well as socio-economic, political and cultural impacts. Public consultation will be an integral part of EIA and ensure that EIA procedures make provision for both an independent review and public comment. The EIA will explicate mitigation plans for environmental management problems. The project will be "pro-poor" and "pro-innovation" by supporting patent protection.

11. Monitoring and reporting

CDT-Africa will establish a Environment Management Team (EMT) consisting of 7-9 independent experts in the field. The team will be led by Dr. Yimtubezinash Woldeamanuel (email: yimtuwa@gmail.com), head of the Institutional Review Board of the College of Health Sciences, Addis Ababa University, and a medical microbiologist. The team will report to the CDT-Africa center leader to make sure that the impact report gets immediate attention of the center. New approved sub projects from CDT-Africa will be required to have its own monitoring and reporting requirements. These projects will also be vetted by the EMT. The EMP reports will be compiled by the CDT-Africa management and forwarded to the Bank on a regular basis.

Part II : EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**Ethiopia –** Center for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa)	Yes [ ] No [√]	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible

				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		Yes [√] No [ ]	2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste [NO radioactive waste in CDT-Africa]	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational ▪ Protective hood and gear for people who may be exposed

		Yes [√] No [ ] [This is for building rehabilitation]	3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 4. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
		Yes [√] No [ ]	5. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible

			construction • Construction waste	Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. [THIS LAST POINT IS NOT APPLICABLE OR VALID FOR CDT-AFRICA]
		Yes [√] No [ ]		Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		Yes [√] No [ ]	6. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes [√] No [ ]	7. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

			9. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and (e) If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes [√] No [ ]	10. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

					13. Water Quality 14. (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities 15. (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment 16. (c) Monitoring of new wastewater systems (before/after) will be carried out

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CDT-AFRICA

COLLEGE OF HEALTH SCIENCES, ADDIS ABABA UNIVERSITY
PUBLIC CONSULTATION ATTENDEES AND DISCUSSION POINTS

Date-January 11, 2016

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Center for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa)	11 January 2016	Professor Asrat Hailu, Microbiologist, CDT-Africa Research Lead	What is the level of risk to the environment posed by CDT-Africa?	The overall risk was considered minimal and agreed upon by all the participants. But important risks requiring management plan were identified and considered as detailed in the separate EMP document. Each of the EMP plans were also discussed in detail by the participants.
		Professor Eyasu Makonnen, Pharmacologist, CDT-Africa Deputy Center Lead	What aspects of the management plan are considered to have positive impact on the environment? This issue was raised in response to the reference in EMP to potential positive impact of CDT-Africa on the environment.	(a) The plan to support conservation of plants at the Gullelie Botanical Gardens and in new botanical gardens (e.g., Debre Tabor University plans to have one) would be pro-environment (b) More important will be the plan to use the methods that are being employed at the Department of Biology of the Addis Ababa University. These methods include culture and micro propagation. This can be also very useful for endangered plant species and reduce risk of depletion. Current practices of medicinal plant use relies on collection of plants from

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				the wild and has the potential to be environmentally hazardous. (c) Integrate herbalists into the work of CDT-Africa and support cultivation
		Dr Teferi Gedif, President, Ethiopian Pharmaceutical Association	Regarding Policy, legal and admin framework: The broader regulation comes from the Ethiopian Environmental Protection Authority where some guidelines are provided; then from EFMHACA and finally from the waste management team in the College of Health Sciences, Tikur Anbessa hospital. Stringent ethics procedures for clinical trials are in place. Ethics frameworks for animal test procedures are also in the National Ethics Committee frame work. It was proposed and accepted that animal tests should only be used when absolutely necessary and no alternatives exist.	
		Mr. Abdulkadir Wolyei, Federal Ministry of Health Food, Medicines and Health Care Administration [National drug regulatory authority]	The Dean of the School of Medicine (Dr. Abebe) explained to the consultation group that the waste management team (called the Environment Health and Sanitation) was a strong team composed of sanitary sciences graduates and three support staffs (led by a Doctor). Although the capacity of the incinerator has so far been limited to handling 100 kg waste per hour, currently two brand new incinerators are arriving, with a capacity of 400 kg/hour. Moreover, the hospital must get accredited and certified by EFMHACA annually regarding the activity of this team. The team will be part of the EMP from the beginning. The consultation group suggested, suggestion was accepted that the waste management system has to be exemplary and of a “benchmarkable” standard.	
		Professor Tsige Gebremariam, Ethiopian Academy of Sciences, Board Member	The Dean also explained that the Laboratory is Accredited by the WHO at the level of grade 4, the only public laboratory in Ethiopia with this level of accreditation. ISO accreditation will be requested after 3 months. Further study of the need of partner institutions (regional and Ethiopian institutions) should be done for further environmental management planning.	

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		Dr. Getnet Yimer, Director of Research and Technology Transfer, College of Health Sciences, Addis Ababa University	Is incineration the only method of waste disposal?	No, incineration is only one of the methods of waste disposal. Standard disposal methods will be followed for liquid waste, such as liquid clinical waste and reagents. The hospital's liquid waste, toxic contaminant, chemical and blood are collected and linked to the city disposal system. There is a central waste disposal system at Akaki (just outside Addis Ababa). It is an existing toxic fluids and chemical disposal system which has a treatment point. This will also support the work of CDT-Africa. Further needs assessment of partner institutions will be required.
		Mr. Birhanu Belay, Head, Gulellie Botanical Gardens	Regarding additional implementation arrangements, CDT-Africa will have multiple sister projects. Individual institutions and departments will submit proposal for funding. They will be required to do an environmental assessment and management plan; and submit approval by the ethics committee which may come before or after the project approval	
		Dr. Ephrem Engidawork, Dean, School of Pharmacy, College of Health Sciences, Addis Ababa University	Would CDT-Africa need a separate EMP committee?	It was agreed that a separate, semi-independent EMP committee should be formed. The committee should do regular monitoring and reporting [see below]

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		Dr. Mirutse Giday, Director, Aklilu Lemma Institute of Pathobiology, Addis Ababa University	It was agreed that the team to be formed would be called CDT-Africa Environmental Management Team. It will be composed of key regulators and experts: EIABC Environmental Management expert (Ms. Haddis); representatives from the following institutions: Ethiopian Environmental Protection Authority; FMHACA; Institute of Biodiversity; Department of Biology; Dr. Wossen, head of the Environmental and Sanitary Team of the College; Environment sector of the Science Faculty (Dr. Seyoum); Environment and Forestry Research Institute (Dr Agena); Dr. Yimtubezinash W/Amanuel, head of the IRB of the College will lead the team. This team will monitor, for example, use and disposal of organic solvents, formulating check points to evaluate and monitor laboratory against recognized standards with documented monitoring. Monitoring may be quarterly or biannually. The team will also review new project proposals from environmental impact perspective. The team will report to the center leader so that the issue gets the full attention of the center.	
		Dr. Anteneh Belete, Training Lead, CDT-Africa	What are the social and the socio-economic impacts?	(a) Considering the support CDT-Africa can give to traditional healers and promotion of local knowledge through registry and patenting, the project can support local economy. Further mechanism of benefiting traditional providers, such as herbalists is through Access benefit sharing (ABS), i.e., herbalists and communities that have disclosed information must share benefit from the outcome of the study. This makes CDT-Africa pro-growth and

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Date-January 11, 2016

				pro-poor. (b) Currently most of the drugs within the region are imported. Therefore, the project has also the potential to offer more political independence.
		Ms. Haddis Rebbi, Environmental Planning and Management, Ethiopian Institute of Architecture and Building Construction, Addis Ababa University	Any other positive impact?	(a) The Gullelie Botanical Gardens (a partner center) cultivates endangered medicinal plants. The CDT-Africa project will be linked with this activity. The plants are gardened based on their category and evolutional relationship which can be enriched by giving emphasis to plants that are very important to this country. (b) Standard guidelines will be developed and posted on CDT-Africa website and these would serve as resource for other institutions. (c) The center can serve as a benchmark for other laboratories, institutions and centers. Thus the center can have additional positive impacts.
		Professor Makonnen Assefa, Deputizing the President, Debre Tabor University, Ethiopia	How could environmental impact related to international travel be mitigated?	CDT-Africa can learn from the Ethiopian Airlines. The airlines plants a tree for each passenger. CDT-Africa should explore the

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				feasibility of this (planting a tree for each international travel for the purposes of a CDT-Africa activity. Restricting travel, both within country and internationally to bare essentials.
		Dr. Helen Yifter, Ethiopian Medical Association, Executive Board Member		
		Dr. Asfaw Debella, Ethiopian Public Health Institute [Traditional medicine unit]		
		Mr. Yohannes Sitotaw, Secretary of the National Research Ethics Board, Ethiopian Science and Technology Ministry		
		Mr. Chemada Diriba, Managing Director, College of Health Sciences, Addis Ababa University		
		Dr. Abebe Bekele, Dean, School of Medicine, College of Health Sciences, Addis Ababa University		
		Prof. Martin Prince, King's College London (Head of Health Services and Population Research Department)		
		Dr. Abebaw Fekadu, CDT-Africa, Center Lead		

Africa Center of Excellence for Water Management (ACEWM)

Environment and Social Management Plan

Addis Ababa University

January 15, 2016

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1 AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

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PART I: Activity Description

A. PDO

The Project Development Objectives (PDO) for the proposed ACE II is to strengthen selected Eastern and Southern African higher education institutions to deliver quality post-graduate education and build collaborative research capacity in the regional priority areas.

Project Beneficiaries

1. **The IDA credit beneficiaries are:**

(a) Students in participating universities and their partner institutions across Eastern and Southern Africa who will benefit from high quality education and training in high growth sectors;
(b) Employers and targeted industries who will have easy access to high quality/skilled personnel, results of applied research, and scientific knowledge for productivity improvement; as well as knowledge partners (including companies, governmental or non-governmental organizations) who will use research produced by the ACEs;
(c) Faculty and staff in the ACEs who will benefit from improved teaching and research conditions and professional development opportunities;

(d) Regional institutions such as EAC and SADC will benefit from improved capacity of the ACEs; and
(e) Faculty and students in STEM and other priority-sector disciplinary areas who will benefit from fellowships/scholarships, exchange visits, and other knowledge-sharing activities across the ACEs organized by the ACE II Regional Facilitation Unit.

PDO Level Results Indicators

2. The following indicators will be used to measure progress towards achieving the above PDO:

(a) Number of non-national/regional students enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(b) Number of students (national and regional) enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(c) Number of nationally or regionally accredited or benchmarked education programs offered by the ACEs; and
(d) Number of collaborative research initiatives being launched by the ACEs.

3. With the view of achieving the above described vision and objective, the proposed ACE II operation will implement three sets of initiatives: (i) strengthening 22 higher education institutions into regional ACEs[1] in Eastern and Southern Africa in a set of defined regional priority areas (US$122 million); (ii) providing capacity building support to these ACEs through institution and regional activities (US$13 million); and (iii) supporting coordination and management of the implementation of components (i) and (ii) (US$5 million). Below provides a description of these proposed activities to be financed under ACE II, including the key features of design and implementation.

Component 1: Strengthening Africa Centers of Excellence (ACEs) in Regional Priority Areas (US$ 122 million)

4. Under this component, the IDA Credit will finance the strengthening of selected 22 ACEs hosted within higher education institutions into regional ACEs selected through a competitive process in five clusters of regional priorities – Industry, Agriculture, Health, Education and Applied Statistics. Each of these specialized regional centers will receive about US$ 6 million grant for implementing its proposal in a specific regional priority area. However, regardless their specifications, all these ACEs are expected to perform the following tasks:

(a) *Building institutional capacity to provide quality post-graduate education with relevance to the labor market*, including, *inter alia,* updating curricula of existing programs or creating new education programs to meet the development challenge; meeting benchmarks for quality education (e.g. national/regional accreditation); attracting a regional student body; training of faculty to introduce new approaches to teaching and learning; enhancing work-place learning; encouraging entrepreneurship among students; upgrading faculty

[1] The final number of ACEs to be supported by the ACE II project will depend upon evaluation results and availability of IDA funding at both national and regional levels.

qualifications; and improving learning resources, including lab equipment, and minor rehabilitation or extension of existing facilities.

(b) *Building institutional capacity to conduct high quality applied research, relevant to addressing a key development challenge/priority*, including, *inter alia,* faculty development and staff training, fellowships and post-doctoral studies, networking activities with national and international partners, hosting and participating in conferences, research equipment and materials and laboratory refurbishment/rehabilitation, research dissemination, knowledge and technology transfer, and patenting or other intellectual property rights related activities.

(c) *Developing and enhancing partnerships with other academic institutions (national, regional and international) to pursue academic excellence*, to raise the capacity of network partners, and to raise the ACE's capacity, including inter alia, joint delivery of education programs, faculty exchanges/visiting faculty, joint research and conferences, sharing of specialized equipment and library resources.

(d) *Developing and enhancing partnerships with industry and the private sector to generate greater impact*, to enhance the impact of the ACE on development and increase relevance of said centers on education and research, including, *inter alia,* industry advisory boards, industry lectures, training of trainers for sector training institutions (such as polytechnics, nursing, teacher or agricultural colleges), joint research, training and other activities to communicate, interact and reach out to civil society, private sector and grassroots communities.

(e) *Improving governance and management of the institution and setting up a role model for other higher education institutions*, to improve monitoring and evaluation, including monitoring of labor market outcomes of graduates, administration, fiduciary management (including financial management (FM), procurement, oversight and capacity), transparency, ability to generate resources, and project implementation.

(f) *Delivering outreach, and creating an impact, to society by delivering excellent teaching and producing high quality applied research.* Individual ACEs are selected because of the strength of their proposals and their relevance to providing solutions to regional development challenges. By fulfilling their mandate, the ACEs can impact positive change in society and become model hubs of teaching, research and innovation to other institutions in the region.

With the investment of the project, these ACEs are also expected to produce measurable results. Table 1 below outlines what can be expected from these ACEs in training and research in the regional priority cluster areas. [***Please note that this table will be filled once the ACEs are selected and their implementation plans are done, expecting in February of 2016***.]

Table 1: Expected Results in Training and Research from ACEs by Regional Priority Area

Priority Cluster	Post-Graduate Training		Initiated Collaborative Research
	# of Masters	# of PhD	
STEM			
Agriculture			
Health			
Education			
Applied Statistics			
Total	*XXXX*	*XXX*	*(Not Applicable)*

5. Unlike many existing centers of excellence in the ESA region which focus primarily on academic research, the selected ACEs under the ACE II project must produce real impact on addressing a specific challenge in one of the priority areas in the region. These priority areas have been defined by the project's Regional Steering Committee (RSC) after broad consultations in the region. These priorities fall into five clusters – Industry, Agriculture, Health, Education and Applied Statistics. Table 2 below provides information on the areas covered within these priorities. All ACE proposals need to address development challenges in one of the priority areas in order to be considered. To encourage flexibility, innovation and cross-cutting solutions, an 'unspecified' category was created to allow preparation of proposals in areas not explicitly listed. This priority list provides guidance for proposal development, but it does not necessarily mean that an ACE would be selected and established for each of these priority areas on the list under this project.

Table 2: Regional Priority Areas for ACEs

Cluster	Priority Area
STEM	• Energy (wind/hydro-power, geothermal & solar-energy, energy generation transmission, etc.) • Value addition / Extractives (oil & gas sector, mining) • Urban design and construction/Infrastructure, transportation and logistics • Disaster/risk analysis and management, hydrology and water purification • ICT (soft/hardware, applications, services, teaching/learning) • Product design, manufacturing, • Railway engineering • Marine and ocean engineering *Unspecified (room for innovation)*
Agriculture	• Agribusiness (crop &livestock sciences, agricultural engineering, agro/food processing &packaging; value chain) • Climate and environmental smart agriculture • Agricultural land management • Water resource management, hydrology and irrigation • Marine and ocean sciences *Unspecified (room for innovation)*
Health	• Pharm-bio technology (drug discovery, science-driven traditional medicine&development) • Bio-medical engineering (implant development, hospital infrastructure, tissue-engineering) • Bio-physics and bio-chemistry (diagnostic tools) • Molecular biology (infectious diseases, vaccine development) • Emergency medicine and trauma (with a focus on traffic injuries &deaths) and nutrition *Unspecified (room for innovation)*
Education	• Quality of Education (innovations in STEM teaching/learning/curriculum development, assessment &management tools, e-learning & education tools, creative design thinking)
Applied Statistics	• Applied Statistics (big data, bioinformatics, data mining, reliability modeling, research design, evidence-based policy analysis)

6. The ACEs financed under the ACE II project are being selected through an open, objective, transparent, and merit-based competitive process. The Call for Proposals was issued on July 31, 2015 and a total of 109 proposals were submitted by the nine participating countries, out of which 92 were

deemed eligible[2] by IUCEA. The eligible proposals which covered eight countries[3] were evaluated using a set of clearly defined criteria[4] by an Independent Evaluation Committee (IEC) consisting of over 60 African and international subject-matter experts. The technical evaluation where each proposal was evaluated by three experts produced a shortlist of 40 proposals which then moved into the second phase of the evaluation – onsite leadership evaluation. During the onsite evaluation, members of the IEC visited each of the 40 proposed ACEs and submitted their results to IUCEA. Reviewing the compiled scores from the technical and onsite evaluations, and considering geographical distribution and balance among priority areas, the RSC recommended the conditional selection of 23 ACEs. [***These conditionally selected ACEs are undergoing FM, procurement and safeguards review, and will be confirmed by the WB Board***]. The 23 conditionally selected ACEs were selected to ensure balance across countries, priority areas and importance of the proposal to the region's development.

7. Of the 109 proposals submitted through the initial call for proposals, there were no proposals in the area of oil & gas due to the current limited capacity for producing much-needed skilled personnel and technology transfer in this area across the region. Given the importance of the oil & gas industry to the economic growth of the ESA region in coming years, oil & gas is listed as one of the regional development priority areas. In order to support the growth of the oil & gas industry for the region, with the spirit of ACE II for real development impact and the guidance of the RSC, the project ran a special targeted call for proposals among the participating countries where there is an emerging oil & gas sector – Ethiopia, Kenya, Mozambique, Tanzania and Uganda. Each of these five countries has submitted one proposal to compete for an ACE in oil & gas for the ESA region. Submitted proposals will go through the same evaluation process as the other ACE proposals did, but with slightly modified criteria to reflect the needs and reality of the oil & gas field in the region at present.[5]

8. The selected ACEs will have the autonomy to implement their own proposals, with the support from their host universities and governments as well as the RFU. For assuring the achievement of targeted results, the ACE II project will employ a performance-based financing mechanism to disburse funding from their respective Ministry of Finance (MoF) to each selected ACE against a set of agreed Disbursement Linked Indicators. To ensure regional collaboration for greater impact, the project will provide a mix of funding requirements and incentives to promote regional mobility of students and faculty, and partnerships with regional and international institutions as well as with the private sector. Each ACE will sign a performance and funding contract with its government (i.e., the Ministry of Education) which will be further developed during appraisal. The contract includes the following criteria:

- At least 15 percent of the funding must be invested in partnerships and at least 10 percent must be invested in partnerships outside the ACE hosting country.[6]
- A partnership agreement between the ACE and its respective partners needs to specify the work plan, budget and outcome arrangements.
- Civil works if needed, should not exceed 25 percent of the total grant.
- The Government's existing commitments for continued funding of the institutional staff need to be part of the funding and performance agreement.

[2] Only those proposals submitted by the governments of the participating countries, with existing PhD programs, and in the defined regional priority areas are eligible for consideration. The eligibility screen was done by the Inter-University Council for East Africa (IUCEA) which is the designated RFU for the ACE II project.

[3] All the proposals submitted from MZ were deemed ineligible because they came from institutions that did not offer PhD programs, which is an eligible requirement.

[4] These criteria, together with proposal eligibility and evaluation process, are captured in the "Protocol for Proposal Assessment" that was approved by the RSC as a guideline for the Independent Evaluation Committee.

[5] For example, the requirement of having a running PhD program is removed and more emphasis is given to partnership with the private sector, etc.

[6] ACEs are required to spend 10 percent of the partnership funding in partnership with institutions outside the ACE hosting country.

Component 2: Capacity Building Support to ACEs through Institution and Regional Interventions (US$ 13 million).

9. Under this component, the IDA Credit will finance activities at the institution and regional level to enhance capacity support to the selected ACEs to enable them to achieve their project development objectives. Experience of ACEs in Western and Central Africa suggests that the establishment of ACEs alone is not sufficient to achieve the intended outcome and impact of the project. Weak capacity in areas such as data collection, creating a conducive environment for collaboration, regional student mobility and long term financial sustainability needs to be addressed with additional support through collective mechanisms at the institution and regional level. This component is therefore designed to provide additional support to the selected ACEs to strengthen their capacity so that they can implement their proposals and achieve their objectives as planned, becoming sustainable hubs in their specialized areas and leading efforts to address development priorities for the region. All activities will be implemented by an international TA firm that will be overseen by the RFU.

10. **Sub-Component 2.1: Support to ACEs through Institution Level Activities (US$ 5 million).** Under this sub-component, activities that are targeted towards strengthening the ACE institution level activities including capacity building and university-industry partnerships will be funded. These activities will be financed based on demonstrated need. Interested ACEs will submit proposals which will be evaluated by the RSC on a semi-annual basis. With the RSC's approval, IUCEA will finance tailored capacity building programs to be delivered to those ACEs. ACEs can request support in the following areas:

(i) Capacity building of the ACE institutions on implementation of their proposal: While the selected ACEs boast of technical skills in their areas of expertise, management and operational skills to implement their technical proposals efficiently and effectively is not available. There is evidence from ACE I implementation that many selected ACEs faced start-up delays due to weaknesses in their capacity to prioritize; develop detailed sequenced plans; ensure adequate budget; assess and mitigate risks and challenges, including those related to incentives of key stakeholders and implementing partners. This sub-component will provide (on demand basis) funds to ACE institutions to build capacity to better implement their programs. Funding requests using templates that highlight critical skills gaps and proposed training and capacity building packages will be reviewed by IUCEA bi-annually and funded on a rolling basis. Such training and capacity building could include joint problem solving workshops to address critical challenges faced by the institution in implementing their programs. Detailed reports of the impact of previous training and capacity building along with concrete proposals are needed prior to funding any additional programs from the same institution.

(ii) Partnership Development: Experience from ACEs in Western and Central Africa shows the uneasiness for academic institutions to forge partnerships to receive mentoring support as well as to collaborate on innovative solutions for development challenges. Partnerships, with academic institutions/industry need to be structured such that the ACEs can benefit from these partnerships. The project also recognizes that a critical aspect of developing partnerships is a function of opportunities to meet and share knowledge. Thus, the project will provide opportunities in the form of ACE collaboration forums where ACEs can share good practices from mentorship programs and/or identify research areas of interest to industry and collaborate on research ideas.

11. **Sub-Component 2.2: Support to ACEs through Regional Level Activities (US$ 8 million).** A number of activities will be undertaken at the regional level to support effective relationship-

building and methodology adoption/development for quality improvement of ACEs to enhance their excellence.

(i) Benchmarking: The project will provide funds to interested ACE host institutions to participate in institutional benchmarking in the region, where institutions can compare themselves to similar institutions across the region and with themselves over time, and learn good practices for their own institutional improvement. The project will provide technical assistance to the institutions enrolled in benchmarking to develop comparable data and indicators, data collection protocols, standard reports for all the ACEs and a data platform, and provide training where relevant. There is also potential for the institutions to be part of the Partnership in Applied Sciences, Engineering and Technology (PASET) initiative between SSA and emerging nations. PASET initiated a pilot program that benchmarked seven African institutions by collecting and analyzing a dataset of indicators at the national and institutional level.[7] This exercise enabled the involved institutions to identify major gaps in their data systems. Through this sub-component, ACEs could partner with PASET and through regular benchmarking exercises use benchmarking diagnostic tools to identify areas for improvement and design specific interventions to enable them to reach their potential.

(ii) Fellowships/Scholarships: To raise the regional and global profile of ACEs, the ACE II project will create an ACE Scholars Program– a type of scholarship program to alleviate the financial constraints that are often a barrier to student mobility across countries in the region. It will be merit-based and awarded to two regional fellows per ACE for a period of two years. The project will potentially have DAAD administer this scholarship program. The project also proposes a MacArthur Fellow or Rhodes Scholar – type fellowship program to identify and cultivate future leaders in science and technology for the region. In addition, the project will collaborate with other development partners/ governments and other programs such as PASET's Regional Scholarship and Innovation Fund (RSIF)[8] to expand the pool of scholarships to encourage students to study in an institution outside their native country in Eastern and Southern Africa. In order to sustain the benefits, the project will coordinate with PASET, and other regional initiatives to expand the pool of scholarships to encourage students to study in an institution outside their native country in ESA.

Component 3: Facilitation, Coordination and Administration of the Project implementation (US$ 5 million)

12. This component will be financed in the form of a Regional IDA grant to the RFU. The sheer number of countries and institutions participating in ACE II has added complexity to the project implementation. The RFU is established to help address this issue and ensure the project success. As the RFU for ACE II, IUCEA[9] will coordinate all aspects of ACE II project preparation and implementation, with guidance from the RSC and technical assistance from the World Bank. As part of facilitating regional collaboration and networking, IUCEA will organize a series of knowledge sharing events for all the selected ACEs and their partners. To facilitate learning and knowledge exchange, IUCEA will organize one annual meeting of the ACEs, where experts will be available to assess program quality and offer advice. IUCEA will sponsor two PASET regional forums through which ACEs can form linkages with technical/vocational programs. Finally, to foster university-industry partnerships, IUCEA will host an annual forum with business leaders and industry experts

[7] The seven universities that participated were Gaston Berger University- Saint-Louis (Senegal), the Federal University of Agriculture – Abeokuta (Nigeria), the International Institute of Water and Environmental Engineering (Burkina-Faso), the University of Abomey-Calavi (Benin), Makerere University (Uganda), the University of Dar-Es-Salaam (Tanzania) and the University of Ghana.

[8] The flagship program of PASET is the Regional Scholarship and Innovation Fund (RSIF) which will contribute to training 10,000 PhDs in applied sciences, engineering and technology and building capacity in selected SSA universities for research and innovation. Funding will be raised through government and businesses, which have already made commitments. The ACE project can potentially help to operationalize the RSIF and raise funding from philanthropic foundations, business leaders and governments.

[9] IUCEA, an institution of the inter-governmental East African Community (EAC), is headquartered in Kampala, Uganda and headed by the Executive Secretary. Their mandate is to foster collaboration in higher education within the East African Community.

in priority areas. Given its limited capacity, IUCEA will recruit and oversee an international firm to help implement most activities listed under Component 2. To fulfill their responsibility as the RFU, IUCEA is in the process of hiring new staff members such as a project coordinator and a financial specialist to oversee ACE II.[10] IUCEA has received an IDA grant of US$1 million as part of the Project Preparation Advance (PPA).

2 Institutional and Implementation Arrangements

1. **Each selected institution will implement its own Africa Centers of Excellence proposal**. Further, administrative capacity, most often from the institutions' central administration will assist with the fiduciary tasks. An ACE team is established, led by a Center leader who is a recognized educator/researcher within the primary discipline of the ACE and supported by faculty from the relevant engaged departments. The university will be responsible for the implementation of the environment management plan under the supervision of the national review committee and the World Bank team. In countries where a related project implementation unit with experience of World Bank safeguard guidelines exists, this unit will provide guidance to the implementing university.

2. **Each government will constitute a National Review Committee through the ministry or agency responsible for higher education**. It is tasked with a semi-annual review of performance and implementation support; including approvals of withdrawal applications and implementation planning (but with no day-to-day implementation or approvals).This committee will include members from Ministry of Finance, as well as relevant line ministries based on the focus area of the ACEs (e. g agriculture, health, oil and gas etc.).

3. The regional ACE Steering Committee will provide overall guidance and oversight for the project.

3 Environment and Social Management Plan for ACEWM Project

3.1 The Ethiopian Policy, Legislation and Guidelines

3.1.1 The Constitution of Ethiopia

The Constitution of the Federal Democratic Republic of Ethiopia contains a number of articles relevant to environmental matters in connection with development projects.
Article 43 gives the rights of people to improve their living standards and to sustainable development.

3.1.2 Environmental Policy of Ethiopia (EPE)

The Environmental Policy of Ethiopia (EPE) is an important policy instrument that demonstrates the Government's commitment on the environment and addresses issues related to development projects.

[10] In addition, during the course of the project, IUCEA will hire either as staff or consultants, whenever there are gaps in personnel. Adequate support and capacity building will be provided to IUCEA by the Bank to enable efficient and effective implementation of its responsibilities. IUCEA has already received training in procurement and FM from Bank staff based in Uganda.

The Environmental Policy of the Federal Democratic Republic of Ethiopia (EPE) was approved by the Council of Ministers in April 1997 (EPA/MEDAC 1997). It is based on the Conservation Strategies of Ethiopia (CSE) that was developed through a consultation process over the period 1989-1995.

The policy has the broad aim of rectifying previous policy failures and deficiencies, which in the past have led to serious environmental degradation. It is fully integrated and compatible with the overall long-term economic development strategy of the country, known as Agricultural Development Led Industrialization (ADLI), and other key national policies like the National Population Policy and the National Policy on Women.

EPE's overall policy goals may be summarized in terms of the improvement and enhancement of the health and quality of life of all Ethiopians and the promotion of sustainable social and economic development through the adoption of sound environmental management principle.

Specific policy objectives and key guiding principles are set out clearly in the EPE and expand on various aspects of the overall goal. The policy contains sectoral and cross sectoral policies and also has provisions required for the appropriate implementation of the policy itself.

3.1.3 Sectoral Policies on Environment

Conservation Strategy of Ethiopia (CSE)
Since the early 1990s, the Federal Government has undertaken a number of initiatives to develop regional, national and sectoral strategies for environmental conservation and protection. Paramount amongst these was CSE, approved by the Council of Ministers, which provides a strategic framework for integrating environmental planning into new and existing policies, programs and projects. The CSE provides a comprehensive and rational approach to environmental management in a very broad sense, covering national and regional strategies, sectoral and cross-sectoral strategies, action plans and programs, as well as providing the basis for development of appropriate institutional and legal frame works for implementation.

Water Policy of Ethiopia
The overall goal of Water Resources Policy is to enhance and promote all national efforts towards the efficient, equitable and optimum utilization of the available Water Resources of Ethiopia for significant socioeconomic development on sustainable basis that incorporate environmental conservation and protection requirements and environmental impact assessment and protection requirements.

3.1.4 Environmental Legislations

Environmental Impact Assessment Proclamation (No. 299/2002)
This proclamation (No. 299/2002) aims primarily at making environmental impact assessment (EIA) as mandatory for categories of projects specified under a directive issued by the authority whether the projects belong to public or private bodies. The authority issued several directives subjecting categories of projects to environmental impact assessment. The proclamation describes a policy, strategy, program, laws or an international agreement as public instrument and directs the authority to issue guidelines distinctively classifying certain categories of public instrument as likely to entail significant environmental impact. The proclamation requires, among others:

- Specifies categories of projects to be subjected to EIA and receive an authorization from the authority or the relevant regional environmental agencies prior to commencing implementation of the project.
- Licensing agencies to ensure that the requisite authorization has been duly received prior to issuing an investment permit, a trade or operation license or a work permit to a business organization.
- The authority or the relevant regional environmental agencies may exempt environmental impact assessment of projects with insignificant environmental impacts.
- A licensing agency may suspend or cancel a license that has already been issued where the authority or the relevant environmental agency suspends or cancels environmental authorization.

The duties of the proponent described in the proclamation are:

- Must carry out a timely environmental impact assessment, identifying the likely adverse impacts, incorporate the means of prevention and submit the environmental impact study report accompanied by the necessary documents to the authority or the relevant regional environmental agency.
- Must submit an environmental impact study report to the authority or the relevant regional environmental agency for review.

Proclamation on Institutional Arrangement for Environmental Protection

The proclamation for the establishment of Environmental Protection Organs, No. 295/2002, was issued to establish a system that fosters coordinated but differentiated responsibilities among Environmental Protection Agencies at Federal and Regional levels. The proclamation recognizes assigning responsibilities to separate organizations for environmental development and management activities on the one hand and environmental protection, regulations and monitoring on the other. It is instrumental for the sustainable use of environmental resources, thereby avoiding possible conflicts of interests and duplication of efforts.

Proclamation on Environmental Pollution Control

The proclamation on Environmental Pollutions Control No. 300/2002 is mainly based on the right of each citizen to live in a healthy environment, as well as the obligation to protect the environment of the country. The primary objective of the proclamation is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the valuation of these standards a punishable act. The proclamation states that the "polluter pays" principle will be applied to all persons. Under this proclamation, FEPA is given the authority to ensure implementation and enforcement of environmental standards and related requirement to inspectors assigned by FEPA or Regional Environmental Agencies.

Proclamation on Solid Waste Management

The proclamation on Solid Waste Management No. 513/2007 is intended to create a sustainable path to limit the adverse effects of waste and maximize all potential benefits. The primary objective of the proclamation is to enhance at all levels capacities to prevent the possible adverse impacts while creating economically and socially beneficial assets out of solid waste. It also sets clear guidelines on the interregional transportation of waste as well as the disposal of toxic materials and recyclable goods. Urban administrations are required to create enabling conditions to promote investment on the provision of solid waste management services. Under the proclamation, all waste disposal facilities need to follow relevant environmental and local regulations as well as secure all required permits before implementation. FEPA is empowered to issue directives for the proper implementation of the proclamation and regulations.

Proclamation on Radiation Protection (Proclamation No. 79/1993)
The proclamation on Radiation protection was issued by the Council of Ministers in 1993. According to this proclamation, the importation, exportation, manufacture, possession, sale, use, storage, transportation or disposal of radioactive materials or devices emitting ionizing radiation shall only be based on licenses issued by the Authority.

This Proclamation seeks to reduce risks of damage to health, property and the environment due to use of radiation and radioisotopes, through proper and effective protection schemes. For this purpose, the Proclamation establishes Ethiopian Radiation Protection Authority, which shall regulate radiation sources and related practices.

The Authority shall be managed by the Ethiopian Radiation Protection Board and shall have radiation protection officers to ensure compliance with the provisions of this Proclamation. The Authority shall, among other things, formulate radiation protection policies and legislation and issue licenses under this Proclamation to mine, manufacture, construct, assemble, acquire, transit, import, stored, etc. a radioactive material. All such activities shall be notified to the Authority.

The Proclamation furthermore, among other things, defines duties and responsibilities of licensees and other concerned parties and grants regulation-making powers for the implementation of provisions of this Proclamation to the Council of Ministers.

3.1.5 Environmental Impact Assessment Guideline of Ethiopia

The Federal Environmental Protection Authority has issued a procedural guideline which defines specific examinations to which a proposed project needs to be subjected in the process of environmental impact assessment. The procedural guideline requires a proponent to submit an Initial Environmental Examination Report to enable the relevant environmental agency to decide the application of a further level of assessment depending on the outcome of a screening or scoping report. At this level of examination the decision may be either of the following: No EA required, preliminary assessment is applied to or full scale ESIA applies where the project is found to be one that may have significant impacts.

According to the Guideline for Environmental Impact Assessment of FEPA 2003, projects requiring EIA have been categorized in schedule 1 and schedule 2. Projects which do not pose any significant impact and do not require EIA are likely to be categorized in schedule3.

Projects which may have adverse and significant environmental impacts, and may, therefore, require full EIA are listed in the guideline document. Concerning industry, chemical where production capacity of each product or of combined products is greater than 50 tons/day and industries utilizing hazardous materials (large scale) are considered to be schedule 1. In addition, waste disposal installations for the chemical treatment or land fill of toxic, hazardous and dangerous wastes, installation for the disposal of industrial waste are also considered schedule1.

Schedule 3. Projects are those which would have no impact and does not require environmental impact assessment. Specific category under schedule which is relevant to the ACEWM project is Category A. (Social infrastructure and services). These are educational facilities (small scale), Audio

visual production, Teaching facilities and equipment, Training, Medical centre (small scale), Medical supplies and equipment, Nutrition, Family planning

3.2 The World Bank Operational Policy on Environmental Assessment

Safeguard Policies: OP4.01, Environmental Assessment (EA)
Summary of Provisions:
States that all projects proposed for World Bank Group funding require EA review/analysis to ensure that they are environmentally and socially sustainable. An EA evaluates a project's potential environmental impacts; examines project alternatives; identifies ways of preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts.

EA considers the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, cultural property); as well as, trans-boundary and global environmental aspects. Projects are categorized based on environmental significance. Category 'A' projects require a full EIA undertaken by independent EA experts. Project sponsors for Category A projects must prepare a Public Consultation and Disclosure Plan (PCDP).

A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

3.3 International Environmental Agreements Ratified By Ethiopia

Among several international environmental agreements ratified by the Ethiopian Parliament the following are more relevant to the proposed ACEWM project.

- The Basel Convention (1989): Ratified in 2000
    - ❖ Control of Trans-boundary Movements of Hazardous Waste and their Disposal "Environmentally Sound Management" (ESM), of waste to protect human health and the environment
- The Bamako Convention (1991)
- The Rotterdam Convention (1998): Ratified in 2003
- The Stockholm Convention (2001: Ratified in 2003
    - ❖ To restrict and eventually prohibit the production, use, emissions and import and export of highly toxic substances known as persistent organic pollutants (POPs)

The above agreements will also be considered concerning the management of chemicasl and hazardous waste.

3.4 Nature of the Africa Center of Excellence for Water Management Project

This ACEWM project is a low-risk minimal civil works involving rehabilitation of class rooms and laboratories. The major focus of our ACE is on softer items like faculty capacity development, curriculum development, enhancement of learning resources etc.. These, we envisage will have very minimal environmental impacts that will not require new approval or licenses. The Centre will share the use of existing laboratories in the Addis Ababa University. The laboratories will lay down procedures for handling chemicals and removal and disposal of toxic and / or hazardous wastes.

3.5 Preparation of Environment and Social Management Plan

As part of the implementation plan preparation, we prepared Environmental Management Plan using a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format is a "pragmatic good practice" approach to be user friendly and compatible with safeguard requirements.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

3.6 Potential Environmental Impact

In general, the project will focus on quality enhancements of the Centers of Excellence, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources, **while construction will be capped at maximum 25 percent of the funding**, and the rational for proposed new construction will be scrutinized to ensure such construction is critical for excellence. **Environmental impacts are expected to be low to moderate**

Potential negative impacts pertain to the pre-construction, construction and post-construction phases. Potential negative environmental impacts relate to the following:

- Noise
- Dust
- Solid generation
- Liquid waste generation from water closet toilets
- Health and safety issues
- Used chemicals from the laboratory

3.7 Environmental and Social Screening

Table 3: Environmental and Social Screening

Will the project activity include/involve any of the following potential issues and/or impacts:	Activity and potential issues and/or impacts	**Status**	Additional references
	1. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ] No	
	2. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[] Yes [X] No	
	3. Individual wastewater treatment system • Effluent and / or discharges into receiving waters	[ ] Yes [X] No	
	4. Historic building(s) and districts • Risk of damage to known/unknown historical or archaeological sites	[ ] Yes [X] No	
	5. Acquisition of land • Encroachment on private property • Relocation of project affected persons • Involuntary resettlement • Impacts on livelihood incomes	[ ] Yes [X] No	
	6. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	[X] Yes [ ] No	
	7. Impacts on forests and/or protected areas • Encroachment on designated forests, buffer and /or protected areas	[ ] Yes [X] No	

3.8 Good Practices Mitigation Measures Checklist

Table 4: Good Practice Mitigation Measures Checklist

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
A. **General Conditions**	Notification and Worker Safety	• All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents, activities and environment. • Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) • Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
	Green approach	• Minimization of waste generation, particularly paper waste • Establish mechanism to purchase environmentally certified items during procurement • The ACEWM will use recycled paper where ever applicable • The ACEWM will provide refresher technical training on environmental management systems
B. **General Rehabilitation and /or Construction Activities**	Air Quality	• During interior demolition use debris-chutes above the first floor • Keep demolition debris in controlled area and spray with water mist to reduce debris dust • Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site • Keep surrounding environment (side walks, roads) free of debris to minimize dust • There will be no open burning of construction / waste material at the site • There will be no excessive idling of construction vehicles at sites
	Noise	• Construction noise will be limited to restricted times agreed to in the permit • During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Waste management	• Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. • Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. • Construction waste will be collected and disposed properly by authorized location • The records of waste disposal will be maintained as proof for proper management as designed. • Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

C. **Toxic Materials**	Asbestos management	• If asbestos is located on the project site, mark clearly as hazardous material • When possible the asbestos will be appropriately contained and sealed to minimize exposure • The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust • Asbestos will be handled and disposed by skilled & experienced professionals • If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately • The removed asbestos will not be reused
	Toxic chemicals/ hazardous waste management	**Waste Minimization** • Decreases the amount of hazardous waste generated • Reduces the inherent toxicity of the waste. **Waste handling and disposal** • Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information • The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching • The wastes are transported and disposed by authorized body • Paints with toxic ingredients or solvents or lead-based paints will not be used
D. **Traffic and Pedestrian Safety**	Direct or indirect hazards to public traffic and pedestrians by construction activities	• In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to ○ Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards ○ Provision of safe passages and crossings for pedestrians where construction traffic interferes. ○ Adjustment of working hours to local traffic patterns,

3.9 Monitoring Plan

Phase	Parameter to be monitored	Frequency of monitoring	Cost of Monitoring	Responsibility
During activity preparation	Traffic management, availability of waste disposal facilities, hazardous waste inventory (asbestos , paints / solvents),	Monthly	marginal, within budget, (prepare special account for analyses)	Contractor, Engineer
During activity implementation and supervision	Dust Generation, noise emissions, waste and wastewater types, quality and volumes, surface drainage,	Monthly	marginal, within budget	Contractor, Engineer
	Laboratory chemicals and hazardous waste management	Monthly	marginal within budget	Heads of the respective Departments/ Centers/Institutes housing analytical laboratories

3.10 Implementation Arrangements

The ACEWM will manage project activities and prepare annual work plans based on the implementation plan ACEWM will also coordinate and provide assistance to partner institutions implementing project components.

As the project site is located within the Addis Ababa City Administration, the Addis Ababa Environmental Protection Authority will be responsible for the overall implementation of the Project and to monitor the Project activities. The key monitoring tasks are to:

- Oversee the implementation of this environmental management plan to ensure that any environmental and social impact is mitigated,
- Follow appropriate laid down protocols for disposing off use chemicals from laboratories,

The responsibility for monitoring of implementation of EMPs will be assigned for the Addis Ababa Environmental Protection Authority (AAEPA).

Institution	EMP monitoring arrangements (name, title, contact information)

Addis Ababa Environmental Protection Authority	Mr. Tsegaye Gebremariam, General Manager of Addis Ababa City Administration Environmental Protection Authority

Annex I Public Consultation Form

Ethiopia- Africa Center of Excellence for Water Management (ACEWM)

14th of January, 2016

No.	Stakeholders present	Institution	Issues raised	Response to the issues
1	Mr. Tewodros Abate	Debreberhan University		
2	Dr. Teshome Sormessa	Chair, Center for Environment, AAU		
3	Dr. Dessie Nadew	A/Head, School of Earth Sciences, AAU		
4	Prof. Brook Lemma	Coordinator, Grant Management Office, AAU		
5	Dr. Seifu Kebede	School of Earth Sciences, AAU	Land acquisition should be checked as yes under the environmental and social screening table	Acquisition of new land is not considered under this project
6	Mr. Abiti Getaneh	Director, Ministry of Water, Irrigation and Electricity	National and international requirements should be considered in chemical and hazardous waste handling and disposal	Agreed
7	Mr. Getaneh Gebre	Manager, GG Consult	Suggested to assign Addis Ababa Environmental Protection Authority to monitor the implementation of EMP	Agreed
8	Dr. Zebene Kifle	Addis Ababa Institute of Technology	Good practice mitigation measures should be clearly specified for all identified potential impacts including the chemical management	

9	Dr. Tetemke Mehari	President, The Chemical Society of Ethiopia	• The issue of handling chemical in the lab and disposal should be given due consideration • Precautionary measure should be taken concerning chemical management	• Laboratories will be responsible to sort chemicals in to different containers based on the nature of chemicals and their hazard category • Procurement of chemicals will be carried out with due consideration of minimization of anticipated environmental impacts
10	Mr. Dessie Tibebe	Gonder University		
11	Mr. Brook Tesfamicahel	Addis Ababa Institute of Technology		
12	Mr. Zerihun Abate	Chair, Env. Eng. Program, Addis Ababa Institute of Technology	Odors should also be considered	Agreed
13	Mrs Meseret Desalegn	Ethiopian Institute of Water Resources		
14	Mr. Getachew Alem	G/Manager, Getachew Alem and Associates	The issues of water to monitor, how to monitor and when to monitor should be clearly indicated in the EMP monitoring part	Agreed
15	Dr. Geremew Sahilu	Director, Ethiopian Institute of Water Resources	• Management of waste chemicals from laboratory should be given proper emphasis • The article on environmental aspect of the Ethiopian Constitution should also be included	Agreed
16	Dr. Solomon Gebreyohannes	Ethiopian Institute of Water Resources	• Inclusion of green thinking and approach in to the overall activities of the Center • Provision of technical training to lab technicians and students	Agreed

17	Prof. Tenalem Ayenew	School of Earth Sciences, AAU	Safety and health issues related to the international students should be considered	This will be properly handled by the International Students/Faculty Affairs Unit of the ACEWM. Detailed duties and responsibilities will be developed during the implementation plan.
17	Dr. Feleke Zewge	Head of Conditionally Accepted ACEWM, AAU		
18	Dr. Ahmed Mustefa	Head, Department of Chemistry, AAU		
19	Ms Adanech Adera	AAU		

Annex II List of Participants

Africa Center of Excellence for Water Management (ACEWM)

Stakeholder Consultation Meeting on Environmental Safeguards and Environmental Management Plan

Participant List

No.	Name	Institution	Telephone	Email	Sign
1	TEWODROS ABATE	Debre Birhan University	0912213468	ttabate@gmail.com	
2	Teshome Soromessa	CES, AAU	0911-210275	soromessa@yahoo.com	
3	Dessie Nedaw	SES	0913 390863	dessienedaw@yah	
4	Brook Lemma	AAU	0910 880822	brook.lemma@aau.edu.et	
5	Seifu Kebede	A.J.U	0911421168	Seifukebede@yahoo	
6	Abiti Getaneh	MOWIE	0911670313	abitigetaneh@yah	
7	Getaneh Gebre	GG Consult	0930033257	emabamgs@gmail	
8	Tobene Kefie	AAU, AAIT	0912167618		
9	Tetemke Mehari	AAU Chem	0911608074	tetemkemehari@gmail.com	
10	Dessie Tibebe	AAU Chem	0918703110	dessie.1977@gmail	
11	Brook Tesfamichael	AAIT SCBE	0911557932	brookutd@gmail.com	
12	Zerihun Abate		0934211237	abateZerihun@gs	
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16	Solomon Glyohannis	EIWR	0922822702	solomon358.sg@gmail.com	
17	Feleke Tewodj	AAU	0911236985	fbeshah@yahoo.com	
18	AHMED MUSTEFA	»	0911680792	ahmed.mustefa@aau.edu.et	
19	Tenalem A/Yenew	AAU	0911230110	tyenew@yahoo.com	
20	Adamek Adem	AAU	-		

Annex III Proposed EMP Checklist for Africa Center of Excellence II Project

3	Yes[√]	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
			Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
			Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
			Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors

			(d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 4. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites

		• Increase in dust and noise from demolition and/or construction • Construction waste	
		5. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
			Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
			Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		6. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		7. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used
		8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes

		• On site or √off-site disposal of medical waste	c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and (e) If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		9. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used
			Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

Environmental Management Plan Checklist and Format for Low-risk Topologies

For low-risk topologies, an alternative to the commonly used "full text" EMP format is to have a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format ("EMP Checklist," see Annex 3) has been developed to provide "pragmatic good practice" and designed to be user friendly and compatible with safeguard requirements. A blank sample is attached as Annex 3.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologizes with temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under OP 4.01 (see Annex 1).

The EMP (Annex 2) format has two sections:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.
- **Part II:** includes the environmental and social screening in a simple Yes/No format followed by mitigation measures for any given activity and the monitoring plan for activities during project construction and implementation. It retains the same format required for standard World Bank EMPs.

Application of the EMP-Checklist

The practical application of the EMP-ckecklist would include the filling in of Part I to obtain and document all relevant site characteristics and activities. In Part 2 the type of foreseen works, as obtained from the design documents, would be checked and the resulting provisions listed below highlighted (e.g. by hatching the field or copy pasting the relevant text passages into the special provisions of the tender documents.

The whole filled in tabular EMP is additionally attached as integral part to the works contract and, analogous to all technical and commercial terms, has to be signed by the contract parties.

For the monitoring of the Contractor's safeguards due diligence the designated construction inspector works with **Part C** of the EMP Checklist, the monitoring plan. This should be developed site specifically and in necessary detail, defining clear criteria and parameters which can be included in the works contracts, which reflect the status of environmental practice on the construction site and which can be observed/measured/ quantified/verified by the inspector during the construction works.

Part C would thus be filled in during the design process to fix key monitoring criteria which can be checked during and after works for compliance assurance and ultimately the Contractor's remuneration.

ANNEX 1: Documents generally required by World Bank's Safeguard Policies

Policy No.	Topic	Documents / deliverables required during		
		preparation	implementation	operation
OP 4.01	Environmental Screening / Assessment (EA)	EA process, including EMF, EIA, EMP, MP	EMP / MP	(EMP) / MP
OP 4.04	Natural Habitats	included in EA under OP 4.01	compensation plan, included in EMP + MP, OP 4.01	included in EMP + MP, OP 4.01
OP 4.09	Pest Management	included in EA under OP 4.01	Pest Management Plan (PMP)	(reference in ISR/ICR)
OP 4.10	Indigenous Peoples	social assessment, IPP	IPP / RAP	(reference in ISR/ICR)
OP 4.11	Physical Cultural Resources	included in EA under OP 4.01	PCR management plan (part of EA)	(reference in ISR/ICR)
OP 4.12	Involuntary Resettlement	RAP (and other instruments)	RAP (and other instruments)	(reference in ISR/ICR)
OP 4.36	Forest	included in EA under OP 4.01	included in EMP + MP, OP 4.01	included in EMP + MP, OP 4.01
OP 4.37	Safety of Dams	dam safety report (DSR), TOR for PoE	DSR & emergency preparedness plan (ERP)	DSR & emergency preparedness plan[1], dam instrumentation & monitoring plan
OP 17.50	Disclosure	SIR	SCR, disclosure of ESIA & EMP	contd. information & consultation
OP/BP 7.50	International Waterways	notification of all affected riparian states		
OP/BP 7.60	Disputed Areas	legal / political negotiations		

Fields hatched in grey: no specific documents required at preparation stage

Acronyms:

DSR	dam safety report	EA	environmental assessment *process*
EIA	environmental impact assessment *report*	EMF	environmental management *framework*
EMP	environmental management *plan*	ESIA	environmental / social impact assessment
ERP	emergency response plan	IPP	indigenous peoples plan
ICR	implementation completion report	MP	monitoring plan
ISR	implementation status report	PoE	Panel of Experts
PCR	physical cultural resources	RAP	resettlement action plan
SCR	stakeholder consultation report	SIR	stakeholder identification report

[1] This is commonly not released to the Public.

ANNEX 1: Format for Environmental Management Plan

Environmental Management Plan (EMP)
Africa Centers of Excellence

January 2016

PART I: Activity Description

1. INTRODUCTION

The Centre of Excellence in Climate Smart Agriculture and Biodiversity Conservation is established to address challenges associated with the realization of sustainable agricultural intensification, utilization and conservation of biodiversity, and climate change adaptation and mitigation in Eastern and Southern Africa by enhancing the capacity of Haramaya University and the collaborating partners. It is intended to produce quality graduates and problem solving research outputs. This document outlines the environmental management plan of the Centre.

2. Project Description

Project Site

The Centre is located at Haramaya University (9° 26'N, 42° 03'E), Oromia National Regional State, Eastern Ethiopia.

Working Hours

The official operation hours of the centre are 8:00 am to 5:00 pm, with an hour's lunch break in between from Monday to Friday. Besides, field and laboratory research activities may take place as required during off hours, weekends, and holidays.

Environmental Management Plan Context

The project mainly focuses on curriculum development, postgraduate training and research, faculty and support staff development, and skill enhancement of national and regional partners. Civil works will be minimal, limited to construction of greenhouses, livestock barns, and development of small scale irrigation facilities. Also, the project involves the purchase and use of some ICT equipment, vehicles, laboratory chemicals, medicaments, glassware, and equipment. Appropriate precaution and mitigation measures will be implemented in compliance with national and international laws and regulations, and practices in order to manage any negative environmental and social impacts.

3. Environmental Footprint

The environmental footprint will be limited to the existing university campus.

4. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Compliance will be made with national laws and regulations, such as National Environmental Policy 1997; Environmental Management Plan 2004; Environmental Impact Assessment Guideline Document 2000; Plant Quarantine Regulation 1992; National Biodiversity Conservation and Research Policy 1998; Conservation Strategy 1997; Biosafety Proclamation 2009; Proclamation

on access to Genetic Resources and Community Knowledge and Rights 2006; Drug Administration and Control Regulation 2008; Veterinary Drugs, Feed Administration and Control 2011; Radiation Protection Proclamation 2008; ICT Policy and Regulatory Environment 2010; Government Procurement and Property Administration Proclamation 2009.

Relevant approval and licensing requirements will be processed in collaboration with concerned regulatory bodies mandated to implement these laws and regulations. Furthermore, compliance will be made with pertinent international laws and regulations.

5. RELEVANT WORLD BANK POLICIES

The project triggers Operational Policy OP 4.01 – Environmental Assessment, due to potential impacts resulting from the works for upgrade of facilities (e.g. greenhouses, livestock barns, and development of small scale irrigation facilities) within Haramaya University.

6. IMPLEMENTATION ARRANGEMENTS

MONITORING ARRANGEMENTS

7. ENVIRONMENTAL SCREENING, ASSESSMENT AND MANAGEMENT

EMP Objectives

- To uphold and ensure compliance to national and international laws and regulations regarding environmental and social safeguard.
- To mainstream global best laboratory, farm management, and field practices
- To put in place functional mechanisms for monitoring and periodic review of environmental management practices

8. Environmental Management Approach

The environmental management makes sure that the EMP objectives are met. The objectives will be realized through ensuring compliance with relevant laws and regulations, mainstreaming best practices, and establishing monitoring and review mechanisms.

9. MONITORING AND REPORTING

The practical application of the EMP-checklist would include the filling in of Part I to obtain and document all relevant site characteristics and activities. In Part 2 the type of foreseen works, as obtained from the design documents, would be checked and the resulting provisions listed below highlighted (e.g. by hatching the field or copy pasting the relevant text passages into the special provisions of the tender documents. The whole filled in tabular EMP is additionally attached as integral part to the works contract and, analogous to all technical and commercial terms, has to be signed by the contract parties. For the monitoring of the Contractor's safeguards due diligence the designated construction inspector works with Part C of the EMP Checklist, the monitoring plan. This should be developed site specifically and in necessary detail, defining clear criteria and parameters which can be included in the works contracts, which reflect the status of environmental practice on the construction site and which can be observed/measured/ quantified/verified by the inspector during the construction works. Part C would thus be filled in during the design process to fix key monitoring criteria which can be checked during and after works for compliance assurance and ultimately the Contractor's remuneration.

Part II : EMP Checklist for Activities

PART A: INSTITUTIONAL & ADMINISTRATIVE				
Country	Ethiopia			
Project title	Environmental Management Plan (EMP) for ACE Climate Smart Agriculture and Biodiversity Conservation (Climate SABC) at Haramaya University, Ethiopia			
Scope of project and activity	The project mainly focuses on curriculum development, postgraduate training and research, faculty and support staff development, and skill enhancement of national and regional partners. Civil works will be minimal, limited to construction of greenhouses, livestock barns, and development of small scale irrigation facilities. Also, the project involves the purchase and use of some ICT equipment, vehicles, laboratory chemicals, medicaments, glassware, and equipment. Appropriate precaution and mitigation measures will be implemented in compliance with national and international laws and regulations, and practices in order to manage any negative environmental and social impacts.			
Institutional arrangements (Name and contacts)	WB (Project Team Leader)	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contactor
SITE DESCRIPTION				
Name of site	Haramaya University, Ethiopia			
Describe site location			Attachment 1: Site Map [ ]Y [X] N	
Geographic description	It is located 5 km from Alemaya, next to Lake Haramaya, a town in the East Hararghe Zone, about 17 kilometers from the city of Harar and 40 kilometers from Dire Dawa.			
LEGISLATION				
Identify national & local legislation & permits that apply to project activity	Compliance will be made with national laws and regulations, such as National Environmental Policy 1997; Environmental Management Plan 2004; Environmental Impact Assessment Guideline Document 2000; Plant Quarantine Regulation 1992; National Biodiversity Conservation and Research Policy 1998; Conservation Strategy 1997; Biosafety Proclamation 2009; Proclamation on access to Genetic Resources and Community Knowledge and Rights 2006; Drug Administration and Control Regulation 2008; Veterinary Drugs, Feed Administration and Control 2011; Radiation Protection Proclamation 2008; ICT Policy and Regulatory Environment 2010; Government Procurement and Property Administration Proclamation 2009.			
PUBLIC CONSULTATION				
Identify when / where the public consultation process took place	Public consultation workshop was organized on the University campus by the project team on January 14, 2016.			
INSTITUTIONAL CAPACITY BUILDING				
Will there be any capacity building?	[X] N or [ ]Y if Yes, Attachment 2 includes the capacity building program			

PART B: ENVIRONMENTAL /SOCIAL SCREENING			
Will the site activity include/involve any of the following potential issues and/or impacts:	**Activity and potential issues and/or impacts**	**Status**	**Additional references**
	1. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ] No	See Section **B** below
	2. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[ ] Yes [X] No	See Section **B** below
	3. Individual wastewater treatment system • Effluent and / or discharges into receiving waters	[ ] Yes [X] No	See Section **C** below
	4. Historic building(s) and districts • Risk of damage to known/unknown historical or archaeological sites	[ ] Yes [X] No	See Section **D** below
	5. Acquisition of land[2] • Encroachment on private property • Relocation of project affected persons • Involuntary resettlement • Impacts on livelihood incomes	[ ] Yes [X] No	See Section **E** below
	6. Hazardous or toxic materials[3] • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	[X] Yes [ ] No	See Section **F** below
	7. Impacts on forests and/or protected areas • Encroachment on designated forests, buffer and /or protected areas • Disturbance of locally protected animal habitat	[ ] Yes [X] No	See Section **G** below
	8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste	[ ] Yes [X] No	See Section **H** below
	9. Traffic and Pedestrian Safety • Site specific vehicular traffic • Site is in a populated area	[ ] Yes [X] No	See Section **I** below
ACTIVITY	**PARAMETER**	**GOOD PRACTICES MITIGATION MEASURES CHECKLIST**	

[3] Toxic / hazardous material includes and is not limited to asbestos, toxic paints, removal of lead paint, etc.

A. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits (to include not limited to land use, resource use, dumping, sanitary inspection permit) have been acquired for construction and/or rehabilitation (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
C. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
D. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and address all construction activities in line with local and national legislation (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds.
F. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals

		(e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
G. Affects forests and/or protected areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees (c) Adjacent wetlands and streams will be protected, from construction site run-off, with appropriate erosion and sediment control feature to include by not limited to hay bales, silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
H. Disposal of medical waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
I Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activites	(b) In compliance with national regulations the contractor will insure that the consruction site is properly secured and construction related traffic regulated. This includes but is not limited to ▪ Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards ▪ Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. ▪ Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement ▪ Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. ▪ Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

PART C: Monitoring Plan							
Phase	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)	**When** (Define the frequency / or continuous?)	**Why** (Is the parameter being monitored?)	**Cost** (if not included in project budget)	**Who** (Is responsible for monitoring?)
During activity preparation	Protecting soils against degradation; preventing eutrophication of water bodies; preventing soil erosion; safe disposal of used laboratory supplies and chemicals	At research sites; at experimental stations; in demonstration fields; in laboratories, glasshouses, lath houses; rivers, lakes and well water	Observation; absence of risks to animals, humans, and the environment	At least twice a year	To avoid risks and harms to humans, animals, and the environment	Included in the project budget:	Environment and Social Safeguard Officer (Dr. Lemma Wogi, Haramaya University)
During activity **implementation**	Water quality Air Quality Waste disposal	Near dwellings, laboratories, human settlements, rivers, lakes, well waters	Soil quality test; water quality test including nitrogen and phosphorus load lakes, and well water; toxic heavy metals in the soil	Once a year	Ensure safe water supply; ensure safe soil to grow crops; promote animal and human health through protecting the environment from hazardous materials	Included in the project budget	Soil quality experts; water quality experts; environment and Social safeguard Officer
During activity **supervision**	All monitoring issues arising during preparation and implementa-	At and near laboratories, research sites, demonstration	Inventory of mitigation measures and environmental management	At least twice a year	To ensure environmental and social safety	Included in the project budget	All the arising issues during preparation and implementation

	tion	plots, experi-mental stations	plans				

ESMP Monitoring table

Institution	EMP monitoring arrangements (name, title, contact information)
Haramaya University	Dr. Bulti Tesso, Head, School of Plant Sciences Tel 138 Dire Dawa, Ethiopia Tel.:+251968347931 Email:bulti-obsa@yahoo.com
	Mr. Admikew Haile, Director for Research Facilities P. O. Box 138 Dire Dawa, Ethiopia Tele.: +25191 Email: yadeniadmkew@gmail.com
	Mr. Tesfaye Guta, ICT Director P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251 911348072 Email:tesfayeguta2@gmail.com
	Mr. Tafesse Tsegaye, Director for Property Administration P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251 922379617
	Mr. Ewnetu Kebede, Dairy Farm Manager P.O.Box 138 Dire Dawa, Ethiopia Tel.: +251 912927403
	Mr. Birhanu Worku, Transport and Garage Team Leader P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251911852754
	Mr. Shimeles Felleke, Landscaping and Custodial coordinator P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251913851244
	Dr. Abebaw Adgo, Department of Chemistry , Director for research thematic area, Engineering and Information Technology P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251938238996

	Email:abebawadgo@gmail.com
	Dr. Abi Tadesse, Department of Chemistry , P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251912018750 Email:abi92003@yahoo.com
	Dr. Tesfaye Gemechu , Head of Higher Clinic P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251 912095067
	Dr. Biresaw Serda, Dean, College of Veterinary Medicine P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251 911052265 Email:biressawserda2011@gmail.com
	Mrs. Haimanot Bizuneh, Technical Assistant in Plant Pathology P.O.Box 138 Dire Dawa, Ethiopia Tel.: Tel.:+251 910822686
	Farm Management Coordinator
	Dr. Negussie Bussa, University Laboratory Management Director Dr. Biresaw Serda, Dean, College of Veterinary Medicine P.O.Box 138 Dire Dawa, Ethiopia Tel.:+251913498532 Email:negussiebussa@yahoo.com

Record of Public Consultations (attendees, date and place held, points raised, responses by the consultants)

Public consultation workshop was organized by the project team on January 14, 2016. To collect relevant information on EMP, the following guiding questions were distributed to the participants, and the responses were collected and recorded.

1. Indicate precautions to be made during procurement of items, import/export of genetic materials, handling, use and disposal of used items.
2. List the possible environmental concerns that may arise from handling/use and disposal of used items and wastes
3. List possible management and mitigation strategies for safe handling and disposal of hazardous materials/chemicals
4. Mention laws/rules/regulations pertinent to the above issues.
5. Other relevant issues related to environmental management while implementing ClimateSABC project

List of stakeholders participated and their views are indicated in the following table.

Stakeholders present	Issues raised	Response to the issues

▪ Environmental Science program Coordinator ▪ Head, School of Plant Science ▪ Director for Facilities Management ▪ ICT Director ▪ Director for Property Administration ▪ Dairy Farm Manager ▪ Transport and Garage Team Leader ▪ Landscaping and Custodial coordinator ▪ Department of Chemistry ▪ Head of Higher Clinic ▪ Dean, College of Veterinary Medicine ▪ Technical Assistant in Plant Pathology ▪ Farm Management Coordinator ▪ University Laboratory Management Director	▪ Existence of national EMP safeguard policy and regulation documents ▪ Existence of national regulation on import and export of genetic materials ▪ Safe and efficient utilization of purchased chemicals/reagents, medicaments and equipment ▪ Purchase,utilization, handling, maintenance and disposal of ICT materials, vehicles, medicaments, laboratory equipments, chemicals/reagents ▪ Existence of Procurement and property disposal service in the university ▪ Animal waste disposal methods ▪ Rules and regulations pertinent to animal welfare ▪ Maintenance and disposal of used vehicles, lubricant ▪ Mainstreaming of best environmental management practices	• Presence of relevant national environmental policy documents, guidelines and regulations • Presence of national bio-safety regulation and plant quarantine regulation • Formulation of environmental management plan • Compliance ICT policy and regulatory environment • Compliance with Government procurement and property administration proclamation 2009 • Compliance with relevant national policies and documents on disposal of used equipment, chemicals and vehicles are available. Moreover, the institute has procurement and property disposal service. • Animal waste will be used for Bio-feul, and organic fertilizer • Compliance with national and institutional regulations and procedures ▪ While purchasing different chemicals and reagents students, researchers and professionals should be consulted; proper logbook, storage and handling practice should be implemented ▪ The Center will ensure compliance to FAO/OIE standard for animal welfare and slaughtering procedures ▪ Awareness creation, training, strengthening environmental club, use of printed materials and University FM radio, website etc ▪ The importance of installation of newly purchased equipment by supplying company and training of technicians that are able to run and conduct minor maintain the new equipment smooth.

'Safeguards Requirements Submission ' by ARERI , Jan. 15, 2016

(1) For the responsibility of monitoring of implementation of EMPs for ACE **: African Railway Education and Research Institute (ARERI)**

Institution	EMP monitoring arrangements (name, title, contact information)
Addis Ababa Institute of Technology, Addis Ababa University, Ethiopia For African Railway Education and Research Institute (ACE)	Dr. Berhanu Assefa : Deputy Scientific Director, Addis Ababa Institute of Technology Addis Ababa University Addis Ababa, Ethiopia Tel: +251 (0) 911 40 54 91 Email : hmberhanu@yahoo.com

(2) Public Consultations

Country – Center of Excellence	Date of consultative meeting	Stakeholders Present	Issues raised	Response to the issues
Ethiopia – African Railway Education and Research Institute (ARERI)	Jan. 13, 2016	Ato Tekola : Ethiopian Railways Corporation	None – Since ARERE plans no new construction or civil works including building rehabilitation/handling or management of medical waste/ hazardous or toxic materials, no EMP related issues were raised	None
		Ato Seyfu Abiy : Metal and Engineering Corporation		
		Ato Hagos Gebre : Entoto Polytechnic College		
		Dr. Birhanu Beshah : ARERI, AAIT, AAU		
		Prof. : Byeong Soo Lim : ARERI, AAIT, AAU		

(3) As for the financial management and procurement assessments, we were informed that the World Bank staffs based in Addis Ababa branch would send the relevant documents to ACEII. They visited AAU. [END]

JARAMOGI OGINGA ODINGA
UNIVERSITY OF SCIENCE AND TECHNOLOGY
AFRICA CENTRE OF EXCELLENCE IN SUSTAINABLE USE OF INSECTS AS FOOD AND FEEDS

Tel. 057-2501804
email: amukhebi@jooust.ac.ke
website: www.jooust.ac.ke

P.O. BOX 210 - 40601
BONDO

15th January 2016

Prof. Alexandre Lyambabaje,
Executive Secretary,
Inter University Council of East Africa,
Eastern and Southern Africa Higher Education Centres of Excellence Project,
Plot M833, Kigobe Road, Kyambogo,
P.O. Box 7110 Kampala, Uganda

Dear Prof. Lyambabaje,

REF: IUCEA/240/1 OF 6TH JANUARY 2016: SAFEGUARD REQUIREMENTS OF THE WORLD BANK

I refer to your above referenced letter requesting for submission of a completed Safeguard Assessment Sheet (SAS) by 15th January 2016. *The Africa Centre of Excellence in Sustainable use of Insects as Food and Feeds (INSEFOODS)* of Jaramogi Oginga Odinga University of Science and Technology (JOOUST) is hereby pleased to submit the attached SAS for your kind consideration.

With kind regards,

Prof. Adrian Mukhehi
Centre Director, INSEFOODS

Copy to:

Prof. Stephen G. Agong' – VC – vc@jooust.ac.ke
Prof. Benson Estambale - DVC RIO – dvcrio@jooust.ac.ke
Prof. Monica Ayieko - DCD&PI - mayieko@jooust.ac.ke

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
Office of the County Director of Environment, Siaya County
P.O. Box 127-40600, Siaya Tel +254-724 990 855
EMAIL; Siaya@nema.go.ke

Ref: NEMA/SYA/STAKEHOLDERS/VOL1/162 **Date: 15th JAN, 2016**

Executive Secretary
Inter University Council of East Africa (IUCEA)
Eastern and Southern Africa
Higher Education Centers of Excellence Projects
Plot M833, Kigobe Road. Kampala Uganda

RE: AFRICA CENTER OF EXCELLENCE IN SUSTAINABLE USE OF INSECTS AS FOOD AND FEEDS (INSEFOODS)

In accordance with Environmental Management and Coordination Act (EMCA), 1999, The National Environment Management Authority was identified as a major stakeholder for the project above. The Authority has participated in research and training activities within the project.

The Environmental Management plan (EMP) developed for the project has been reviewed. It identifies the major impacts that the project is likely to have on the environment. The mitigation measures provided are sufficient to deal with the impacts that have been identified.

Any clarifications can be sought through the contacts provided.

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
15 JAN 2016
SIAYA COUNTY ENVIRONMENT OFFICE
P. O. BOX 127 - 40600, SIAYA

OCHWERI SAMSON
COUNTY ENVIRONMENT OFFICER
SIAYA COUNTY

ENVIRONMENT SAFEGUARDS FOR THE AFRICA CENTRE OF EXCELLENCE IN SUSTAINABLE USE OF INSECTS AS FOOD AND FEEDS (INSEFOODs)

1.1 Project's Environmental Management (EMP) Plan Context

The Africa Centre of Excellence in Sustainable Use of Insects as Food and Feeds (INSEFOODs) is established to provide quality post-graduate education. This entails conducting high quality applied research in the Sustainable Use of Insects for Foods and Feeds to address challenges of food and nutrition security in the Eastern and Southern Africa Region. INSEFOODs will enhance capacity of Jaramogi Oginga Odinga University of Science and Technology (JOOUST) and collaborating partner institutions to produce high quality performing graduates and demand-driven research outputs.

This ACE project is low-risk with Environmental Impacts expected to be minimal. Civil works will be minimal and will be confined to minor rehabilitation and extensions of laboratories as such environmental and social impacts will be minimal and manageable. The project will focus on quality enhancements of faculty, curriculum development, and learning resources. Small scale rearing and processing of commonly available edible insects for learning, training and research will be undertaken both at the center and with communities as an outreach activity. To realize these goals, the issue of acceptability as well as minimal effects to the physical environment will require to be integrated into the project through constant consultations, evaluations and review of the design aspects throughout the project period. This project's environmental and social management plan (EMP) consists of a set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. This plan also includes the actions needed to implement these measures. The EMP checklist-type has been used. The EMP checklist has the following sections:

Part 1 provides introduction

Part 2 is the descriptive part that characterizes the project, specifies institutional and regulatory aspects, describes technical project content, outlines any potential need for capacity building and briefly characterizes the public consultation process.

Part 3 presents a screening checklist of potential environmental and social impacts, where activities and potential environmental issues can be checked in a simple Yes/No format. If any given activity/issue is triggered by checking “yes”, a reference to the appropriate section can be followed, which contains clearly formulated environmental and social management and mitigation measures.

Part 4 presents a simple monitoring plan to enable all stakeholders to monitor implementation of environmental management and protection measures and detect deviations and shortcomings in a

timely manner. It is structured in a way to provide concrete and enforceable environmental and social measures, which are understandable to non-specialists and are easy to check and enforce.

1.2 General and Site Information

Summary information on the institution, and administrative framework is presented in Table 1. The table further provides key information on the location of Jaramogi Oginga Odinga University of Science and Technology in addition to the legal requirement of this project.

Table 1 Institutional and Administrative Framework for INSEFOODS

INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK FOR INSEFOODS				
Country	Kenya			
Project title	Sustainable Use of Insects as Food and Feeds			
Scope of Project and Activity	This project involves capacity building through training, research, partnerships and community outreach. There will be minimal low-risk civil works such as minor rehabilitation or refurbishment works of lecture rooms and research laboratories to provide space for postgraduate students. Small scale rearing and processing of commonly available edible insects for learning, training and research will also be undertaken.			
Institutional arrangements (Name and contacts)	World Bank Task Team	Project Management Team	(Kenya Government/ Ministry of Education/ Ministry of Finance/ JOOUST Project Team)	
Implementation arrangements (Name and contacts **)**	Safeguard supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contractor, Project Director
SITE DESCRIPTION				
Name of site	Jaramogi Oginga Odinga University of Science and Technology (JOOUST)			
Site description	The site is located in Bondo Kenya.			
Geographic description	-0.0924825° S, 34.2579889° E			
LEGISLATION				
Identify national & local legislation & permits that apply to project activity	Kenya has environmental legal, regulation and policy instruments for safeguarding the environment. Environmental permit is required for any project that is likely to impact on the environment from the National Environment Management Authority (NEMA)**.**			
PUBLIC CONSULTATION				
Identify where/ when public consultation process took place	Public consultations was carried out at the proposed project site (JOOUST Main Campus in Bondo township)			
INSTITUTIONAL CAPACITY BUILDING				
Will there be institutional capacity building**?**	[ ] N or [X] Yes. There is capacity building program			

Relevant Policy, Legal, Regulatory and Institutional Framework

Environmental Policy Framework

Kenya's Environmental policy approach to environmental management is preventive and emphasizes the need to promote socio-economic development within the context of prescribed acceptable environmental standards and safeguards. Environmental Impact Assessment (EIA) is a methodology used to identify the actual and probable impacts of the projects and programmes on the environment and to recommend alternatives and mitigating measures. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The national EIA regulations were issued in accordance with the provisions of the Environmental Management and Coordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking cognizance of provisions of both EMCA 1999 and subsequent relevant national laws and regulations. The intention is to approve and license only those projects that take into consideration all aspects of concern to the public as they impact on health and the quality of the environment. In effect, it seeks reconciliation between economic and environmental resource development with the view of achieving sustainable national development. JOOUST also has Institutional Environmental Management Policy.

In compliance with the 1999 Environmental Management and Coordination Act EMCA (1999), Kenya's legislation requires an environmental authorization, by the National Environment Management Authority (NEMA), for the start-up of any project that comes under sectors with adverse environmental impact. Where applicable, an Environmental and Social Management Plan (EMP) may also be required for some projects with minimal impact. The EMCA gives mandate to NEMA to ensure compliance of all investments and undertakings with any laid down Environmental Impact Assessment (EIA) procedures in the planning and execution of development projects, including compliance in respect of existing projects. Existing legislations and institutional arrangements are as follows:

Existing Environmental Legal Framework

Primary environmental legislation includes Environmental Management and Coordination Act 1999 (EMCA) and Environmental Impact Assessment and Audit Regulations of 2003 (EIAAR). EMCA was the first legislation to formally define EIA within the Kenyan context, as well as to establish procedures and supporting institutions for EIA. This was followed by the Environmental Impact Assessment and Audit Regulations of 2003 (EIAAR). Together, these two legislations form the basis of EIA in Kenya. Subsidiary legislation has been enacted to support EMCA, and includes the following: Environmental Management and Coordination (Noise and Excessive Vibration Pollution) Control Regulations of 2009; Environmental Management and Coordination (Wetlands, Riverbanks, Lake Shores, and Sea Shore Management) Regulations of 2009; Environmental Management and Coordination (Air Quality Standards) Regulations of 2007; Environmental Management and Coordination (Controlled Substances) Regulations of

2007; Environmental Management and Coordination (Waste Management) Regulations of 2006; Environmental Management and Coordination (Water Quality) Regulations of 2006.

In addition, NEMA, the principal instrument of Government for the implementation of environmental management in Kenya, prepared guidelines and administrative procedures for the following: EIA; Environmental Audit and Monitoring; Strategic Environmental Assessment (SEA); EIA in the transboundary context; EIA in the context of international and regional treaties, conventions and agreements; and guidance to development of sectoral EIA guidelines. Between 2006 and 2009, subsidiary legislation to EMCA has been enacted to support EIA and environmental audit and monitoring. Article 69 (f) of the Constitution of Kenya 2010, by stating '*[T]he State shall establish systems of environmental impact assessment, environmental audit and monitoring of the environment*', encourages the continued establishment of systems to further support EIA and environmental audit and monitoring.

Other relevant laws include the Public Health Act (Cap. 242); Physical Planning Act (Cap. 286); Water Act, 2002; Electricity Power Act No. 11 of 1997; Building Code; Penal Code; Factories and Other Places of Work Act (Cap 514); The Forest Act (Cap 385); Food, Drugs and Chemical Substances Act (Cap 254); The Petroleum Act (Cap 116); Weights and Measures (Act Cap 518); Standards Act (Cap 496); and The Traffic Act (Cap 403).

Institutional Framework

There are over 20 institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environment Management Authority (NEMA), the Forestry Department, and the Kenya Wildlife Services (KWS) among others. There are also local and international NGOs involved in environmental issues in the country. The object and purpose for which NEMA was established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principle instrument of the government in the implementation of all policies relating to the environment. JOOUST has an Environmental Management Committee that ensures the implementation of JOOUST's Environmental Policy.

Relevant World Bank policy

Environmental effects of a project may be direct and/or indirect. This project will include minor construction works related to renovations or minimal civil works of teaching and learning rooms as well as laboratories. To allow the flexibility to accommodate or to address environmental hazards as they may be encountered, the EMP is prepared according to WB OP 4.01, which provides guidelines, and the grant receiver's country (Kenya) legal and regulatory framework. The document outlines the foreseen environmental impacts and provides good operational practice to control emissions (e.g. dust, and noise), wastewater discharge and solid waste management on the rehabilitation and minor construction sites. It provides guidance on avoiding the use of hazardous substances, such as toxic paints, solvents or cleaning agents and includes traffic safety (especially focusing on pedestrian safety) in the immediate vicinity of the sites, as necessary.

Environmental Safeguard Implementation Arrangements

In order to implement the management plan, the Centre Director will be the overall supervisor and will oversee environmental and management aspects including but not limited to pollution control, management of sanitation, health and safety and hygiene measures throughout the project area. The supervisor will also be expected to co-ordinate and monitor environmental management during construction and provide monitoring schedules during operations. Other recommended participants could include the respective Environmental Officers and the Physical Planning Officers and project members and partners. The key management tasks of the Centre are to:

- Oversee the implementation of this environmental management plan to ensure that any environmental and social impact is mitigated;
- Follow appropriate laid down protocols for disposing off used chemicals from laboratories;
- Manage project activities and prepare annual work plans based on the implementation plan;
- Coordinate and provide assistance to partner institutions implementing project components.

1.3 Environmental Screening, Assessment and Management

The INSEFOODs project may be classified as Category B since it is likely to have minimal or no adverse environmental impacts. The development proposal is screened by NEMA assisted by a cross-sectoral technical committee in order to identify projects which are likely to have harmful impacts and to exclude the other projects for further environmental consideration, to identify the important expected impacts (environmental and social) of a project and to indicate the level and nature of evaluation the project will need. Type (project or specific components have inherent environmental risks), location (proximity to environmentally, socially and culturally important areas), sensitivity (potential impacts may be irreversible or environment sensitive changes), and scale/size (extent of environmental and social issues), output of proposed project, technology used, concerns of the general public and land use considerations are all relevant during screening and in taking a decision on the project.

Potential Environmental Impact

Potential negative impacts pertain to the rehabilitation and minor extension - hence pre-construction, construction and post-construction/ phases. Site specific minor negative impacts could also pertain to small scale rearing of insects and processing of food products from insects for learning, training, research and community outreach.

Potential negative environmental impacts relate to the following:

- Noise
- Dust
- Soil Erosion and sedimentation prevention.
- Air quality/foul smell
- Solid waste generation
- Liquid waste generation
- Health and safety issues
- Used chemicals from the research laboratories

All these are addressed in the mitigation measures and the monitoring plan to safeguard the environment.

Table 2 Environmental /Social Screening

Will the site activity include/involve any of the following potential issues and/or impacts:	**Activity and potential issues and/or impacts**	**Status**	**Additional References**
	1. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ] No	See Section **B** below
	2. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ] No	See Section **B** below
	3. Individual wastewater treatment system • Effluent and / or discharges into receiving waters	[] Yes [X] No	See Section **C** below
	4. Historic building(s) and districts • Risk of damage to known/unknown historical or archaeological sites	[] Yes [X] No	See Section **D** below
	5. Acquisition of land • Encroachment on private property • Relocation of project affected persons • Involuntary resettlement • Impacts on livelihood incomes	[] Yes [X] No	See Section **E** below

	6. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	[] Yes [X] No	See Section **F** below
	7. Impacts on forests and/or protected areas • Encroachment on designated forests, buffer and /or protected areas • Disturbance of locally protected animal habitat	[] Yes [X] No	See Section **G** below
	8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (toxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste	[] Yes [X] No	See Section **H** below
	9. Traffic and Pedestrian Safety • Site specific vehicular traffic • Site is in a populated area	[] Yes [X] No	See Section **I** below

Mitigation Measures

Table 3 presents a checklist of good practice mitigation measures. *Section B (highlighted) of these good practice mitigation measures will be applicable to this ACE project*. The impacts such as air quality, noise, water quality and waste management will require mitigation.

The EMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.

The EMP is developed below to:

(a) Identify and summarize all anticipated significant adverse environmental;

(b) describe with technical details each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;

(c) Estimates any potential environmental impacts of these measures; and

(d) Provides linkage with any other mitigation plans required for the project.

Table 3 Good Practices Mitigation Measures Checklist

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
A. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits (to include but not limited to land use, resource use, dumping, sanitary inspection permit) have been acquired for construction and/or rehabilitation (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighbouring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste Management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
		proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
C. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
E. Acquisition of land	Land Acquisition Plan/Framework	Projects requiring land acquisition will not be financed under ACE II
F. Toxic Materials	Asbestos management	(a)If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic/hazardous waste Management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
G. Affects forests and/or protected areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees (c) Adjacent wetlands and streams will be protected, from construction site run-off, with appropriate erosion and sediment control feature to include but not limited to hay bales and silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
H. Disposal of medical waste	Infrastructure for medical waste	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
	management	handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place and; ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
I Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to: • Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards • Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. • Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement • Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. • Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

1.4 Monitoring Plan

The monitoring section of the EMP provides:

(a) Specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and

(b) Monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

Table 4 presents the monitoring plan for the project by outlining what have to be checked during activity preparation and implementation. For the monitoring of the rehabilitation and construction safeguards, a due diligence of the designated construction inspector is required. The

key monitoring criteria have to be checked during and after works for compliance assurance. Such parameters and criteria include:

- dust generation and prevention,
- amount of water used and discharged by site,
- presence of proper sanitary facilities for workers,
- waste collection of separate types (mineral waste, wood, metals, plastic, hazardous waste, e.g. spent engine oil), waste quantities, proper organization of disposal pathways and facilities, or reuse and recycling wherever possible.

To assure a degree of leverage on the Contractor's environmental performance an appropriate clause will be introduced in the works contracts, specifying penalties in case of noncompliance with the contractual environmental provisions, e.g. in the form of withholding a certain proportion of the payments, its size depending on the severity of the breach of contract.

For monitoring of insect rearing and processing safeguards there will be health and safety training for all staff. The key monitoring criteria have to be continually checked for compliance assurance. Such parameters are similar to the above but include chemicals from laboratories as a waste.

Capacity Development

To support timely and effective implementation of environmental project components and mitigation measures, the EMP draws on the EA's assessment of the existence, role, and capability of environmental units on site or at the agency and ministry level. Specifically, the EMP provides a specific description of institutional arrangements - who is responsible for carrying out the mitigatory and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training).

Project Implementation

It is expected that the plan be specific in its description of the individual mitigation and monitoring measures and its assignment of institutional responsibilities, and it must be integrated into the project's overall planning, design, budget, and implementation. Such integration is achieved by establishing the EMP within the project so that the plan will receive funding and supervision along with the other components.

For all three aspects (mitigation, monitoring, and capacity development), the EMP provides:

(a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and

(b) the capital and recurrent cost estimates and sources of funds for implementing the EMP are also to be integrated into the total project cost.

Table 4 Monitoring Plan

Phase	**What** (Is the parameter to be monitored)	**Where** (Is the parameter to be monitored)	**How** (Is the parameter to be monitored?)	**When** (Define the frequency / or continuous?)	**Why** (Is the parameter being monitored?)	**Cost** (if not included in project budget)	**Who** (Is responsible for monitoring)
During activity preparation	Traffic management, availability of waste disposal facilities, hazardous waste inventory (asbestos , paints / solvents, chemicals from laboratory),	at the site, in site vicinity, Contractor's store / building yard,	check if design and project planning, procedures, visual /analytical if in doubt, visual /research in toxic materials databases	before start of rehabilitation, before launch of construction, before approval to use materials,	safety of general public, timely detection of waste disposal bottlenecks, public and workplace health and safety,	marginal, not factored within budget, (prepare special account for analyses)	Project Director, Contractor, Engineer
During activity implementation and supervision	Dust generation, noise emissions, waste and wastewater types, quality and volumes, surface drainage,	on site and in immediate neighbourhood, close to potential residents, at discharge points or in storage facilities, at insect rearing points	consultation of immediate communities visual, analytical if suspicious, count of waste transports off site, check flow rates and runoff routes for wastewater,	daily / continuous	Where there are potential for nuisance from dust generation, ensure earth moving is under dump conditions, avoidance of public nuisance, avoidance of negative impacts on ground/surface waters, ensuring proper waste management and disposal, Provide notices, signage and information to the public for their safety at all locations	marginal, within budget,	Project Director, Contractor, Site Engineer,
	New species introduction (Invasive species)	Insect rearing sites, field farms and laboratories	Visual, data analysis, internal checks and audits	Continually During daily entry of personnel to the rearing sites	To continually identify impacts and control the risks	marginal, within budget,	Project Director, PI the center entomologist

Phase	What (Is the parameter to be monitored)	Where (Is the parameter to be monitored)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring)
	Wastes from research laboratories availability of waste disposal facilities, hazardous waste inventory	Laboratories	safe containers labeled with details of composition, properties and handling information	Continually	safety of general public, timely detection of waste disposal bottlenecks, public and workplace health and safety,		Project Director, PI, Environmental Health Committee

All team members will be trained through practical experience and instructions received on methods of detecting and avoiding the listed potential impacts and care of facilities to ensure adequate and continuous sound environmental practices and methods of protecting environmental resources from damage.

Table 5 Monitoring of Implementation of EMP

Jaramogi Oginga Odinga University of Science and Technology	EMP monitoring arrangements (name, title, contact information)
	Prof. Adrian Mukhebi, The Centre Director amukhebi@jooust.ac.ke, Tel. +254710344273 (or designee) will be responsible for the execution of the EMP and will include the following: Ensuring adherence to the Environmental Management Plan; Manifesting that all waste be removed from the site; and Training personnel in accordance with the requirements of this plan.

ANNEX A : PUBLIC CONSULTATIONS

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Kenya – Africa Centre of Excellence in Sustainable Use of Insects as Food and Feed (INSEFOODs)	13/01/2015	1. Florence Awour, Majiwa, Community Based Organization (CBO) 2. Caren Auma, Maranda, CBO 3. Judith Ngesa, Majiwa Group, CBO 4. Charles Achieng Apol, Maranda, CBO 5. Steven Otieno Opondo, Maranda, CBO	Current generation may be reluctant to eat insect products	Through training research and awareness they will know that insects are edible, the Centre will do research on attitudes and perceptions on insects as foods
			Could we be trained to rear the insects	The Centre after researching and ensuring safety will disseminate the knowledge to the community
			Could other animals be attracted by the reared insects	Yes. But they are reared in cages so the predators cannot get in
			I have been involved in this, and when other people see what we do they will know that we can eat insects and products made from insects	Those already involved in this project will be the champions of its benefits
	15/01/2016	1. Jared Airo, Ugadhi Primary School 2. Esabwa Mamesa, Ministry of Agriculture, Livestock and Fisheries (Bondo) 3. Elizabeth Olango, Ministry of Health (Bondo) 4. David Ochola, IMPACT Research and Development Organization (Bondo) 5. Ambrose Senga, Kenya Forestry Service (Siaya) 6. Samson Ochweri, National Environmental Management Authority (Siaya) 7. Joy Ouma, Plan International (Bondo) 8. Peter Oyugi (Kenya Forestry Services (Siaya)	Social acceptability of crickets as food	The project has an anthropologist as a team member to lead research and address challenges of acceptability. That traditional sources of food have been neglected and with the project conducting, training, research and community outreach there will be acceptability due to increased awareness creation by the project.
			Social issues and perception in feeding on crickets	Indigenous people fed on crickets and the project will create awareness on its nutritional benefits
			Food processing plants for mass production of the products	The INSEOODs will mainly focus on training, teaching and research but the Centre will have partnership where the

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
				University will generate new knowledge for uptake by the industry
			Health risk during project implementation	There are minimal to no health risks from the project. This can only be foreseen in the laboratory but there are safety measures in place. For food products from insects they will only be available for use in the markets once all the research proves so and when safety measures and approval by relevant bodies are undertaken.
			What different variety of crickets species are available	There are several species available but the types being promoted by the project are the edible ones from the local environment
			Challenges brought about by invasive species while rearing the cricket	The crickets are reared in an artificial (caged) environment where concentration and containment will be key factors -Changing rooms with specific clothes that are regularly disinfected for those working/ entering rearing sites will be provided
			Predators attracted to the rearing site	The crickets are reared in a controlled environment
			Sustainability of use of insect as food	The project to target women through awareness creation for uptake
			Challenges in domestication of cricket	Lack of knowledge and skills in rearing of insects will be addressed through research, teaching and training including short courses and demonstrations

MOI UNIVERSITY

PYTOCHEMICALS, TEXTILE AND RENEWABLE ENERGY

PART I: ACTIVITY DESCRIPTION

1. INTRODUCTION

The manufacturing sector is envisaged under Kenya Vision 2030 as a key driver to economic growth with an annual growth rate of 10% projected. To make Kenya a dynamic industrial nation by year 2030, a high number of diversified skilled personnel in science, technology, engineering and mathematics (STEM) are necessary. As the level of industrialization advances, the energy demand is expected to rise correspondingly, requiring better energy management with new technologies in energy generation and distribution. Sustainable industrialization thus requires highly skilled workforce capable of introducing novel manufacturing technologies and energy alternatives for sustainable development. This proposal seeks therefore to establish a Centre of Excellence in manufacturing technologies for textile, phytochemicals and renewable energy at Moi University, Kenya.

The ACE II-PTRE project focuses on training, mentorship and research. In this regard, it is a low risk project involving research activities such as the use of phytochemicals in textile, renewable energy harnessing and e-platform. It also includes refurbishment of an office building and an upgrade of laboratories. All these activities have minimal environmental and social impacts. The project's environmental and social management plan consists of mitigation measures for specific issues under;

- Management of ecosystems and sustainable use of natural resources.
- Environmental quality and health.
- Training, research, monitoring and evaluation.
- Waste management.

Institutional measures are also included for implementation to mitigate any adverse environmental and social impacts.

The EMP checklist contains the following;

(i) A descriptive part that characterizes project activities, describe technical project content and briefly captures the public concerns and mitigation measures.

(ii) A screening checklist of potential environmental and social impacts where activities and potential environmental issues can be checked in a simple Yes or No format.

(iii) A monitoring plan to enable the ACE II management team, partners, stakeholders and World Bank specialists to monitor implementation of the environmental management and protection measures, in order to detect deviations and shortcomings promptly.

Management of the centre shall be infused into the Moi University structure. The Centre leader shall be in charge of centre activities, assisted by the deputy and steering committee. Quality assurance shall be ensured through regular monitoring and evaluation of the activities and the environmental impact based on set indicators.

2. PROJECT OBJECTIVES

The objectives of the PTRE encompass strengthening of:

- Education Capacity excellence – quality and productivity
- Education Capacity & Development Impact
- Research Capacity excellence quality and productivity
- Education and research capacity (through increased financial sustainability) and demonstration of value to students and partners

3. PROJECT DESCRIPTION

This project seeks to establish a Centre of Excellence in manufacturing technologies for textile, phytochemicals and renewable energy at Moi University, Kenya. This Centre shall provide Post-doctoral, Doctoral and Masters Degrees training, while conducting research focused on Textile Engineering, Industrial Engineering, Analytical Chemistry and Renewable Energy. It shall also offer short courses and specialized workshops for professionals and academicians. The Centre shall collaborate with national, regional and international academic and private sector institutions. The center shall achieve excellence derived from being the only centre in the region offering PhD programs in Textile engineering that are anchored on ground breaking innovative research that has earned patents and awards worldwide. In addition, exploiting state of the-art-laboratories at Moi University, internship at collaborating institutions, residence and visiting top-notch professors as well as short-term exchange programmes shall contribute to the excellence of the centre.

The main project activities shall involve:

- Training of at least 4 ACE students at postdoc level
- Training of at least 50 ACE students at masters level
- Training of at least 50 ACE students at doctorate level
- Training of at least 150 professionals on specialized short courses
- Developing, accrediting and mounting 10 ACE short professional courses
- Applied research on thematic areas of phytochemicals, textiles, industrial engineering and renewable energy.
- Specialized seminars and workshops for academicians and professionals in the industry

4. COST OF THE ACTION

The total cost of the project is estimated at six million USD ($ 6,000,000)

5. IMPACT ON THE ENVIRONMENT

The ACE II-PTRE project activities involve training, mentorship and research activities such as the use of phytochemicals in textile, renewable energy harnessing and e-platform. The project also includes refurbishment of an office building and an upgrade of laboratories. All these activities have minimal environmental and social impacts. In this regard, it is a low risk project.

6. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The environmental resource contributes to the local and national economy through revenue generation and wealth creation in most productive sectors in Kenya. Most Kenyan citizens depend directly or indirectly on environment for goods and services. Consequently the survival and socio-economic wellbeing of the citizens is intertwined with the environment. For this reason, the environment is an essential feature of Kenya's development policy.

Functioning governance structures and policy instruments as well as institutional capacity for judicious implementation and enforcement are necessary conditions for effective environmental governance. In this regard, the Government of Kenya, through the National Environmental Management Authority has taken a coordinated and participatory approach to environmental protection and management requiring all government agencies to participate in the planning, implementation and decision making process. This approach is implemented though domestication of the National Environmental Policy and submission of quarterly reports to the National Environmental Authority.

Moi University has a goal of being an environmentally safe and responsible institution of learning and a model of environmentally responsible living. The University therefore has a responsibility to maintain and sustain its ecosystems, as well as contribute to environmental management through research and capacity building. It is against this premise that Moi University developed an Environmental Policy and took initiatives to embed environmental management in its activities. The policy spells out the University's commitment to environmental management and guides the management of environment and natural resources in Moi University and its surroundings. It specifies environmental strategies that involve both actions to promote and enforce requirements. It states the University's commitment to protecting the environment, complying with relevant legislation and regulation, complying with relevant government policy commitments, and continual improvement in environmental performance. Further, it provides timelines for periodically reviewing the environmental goals.

7. RELEVANT WORLD BANK POLICIES RELATED TO IMPLEMENTATION OF THE PROJECT

The project endeavours to develop technologies in the manufacturing industry by exploiting phytochemicals as natural sources of products utilized in textile industrial processes. In addressing the high need for energy for the manufacturing, renewable energy is explored by the project to provide alternative and environmentally safer option. The project in its Implementation shall give due accord to the World Bank polices for each of its action plans, particularly policy on protecting the poor and environment is emphasized in the project by conducting environmental and social impact assessments, consulting and involving the community by tasking a partner (KVDA) specifically for the purpose. This substantially illustrates adherence to the World Bank policy to ensure environmental and social impacts.

8. IMPLEMENTATION ARRANGEMENTS

The ACE II PTRE has national, regional and international partners who shall be involved in the implementation of the project. All partners shall be actively involved in all the phases during the implementation of the project. The centre shall provide full scholarships for post graduate training in the areas of manufacturing technologies while the industry and private sector partners shall provide internship placement for both staff and students and assist in technology transfer as well as in identifying new technology demands for incorporation in the curriculum. The partners shall benefit in professional short courses offered by the centre.

9. ENVIRONMENTAL SCREENING, ASSESSMENT AND MANAGEMENT

(a) Site location and Accessibility

The project site will be located within Moi University which is accessible via tarmac road from Eldoret town.

(b) Land Tenure

The project site is on land that is legally and solely owned by Moi University.

(c) Project Components

The following project components that have a potential to affect the environment are discussed in the EMP checklist together with their respective safeguards:

- Rehabilitation works
- Handling and managing the collection of plants and other natural products
- Conservation of biodiversity
- Handling and management of solid, liquid and gaseous wastes as well as e-waste

10. POTENTIAL IMPACTS

The ACE for PTRE and all the activities therein are not expected to have detrimental environmental and social impacts. Nevertheless in line with national legislation as well as the Moi University Environmental Policy, mitigation measures have been developed for specific issues under;

- Management of ecosystems and sustainable use of natural resources.
- Environmental quality and health.
- Training, research, monitoring and evaluation.
- Waste management.

Institutional measures are also included for implementation to mitigate any adverse environmental and social impacts.

11. ENVIRONMENTAL MANAGEMENT APPROACH

Moi University is committed to promote environmental sustainability, to conserve and enhance natural resources, to prevent environmental pollution and continual improvement in its environmental performance. The University will comply fully with environmental legislation and officially approved codes of practice, and will make continued efforts to reduce its environmental impact through the implementation of an Environmental Management Plan which sets out a range of objectives and targets related to mitigation measures for any significant environmental impacts. During the rehabilitation and operation phases of the centre, the mitigation measures espoused in the attached Checklist for Activities shall be adhered to..

12. MONITORING AND REPORTING

Monitoring, evaluation and reporting of the PTRE activities including EMP issues shall be done regularly. The project will be monitored and evaluated based on:

(a) Project execution.

Monitoring will assess whether the management and supervision of project activities is efficient and seek to improve the efficiencies, when needed, so as to improve the overall effectiveness of project implementation. It is a continuous process, during which information about the execution of activities programmed in the annual work plans will be collected, including the delivery of quality outputs in a timely manner. Such information will facilitate the comparison of accomplished against programmed tasks (according to the annual work plan), with a view to identifying any corrective measures that may be necessary to improve performance. This activity will be the direct responsibility of the Centre leader, with advice from the Project Steering Committee.

(b) Project performance, milestones and delivered outputs.

The project will be monitored closely by the Project Steering Committee, in consultation with the Moi university office of quality assurance through semi-annual reports and quarterly implementation reviews. How successful the project is will be evaluated at mid-

term (after two years of project execution) and final (at the end of project execution) by external consultants.

(c) Project impact.

Evaluation of the project's success in achieving its outcomes will be monitored continuously throughout the project through semi-annual project progress reports, annual summary progress reports, and a midterm and final evaluation. The key performance indicators identified in the project implementation plan (section 9) will guide the evaluation of project impact. The responsibility for monitoring of implementation of EMPs has been assigned for each of the Centers of Excellence stakeholders as follows:

Institution	**EMP monitoring arrangements (name, title, contact information)**
1. Moi University ACE II-PTRE	Prof. Ambrose Kiprop, Centre Leader, P.O. Box 3900 -30100, Eldoret.
2. Moi University Environmental and Sustainability Committee (MUESC)	Dr. Simon Mburu, Vice-chair MUESC, P.O. Box 3900 - 30100, Eldoret.
3. National Environmental Management Authority (NEMA)	Mr. Simat Naikumi, Environment Assistant NEMA, Box 41-30100, Eldoret
4. Kenya Industrial Research Development Institute (KIRDI)	Dr. Kenneth Chelule, Deputy Director –KIRDI, P.O. Box 30650 - 00100, Nairobi.
5. RIVATEX East Africa Limited (REAL)	Prof. Thomas Kipkurgat, Managing Director – REAL, P.O. Box 4744 - 30100, Eldoret.
6. Kerio Valley Development Authority (KVDA)	Eng. Paul Serem, Hydrologist KVDA, P.O. Box 2660 - 30100, Eldoret.

PART II: EMP CHECKLIST FOR ACTIVITIES

S/N	Centre Name	ESMP required?	Issues	Mitigation Measures
1.	ACE II-PTRE	Yes[√]	**1. Laboratory and centre office rehabilitation;** • Increase in dust and noise from rehabilitation works. • Site specific rehabilitation waste.	**Air quality** a) During rehabilitation of buildings dust screen enclosures to be installed to confine dust in a controlled area and spray with water mist to reduce airborne debris. b) The surrounding environment of the laboratories to be kept free of construction debris. c) Disposal of construction debris to adhere to the Moi University Environmental Policy and national regulations. **Noise** a) Construction noise to be limited to agreed times as per the national construction authority permit. **Waste management** a) Waste sources, collection and disposal pathways will be identified for all the major waste categories expected from the rehabilitation works. b) Segregation of waste according to the major waste categories will be followed. c) Wherever feasible the contractor will minimize waste generation besides reusing and recycling the suitable and worthwhile materials. d) Waste from building rehabilitation works will be collected and disposed off properly by approved waste collectors. e) Records of waste disposal shall be maintained for accountability and proof of prudent waste management. f) Lead based paints or any paint with toxic ingredients will not be used.

		Yes[√]	**2. Handling the collection of plants and other natural products;** • Disposal of off-cuts in form of dried plant parts. • Disposal of residues emanating from phytochemicals extraction methods by soaking ground plant material. • Disposal of sample collection bags and containers. • Disposal of sharps.	**Solid waste plant material** a) All plant material not used as sample shall be adequately deposited in the composite pits for organic decomposition into manure. b) Residues in form of ground plant material shall be spread to dry inside fume chambers and flashed with water before depositing it to composite pits for biodegradation. c) The surrounding environment of the laboratories shall be kept free of plant material debris to minimize. **Non-biodegradable sampling bags and containers** a) Sample collection bags and containers that are not biodegradable shall be incinerated to ash before appropriately depositing in designated dump sites managed and operated by the local authorities for consequent disposal. **Sharps** a) Disposed in special puncture resistant containers and boxes.
		Yes[√]	**3. Conservation of biodiversity;** • Harvesting plant parts for phytochemicals. • Harnessing natural products.	**Biodiversity conservation** a) Use of non-destructive plant sample collection methods. b) Replenishing the species by planting and nurturing the seedlings. **Natural products conservation** a) Ensuring the natural product source is not depleted to provide for natural regeneration.
		Yes[√]	**4. Handling and management of extraction solvents/ hazardous chemicals;** • Mineral and organic solvents. • Oxidizing/reducing agents. • Acid and alkalis.	**Mineral and organic solvents** a) In compliance with national regulations there shall be temporary storage of the solution in separate leak-proof containers to prevent spillage and leaching. b) Each of the containers will be appropriately labelled with details of date, composition and properties of hazardous or toxic substances together with information of how to handle. c) The wastes will then be transported by licensed carriers and disposed in a licensed facility. d) Use of personal protective equipments at all times while handling/or manipulating hazardous chemicals under fume chamber. **Aqueous residues** a) The aqueous residues shall be drained with copious amounts of water straining any solid particles.

		Yes[√]	**5. Handling and management of textile wastes;** • Disposal of solid waste: fibres, yarns and fabric. • Disposal of textile effluents from dyeing and finishing processes.	**Textile wastes management;** a) All textile solid waste shall be collected in temporary storage in the laboratories and disposed off in a licensed landfill. b) All textile effluents shall be stored temporary in the laboratories in leak-proof containers and later disposed off in a textile effluent treatment plant which is in place and operational.
		Yes[√]	**6. Handling and management of air emission from textile process;** • Oil and acid mist • Solvent vapours. • Dust and lint.	**Air emission management;** a) Mist eliminators/fume chambers shall be installed in the laboratories to mitigate their emission into working area/or atmosphere. Conducting chimney which is in place and operation at site shall allow the residual mist to be dispersed at appropriate height. b) Condensation of vapours by cooling in heater exchangers shall allow recovery of solvent vapours generated by textile processes. The remnant vapours shall be captured through the use of activated carbon. c) Fabric filters shall be used for capturing dust and lint emanating from textile processes. d) Production of dust and lint shall be controlled through site humidification by either spraying water or by using air humidifier available at the site.
		Yes[√]	**7. Handling and management of cultured microbes;** • Disposal of used materials and apparatus. • Disposal of microbial organisms.	**Materials and apparatus** a) Autoclaving and other sterilization methods use before disposal in licensed sites for incineration. **Microbial organisms** b) These shall be sterilized using UV rays followed by destruction with autoclave steam before disposal following recommended procedures. c) Adhere to Standard Operating Procedures according to National Council for Clinical Laboratories Standard (NCCLS) for maintaining pure cultures, and also ensuring recommended numbers per culture.

		Yes[√]	**8. Handling and management of solid, liquid and gaseous waste from renewable energy research activities;** • Sample storage. • Disposal of solid, liquid and gaseous waste.	**Research materials and samples** a) In compliance with national regulations, all research materials shall be stored in separate leak-proof containers to prevent spillage and leaching. b) Each of the containers will be appropriately labelled with details including date, composition and properties of hazardous or toxic substances together with information of how to handle them. c) Appropriate storage facilities for research materials and samples are in place. **Waste management** a) Waste sources, collection and disposal pathways will be identified for all the major waste categories expected from the research activities b) Segregation of waste according to the major waste categories will be followed. c) Wherever feasible, the researchers will minimize waste generation besides reusing and recycling the suitable and worthwhile materials (except any toxic materials). d) Waste materials will be collected and disposed off properly by approved waste collectors. e) Records of waste disposal shall be maintained for accountability and proof of prudent waste management.
		Yes[√]	**9. Handling and management of e-waste;** • Disposal of office electronics that include: computers, printers, televisions, monitors, projectors, telephones, fax machines. • Disposal of monitoring and control instruments, thin films and photo-voltaic modules. • Disposal of batteries and UPS systems.	**Electronic waste Management** a) Create awareness and conduct sensitization on responsible e-waste management. b) Separate e-waste from other wastes to facilitate collection, treatment and recycling. c) Implementing signed MOU by Moi University. d) Sell or donate e-waste to licensed recyclers. e) Take back equipment to the manufacturer, importer or assembler, if they allow it. f) Dump e-waste at the licensed dumping site specified for e-waste.

ANNEXURES

ANNEX A: PUBLIC CONSULTATIONS

Kenya – Centre of Excellence for Phytochemicals, Textiles & Renewable Energy	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
	12th January, 2016	Kerio Valley Development Authority (KVDA) Mr. Nixon Yegon Mobile No. : +254722510861	• Renewable energy. • Possibility of producing organic fertilizers.	• Plant biomass shall be used for biogas production. • Microbial inoculants shall be used for the bioconversion of plant residues into bio-fertilizers.
		Kenya Chemical Society (KCS) Dr. Austin Aluoch Mobile No. : +254725659395	• Commercialization and patenting of phytochemicals • Toxicity of phytochemicals.	• The Centre shall liase with the Kenya Industrial Property Institute (KIPI) that is responsible for examining patent applications and granting patents. • Cytotoxicity testing studies shall be done to assure safety of the phytochemicals.
		National Environment Management Authority (NEMA) Mr. Simat Naikumi Mobile No. : +254720137288	• Environmental degradation as a result of project activities. • Ensure community water safety.	• Environmental impact assessment (EIA) shall be done in accordance with the issues and general guidelines spelled out in 2nd and 3rd schedules of NEMA's EIA Regulations. • Ensure proper disposal of liquid waste.
		Uasin Gishu County Chief Officer - Education Mr. Kenneth Misoi Mobile No. : +254722788769	• Approval of research products prior to commercialization. • Benefits to local community in terms of education/training and commercialisation of research output	• The centre shall adhere to the Kenya Bureau of Standards (KEBS) standards relating to products, certification, and commercialization of products. • The centre shall have a dedicated community component designed to support both academic connections to communities and community connections to the centre. • Involve county government during demonstration of project activities to the

				community. • Sharing the benefits of the research output according to the provisions in the national legislation.
		Farmers Association Ms. Esther Maritim Mobile No. : +254722902046	• Can the research output be used in farming?	• Bioconversion of plant residue yields bio-fertilizers that are very cheap, easy to use, safe and do not require repeated applications.
		Community Based Organization Ms. Sally Jepkoech Mobile No. : +254725550577	• Safety of community water from the phytochemicals. • Will research products be provided to the community?	• Moi University has an efficient waste-water treatment system hence low risk of contamination of community water. • The research products will be availed to the community.
		Students Mr. Benard Maiyo Mobile No. : +254722286183 Mr. Dennis Nkurunzinza Mobile No. : +254707876956	• Availability of scholarships and award criteria. • Upgrading of laboratories.	• Fellowships shall be provided for students; the international office shall be in charge of student welfare; accommodation shall also be provided for the regional students. • Admissions shall be processed as required by Moi university senate; number of students selected shall be based on needs assessment of the partner institutions, gender and marginalised groups. • The textile laboratory and phytochemicals research laboratory shall be upgraded, with provision of laminar flow.
		National Biosafety Association (NBA) Prof. Jenessio Kinyamario	• Disposal of spent microbes • Source of starter cultures. • Safe storage of microbes	• Microbial solid waste shall be treated by autoclaving and disposed through the regular solid waste; chemical disinfection shall be used for decontamination of liquid waste before disposal through the sanitary sewer; remaining non-disposable liquid waste containers shall be decontaminated, washed and reused. • Starter cultures/inoculums shall be obtained from Kenya medical research institute

				(KEMRI) Centre for Microbiology Research (CMR) unit. • Experimental cultures shall be stored by culture preservation techniques, i.e., refrigeration and lyophilisation.
		Kenya Industrial Research & Development Institute (KIRDI) Ms. Agnes Kisorio Mobile No. : +254729881260	• Joint supervision of students. • Procurement of consumables done by Moi University or independently	• Highly qualified personnel in partner institutions shall be requested to co-supervise students where necessary. • The centre shall carry out its procurement of consumables as stipulated in policy documents of Moi University.
		RIVATEX East Africa Limited (REAL) Prof. Thomas Kipkurgat	• Capacity building at industrial level • Safety of applicability of developed products	• Specialised training to industry professionals in the areas of quality management for Industrial production, phytodyes technology, innovation and entrepreneurship, and material characterisation techniques shall be conducted. • The centre shall adhere to KEBS product quality standards.

Africa Centers of Excellence Project
Environment and Social Management Plan

For low-risk topologies, an alternative to the commonly used "full text" EMP format is to have a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format is a "pragmatic good practice" approach to be user friendly and compatible with safeguard requirements.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

The EMP template format has two parts:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.
- **Part II:** includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

PART I: Activity Description

A. PDO

The Project Development Objectives (PDO) for the proposed ACE II is to strengthen selected Eastern and Southern African higher education institutions to deliver quality post-graduate education and build collaborative research capacity in the regional priority areas.

Project Beneficiaries

1. **The IDA credit beneficiaries are:**

(a) Students in participating universities and their partner institutions across Eastern and Southern Africa who will benefit from high quality education and training in high growth sectors;
(b) Employers and targeted industries who will have easy access to high quality/skilled personnel, results of applied research, and scientific knowledge for productivity improvement; as well as knowledge partners (including companies, governmental or non-governmental organizations) who will use research produced by the ACEs;

(c) Faculty and staff in the ACEs who will benefit from improved teaching and research conditions and professional development opportunities;
(d) Regional institutions such as EAC and SADC will benefit from improved capacity of the ACEs; and
(e) Faculty and students in STEM and other priority-sector disciplinary areas who will benefit from fellowships/scholarships, exchange visits, and other knowledge-sharing activities across the ACEs organized by the ACE II Regional Facilitation Unit.

PDO Level Results Indicators

2. The following indicators will be used to measure progress towards achieving the above PDO:

(a) Number of non-national/regional students enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(b) Number of students (national and regional) enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(c) Number of nationally or regionally accredited or benchmarked education programs offered by the ACEs; and
(d) Number of collaborative research initiatives being launched by the ACEs.

3. With the view of achieving the above described vision and objective, the proposed ACE II operation will implement three sets of initiatives: (i) strengthening 22 higher education institutions into regional ACEs[1] in Eastern and Southern Africa in a set of defined regional priority areas (US$122 million); (ii) providing capacity building support to these ACEs through institution and regional activities (US$13 million); and (iii) supporting coordination and management of the implementation of components (i) and (ii) (US$5 million). Below provides a description of these proposed activities to be financed under ACE II, including the key features of design and implementation.

Component 1: Strengthening Africa Centers of Excellence (ACEs) in Regional Priority Areas (US$ 122 million)

4. Under this component, the IDA Credit will finance the strengthening of selected 22 ACEs hosted within higher education institutions into regional ACEs selected through a competitive process in five clusters of regional priorities – Industry, Agriculture, Health, Education and Applied Statistics. Each of these specialized regional centers will receive about US$ 6 million grant for implementing its proposal in a specific regional priority area. However, regardless their specifications, all these ACEs are expected to perform the following tasks:

(a) *Building institutional capacity to provide quality post-graduate education with relevance to the labor market*, including, *inter alia*, updating curricula of existing programs or creating

[1] The final number of ACEs to be supported by the ACE II project will depend upon evaluation results and availability of IDA funding at both national and regional levels.

new education programs to meet the development challenge; meeting benchmarks for quality education (e.g. national/regional accreditation); attracting a regional student body; training of faculty to introduce new approaches to teaching and learning; enhancing work-place learning; encouraging entrepreneurship among students; upgrading faculty qualifications; and improving learning resources, including lab equipment, and minor rehabilitation or extension of existing facilities.

(b) *Building institutional capacity to conduct high quality applied research, relevant to addressing a key development challenge/priority*, including, *inter alia*, faculty development and staff training, fellowships and post-doctoral studies, networking activities with national and international partners, hosting and participating in conferences, research equipment and materials and laboratory refurbishment/rehabilitation, research dissemination, knowledge and technology transfer, and patenting or other intellectual property rights related activities.

(c) *Developing and enhancing partnerships with other academic institutions (national, regional and international) to pursue academic excellence*, to raise the capacity of network partners, and to raise the ACE's capacity, including inter alia, joint delivery of education programs, faculty exchanges/visiting faculty, joint research and conferences, sharing of specialized equipment and library resources.

(d) *Developing and enhancing partnerships with industry and the private sector to generate greater impact*, to enhance the impact of the ACE on development and increase relevance of said centers on education and research, including, *inter alia*, industry advisory boards, industry lectures, training of trainers for sector training institutions (such as polytechnics, nursing, teacher or agricultural colleges), joint research, training and other activities to communicate, interact and reach out to civil society, private sector and grassroots communities.

(e) *Improving governance and management of the institution and setting up a role model for other higher education institutions*, to improve monitoring and evaluation, including monitoring of labor market outcomes of graduates, administration, fiduciary management (including financial management (FM), procurement, oversight and capacity), transparency, ability to generate resources, and project implementation.

(f) *Delivering outreach, and creating an impact, to society by delivering excellent teaching and producing high quality applied research.* Individual ACEs are selected because of the strength of their proposals and their relevance to providing solutions to regional development challenges. By fulfilling their mandate, the ACEs can impact positive change in society and become model hubs of teaching, research and innovation to other institutions in the region.

With the investment of the project, these ACEs are also expected to produce measurable results. Table 1 below outlines what can be expected from these ACEs in training and research in the regional priority cluster areas. [***Please note that this table will be filled once the ACEs are selected and their implementation plans are done, expecting in February of 2016***.]

Table 1: Expected Results in Training and Research from ACEs by Regional Priority Area

Priority Cluster	Post-Graduate Training		Initiated Collaborative Research
	# of Masters	# of PhD	
STEM			
Agriculture			

Health			
Education			
Applied Statistics			
Total	*XXXX*	*XXX*	*(Not Applicable)*

5. Unlike many existing centers of excellence in the ESA region which focus primarily on academic research, the selected ACEs under the ACE II project must produce real impact on addressing a specific challenge in one of the priority areas in the region. These priority areas have been defined by the project's Regional Steering Committee (RSC) after broad consultations in the region. These priorities fall into five clusters – Industry, Agriculture, Health, Education and Applied Statistics. Table 2 below provides information on the areas covered within these priorities. All ACE proposals need to address development challenges in one of the priority areas in order to be considered. To encourage flexibility, innovation and cross-cutting solutions, an 'unspecified' category was created to allow preparation of proposals in areas not explicitly listed. This priority list provides guidance for proposal development, but it does not necessarily mean that an ACE would be selected and established for each of these priority areas on the list under this project.

Table 2: Regional Priority Areas for ACEs

Cluster	Priority Area
STEM	• Energy (wind/hydro-power, geothermal & solar-energy, energy generation & transmission, etc.) • Value addition / Extractives (oil & gas sector, mining) • Urban design and construction/Infrastructure, transportation and logistics • Disaster/risk analysis and management, hydrology and water purification • ICT (soft/hardware, applications, services, teaching/learning) • Product design, manufacturing, • Railway engineering • Marine and ocean engineering *Unspecified (room for innovation)*
Agriculture	• Agribusiness (crop &livestock sciences, agricultural engineering, agro/food processing &packaging; value chain) • Climate and environmental smart agriculture • Agricultural land management • Water resource management, hydrology and irrigation • Marine and ocean sciences *Unspecified (room for innovation)*
Health	• Pharm-bio technology (drug discovery, science-driven traditional medicine & development) • Bio-medical engineering (implant development, hospital infrastructure, tissue-engineering) • Bio-physics and bio-chemistry (diagnostic tools) • Molecular biology (infectious diseases, vaccine development) • Emergency medicine and trauma (with a focus on traffic injuries &deaths) and nutrition *Unspecified (room for innovation)*
Education	• Quality of Education (innovations in STEM teaching/learning/curriculum development, assessment &management tools, e-learning & education tools, creative design thinking)
Applied Statistics	• Applied Statistics (big data, bioinformatics, data mining, reliability modeling, research design, evidence-based policy analysis)

6. The ACEs financed under the ACE II project are being selected through an open, objective, transparent, and merit-based competitive process. The Call for Proposals was issued on July 31, 2015 and a total of 109 proposals were submitted by the nine participating countries, out of which 92 were deemed eligible[2] by IUCEA. The eligible proposals which covered eight countries[3] were evaluated using a set of clearly defined criteria[4] by an Independent Evaluation Committee (IEC) consisting of over 60 African and international subject-matter experts. The technical evaluation where each proposal was evaluated by three experts produced a shortlist of 40 proposals which then moved into the second phase of the evaluation – onsite leadership evaluation. During the onsite evaluation, members of the IEC visited each of the 40 proposed ACEs and submitted their results to IUCEA. Reviewing the compiled scores from the technical and onsite evaluations, and considering geographical distribution and balance among priority areas, the RSC recommended the conditional selection of 23 ACEs. [***These conditionally selected ACEs are undergoing FM, procurement and safeguards review, and will be confirmed by the WB Board***]. The 23 conditionally selected ACEs were selected to ensure balance across countries, priority areas and importance of the proposal to the region's development.

7. Of the 109 proposals submitted through the initial call for proposals, there were no proposals in the area of oil & gas due to the current limited capacity for producing much-needed skilled personnel and technology transfer in this area across the region. Given the importance of the oil & gas industry to the economic growth of the ESA region in coming years, oil & gas is listed as one of the regional development priority areas. In order to support the growth of the oil & gas industry for the region, with the spirit of ACE II for real development impact and the guidance of the RSC, the project ran a special targeted call for proposals among the participating countries where there is an emerging oil & gas sector – Ethiopia, Kenya, Mozambique, Tanzania and Uganda. Each of these five countries has submitted one proposal to compete for an ACE in oil & gas for the ESA region. Submitted proposals will go through the same evaluation process as the other ACE proposals did, but with slightly modified criteria to reflect the needs and reality of the oil & gas field in the region at present.[5]

8. The selected ACEs will have the autonomy to implement their own proposals, with the support from their host universities and governments as well as the RFU. For assuring the achievement of targeted results, the ACE II project will employ a performance-based financing mechanism to disburse funding from their respective Ministry of Finance (MoF) to each selected ACE against a set of agreed Disbursement Linked Indicators. To ensure regional collaboration for greater impact, the project will provide a mix of funding requirements and incentives to promote regional mobility of students and faculty, and partnerships with regional and international institutions as well as with the private sector. Each ACE will sign a performance and funding contract with its government (i.e., the Ministry of Education) which will be further developed during appraisal. The contract includes the following criteria:

[2] Only those proposals submitted by the governments of the participating countries, with existing PhD programs, and in the defined regional priority areas are eligible for consideration. The eligibility screen was done by the Inter-University Council for East Africa (IUCEA) which is the designated RFU for the ACE II project.

[3] All the proposals submitted from MZ were deemed ineligible because they came from institutions that did not offer PhD programs, which is an eligible requirement.

[4] These criteria, together with proposal eligibility and evaluation process, are captured in the "Protocol for Proposal Assessment" that was approved by the RSC as a guideline for the Independent Evaluation Committee.

[5] For example, the requirement of having a running PhD program is removed and more emphasis is given to partnership with the private sector, etc.

- At least 15 percent of the funding must be invested in partnerships and at least 10 percent must be invested in partnerships outside the ACE hosting country.[6]
- A partnership agreement between the ACE and its respective partners needs to specify the work plan, budget and outcome arrangements.
- Civil works if needed, should not exceed 25 percent of the total grant.
- The Government's existing commitments for continued funding of the institutional staff need to be part of the funding and performance agreement.

Component 2: Capacity Building Support to ACEs through Institution and Regional Interventions (US$ 13 million).

9. Under this component, the IDA Credit will finance activities at the institution and regional level to enhance capacity support to the selected ACEs to enable them to achieve their project development objectives. Experience of ACEs in Western and Central Africa suggests that the establishment of ACEs alone is not sufficient to achieve the intended outcome and impact of the project. Weak capacity in areas such as data collection, creating a conducive environment for collaboration, regional student mobility and long term financial sustainability needs to be addressed with additional support through collective mechanisms at the institution and regional level. This component is therefore designed to provide additional support to the selected ACEs to strengthen their capacity so that they can implement their proposals and achieve their objectives as planned, becoming sustainable hubs in their specialized areas and leading efforts to address development priorities for the region. All activities will be implemented by an international TA firm that will be overseen by the RFU.

10. **Sub-Component 2.1: Support to ACEs through Institution Level Activities (US$ 5 million).** Under this sub-component, activities that are targeted towards strengthening the ACE institution level activities including capacity building and university-industry partnerships will be funded. These activities will be financed based on demonstrated need. Interested ACEs will submit proposals which will be evaluated by the RSC on a semi-annual basis. With the RSC's approval, IUCEA will finance tailored capacity building programs to be delivered to those ACEs. ACEs can request support in the following areas:

(i) Capacity building of the ACE institutions on implementation of their proposal: While the selected ACEs boast of technical skills in their areas of expertise, management and operational skills to implement their technical proposals efficiently and effectively is not available. There is evidence from ACE I implementation that many selected ACEs faced start-up delays due to weaknesses in their capacity to prioritize; develop detailed sequenced plans; ensure adequate budget; assess and mitigate risks and challenges, including those related to incentives of key stakeholders and implementing partners. This sub-component will provide (on demand basis) funds to ACE institutions to build capacity to better implement their programs. Funding requests using templates that highlight critical skills gaps and proposed training and capacity building packages will be reviewed by IUCEA bi-annually and funded on a rolling basis. Such training and capacity building could include joint problem solving workshops to address critical challenges faced by the institution

[6] ACEs are required to spend 10 percent of the partnership funding in partnership with institutions outside the ACE hosting country.

in implementing their programs. Detailed reports of the impact of previous training and capacity building along with concrete proposals are needed prior to funding any additional programs from the same institution.

(ii) Partnership Development: Experience from ACEs in Western and Central Africa shows the uneasiness for academic institutions to forge partnerships to receive mentoring support as well as to collaborate on innovative solutions for development challenges. Partnerships, with academic institutions/industry need to be structured such that the ACEs can benefit from these partnerships. The project also recognizes that a critical aspect of developing partnerships is a function of opportunities to meet and share knowledge. Thus, the project will provide opportunities in the form of ACE collaboration forums where ACEs can share good practices from mentorship programs and/or identify research areas of interest to industry and collaborate on research ideas.

11. **Sub-Component 2.2: Support to ACEs through Regional Level Activities (US$ 8 million).** A number of activities will be undertaken at the regional level to support effective relationship-building and methodology adoption/development for quality improvement of ACEs to enhance their excellence.

(i) Benchmarking: The project will provide funds to interested ACE host institutions to participate in institutional benchmarking in the region, where institutions can compare themselves to similar institutions across the region and with themselves over time, and learn good practices for their own institutional improvement. The project will provide technical assistance to the institutions enrolled in benchmarking to develop comparable data and indicators, data collection protocols, standard reports for all the ACEs and a data platform, and provide training where relevant. There is also potential for the institutions to be part of the Partnership in Applied Sciences, Engineering and Technology (PASET) initiative between SSA and emerging nations. PASET initiated a pilot program that benchmarked seven African institutions by collecting and analyzing a dataset of indicators at the national and institutional level.[7] This exercise enabled the involved institutions to identify major gaps in their data systems. Through this sub-component, ACEs could partner with PASET and through regular benchmarking exercises use benchmarking diagnostic tools to identify areas for improvement and design specific interventions to enable them to reach their potential.

(ii) Fellowships/Scholarships: To raise the regional and global profile of ACEs, the ACE II project will create an ACE Scholars Program– a type of scholarship program to alleviate the financial constraints that are often a barrier to student mobility across countries in the region. It will be merit-based and awarded to two regional fellows per ACE for a period of two years. The project will potentially have DAAD administer this scholarship program. The project also proposes a MacArthur Fellow or Rhodes Scholar – type fellowship program to identify and cultivate future leaders in science and technology for the region. In addition, the project will collaborate with other development partners/ governments and other programs such as PASET's Regional Scholarship and Innovation Fund (RSIF)[8] to expand the pool of scholarships to encourage students to study in an

[7] The seven universities that participated were Gaston Berger University- Saint-Louis (Senegal), the Federal University of Agriculture – Abeokuta (Nigeria), the International Institute of Water and Environmental Engineering (Burkina-Faso), the University of Abomey-Calavi (Benin), Makerere University (Uganda), the University of Dar-Es-Salaam (Tanzania) and the University of Ghana.

[8] The flagship program of PASET is the Regional Scholarship and Innovation Fund (RSIF) which will contribute to training 10,000 PhDs in applied sciences, engineering and technology and building capacity in selected SSA universities for research and innovation. Funding will be raised through

institution outside their native country in Eastern and Southern Africa. In order to sustain the benefits, the project will coordinate with PASET, and other regional initiatives to expand the pool of scholarships to encourage students to study in an institution outside their native country in ESA.

Component 3: Facilitation, Coordination and Administration of the Project implementation (US$ 5 million)

12. This component will be financed in the form of a Regional IDA grant to the RFU. The sheer number of countries and institutions participating in ACE II has added complexity to the project implementation. The RFU is established to help address this issue and ensure the project success. As the RFU for ACE II, IUCEA[9] will coordinate all aspects of ACE II project preparation and implementation, with guidance from the RSC and technical assistance from the World Bank. As part of facilitating regional collaboration and networking, IUCEA will organize a series of knowledge sharing events for all the selected ACEs and their partners. To facilitate learning and knowledge exchange, IUCEA will organize one annual meeting of the ACEs, where experts will be available to assess program quality and offer advice. IUCEA will sponsor two PASET regional forums through which ACEs can form linkages with technical/vocational programs. Finally, to foster university-industry partnerships, IUCEA will host an annual forum with business leaders and industry experts in priority areas. Given its limited capacity, IUCEA will recruit and oversee an international firm to help implement most activities listed under Component 2. To fulfill their responsibility as the RFU, IUCEA is in the process of hiring new staff members such as a project coordinator and a financial specialist to oversee ACE II.[10] IUCEA has received an IDA grant of US$1 million as part of the Project Preparation Advance (PPA).

B. Institutional and Implementation Arrangements

1. **Each selected institution will implement its own Africa Centers of Excellence proposal**. Further, administrative capacity, most often from the institutions' central administration will assist with the fiduciary tasks. An ACE team is established, led by a Center leader who is a recognized educator/researcher within the primary discipline of the ACE and supported by faculty from the relevant engaged departments. The university will be responsible for the implementation of the environment management plan under the supervision of the national review committee and the World Bank team. In countries where a related project implementation unit with experience of World Bank safeguard guidelines exists, this unit will provide guidance to the implementing university.

2. **Each government will constitute a National Review Committee through the ministry or agency responsible for higher education**. It is tasked with a semi-annual review of performance and implementation support, including approvals of withdrawal applications and implementation planning (but with no day-to-day implementation or approvals).This committee will include

government and businesses, which have already made commitments. The ACE project can potentially help to operationalize the RSIF and raise funding from philanthropic foundations, business leaders and governments.

[9] IUCEA, an institution of the inter-governmental East African Community (EAC), is headquartered in Kampala, Uganda and headed by the Executive Secretary. Their mandate is to foster collaboration in higher education within the East African Community.

[10] In addition, during the course of the project, IUCEA will hire either as staff or consultants, whenever there are gaps in personnel. Adequate support and capacity building will be provided to IUCEA by the Bank to enable efficient and effective implementation of its responsibilities. IUCEA has already received training in procurement and FM from Bank staff based in Uganda.

members from Ministry of Finance, as well as relevant line ministries based on the focus area of the ACEs (e. g agriculture, health, oil and gas etc.).

3. The regional ACE Steering Committee will provide overall guidance and oversight for the project.

C. Environmental screening, assessment and management and World Bank applicable environment policies

4. **Environmental impacts are expected to be low to moderate.** The Environmental Assessment category is B (Partial Assessment), and OP/BP 4.01(Environmental Assessment)is triggered. There will be some rehabilitation and extensions of the selected institutions. The need for new construction will be assessed as part of the project preparations. There will be no new land acquisition for the Centers of Excellence; the project will select existing institutions. In general, the project will focus on quality enhancements of the Centers of Excellence, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources, while construction will be capped at maximum 25 percent of the funding, and the rational for proposed new construction will be scrutinized to ensure such construction is critical for excellence. A clear rule on the maximum extent of civil works allowed under the project will be established in the operational manual and the subsidiary agreements between the governments and the universities. Further, ESMP has been prepared and disclosed for each candidate institution to manage environmental and social impacts based on the submitted proposals. For in some cases, the civil works are so minor and localized that they can be guided by national and local laws and procedures, and therefore no ESMP has been developed. The prepared ESMP are disclosed in country and on the World Bank info shop. In addition, a general set of best practice guidelines for environmental and social management was disclosed in the region in the early stages of project preparation. The ESMP has undergone a set of public consultations, which are presented in Annex A.

D. Environmental Management Approach

5. **For all regionally funded ACE proposals the attached EMP checklist has been completed and disclosed at the institutional website to comply with environmental and social safeguards**.

E. Monitoring and reporting

6. Each Africa Center of Excellence will have its own monitoring and reporting requirements. This will be consolidated and reported through the general reporting requirements for the national review committee and the World Bank supervisory team to monitor on a regular basis.

7. The responsibility for monitoring of implementation of EMPs has been assigned for each of the Centers of Excellence as following:

Institution	EMP monitoring arrangements (name, title, contact information)
Egerton University	Prof. Rose A. Mwonya Title: Vice Chancellor, Egerton University Tel: +254 (0)51 2217810 Cell: +254722106572 Emai: vc@egerton.ac.ke rmwonya@egerton.ac.ke

Part II: EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	Kenya-Center of Excellence in Sustainable Agriculture and Agribusiness Management (CESAAM)-Egerton University	Yes[√]	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Air Quality** (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		Yes[√]	2. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 3. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Air Quality** (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
		Yes[√]	4. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Noise** (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
		Yes[√]		**Waste Management** (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		No [√]	5. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes[√]	6. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

				Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

ANNEX A: PUBLIC CONSULTATIONS

Participants at the EMP Stakeholder Consultative Meeting Held on 13th January 2016

1. Ms. Sara Waruo-Deputy County Director National Environmental Management Authority (NEMA), Nakuru County
2. Ms. Jacqueline Wanjala-County Director of Agriculture-Nakuru County Government
3. Mr. Miheso Manfred-Kenya Agricultural and Livestock Research Organization
4. Mr. Laura Karanja- Kenya Agricultural and Livestock Research Organization
5. Dr. John Momanyi Mironga- Management Representative Designate, EMS-Egerton University
6. Dr. K. Ngeno-Acting Chair of Animal Science Department - Egerton University
7. Prof. George Owuor-Chair AGEC/AGBM Department and Deputy Center Leader for CESAAM
8. Prof. Samuel Mwonga-Crops, Horticulture and Soils Department -Egerton
9. Dr. Patrick S. Muliro-Coordinator ISO Secretariat -Egerton University
10. Mr. Edward K. Shakala-Technologist, Animal Science Department-Egerton University
11. Dr. Gilbert Obwoyere-Dean, Faculty of Environment and Natural Resource Development
12. Prof. Joshua Ogendo-Dean, Faculty of Agriculture-Egerton University
13. Prof. Abdi Guliye-Director Quality Assurance and ACE Team leader
14. Prof. Josephine Ouma-Crops Horticulture and Soils Department-Egerton University
15. Dr. Mary Omwamba- Department of Dairy and Food Science and Technology
16. Mr. Paul Kangethe-Directorate of University Welfare Services
17. Prof. Abdul Faraj-Chair Department of Dairy and Food Science and Technology

Country – Center of Excellence	**Date of consultative meeting**	**Stakeholders present**	**Issues raised**	**Response to the issues**
Kenya-Centre of Excellence in Sustainable Agriculture and Agribusiness Management (CESAAM), Egerton University	13/1/2016		Egerton University has a publicly available environmental policy that sets forth the environmental commitments covering all activities, products and services of the University. It includes a commitment to continual improvement, prevention of pollution and meeting or exceeding relevant environmental legislation, regulations and other requirements to which Egerton University subscribes to its environmental aspects. The policy provides a framework for setting and reviewing environmental objectives and targets and will be reviewed when necessary. Egerton University is in the process of obtaining ISO 14001:2015 on Environmental Management Systems (EMS).	

			A. Environmental Procedures: **1. Hazardous or toxic materials** -agrochemicals -laboratory chemicals -demolition and / or construction waste -machine oils and lubricants	Egerton University's ISO 14001: 2015 EMS procedures for certification is in process (See ISO 14001:2004 Environmental Management System Manual- Attachment - 1), EU/EMS/OP/07 (Attachment 11) and EU/EMS/OP/08 (Attachment 12). Key areas in relation to hazardous and toxic materials covered are - a) Temporary storage of all hazardous or toxic substances in safe containers labeled with details of composition, properties and handling information. b) The containers of hazardous substances will be leak-proof to prevent spillage and leaching. c) Wastes to be transported by specially licensed carriers and disposed in a licensed facility. d) Paints with toxic ingredients or solvents or lead-based paints are not used.
			2. **Occupational Safety and Health** - spillage -fire -fumes	-Compliance with Kenya Government Legislation (The Occupational Safety and Health Act-OSHA 2007) and Egerton University ISO 14001: 2015 EMS procedures (See Attachment 2 and 10).
			3. **Environmental parameters:** -water Quality -effluent -water yields -air quality -gas emissions - noise	Compliance with Egerton University ISO 14001: 2015 EMS procedures EU/EMS/GP/07 and EU/EMS/OP/05 (See Attachment 3 and 4, respectively).
			4. **Production and handling of solid waste** -livestock waste -crop waste -packaging waste	Compliance with Egerton University ISO 14001: 2015 EMS procedures EU/EMS/OP/04 (See Attachment 5).

			5. **Biomedical /** Biohazards **waste**	Compliance with Egerton University ISO 14001: 2015 EMS procedures EU/EMS/OP/06 (See Attachment 6).
			6. **Disruption of ecological systems**	Biodiversity restoration procedures EU/EMS/OP/03 (See Attachment 7).
			B. Social procedures	
			1. **Inadequate environmental stewardship** -smoking in undesignated areas -littering -spitting in public	Compliance with Egerton University ISO 14001: 2015 EMS procedures EU/EMS/OP/01 (See Attachment 8) on environmental education)
			2. C**ulture shock** -foreign students -new employees -visiting professors	Orientation programmes QMS procedure EU/AA/OP/04 (See Attachment 9).

Description of Egerton University's Center of Excellence in Sustainable Agriculture and Agribusiness Management (CESAAM)

Project Physical Location

The CESAAM project is implemented by the Faculty of Agriculture at Egerton University located in Njoro, about 185 kilometers north-west of Nairobi City.

Institutional and Legislative Aspects

Egerton University is a public institution having started as a farm school in 1939, upgraded to an agricultural college in 1950 and became a fully-fledged university in 1987 through an Act of Parliament. The University was then chartered in 2013 under the Universities Act, 2012. The University currently has ten faculties offering a wide range of programmes at diploma, undergraduate, and postgraduate levels. The University has about 25000 students comprising of both local and international students. The University has a national mandate in agricultural research and training.

Project Description

There are a number of factors that contribute to food insecurity in Africa. Key among them are frequent droughts, rampant diseases (crop, livestock and human), poor infrastructure, poor policies, market access, increase in input costs, political instability, poor plant and animal genotypes, inadequate technical capacity and limited technologies and innovations. Over the years there has been a number of initiatives geared towards addressing these challenges, however they have not adequately addressed these gaps.

One of the key approaches to address the above challenges is to enhance capacity building of actors across the agricultural value chain. This can be achieved through targeted higher education training and research along the agricultural value chain that will promote incubation of promising technologies, up-scaling of such technologies to the farming community and agribusiness thereby increasing productivity. A Center of Excellence modeled around these themes would greatly play an important role in developing an effective and responsive manpower capable of addressing food insecurity in the region, particularly among the fragile and post conflict states.

Egerton University is centrally placed within the Eastern Africa region where a number of countries are emerging from conflict and trying to re-build their human capacity. These countries (South Sudan, Rwanda and Burundi) will benefit from Egerton's long experience in agricultural research and training as they endeavor to re-establish their agricultural institutions. Therefore, the proposed CESAAM will contribute to regional food security by focusing on technical capacity development, innovative agricultural research, incubation and transfer of technologies, and evidenced based policy development by creating Agricultural Knowledge Centers.

Overall objective of CESAAM: Sustainable Agriculture and Agribusiness Management through capacity development, research and technology transfer for enhanced food security.

Specific Objectives of CESAAM are;

1. Capacity development along the agricultural Value Chain in the Eastern and Southern Africa region, especially for the fragile and post conflict states.
2. Undertake innovative research, including use of biotechnology and climate smart agriculture, for increased crop and livestock productivity.
3. Enhance the capacity of the University's Agro-Science Park to assist partner universities establish a similar model for incubation of technological innovations.
4. Develop evidence based agricultural policy briefs and disseminate best practices through Agricultural Knowledge Centers in Egerton (CESAAM) and partner universities.

EMP Consultation Process

In compliance with the World Bank Environmental and Social Safeguard requirements, Egerton University convened a consultative meeting on 13 January 2016 attended by representatives of internal and external stakeholders. The meeting highlighted issues likely to arise from the implementation of CESAAM activities. Consequently, the project team prepared the attached EMP.

EGERTON  **UNIVERSITY**

ISO 14001:2004

Environmental Management System Manual

Issue No 2 Revision: 1

APPROVALS

Approved by:

Prof. J. K. Tuitoek, PhD

Vice Chancellor

Signature  Date.

Issued by:

Environmental Management Representative (EMR)

Signature.. Date.....

TABLE OF CONTENTS

1.0 BACKGROUND

Egerton University has the oldest history among all institutions of higher learning in Kenya. It was founded in 1939 by Lord Maurice of Egerton Tatton, a British subject who settled in Kenya in the early 1920s. In 1986 Egerton Agricultural College was upgraded to a constituent college of the University of Nairobi. The following year, 1987 Egerton became a fully-fledged University through the Egerton University Act of 1987 (Chapter 214 of the laws of Kenya).The new autonomous fully fledged institution retained the name of its founder as a sign of recognition to his benevolence, and continued to have as its motto the words inscribed in the Egerton campuses coat of arms – (Thus until). Currently the University fosters a culture that embraces passion for excellence, devotion to duty, Integrity, transparency and Accountability, Professionalism and social fairness.

1.1 Mandate

The mandate of the University as provided by the Egerton University Act of 1987 (Chapter 214 of the laws of Kenya) includes:

- Teaching
- Discovery, transmission and preservation of knowledge
- Corporate social responsibility
- Promotion of social fairness in all matters affecting students and staff
- Cooperation with the Government in the planned Development of University education
- Advisory and Consultancy services

1.2 Vision

To be a World class University for the advancement of humanity.

1.3 Mission

To generate and disseminate significant knowledge, and offer exemplary education that contributes to national and global development.

1.4 Core values

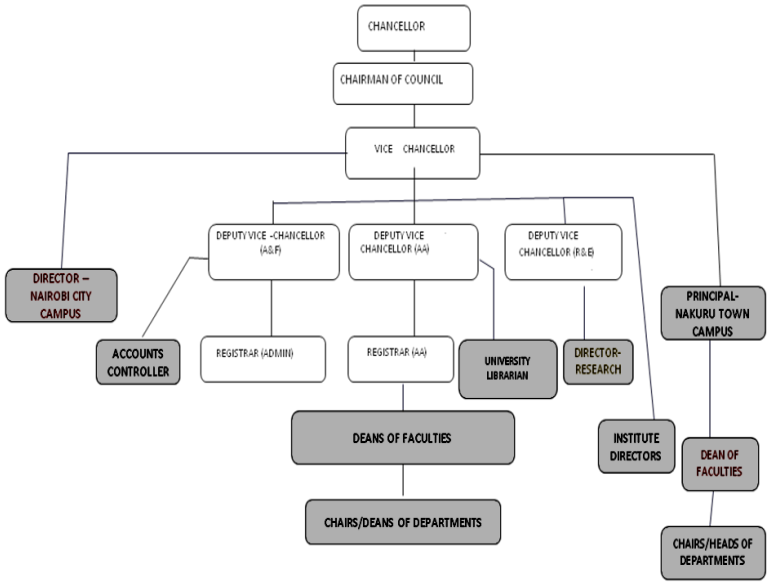
The university activities and decisions are guided by the following core values:

- National Unity
- Internationalism
- Passion for excellence
- Professionalism
- Devotion to duty
- Integrity, Transparency and Accountability
- Social fairness

1.5 Philosophy

Egerton University innovatively influences human development through holistic education and generation, acquisition, preservation and dissemination of knowledge and skills, with emphasis on Agriculture and related disciplines. The University provides equal opportunity in producing competitive and hands-on graduates that contribute to national and global development.

1.6 Egerton University Organisational Structure



1.7 Purpose of the Manual

This manual defines the scope of the Environmental Management System (EMS) at Egerton University. It describes in brief the implementation of the main elements of the EMS that minimises adverse environmental impacts from the University activities, products and services. The manual provides a linkage of system documents to the various elements of the ISO 14001:2004 Standard.

The principal elements of the system described in this manual are:

- Environmental Policy
- Environmental Aspects
- Legal and Other Requirements

- Environmental Objectives and Targets
- Environmental Management Programs
- Organizational Structure and Responsibility for implementation
- Competence, Training and Awareness
- Communication
- Document Control
- Operational Control
- Emergency Preparedness and Response
- Monitoring and Measurement
- Evaluation of Compliance
- Non-conformity, Corrective action and Preventive Action
- Control of Records
- Internal Environmental Management System Audit
- Management Review

The University is committed to the review and evaluation of the EMS, to identify opportunities for continuous improvement.

2.0. EMS SCOPE

The Environmental Management System (EMS) has been designed to cover the activities, products and services offered by Egerton University Njoro Main Campus, institutions that operate within its compound and Faculty of Health Sciences, Nakuru Town Campus College.

3.0. REFERENCES

2.1 Initial Review Exercise Conducted by EMS team

2.2 ISO 14004:2004 Environmental Management Systems – General guidelines on principles, systems and support techniques.

2.3 ISO 19011:2002 Guidelines for quality and /or EMS auditing

2.4 ISO 14001:2004 Environmental Management System-Requirements with guidance for use.

2.5 Relevant legal requirements

4.0 Definition of Terms

Auditor – person with competence to conduct an audit

Continual improvement –recurring process of enhancing EMS to achieve improvements in environmental performance, consistent with the organization's environmental policy

Corrective action – action to eliminate the cause of detected non-conformity

Document - information and its supporting medium

Environment - surroundings in which Egerton University operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations. Surroundings in this context extend beyond the University's to the global system

Environmental aspect - element of an organization's activities or products or services that can interact with the environment. An aspect can have a significant environmental impact or not

Environmental impact - any change to the environment whether adverse or beneficial, wholly or partially resulting from University's environmental aspects

Environmental Management Representative (EMR) – An officer appointed by University Management Board to ensure that environmental

management system requirements are established, implemented and maintained in accordance with ISO 14001:2004

Environmental Management System (EMS) – part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects

Process Owner– An officer who **oversees** an area of work where there are significant environmental aspects and has responsibility to ensure EMS requirements and procedures as applicable to that area are implemented

EMS Core Team – Officers appointed by Egerton University Top Management to carry out environmental reviews, documents, implements and maintains the EMS, carry out EMS awareness training and conduct internal environmental audits in line with ISO 19011 requirements to determine conformance to ISO 14001:2004

Environmental objective - overall environmental goal consistent with the policy that Egerton University has set to achieve

Environmental performance – measurable results of Egerton University's management of its environmental aspects

Environmental policy – overall intentions and direction of Egerton University environmental performance as formally expressed by the top management

Environmental target - detailed environmental performance requirement set by Egerton University that arise from its environmental objectives and that needs to be met in order to achieve those objectives

Interested party - person or group concerned with or affected by the environmental performance of Egerton University

Internal audit - systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the environmental management system audit criteria set by the University are fulfilled

Nonconformity – non-fulfilment of a requirement

Preventive action – action to eliminate the cause of potential nonconformity

Prevention of pollution – use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge or any type of pollutant or waste, in order to reduce adverse environmental impacts

Procedure – A specified way to carry out activity or a process. Procedures can be documented or not

Record - a document stating results achieved or providing evidence of activities performed

University Management Board - A group of people who direct and control an organization at the highest level. The top management of Egerton University is the Vice Chancellor, DVC's, Principals and Registrars, Finance & Accounts Controller and Librarian.

Management review - periodic review of the EMS activities conducted by the top management to address emerging concerns and ensure continuous improvement

5.0 Abbreviations and Acronyms

DoS - Degree of Significance

EMCA - Environmental Management Coordination Act

EMP - Environmental Management Programme

EMR - Environmental Management Representative

EMS - Environmental Management System

FM - Form

GoK - Government of Kenya

GP - General Procedure

ISO - International Organization for Standardization

NEMA - National Environment Management Authority

OP - Operational Procedure

OSHA - Occupational Safety and Health Act

6.0 ENVIRONMENTAL MANAGEMENT SYSTEM REQUIREMENTS

6.1 General requirements

Egerton University has established implemented, maintains and continually improves an EMS in accordance with the ISO 14001:2004.

6.2 Environmental policy

Egerton has a publicly available environmental policy that has been endorsed by the top management. The policy sets forth the environmental commitments of Egerton, which cover all activities, products and services of the Institute. It includes a commitment to continual improvement, prevention of pollution and meeting or exceeding relevant environmental legislation, regulations and other requirements to which Egerton University subscribes as related to its environmental aspects. The policy provides a framework for setting and reviewing environmental objectives and targets and will be reviewed when necessary by the top management as part of the management review. The policy shall be communicated to all persons working for or on behalf of Egerton and made available to the public in accordance with the communications procedure.

Egerton University Policy is as below.

ENVIRONMENTAL POLICY

"On its path to a world-class university for the advancement of humanity, Egerton University undertakes activities to generate and disseminate significant knowledge and offer exemplary education that contributes to national and global development. In tandem with this mandate the University takes responsibility for, and remains committed to protecting the environment at all levels. Egerton University Njoro campus shall:

1. Comply with applicable National Environmental Legislation, regulations and other requirements
2. Mainstream environmental issues into all relevant aspects of the University's teaching and research activities
3. Promote and raise awareness of good environmental management policies and practices
4. Promote efficient use of water and energy
5. Implement sustainable waste management strategies
6. Develop and maintain the grounds and buildings, protect and enhance natural habitats and biodiversity
7. Review environmental objectives and targets for the purpose of continual improvement
8. Provide leadership in the field of environmental management
9. Document, implement and maintain this policy
10. Communicate this policy to all staff, students, and service providers within and outside the university including the public"

Prof. James K. Tuitoek (PhD)
Vice-Chancellor
February 2015

6.3 Planning

6.3.1 Environmental Aspects

Egerton has a documented procedure **EU/EMS/GP/01** to identify environmental aspects and their associated impacts. An EMS team carried out an initial environmental review in order to determine the environmental aspects and their associated impacts from the University's activities, procedures and products. The environmental aspects were analyzed and qualified for significance using review criteria. The following significant aspects were identified.

1. Use and Disposal of Agrochemicals
2. Disposal of Biomedical Waste
3. Disposal of Effluent
4. Handling and Disposal of Hazardous Material
5. Disposal of Solid Waste
6. Education - Taught courses
7. River bank stabilization
8. Tree seedling production and reforestation

The University will every three years review its significant aspects for relevance and in a bid to improve its environmental performance.

6.3.2 Legal and other requirements

Egerton University has established a procedure **EU/EMS/GP/02** for identifying, accessing and communicating legal and other requirements that are applicable to its activities. The relevant requirements are identified, accessed and communicated to all personnel as necessary. These requirements have been documented in the form **EU/EMS/FM/09** and this record is reviewed as necessary.

6.3.3 Objectives, Targets and Programme(s)

The Egerton University has developed and maintains documented environmental objectives and targets for each significant environmental aspect. The objectives and targets are where feasible measurable and consistent with the environmental policy as approved by top management. They define:

- The performance objectives for each significant environmental aspect
- The specific, quantified targets which define those performance objectives and
- The planned timelines for the achievement of those targets

An Environmental Management Program (EMP) has been established and is maintained for respective aspect, objective and targets. The EMP defines the principal action to be taken, those responsible for undertaking them at each function and relevant level, resources required and the means and time frame for their implementation. Objectives, targets and EMPs are documented and recorded.

6.4 Implementation and Operation

6.4.1 Resources, roles and responsibility and authority

The University has defined and documented the responsibilities, roles and authorities for the implementation of the EMS. These have been communicated to relevant functions and staff to facilitate effective environmental management. The structure of the University's EMS and key functions are described in table 1

Table 1. Roles and responsibilities

Person	Responsibility
University Management Board	• Approve institutional strategy, allocate resources for implementation of the EMS • Participate in Management Review
Vice-Chancellor	• Appointment of EMS Core Team • Appointment of EMR • Communication of Egerton University Environmental Policy • Approval of EMS Manual • Communication and approval of objectives, Targets and Programmes • Chairs management review meetings at institutional level • Authorization of the circulation and use of following EMS procedures: 1. Procedure for Awareness, Competence and Training 2. Procedure for Communication 3. Procedure for Control of Documents 4. Procedure for Control of Records 5. Procedure for Emergency Preparedness and Response 6. Procedure for Evaluation of Legal Compliance 7. Procedure for Identification of Environmental Aspects 8. Procedure for Conducting Internal Audits 9. Procedure for Monitoring Environmental Parameters 10. Procedure for Identification of Non-conformities and Preventive Actions
Deputy Vice-Chancellor (Academic Affairs)	• Link person for EMS Team at the University Management • Authorization of the circulation and use of

	following EMS procedures: 1. Procedure for Seedling Production and Reforestation 2. Procedure for Handling, Use and Disposal of Agrochemicals 3. Procedure for Environmental Education and Awareness Creation 4. Procedure on Handling Biomedical Waste
Deputy Vice-Chancellor (Finance & Administration)	• Authorization of the circulation and use of the following EMS procedures: 1. Procedure for Handling and Disposal of Hazardous Waste 2. Procedure for Solid Waste Management 3. Procedure for handling and disposal of effluent
Deputy Vice-Chancellor (Research & Extension)	Authorization of the circulation and use of: • Procedure on Riverbank Stabilization • Procedure for Afforestation
Environmental Management Representative (EMR)	• Ensure than EMS is established, implemented and maintained in accordance with the requiirements of ISO 14001:2004 Standard • Reporting to management on the performance of EMS for review including recommendations for improvement • Prepare annual budgetary requirements for EMS • Plan, disseminate, implement and continuously develop the EMS according to the Policy • Issuance of all EMS procedures . • Supervise the implementation of all Environmental Management Programs (EMPs).

	• Identify competence gaps and prepare training schedule for implementation by HR • In-charge of all internal communication • Convening Environmental Management Systems Core Team Meetings • Presenting Audit Reports to Management • In charge of all EMS procedures:
Coordinator ISO	• Financial vote holder for EMS • Custodian of all EMS records • Coordinate analysis of data resulting from surveillance audits and initiates follow-up actions for continual improvement • Participate in Management Review • Member of the EMS Team • Coordinate Audits, documentation and training
EMS core Team	• Perform baseline survey for all activities, products services and identify environmental aspects • Identify significant environmental aspects • Conduct annual review of all aspects • Develop and review documents for EMS • Conduct sensitization workshops for all stakeholders • Promote the implementation of EMPs • Conduct internal audits • Oversee the implementation of corrective and preventive action plans
Dean Faculty of Environment and Resources Development	• Process Owner in the following EMPs: 1. Tree Seedlings Production and Reforestation 2. Environmental Education and Awareness Creation

	• Undertake review of training needs and forward the same to EMR • Make annual budgetary requirements for implementation of EMPs and forward to EMR
Dean Faculty of Health Sciences	• Process Owner of EMP on handling and disposal of biomedical waste • Assessment of departmental training needs • Make annual budgetary requirements for implementation of EMPs and forward to EMR
Dean, Faculty of Agriculture	• Process Owner of EMP on handling, use and disposal of agrochemicals • Assessment of departmental training needs • Make annual budgetary requirements for implementation of EMP and forward to EMR
Dean, Faculty of Veterinary Sciences	• Process Owner of EMP on handling and disposal of biomedical waste • Process Owner of EMP on handling, use and disposal of agrochemicals • Assessment of training needs • Make annual budgetary requirements for implementation of EMP and forward to EMR
Managing Director, EUIC	• Process Owner of EMP on handling, use and disposal of agrochemicals • Assessment of training needs • Make annual budgetary requirements for implementation of EMPs and forward to EMR
Estates Manager	• Process Owner of EMP on handling and disposal hazardous materials • Assessment of training needs • Make annual budgetary requirements for implementation of EMP and forward to

	EMR
Water Engineer	• In charge of the following EMPs: 1 Handling and disposal of Effluent 2 Solid Waste Management • Assessment of training needs • Make annual budgetary requirements for implementation of EMPs and forward to EMR
Coordinator, River Njoro Rehabilitation Project	• In charge of EMP on River Njoro Rehabilitation • Assessment of training needs • Make annual budgetary requirements for implementation of EMP and forward to EMR
All CoDs and Heads of Departments	• Implementation of the EMPs in collaboration with respective process owners • Identify departmental training needs in consultation with Liaison Officer(s)
Departmental EMS Liaison Officers	Assist the COD to: • Oversee the implementation of EMS in their respective departments • Identify areas for improvement in EMS in their respective departments • Avail to all stakeholders EMS documents and other relevant documents. • Implemen EMS objectives and targets relevant to departments. • Identify training gaps and recommend for training • Prepare respective departments for participation in all EMS activities including Environmental Clean-up Day and Environmental Audits • Establish emerging environmental aspects
All members of staff,	• Understanding the Environmental Policy

students, visitors and other stakeholders.	and EMS implementation process • Implementing individual activities in line with the EMS • Taking responsibility for impact that comes from individual activity

6.4.2 Competence, training and awareness

Egerton University shall ensure that any personnel performing tasks for or on its behalf, whose work may create significant environmental impact(s), are competent. The University has established, implements and maintains a procedure **EU/EMS/GP/03** to provide guidelines for conducting competence training and creating employee and stakeholder environmental awareness. The procedure covers general environmental awareness to all staff and public and competence training to staff whose tasks have a potential to cause significant environmental impact.

6.4.3 Communication

Egerton University has established a procedure for internal and external communication **EU/EMS/GP/04** to ensure effective and timely internal and external communication of environmental matters within the University. The university will communicate externally about its significant environmental aspects.

6.4.4 Documentation

Besides this EMS Manual that describes the core elements of the EMS, Egerton University EMS documents also consist of:

a) EMS Policy

b) Objectives, targets and programmes

c) Generic and Operational Procedures and associated forms
d) Documents, including records required by ISO 14001:2004
e) Documents, including records, generated during operation and control of processes that relate to its significant environmental aspects

Egerton University has established and maintains a document master list to track its EMS documents.

6.4.5 Control of Documents

Egerton University has established implements and maintains a procedure **EU/EMS/GP/05** for the identification, approval, review, update, re-approval, distribution and maintenance of documents that describe and control the EMS.

6.4.6 Operational Control

The University has established, implements and maintains Operational control procedures for those activities associated with each identified significant environmental aspect. The operational control procedures are documented, identified and approved in line with the procedure on Control of documents.

6.4.7 Emergency Preparedness and Response

Egerton University has established an environmental emergency preparedness procedure **EU/EMS/GP/06** to identify potential for and appropriate response to environmental accidents and emergency situations, and for preventing and mitigating associated environmental

impacts. The procedure is supported by work instructions that specify the response to take for respective emergency situation.

7.5 Checking

Measuring, monitoring and evaluating environmental performance are key activities of the EMS at Egerton University, which ensure that activities, products and services at the University are in accordance with the stated Environmental Management Programmes.

7.5.1 Monitoring and Measurement

Egerton University has established, implements and maintains a procedure **EU/EMS/GP/07** setting the process for monitoring and measuring parameters of the University operational activities products and services, which might have significant environmental impact. The procedure outlines requirements for recording information needed to track performance, relevant operational controls and conformity with the organization's environmental objectives and targets. The University shall ensure that monitoring and measuring equipment are calibrated or verified before use. Records of calibration shall be maintained.

7.5.2 Evaluation of Compliance

The University has established and maintains a documented procedure **EU/EMS/GP/08** for periodically evaluating compliance with relevant environmental legislation and other requirements to which it subscribes. The procedure applies to and covers all legal and non-legal environmental requirements that the University subscribes to.

7.5.3 Nonconformity, Corrective Action and Preventive Action

Egerton University has established, implements and maintains procedure **EU/EMS/GP/09** to ensure that all non-conformities identified in the University EMS are effectively addressed so that they do not recur. The procedure outlines the process for identifying, documenting, analysing non-conformities, implementing and reviewing effectiveness of corrective and preventive actions at the University.

7.5.4 Control of Records

Egerton University has established, implements and maintains procedure **EU/EMS/GP/10** to establish the control needed for identification, storage, protection, retrieval, retention and disposal of EMS records. The EMR and process owners have principal responsibility of implementing the procedure.

7.5.5 Internal Environmental Management System Audit

Egerton University has trained internal and lead auditors who periodically conduct internal audits to determine whether the EMS conforms to planned arrangements for environmental management, including requirements of ISO 14001 and whether the EMS has been properly implemented and maintained. An audit procedure **EU/EMS/GP/11** has been established and comprehensively covers the audit scope, frequency, methodologies applied and the responsibilities and requirements for conducting audits and reporting results. The EMR has principal responsibility of implementing the procedure.

6.6 Management Review

Egerton University conducts management review at least twice a year to cover all elements of the EMS so as to ensure its continuing suitability, adequacy and effectiveness in achieving the aims set out in the environmental policy, environmental objectives, targets and environmental management programmes. The scope of the review, chaired by the Vice Chancellor, shall be as prescribed by the ISO 14001:2004 standard.

EGERTON UNIVERSITY	
DOCUMENT: **Legal Requirements for EMS**	
Department: Corporate	**DOC NO**:
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.1
ISSUED BY: **EMR**	**AUTHORIZED BY: VC** 26th February 2015

SN	EMP	Regulation	Clause	Specific Provision
1	Handling, Use and Disposal of Agrochemicals	Environmental Management and Co-ordination (Waste Management) Regulations, 2006.	General Provisions	1) No person shall dispose of any waste on a public highway, street, road, and recreational area or in any public place except in a designated waste receptacle. 2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations.

				3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility.
			Pesticides and Toxic Substances	33. The Regulations made under the Pests Control Products Act relating to the classification, registration, labeling, packaging, advertising, import, export, distribution, storage, transportation, handling and disposal of pesticides shall apply to this Part. 34. No person shall dispose of any pesticide or toxic substance other than at a designated site or plant approved by the Authority.
		The Occupational Safety and Health Act (2007)	• Part II- General Duties • Part VI- Health General Provisions • Part VIII- Safety General Provisions • Part IX- Chemical Safety • Part X- Welfare General Provisions • Part XI- Health Safety and Welfare- Special Provisions • Part XII- Special Applications	

			• Part XIII- Offences, Penalties and Legal Proceedings	
2	Disposal of Biomedical Waste	Environmental Management and Co-ordination (Waste Management) Regulations, 2006.	Part VI Biomedical Waste	38. Any person who generates biomedical waste shall at the point of generation and at all stages thereafter segregate the waste in accordance with the categories provided under the Seventh Schedule to these Regulations 39. All biomedical waste shall be securely packaged in biohazard containers which shall be labeled with the symbols set out in Part I and II of the Eighth Schedule to these Regulations. 40. Any person who generates waste shall treat or cause to be treated all biomedical waste in the manner set out in the Ninth Schedule to these Regulations, before such biomedical waste is stored or disposed of. 41. The relevant lead agency shall monitor the treatment of all biomedical waste to ensure that such waste is treated in a manner that will not adversely affect public health and the environment 42. No person shall store biomedical waste above 0º C for more than seven days without the written approval of the relevant lead agency, provided that untreated pathological

				waste shall be disposed of within 48 hours.
3	Handling and Disposal of Effluent Environmental Management and Co-ordination (Waste Management) Regulations, 2006.		Responsibility of waste by generator	) No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. (2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations. (3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility
			Waste treatment by operators of disposal sites cap 265	13. Any operator of a disposal site or plant shall apply the relevant provisions on waste treatment under the Local Government Act and Regulations thereunder to ensure that such waste does not present any imminent and substantial danger to public health, the environment and natural resources.
4	Handling and Disposal of Hazardous Material	Environmental Management and Co-ordination (Waste Management) Regulations,	Segregation of waste by generator	• Any people whose activities generate waste, shall segregate such waste by separating hazardous waste from non-

		2006.		hazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority.
		The Occupational Safety and Health Act (2007)	• Part II- General Duties • Part VI- Health General Provisions • Part VIII- Safety General Provisions • Part IX- Chemical Safety • Part X- Welfare General Provisions • Part XI- Health Safety and Welfare- Special Provisions • Part XII- Special Applications • Part XIII- Offences, Penalties and Legal Proceedings	
5	Disposal of Solid Waste Environmental Management and Co-ordination (Waste Management) Regulations, 2006. The Occupational Safety and Health Act (2007)		Responsibility of waste by generator	1) No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. (2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations. (3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who

			is licensed to transport and dispose off such waste in a designated waste disposal facility.
		Segregation of waste by generator	5. (1) Any person whose activities generate waste, shall segregate such waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority.
		Cleaner production principles	6. (1) Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles: improvement of production process through: conserving raw materials and energy (ii) eliminating the use of toxic raw materials within such time as may be prescribed by the Authority (iii) reducing toxic emissions and wastes monitoring the product cycle from beginning to end by: identifying and eliminating potential negative impacts of the product. (ii) Enabling the recovery and re-use of the product where possible. (iii) Reclamation and recycling. (c) incorporating environmental concerns in

				the design, process and disposal of a product
			Waste treatment by operators of disposal sites Cap 265	13. Any operator of a disposal site or plant shall apply the relevant provisions on waste treatment under the Local Government Act and Regulations thereunder to ensure that such waste does not present any imminent and substantial danger to public health, the environment and natural resources.
		The Occupational Safety and Health Act (2007)	• Part II- General Duties • Part VI- Health General Provisions • Part VIII- Safety General Provisions • Part IX- Chemical Safety • Part X- Welfare General Provisions • Part XI- Health Safety and Welfare- Special Provisions • Part XII- Special Applications • Part XIII- Offences, Penalties and Legal Proceedings	

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Monitoring and Measuring Environmental Parameters	
DEPT: Corporate	**DOC NO**: EU/EMS/GP/07
DATE OF ISSUE: October 2013	**ISSUE NO**:01 **REV NO**.01
ISSUED BY: EMR	**AUTHORIZED BY**: Vice Chancellor 26th February, 2015

1.0 Purpose: To measure and monitor environmental parameters of Egerton University operational activities, products and services that might have significant environmental impact.

2.0 Scope: To measure and monitor environmental parameters within Egerton University and Nakuru Town Campus College.

3.0 References:

3.1 14001: 2004 Environmental Management Systems

3.2 ISO 14004: 2004 Environmental Management Systems –

3.3 EMCA – Environmental Management and Coordination Act 1999

3.4 KEBS Calibration Standards

3.5 The standards Act Cap 496 2002

3.5 Weights and Measures Act Cap 513, 1993

3.6 Waste Management Regulations, 2006

4.0 Terms and Definitions

4.1 EMR Environmental Management representative

4.6 EU Egerton University

5.0 Responsibilities:

5.1 EMR shall ensure the procedure is effectively implemented

6.0 Method

6.1 The EMR in consultation with EMS team shall determine the key characteristics to be measured and recorded in respect of Egerton University functions, activities, products and services that are likely to have potential significant environmental impacts

6.2 The records of monitored environmental parameters associated with activities, products and services (EU/EMS/FM/08) will include details such as:

6.2.1 Measurement attributes and frequency

6.2.2 Report of measurements with information on deviation from normal where applicable

6.2.2 Key environmental characteristics measured and monitored and

6.2.4 Reference to appropriate calibration equipment where necessary

6.3 Records generated shall be controlled as per procedure on control of records

6.4 Measurement and monitoring of key environmental characteristics shall be carried out as detailed in the appropriate procedure pertaining to that aspect

6.5 Egerton University management shall ensure that appropriate financial, human and technological resources are available to measure and monitor identified parameters

6.6 The EMR and Human Resource department shall ensure that staff involved in measurements have relevant competence to accomplish those tasks

7.0 Appendices

7.1 Measurement and Monitoring Form: EU/EMS/FM/08

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Handling and Disposal of Effluent	
DEPT: Water and Sanitation	**DOC NO**. : EU/EMS/OP/05
DATE OF ISSUE: Feb 2015	**ISSUE NO**: **REV NO**
ISSUED BY: EMR	**AUTHORIZED BY**: DVC A&F 26th February 2015

1.0 Purpose: To identify the levels of pollutants in the effluent from Egerton University and to minimize significant impacts on the environment.

2.0 Scope: All Egerton University sections

3.0 References:

3.1 ISO 14004:2004 Environmental management system

3.2 EMCA 2006: Waste management regulation

3.3 Public Health Act 2012

4.0 Terms and Definitions:

4.1 EMS – Environmental management system

4.2 Effluent – Liquid waste flowing out of a institution, farm, commercial establishment, or a household into a water body such as a river, lake, or lagoon, or a sewer system or reservoir.

4.3 EMCA – Environmental Management and Coordination Act

4.4 Environmental aspects – Those elements of Egerton University's activities, products or services that are likely to interact with the environment.

4.5 Environmental impact – Environmental impacts are those changes to the environment, adverse or beneficial, wholly or partially resulting from its activities, products or services.

4.6 Environment – Surroundings in which Egerton University operates including Air, Water, Land, Natural Resources, Flora and Fauna, Humans, and their inter-relation.

4.7 EMR – Environmental Management Representative

5.0 Responsibility

The Water Engineer shall ensure the procedure is implemented.

6.0 Method:

6.1 The Water Engineer shall biennially evaluate the efficiency of the effluent system.

6.2 The Water Engineer shall biennially monitor the status of the effluent receptacle (volume) and fill in the details in form EU/EMS/FM/12

6.3 The Water Engineer shall monitor the levels of pollutants in the effluent at the waste treatment ponds/lagoons biennially.

6.4 The Water Engineer shall review the records and recommend remedial measures if necessary

6.5 The Water Engineer shall ensure that annual Environmental Audits are undertaken for the effluent system

6.6 After every five years, the Water Engineer shall evaluate the efficiency of the effluent management system and perform the desludging.

6.7 In case of an emergency (over flow, clogging, bursting) remedial action should be taken using work instruction EU/EMS/WI/02

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Solid Waste Disposal	
DEPT: Water & Sanitation	**DOC NO** : EU/EMS/OP/04
DATE OF ISSUE: February, 2015	**ISSUE NO**:01 **REV NO**.01
ISSUED BY: EMR	**AUTHORIZED BY**: DVC (A&F) 26th February, 2015

1.0 Purpose: To prevent environmental pollution and ensure compliance with EMCA (Waste Management Regulations, 2006) requirements for disposal of solid waste.

2.0 Scope: This procedure covers all activities related to solid waste collection and disposal at Egerton University Njoro Campus

3.0 References

3.1 **ISO 14001-2004:** EMS requirements with guidance for disposal

3.2 **ISO 14004-2004:** EMS- General guidelines on principles, systems and support Techniques

3.3 **EMCA:** 2006 Waste management regulations

3.4 Public Health Act Cap 242

3.5 County by-laws

3.6 Occupational Safety and Health Act 2007 Cap 514

4.0 Terms and Definitions

4.1 **Solid waste:** any discarded materials in solid, semi-solid form arising from industrial, agricultural, mining and community activities.

4.2 **CPHO**: Chief Public Health Officer

4.3 **Environmental impact -** Environmental impacts are those changes to the environment, adverse or beneficial, wholly or partially resulting from its activities, products or services.

4.4 **Environment** - Surroundings in which Egerton University operates including Air, Water, Land, Natural Resources, Flora and Fauna, Humans, and their inter-relation

4.5 **EMR** - Environmental Management Representative

4.6 **EMS:** Environmental Management System

4.7 **EMC**A: Environmental Management and Coordination Act.

4.8 **Sanitary landfill**; a site where waste is isolated from the environment until its completely safe..

4.9 **Segregation**: Any activity that separates waste materials for processing

4.10 **SPO**: Senior Procurement Officer

4.11 **Waste Management:** refers to activities, administrative and operational, that are used

in handling, packaging, treatment, conditioning, reducing, recycling, re-using, storage and disposal of waste

4.12 **WSD**: Water and Sanitation Department

5.0 Responsibilities

5.1 The Water Engineer shall be responsible for the effective implementation of this procedure.

6.0 Method

6.1 The Water Engineer shall organize a sensitization workshop on procedures for safe solid waste disposal.

6.2 The Water Engineer shall communicate information on different receptacle colour codes to all EU staff & students (Table 7.1)

6.3 The Water Engineer shall make sure that waste receptacle structures are constructed at strategic points

6.4 The SPO shall purchase and the Water Engineer shall distribute bins to all functional units within EU for solid waste segregation

6.5 The Estate Manager shall ensure that bins are labelled appropriately.

6.6 All staff, students, residents and visitors while within EU shall segregate solid waste at source into organics, paper, glass/e-waste and plastics.

6.7 The Water Engineer shall ensure sorting of solid waste at the receptacle as per Table 7.1

6.8 The Estate Manager will oversee transfer of the segregated waste to recyclers

6.9 The Water Engineer shall oversee transfer of the organic waste to sanitary landfill.

6.10 The Water Engineer shall ensure that the landfill is licenced and renewed on annual basis.

6.11 In case of spills or accidental disposal of solid wastes, follow steps in (EU/EMS/WI/01) to avoid environmental pollution.

6.12 The Water Engineer shall coordinate the monthly environmental clean

Table 7.1: Colour Codes for Segregating Solid Waste

Category of Waste	**Colour**
Paper	White
Plastic	Yellow
Glass/ E-waste	Red
Organic	Green

7.0 Appendices

7.2 Work instruction in case of spillage of solid wastes EU/EMS/WI/01

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Handling and Disposal of Biomedical Waste	
DEPT: FHS, FVMS	**DOC NO**: EU/EMS/OP/06
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.02
ISSUED BY: EMR	**AUTHORIZED BY**: DVC AA Rone A Mwonya 26th February 2015

1.0 Purpose: To ensure compliance with EMCA requirements for handling and disposal of biomedical waste and prevention of environmental pollution.

2.0 Scope: This procedure covers all activities related to biomedical waste disposal in Egerton University health and teaching facilities.

3.0 References

3.1 ISO 14001-2004: EMS requirements with guidance for disposal

3.2.1 ISO 14004-2004: EMS- General guidelines on principles, systems and support techniques

3.3 EMCA: 1999 (2006 Waste management regulations)

3.4 Public Health Act Cap 242

3.5 County by-laws

3.6 Occupational Safety and Health Act 2007

3.7 Human Anatomy Act cap 249

3.8 Meat control Act cap 356

4.0 Terms and Definitions

4.1 Biomedical wastes: any waste that falls in the categories provided under the 7th schedule of EMCA (waste management 2006 Part VI Biomedical Wastes)

4.2 FHS: Faculty of Health Sciences

4.3 FVM: Faculty of Veterinary Medicine

4.2 CMO: Chief Medical Officer

4.3 CPHO: Chief Public Health Officer

4.4 COD: Chair of Department

4.5 Environmental impact - Environmental impacts are those changes to the environment, Adverse or beneficial, wholly or partially resulting from its activities, products or Services of an institution or organisation

4.6 Environment - Surroundings in which Egerton University operates including Air, Water, Land, Natural Resources, Flora and Fauna, Humans, and their inter-relation

4.7 EMR - Environmental Management Representative

4.8 EMS: Part of Egerton University's Management System used to develop and implement its environmental policy and manage its environmental aspects

4.9 EMCA 1999: Environmental Management and Coordination Act

4.10 Incineration: The controlled burnings of solids, liquids, gaseous combustible wastes to produce gases and residues continuing little or no combustible materials

4.11 Segregation: Any activity that separates waste materials for processing

4.12 SPO: Senior Purchasing Officer

4.13 Waste management: means the activities, administrative and operational, that are used in handling, packaging, treatment, conditioning, reducing, recycling, re-using, storage and disposal of waste.

5.0 Responsibilities

5.1 Dean FHS, Dean FVMS shall have the principal responsibility for the effective implementation of this procedure.

6.0 Method

6.1 The Dean Faculty of Health Sciences and Dean FVMS shall organize a sensitization workshop on procedures for biomedical waste disposal.

6.2 The Dean Faculty of Health Sciences and Dean FVMS shall communicate information on different receptacle colour codes to all biomedical staff

6.3 The Senior Purchasing Officer shall purchase biomedical waste receptacles (as per colour codes in the eight schedule of EMCA waste management regulations (2006)) for installation at various designated points at Njoro and Nakuru Town Campus College.

6.4 The Dean FHS and Dean FVMS shall ensure that the receptacles are properly installed.

6.5 The Dean FHS and Dean FVMS shall ensure that staff and students handling biomedical waste are provided with personal protective equipment.

6.6 The staff and students working in the health and teaching facilities shall segregate (as per the seventh schedule of EMCA - Waste Management Regulations (2006)) and treat biomedical waste (as per the ninth schedule of EMCA waste management regulations (2006)) before disposal

6.7 The paramedic staff assigned shall use work instructions (EU/EMS/WI/03) for storage of biomedical waste and ensure that containers or packages for biomedical waste are secure and labelled appropriately with legible characters written in English and Kiswahili as required by EMCA regulations 2006 section 24.

6.8 The Dean FHS and Dean FVMS shall ensure that there are adequate storage facilities for biomedical wastes

6.9 The paramedic staff assigned to various health and teaching facilities shall use work instructions for disposal of biomedical waste and ensure that packages or containers are appropriately labelled with legible characters in English and Kiswahili as required by EMCA (waste management) Regulations 2006, section 24.

6.10 The paramedic staff assigned shall develop or apply labels for warning or caution statements for biomedical wastes, which may include any of the following as appropriate e.g.:

6.9.1 The words **"WARNING"** or **"CAUTION"**;

6.9.2 The word **"POISON"** (marked indelibly in red on a contrasting background;

6.9.3 The words **"DANGER! KEEP AWAY FROM UNAUTHORIZED PERSONS"**;

6.9.4 A pictogram of skull and crossbones

6.9.5 A statement of first aid measures, including the antidote when inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately.

6.11 The Chief Technologist in respective health and teaching facility shall monitor biomedical waste disposed of using Form EU/EMS/FM/13

6.11 Chief Technologist assigned in respective health and teaching facility shall ensure that all packages containing treated biomedical wastes are safely transported and incinerated at Njoro and PGH facilities.

6.12 In case of spills or accidental disposal of biomedical wastes follow steps in EU/EMS/WI/04 to avoid environmental pollution

7.0 Appendices

7.1 Biomedical waste disposal monitoring form EU/EMS/FM/13

7.2 Work instruction for storage of biomedical waste EU/EMS/WI/03

7.3 Work instruction for accidental disposal of biomedical waste EU/EMS/WI/04

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for River Njoro Stabilization	
DEPT: NRRP	**DOC NO**: EU/EMS/OP/03
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.01
ISSUED BY EMR	**AUTHORIZED BY**: DVC R& E 26th February 2015

1.0 Purpose: Restore the ecological functions of River Njoro.

2.0 Scope: River Njoro and the riparian communities within 2 Km radius of Egerton University.

3.0 References:

3.1 ISO 14001: 2004 Environmental Management Systems- Requirements with guidance for use

3.2 Water Act 2002

3.3 Forest Act 2005

3.4 Crop and Livestock Production Act CAP 321

3.5 Current Strategic Plan of Egerton University (2009-2015)

4.0. Terms and Definitions:

4.1 FERD – Faculty of Environment and Resources management

4.2 NRRP – Njoro River Rehabilitation Project

5.0. Responsibilities:

5.1 The DVC RE shall be responsible for provision of resources.

5.2 The Coordinator NRRP shall be responsible for ensuring the enforcement of the procedure.

6.0. Method

6.1 The Coordinator NRRP in collaboration with other stakeholders shall develop a management plan for rehabilitation of River Njoro by February 2015.

6.2 The Coordinator NRRP shall ensure appropriate trees are planted along River Njoro Bank.

6.3 The Coordinator NRRP shall conduct River Njoro bank cleaning and erosion control exercises annually.

6.4 The Coordinator NRRP shall conduct local communities' annual sensitization seminars and workshops on rehabilitation of Njoro river

6.5 The Coordinator NRRP shall establish a protocol for monitoring the ecological health of River Njoro using EU/EMS/FM/10 Form

7.0 Appendices

7.1 Schedule for monitoring of ecological health of Njoro River **EU/EMS/FM/10**

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for environmental education	
DEPT: FERD	**DOC NO** : EU/EMS/OP/01
DATE OF ISSUE: February 2015	**ISSUE NO**: 01 **REV NO**.01
ISSUED BY: EMR	**AUTHORIZED BY**: DVC (AA) Rone A Mwonya 26th February 2015

1.0 Purpose: To ensure that environmental technologies and information reach a wide range of stakeholders.

2.0 Scope: This procedure covers dissemination of environmental education and general environmental awareness to all EU staff, students and public whose activities have a potential to cause significant positive environmental impact.

3.0 References:

3.1 **ISO 14001:** 2004 Environmental management systems - Requirements with guidance for use

3.2 **ISO 14004:** 2004 General guidelines on principles, systems and support techniques

4.0 Terms and Definitions

4.1 **Environmental education** - is a process that aims to develop an environmentally literate citizenry that can compete in our global economy, has the skills, knowledge, and inclinations to make well-informed choices, and exercises the rights and responsibilities of members of a community.

4.2 **Environmental awareness** – Consciousness of impacts of one's actions on the surroundings (land, water, air, etc.)

4.3 **Top Management** – The organ in charge of resource mobilization and allocation (UMB).

5.0 Responsibility:

5.1 The Dean FERD has the principal responsibility of ensuring that dissemination of environmental education is provided and shall ensure that environmental awareness is conducted appropriately to EU staff, students and surrounding communities.

6.0 Method

6.1 Dean, FERD shall prepare training materials meant for environmental education and awareness creation.

6.2 The Dean FERD shall communicate information on emerging environmental issues through various channels e.g. workshops, SMS, social media platforms, University website every two years.

6.3 Organize environmental conservation event annually involving the local community.

6.4 Publish at least two issues of EU EMS Newsletter annually.

EGERTON  **UNIVERSITY**	
SUBJECT: Procedure for Students' Orientation	
DEPT: Office of the Dean of Students	**DOC NO**. : EU/AA/OP/04
DATE OF ISSUE: June 2013	**ISSUE NO**: 01 **REV. NO.:** 01
ISSUED BY: Management Representative	**AUTHORIZED BY**: DVC (AA) Rone A Nwonya 17th June, 2013

0.1 DOCUMENT CHANGES

DATE	DETAIL OF CHANGES	AUTHORIZED BY

1.0 PURPOSE

To ensure proper university familiarization by new students who shall acquire vital information on various aspects of the university

2.0 SCOPE

This procedure is meant for newly admitted students

3.0 REFERENCES

3.1 Student handbook

3.2 Student's bond of conduct

3.3 Student's rules and regulations form

4.0 DEFINITION OF TERMS AND ABBREVIATIONS

4.1 VC – Vice-chancellor

4.2 DOS – Dean of Students

4.3 ADM –Administrator

4.4 SUEU – Students' Union of Egerton University

5.0 RESPONSIBILITIES

Dean of Students

6.0 METHOD

6.1. The ADM shall issue to new students the orientation programme, Student handbook, Student's bond of conduct and the Student's rules and regulations form on the first day of reporting

6.2 The ADM and Students' Counselors shall guide new students on systematic registration procedures

6.3 The ADM and Counselors shall organize for addresses by key members of University during the orientation week.

6.4 The ADM, Students' Counselors and SUEU shall organize for a Campus tour for the new students during the orientation week.

6.5 The DOS shall organize for the VC to address new students during the orientation week.

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Emergency Preparedness and Response	
DEPT: Corporate	**DOC NO** : EU/EMS/GP/06
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.01
ISSUED BY: E.M.R	**AUTHORIZED BY**: Vice Chancellor 26th February 2015

0.1 DOCUMENT CHANGES

Date	Changes	Authorized by
November 2014	**Inclusion of 6.1.1** The EMR shall identify the potential emergencies in the significant aspects and prepare a risk analysis framework. Inclusion of 6.1.2The DPROs shall prepare a schedule for testing the mitigation/ preventive actions/procedures indicated in the risk analysis framework. The drill shall be conducted (where applicable) once a year	**Vice Chancellor**
	Rewritting of 6.1. 3 to read:The EMR shall review the procedures/ plans for potential environmental emergencies after the occurrence of an environmental emergency or accident for effectiveness.	
	Deletion of 6.1.3 , 6.1.4 and 6.1.7	
	Inclussion of timeline on 6.1.6 to read:The DPROs shall, semi-annually inspect and advice on the status of University facilities to avoid environmental emergencies	

1.0. Purpose: To identify potential and actual emergency situations and accidents that can have an impact on the environment and how the University will respond to them.

2.0 Scope: This procedure covers actual and potential environmental emergencies and accidents arising from EU activities.

3.0 References:

3.1 ISO 14001:2004 Environmental management systems – Requirements with guidance for use

3.2 ISO 14004: 2004 Environmental Management Systems - General guidelines on principles systems and support techniques

3.3 ISO 18001: 1996 Occupational Health and Safety assessment series

3.4 The Occupational Safety and Health Act, 2007, Cap 514

3.5. EMCA 2006

3.6 OSHA-Occupational Safety and Health Act, 2007, Cap 514

4.0 Terms and Definitions

4.1 EU -Egerton University

4.3 EMR-Environmental Management Representative

4.4 HRM-Human Resource Manager

4.5 EMCA-Environmental Management and co-ordination Act 2006

4.6 DPRO- Disaster Preparedness and Response Officers

5.0. Responsibilities:

5.1 The CSO, CMO, Water Engineer and Estates Manager shall have the principal responsibility to ensure that this procedure is effectively implemented.

6.0 Method

6.1 Emergency Preparedness

6.1.1 The EMR shall identify the potential emergencies in the significant aspects and prepare a risk analysis framework.

6.1.2 The DPROs shall prepare a schedule for testing the mitigation/ preventive actions/procedures indicated in the risk analysis framework. The drill shall be conducted (where applicable) once a year

6.1. 3 The EMR shall review the procedures/ plans for potential environmental emergencies after the occurrence of an environmental emergency or accident

6.1.4 DPROs shall create awareness on the respective environmental emergency preparedness and response to concerned staff on an annual basis and shall review the staff emergency preparedness competence and record the training needs using form EU/EMS/FM/04.

6.1.5 PROs and Human Resource Manager (HRM) shall ensure that personnel working in areas with potential of environmental emergencies are adequately trained in emergency management.

6.1.6 The DPROs shall semi-annually inspect and advice on the status of University facilities to avoid environmental emergencies

6.2 Responses

6.2.1 In case of an environmental emergency use work instruction EU/EMS/WI/06

6.2.2 The DPROs shall prepare a report detailing the cause of the emergency and the response action taken.

7.0 Appendices

7.1 Training Needs Assessment Form EU/EMS/FM/04

7.2 Schedule for drills

7.3 Disaster preparedness plan/ framework

EGERTON UNIVERSITY	
DOCUMENT: Procedure for handling, use and disposal of agrochemicals	
DEPT: Dean FoA, MD EUIC, Dean VET. MED & SPO.	**DOC NO**: EU/EMS/OP/07
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.01
ISSUED BY: **EMR**	**AUTHORIZED BY: DVC (AA)** Rone A Nwonya 26th February 2015

1.0 Purpose: To prevent environmental pollution and comply with EMCA (1999).

2.0. Scope: This procedure will apply to all Egerton farms and departments handling agrochemicals in the Njoro campus,

3.0. References:

3.1 **ISO 14001:** 2004 Environmental Management Systems – Requirements with guidance for use

3.2 **ISO 14004: 2004** Environmental Management Systems - General guidelines on principles systems and support techniques

3.3 **EMCA 1999:** Waste Management Regulations, 2006 Part V

3.4 Pesticide Control Act Cap 346 of the Laws of Kenya of 1982

3.5 OSHA, 2007

4.0. Terms and Definitions

4.1 **MD-EUIC**– Managing Director of Egerton University Investments Company

4.2 **EMR** - Environmental Management Representative

4.3 **EMCA** - The Environmental Management and Co-Ordination Act

4.4 **EU** - Egerton University

4.5 **FVMS** – Faculty of Veterinary Medicine and Surgery

4.6 **FOA** – Faculty of Agriculture

4.7 **HR**-Human Resources

4.8 OSHA: Occupation Safety and Health Act

4.8 PO- Procurement Office

4.8 **SPO** – Senior Procurement Officer

4.9 **Agrochemicals** - Chemicals used to improve the quality and the quantity of farm produce e.g. *P*esticides, insecticides, herbicides and fertilizers

5.0 Responsibilities:

The Managing Director –Egerton University Investment Company Limited and Dean FOA and Dean FVMS shall be responsible for implementation of this procedure

6.0 Method

6.1.1 The MD-EUIC and Dean FOA/ FVMS and SPO shall conduct annual workshops to sensitize the EU staff handling agrochemicals and service providers on proper use of the agrochemicals

6.2 The MD-EUIC and deans FOA/ FVMS and SPO shall assign a qualified staff to classify and label the agro chemicals used for safe storage.

6.3 The MD-EUIC and Deans FOA/ FVM&S and SPO shall build / designate appropriate holding facilities for agro chemicals at the EU farms/stores

6.4 The MD-EUIC and Dean FOA/ FVM&S and SPO shall maintain a schedule for handling and use of agrochemicals using form EU/EMS/FM/14

6.5 The MD-EUIC and Dean FOA/ FVMS shall ensure that all the agrochemical residuals and containers are safely disposed of using procedure using form EU/EMS/FM/15 for disposal of agrochemicals.

6.6 In case of emergency spills of agrochemicals, follow the work instruction EU/EMS/WI/05 to remedy the situation.

7.0 Appendices

7.1 Form …Monitoring of Agrochemical handling and use EU/EMS/FM/14

7.2 Form …..Monitoring Agrochemical wastes disposal form EU/EMS/FM/15

7.3 Work instruction for emergency spills of agrochemicals EU/EMS/WI/05

EGERTON  **UNIVERSITY**	
DOCUMENT: Procedure for Handling and Disposal of Hazardous Materials	
DEPT: FOA/FHS/FVHS/FS	**DOC NO**: EU/EMS/OP/08
DATE OF ISSUE: February 2015	**ISSUE NO**:01 **REV NO**.01
ISSUED BY: EMR	**AUTHORIZED BY**: DVC (A&F) 26th February 2015

1.0 Purpose: To prevent environmental pollution and comply with EMCA regulations on waste management (2006) in respect to hazardous materials

2.0. Scope: This procedure will apply to all Egerton University production units and teaching facilities handling hazardous material in Njoro Campus and Faculty of Health Sciences, Nakuru.

3.0. References:

3.1 **ISO 14001:** 2004 Environmental Management Systems – Requirements with guidance for use

3.2 ISO 14004: 2004 Environmental Management Systems - General guidelines on principles systems and support techniques

3.3 **EMCA 1999:** Waste Management Regulations 2006

3.4. Occupational Safety and Health Act (OSHA) (2007)

4.0. Terms and Definitions

4.1 **CPHO** – Chief Public Health Officer

4.2 **DVC (AA)** – Deputy Vice Chancellor in charge of Academic Affairs

4.3 **DVC (A&F)** – Deputy Vice Chancellor in charge of Administration and Finance

4.4 **FOA** – Faculty of Agriculture

4.5 **FHS** – Faculty of health Sciences

4.6 **FVHS**- Faculty of Veterinary Heath Sciences

4.5 **EIA/A** – Environmental Impact Assessment and Audit

4.6 EMS - Environmental Management System

4.7 **EMR** - Environmental Management Representative

4.8 **EMCA** - The Environmental Management and Co-Ordination Act

4.9 **LPO** – Local Purchase Order

4.10 **MSDS** – Material Safety Data Sheet

4.11 **PPE** – Personal Protective Equipment

4.12 **SPO** – Senior Procurement Officer

4.13 R- ADMIN- Registrar Administration

4.14 **Hazardous material** - Any waste specified in the Fourth Schedule or any waste having the characteristics defined in the Fifth Schedule of EMCA (Waste management) Regulations 2006.

5.0 Responsibilities:

5.1 The Estates Manager and CPHO shall have the principal responsibility to ensure that this procedure implemented.

6.0 Method

6.1 The SPO shall ensure all Local Purchase Orders (LPOs) for hazardous materials contain a requirement for the delivery of the respective Material Safety Data sheet (MSDS).

6.2 The Registrar Administration shall provide staff and clients handling or disposing hazardous material with Personal Protective Equipment (PPE) to avoid contacts

6.3 The Estates Manager shall supply segregation bins for temporary storage of hazardous waste at source to avoid contamination of the environment.

6.4 The Estates Manager shall ensure construction of a facility for disposal of hazardous waste from the environment.

6.5 The Estates Manager and Chief Technologists shall ensure all areas where hazardous materials are stored are prominently labelled and secured to avoid environmental pollution.

6.6 The Estates Manager shall ensure that the environmental impact assessments and audits (EIA/EA) for sections using hazardous material are conducted.

6.7 The EMR shall ensure that the EMS core team, the Internal Auditors and the Lead Auditors are trained to conduct (EIA/EA) internal audits for preventive action.

6.1.8 The EMR shall avail relevant laws and regulations on handling, storage and disposal of hazardous materials.

6.2 Storage of hazardous wastes

6.3.1 Farms managers and chief technologists shall monitor the handling and storage of hazardous material using EU/EMS/FM/20

6.3 Disposal of hazardous wastes

6.4.1 The Chief Technologists shall ensure work instructions EU/EMS/WI/07 for disposal of hazardous wastes as per EMCA (1999).

6.5 Precautions

6.5.1 Estates Manager, CPHO and chief technologists shall develop and erect notice boards

for warning, with cautionary statements for hazardous wastes as follows;

6.5.1.1 The words **"WARNING"** or **"CAUTION"**;

6.5.1.2 The word **"POISON"** (marked indelibly in red on a contrasting background; a

6.5.1.3 The words **"DANGER! KEEP AWAY FROM**

6.5.1.4 **UNAUTHORIZED PERSONS not allowed"**; and also

6.5.1.5 A pictogram of a skull and crossbones

6.5.1.6 A statement of first aid measures, including the antidote when inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately.

6.5.3 The CPHO and Chief Technologists shall incinerate the hazardous waste as prescribed in the third schedule of EMCA waste management regulations 2006.

6.5.4 The Chief Technologists shall use work instruction EU/EMS/WI/06 (on emergency preparedness and response) to ensure that all staff handling hazardous material are prepared in case of any emergency.

7.0 Appendices:

7.1 Hazardous material handling monitoring form- EU/EMS/FM/20

7.2 Hazardous waste disposal monitoring form- EU/EMS/FM/FM/21

7.3. Hazardous Material Emergency preparedness and response work instruction- EU/EMS/WI/06

7.4 Work instruction for disposal of hazardous material EU/EMS/WI/07

Africa Center for Public Health and Herbal Medicine (CEPHEM)

Environment and Social Management Plan

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1. Introduction

The African region is faced with a double burden of communicable and non-communicable diseases. Diseases such as malaria, tuberculosis, HIV and AIDS and neglected tropical diseases (NTD) as well cardiovascular diseases and diabetes cause significant morbidity and mortality on the content. Further, Africa is urbanizing quickly to the extent that the proportion of countries with 20% or more of their population living in urban areas is increasing. Urban areas are suffering from communicable diseases such as those related to water, sanitation and hygiene (WASH) as well as non-communicable diseases associated with smoking, alcohol, stress,

obesity and illicit drug use. Disparities between the wealthy and the poor contribute to the deteriorating health status of communities.

Natural products (e.g. herbs) are a source of many medicines even though there is increased prominence of synthetic medicines. The growing antimicrobial resistance globally also calls for alternative effective therapies. While these herbal remedies may be used, often, the dosage and toxicity remain undetermined for many natural remedies. Heavy metal contamination for instance, is a real concern so is drug-herbal interactions that may negatively affect the health of users.

The objective of the African Centre of Excellence for Public Health and Herbal Medicine is to improve human public health through the development of human capacity in public health practice and research in urban areas. Further we aim to develop the human capacity for herbal medicine in practice, research, identification and industrialization. Such human capacity develop will further contribute to the training and education of themselves, others, engage in multi-disciplinary endeavors of teaching and research and establish linkages or networks with colleagues in the region and elsewhere as well as rural communities from which many herbs are obtained. .

2. PROJECT OBJECTIVES

The CEPHEM aims are to build capacity through training at the MSc, MMED (Master in Medicine) and MPhil/PhD levels in Public Health and Herbal Medicine for the Eastern and Southern Africa. The center will establish basic and applied research programs for African scientists in collaboration with relevant researchers from outside the region to engage in high-impact (research) projects in urban public health on the one hand and herbal medicine on the other.

3. PROJECT DESCRIPTION

The project will engage in the following:

(i) Train at least 70 MSc/MPhil/MMED students in urban public health/herbal medicine

(ii) Train 26 PhD students in fields that are relevant to public health (e.g. adolescent health, health disparities) and herbal medicine

(iii) Conduct research in public health practice

(iv) Build the capacity of partner research and academic institutions in urban public health and herbal medicine

(v) Procure two project vehicles, relevant laboratory equipment and other project equipment

(vi) Construct the center's premises for office space, teaching and meeting venues

(vii) Conduct short term training workshops, support publications in peer-reviewed journals,

(viii) Implement faculty and student exchange,

(ix) Network with industry to commercialize products with the potential for the market

4: COST OF THE ACTION

Total cost of the project is estimated at $7,320,750 (Seven Million, Three Hundred and Twenty Thousand, Seven Hundred and Fifty USD).

5. IMPACT ON THE ENVIRONMENT

(i) The project activities have minimal environmental impact

(ii) There will be no displacement of human or large animal population as a result of the proposed building/construction. The Malawi College of Medicine will provide two hectares of land for the construction of the proposed ACE building. This land is already available on the main campus of the college.

(iii) travel to meetings, field work and the conferences will contribute to fossil fuel combustion products. However, this will not be more than what is usual for land and air travel.

6. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The management and coordination of environment issues Malawi is under the Department of Environmental Affairs in the Ministry of

Environment and Climate Change. The Constitution of Malawi (Republic of Malawi 1994; as amended) recognizes that responsible environmental management can make an important contribution towards achieving sustainable development, improved standards of living and conservation of natural resources. The Constitution states that the environment of Malawi should be managed in order to:

- prevent the degradation of the environment;
- provide a healthy living and working environment for the people;
- accord full recognition of the rights of future generations by means of environmental protection; and
- conserve and enhance the biological diversity.

Further, the government of Malawi in 1994 developed the National Environmental Action Plan (NEAP) through broad public participation and provides the framework for integrating environmental protection and management in all national development programmes with the view to achieving sustainable socio-economic development. The NEAP is often used as a reference document to guide planners, developers and development partners. Its key objectives include the following:

- To document and analyze all major environmental issues and identify measures to alleviate them;
- To promote sustainable use of natural resources; and
- To develop an environmental protection and management plan.

The College of Medicine is headed by a Principal as the Chief Academic and Administrative Officer (Dr Mwapatsa Mipando). He is support by the College Registrar (Mr Margret Longwe) and the College Finance Office (Mr Samson Kalulu is Acting). The College of Medicine is a public institution constituted by an Act of Parliament (University of Malawi Act, as amended in 1998). The main campus of the College of Medicine is located in Blantyre on land allocated by the government.

a) Road infrastructure

The College of Medicine main campus on which the CEPHEM will be located is on 1 Mahatma Gandhi Road. It is located on the other side of Ginnery Corner in Chichiri, Blantyre, Malawi. The site is 3 kilometers from Blantyre main commercial district. There exists paved and gravel

roads with the College's campus. There are two main entrances to the campus. During construction of the center, only one of the entrances will be used and appropriate road signs and speed calming measures will be introduced.

(b) Water supply

The College of Medicine obtains piped water from Blantyre Water Board. The Board draws its water from Shire River, the outlet of Lake Malawi which drains into the Zambezi. The college has also two large elevated water tanks for student and office use. The water for construction will be obtained from the piped water as supplied by Blantyre Water Board. The College of Medicine may receive water from Blantyre Water Board via bowsers when there is water shortage. Such water may not be used for construction as it is only provided during water scarcity arising whether there is a burst pipe or significant challenges at the water treatment plants.

(c) Storm and Waste Water Management

There are multiple gutters and drains to direct storm water drainage into the environment. Further waste water from the building will be connected to the institutes water systems.

10. POTENTIAL ENVIRONMENTAL IMPACTS

The CEPHEM is expected to have minimal negative environmental impact. The main environmental impact will arise from our harvesting of leaves, barks, roots and other plant materials. The construction that will go on has potential to have dust released, noise levels to increase and plants uprooted.

11. ENVIRONMENTAL MANAGEMENT APPROACH

The harvesting of plants materials will be done. We will ensure that we do not harvest to the extent that the parent plant dies or is significantly

harmed. We will be working with the National Botanical Gardens and the Forestry Research Institute of Malawi (FRIM), both of whom conduct botanical research and are actively involved in plant preservation and breeding. Advice from FRIM and the Botanical Gardens will be sought from time to time to guide us as to the safe planting harvesting technique. Further, the Botanical Gardens and Forestry Research Institute often propagate medicinal plants. We will also conduct assessments/monitoring as to the center's contribution to environmental harm and when known immediately institute remedial measures.

In order to reduce dust, there will be sprinkling of water on the access roads. Further, plant and vehicles which do not make significant amounts of noise will be preferred.

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During the construction and operation phases of the CEPHEM the following measures will be implemented because of their potential adverse impact on the environment:

(a) Sanitation facilities

Waste water management system for the construction site will be connected to the campus waste water systems/waste water stabilization ponds where final effluent is discharged for treatment before being released to the environment.

(b) General waste disposal

Waste will inevitably be generated during construction. These will include: wood, cement bags, electric waste, plumbing waste, roofing wastes, quarry, boxes, and plastics. The contractors will be responsible for the disposal of these substances.

Laboratory wastes including animal tissues/carcasses will be disposed off according to standard operating procedures which will be adapted for our laboratories..

(c) Health and safety services

Workers and research staff who may be exposed to dust, fumes and other hazards, these will be provided with Personal Protective Equipment (PPE) such as air mask, gloves, googles and boots. There will be restriction of entry to labs, construction sites by unauthorized people.

The building will have the necessary firefighting equipment. Regular fire drills will be done. Fire assembly point will be created. There will be adequate poster reminders of measures to prevent fires.
The College of Medicine's policy is to contract out hygiene and sanitation services.

Travel and Transport
We will travel to conferences using motor vehicle and air travels. Both these contribute to fossil fuel products. We will ensure that we combine several trips into one such that repeated travel is minimized.

12. MONITORING AND EVALUATION

The following will be done:
(ii) The Deputy Team leader will ensure that there is monitoring, evaluation and reporting to center management
(iii) Monitoring and Evaluation by the Director of Quality Assurance of the college
(iii) A monitoring and evaluation framework will be created
(iii) The Center Director will report to the World Bank as required.

13. GOVERNANCE

The Deputy Team Leader, Dr Fanuel Lampiao will be the lead for environmental and social management of the Center of Excellence at the University of Malawi-College of Medicine. A three person team will be meeting to assess, provide oversight and report on risks and mitigation measures relating to the environment and society. In the matrix below, we have presented our current estimate of environmental and social risk

and what we intend to deal with those threats.

Table 1: Specific Social and Environmental Risk association with CEPHEM

ITEM	CHECKLIST REQUIRED	DESCRIPTION	COMMENTS/
1. New construction/Refurbishments of buildings • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Increase in dust and noise from demolition and/or construction • Construction waste	YES	Air Quality (a) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (b) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (c) There will be no open burning of construction / waste material at the site Noise (d) Construction noise will be limited to restricted times agreed to in the permit (e) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be	This will be done in liaison with the University/college guidelines and memorandum of understanding with the contractor

		closed, and equipment placed as far away from residential areas as possible Waste Management (f) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (g) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (h) Construction waste will be collected and disposed properly by licensed collectors (i) The records of waste disposal will be maintained as proof for proper management as designed.	
2. Handling / management of medical waste ● Clinical waste, sharps, pharmaceutical products	Yes	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly	Disposal of biological and clinical waste will be done in accordance with waste management guidelines that spell out clinical waste disposal, decontamination of

(cytotoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste ● On site or √off-site disposal of medical waste		constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and If the activity includes facility-based treatment, appropriate disposal options are in place and operational	containers and hypodermic needles.
3.Herbal and plant materials	Yes	The center will collect or facilitate the collection of herbal/plan materials for research and medicinal development. This has potential to	One of our key partner institutions is the Forestry Institute of Malawi which is also affiliated to the National Botanic Gardens.

		result in harmful deforestation and extinction of tree and other plant species	We will ensure that we will not remove all leaves, especially roots or barks of plants to the extent that the tree dies. We will work will with the FRIM to ensure that communities receive seedling of the trees or other plant species which we will be harvesting.
4 Intellectual Property Rights	Yes	We plan to work with traditional/community herbalists to guide us and even supply us with the different medicinal herbs that they use. There may be concerns that once they have shared with us their knowledge of herbs, any gains that may be accrued to society may exclude them	We will be guided by the countries regulations of intellectual property as well as the University of Malawi draft intellectual property guidelines.
5. Research among vulnerable populations	Yes	In our public health research, there is possibility that we may have to recruit vulnerable, minority groups and marginalized populations (e.g. orphans, sex workers). Research among this group must be sensitive to potential for exploitation.	We will be submitting all our research protocols to the College of Medicine Research and Ethics Committee (COMREC) for ethics review and approval. Further some potentially sensitive research will have community advisory boards which will include representatives or guardians from the community from which we will draw

			study participants.

Africa Centers of Excellence Project
Environment and Social Management Plan

For low-risk topologies, an alternative to the commonly used "full text" EMP format is to have a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format is a "pragmatic good practice" approach to be user friendly and compatible with safeguard requirements.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

The EMP template format has two parts:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.
- **Part II:** includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

PART I: Activity Description

A. PDO

The Project Development Objectives (PDO) for the proposed ACE II is to strengthen selected Eastern and Southern African higher education institutions to deliver quality post-graduate education and build collaborative research capacity in the regional priority areas.

Project Beneficiaries

1. **The IDA credit beneficiaries are:**

(a) Students in participating universities and their partner institutions across Eastern and Southern Africa who will benefit from high quality education and training in high growth sectors;
(b) Employers and targeted industries who will have easy access to high quality/skilled personnel, results of applied research, and scientific knowledge for productivity

improvement; as well as knowledge partners (including companies, governmental or non-governmental organizations) who will use research produced by the ACEs;
(c) Faculty and staff in the ACEs who will benefit from improved teaching and research conditions and professional development opportunities;
(d) Regional institutions such as EAC and SADC will benefit from improved capacity of the ACEs; and
(e) Faculty and students in STEM and other priority-sector disciplinary areas who will benefit from fellowships/scholarships, exchange visits, and other knowledge-sharing activities across the ACEs organized by the ACE II Regional Facilitation Unit.

PDO Level Results Indicators

2. The following indicators will be used to measure progress towards achieving the above PDO:

(a) Number of non-national/regional students enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(b) Number of students (national and regional) enrolled by the ACEs in Masters and PhD programs in the regional priority areas;
(c) Number of nationally or regionally accredited or benchmarked education programs offered by the ACEs; and
(d) Number of collaborative research initiatives being launched by the ACEs.

3. With the view of achieving the above described vision and objective, the proposed ACE II operation will implement three sets of initiatives: (i) strengthening 22 higher education institutions into regional ACEs[1] in Eastern and Southern Africa in a set of defined regional priority areas (US$122 million); (ii) providing capacity building support to these ACEs through institution and regional activities (US$13 million); and (iii) supporting coordination and management of the implementation of components (i) and (ii) (US$5 million). Below provides a description of these proposed activities to be financed under ACE II, including the key features of design and implementation.

Component 1: Strengthening Africa Centers of Excellence (ACEs) in Regional Priority Areas (US$ 122 million)

4. Under this component, the IDA Credit will finance the strengthening of selected 22 ACEs hosted within higher education institutions into regional ACEs selected through a competitive process in five clusters of regional priorities – Industry, Agriculture, Health, Education and Applied Statistics. Each of these specialized regional centers will receive about US$ 6 million grant for implementing its proposal in a specific regional priority area. However, regardless their specifications, all these ACEs are expected to perform the following tasks:

[1] The final number of ACEs to be supported by the ACE II project will depend upon evaluation results and availability of IDA funding at both national and regional levels.

(a) *Building institutional capacity to provide quality post-graduate education with relevance to the labor market*, including, *inter alia*, updating curricula of existing programs or creating new education programs to meet the development challenge; meeting benchmarks for quality education (e.g. national/regional accreditation); attracting a regional student body; training of faculty to introduce new approaches to teaching and learning; enhancing work-place learning; encouraging entrepreneurship among students; upgrading faculty qualifications; and improving learning resources, including lab equipment, and minor rehabilitation or extension of existing facilities.

(b) *Building institutional capacity to conduct high quality applied research, relevant to addressing a key development challenge/priority*, including, *inter alia*, faculty development and staff training, fellowships and post-doctoral studies, networking activities with national and international partners, hosting and participating in conferences, research equipment and materials and laboratory refurbishment/rehabilitation, research dissemination, knowledge and technology transfer, and patenting or other intellectual property rights related activities.

(c) *Developing and enhancing partnerships with other academic institutions (national, regional and international) to pursue academic excellence*, to raise the capacity of network partners, and to raise the ACE's capacity, including inter alia, joint delivery of education programs, faculty exchanges/visiting faculty, joint research and conferences, sharing of specialized equipment and library resources.

(d) *Developing and enhancing partnerships with industry and the private sector to generate greater impact*, to enhance the impact of the ACE on development and increase relevance of said centers on education and research, including, *inter alia*, industry advisory boards, industry lectures, training of trainers for sector training institutions (such as polytechnics, nursing, teacher or agricultural colleges), joint research, training and other activities to communicate, interact and reach out to civil society, private sector and grassroots communities.

(e) *Improving governance and management of the institution and setting up a role model for other higher education institutions*, to improve monitoring and evaluation, including monitoring of labor market outcomes of graduates, administration, fiduciary management (including financial management (FM), procurement, oversight and capacity), transparency, ability to generate resources, and project implementation.

(f) *Delivering outreach, and creating an impact, to society by delivering excellent teaching and producing high quality applied research.* Individual ACEs are selected because of the strength of their proposals and their relevance to providing solutions to regional development challenges. By fulfilling their mandate, the ACEs can impact positive change in society and become model hubs of teaching, research and innovation to other institutions in the region.

With the investment of the project, these ACEs are also expected to produce measurable results. Table 1 below outlines what can be expected from these ACEs in training and research in the regional priority cluster areas. [***Please note that this table will be filled once the ACEs are selected and their implementation plans are done, expecting in February of 2016***.]

Table 1: Expected Results in Training and Research from ACEs by Regional Priority Area

Priority Cluster	Post-Graduate Training	

	# of Masters	# of PhD	Initiated Collaborative Research
STEM			
Agriculture			
Health			
Education			
Applied Statistics			
Total	*XXXX*	*XXX*	*(Not Applicable)*

5. Unlike many existing centers of excellence in the ESA region which focus primarily on academic research, the selected ACEs under the ACE II project must produce real impact on addressing a specific challenge in one of the priority areas in the region. These priority areas have been defined by the project's Regional Steering Committee (RSC) after broad consultations in the region. These priorities fall into five clusters – Industry, Agriculture, Health, Education and Applied Statistics. Table 2 below provides information on the areas covered within these priorities. All ACE proposals need to address development challenges in one of the priority areas in order to be considered. To encourage flexibility, innovation and cross-cutting solutions, an 'unspecified' category was created to allow preparation of proposals in areas not explicitly listed. This priority list provides guidance for proposal development, but it does not necessarily mean that an ACE would be selected and established for each of these priority areas on the list under this project.

Table 2: Regional Priority Areas for ACEs

Cluster	Priority Area
STEM	• Energy (wind/hydro-power, geothermal & solar-energy, energy generation & transmission, etc.) • Value addition / Extractives (oil & gas sector, mining) • Urban design and construction/Infrastructure, transportation and logistics • Disaster/risk analysis and management, hydrology and water purification • ICT (soft/hardware, applications, services, teaching/learning) • Product design, manufacturing, • Railway engineering • Marine and ocean engineering *Unspecified (room for innovation)*
Agriculture	• Agribusiness (crop & livestock sciences, agricultural engineering, agro/food processing & packaging; value chain) • Climate and environmental smart agriculture • Agricultural land management • Water resource management, hydrology and irrigation • Marine and ocean sciences *Unspecified (room for innovation)*
Health	• Pharm-bio technology (drug discovery, science-driven traditional medicine & development) • Bio-medical engineering (implant development, hospital infrastructure, tissue-engineering) • Bio-physics and bio-chemistry (diagnostic tools) • Molecular biology (infectious diseases, vaccine development) • Emergency medicine and trauma (with a focus on traffic injuries & deaths) and nutrition *Unspecified (room for innovation)*

Education	• Quality of Education (innovations in STEM teaching/learning/curriculum development, assessment & management tools, e-learning & education tools, creative design thinking)
Applied Statistics	• Applied Statistics (big data, bioinformatics, data mining, reliability modeling, research design, evidence-based policy analysis)

6. The ACEs financed under the ACE II project are being selected through an open, objective, transparent, and merit-based competitive process. The Call for Proposals was issued on July 31, 2015 and a total of 109 proposals were submitted by the nine participating countries, out of which 92 were deemed eligible[2] by IUCEA. The eligible proposals which covered eight countries[3] were evaluated using a set of clearly defined criteria[4] by an Independent Evaluation Committee (IEC) consisting of over 60 African and international subject-matter experts. The technical evaluation where each proposal was evaluated by three experts produced a shortlist of 40 proposals which then moved into the second phase of the evaluation – onsite leadership evaluation. During the onsite evaluation, members of the IEC visited each of the 40 proposed ACEs and submitted their results to IUCEA. Reviewing the compiled scores from the technical and onsite evaluations, and considering geographical distribution and balance among priority areas, the RSC recommended the conditional selection of 23 ACEs. [***These conditionally selected ACEs are undergoing FM, procurement and safeguards review, and will be confirmed by the WB Board***]. The 23 conditionally selected ACEs were selected to ensure balance across countries, priority areas and importance of the proposal to the region's development.

7. Of the 109 proposals submitted through the initial call for proposals, there were no proposals in the area of oil & gas due to the current limited capacity for producing much-needed skilled personnel and technology transfer in this area across the region. Given the importance of the oil & gas industry to the economic growth of the ESA region in coming years, oil & gas is listed as one of the regional development priority areas. In order to support the growth of the oil & gas industry for the region, with the spirit of ACE II for real development impact and the guidance of the RSC, the project ran a special targeted call for proposals among the participating countries where there is an emerging oil & gas sector – Ethiopia, Kenya, Mozambique, Tanzania and Uganda. Each of these five countries has submitted one proposal to compete for an ACE in oil & gas for the ESA region. Submitted proposals will go through the same evaluation process as the other ACE proposals did, but with slightly modified criteria to reflect the needs and reality of the oil & gas field in the region at present.[5]

8. The selected ACEs will have the autonomy to implement their own proposals, with the support from their host universities and governments as well as the RFU. For assuring the achievement of targeted results, the ACE II project will employ a performance-based financing mechanism to disburse funding from their respective Ministry of Finance (MoF) to each selected ACE against a set of agreed Disbursement Linked Indicators. To ensure regional collaboration for greater impact, the project will provide a mix of funding requirements and incentives to promote regional mobility of students and

[2] Only those proposals submitted by the governments of the participating countries, with existing PhD programs, and in the defined regional priority areas are eligible for consideration. The eligibility screen was done by the Inter-University Council for East Africa (IUCEA) which is the designated RFU for the ACE II project.

[3] All the proposals submitted from MZ were deemed ineligible because they came from institutions that did not offer PhD programs, which is an eligible requirement.

[4] These criteria, together with proposal eligibility and evaluation process, are captured in the "Protocol for Proposal Assessment" that was approved by the RSC as a guideline for the Independent Evaluation Committee.

[5] For example, the requirement of having a running PhD program is removed and more emphasis is given to partnership with the private sector, etc.

faculty, and partnerships with regional and international institutions as well as with the private sector. Each ACE will sign a performance and funding contract with its government (i.e., the Ministry of Education) which will be further developed during appraisal. The contract includes the following criteria:

- At least 15 percent of the funding must be invested in partnerships and at least 10 percent must be invested in partnerships outside the ACE hosting country.[6]
- A partnership agreement between the ACE and its respective partners needs to specify the work plan, budget and outcome arrangements.
- Civil works if needed, should not exceed 25 percent of the total grant.
- The Government's existing commitments for continued funding of the institutional staff need to be part of the funding and performance agreement.

Component 2: Capacity Building Support to ACEs through Institution and Regional Interventions (US$ 13 million).

9. Under this component, the IDA Credit will finance activities at the institution and regional level to enhance capacity support to the selected ACEs to enable them to achieve their project development objectives. Experience of ACEs in Western and Central Africa suggests that the establishment of ACEs alone is not sufficient to achieve the intended outcome and impact of the project. Weak capacity in areas such as data collection, creating a conducive environment for collaboration, regional student mobility and long term financial sustainability needs to be addressed with additional support through collective mechanisms at the institution and regional level. This component is therefore designed to provide additional support to the selected ACEs to strengthen their capacity so that they can implement their proposals and achieve their objectives as planned, becoming sustainable hubs in their specialized areas and leading efforts to address development priorities for the region. All activities will be implemented by an international TA firm that will be overseen by the RFU.

10. **Sub-Component 2.1: Support to ACEs through Institution Level Activities (US$ 5 million).** Under this sub-component, activities that are targeted towards strengthening the ACE institution level activities including capacity building and university-industry partnerships will be funded. These activities will be financed based on demonstrated need. Interested ACEs will submit proposals which will be evaluated by the RSC on a semi-annual basis. With the RSC's approval, IUCEA will finance tailored capacity building programs to be delivered to those ACEs. ACEs can request support in the following areas:

(i) Capacity building of the ACE institutions on implementation of their proposal: While the selected ACEs boast of technical skills in their areas of expertise, management and operational skills to implement their technical proposals efficiently and effectively is not available. There is evidence from ACE I implementation that many selected ACEs faced start-up delays due to weaknesses in their capacity to prioritize; develop detailed sequenced plans; ensure adequate budget; assess and mitigate risks and challenges, including those related to incentives of key stakeholders and implementing partners. This sub-component will provide (on demand basis) funds to ACE institutions to build

[6] ACEs are required to spend 10 percent of the partnership funding in partnership with institutions outside the ACE hosting country.

capacity to better implement their programs. Funding requests using templates that highlight critical skills gaps and proposed training and capacity building packages will be reviewed by IUCEA bi-annually and funded on a rolling basis. Such training and capacity building could include joint problem solving workshops to address critical challenges faced by the institution in implementing their programs. Detailed reports of the impact of previous training and capacity building along with concrete proposals are needed prior to funding any additional programs from the same institution.

(ii) Partnership Development: Experience from ACEs in Western and Central Africa shows the uneasiness for academic institutions to forge partnerships to receive mentoring support as well as to collaborate on innovative solutions for development challenges. Partnerships, with academic institutions/industry need to be structured such that the ACEs can benefit from these partnerships. The project also recognizes that a critical aspect of developing partnerships is a function of opportunities to meet and share knowledge. Thus, the project will provide opportunities in the form of ACE collaboration forums where ACEs can share good practices from mentorship programs and/or identify research areas of interest to industry and collaborate on research ideas.

11. **Sub-Component 2.2: Support to ACEs through Regional Level Activities (US$ 8 million).** A number of activities will be undertaken at the regional level to support effective relationship-building and methodology adoption/development for quality improvement of ACEs to enhance their excellence.

(i) Benchmarking: The project will provide funds to interested ACE host institutions to participate in institutional benchmarking in the region, where institutions can compare themselves to similar institutions across the region and with themselves over time, and learn good practices for their own institutional improvement. The project will provide technical assistance to the institutions enrolled in benchmarking to develop comparable data and indicators, data collection protocols, standard reports for all the ACEs and a data platform, and provide training where relevant. There is also potential for the institutions to be part of the Partnership in Applied Sciences, Engineering and Technology (PASET) initiative between SSA and emerging nations. PASET initiated a pilot program that benchmarked seven African institutions by collecting and analyzing a dataset of indicators at the national and institutional level.[7] This exercise enabled the involved institutions to identify major gaps in their data systems. Through this sub-component, ACEs could partner with PASET and through regular benchmarking exercises use benchmarking diagnostic tools to identify areas for improvement and design specific interventions to enable them to reach their potential.

(ii) Fellowships/Scholarships: To raise the regional and global profile of ACEs, the ACE II project will create an ACE Scholars Program– a type of scholarship program to alleviate the financial constraints that are often a barrier to student mobility across countries in the region. It will be merit-based and awarded to two regional fellows per ACE for a period of two years. The project will potentially have DAAD administer this scholarship program. The project also proposes a MacArthur Fellow or Rhodes Scholar – type fellowship program to identify and cultivate future leaders in science and technology for the region. In addition, the project will collaborate with other development partners/ governments and other programs such as PASET's Regional Scholarship and Innovation

[7] The seven universities that participated were Gaston Berger University- Saint-Louis (Senegal), the Federal University of Agriculture – Abeokuta (Nigeria), the International Institute of Water and Environmental Engineering (Burkina-Faso), the University of Abomey-Calavi (Benin), Makerere University (Uganda), the University of Dar-Es-Salaam (Tanzania) and the University of Ghana.

Fund (RSIF)[8] to expand the pool of scholarships to encourage students to study in an institution outside their native country in Eastern and Southern Africa. In order to sustain the benefits, the project will coordinate with PASET, and other regional initiatives to expand the pool of scholarships to encourage students to study in an institution outside their native country in ESA.

Component 3: Facilitation, Coordination and Administration of the Project implementation (US$ 5 million)

12. This component will be financed in the form of a Regional IDA grant to the RFU. The sheer number of countries and institutions participating in ACE II has added complexity to the project implementation. The RFU is established to help address this issue and ensure the project success. As the RFU for ACE II, IUCEA[9] will coordinate all aspects of ACE II project preparation and implementation, with guidance from the RSC and technical assistance from the World Bank. As part of facilitating regional collaboration and networking, IUCEA will organize a series of knowledge sharing events for all the selected ACEs and their partners. To facilitate learning and knowledge exchange, IUCEA will organize one annual meeting of the ACEs, where experts will be available to assess program quality and offer advice. IUCEA will sponsor two PASET regional forums through which ACEs can form linkages with technical/vocational programs. Finally, to foster university-industry partnerships, IUCEA will host an annual forum with business leaders and industry experts in priority areas. Given its limited capacity, IUCEA will recruit and oversee an international firm to help implement most activities listed under Component 2. To fulfill their responsibility as the RFU, IUCEA is in the process of hiring new staff members such as a project coordinator and a financial specialist to oversee ACE II.[10] IUCEA has received an IDA grant of US$1 million as part of the Project Preparation Advance (PPA).

B. Institutional and Implementation Arrangements

1. **Each selected institution will implement its own Africa Centers of Excellence proposal**. Further, administrative capacity, most often from the institutions' central administration will assist with the fiduciary tasks. An ACE team is established, led by a Center leader who is a recognized educator/researcher within the primary discipline of the ACE and supported by faculty from the relevant engaged departments. The university will be responsible for the implementation of the environment management plan under the supervision of the national review committee and the World Bank team. In countries where a related project implementation unit with experience of World Bank safeguard guidelines exists, this unit will provide guidance to the implementing university.

2. **Each government will constitute a National Review Committee through the ministry or agency responsible for higher education**. It is tasked with a semi-annual review of performance and implementation support, including approvals of withdrawal applications and implementation planning

[8] The flagship program of PASET is the Regional Scholarship and Innovation Fund (RSIF) which will contribute to training 10,000 PhDs in applied sciences, engineering and technology and building capacity in selected SSA universities for research and innovation. Funding will be raised through government and businesses, which have already made commitments. The ACE project can potentially help to operationalize the RSIF and raise funding from philanthropic foundations, business leaders and governments.

[9] IUCEA, an institution of the inter-governmental East African Community (EAC), is headquartered in Kampala, Uganda and headed by the Executive Secretary. Their mandate is to foster collaboration in higher education within the East African Community.

[10] In addition, during the course of the project, IUCEA will hire either as staff or consultants, whenever there are gaps in personnel. Adequate support and capacity building will be provided to IUCEA by the Bank to enable efficient and effective implementation of its responsibilities. IUCEA has already received training in procurement and FM from Bank staff based in Uganda.

(but with no day-to-day implementation or approvals). This committee will include members from Ministry of Finance, as well as relevant line ministries based on the focus area of the ACEs (e. g agriculture, health, oil and gas etc.).

3. The regional ACE Steering Committee will provide overall guidance and oversight for the project.

C. Environmental screening, assessment and management and World Bank applicable environment policies

4. **Environmental impacts are expected to be low to moderate.** The Environmental Assessment category is B (Partial Assessment), and OP/BP 4.01 (Environmental Assessment) is triggered. There will be some rehabilitation and extensions of the selected institutions. The need for new construction will be assessed as part of the project preparations. There will be no new land acquisition for the Centers of Excellence; the project will select existing institutions. In general, the project will focus on quality enhancements of the Centers of Excellence, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources, while construction will be capped at maximum 25 percent of the funding, and the rational for proposed new construction will be scrutinized to ensure such construction is critical for excellence. A clear rule on the maximum extent of civil works allowed under the project will be established in the operational manual and the subsidiary agreements between the governments and the universities. Further, ESMP has been prepared and disclosed for each candidate institution to manage environmental and social impacts based on the submitted proposals. For in some cases, the civil works are so minor and localized that they can be guided by national and local laws and procedures, and therefore no ESMP has been developed. The prepared ESMP are disclosed in country and on the World Bank infoshop. In addition, a general set of best practice guidelines for environmental and social management was disclosed in the region in the early stages of project preparation. The ESMP has undergone a set of public consultations, which are presented in Annex A.

D. Environmental Management Approach

5. **For all regionally funded ACE proposals the attached EMP checklist has been completed and disclosed at the institutional website to comply with environmental and social safeguards**.

E. Monitoring and reporting

6. Each Africa Center of Excellence will have its own monitoring and reporting requirements. This will be consolidated and reported through the general reporting requirements for the national review committee and the World Bank supervisory team to monitor on a regular basis.

7. The responsibility for monitoring of implementation of EMPs has been assigned for each of the Centers of Excellence as following:

Institution	EMP monitoring arrangements (name, title, contact information)
Environmental Affairs Department	Ms Shamisu Najira (shamisu_b@yahoo.com; +265999895000)
LUANAR	Mr Edwin Chiwona (+265888344298, chiwonaea@gmail.com)
University of Malawi, Polytechnic	Dr Ishamel Kosamu (ikosamu@poly.ac.mw; 0888654552)
University of Malawi, Chancellor College	Ms Meya Kalindekafe (mkalindekafe@cc.ac.mw; meykalinde@yahoo.co.uk; +265995623338)
Leadership for Environment and Development (LEAD)	Prof Sosten Chiotha (+265999358870; schiotha@cc.ac.mw)
Mzuzu University	Dr Victor Kasulo (+265992343494; kasulov@gmail.com)

Methods of monitoring the identified adverse impacts under AquaFish ESMP

Key Activity	**Potential Impacts**	**Monitoring method**	**Frequency of monitoring**	**Provisional Monitoring Cost in USD**
Pond construction and rehabilitation	Increase in dust and debris Noise pollution	Site inspection	Routine	3000
	Water quality deterioration	Inspection by skilled personnel	Twice a year	6000
Management of ponds/cages	Animals or people falling into ponds	Pre-inspection that ponds are fenced	Twice a year	3000
	Proliferation of malaria and bilharzia	Inspection by health personnel	Twice a year	3000
	Erosion	Site inspection	Once a year	2000

	Eutrophication	Site inspection of water quality	Twice a year	3000
Fisheries management	Deforestation	Site inspection to ensure afforestation and use of alternative energy source for fish smoking	Thrice a year	5000
Management of water bodies	Erosion leading to siltation Poor water quality leading to loss of fish diversity	Site inspection by skilled personel to ensure vetiver grass is planted and proper farming practices are followed	Once a year	2000

Part II :	**EMP Checklist for Activities**

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**MALAWI – AquaFish**	Yes[√]	1. AQUACULTURE a) New construction i) Ponds, cages, tanks and raceways • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Increase in dust and noise from demolition and/or construction • Loss of wildlife habitat • Construction waste • Erosion	Water Quality • The site will establish appropriate erosion and sediment control measures such as planting of vetiver grass or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. • Site ponds in flood-free areas
				Air Quality • Keep demolition debris in controlled area and spray with water mist to reduce debris dust • Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site • Keep surrounding environment (sidewalks, roads) free of debris to minimize dust • There will be no open burning of construction / waste material at the site • There will be no excessive idling of construction vehicles at sites
				Noise • The project will not use heavy machinery
				Loss of wildlife habitat • Creating wild life reserves • Rehabilitation of destroyed habitats
				Erosion • Plant vetiver grass or any other grass along pond banks and water ways • Ponds should be drainable • Proper siting of ponds in areas with reduced risk of erosion
			• Management Ponds, cages, tanks and raceways • Water pollution (use of fertilizers, chemicals, feed) • Accumulation of wastes (feed) • Air pollution (from ponds, if there is overfeeding) • Health- malaria and bilharzia (mosquito and snail breeding grounds) • Loss of biodiversity (introduced exotic)	Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. (b) Encourage use of organic fertilizer (c) Avoid overfeeding which may increase nitrogen and phosphorus load and may encourage eutrophication

			• Conflict of water use exacerbated by climate change too • Threat to children, livestock and other weak and vulnerable people • Disposal of waste material from processing	Air Quality • Avoid overfeeding in ponds and cages that can cause eutrophication due to loading of nutrients such as nitrogen and phosphorus in formulated feed • Use recommended fertilizer rates • Rehabilitating abandoned ponds • Reclaiming land that was used for pond • Replacement of water periodically • There will be no open burning of construction / waste material at the site
				Health • Proper treatment of mosquito and snail breeding grounds • Rehabilitating abandoned ponds • Reclaiming land that was used for pond • Setting up precautionary measures to protect children and other vulnerable groups
				Biodiversity • Site ponds away from wildlife habitat areas • Restoration of degraded areas • During stocking of ponds, select species that are not invasive Containment of escapees
				Conflict of use of water • Good planning of water use (involving all concerned users) including water budgeting • Strengthen existing local institutional structures (Village Development Committee, Community Based Natural Resource Management committees) • Water harvesting to increase water quantity available for fish farming
				Waste management • Provide recycling bins for collection • Provide potable spill containment and clean up equipment • Engage registered companies to collect specific wastes from fish waste
			2. Fisheries Sector <u>Environmental Issues</u> • New construction Cages • Conflict of use (navigation and fishing) • Alteration of habitat to fish	Conflict of use • Good planning of water use (involving all concerned users) • Strengthen existing local institutional structures (BVC, VDC, CBNRM)
				Habitat alteration • Use brushparks for artificial reefs
				Water Quality • Avoid overfeeding which may increase nitrogen load
				Deforestation • Afforestation • Establishment of woodlots • Use of alternative source of energy for smoking fish

			• Increased nutrient loads in the waters which may lead to eutrophication Kilns and drying racks • Deforestation (to get firewood for processing and constructing racks) • Construction waste • Increase in dust and noise from demolition and/or construction • Construction waste	Waste Management • Construction waste will be collected and disposed properly • The records of waste disposal will be maintained as proof for proper management as designed. • Whenever feasible the collector will reuse and recycle appropriate and viable materials (except asbestos) in other agriculture systems.
			Management of water bodies • Water pollution (use of fertilizers, chemicals, feed) • Erosion from farm areas • Health- malaria and bilharzia (mosquito and snail breeding grounds) • Loss of biodiversity (introduced exotic)	Water Quality • Establish appropriate erosion and sediment control measures such as planting of vetiver grass or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. • Enforce policy of farming at a set distance from river banks and also follow good farming practices that minimizes erosion and siltation • Avoid overfeeding which may increase nitrogen load
				Health • Proper treatment of mosquito and snail breeding grounds Enhancement of snail eating fish stocks
				Biodiversity • Each country must follow and abide to set laws on exotic species

			3. **Aquaculture Social Issues** During construction and commissioning of fish ponds • Land tenure • Land use conflict • Conflicts of water use During operations of fish ponds • Child labor • Risks of bilharzias • Some fish species not accepted by some communities During and after the project • Threat to food security • Threat to health (HIV/AIDS) Social amenities • Increased demand for health services • Increased demand for extension services	• Land use planning • Water budgeting • Strengthen existing local institutional structures (VDC) • Enforcement of child labor law • Implement community sanitation plans • Recommend fish species based on preferences of communities • Integrate aquaculture into existing livelihoods and diversity livelihood opportunities • Sensitize communities • Conduct community sensitization and liaise with Ministry of Health to equip health facilities with enough chemicals/medicine and supplies • Use lead farmers to support the extension services

			4. Capture Fisheries Social Issues During fishing operations • Limits navigation • Child labour • Safety at sea During and after the project • Migration • Threat to health (HIV/AIDS) Social amenities • Increased demand for health services • Increased demand for extension services	• Strengthen existing local institutional structures (Beach Village Committees and CBNRM) • Enforcement of child labor law • Capacity building • Strengthen existing local institutional structures to encourage participation of community members in fishing and the entire value chain • Sensitize communities • Conduct community sensitization and liaise with Ministry of Health to equip health facilities with enough chemicals/medicine and supplies • Strengthen existing local institutional structures (Beach Village Committees and CBNRM)
			5. **Culture Based Fisheries** Construction (submerging substrates) • Hinder navigation • Hinders fishing • Water quality	Navigation • Zoning of the water bodies for different uses • Encourage participatory planning at the beginning

				Fishing • Zoning of the water bodies for different uses • Encourage participatory planning at the beginning
				Water quality • Regular monitoring of water parameters • Avoid submerging too much substrates
			Management • Competition for hatchery fingerlings with aquaculture and limited seed supply • Water pollution (use of fertilizers, chemicals, feed and substrates) • Accumulation of wastes (submerged substrates) • Health (introduction of fish diseases) • Loss of biodiversity (introduced farmed species) • Conflict of water use	Competition for fingerlings • Increase fingerling production from hatcheries
				Water quality • Regular monitoring of water parameters
				Accumulation of wastes • Submerge substrates with slow decomposition rates in right quantities.
				Health • Quarantine introduced farm fishes • Avoid farmed fish and enhance the natural/wild fish production
				Biodiversity • Avoid use of introduced fish
				Conflict of water use • Zoning of water bodies • Strengthening community institutions and consultations
			3. Socioeconomic impacts • Relatively new method of culturing fish • Ownership of the culture based fishery • Reluctance by famers to invest in culture based fishery • Conflicts during distribution of benefits	New method of culturing fish • Increase extension messages • Increase monitoring of communities
				Ownership • Use existing local structures to organize communities. • Use of participatory of planning
				Reluctant to invest • Provide farmers with an insurance of investment scheme
				Distribution of benefits • Encourage equal shares resulting into equal benefits
			Crosscutting Issues Gender • Different gender groups • Ownership and Control	• Equitable targeting of different gender groups • Training and use of transformational approaches on gender (young, aged, disabled, men, women) groups

			• Sharing of household incomes Travel (Air or road) • High carbon footprint due to road and air travel by faculty and students	• Encourage use of teleconferencing/ video conferencing and e-learning
			Ethical Cultural and Political impacts • Cultural influence of fish farming on the communities including women involvement in fish farming and marketing • Political influence of the growth and spread of fish farming especially political on sites for the enhancement of rural incomes • Impact of the on religion – like promotion of cat fish in Muslim or Seventh day adventist areas	• Training and sensitization of communities to minimize negative cultural impacts • Working with politicians to avoid politicizing the program • The program will be inclusive of all religious groups
			Use of paper High use of paper in training	• Promote e-learning, teleconferencing and emails

ANNEX A : PUBLIC CONSULTATIONS

MALAWI – AQUAFISH Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
	12-01-2016 (Bunda campus, Consulting Traditional leaders surrounding Bunda)	Senior Chief Chadza Senior Chief Chitseka Senior GVH Mwenda Group Village Headman (GVH) Chilowa GVH Kamgubwe GVH Kumitondo VH Kunthindi VH Mphamba VH Kulinga VH Jelemiya VH Mthiko	• Chiefs welcomed the project and assured us that conflict of use in terms of fish feed and human feed may not be as serious as we thought because farers have plenty of ingredients like soya • Chiefs raised a concern on how the project will address an increased demand of water for aquaculture in this era of climate change • Chiefs assured us that they will strengthen bylaws to reduce theft of fish in ponds.	• Most comments were taken on board as indicated in the ESMP above, for instance water budgetting issues.
	13-01-2016 (University of Malawi, Chancellor College, Zomba)	Mrs. M. Kalindekafe Mr. J. Nagoli Mr. D. Mbamba Mr. M. Mkandawire Mr. P. Likongwe Dr L. Mapemba Mr V. Mlotha	• The participants observed that we need to emphasize more on crosscutting issues such as gender, ethical issues, and heavy use of papers, flights and road transport	• Most of these issues have been incoorporated
	13-01-2016 (Hotel Victoria, Blantyre)			
		Chifundo Thawi	The participants here emphasized on the need to do the ESMP along the whole fish value chain.	
		Silvester Jambo		
		Hoffman L Aipira		

		Keith Mwachande		
		Geoffrey Banda		
		Dr Royal J,B,M Mkandawire		
		Robert I Kawiya		
		Ishmael B,M Kosamu		
		Stanley W. Mvula		
	13-01-2016 (Capital Hotel, Lilongwe)			
		Joshua Valeta	• Emphasis here was that the fisheries sector mu be divided into sub categories of capture fisheries, aquaculture and culture based fisheries, in that case the ESMP would flow logically • Water budgetting issue also resurfaced here • It was also pointed out that since this project will be implemented with partners outside Malawi, there maybe need to do simple EIA or just environmental screening in countries where certain activities will also take place just to ensure activities are done in line with WB safeguard rules as well as national rules.	• These issues were taken on board..
		Joanna Mbeye-Chikafa		
		Brown Chitekwere		
		Hilda Mkupu		
		Patricia Ngwale		
		Agress Bisika Liwonde		
		Phillip Sefu Nkhoma		
		Lucky Penumlungu		
		Brian Rashid		
		Jeremiah Kang'ombe		
		Chikondi L. Pasani		
		Emmanuel Kaunda		
		Phillip Kaonda		
		Chimwemwe Magalasi		
		J.D. Balarin		
		Wales Singini		
		Wilfred Kadewa		
		Edwin Chiwona		
		Daud Kassam		

SOME PICTORIAL EVIDENCE OF CONSULTATION MEETINGS DONE

MEETING WITH TRADITIONAL LEADERS (12-01-2016)

CAPITAL HOTEL PARTICIPANTS IN LILONGWE, MALAWI (13-01-2016)

HOTEL VICTORIA MEETING IN BLANTYRE (13-01-2016)

CHANCELLOR COLLEGE MEETING, ZOMBA (13-01-2016)

UNIVERSIDADE
EDUARDO
MONDLANE

Centro de Estudos em Engenharia e Tecnologia de Petróleo e Gás (CS-OGET)

Plano de Gestão Ambiental Indicativo

Consulta Pública

1. Introdução

O Banco Mundial estabeleceu, em colaboração com governos de países da África Oriental e Austral (nomedamente Etiópia, Quénia, Malawi, Moçambique, Ruanda, Tanzânia, Uganda, Zâmbia e Zimbabwe), Projectos de Centros de Excelência nas seguintes áreas: *(i)* Ciência, Tecnologia, Engenharia e Matemática (STEM); *(ii)* Agricultura; *(iii)* Saúde; e *(iv)* Ciência, Tecnologia e Inovação (STI) Educação – Qualidade de Educação e Estatística Aplicada.

Estes Centros têm por objectivo o estabelecimento e o reforço de programas de especialização e colaboração entre as instituições de ensino superior das regiões oriental e austral de África por forma a promover educação e investigação aplicada relevante e de elevada qualidade.

Moçambique, através da Universidade Eduardo Mondlane (UEM), numa parceria com a Universidade de Lúrio, apresentou uma proposta de criação de um centro regional de excelência em Engenharia de Petóleo e Gás. Tal proposta respondia a um chamamento especial feito a países onde o sector de petróleo e gás é emergente, designadamente Etiópia, Quénia, Moçambique, Tanzânia e Uganda. Após um renhido pocesso de avaliação, que compreendeu duas fases (avaliação documental e visita), feita por duas comissões independentes nomeadas pelo Banco Mundial, a proposta de Moçambique foi condicionalmente seleccionada para financiamento. A aprovação final fica condicionada ao melhoramento da proposta da criação do centro, apresentação de um plano de implementação e Plano de Gestão Ambiental e Social da implantação, implementação e supervisão do projecto.

Neste âmbito, a UEM, através da Faculdade de Engenharia propõe-se a realizar obras de reabilitação/conversão do edifício das cadeiras gerais por forma a transformá-lo em instalações-sede do Centro de Excelência, a designar-se Centro de Estudos em Engenharia e Tecnologia de Petróleo e Gás. É no contexto deste projecto e em resposta a um dos requisitos do Banco Mundial que se realiza uma consulta pública com a finalidade de discutir o Plano de Gestão Ambiental (PGA) indicativo e outros impactos ambientais e sociais do projecto. O PGA refere-se à fase de implantação do centro (obras do edifício) e o seu funcionamento.

2. Descrição do Projecto

Com o presente projecto de construção, pretende-se adequar o edifício acima descrito em instalações do Centro de Excelência em Engenharia de Petróleo e Gás com o mínimo de demolições e novas construções.

2.1. Descrição do edifício

O edifício onde se pretende instalar o centro é o edifício onde funcionam as cadeiras gerais. Trata-se de um edifício convencional com uma estrutura em pilares e vigas de betão armado e alvenarias de bloco de cimento e areia. As paredes e tectos estão rebocados em argamassa de cimento e pintados. O edifício têm dois pisos e têm abastecimento de água, electricidade, saneamento e telecomunicações. O edifício comporta secretaria, biblioteca que ocupa dois pisos com uma sala de leitura adstrita, uma sala de leitura independente, um anfiteatro, uma sala de

informática, seis casas de banho, cinco salas de aula, um laboratório de física e gabinetes de trabalho.

2.2. Funcionalidades do edifício pós-conversão

Foi estabelecido que após as obras de reabilitação/conversão o edifício passe a comportar as seguintes funções:

Primeiro piso: secretaria, administração, biblioteca, gabinetes para docentes e sanitários.

Segundo piso: anfiteatro, sala de informática para estudantes de mestrado, sala de estudo, quatro salas de aula, três gabinetes para estudantes de doutoramento, laboratório virtual e uma área para laboratórios de investigação diversos, armazém de reagentes e outros materiais laboratoriais e sanitários.

2.3. Descrição das obras de conversão

A conversão passa por uma reabilitação do edifício e refuncionalização dos espaços de uma forma optimizada. A intervenção será a mínima possível.

As obras de reabilitação/conversão do edifício consistirão nas seguintes fases:

I. Fase preliminar:

(a) Transferência do mobiliário, acervo bibliográfico e todos os demais objectos, materiais e equipamentos que posam interferir nas obras;

(b) Vedação do espaço circundante do edifício com tapumes. Montagem de estaleiro e acessos à obra, bem como saídas e pontos de encontro em casos de emergência, segundo as normas de higiene e segurança no trabalho vigentes em Moçambique.

II. Execução da obra:

(a) Demolições de algumas paredes e pavimento e remoção de entulhos e transporte para o vazadouro de acordo com as normas;

(b) Transporte de material de construção para a obra segundo as normas ambientais e de segurança;

(c) Execução de obras de construção civil (alvenarias, revestimentos, montagem de portas e janelas e pintura) e de redes técnicas (abastecimento de água, saneamento, electricidade e telecomunicações).

III. Pós-execução da obra:

(a) Desmantelamento do estaleiro de obra e remoção dos tapumes;

(b) Vistoria e entrega provisória da obra.

2.4. Funcionamento do edifício

O Centro de Estudos em Engenharia e Tecnologia de Petróleo e Gás é um centro de ensino pós-graduado e investigação. As suas principais actividades consistirão em leccionamento de aulas de mestrado e eventualmente de doutoramento, cursos de curta duração, pesquisa teórica na biblioteca, investigação prática e aplicada tanto em laboratórios físicos como em virtuais, palestras e outras actividades afins.

3. Considerações Finais

Como foi referido, a consulta pública tem por objectivo dar a compreender e analisar as diversas fases da implantação e implementação do centro de excelência e discutir o PGA indicativo e outros impactos ambientais e sociais do projecto. Para tal são apresentados em anexo listas de verificação segundo o modelo do Banco Mundial indicando possíveis actividades no âmbito da construção e respectivos possíveis impactos e uma lista de medidas de mitigação. Esta lista servirá de elemento orientador da discussão na consulta pública, podendo outros eventuais aspectos não constantes na lista ser apresentados durante a discussão.

Part II : EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**Mozambique –** Center of Studies in Oil and Gas Engineering and Technology (CS-OGET)	Yes[√]	**1. New construction / rehabilitation** • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Air Quality** (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos).

			2. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Air Quality** (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
			3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	**Noise** (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

			4. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	**Toxic / hazardous waste management** (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used **Water Quality** (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

African Centre of Excellence for Data Sciences (ACE - DS) Project
Environment and Social Management Plan

African Centre of Excellence for Data Sciences (ACE - DS) focuses on data science involving the collection, analysis and transmission of data for facilitating decision-making. For this reason, this center will be a low-risk topology and therefore we have chosen the checklist approach as an alternative to the commonly used "full text" EMP format. We have endeavored to prepare the EMPs to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

Part I: Site passport

This first part of the EMP constitutes a descriptive part ("site passport") that describes the project specifics as requested in the document "ACE II EMP – 5Jan16".

Physical Location: College of Business and Economics (CBE), University of Rwanda, Kigali. The CBE (www.cbe.ur.ac.rw) is physically located in the heart of the city of Kigali with excellent links to Kigali's international airport (10 minutes away). It is also situated within 5 minutes from the financial services sector, government ministries, donor agencies and key partners. The ease of moving across Kigali which enjoys no traffic jams will greatly facilitate meetings, seminars and workshops.

Institutional and legislative aspects: The CBE is one of 6 colleges of University of Rwanda. The University of Rwanda (UR) is the sole public Higher learning Institution in the country that was established by the government of Rwanda through the law no 71/2013 of 10th September 2013. The University resulted from merging the former seven (7) Higher Learning Institutions namely; National University of Rwanda (NUR), Kigali Institute of Science and Technology (KIST), Kigali Health Institute (KHI), Institute of Agriculture and Animal Husbandry (ISAE), Umutara University (UP), School of Finance and Banking (SFB) and Kigali Institute of Education (KIE). It is governed by the Board of Governors and an Academic senate with the Vice chancellor as the Chief Executive Officer. The CBE has three Schools; School of Economics, School of Business and School of Tourism and Hospitality Management. The ACE-DS will be hosted by College of Business and Economics (CBE) in Department of Applied statistics. Department of Applied Statistics was established in 2005 and the major programs are statistics, demography and policy analysis. However, the centre will also involve other units of the University and partners.

Project Description: Data science is a growing area that involves inter-disciplinary collaboration between statistics, economics, business, computer science and engineering. Africa has demonstrated rapid and sustained economic growth over the last decade and recent

developments suggest that a focus on data science is timely. The African Centre of Excellence for Data Sciences (ACE-DS) will address specific development challenges by: (1) offering a research hub for postgraduate students, attracting international expertise and practitioners (2) stimulating collaboration between academics, partners and stakeholders; (3) demonstrating the relevance of the centre for innovation, job creation and economic prosperity; and (4) securing resources to stimulate multidisciplinary collaborative international research projects.

The ACE-DS will be based in Rwanda but it will place southern and eastern regions of Africa at the forefront of an emerging academic field that will encourage collaborative partnerships between academia, government and the private sector. Rwanda is suitable for ACE-DS given its established and recognized leadership in ICT, good governance, and political commitment to provide leadership in building regional capacity. Rwanda has a strong public institution, National Institute of Statistics of Rwanda (NISR), that deals with data collection and NISR has a long experience and expertise in surveys and data handling. Key partners including Carnegie Mellon University, Rochester Institute of Technology and the NISR will boost the academic excellence of the centre.

An international multidisciplinary centre will combine expertise from statistics, economics, business, computer science and engineering to use big data and data analytics to solve 21st century challenges. ACE-DS will transform the appeal and relevance of applied research by showcasing studies and real world solutions with direct benefits for stakeholders in the region. ACE-DS will also serve an important role of helping the region to satisfy the aims of STISTA 2024 by collecting, sharing and analyzing data. It will also provide expertise to measure and monitor the United Nation's new Sustainable Development Goals and the African aspirations for 2063. Students who graduate from ACE-DS will be capable of independent research and critical thinking, and will have sufficient communication skills to engage with organizations needing to embrace data sciences.

Public Consultation:

As there are no identified environmental or social impacts, a public consultation was not deemed necessary.

Additional Information:

There is no additional information.

Part II : EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
1	**African Centre of Excellence for Data Sciences (ACE - DS)**	Yes[ ] No[√]	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

2		Yes[ ] No[√]	2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
3		Yes[ ] No[√]	3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 4. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
4		Yes[ ] No[√]	5. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible

			from demolition and/or construction • Construction waste	Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
5		Yes[ ] No[√]	6. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
6		Yes[ ] No[√]	7. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

7		Yes[ ] No[√]	8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and (e) If the activity includes facility-based treatment, appropriate disposal options are in place and operational
8		Yes[ ] No[√]	9. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

				Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

Environmental Management Plan (EMP)

African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS)

University of Rwanda- College of Education, P.O. Box 5039, Kigali (Rwanda)

PART I: Activity Description

INTRODUCTION

Mathematics and science education is the basic foundation in building human capacity for an innovative and knowledge-based economy in Africa. However, mathematics and science education in East African Community (EAC) faces a number of challenges. Major challenges include (i) a significant curriculum disconnect between outcomes and real world experiences, (ii) poor research outcomes to inform policy, (iii) shortage of well qualified science and mathematics educators, (iv) low level of integration of new technologies in teaching and learning, (v) insufficient number of students at postgraduate level, and (vi) gender imbalance in both staff and students. These calls for increased and sustained efforts based on research evidence that is geared towards informing policy and in training manpower with requisite skills that will confront these serious challenges.

The University of Rwanda, College of Education (UR-CE), therefore, proposes the creation of African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS).

A. Project Development Objective

This centre will encompass three components namely: teaching and learning; research and training; and community engagement that will focus on outreach programmes. Research, being a core component in the centre will focus on critical issues in relation to: a) learning barriers in science and mathematics; b) innovative pedagogy; c) science and mathematics curriculum; d) materials and teaching aid production; among others. Capacity building will form part and parcel of the postgraduate training in both Masters and Doctoral levels. Fellowship projects at the centre will be grounded on practical engagement in pre-service and in-service teacher training. Action research will be integrated in all programs in a deliberate effort to solve tangible problems in science and mathematics education.

The total project cost is estimated at 7,667,910.0 USD. The project will have the following main components:

(a) provision of funds for Training MEd students and PhD students, and Post-doctoral fellowships (salaries): 2,726,080 USD (b) provision of funds for MEd, PhD and Post-doctoral research; independent, individual and collaborative research: 1,201,060 USD (c) provision of

funds for Student and Staff exchange programs: 741,000 USD (d) provision of funds for Joint supervision in MEd/PhD projects: 819,000 USD (e) provision of funds for: Upgrading the Centre, allowances and salaries of centre support staff: 358,200 USD; Strengthen Science and ICT Lab equipment: 330,000 USD; Book store and Guest house project: 340,000 USD.

B. Institutional and Implementation Arrangements

Department or individual seeking funds from the ACEITLMS project will have to submit a full project proposal to the ACEITLMS for review and eventual release of funds. Each submission will be accompanied by an Environmental Impact Assessment (EIA), EMP and the approval of the ethical committee. The Finance Sub-Committee of the proposed Centre, through Account Officer, Procurement Officer and Logistics Officer will assist the Leader of the proposed centre in implementation of environmental assessment (EA) action.

C. Environmental screening, assessment and management and World Bank applicable environment policies

A positive environmental footprint is being envisaged during the project. Mathematics and science education research is already on-going at the UR-CE and has positive impact on the population. The project when initiated is expected to have no adverse impact on the environment and/or population. No displacement of population or destruction of vegetation is anticipated.

For ACEITLMS proposal the EMP checklist will be disclosed at the College website to comply with environmental and social safeguards. ACEITLMS will have its own monitoring and reporting requirements. This will be consolidated and reported through the general reporting requirements for the national review committee and the World Bank supervisory team to monitor on a regular basis.

To ensure the sustainability of the ACEITLMS, it intends to invest in construction of a Guest House and Book Store on the UR-CE campus. These will classify as the Environmental Assessment category C (likely to have minimal or no adverse environmental impacts), and OP/BP 4.01 (Environmental Assessment) of the World Bank, requiring no further Environmental Assessment (EA) action.

The Rwanda Environment Management Authority (REMA) is mandated for national environmental protection, conservation, promotion and overall management of the environment and climate change, under supervision of the Ministry of Natural Resources as stipulated in the Law n°63/2013 of 27/08/2013.

Official Gazette of the Republic of Rwanda N° 04/2005 of 08/04/2005 Organic Law determines the modalities of protection, conservation and promotion of environment in Rwanda.

The Rwanda Housing Authority (RHA) is mandated to implement the national housing and construction policies, e.g. the second edition of Rwanda Building Control Regulations (May 2012), National Urban Housing Policy (December 2008), Official *Gazette n° Special of 30 May 2012*, N°10/2012 of 02/05/2012 Law governing urban planning and building in Rwanda, etc.

D. Environmental Management Approach

The Rwanda Environment Management Authority (REMA) has a solid framework for EIAs in place, and both the national review committee and the World Bank will review each sub project proposal. The Centre will make sure to arrange public consultations with different stakeholders and will take into consideration the issues that could be raised. The environmental impacts are likely to have minimal or no adverse impacts but the national review committee and the World Bank will review each Environmental Impact Assessment (EIA) and the proposed mitigating measures to ensure that they are in compliance with the World Bank operational Policies.

E. Monitoring and reporting

The Centre will provide information about key environmental aspects of the project, particularly the environmental impacts of the project and the effectiveness of mitigation measures, which will enable the national review committee and the World Bank to monitor on regular basis. Each sub project will have its own monitoring and reporting requirements which will be harnessed through the Centre Director to the national review committee and the World Bank on a regular basis.

The responsibility for monitoring of implementation of EMPs has been assigned for ACEITLMS as following:

Institution	**EMP monitoring arrangements (name, title, contact information)**
University of Rwanda- College of Education	Prof. Lakhan Lal Yadav, Leader of the Centre, ACEITMS, Mobile: (+250)788590715 Email: yadavll@yahoo.com
University of Rwanda- College of Education	Prof. Joachim Nzotungicimpaye, Deputy Leader of the Centre, ACEITLMS Mobile: (+250)788527345 Email: kimpayakad@gmail.com
University of Rwanda- College of Education	Dr Alphone Uworwabayeho Mobile: (+250)788576566 Email: rwabayeho@yahoo.fr

PART II: EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	**Center Name**	**ESMP required?**	**Issues**	**Mitigation measures**
		Yes	**1. New Construction** -excavation impacts and soil erosion -Increase sediment loads in receiving waters -Site specific vehicular traffic - increase in dust and noise from demolition and /or construction -construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences

				to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		No	1. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture

				resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes	2. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
		No	3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites

ANNEXE A: PUBLIC CONULTATIONS				
Country center of excellence	**Date of consultative meeting**	**Stakeholders present**	**Issues raised**	**Response to the issues**
	09.02.2016	City of Kigali, Health and environmental officer	Management of waste water, dust and solid dust.	Reference to existing Rwandan rules in the matter will be observed.
	09.02.2016	City of Kigali, One stop center officer	Land site Design of a Guesthouse and Bookstore	University of Rwanda - College of Education, Remera Campus The houses are not yet designed. To gain space, we plan to build one with two levels.
	09.02.2016	R EMA officer and RDB officer in charge of environment	Management of waste water, dust and solid dust.	Reference to existing Rwandan rules in the matter will be observed.
	09.02.2016	Kimironko sector officer in charge of constructions	Land site Design of each of those houses Accessibility of the site	University of Rwanda College of education, Remera Campus The houses are not yet designed. To gain space, we plan to build one with two levels. It is adjacent to the road and law in the matter will be followed.
	09.02.2016	REB Officer	Land site Innovative character of the centre.	University of Rwanda-College of Education, Remera Campus The centre will helpful for capacity building in the region through research based training and use of ICT.
	09.02.2016	Head of the Department of Mathematics, Science and Physical Education (UR-	Increase of the number of lab users , lab consumers and computer	For postgradu**a**te programmes, there will be well equipped labs and well equipped computer lab with

		College of Education)	labs users Need of a large number of highly qualified academic human resources.	appropriate softwares . The project favors collaboration with regional and international institutions.
	09.02.2016	UR-CE Guild President of students' association and secretary .	Opportunity for undergraduate students, particularly females, to pursue further studies . Increase of the library users. Link between UR-CE with industries Need of guest house.	The programme will allow training towards MEd and PhD degrees. Gender balance will be respected. Use of online resources will be encouraged. There will be enhancement of the link between UR-CE and industries in the sense industries will be looking for consultancy from high caliber of human resources. The guest house will be part of the sustainability for the programme.

African Center of Excellence in Energy for Sustainable Development (ACEESD)

Environment and Social Management Plan (ESMP)

The ACEESD under the University of Rwanda, College of Science and Technology has been conditionally selected as a center of Excellence within the Eastern and Southern Africa Higher Education Center of Excellence (ACE II) project. To fulfill safeguards requirements, a rapid environment assessment has been carried out from January 11th to 15th 2016 so as to avoid or mitigate any potential threat to the natural and social environment.

The present ESMP document has been developed using a checklist–type format. The checklist-type format is a "pragmatic good practice" which attempts to cover typical mitigation approaches common to low-risk topology with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

The present EMP has two parts:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process.
- **Part II:** includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

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Part I : Project Description

1. Physical Location

The College of Science and Technology is part of the University of Rwanda, whose formation was put in law on October 15th 2014, in a search for efficiency, making it the only public institution of its kind in the land. Geographically, the College is cast on 3 main Campuses: Nyarugenge (Headquarters, in Kigali close to the main city Centre); Huye and Nyagatare. The ACEESD will be hosted at the Nyarugenge campus of CST.

Originating Institution:	University of Rwanda-College of Science and Technology (UR-CST)
Centre of Excellence Name	African Center of Excellence in Energy for Sustainable Development (ACEESD)
Head of Institution	Professor Manasse Mbonye Mob: +250 788304263 Email: principal.cst@ur.ac.rw
Proposed Centre Leader	Prof. Etienne Ntagwirumugara Mob: +250 788353874 Email: e.ntagwirumugara@kist.ac.rw etienne.ntagwirumugara@gmail.com
Deputy Centre Leader	Prof. Bruce Krogh Mob: +250 784840855 Email: krogh@ece.cmu.edu

2. Summary of the ACEESD Proposal

The Africa Center of Excellence in Energy for Sustainable Development (ACEESD) is envisioned to address key economic challenges resulting from low rural energy access, poor adoption of energy technologies in rural areas, and poor inter-state energy trading in the East Africa region. The marginalized areas have been cut off from absorbing modern energy services which act as key drivers for economic growth through industrialization and creation of knowledge based economies. The objective of this Centre is to develop interdisciplinary research and training in smart micro-grid energy systems, tailored to serve remote and/or rural areas using renewable sources and inter-state energy trading. This will provide the much needed critical mass of MSc and PhD graduates who are fit-for-purpose, and who will serve as the backbone of this transformation.

3. Institutional and Legislative Aspects

The responsibility for environment governance and management falls under the authority of the Ministry of Natural Resources (MINIRENA) created in 1992 (then called Ministry of Environment and Tourism). MINIRENA has agencies who are responsible for executing its main mandate. The principal of these is the Rwanda Environment Management Authority (REMA) established by Law No. 16/2006 of 03/04/2006, specifying the agency's main mandate, roles and functions. REMA is responsible for implementing the EIA Law (Ministerial Order No 003/2008 of 15/08/2008 Relating to the Requirements and Procedure for Environmental Impact Assessment).

Other government agencies who also perform some environment-related functions include the Rwanda Utilities Regulatory Authority (RURA) under the Prime Minister's Office and Rwanda Standards Board (RSB) under the Ministry of Commerce (MINICOM).

RURA initially created by Law No 39/2001 of 13/09/2001 (now replaced by Law No. 09/2013 of 01/03/2013) has the primary mission of regulating certain public utilities including Renewable and non-renewable energy, industrial gases, pipelines and storage facilities; water and sanitation. RURA is thus an important regulatory agency in the execution of the ACEESD project.

Rwanda Standards Board (RSB) is a public institution established by Rwanda Government Legislation Nº 30 of 29/07/2013 to undertake all activities pertaining to the development of Standards, Conformity Assessment and Metrology services in the country. It is the only body with powers to define and possess national standards.

Other relevant national legislative and regulatory laws for environmental management include the following:

- Law N° 004/2008 of 15/08/2008 Ministerial Order establishing the list of works, activities and projects that have to undertake an environment impact assessment.
- N°003/16.01 of 15/07/2010 Ministerial Order preventing activities that pollute the atmosphere
- N°006/16.01 of 15/07/2010 Ministerial Order establishing special regulations relating to burying toxic wastes

4. Project Description

The ACEESD project has a total cost of $6,957,420, with the following components: **(i)** funds for program coordination and partners ($1,920,000); **(ii)** Provision of funds for Research and Learning Excellence: books and periodicals/boarding/local transportation for interdisciplinary MSc/PhD programs including program accreditations at national and international levels, internal and external evaluation ($2,130,220); **(iii)** funds for research, collaborative networks and capacity building excellence including management excellence governance of Centre Secretariat: international travel fellowships, support for visiting academics, conference attendances, publication charges salaries of Centre staff, honorarium for faculty and team members etc. ($962,000); **(iv)** provision of funds for national and regional faculty and student visits, education capacity strengthening and development, short training programs/workshops (national and regional), outreach to industry, schools and gender component ($745,200); and **(v)** funds for the upgrading of lecture rooms, workstations, equipment and laboratories, broadband, software and licensing, equipment maintenance and training for equipment handling, payment for utilities, E-Learning platforms, purchase of high performance computer clusters, large scale memory access computers and shared mass storage devices etc. ($1,200,000).

4.1 Public Consultation Process

As part of developing this ESMP, public consultations were held with agencies and institutions concerned with environmental impact assessment and management as well as other regulatory bodies related within the sector in which the ACEESD project will operate. These are mainly MINIRENA, REMA, RURA, RSB and REG. The consultation process involved mainly meeting representatives and from these institutions specialist (in environmental monitoring and assessment) to deliberate on the environmental assessment of the ACEESD project. Input from the project's

partners were also sought mainly through email correspondence. In addition, student leadership was also consulted to seek their views on the possible social and environmental impacts and workable mediation measures to adopt. Details of these consultations are appended in Annex A.

5. Environmental screening, assessment and management and World Bank applicable environment policies

The environmental impacts of the ACEESD are expected to be low**.** There will be some rehabilitation and extensions of some of the existing classrooms and laboratories to accommodate new infrastructures as well new students. There will be no new land acquisition for the Center of Excellence because the project will be housed in the existing facilities of the College of Science and Technology. Also, there will be no need for new construction as the College/University has enough buildings that can contain the required space for laboratories and classrooms.

In general, the project will focus on quality enhancement aspects of teaching and research, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources. We envisage will have very minimal environmental impacts that will not require new approval or licenses apart from those that already exist. Further, the ESMP has undergone a set of public consultations, which are presented in Annex A.

The ESMP has been developed in alignment with promulgated environmental legislative and guidelines of the Government of Rwanda and that of the World Bank's safeguard policies.

6. EMP Monitoring and Reporting

Monitoring and controlling processes will happen throughout the project lifecycle. The Project Management Office (PMO) will ensure that environment and social issues are included in the Issue Log and are controlled just like others from traditional project management aspects (scope, schedule, HR, cost, risk, quality, communications, procurement, etc.). The stakeholder management process will also help tackle some of these issues. The ACEESD PMO will consolidate environment and social issues and lesson learnt on periodic reports and submit them to the national review committee under the supervision of the Work Bank.

The responsibility for monitoring the implementation of the present EMSP has been assigned as follows:

Institution	**EMP Monitoring Arrangements (Name, Title, Contact Information)**
University of Rwanda, College of Science and Technology	Center Leader Prof. Etienne Ntagwirumugara +250 788353874 etienne.ntagwirumugara@gmail.com entagwir@yahoo.fr e.ntagwirumugara@ur.ac.rw
University of Rwanda, College of Science and Technology	Deputy Center Leader Prof. Bruce Krogh +250 784840855 krogh@ece.cmu.edu

University of Rwanda, College of Science and Technology	Estate Management Office Mr. Olivier Kaliboli +250 788768006 de@kist.ac.rw okaliboli@gmail.com
University of Rwanda, College of Science and Technology	Office of the Nyarugenge Campus Manager Mr. Andrew Mpamo +250 788506185 mpamo4@yahoo.com
University of Rwanda, College of Science and Technology	Office of the Director of Planning, Monitoring and Evaluation Mr. Anselme Sano +250 788410590 asano@ur.ac.rw sanoanselme@yahoo.fr
University of Rwanda, College of Science and Technology	Procurement Office Mr. Callixte Gahunga +250 788510280 c.gahunga@kist.ac.rw

Part II : EMP Checklist for Activities

S/N	Action Plan	ESMP required?	Issues	Mitigation Measures
1	**Set-up institutional framework for commencement of the ACE**			
	Negotiate and sign funding contract	No [X]		
	Put in place governance framework, financial management, administrative procurement, monitoring and evaluation procedures and systems	No [X]		
	Schedule and hold ACE implementation team meetings	No [X]		
	Collect, Collate and Analyze Data for Monitoring and Evaluation	No [X]		
	Schedule and hold ACE Monitoring and Evaluation Meetings	No [X]		
2	**Learning Excellence**			
	Develop curriculum for Masters and PhD degree in Renewable Energy and Sustainability	No [X]		
	Obtain accreditation for Masters and PhD programmes	No [X]		
	Develop curriculum for short courses and industrial training programmes	Yes [√]	Ensure short courses support the operation of Micro-Grids systems	- Engage TVET and local community in programmes in maintenance of off grid micro grid systems.
	Admit quality students into Masters and PhD programmes	No [X]		
	Offer required taught courses to first year PhD students.	No [X]		
	Organize industrial training workshops and seminars to broaden students' learning experience.	Yes [√]		
	Attract, retain and retool faculty in areas relevant to the ACE	No [X]		
	Purchase laboratory and learning equipment	Yes [√]		
	Improve teaching, learning and pedagogical methodologies	No [X]		
3	**Research excellence**			

	Broaden students' knowledge through exposure to advanced research institutions.	No [X]		
	Establish new partnerships and strengthen existing ones in the area of teaching and learning	No [X]		
	Constitute students' supervisor committees	No [X]		
	Procure Software and Systems Development for Smart Grid	No [X]		
	Remodel students' workstations into lecturing facility and set up a eLearning platform	No [X]		
	Students' undertake research in home institutions	No [X]		
	Publish research in recognized and peer-reviewed journals	No [X]		
4	**Sustainable Financing**			
	Establish additional services to raise revenue from external sources	Yes [√]	Introduce a highly specialized consultancy services for the Energy Sector within the region	Simulation labs and equipment to measure efficiency, radiation and other aspects of output during energy production.
5	**Attracting Academic Staff and Students from the Region**			
	To conduct Public awareness with Advertisement, Marketing, Joint curriculum development, Admission including regional joint workshops	No [X]		
	Establish satellite offices and laboratories	No [X]		
	Host workshop and conference in the region.	No [X]		
	Advertisement and Marketing of ACEESD- programmes, events etc.	No [X]		
6	**National and Regional Sector Partners**			
	Joint supervision of students with faculty from regional and international partners.			
	Students and staff exchange			
	To develop collaboration, Networking, and co-operation within the region with stakeholders	No [X]		
7	**Collaboration with national, Regional and International Sector Partners**			

	To Have inter university Joint Collaboration.	No [X]		
	Consultancy Services on Research	No [X]		
	Provision of equipment maintenance	No [X]		
8	**Management and Governance**			
	Governance structure, Regular evaluation team, Prepare and submit annual financial reports, Ensure transparency in financial management, internal audit oversight, complete retirement of funds advanced to students for research, by partners, Disbursement plans (Activities and Finance)	No [X]		-
9	**Setting up of Infrastructure for learning (Architectural Planning and Engineering Design for Classroom and Workshops)**			
	Compliance to building standards and by-laws	Yes [√]	Design of existing building as to be renovated should be adapted to standard classroom and laboratory guidelines	- All designs to undergo a review process by an architect and relevant structural and MEP Engineers to ascertain that they conform to requirements for classroom and laboratory
	Adequate space allocation	Yes [√]	Facilities provided should be adequate to staff and student, including visiting persons as per the local building by-laws	- Check the drawings in compliance to the space requirements and relevant standards. -
	Renovating existing classrooms and laboratory facilities	Yes [√]	Noise and Vibrations	- During construction work noise will be limited to restricted times agreed to in the permit - During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from working area as possible - Generators and other powered mechanical equipment will have exhaust mufflers (silencers) to minimize noise generation.
	Disaster Management Plan	Yes [√]	Provide evacuation means recovery in case of accidents and natural disasters	- Proper emergency exits / escape pathways will be provided in the center buildings - Fire extinguishing hydrants will be incorporated at appropriate locations in the center buildings. - First aid facility and Assembly points to be clearly provided and marked

	Air quality deterioration management during innovation	Yes [√]	Provide the way of overcoming the air quality deterioration	- Generators and other powered mechanical equipment will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. - Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil where appropriate and required
	Waste Management during construction works	Yes [√]	Provision of proper waster separation and disposal of material as used during construction.	- Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. - Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. - Construction waste will be collected and disposed properly by licensed waste collectors - The records of waste disposal will be maintained as proof for proper management as designed - Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
	Toxic / hazardous waste management	Yes [√]	Ensure safe removal and disposal of hazardous waste material during construction and operation of the Centre.	- Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information - The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching - The wastes are transported by specially licensed carriers and disposed in a licensed facility. - Paints with toxic ingredients or solvents or lead-based paints will not be used
	Safety management during construction works	Yes [√]	How safety precaution measure can be instituted on site during construction	- Protective fencing to be installed around the site to avoid any accidents. - All safety precautions will be taken to transport, handle and store - Ensure all workers are wearing Personnel Protection Equipment (PPE) at all times during construction.

	Damage management to existing infrastructure and utilities during Renovation works	Yes [√]	Minimum modification to the existing labs, infrastructure and utilities	- Drawings of existing infrastructure shall be provided to ensure contractor is familiar with existing installation - Contractor will be required to exercise duty of care while undertaking construction. - Where damage is unavoidable, contractor shall undertake to restore all infrastructure to original or better condition.
	Operation and maintenance of Center Facilities	Yes [√]	Lack of public utilities	- Provision of space for the public utilities like photocopying, internet / cyber café, cafeteria and other social amenities, in larger building complexes will be made
	Increased Energy cost during the operation of the center	Yes [√]	Principles of energy efficient building design and operation to be adopted	- The building is oriented in accordance to the principles of passive building design - Equipment as to be installed to have a low power rating to optimize energy consumption. - Adequate window sizes and openings have been provided to allow for natural air for ventilation and sunlight for lighting will be adopted in the rehabilitation work
	Application of accessibility code for handicapped	Yes [√]	Provide universal access for classroom and other facilities to Persons With Disabilities (PWD)	- The center has provisions for some facilities to allow for accessibility and operation for person with disability as per the International best practice and building code. - Provision of Disable toilets complete with all accessories to assist the users - Special floors for the visually impaired people.
	Gender related issues	Yes [√]	Ensure equitable access to learning facilities and amenities to all gender	- Provision for adequate and separate ablution and any other facilities that are gender related in accordance to building codes and by-laws
	Vehicular Access and Adequate Parking facilities	No [X]	Provide vehicular access and parking facilities to the Centre.	- The Campus has adequate parking facilities for visitors to the new facilities in the Center. Parking bays have to be clearly marked to ensure they are used efficiently

	Soil contamination management	Yes [√]	Provide the technics for avoiding the soil contamination	- After the completion of the construction works, the site and other will be completely restored. No debris, surplus construction material or any garbage will be left behind - Photographic record if maintained for pre-project conditions will be used to restore the area.
	Human exposure to the electromagnetic radiation from RF devices	Yes [√]	Management of electromagnetic radiation from RF devices	- The use of RF devices will adhere to exposure guidelines and measurements standards

ANNEX A: PUBLIC CONSULTATIONS

Country – Center of Excellence	Date of Consultative Meeting	Stakeholders Present	Issues raised	Response to the issues
RWANDA - ACEESD	**Stakeholder:** University of Rwanda, College of Science and Technology **Date:** 12/01/2016 **Venue:** CST Headquarters **Invitee:** UR Senior Staffs	Prof. Etienne Ntagwirumugara Dr. Said Rutabayiro Ngoga Dr. Kabera Telesphore Dr. Munyaneza Omar Dr. Richard Musabe Mr. Habyarimana Fabien Mr. Hitiyise Emmanuel Mr. Gasore Geoffrey Mr. Ugirimbabazi Odax	- Increase in dust and noise from demolition and/or rehabilitation - Waste Management - Health concerts - Damage to utility facilities - Displacement related issues for staffs and students	- The construction noise will be limited to times agreed in the contract - Waste will be collected and disposed properly by licensed collectors - All damaged infrastructure will be restored to original or better condition. - Staffs and students will be moved to identified locations
	Stakeholder: Rwanda Utility Regulation Agency **Date:** 13/01/2016 **Venue:** RURA Headquarters **Invitee:** RURA Senior Staffs	Mr. Francois Gatete Mr. Justice Rugondihene Mr.Alexis Mutware Mr.Alex Mudasingwa Mr.Valens Kubwimana Mr. Protais Kanyankore Mr. Alfred D. Byigero Prof. Etienne Ntagwirumagara Dr. Said Rutabayiro Ngoga	- Waste Management - Natural disasters - Application of Accessibility code for handicapped	- Waste will be collected and disposed properly by licensed collectors - Proper emergency exits / escape pathways will be provided in the center buildings - The center facilities will be prepared according to the accessibility code and will be a barrier free for the disabled and special person, e.g., provision of wheelchair-ramps, side rail along stairs, toilets for disabled and studded floors for the visually impaired people.

	Stakeholder: Rwanda Development Board **Date:** 14/01/2016 **Venue:** RDB Headquarters **Invitee:** RDB Heads of Division	Mr. Viateur Kabiligi Mrs. Francine Gatarayiha Pierre Celestin Nizeyimana Prof. Etienne Ntagwirumagara Dr. Said Rutabayiro Ngoga Dr. Luc E. Ngend Ngend	- Waste Management - Human Exposure to Electromagnetic Radiation from RF devices	- Waste will be collected and disposed properly by licensed collectors - The use of RF devices will adhere to exposure guidelines and measurements standards
	Stakeholder: Rwanda Energy Group **Date:** 14/01/2016 **Venue:** REG Headquarters **Invitee:** REG Senior Staffs	Dr. Luc Ngend Ngend Mr. Theoneste Higaniro Mr. Anicet Mushuti Mr. Papias Karanganwa	- Radiation management - E-waste management - Soil degradation due to expansion of car parking facilities - Power fluctuations/variations - Fire hazards/issues - Dealing with gender and foreign students	- Waste will be collected and disposed using licensed companies who will sign contracts - Adherence to radiation exposure guidelines and measurement standards - Existing car parking facilities can be enough if efficiently utilized by providing markings. No need to expand parking - As part of renovation works, wiring will be upgraded and fire protection systems installed. - Provision of back-up power supply.
	Stakeholder: Rwanda Environment Management Authority **Date:** 15/01/2016 **Venue:** REMA Headquarters **Invitee:** REMA Senior Staffs	Ms. Beatrice CYIZA Eng Coletha RUHAMYA Prof. Etienne Ntagwirumugara	- Energy efficiency and management during renovations - Compliance with regulations for renovation - Waste management - Cooling System without R22 or R12 Gaz	- Use of energy efficient materials and installation of green technologies - Follow through normal procedure to request permission for renovation from sector agency concerned - Waste collector to sign contracts and also report activities to the relevant authority as a compliance monitoring tool. - Equipment Cooling

				with acceptable gaz (Ozone friendly gas)

UNIVERSITY OF RWANDA

COLLEGE OF SCIENCE AND TECHNOLOGY

SCHOOL OF ICT

Africa Center of Excellence in Internet to Things (ACEIoT)

Environment and Social Management Plan (ESMP)

January 2016

Background

The ACEIoT under the University of Rwanda, College of Science and Technology has been conditionally selected as an African Center of Excellence within the Eastern and Southern Africa Higher Education Center of Excellence (ACE II) Project. To fulfill World Bank safeguards requirements, a rapid environment assessment has been carried out from January 11th to 13th 2016 to avoid or mitigate any potential threats to the natural and social environments.

The present ESMP document has been developed using a checklist–type format. This format is used as a "pragmatic good practice" which attempts to cover typical mitigation approaches common to low-risk topology with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet Environmental Assessment requirements under World Bank safeguard policies.

The present EMP has two parts:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process.
- **Part II:** includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

Part I: Project Description

1. Basic Institutional Information

The College of Science and Technology is part of the University of Rwanda, whose formation was put in law on October 15th 2014, in a search for efficiency; making it the only public institution of its kind in the country. Geographically, the College is composed of three main campuses namely Nyarugenge (Headquarters), Huye and Nyagatare.

2. Project Description

Originating Institution:	University of Rwanda-College of Science and Technology (UR-CST)
Centre of Excellence Name	African Center Excellence of Internet of Things (ACEIoT)
Head of Institution	Professor Manasse Mbonye +250 788304263 principal.cst@ur.ac.rw
Centre Leader	Prof. Santhi Kumaran +250 788594505 santhikr@yahoo.com kr.santhi@ur.ac.rw
Deputy Centre Leader	Dr. Rutabayiro Ngoga Said said.rutabayiro.ngoga@gmail.com nrubayiro@ur.ac.rw +250 783111906

3. Summary of the ACEIoT Proposal

Despite the remarkable growth in the GDPs of East and South African (ESA) countries, the region significantly lags behind developed economies in Science and Technology (S&T) capacity. Without a quantum leap in S&T capacity, Africa's development challenges cannot be addressed. We propose an African Center of Excellence in Internet of Things (ACEIoT) to educate and train the future S&T innovators who will create and deploy the IoT technological infrastructure for future advances in all critical development sectors. Rather than addressing a specific development challenge, IoT focusses on the underlying technological framework for all development challenges. For example, wide-area networked sensing for precision agriculture to achieve food nutrition and security; remote monitoring and diagnosis technology to provide rural populations with access to quality healthcare; and wireless systems for fine-grained monitoring and control of distributed renewable generation and energy demand at the individual customer level, thereby increasing equitable access to electricity.

The contributive initiatives of ACEIoT are to

1) Develop curricula to support and promote cutting-edge research in the IoT field;
2) Set up an IoT living lab for open innovation and co-creation of IoT4D;
3) Build a critical mass of African scientists and engineers in the field of IoT through higher education, research and training; and
4) Empower African researchers to utilize IoT technologies to develop service delivery applications and solutions across all ESA high-priority domains.

ACEIoT will build on UR-CST's existing collaborations with eight local partners, including Carnegie Mellon University in Rwanda (CMU-R), three regional partners and five international partners, including International Center for Theoretical Physics (ICTP) (Italy).

ACEIoT objectives are:

(i) Train high-level professionals and academics in the field of IoT through master's and PhD programmes in Wireless Intelligent Sensor Networks and Embedded Computing Systems;
(ii) Provide an e-learning platform to promote teaching, research, and dissemination of information among IoT professionals and academics;
(iii) Serve as a core facility with state-of-the art IoT laboratories to support new applications that are made possible by IoT technologies;
(iv) Increase IoT research output with relevance to developing countries, through a focus on low-cost, open and sustainable solutions; and
(v) Excel as a focal point for enhancing regional and international collaboration by providing a forum for researchers to share thoughts and results on IoT applications.

4. Environmental screening, assessment and management and World Bank applicable environment policies

The environmental impacts of the ACEIoT are expected to be low**.** There will be some rehabilitation and extensions of some of the existing classrooms and laboratories to accommodate new infrastructures as well as new students. There will be no new land acquisition for the Center of Excellence because the project will be housed in the existing facilities of the College of Science and Technology. Also, there will be no need for new construction as the College/University has enough buildings that can contain the required space for laboratories and classrooms.

In general, the project will focus on quality enhancement aspects of teaching and research, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources. We envisage will have very minimal environmental impacts that will not require new approval or licenses apart from those that already exist. Further, the ESMP has undergone a set of public consultations, which are presented in Annex A.

The ESMP has been developed in alignment with promulgated environmental legislative and guidelines of the Government of Rwanda and that of the World Bank's safeguard policies.

5. EMP Monitoring and Reporting

Monitoring and controlling processes will happen throughout the project lifecycle. The Project Management Office (PMO) will ensure that environment and social issues are included in the Issue Log and are controlled just like others from traditional project management aspects (scope, schedule, HR, cost, risk, quality, communications, procurement, etc.). The stakeholder management process will also help tackle some of these issues. The ACEIoT PMO will consolidate environment and social issues and lesson learnt on periodic reports and submit them to the national review committee under the supervision of the Work Bank.

The responsibility for monitoring the implementation of the present EMSP has been assigned as follows:

Institution	**EMP Monitoring Arrangements (Name, Title, Contact Information)**
University of Rwanda, College of Science and Technology	Center Leader Prof. Santhi Kumaran +250 788594505 santhikr@yahoo.com kr.santhi@ur.ac.rw
University of Rwanda, College of Science and Technology	Deputy Center Leader Dr. Rutabayiro Ngoga Said said.rutabayiro.ngoga@gmail.com nrubayiro@ur.ac.rw +250 783111906
University of Rwanda, College of Science and Technology	Estate Management Office Mr. Olivier Kaliboli +250 788768006 de@kist.ac.rw okaliboli@gmail.com
University of Rwanda, College of Science and Technology	Office of the Nyarugenge Campus Manager Mr. Andrew Mpamo +250 788506185 mpamo4@yahoo.com
University of Rwanda, College of Science and Technology	Office of the Director of Planning, Monitoring and Evaluation Mr. Anselme Sano +250 788410590 asano@ur.ac.rw sanoanselme@yahoo.fr
University of Rwanda, College of Science and Technology	Procurement Office Mr. Callixte Gahunga +250 788510280 c.gahunga@kist.ac.rw

Part II: EMP Checklist for Activities

Action Plan	ESMP required?	Issues	Mitigation Measures
1. Learning Excellence			
Development of new curriculum in the field	No [X]	NA	NA
Offering postgraduate course in the field	No [X]	NA	NA
2. Research Excellence			
Publish research papers in high quality conference/journals,	No [X]	NA	NA
Conduct or participate in funded researchers projects	No [X]	NA	NA
3. Quality Assurance			
Develop Assessment tools for Programme and Module specifications	No [X]	NA	NA
4. Equity Dimensions			
Advertise, tender, procure specialized equipment for disabled and disburse funds appropriately	No [X]	NA	NA
To conduct seminar, training, workshop, conferences and exhibition targeting people with disabilities and promoting gender balance	No [X]	NA	NA
5. Attracting Academic Staff and Students from the Region			

To conduct Public awareness with Advertisement, Marketing, Joint curriculum development, Admission including regional joint workshops	No [X]	NA	NA
To conduct Seminar, Training, Workshop, Conferences and Joint Exhibition's with regional and international partners to focus on High end Publications as result	No [X]	NA	NA
6. National and Regional Sector Partners			
To develop collaboration, Networking, and co-operation within the region with stakeholders	No [X]	NA	NA
7. Collaboration with International Academic Partners			
To Have inter university Joint Collaborations	No [X]	NA	NA
8. Management and Governance			
Renovating existing classrooms and laboratory facilities	Yes [√]	- Noise and vibrations - Increase in dust and noise from demolished and/or construction	- During construction works, noise will be limited to restricted times agreed to in the permit. - During operations, the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from working area as possible. - Generators and other powered mechanical equipment will have exhaust mufflers (silencers) to minimize noise generation.
		Natural disasters	- Proper emergency exits / escape pathways will be provided in the center buildings. - Fire extinguishing hydrants will be incorporated at appropriate locations in the center buildings.

		Air quality deterioration	- Generators and other powered mechanical equipment will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. - Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil where appropriate and required
		- Construction waste - Solid waste - Electronic waste	- Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. - Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. - Waste will be collected and disposed properly by licensed collectors - The records of waste disposal will be maintained as proof for proper management as designed. - Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Toxic / hazardous waste management	- Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information. - The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching. - The wastes are transported by specially licensed carriers and disposed in a licensed facility. - Paints with toxic ingredients or solvents or lead-based paints will not be used.
		Safety Hazards during construction works	- Protective fencing to be installed around the site to avoid any accidents. - All safety precautions will be taken to transport, handle and store.
		Damage to existing infrastructure and utilities during constriction works	- All damaged infrastructure will be restored to original or better condition.
		Soil Contamination	- After the completion of the construction works, the site and other will be completely restored. No debris, surplus construction material or any garbage will be left behind. - Photographic record if maintained for pre-project conditions will be used to restore the area.
Operation and maintenance of Center Facilities	Yes [√]	Lack of public utilities	- Provision of space for the public utilities like photocopying, internet, in larger building complexes will be made.

		Increased Energy cost during the operation of the center	- The principles of passive building design incorporating natural air for ventilation and sunlight for lighting will be will adopted in the rehabilitation work.
		- Application of Accessibility code for handicapped	- The center facilities will be prepared according to the accessibility code and will be a barrier free for the disabled and special person, e.g., provision of wheelchair-ramps, side rail along stairs, toilets for disabled and studded floors for the visually impaired people.
		- Gender issues	- Provision for separate toilet facilities for men and women will be made. - Integrative approach that will enable the females to play the same important roles as their male peers. - The language used by stakeholders in our exchanges via the different identified channels should not be gender neutral rather gender sensitive.
		- Congestions of spaces	- The center facility will be prepared to accommodate all the staff and visiting persons in accordance with the guidelines provided by the Government and other relevant standards.
		- Parking related issues	- The site will be prepared in way give sufficient parking spaces for the visitors to the new facilities in the Center.
		- Human exposure to Electromagetic radiation from RF devices	- The use of RF devices will adhere to exposure guidelines and measurements standards.

ANNEX A : PUBLIC CONSULTATIONS

Country – Center of Excellence	Date of Consultative Meeting	Stakeholders Present	Issues raised	Response to the issues
Rwanda, African Center of Excellence in Internet of Things (ACEIoT)	**Stakeholder:** Univeristy of Rwanda, College of Science and Technology **Date :** 12/01/2016 **Venue :** CST Headquarters **Invitee :** UR Senoir Staff	Prof. Etienne Ntagwirumugara Dr. Said Rutabayiro Ngoga Dr. Kabera Telesphore Dr. Munyaneza Omar Dr. Richard Musabe Mr. Habarimana Fabien Mr. Hitiyise Emmanuel Mr. Gasore Geoffrey Mr. Ugirimbabazi Odax	- Increase in dust and noise from demolition and/or rehabilitation - Waste Management - Health concerts - Damage to utility facilities - Displacement related issues for staffs and students	- The construction noise will be limited to times agreed in the contract - Waste will be collected and disposed properly by licensed collectors - All damaged infrastructure will be restored to original or better condition. - Staffs and students will be moved to identified locations
	Stakeholder : Rwanda Utility Regulation Agency **Date :** 13/01/2016 **Venue :** RURA Headquarters **Invitee :** RURA Senoir Staff	Mr. Francois Gatete Mr. Justice Rugondihene Mr. Alexis Mutware Mr. Alex Mudasingwa Mr. Valens Kubwimana Mr. Protais Kanyankore Mr. Alfred D. Byigero Prof. Etienne Ntagwirumagara Dr. Said Rutabayiro Ngoga	- Waste Management - Natural disasters - Application of Accessibility code for handicapped	- Waste will be collected and disposed properly by licensed collectors - Proper emergency exits / escape pathways will be provided in the center buildings - The center facilities will be prepared according to the accessibility code and will be a barrier free for the disabled and special person, e.g., provision of wheelchair-ramps, side rail along stairs, toilets for disabled and studded floors for the visually impaired people.
	Stakeholder : Rwanda Development Board **Date :** 14/01/2016	Mr. Viateur Kabiligi Mrs. Francine Gatarayiha Mr. Pierre Celestin	- Waste Management - Human Exposure to Electromagetic	- Waste will be collected and disposed properly by licensed collectors

	Venue : RRD Headquarters **Invitee :** RDB Heads of Division	Nizeyimana Prof. Etienne Ntagwirumagara Dr. Said Rutabayiro Ngoga Dr. Luc E. Ngend Ngend	Radiation from RF devices	- The use of RF devices will adhere to exposure guidelines and measurements standards
	Stakeholder : Rwanda Energy Group (REG) **Date** : 14/01/2016 **Venue** : KIST I Building **Invitee** : REG Senior Staff	Prof. Etienne Ntagwirumagara Dr. Luc E. Ngend Ngend Mr. Theoneste Higaniro Mr. Anicet Nshuti Mr. Papias Karanganwa Mr. Soita Wambete Mr. Michael Asinyaka Mr. Ugirimbabazi Odax	- Waste Management - Human Exposure to Electromagetic Radiation from RF devices - Natural disasters	- Waste will be collected and disposed properly by licensed collectors - The use of RF devices will adhere to exposure guidelines and measurements standards - Proper emergency exits / escape pathways will be provided in the center buildings - Fire extinguishing hydrants will be incorporated at appropriate locations in the center buildings.
	Stakeholder : Ministry of Youth and ICT (MyICT) **Date** : 15/01/2016 **Venue** : MyICT Office **Invitee** : MyICT Senior Staff	Dr. Luc E. Ngend Ngend Mrs. Josephine Nyiranzeyimana Mr. Patrick Rwabidadi	- Human Exposure to Electromagetic Radiation from RF devices - Natural disasters - Waste Management	- The use of RF devices will adhere to exposure guidelines and measurements standards - Proper emergency exits / escape pathways will be provided in the center buildings - Fire extinguishing hydrants will be incorporated at appropriate locations in the center buildings. - Waste will be collected and disposed properly by licensed collectors
	Stakeholder : Rwanda Environment Management	Prof. Etienne Ntagwirumugara Dr. Luc E. Ngend Ngend	- Efficient management of Enery during	- Use of energy efficient materials and

	Authority (REMA) **Date** : 15/01/2016 **Venue** : REMA Office **Invitee :** REMA Senior Staff	Eng. Coletha Ruhamya Mr. Remy Norbert Duhuze	renovations - Compliance with regulations regarding renovation works - Waste management	installation of green technologies - Adhere to district regulations and norms regarding rehabilitation. - Waste collector to sign contracts and also report activities to the relevant authority as a compliance monitoring tool.

Centre in Research, Agricultural advancement & Teaching Excellence and Sustainability (CREATES)

Environment and Social Management Plan

Part I: Site Passport

1.1 Location

CREATES is hosted at the Nelson Mandela African Institution of Science and Technology, Arusha-Tanzania

1.2 Institutional and legislative aspects

In Tanzania, the National Environmental Policy (1997), and National Environmental Management Act (2004) provide the institutional framework for safeguarding the environment. The National Environmental Management Council (NEMC) was created in 1983, under the National Environment Management Act No. 19 of 1983. In 2004, the Act No 19 of 1983 was repealed by National Environmental Management act 2004. Under the new Act, NEMC was given additional mandate to undertake enforcement, compliance, review and monitoring of Environmental Impact Assessments (EIA). Other new mandates given to NEMC include research, raising environmental awareness and collection and dissemination of environmental information.

According to the Law, the following key steps are necessary for an EIA;

- The proponent is required to register a project with NEMC by submitting duly filled EIA application form. The forms are available at NEMC
- The EIA application forms and Project Brief are screened in order to assess and establish the category of project and determine the level of EIA required.
- If the screening indicates that a full EIA is required, identification of main issues of concern through scoping would be conducted by the developer through his Consultant.
- Conducting EIA study is done after approval of Terms of Reference (ToR) by NEMC. The Consultant uses the ToR to conduct the actual EIA study
- Once the proponent has submitted an EIA report, NEMC conducts site verification visit. The site visit is conducted to verify information provided in the EIS report.
- As part of the review process a public hearing may be necessary to address public concerns over a proposed activity or project
- After submission of the final version of the EIA report, NEMC assesses it in order to ascertain whether all comments and recommendations have been adequately addressed by the consultant
- Both the proponent and the affected or interested parties have the right to appeal, if there is dissatisfaction on the decision reached
- Project implementation is conducted according to the terms and conditions of approval and is guided by the Environmental Management and Monitoring Plans.
- Monitoring is done through a series of repetitive measurements of environmental parameters (or more generally, a process of systematic observations)

- Environmental audit is carried by an independent consultant to examine if the practice complies with expected standards.
- At the end of the project life i.e. during the phase out and closure periods, a decommissioning report, which includes a comprehensive decommissioning plan (DP) is prepared for review and approval by NEMC.

Other policy and regulation that provide for the sustainable use and management of environment and its resources include the National Water Policy, 2002 and National Water Management Act, 2009, Food and Nutrition Security Strategy, Agricultural Products Marketing Policy, Food and Nutrition Policy, Public Health Act, The Tanzania Food, Drugs and Cosmetics Act, 2003, Tanzania Livestock Policy, 2006.

1.3 Project description

The project seeks to establish an Eastern and Southern Africa Centre for Research, Agricultural advancement & Teaching Excellence and Sustainability (CREATES). The Centre will provide innovative research, training, and outreach programmes in the region, taking advantage of the strong existing international and regional collaboration activities in the Nelson Mandela African Institute of Science and Technology (NM-AIST).

The Eastern and Southern Africa region, is characterized by high food and nutrition insecurity ranging between 37% and 76%. Efforts to ensure food and nutrition security in the region have been compounded by a number of challenges; poor agricultural productivity caused by poor agricultural practices, prevalent diseases and pests, climate variability, low plant and animal genetic potential and also the food loss, which is characterized by reduction in quantity and quality of the produced food along the value chain. Furthermore, as a consequence of spatial expansion of agriculture in order to produce more food, a number of inadvertent negative consequences have been observed. These include the loss of biodiversity and threatening of endangered species as well as the close interactions between humans and wildlife, which has precipitated outbreaks of diseases that are threatening survival of humans and their livestock.

CREATES will serve as a regional excellence hub to achieve and promote specific Sustainable Development Goals under the following aspects:

- Research based training and support of excellent professionals and academia;
- Provide an e-learning platform to promote graduate teaching programmes, research activities, and dissemination of information;
- Serve as a state-of-art core laboratory to support Life Science and related research fields;
- Promote technological research output in good agricultural practice (GAP), food safety, nutrition and health using bio-nanoscience and bio-repositories for future research activities; and
- Establish data repository to build capacity on predicting risks generated through climate variability and to provide scenarios on climate mitigation and adaptation

Furthermore the proposed Centre aims to strengthen the content, delivery, outputs and outreach for the MSc and PhD in Life Sciences other related programs at NM-AIST with particular focus

on the thematic core areas of Sustainable Agriculture, Biodiversity and Ecosystem Conservation and Management, Food and Nutrition Sciences, and Health and Biomedical Sciences as a way to contribute to food and nutrition security in the region.

Overall Objective:

The overall objective of the proposed project is to strengthen the capacity of NM-AIST to serve as an African Centre of Excellence for provision of post graduate training (Master, PhD and post-doc), applied research and outreach programs for Food and Nutrition Security in the Eastern and Southern Africa region.

Specific objectives

Specifically the project seeks to become a magnet environment that provides innovative opportunities and state-of the-art learning environments for graduate students (PhD and MSc students) as well as for faculty and other relevant stakeholders in the abovementioned thematic core areas

To produce high quality evidence-based research products, technologies and services with respect to agriculture, health and nutrition

Project outcome

The outcome of the project includes Critical mass of high capacity education staff, new technologies, spin off products and patents, Transparency and access to knowledge, Strong linkage with Industries, Regional excellence inacademic programme and Bio repository

Public Consultations

In addition to the public consultations carried out during the initial conceptualisation of the institution, programs and the centre, in the course of developing this EMPs, we consulted various stakeholders listed in Annex A.

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Part II : EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**Tanzania - CREATES**	**NO**	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.

				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		YES	2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • √On site or off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		NO	3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 4. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
		NO	5. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible

		NO	• Construction waste	Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
		NO		Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		YES	6. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

Please note that items 6 and 8 seem to repeat item 2.

Monitoring and Reporting

Table: Responsibility for monitoring of implementation of EMPs

Institution	EMP monitoring arrangements (name, title, contact information)
NM-AIST	EngIgnantioSanga, Estate and Assets Manager, NM-AIST, P. O. Box 447, Arusha Tanzania, Email: ignantio.sanga@nm-aist.ac.tz, Tel +255 762844904
National Enviroment Management Council (NEMC)	Dr. MenanJangu Zonal Coordinator and Environmental Officer NEMC - Northern Zone Office Tel +255 767535839

ANNEX A : PUBLIC CONSULTATIONS

Stakeholder Public Consultation

	Country Centre of Excellence	Date of Consultative Meeting	Stakeholders present	Issues Raised	Mitigation/ Comments from NM-AIST
1.	Tanzania - CREATES	14th January 2016	Mr. RamadhaniKupaza Director, Oikos, East Africa, P.O. Box 8342, Arusha Tanzania Tel. +255 272544106	- Solid waste and e-waste management challenge - Limited community awareness on high value/organic agricultural products - Overuse of chemical pesticides and antibiotics	- Waste management facilities available at NM-AIST including incinerator for medical/biological waste.Consult competent authorities on e-waste management - Raise awareness on high value and organic agricultural products, through outreach program - Intensify research researching on the use of bio pesticides to replace chemical pesticides. Strengthen research/extension linkages.
2.		14th January 2016	Mr. James P. Lobikoki Head of Sanitation and Environment Department Arusha City Council	- Capacity to detect and quantify environmental pollution (air, sound, soil) is limited - Some City water wells are contaminated - Leakage of water pipes	- Generate and disseminate knowledge on detection and quantification of environmental pollutants

			Tel. +255 713563566	- Management of hazardous wastes and e-wastes is not adequate - The health and environmental impact of urban agriculture is not recognized	- Consult competent authorities on e-waste management - Define a mechanism and advise the government on regulation of urban agriculture
3.		14th January 2016	Mr. Chuma S.S District Town Planner, Meru District +255 754803627	- Limited awareness about the role of NM-AIST to the community - Very daunting task to change people's mindset - Prior information to all stakeholders is very crucial - Limited information on ground water sources and the importance of developing water resource maps for protection of the resources - Conflicts of interest in use of water and land - Research is less demand driven	- Use ACES to improve linkage with the society - Promote agricultural intensification - Derive research needs from the community
4.		14th January 2016	Mr. Kamuguisha John Byarugaba District Town Planner Arusha District Council +255 784990198		
5.		14th January 2016	Dr. MenanJangu Zonal Coordinator and Environmental Officer NEMC- Northern Zone Office	- Possible increase in waste discharge due to increase of student numbers - Possibility that the Center can be in	- The number of students shall not surpass the design capacity of the NM-AIST Tengeru Campus. The design

			Tel +255 767535839	environmentally sensitive areas - Challenges for provision of clean, safe and health environment to the center occupancy - Increase in release of toxic and hazardous waste from laboratories	capacity is 500 students but we currently have 150 - The Centre is not constructing new buildings it will use the existing NM-AIST infrastructure which are approved by the relevant authorities - All the students in the Centre shall stay at the NM-AIST campus which is well provided with all necessary facilities and clean, safe, secure and healthy environment - There will be minimal use of toxic substance such as in the use analytical chemicals. The system for handling such materials is in place. - There is also a system for disposal of medical and biological wastes including an incinerator
6.		14th January 2016	Gerald Nyoni Environmental Management Officer NEMC- Northern Zone Office Tel +255 712 922222		

Environmental and Social Management Plan for the Centre of Excellence in **Water Infrastructure and Sustainable Energy Futures (WISE – Futures)**

A Centre of Excellence within the East and Southern Africa Higher Education Centre of Excellence (ACE II) Project at the Nelson Mandela African Institution of Science and Technology, Arusha Tanzania

Contacts:

Prof. Karoli Njau (Centre Leader), email karoli.njau@nm-aist.ac.tz

Dr. Hans C. Komakech (Deputy Centre Leader) email: hans.komakech@nm-aist.ac.tz

Africa Centers of Excellence Project
Environment and Social Management Plan

For low-risk topologies, an alternative to the commonly used "full text" EMP format is to have a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format is a "pragmatic good practice" approach to be user friendly and compatible with safeguard requirements.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

The EMP template format has two parts:

- **Part I:** constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.
- **Part II:** includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.

Table of Contents

PART I: Activity Description (Site Passport)

I. BACKGROUND

Africa is undergoing tremendous economic transformation. The continent's economic transformation features favorable GDP growth rates with 6 of the world's 10 fastest growing economies are African. Overall, East Africa is considered one of the fastest growing economic zones in Sub-Sahara Africa (SSA), estimated at 5 to 7% per year. In addition, Africa is now the world's second populous continent. Current estimate is that over 1 billion people live in Africa, and that by the year 2050, Africa's population will double, reaching 2.4 billion. At the end of the century, about 4.2 billion people will live Africa, nearly the size of the total world population in 1977.

These growth (economic and population) poses new challenges in a region already under huge energy, water, and sanitation infrastructure stress. Currently, access to energy in the East African countries is only about 27% with large population dependent on biomass for energy. There is also limited development of the vast sources of renewable energy resources in the region. Gender disparity remains prevalent in East and Southern Africa. Inclusive growth will be dependent on the capacities of Africa countries to unlock the potential and reap from the growing population. This centre, Water Infrastructure and Sustainable Energy Futures (Acronym WISE - FUTURES) objective is to contribute to the transformation of Africa's economies by assembling a critical mass of highly skilled water and energy professionals able to deliver cutting edge research and innovation in the sector.

1.1 Project Objectives

The main objective is to establishment of a centre of excellence for postgraduate education, training and research in Water, Sanitation, and Sustainable Energy at the Nelson Mandela African Institution of Science and Technology. Specifically, the proposed center aspires to: 1) to provide excellent learning environment for training top-notch Masters and PhD graduates specializing in water and energy related fields; 2) to provide a stimulating research environment for early career researchers to enable them contribute to solving pressing problems related to water and energy; 3) to strengthen regional and international research collaboration in order to promote the development of cutting edge solutions to water and energy challenges in the region; and 4) to promote inclusive socio-economic transformation in the region by turning research findings into usable and accessible products for the benefits of society, industry, and the environment.

1.2 Project Description

Hosted at the Nelson Mandela African Institution of Science and Technology, Arusha Tanzania, the project is estimated to cost USD5, 996,720 to be implemented over a period of five years. The project will have the following components: a) provision of funds for strengthening teaching and learning for MSc and PhD programme (development of new courses, and staff exchange between partner institutions),

estimated at USD 1,300,000; b) Providing partial scholarships (tuition fees) to masters and PhD students, estimated at USD 1,877,520; c) Strengthening research capacity, estimated at USD 1,366,800; d) Internship for academic staff and students estimated at USD 322,400; e) Laboratory supplies and upgrading of existing facilities estimated at USD200,000; f) Outreach programme for problem identification and promotion of adoption of research findings estimated at USD 200,000; and g) Centre Administration estimated at USD 780,000.

1.3 Institutional and Legislative Aspects for Environmental Safeguards

In Tanzania, the National Environmental Policy (1997), and National Environmental Management Act (2004) provide the institutional framework for safeguarding the environment. The National Environmental Management Council (NEMC) was created as early 1983, when the Government of Tanzania enacted the National Environment Management Act No. 19 of 1983. The National Environmental Management act 2004 repealed the National Environmental Management Act No.19 of 1983 and re-established NEMC giving it mandates to undertake enforcement, compliance, review and monitoring of Environmental Impact Assessments (EIA), research, raise environmental awareness and collect and disseminate environmental information. EIA key steps of EIA process according to the Law:

- The proponent is required to register a project with NEMC by submitting duly filled EIA application form. The forms are available at NEMC
- The EIA application forms and Project Brief are screened in order to assess and establish the category of project and determine the level of EIA required.
- If the screening indicates that a full EIA is required, identification of main issues of concern through scoping will be conducted by the developer through his Consultant.
- Conducting EIA study is done after approval of ToR by NEMC. The Consultant uses the ToR to conduct the actual EIA study
- Once the proponent has submitted an EIA report (EIS), NEMC conducts site verification visit. The site visit is conducted to verify information provided in the EIS report.
- As part of the review process a public hearing may be necessary to address public concerns over a proposed activity or project
- After submission of the final version of the EIS, NEMC assesses it in order to ascertain whether all comments and recommendations have been adequately addressed by the consultant
- Both the proponent and the affected or interested parties have the right to appeal. If there is dissatisfaction on the decision reached
- Project implementation is conducted according to the terms and conditions of approval and is guided by the Environmental Management and Monitoring Plans
- Monitoring is done through a series of repetitive measurements of environmental parameters (or more generally, a process of systematic observation)
- Environmental audit is carried by an independent consultant to examine if the practice complies with expected standards.
- At the end of the project life i.e. during the phase out and closure periods, a decommissioning report, which includes a comprehensive decommissioning plan (DP) is prepared for review and approval by NEMC.

Other policies and regulations that provides for the sustainable use and management of environment and its resources include the National Water Policy, 2002 and National Water Management Act, 2009, Food and Nutrition Security Strategy, Agricultural Products Marketing Policy, Food and Nutrition Policy, Public Health Act, The Tanzania Food, Drugs and Cosmetics Act, 2003, Tanzania Livestock Policy, 2006.

Part II: EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

2. THE ENVIRONMENTAL AND SOCIAL SCREENING

The environmental impact from the activities proposed under the centre is likely to be very low. No major civil construction works is foreseen during the project. Any minor works will be guided by the EIA requirements of Tanzania and the World Bank Policy on Environmental Assessment. The EMP checklist is provided in the table below. However, since 6 and 8 seems to repeat 2 we have also provided additional information in Annex B table B2 and B3, particularly since the centre's waste will mainly research activities in the laboratories.

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**Tanzania – Water Infrastructure and Sustainable Energy (WISE - Futures) Centre**	NO	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.

				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		NO	2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		NO NO	3. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste 4. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
		NO	5. Building rehabilitation • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.

				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		NO	6. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		~~NO~~Yes	7. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used (d) Waste management facilities available at NM-AIST including incinerator for medical/biological waste (e) Consult with e-waste collection system (f) NM-AIST is researching on the use of bio pesticides to replace synthetic pesticides
		NO	8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and (e) If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		NO	9. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used
		NO	10. Individual wastewater treatment system	Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

3. MONITORING AND REPORTING

The arrangement for monitoring implementation of the EMPs is as indicated in the table below.

Table: Responsibility for monitoring of implementation of EMPs

Institution	**EMP monitoring arrangements (name, title, contact information)**
NM-AIST	Eng Ignantio Sanga, Estate and Assets Manager, NM-AIST, P. O. Box 447, Arusha Tanzania, Email: ignantio.sanga@nm-aist.ac.tz, Tel +255 762844904
National Environmental Council (NEMC)	Mr. Gerald Nyoni, Environmental Management Officer NEMC- Northern Zone Office
Pangani Basin Water Board	Eng. Araf Maggid, Environment and Water Quality Manager

ANNEX A : PUBLIC CONSULTATIONS

In addition to public consultation conducted during the initial conceptualization of NM-AIST, and this centre project, further consultation was made while completing the EMPs. The stakeholders listed in the table A were presentation the centre proposal and activities. Issues raised and responses are captured in the table A below.

Table: Issues Stakeholders consultation

Country – Center of Excellence **Date of consultative meeting** Tanzania – Water Infrastructure and Sustainable Energy Futures (WISE – Futures) January 14, 2015	**Stakeholders present**	**Issues raised**	**Response to the issues**
	Mr. Ramadhani Kupaza Director, Oikos, East Africa, P.O. Box 8342, Arusha Tanzania Tel. +255 272544106	• Solid waste, e-waste management • For Solar energy disposal of storage battery is an issue • Sensitize community on high value/organic agricultural products • There is an overuse of pesticides	• Waste management facilities available at NM-AIST including incinerator for medical/biological waste • Consult with e-waste collection system • NM-AIST is researching on the use of bio pesticides to replace synthetic pesticides
	Mr. James P. Lobikoki, Head of Sanitation and Environment Department, Arusha City Council.	• Capacity to detect and quantify environmental pollution (air, sound, soil) is lacking • Some City water wells are contaminated • Leakage of pipes • Management of hazardous wastes and e-wastes is not adequate • Urban agriculture is very important for Arusha and should be regulated • Put emphasis on socio mobilization such as carrying outreach programmes.	• Generate and disseminate knowledge on detection and quantification of environmental pollutants • Consult competent authorities on e-waste management • Define a mechanism and advise the government on regulation of urban agriculture
	Mr. Chuma S.S, District Town Planner, Meru District, +255 754803627 Mr. Kamuguisha John Byarugaba, District Town Planner Arusha District Council, +255 784990198	• Outreach programmes on what the ACE are doing are very important • Very daunting task to change people's mindset • Prior information to all stakeholders is very crucial • There is a lack of information on ground water sources and the	• Use ACES to improve linkage with the society • Promote agricultural intensification • Derive research needs from the community

		importance of developing water resource maps for protection of the resources • There are conflicts for water resources between different users • Research should address grass root issues	
	Dr. Menan Jangu, Zonal Coordinator and Environmental Officer NEMC- Northern Zone Office, Tel +255 767535839 Gerald Nyoni, Environmental Management Officer NEMC- Northern Zone Office, Tel +255 712 922222	• There shall be increase of student numbers which would increase waste discharges • You need to check whether the Center shall be in environmentally sensitive areas • The law requires that there is a provision of clean, safe and healthy environment • Need to check release of toxic and hazardous waste from laboratories	• The number of students shall increase but not surpass the design capacity of the NM-AIST Tengeru Campus. The design capacity is 500 students but we currently have 150 • The Centre is not constructing new buildings it will use the existing NM-AIST infrastructure which are approved by the relevant authorities • All the students in the Centre shall stay at the NM-AIST campus which is well provided with all necessary facilities and clean, safe, secure and healthy environment • There will be minimal use of toxic substance such as in the use analytical chemicals. The system for handling such materials is in place. • There is also a system for disposal of medical and biological wastes including an incinerator

ANNEX B: ADDITIONAL EMPS DOCUMENT FILLED.

Table B1: General Project Description and Site Information

INSTITUTIONAL & ADMINISTRATIVE				
Country	**Tanzania**			
Project title	Centre of Excellence in Water Infrastructure and Sustainable Energy (WISE – Futures)			
Scope of project and activity	The main objective is to establishment of a centre of excellence for postgraduate education, training and research in Water, Sanitation, and Sustainable Energy at the Nelson Mandela African Institution of Science and Technology. Specifically, the proposed center aspires to: 1) to provide excellent learning environment for training top-notch Masters and PhD graduates specializing in water and energy related fields; 2) to provide a stimulating research environment for early career researchers to enable them contribute to solving pressing problems related to water and energy; 3) to strengthen regional and international research collaboration in order to promote the development of cutting edge solutions to water and energy challenges in the region; and 4) to promote inclusive socio-economic transformation in the region by turning research findings into usable and accessible products for the benefits of society, industry, and the environment.			
Institutional arrangements (Name and contacts)	WB (Project Team Leader)	Project Management Prof. Karoli Njau (Centre Leader) Dr. Hans C. Komakech (Deputy Centre Leader)	Local Counterpart and/or Recipient The Nelson Mandela African Institution of Science and Technology, Arusha Tanzania	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contactor
SITE DESCRIPTION				
Name of site	The Nelson Mandela African Institution of Science and Technology (NM-AIST)			
Describe site location			Attachment 1: Site Map [ ]Y [x] N	
Who owns the land?	Land own by NM-AIST			
Description of geographic, physical, biological, geological, hydrographic and socio-economic context	Arusha region, Arumeru District.			
Locations and distance for material sourcing,	N/A			

especially aggregates, water, stones?	
LEGISLATION	
Identify national & local legislation & permits that apply to project activity	Environmental Management Policy of 1997; Environmental Management Act, 2004; National Water Policy, 2002; and Water Resources Management Act, 2004
PUBLIC CONSULTATION	
Identify when / where the public consultation process took place	**N/A**
INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	[ ] N or [ ]Y if Yes, Attachment 2 includes the capacity building program

Table B2: EMP Checklist for Activities

SN	Centre Name	ENVIRONMENTAL /SOCIAL SCREENING			
1	NM – AIST: Water Infrastructure and Sustainable Energy Futures (WISE – Futures)	Will the site activity include/involve any of the following?	**Activity**	**Status**	**Triggered Actions**
			A. Building rehabilitation	[] Yes [X] No	See Section **A** below
			B. Minor new construction	[] Yes [X] No	See Section **A** below
			C. Individual wastewater treatment system	[ ] Yes [X] No	See Section **B** below
			D. Historic building(s) and districts	[ ] Yes [X] No	See Section **C** below
			E. Acquisition of land[1]	[ ] Yes [X] No	See Section **D** below
			F. Hazardous or toxic materials[2]	[X] Yes [ ] No	See Section **E** below
			G. Impacts on forests and/or protected areas	[ ] Yes [X] No	See Section **F** below
			H. Handling / management of medical waste	[] Yes [X] No	See Section **G** below
			I. Traffic and Pedestrian Safety	[] Yes [X] No	See Section **H** below

[1] Land acquisitions includes displacement of people, change of livelihood encroachment on private property this is to land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired.

[2] Toxic / hazardous material includes but is not limited to asbestos, toxic paints, noxious solvents, removal of lead paint, etc.

Table B3: Mitigation measures

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits have been acquired for construction and/or rehabilitation (d) The Contractor formally agrees that all work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
A. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition debris-chutes shall be used above the first floor (b) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust (c) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site (d) The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
B. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out (d) Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.
C. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notification shall be made and approvals/permits be obtained from local authorities and all construction activities planned and carried out in line with local and national legislation. (b) It shall be ensured that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted and registered, responsible officials contacted, and works activities delayed or modified to account for such finds.

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
D. Acquisition of land	Land Acquisition Plan/Framework	(a) If expropriation of land was not expected but is required, or if loss of access to income of legal or illegal users of land was not expected but may occur, that the Bank's Task Team Leader shall be immediately consulted. (b) The approved Land Acquisition Plan/Framework (if required by the project) will be implemented
E. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, it shall be marked clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately. Security measures will be taken against unauthorized removal from the site. (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
F. Affected forests, wetlands and/or protected areas	Protection	(a) All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) A survey and an inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided (c) Adjacent wetlands and streams shall be protected from construction site run-off with appropriate erosion and sediment control feature to include by not limited to hay bales and silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
G. Disposal of medical waste	Infrastructure for medical waste management	(b) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal; and ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
H Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(c) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to ▪ Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards ▪ Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. ▪ Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement ▪ Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public.

		▪ Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

Africa Centers of Excellence Project

Environment and Social Management Plan

For low-risk topologies, an alternative to the commonly used “full text” EMP format is to have a checklist approach. The goal is to provide a more streamlined approach to preparing EMPs. This checklist-type format is a “pragmatic good practice” approach to be user friendly and compatible with safeguard requirements.

The checklist-type format attempts to cover typical mitigation approaches to common low-risk topologies with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental Management Plan (EMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies.

The EMP template format has two parts:

Part I: constitutes a descriptive part (“site passport”) that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.

Part II: includes the environmental and social screening in a simple Yes/No format followed by mitigation measures for any given activity and the monitoring plan for activities during project construction and implementation. It retains the same format required for standard World Bank EMPs.

Application of the EMP-Checklist

The practical application of the EMP-checklist would include the filling in of Part I to obtain and document all relevant site characteristics and activities. In Part 2 the type of foreseen works, as obtained from the design documents, would be checked and the resulting provisions listed below highlighted (e.g. by hatching the field or copy pasting the relevant text passages into the special provisions of the tender documents.

The whole filled in tabular EMP is additionally attached as integral part to the works contract and, analogous to all technical and commercial terms, has to be signed by the contract parties.

For the monitoring of the Contractor's safeguards due diligence the designated construction inspector works with **Part C** of the EMP Checklist, the monitoring plan. This should be developed site specifically and in necessary detail, defining clear criteria and parameters which can be included in the works contracts, which reflect the status of environmental practice on the construction site and which can be observed/measured/ quantified/verified by the inspector during the construction works.

Part C would thus be filled in during the design process to fix key monitoring criteria which can be checked during and after works for compliance assurance and ultimately the Contractor's remuneration.

Environmental Management Plan (EMP)
AFRICAN CENTRE OF EXCELLENCE FOR INNOVATIVE RODENT PEST MANAGEMENT AND BIOSENSOR TECHNOLOGY DEVELOPMENT (ACEIRPM&BTD) [TANZANIA]

(14th JANUARY 2016)

PART I: Activity Description

1. INTRODUCTION

Pests (insects, mammals, viruses, fungi, birds etc.) are a serious threat to crop, forestry and animal production worldwide. In addition to causing animal and human diseases, some are just mere nuisance that cause discomfort to humans and other animals. The cost of controlling pests worldwide is enormous and is a significant constraint to many world economies but in particular to poor developing countries. With increasing acreage under agriculture, rodents have emerged as a major pest which occur in outbreak proportions particularly in sub-Saharan Africa. Management of rodents using conventional approaches, such as application of toxic chemicals to poison them, is both environmentally disruptive and unsustainable since such chemicals often poison and kill non target species and most often target species become resistant to such chemicals. The poisons can also find their way into water sources and contaminate the environment. Currently there is an urgent need for new technologies, which are ecologically sound for management of rodents in order to avoid the negative effects of rodenticides, which are currently marketed for rodent management. The objective of the African Centre of Excellence for Innovative Rodent Pest Management and Biosensor Technology Development (ACE for IRPM &BTD) is to develop rodent pest management technologies which are ecologically sound for farming communities in the region and the use of rats detect landmines and diagnose diseases such as tuberculosis. The approaches to be developed are more cost effective and sustainable and will reduce the pest burden on resource poor farmers as well as enable people to re-settle in areas which were mined in various war zones in Africa. The biosensor technology for disease diagnosis will reduce the time for disease diagnosis, costs for the diagnosis, and handling a large number of patients particularly in situations like refugee camps where people are concentrated and the likelihood of outbreaks of tuberculosis is high. ACE for IRPM &BTD will integrate research, training for capacity building, and outreach in rodent pest management technologies and introduction of biosensor technologies in the region.

2. PROJECT OBJECTIVES

The ACE in **IRPM&BTD aims are to** build capacity through training at the MSc and PhD levels in rodent taxonomy, ecology, innovative STI in rodent management and biosensor technology in East, Southern and Central Africa. IRPM&BTD will establish basic and applied research programs for African scientists to pursue high-impact projects in rodent

management, understanding the impact of zoonotic transmitted diseases on communities and their mitigation, and to broaden use of biosensor technology beyond detecting landmines and diagnosis of diseases.

3. PROJECT DESCRIPTION

The project will have the following provisions

(i) Training at least 75 MSc. Students in applied pest management
(ii) Training not less than 28 PhD students in diverse fields including rodent taxonomy, ecology, ecologically-based rodent management technologies, biosensor technology development and zoonotic diseases which involve rodents as host reservoirs or vectors.
(iii) Applied research on rodent biology, ecology, management and biosensor technology
(iv) Building capacity in partner country institutions in the region by developing the ability to responds to rodent borne problems such as crop damage, zoonotic disease outbreaks, etc.
(v) Funding for purchase of laboratory equipment and other project equipment, construction of a core facility for research and teaching
(vi) Short term workshops, publications, faculty and student exchange, engagement of the private sector for technology marketing and outreach activities to introduce technologies to stakeholders.

4: COST OF THE ACTION

Total cost of the project is estimated at $6,000,000 (six million USD).

5. IMPACT ON THE ENVIRONMENT

(i) The project activities are not expected to impact on the environment negatively. Indeed some activities will have a major positive impact on the environment (i.e. removal of landmines makes the land accessible for human re-settlement).

(ii) There will be no displacement of human population as a result of building construction. Sokoine University of Agriculture allocates a 50 ha land for construction of the proposed ACE building. This will be located in the area designated for academic buildings and research activities (Academic Zone) as approved in the Land Use Master Plan of SUA (Appendix 1).

6. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The management and coordination of environment issues in Tanzania is mandated to the National Environmental Management Council (NEMC), which was enacted by the Parliament of the United Republic of Tanzania (The Environmental Management Act, 2004). Among the provisions of the NEMC establishment is: To provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and

enforcement; to provide basis for implementation of international instruments on environment and to provide for implementation of the National Environment Policy.

Sokoine University of Agriculture adheres to, and observes, not only the provisions stated in the Act that established the NEMC, but also strictly implements all projects and activities in accordance to the National Environmental Policy.

7. RELEVANT WORLD BANK POLICIES RELATED TO IMPLEMENTATION OF THE PROJECT

The project aims at developing technologies which are ecologically-based and therefore not disruptive or destructive to the environment or environmental processes. Further there are activities to be implemented that have positive impact on the environment as well on people's welfare. Thus the project implementation process will ensure that all activities are environmentally sound and sustainable. This is in line with World Bank Policy on Environmental Assessment (OP 4.01) which takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects.

8. IMPLEMENTATION ARRANGEMENTS

The ACE for IRPM & BTD has some regional, international and national partners who shall be involved in project implementation. There will be a large number of individuals, including students, who shall access project funds to implement planned and approved activities. To access the funds, all individuals will have to submit a request that details the nature of activities and a certificate of approval from the SUA's Research and Publications Ethical Committee, which, among others, will have to approve that the activities have been carefully checked/assessed for Environmental Impact.

9. ENVIRONMENTAL SCREENING, ASSESSMENT AND MANAGEMENT

(i) Site location and Accessibility

The project site will be located within SUA main campus on an academic zone of about 300 hectares, of which ACE IRPM&BTD will be allocated 50ha for construction. The site project is accessible via main entry tarmac road to the SUA campus.

(ii) Land Tenure

The project site is on a land which is legally owned by Sokoine University of Agriculture. It is located at the academic zone of SUA main campus. SUA land is within Morogoro Municipality according to the SUA Land Use Master Plan, it is solely for academic activities.

(iii) Project components

(a) Road infrastructure

The project site can be accessed through the SUA main campus tarmac road, 3km from the centre of Morogoro Municipality. There are also other paved roads within the University that enable accessibility from other zones of the campus to the project site.SUA main campus road will be used for transportation of materials to the project site for the period of construction, thus it will not be destructive to the environment.

(b) Water supply

The water which will be used for construction activities and beyond is supplied by SUA's independent water source which is drawn from Mzinga River. SUA possesses a water use permit for abstraction of 725.902m^3 per day. Water to be used during finishing works shall be stored in PVC water tanks.

During operations the building will continue using water from the same source for sanitary, cleaning and maintaining the landscaping. It is not expected that at any time during construction there will be a shortage that may necessitate obtaining water from other sources.

(c) Storm Water Management

Storm water drainage will be created to direct surface runoff into the environment
During operations rain water will be collected by rain gutters connected to the open drainage system that collects storm water from the campus to the University farm.

10. POTENTIAL ENVIRONMENTAL IMPACTS

The ACEIRPM&BTD is not expected to have a significant negative environmental impact. However, it in accordance with the university regulations and the National Environmental Policy and guidelines, there will be a periodic evaluation of the activities of the Centre to ensure the criteria for protection of the environment are met and where shortfalls in achieving these occur, mitigating factors will be put in place to comply with the national guidelines and World Bank Operational Policies.

11. ENVIRONMENTAL MANAGEMENT APPROACH

SUA adheres to guidelines provided by the National Environmental Management Council in implementing its activities, to reduce impact on the environment. A solid framework for environmental impact assessment (EIA) is in place. During the construction and operation phases of the ACEIRPM&BTD the following will be strictly observed because of their potential adverse impact on the environment:

(a) Sanitation facilities

Waste water management system for the building will be connected to the campus waste water systems/waste water stabilization ponds where final effluent is discharged for treatment before being released to the environment.

(b) General waste disposal

Different kinds of waste will be generated during the finishing stage of construction including wood, cement bags, electric waste, plumbing waste, roofing wastes, dimension stones, boxes, plastics etc. These wastes will be collected by contractors for final disposal.

During the operational stage waste to be generated include: waste water, laboratory waste, sanitary waste, tissue paper etc. With exclusion of waste water, other wastes will be collected in waste bins within the building for final disposal. All laboratory wastes including animal tissues will be handled properly according to laboratory safety procedures and incinerated.

(c) Health and safety services

Workers will be provided with Personal Protective Equipment (PPE) such as air mask, gloves, googles and boots.

Unauthorized people will not be allowed to enter the site to protect them from any impacts associated with the construction. During operation, the building will be equipped with the necessary fire fighting equipment. Fire assembly point part and parcel of the building design.

The building hygiene and sanitation will be contracted to ensure safe working environment.

University Auxiliary Police and private security operators will be contracted to ensure safety and protection of property. Students and staff will be provided with fire fighting training every academic year.

12. MONITORING AND REPORTING

A successful ACEIRPM&BTD requires that a monitoring, evaluation and reporting is carried out on a regular basis. The implementation and management of IRPM&BTD activities will involve advisory service provided by the international partners who have been chosen specifically because of their international reputation and experiences in tackling rodent related problems in developed and developing countries. A long term working collaboration with these international partners exists. The international partners will add value not only to research activities conducted by staff and students, but the laboratories where they belong will provide internships for students and young scientists to familiarize with advanced techniques for example in molecular sequencing, PCR and taxonomic techniques. They will also have the duty to monitor and report the activities to the ACEIRPM&BTD to ensure research and teaching is of the highest standard. Monitoring and evaluation of activities of the ACEIRPM&BTD will involve three levels:

(i) Monitoring of staff and students activities at the departmental level, and submit to the Heads of Departments.

(ii) Monitoring, evaluation and reporting to the ACEIRPM&BTD Board through the Director.

(iii) Monitoring and Evaluation by the Quality Assurance Committee of the University and reported to the Directorate of Research and Postgraduate Studies and to the University Senate.

The Director of the ACE IRPM&BTD will report to the World Bank as required.

Part II: EMP Checklist for Activities

PART A: INSTITUTIONAL & ADMINISTRATIVE FOR THE AFRICA CENTRES OF EXCELLENCE PROJECT				
Country	TANZANIA			
Project title	INNOVATIVE RODENT PEST MANAGEMENT AND BIOSENSOR TECHNOLOGY DEVELOPMENT			
Scope of project and activity	The main objective of this centre is to develop a critical mass of scientists through training of students (MSc. & PhD) in the region to undertake research and development of technologies for rodent pest management and biosensor technology development. This will serve communities within the region to enable them overcome losses of crops and outbreaks of diseases caused by rodents and to use the biosensor technology for demining and diseases diagnosis.			
Institutional arrangements (names and contacts)	WB ?	Project Management Prof. A. W. Massawe (ACE Director) (apiamas@yahoo.com) Prof. R.H. Makundi (Deputy ACE Director) (rmakundi@yahoo.com) Bursar, SUA (Finance) Director of Research and Postgraduate Studies, SUA (Postgraduate Students)		Local counterpart and/or recipient Sokoine University of Agriculture (vc@suanet.ac.tz)
Implementation arrangements (name and contacts)	Safeguard supervision Deputy Vice Chancellor, Administration and Finance	Local counterpart supervision Planning Unit, SUA	Local Inspectorate supervision Estates Department, SUA	Contractor

SITE DESCRIPTION

Name of site	PEST MANAGEMENT CENTRE, SOKOINE UNIVERSITY OF AGRICULTURE	Attachment 1: Site Map [X] Y [ ]N
Who owns the land?	SOKOINE UNIVERSITY OF AGRICULTURE	
Geographic location	Morogoro Region, Eastern-Central Tanzania	
LEGISLATION		
Identify national & local legislation & permits that apply to protect activity	The project will be one of the several projects owned by SUA, hence it will be protected by the Act of Government (Act no. 14, 1984) that established the University, and the SUA Charter (2007).	
PUBLIC CONSULTATION		
Identify when/where the public consultation took place	SUA, 2015	
INSTITUTIONAL CAPACITY BUILDING		
Will there be any capacity building?	[ ]N [X] Y if yes attachment 2 includes the capacity building program	

PART B: ENVIRONMENTAL/SOCIAL SCREENING			
Will the site activity include/involve any of the following potential issues and/or impacts	**Activity and potential issues and/or impacts**	**Status**	**Additional references**
	1. Building rehabilitation •Site specific vehicular traffic •Increase in dust and noise from demolition and/or construction •Construction waste	[ ] Yes [X]No	See section B below
	2. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ]No	See section B below
	3. Individual wastewater treatment system • Effluent and / or discharges into receiving waters	[ ] Yes [X]No	See section C below
	4. Historic building(s) and districts • Risk of damage to known/unknown historical or archaeological sites	[ ] Yes [X]No	See section D below
	5. Acquisition of land[1] • Encroachment on private property • Relocation of project affected persons • Involuntary resettlement • Impacts on livelihood incomes	[ ] Yes [X]No	See section E below
	6. Hazardous or toxic materials[2] • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	[ ] Yes [X]No	See section F below
	7. Impacts on forests and/or protected areas • Encroachment on designated forests, buffer and /or protected areas • Disturbance of locally protected animal habitat	[ ] Yes [X]No	See section G below
	8. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products	[X] Yes [No	See section H below

	(cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste		
	9. Traffic and Pedestrian Safety • Site specific vehicular traffic • Site is in a populated area	[ ] Yes [X]No	See section I below

[1] Land acquisitions includes displacement of people, change of livelihood encroachment on private property this is to land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired.

[2] Toxic / hazardous material includes and is not limited to asbestos, toxic paints, removal of lead paint, etc.

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURE CHECKLIST
A: General conditions	Notification and workers safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits (to include not limited to land use, resource use, dumping, sanitary inspection permit) have been acquired for construction and/or rehabilitation (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B: General rehabilitation and/or construction activities	Air quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types

		expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
C: Individual waste water treatment	Water quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
D: Historic building(s)	Cultural heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and address all construction activities in line with local and national legislation (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds
E: Acquisition of land	Land Acquisition Plan/Framework	a) If expropriation of land was not expected and is required, or if loss of access to income of legal or illegal users of land was not expected but may occur, that the bank task Team Leader is consulted. (b) The approved Land Acquisition Plan/Framework (if required by the project) will be implemented
F: Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
G: Affects forests and/or protected areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees
H: Disposal of medical waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: •Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes

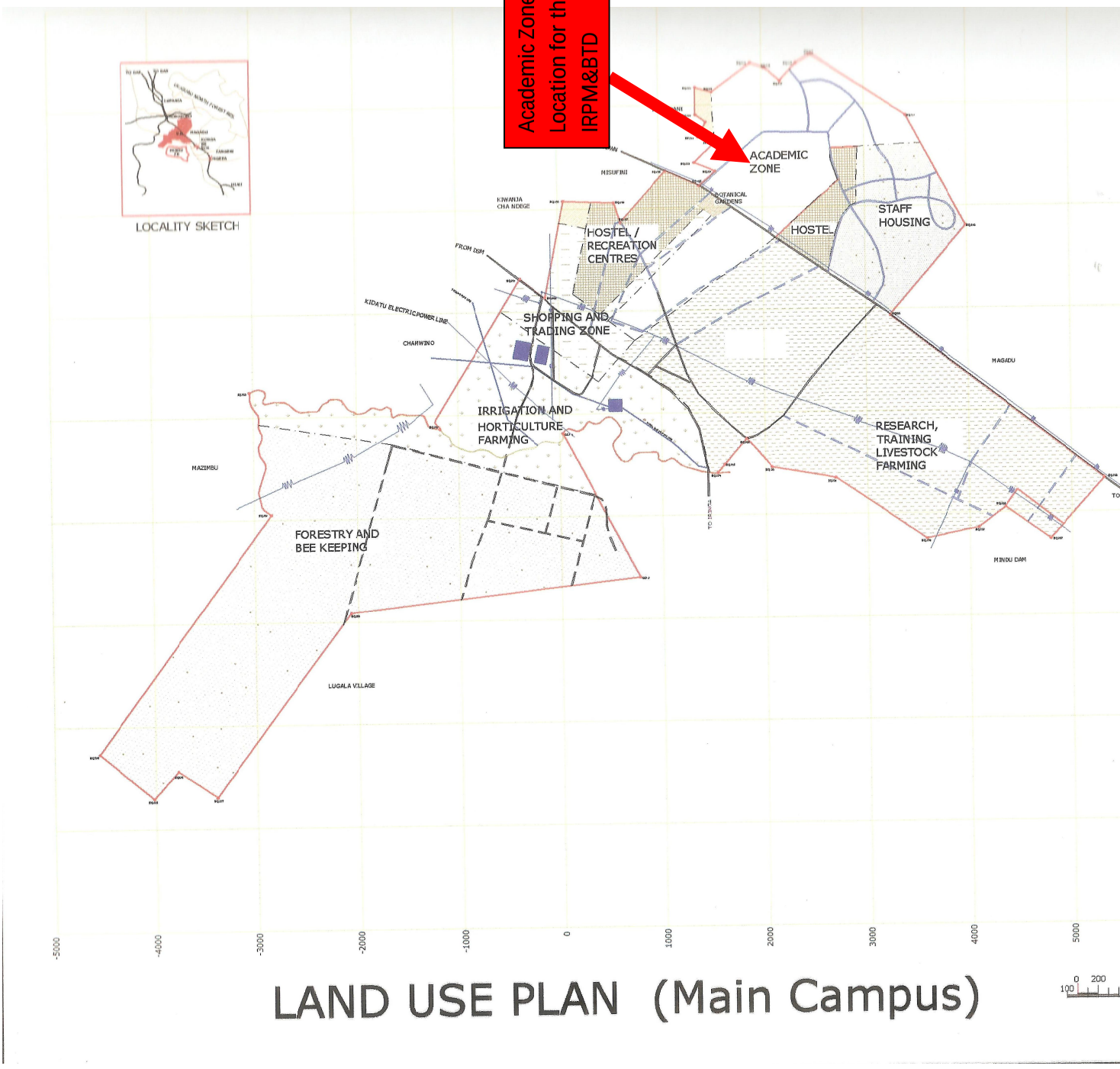
		c. Domestic waste (non-organic): black bags and containers • Appropriate storage facilities for medical waste are in place; and • If the activity includes facility-based treatment, appropriate disposal options are in place and operational
I: Traffic and pedestrian safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	b) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to •Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards •Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes.

PART: MONITORING PLAN							
Phase	**What** (Is the parameter to bemonitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)	**When** (Define the frequency / or continuous?)	**Why** (Is the parameter being monitored?)	**Cost** (if not included in project budget)	**Who** (Is responsible for monitoring?)
During activity **Preparation**	Notification and workers safety	At the construction site	Notification of the public and workers on nature of activity	Permanent display of Precautions and safety measures to be observed on working site	To ensure safety of workers and the public	Not quantified. To be incurred by contractor	Contractor/site engineer
During activity **Implementation**	Waste management	Construction site	Record wastes, and disposed properly	Daily basis	Could hazardous to construction workers	Part of constructions costs due to contractor	Contractor/site engineer and Planning Unit, SUA
During activity **Supervision**	Waste management	In research laboratories	Daily accumulation in waste disposal containers	Daily basis	Good laboratory practices (Bio-safety laboratory procedures)	Running costs for laboratory activities. Not quantified	Laboratory technicians/Lab assistants/students/research scientists

APPENDIX 1: Site map

(a) Current building for the Pest Management Centre, SUA

(b) Proposed building site



LAND USE PLAN (Main Campus)

APPENDIX 2: Capacity building program

Table 1: Projected staff growth in the next 10 years (2016/2017- 2016/2027)

	Projected Number of Staff positions (Fig 1)						
	Current (2015)	**2016/2017**	**2018/2019**	**2020/2021**	**2022/2023**	**2024/2025**	**2026/2027**
Research Professors	2	3	4	4	5	6	7
Associate Research Professors	2	3	4	5	6	8	10
Senior Research Fellows	2	4	4	5	7	10	12
Research Fellows	1	3	4	5	8	12	15
Assistant Research	1	4	4	6	6	8	10

Fellows							
Field Officers	1	2	2	2	3	4	4
Laboratory Technologists	1	2	3	3	4	5	5
Laboratory Assistants	3	4	4	5	6	8	8
Admin. Staff	2	3	3	3	3	3	3

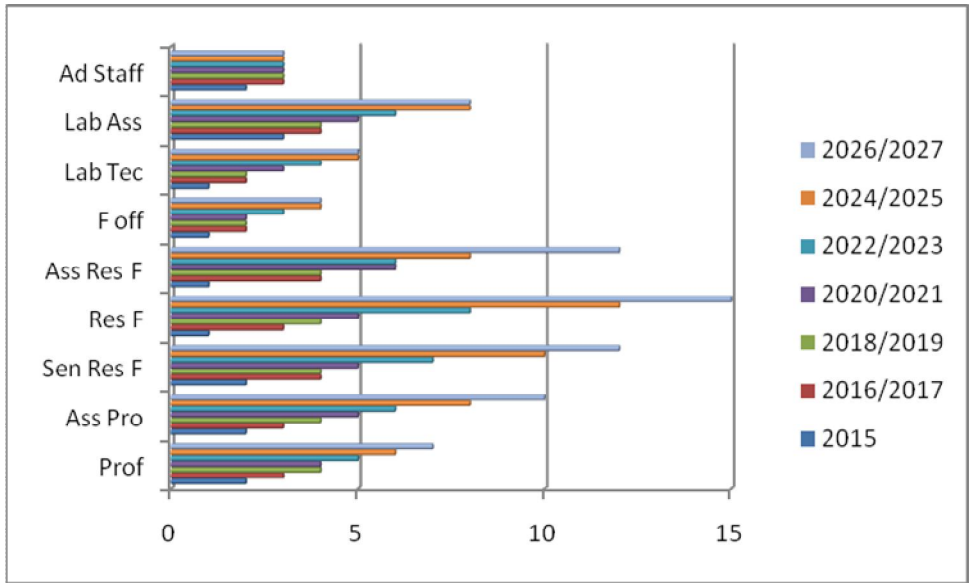


Fig. 1. Projected staff growth at the SPMC in the next 10 years

ANNEX A: Public consultations

Stakeholder identification:

THE ACE IRPM &BTD had an explicitly designed consultation strategy based upon National Environmental Council (NEMC) guidelines and the World Bank's safeguard policies. Consultations and discussions were made with key stakeholders from 10-14th January 2016. We also shared information which was collected by another project (African Centre of Excellence for Infectious Diseases of Humans and Animals in Southern and East Africa). Key stakeholders were initially defined as those who were knowledgeable on the issues that were in the proposal for the ACE IRPM&BTD as well as consultations with communities who could be affected by the activities of the project or beneficiaries. Other stakeholders such as projects with some similar activities were also considered as sources of information that could be useful for project implementation. Gender was also considered in the process of choosing stakeholders.

Consultation mechanism: The types of consultation that was carried out involved public meetings and discussion to elicit opinions of persons affected directly by the projects. Community opinion in particular from the community of people surrounded by the proposed ACE site and expert discussions related to environmental impacts were conducted. Consultations with communities in villages where some of the project activities will be implemented were also conducted.

Country – Center of Excellence	**Date of consultative meeting**	**Stakeholders present**	**Issues raised**	**Response to the issues**
African Center of Excellence for Innovative Rodent Pest Management and Biosensor Technology Development	10th January, 2016	Sokoine University of Agriculture (SUA) (Prof. Apia W. Massawe, Prof. Rhodes H. Makundi, Prof. Robert Machangu, Mr Richard Massawe, Mr C. Sabuni	Waste disposal at building sites	*Waste Management* i. Waste collection and disposal pathways and sites will be identified for all major waste types expected from refurbishment activities. ii. Wastes from refurbishment will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. iii. Refurbishment waste will be collected and disposed properly according to the National regulations. iv. The records of waste disposal will be maintained as proof for proper management as designed. *Water Quality* The site will establish appropriate erosion and sediment control measures, in line with the environment guidelines applicable locally and nationally.
	11 January 2016	Muhimbili University of Health and Allied Sciences (MUHAS) (Prof.	Management of toxic/clinical waste	*Toxic / hazardous waste management* i.Temporarily storage on site of all hazardous or

		Lyamuya)		toxic substances will be in safe containers labeled with details of composition, properties and handling information. ii. The containers of hazardous substances will be placed in an leak-proof container to prevent spillage and leaching. iii. Responsible authorities will be notified to make arrangements for appropriate disposal. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytotoxic and hazardous chemical waste), organic domestic waste, non-organic domestic waste • Handling of infectious clinical material • Disposal of waste water • Disposal of solid wastes from construction sites • Handling of pesticidal chemicals • Safety of use of pesticides for pest management
	12 -13 January-2016	National Rodent Control Centre (Mr. P. Tesha, Ms Christina Tewele Agricultural Research Institute, Ilonga- Dr. F.P. Mrosso Village communities in Morogoro and Iringa	Management of pesticidal materials	Pesticidal materials i. Use of pesticidal materials which could contaminate the environment should be highly restricted. Safety precautions recommended by the manufacture must be observed by all persons handling pesticidal materials. Only individuals who are mentally fit should be allowed to use and handle such materials. Disposal procedures usually printed on the container have to be complied with to reduce potential for environmental contamination ii. Only individuals authorized to use and apply such materials should be allowed to handle them. iii. All safety precautions, including wearing of protection gear must be observed. **iv.** Disposal of containers must be carried out in an appropriate way to ensure that they do not contaminate the environment

	14 January 2016	National Environmental Management Council (NEMC) (Ms. Amina Kibola)	General guidelines for management of environmentally hazardous wastes	There are already national regulations in existence for which are enforced by the National Environmental Council for which SUA must comply with. THE ACE IRPM &BTD were advised to familiarize with Management (Hazardous Waste Control and Management) Regulations, 2009 and Guidelines for Management for Hazardous Wastes, 2013.In compliance with these rules and regulations, infrastructure for medical waste handling and disposal will be part of the new infrastructure proposed.
	14 January 2016	Dr. G. Mgode Tuberculosis Diagnostic Laboratory – APOPO, Tanzania Dr Misinzo : Southern African Center for Infectious Disease Surveillance (SACIDS)	Laboratory safety and handling hazardous /infectious waste	*Bio-hazardous /infectious waste* i. Pathological waste will be excluded from disposal with the normal waste stream and must be provided for incineration. ii. Microbiological waste will be treated through incineration, autoclaving or chemical treatment. If the waste is decontaminated, it will be disposed with the general normal waste. iii. Waste to be incinerated will be placed in plastic biohazard bags and then placed in appropriate containers. iv. Personnel and students will be trained on bio-safety and appropriate handling of infectious waste. Specific bio-safety training will be offered to ALL research students that are likely to be handling pathogens (or samples) of Category 2 and Category 3 risk. v. Exposure control training requirements apply to all employees that generate and/or handle bio-hazardous or pathological waste. Training will be provided on initial assignment of the employee to a task involving the generation or handling of bio-hazardous waste and refresher training as often as necessary to assure compliance.

				vi. Bio-hazardous materials will be handled according to their respective biological safety levels based on risk assessment.

Environmental and Social Management Plan (ESMP)

SOUTHERN AFRICAN CENTER FOR INFECTIOUS DISEASE SURVEILLANCE (SACIDS) – AFRICAN CENTER OF EXCELLENCE FOR INFECTIOUS DISEASES OF HUMANS AND ANIMALS IN SOUTHERN AND EAST AFRICA [TANZANIA]

(15th JANUARY 2016)

PART I: Activity Description

1. INTRODUCTION

In 2008, concerned by the burden of infectious diseases in Africa, academic and research institutions in epidemiologically linked southern and East African countries (Tanzania, DRC, Zambia, Mozambique and South Africa) embarked on a pathway towards developing Africa's capacity for training and research in infectious diseases. We formed a One Health partnership of medical and veterinary institutions (i.e. Southern Africa Center for Infectious Disease Surveillance - SACIDS) with an ambition for an African-led Center with progressive relevance to the wider Sub-Saharan region. We have worked closely with UK institutions, namely the London School of Hygiene and Tropical Medicine (LSHTM), the Royal Veterinary College (RVC), the London International Development Center (LIDC) and the Pirbright Institute (TPI), with wider international collaboration on a project-by-project basis. Our Center will develop from this platform to provide regional leadership for excellence in postgraduate training and research on infectious diseases.

We will strength postgraduate training and student-based research, developing competence in molecular biology and analytical epidemiology, testing innovative approaches, and working across sectors, institutions and borders, in partnership with internationally renowned centers of training and research excellence. SACIDS is led by Sokoine University of Agriculture (SUA), with core collaboration by the Muhimbili University of Health and Allied Sciences **(**MUHAS) and the National Institute for Medical Research (NIMR) to consolidate the inter-sectoral partnership. We will train 42 MSc, 10 MPhil/Res MSc and 15 PhD students, 30% of who will be from outside Tanzania and 40% female. We will also offer 2 Postdoctoral Fellowships. We will run short courses through our tested Summer School Program. We will collaborate with our established regional and UK partners to develop skills, research capacity and contact networks. We will introduce a novel Research Leadership and Management Training program tailored to different levels ranging from PhD students right through to senior academic staff. We will build on existing videoconference and server capacity to expand the role of ICT in learning.

Our facilities, students and scientists will serve as a source of authoritative expertise for

infectious diseases in diagnosis, surveillance, pathogen characterization, epidemiological modeling, and the definition of cost-effective disease risk management measures.

2. PROJECT OBJECTIVES

The objectives of SACIDS – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa are in two strands: The training strand, which focuses on developing competence for a dynamic community of African researchers in the application of molecular biology and epidemiology to the understand and manage infectious diseases, through a tiered postgraduate training program; and the research strand which focuses on developing world-class students and fellows, addressing capacity gaps and the convergent needs in science and technology that make linking medical and veterinary research efficient and effective in the resource poor setting of southern and East Africa. Accordingly, the Center will aim to develop researchers with skills in new technologies to interrogate the natural history of disease at source and within endemic African settings. Both strategies will lead to African-led development of world-class researchers and research leaders to address the burden of infectious disease in Africa through the One Health approach based on core competencies of molecular biology and epidemiology.

3. PROJECT DESCRIPTION

Background

The SACIDS – African Centre for Infectious Diseases of Humans and Animals stems from the concern for a high burden of infectious diseases in Africa and yet a low capacity for its risk management. It arises out of a consortium of academic and research institutions in southern and East African countries (Tanzania, DRC, Zambia, Mozambique and South Africa) that was formed in 2008 as a One Health partnership of medical and veterinary institutions, with Sokoine University of Agriculture (SUA) in Tanzania as the Lead Institution. The Center will be located in the Department of Veterinary Microbiology and Parasitology of the Faculty of Veterinary Medicine (FVM) at SUA within the academic zone of the University.

The Vision and Mission of the Center are rooted in the quest for enhancing Africa's capacity for the science evidence based risk management of infectious diseases through the One Health approach. The SACIDS focus is to address infectious diseases in the African endemic settings through a collaborative effort between natural and social sciences to advance the understanding of interactions between humans, animals and the environment to improve public and animal health.

Postgraduate Training

Our training strategy focuses on developing students who can apply principles of molecular biology or epidemiology in a One Health context to the understanding and management of infectious diseases, through a tiered postgraduate training program. Emphasis will be on self-driven learning, aiming at developing critical thinking skills and retaining knowledge that leads to self-actualization. Training will be in seven strands, i.e. (i) Taught Master's Program involving 1 year course work plus 1 year guided research; (ii) MPhil/MSC-Research involving based on by 2 years research; (iii) PhD development; (iv) Postdoctoral program; (v) Structured short courses for students and practicing professionals covering a variety of disciplines including bioinformatics, biosafety, statistics; (vi) annual One Health driven 1 week summer schools; (vii) a novel program for research leadership and management for PhD students, supervisors and senior academic staff. Course delivery modes will include: fully face-to-face, web enhanced, flipped, blended/hybrid and fully online (e-books, e-resources, e-journals). Laboratory training will provide knowledge of both the strengths and limitations of each method to empower students to interpret experimental data.

SACIDS will train 40 MSc, 25 MPhil/Res MSc and 10 PhD students, 30% of who will be from outside Tanzania and 40% female and will offer 3 Postdoctoral Fellowships. It will have a rigorous selection and performance appraisal system for students and supervisors. It will offer short courses for students and in-service practitioners (100 trainees) and biennual One Health Summer Schools (50 trainees), as well as Research Leadership and Management, including equity issues such as gender and marginalized communities (60 trainees).

Developing Applied Research Excellence

Student based research will be in three strands: (i) Addressing Viral Disease Threat to Human Health, Food Security and Livelihoods – including emerging diseases e.g. Ebola and vector-borne diseases e.g. Rift Valley fever, Dengue, Chikungunya, Zika; livelihoods and food security diseases such as foot-and-mouth disease; (ii) Addressing Neglected Tropical Infectious Diseases, with a focus on those that cause chronic disease and disability, with severe health, economic and social consequences that impact on the quality of life and livelihoods in low income or marginalized communities, especially women, children and people with disability; (iii) Addressing Community Level One Health Security, with a focus on rural, remote, cross-border and marginalized communities.

Academic and Research Partnerships

The core partnership for the Center is SUA, Muhimbili University of Health and Allied Sciences (MUHAS) and the Tanzania National Institute for Medical Research (NIMR). National Partners will be the Catholic University for Health and Allied Sciences (CUAHAS), Tanzania Veterinary Laboratory Agencies (TVLA) and Tanzania Wildlife Research Institute (TAWIRI). Regional Partners will be the South African National Institute for Communicable Diseases (NICD); the University of Zambia (UNZA), Eduardo Mondlane University (UEM/EMU); University of Kinshasa (UNIKIN), the Biomedical Research Institute, Kinshasa; the ARC-Onderstepoort Veterinary Institute

(ARC-OVI), South Africa; the Uganda Virus Research Institute (UVRI); (ix) the Kenya Medical Research Institute (KEMRI); and (x) the International Livestock Research Institute –Biosciences Eastern and Central Africa (BecA) hub in Nairobi, Kenya.

Beyond Africa partners will be the London School of Hygiene and Tropical Medicine (LSHTM), the Royal Veterinary College (RVC), the London International Development Center (LIDC), The Pirbright Institute (TPI), Ranmore Consulting (UK) and the Policy Institute of King's College, University of London plus a wider international collaboration on a tactical basis.

Partnership with Industry and Private Sector
Industry partners will be ZENUFA Tanzania Ltd and the Botswana Vaccine Institute (BVI). The Tanzania Food and Drug Agency (TFDA) as a regulatory body, and the of Pharm Access Foundation will provide interface expertise. We are developing in-house capability for biologicals (vaccine and diagnostics) development and trials through a USAID collaborative grant with the University of Texas El Paso and link with a Moroccan commercial company (MCI). A conceptual framework for developing a SACIDS Innovation Hub for partnership with industry and the private sector is described.

4: COST OF THE ACTION

Total cost of the project is estimated at $6,000,000 (six million USD).

5. IMPACT ON THE ENVIRONMENT

i. The project activities are not expected to impact on the environment negatively.
ii. There will be no displacement of human population as there will be no any construction. Instead there will be refurbishment of the student laboratory at the Faculty of Veterinary Medicine (FVM), Sokoine University of Agriculture (SUA).

6. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The management and coordination of environment issues in Tanzania is mandated to the National Environmental Management Council (NEMC), which was enacted by the Parliament of the United Republic of Tanzania (The Environmental Management Act, 2004). Among the provisions of the NEMC establishment is: To provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment and to provide for implementation of the National Environment Policy. Sokoine University of Agriculture adheres to, and observes, not only the provisions stated in the Act that established the NEMC, but also implements all projects and activities in accordance to the National Environmental Policy.

7. RELEVANT WORLD BANK POLICIES RELATED TO IMPLEMENTATION

OF THE PROJECT

The project aims at utilizing technologies, which are environmentally friendly and therefore not disruptive or destructive to the environment or environmental processes. Furthermore, there are activities to be implemented that have positive impact on the environment as well on people's welfare. Thus the project implementation process will ensure that all activities are environmentally sound and sustainable. This is in line with World Bank Policy on Environmental Assessment (OP 4.01), which takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects.

8. IMPLEMENTATION ARRANGEMENTS

SACIDS – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa has regional, international and national partners who will be involved in project implementation. There will be a large number of individuals, including students, who will access project funds to implement planned and approved activities. To access the funds, all individuals will have to submit a request that details the nature of activities and a certificate of approval from the SUA's Research and Publications Ethical Committee, which, among others, will have to approve that the activities have been carefully checked/assessed for Environmental Impact. Furthermore, all research involving human subjects will have to be submitted for ethical clearance by the Tanzania Medical Research Coordinating Committee of the National Institute for Medical Research.

9. ENVIRONMENTAL SCREENING, ASSESSMENT AND MANAGEMENT

(i) Site location and Accessibility

The project will be based within SUA main campus at the Department of Veterinary Microbiology and Parasitology, FVM, which is accessible via main entry tarmac road to the SUA campus.

(ii) Land Tenure

The Center will be on land that is legally owned by Sokoine University of Agriculture. SUA land is within Morogoro Municipality according to the SUA Land Use Plan.

(iii) Project components

(a) Road infrastructure

The Center can be accessed through the SUA main campus tarmac road, 3km from the Center of Morogoro Municipality. There are also other paved roads within the University that enable accessibility from other zones of the campus to the Center.

(b) Water supply

The water which will be used for the entire period of the project and beyond, at FVM is supplied by SUA's independent water source which is drawn from Mzinga River. SUA possesses a water use permit for abstraction of 725.902 m^3 per day. The water is used for sanitary, cleaning and maintaining the landscaping.

(c) Storm Water Management

Storm water drainage system to direct surface runoff into the environment is already in place at FVM. Rainwater is collected by rain gutters connected to open drainage system that collects storm water from the campus to the University farm.

10. POTENTIAL ENVIRONMENTAL IMPACTS

SACIDS – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa is not expected to have a significant negative environmental impact. However, it in accordance with the university regulations and the National Environmental Policy and guidelines, there will be a periodic evaluation of the activities of the Center to ensure the criteria for protection of the environment are met and where shortfalls in achieving these occur, mitigating factors will be put in place to comply with the national guidelines and World Bank Operational Policies.

11. ENVIRONMENTAL MANAGEMENT APPROACH

SUA adheres to guidelines provided by the National Environmental Management Council in implementing its activities, to reduce impact on the environment. A solid framework for environmental impact assessment (EIA) is in place. During operation of SACIDS – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa, the following will be strictly observed because of their potential adverse impact on the environment:

(a) Sanitation facilities

Wastewater management system is connected to the campus wastewater systems/waste water stabilization ponds where final effluent is discharged for treatment before being released to the environment.

(b) General waste disposal

Waste to be generated includes: waste water, laboratory waste, sanitary waste, tissue paper etc. With exclusion of wastewater, other wastes will be collected in waste bins within the building for final disposal. All laboratory wastes including animal tissues will be handled properly according to laboratory safety procedures and incinerated.

(c) Health and safety services

Students, laboratory staff and researchers will be provided with Personal Protective Equipment (PPE) such as N95 air mask, gloves, goggles, laboratory coats/gowns and

boots for use in situations of handling human or animal patients. For specimen and pathogen manipulation in the laboratories, PPE will be provided in accordance with the requirements of WHO/OIE for Categories 1 or 2 or 3 pathogens. The laboratory working environment will also meet the WHO/OIE requirements for handling Categories 2 or 3 pathogens including but not limited to use of class II biological safety cabinets and biosafety level 3 (BSL-3) isolation chambers (IsoArk) equipped with High-Efficiency Particulate Arrestance (HEPA) filters to safeguard workers and environment. Accordingly, the facilities and procedures in the microbiological/molecular biology laboratories of the Center will be implemented to conform to the WHO Laboratory Biosafety Manual and the OIE Terrestrial Manual Chapter 1.1.3 (2015 Version for Biosafety and Biosecurity).

To take care of accidental splashes to personnel, laboratories will be fitted with well marked and easy to access overhead showers, eyewashes and first aid kits. FVM buildings dedicated to the Center will be equipped with the necessary fire fighting equipment. Fire assembly point will be identified and proper signs will be put in place. The building hygiene and sanitation will be contracted to ensure safe working environment. The Center will keep a register of all accidents of potential health and safety at work implications.

Furthermore, students and laboratory personnel will undergo special training in biosafety. A specific biosafety, health and safety manual will be developed for SACIDS ACE Center staff.

University Auxiliary Police and private security operators will be contracted to ensure safety and protection of property. Students and staff will be provided with firefighting training every academic year.

12. MONITORING AND REPORTING

The Center will be located in the area designated for academic and research activities (Academic Zone) in accordance with the Land Use Master Plan of SUA and will adhere to the environment protection requirements stipulated therein as described above in this document. As a Center we undertake additional center specific environment and biosafety actions, with special focus on microbial and chemical biosafety and containment as described in this document and Annexes.

As described in the SUA Corporate Strategic Plan 2011-2020, the university does not yet have a formal system for structured environmental monitoring and reporting.

Our Center Implementation Plan for Year 1 will include commissioning a specialist consultancy to develop a Center specific Environment and Social Monitoring and Reporting Plan, using, as benchmark, the experience of NIMR, which is currently in the process for developing such a plan with consultancy advice. We will also be recruiting a Laboratory Manager in Year 1, whose responsibility will include ensuring implementation of the biosafety and environmental requirements, staff training in the

same and monitoring in collaboration with both the university (Mr. Richard Massawe, Chief Planning Officer) and NIMR.

The overall responsibility for monitoring of implementation of the Center ESMP has been assigned to Mr. Richard L. Massawe, Chief Planning Officer, SUA Planning Unit, P.O. Box 3000, Chuo Kikuu, Morogoro. Telephone: + 255 23 2613868, E-mail: planning@suanet.ac.tz

Table 1: Monitoring of implementation of EMPs

Institution	EMP monitoring arrangements (name, title, contact information)
Sokoine University of Agriculture (SUA)	Mr. Richard L. Massawe, Chief Planning Officer, SUA Planning Unit, P.O. Box 3000, Chuo Kikuu, Morogoro. Telephone: + 255 23 2613868, E-mail: planning@suanet.ac.tz

Part II: EMP Checklist for Activities

PART A: **(a) INSTITUTIONAL & ADMINISTRATIVE FOR THE AFRICA CENTERS OF EXCELLENCE PROJECT**				
Country	TANZANIA			
Project title	SACIDS – ACE for Infectious Diseases of Humans and Animals in Southern and East Africa			
Scope of project and activity	The main objective of this Center is to train a critical mass of students and research fellows (MSc, MPhil/Res MSc., PhD & Postdocs) in the region to undertake research and development of technologies for detection and identification of pathogens causing infectious diseases using a One health approach.			
Institutional arrangements (names and contacts)	Project Oversight: WB (Project Team Leader)	Project Management: Prof. Gerald Monela, Vice-Chancellor - SUA (Oversight) (vc@suanet.ac.tz) Prof. Gerald Misinzo (ACE Leader) (gmisinzo@gmail.com) Prof. M. Rweyemamu (ACE Deputy Leader and PI) (mark.rweyemamu@sacids.org) Bursar, SUA (Finance) (bursar@suanet.ac.tz) Director of Research and Postgraduate Studies, SUA (Postgraduate Students) (drpgs@suanet.ac.tz) Center Project Operations Manager (Dr. Filomena Namuba Filomena.namuba@sacids.org)		Local counterpart and/or recipient MUHAS: Prof. Mecky Matee, Professor of Microbiology & Immunology. Center Coordinator MUHAS mateemecky@yahoo.com NIMR: Dr. Leonard Mboera, Chief Research Scientist and Director , Information & Communication. Center Coordinator, NIMR lmboera@nimr.or.tz
Implementation arrangements (name and contacts)	Safeguard supervision Deputy Vice Chancellor (Administration and Finance)	Local counterpart supervision Planning Unit, SUA	Local Inspectorate supervision Estates Department, SUA	Contractor

(b) SITE DESCRIPTION	
Name of site: Department of Veterinary Microbiology and Parasitology, Faculty of Veterinary Medicine, Sokoine University of Agriculture	
Describe site location: Morogoro Municipality, Morogoro region, Eastern- and Central Tanzania	Attachment 1: Site Map [X]Y [ ] N
Who owns the land? Sokoine University of Agriculture	
Geographic description: The Center is located within the Academic Zone at the main campus of Sokoine University of	

Agriculture, which is 3.0 km from the center of Morogoro town and about 200 km west of Dar es Salaam.	
(c) LEGISLATION	
Identify national & local legislation & permits that apply to project activity: The Center will be a constituent of Sokoine University of Agriculture and thereby protected by the Act of Parliament (Act #14/1984) that established the Sokoine University of Agriculture and by the Sokoine University of Agriculture Charter of 2007.	
(d) PUBLIC CONSULTATION	
Identify when / where the public consultation process took place: January 13th, 2016 at Sokoine University of Agriculture (Annex A)	
(e) INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	[ ] N or [X]Y if Yes, Attachment 2 includes the capacity building program

Section B: ENVIRONMENTAL & SOCIAL SCREENING **Will the site activity include/involve any of the following potential issues and/or impacts:**		
Activity and potential issues and/or impacts	**Status**	**If YES see additional references:**
1. Building rehabilitation □ Site specific vehicular traffic □ Increase in dust and noise from demolition and /or construction □ Construction waste	[X] YES [ ] NO	Activity Box **A& B** below
2. New construction □ Excavation impact and soil erosion □ Increase sediment loads in receiving waters □ Site specific vehicular traffic □ Increase in dust and noise from demolition and /or construction waste	[ ] YES [X] NO	Activity Box **A& B** below
3. Individual wastewater treatment system □ _Effluent and / or discharges into receiving waters	[X] YES [ ] NO	Activity Box **A& C** below
4. Historic building(s) and districts □ Risk of damage to known/unknown historical or archaeological sites	[ ] YES [X] NO	Activity Box **A& D** below
5. Acquisition of land / involuntary resettlement[1] □ Encroachment on private property □ Relocation of project affected persons □ Negative impacts on livelihood incomes	[ ] YES [X] NO	If YES, the sub-project is not eligible for financing under ACE project.

6. Indigenous People[2] Adversely effect on indigenous peoples, as they themselves would determine through consultations on the project conceptualization and design	[ ] YES [X] NO	If YES, the sub-project is not eligible for financing under ACE project.

Hazadous or toxic materials Removal and disposal of toxic and/or hazardous demolition and / or construction waste storage of machine oils and lubricants _ Procurement or use of pesticides – or formulated products that are in the World Health Organization (WHO) Classes IA and IB, or formulation so products in Class II4	[X] YES [ ] NO	Activity Box **A& F** below
8. Impacts on forests, natural and/or protected areas Conversion of forested land, protected areas or natural habitats for biofuel crops Encroachment on designated forests, buffer and /or protected areas Disturbance of locally protected biodiversity habitat	[ ] YES [X] NO	Activity Box **A& G** below
9. Handling / management of medical waste Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste On site or off-site disposal of medical waste	[X] YES [ ] NO	Activity Box **A& H** below
10. Traffic and Pedestrian Safety Site specific vehicular traffic Site is in a populated area	[ ] YES [X] NO	Activity Box **A& I** below

10. General land and water issues • Contributes to irreversible land degradation and /or siltation in waterways • Includes impoundments in waterways (generally for water extraction) • Groundwater extraction	[ ] YES [X] NO	Activity Box **A& I** below

ACTIVITY BOX	**PARAMETER**	**GOOD PRACTICES MITIGATION MEASURES CHECKLIST**
A. General Conditions	Notification & Worker Safety	(a) Consult with the Regional Steering Committee and World Bank Task Team to discuss activities and the due diligence requirements (b) The local construction and environment inspectorates and communities have been notified of upcoming activities (c) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (d) All legally required permits (to include not limited to land use, water use, resource use, dumping, sanitary inspection permit) have been acquired for proposed activity (e) All work will be carried out in a safe and disciplined manner designed to minimize impacts on the environment and neighboring residents (f) Workers' personal protective equipment (PPE) will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (g) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.

ACTIVITY BOX	**PARAMETER**	**GOOD PRACTICES MITIGATION MEASURES CHECKLIST**
B. General Rehabilitation and /or Construction	Air Quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to

Activities		reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

C. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
D. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and address all construction activities in line with local and national legislation (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds.

ACTIVITY BOX	**PARAMETER**	**GOOD PRACTICES MITIGATION MEASURES CHECKLIST**
E. Acquisition of land	Land Acquisition Plan/Framework	(a) If expropriation of land was not expected and is required, or if loss of access to income of legal or illegal users of land was not expected but may occur, then consult with Task Team Lead and /or Regional Safeguard Coordinator (b) The approved Land Acquisition Plan/Framework (if required by the project) will be implemented

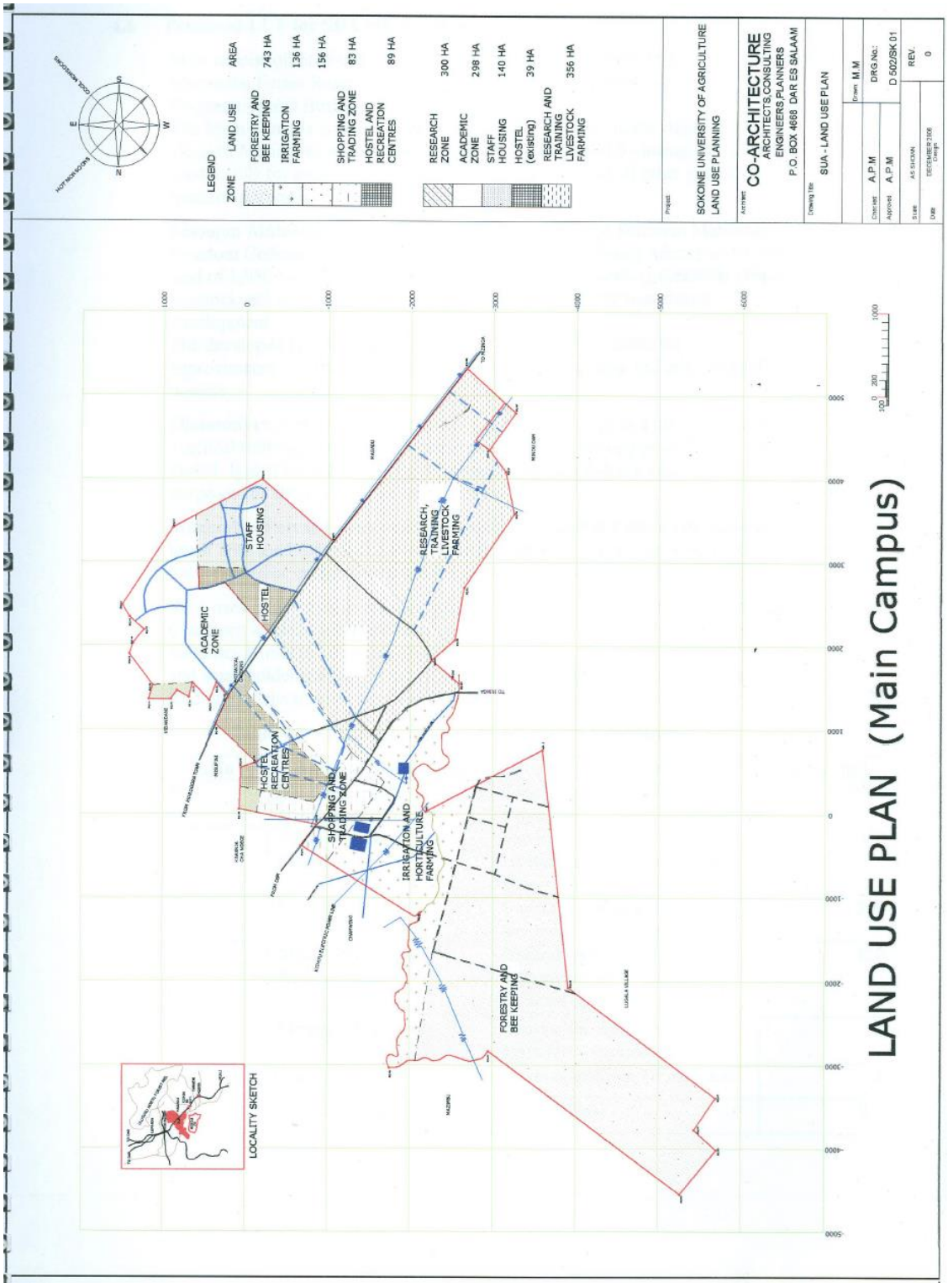
F. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
	Pesticides	(a) Follow recommend and minimum standards as described in the United Nations Food and Agriculture Organization (FAO) International Code of Conduct on the Distribution and Use of Pesticides (Rome, 2003) (b) Promote use of ecologically based biological or environmental pest management practices (integrated pest management IPM)

G. Affects forests and/or protected areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees (c) Adjacent wetlands and streams will be protected, from construction site run-off, with appropriate erosion and sediment control feature to include by not limited to hay bales, silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas (e) Forested areas/natural areas and protected will not be converted for bio-fuel crop production.
H. Disposal of medical waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: □□Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers □□Appropriate storage facilities for medical waste are in place; and □□If the activity includes facility-based treatment, appropriate disposal options are in place and operational

ACTIVITY BOX	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
I. Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) The contractor shall provide the University with a traffic management plan including temporary loss of roadway, blockage due to deliveries and site related activities, including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the participating university and RFU. (b) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to □□Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards □□Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. □□Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement □□Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. □□Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.
J. Land and Water	General land and water uses	(a) Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the University. (b) Internationally accepted good land use practices in place to minimize land degradation, and /or siltation in waterways (c) Minimize excessive groundwater extraction and put in place appropriate conservation of water measures which can contribute to significant water savings

Section C: Monitoring Plan							
Phase	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)	**When** (Define the frequency / or continuous?)	**Why** (Is the parameter being monitored?)	**Cost** (if not included in project budget)	**Who** (Is responsible for monitoring?)
During activity **preparation**	Notification and workers safety	At the laboratory internal refurbishment site	Notification of staff and students on nature of activity	Display of safety measures to be observed	To ensure safety of workers, staff and students	Included in the detailed budget	Contractor/Site Manager
During activity **implementation**	Waste management	Construction site	Record waste and dispose properly	Daily	Construction workers, staff and students safety	Included in the detailed budget	Contractor/Site Engineer and Planning Unit (SUA)
During activity **supervision**	Waste management	Student and Research Laboratories	Biosafety and Biosecurity training	Daily	Good Laboratory Practices (Biosafety Laboratory Procedures)	Part of running cost	Laboratory Manager, laboratory staff, students and researchers

Attachment 1: Site Map



Attachment 2: The SACIDS ACE II Capacity building program

Objective	Indicator	Baseline (2014)	Baseline (2015)	Annual Targets (2016)	Annual Targets (2017)	Annual Targets (2018)	Annual Targets (2019)
1. Strengthen Education Capacity excellence – quality and productivity	Number of new students in ACE courses (30% must be regional students*):						
	• New PhD students (% female) (% regional)	5 (20% female) (80% regional)	2 (100% female) (50% regional)	5 (40% female) (20% regional)	5 (40% female) (40% regional)	0	0
	• New Master students (% female) (% regional)	31 (29% female) (33% regional)	11 (36% female) (57% regional)	15 (40% female) (30% regional)	15 (40% female) (30% regional)	10 (40% female) (30% regional)	10 (40% female) (30% regional)
	• New short term (min. 40 hours) (% female) (% regional)	37 (27% female) (54% regional)	NIL	25 (40% female) (30% regional)	25 (40% female) (30% regional)	25 (40% female) (30% regional)	25 (40% female) (30% regional)
2. Strengthen Education Capacity & Development Impact	No. of academic staff with at least 1 month internship in a private sector company or a local institution relevant to their field/ sector (% female)	0	0	5 (40% female)	5 (40% female)	5 (40% female)	5 (40% female)
	No. of Students with at least 1 month internship in a private sector company or a local institution relevant to their field/ sector (% female)				12 (40% female)	12 (40% female)	8 (40% female)
	No. of internationally accredited education programs including sub-regional accreditation	0	0	0	2	3	3

	No. of students employed by industry No. of students who create/ start businesses No. of students employed by universities as faculty members	0 0 2	0 0 2	3 3 0	3 3 1	4 4 1	4 4 1
3.Strengthen Research Capacity excellence – quality and productivity	Number of internationally peer reviewed research publications in disciplines supported by the ACE Program No. of new research collaboration in region No. of students employed by research organizations No. of patents, invention disclosures, trademarks and copyrights	34 11 (Existing collaborations, including 5 national) 0	19 11 (Existing collaborations, including 5 national 0	25 3 0	30 2 5 1	35 1 5	40 1 5 1
4.Strengthen education and research capacity (through increased financial sustainability) and demonstration of value to students and partners	Amount of externally generated revenue by the ACEs	USD 1,531,415	USD 3,444,221	USD 2,000,000	USD 2,000,000	USD 2,000,000	USD 2,000,000

Annex A : Public consultations

On the 13th January 2016, the project team convened public consultation at Sokoine University of Agriculture to explain the objectives, structure and activities of the proposed SACIDS ACE for Infectious Diseases of Humans and Animals in Southern and East Africa. Participants were from Sokoine University of Agriculture (SUA), Muhimbili University of Health and Allied Sciences (MUHAS), National Institute for Medical Research (NIMR), Morogoro Urban Water and Sewerage Authority (MORUWASA) and Catholic University of Health and Allied Sciences. In addition, the project team consulted National Environmental Management Council (NEMC), Vice President's Office (VPO) – Environment, Government Chemist Laboratory Agency (GCLA) and Tanzania Occupational Safety and Health Authority (OSHA). During both the meeting and the consultations, the Center team emphasized on the regional nature of the Center and the need for exemplary performance not in terms of number of students trained but also the necessity for environment and social protection. Morogoro Urban Water and Sewerage Authority (MORUWASA) and Catholic University of Health and Allied Sciences (CUHAS). Representatives of NEMC, VPO – Environment, GCLA and OSHA were satisfied with the mitigations measures described by the Center team and the SUA Chief Planning Officer as being satisfactory. They also recommended additional mitigation measures, which have been incorporated in this EMSP. Overall all the participants and consulted officials welcome the initiative and viewed it positively in terms of its capacity development strategy including realization that the Center is intended to be leading technical scientific authority in infectious diseases of importance both locally at the community level and regionally.

Country – Center of Excellence	**Date of consultative meeting**	**Stakeholders present**	**Issues raised**	**Response to the issues**
Tanzania - Southern African Center for Infectious Disease Surveillance (SACIDS) - African Center of Excellence for Infectious Diseases of Humans and Animals in Southern and East Africa	13th January, 2016	Sokoine University of Agriculture (SUA) (Prof. Gerald Misinzo, Prof. Mark Rweyemamu, Prof. Esron Karimuribo, Dr. Huruma Tuntufye, Dr. Christopher Kasanga, Dr. Kenneth Bengesi, Dr. Filomena Namuba, Eng. Eric Beda, Mr. Emanuel Mkilalu, Mr. Richard L. Massawe)	1. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytotoxic and hazardous chemical waste), organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical	*Infrastructure for medical waste management* We will comply with the national regulations -The Environmental Management (Hazardous Waste Control and Management) Regulations, 2009 and Guidelines for Management for Hazardous Wastes, 2013.We will ensure sufficient infrastructure for

		Muhimbili University of Health and Allied Sciences (MUHAS) (Prof. Mecky Matee) National Institute for Medical Research (NIMR) (Dr. Leonard Mboera) Catholic University of Health and Allied Sciences (CUHAS) (Prof. Stephen Mshana)	waste	medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate disinfection and storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational.
		National Environmental Management Council (NEMC) (Ms. Amina Kibola) Vice President's Office (VPO) – Environment (Mr. Deogratius Paul Nyangu) Government Chemist Laboratory Agency (GCLA) (Ms. Glory Machuve) Morogoro Urban Water and Sewerage Authority (MORUWASA) (Eng.	2. Refurbishment of teaching laboratories at the Department of Veterinary Microbiology and Parasitology • Increase in dust and noise from construction. • Construction waste.	*Noise* i. Construction noise will be limited to restricted times agreed to in the permit. ii. During operations, powered mechanical equipment will be closed, covered and placed as far away from working areas and classrooms. *Water Quality* The site will establish appropriate erosion and sediment control measures, in line with the environment guidelines mentioned above. *Waste Management* i. Waste collection and disposal

		Julius Tanika) Tanzania Occupational Safety and Health Authority (OSHA) (Mr. Joshua Matiko)		pathways and sites will be identified for all major waste types expected from refurbishment activities. ii. Wastes from refurbishment will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. iii. Refurbishment waste will be collected and disposed properly according to the National regulations. iv. The records of waste disposal will be maintained as proof for proper management as designed.
			3. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine (standby generator) oils and lubricants.	*Toxic / hazardous waste management* i. Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information. ii. The containers of hazardous substances will be placed in an leak-proof container to prevent spillage and leaching. iii. Responsible authorities will be notified to make arrangements for appropriate disposal.
			4. Biohazardous waste including pathological (e.g. blood, tissue samples and body fluids) and microbiological waste (e.g. cultures and stocks of infectious etiological agents)	*Biohazardous waste* i. Pathological waste will be excluded from disposal with the normal waste stream and must be provided for incineration. ii. Microbiological waste will be treated through incineration, autoclaving or chemical treatment. If the waste is decontaminated, it will be disposed with the general normal waste. iii. Waste to be incinerated will be placed in plastic biohazard bags and then placed in appropriate

				containers. iv. Personnel and students will be trained on biosafety and appropriate handling of infectious waste. Specific biosafety training will be offered to ALL research students that are likely to be handling pathogens (or samples) of Category 2 and Category 3 risk. v. Exposure control training requirements apply to all employees that generate and/or handle biohazardous or pathological waste. Training will be provided on initial assignment of the employee to a task involving the generation or handling of biohazardous waste and refresher training as often as necessary to assure compliance. vi. Biohazardous materials will be handled according to their respective biological safety levels based on risk assessment. vii. Laboratory infrastructures and biosafety equipment at SUA, NIMR and MUHAS are graded for Category 2 and category 3. SUA and NIMR have Biosafety Category 3 containment facilities with High-Efficiency Particulate Arrestance (HEPA) filtering of exhaust air for safe handling dangerous pathogens protecting both the laboratory operators and the environment. In addition, NIMR has mobile laboratory for safe field sampling of dangerous pathogens including Ebola. viii. Risk of exposure to viable pathogens will be minimized by adopting molecular biology

				technologies, which are based on operations with extracted and non-infective genetic material (nucleic acids) and thereby can be carried out at relatively low risk biosafety levels. ix. Our relationship with National Institute for Communicable Diseases **(**NICD) offers us additional mitigation both in terms of training in Biosafety to WHO recognised levels and also access to the unique biosafety level 4 (BSL-4) facilities of the NICD. This will allow us to plan for safe handling of pathogens for humans and animals through strong partnership between SUA-MUHAS-NIMR and NICD.
			5. Monitoring and compliance	*Monitoring* i. ESMP is integrated in the work plan and budget. ii. Regulatory authorities will be engaged throughout the project life cycle.

African Centers of Excellence - II Project proposal

Environment and Social Management Plan (ESMP)

MAKERERE UNIVERSITY

Project title: Establishment of an East African Center for Crop Improvement at Makerere University (MaCCI), Uganda

January 2016[1]

[1] Stakeholder consultation took place on 12 January 2016

PART I: Activity Description

1. Introduction

Low agricultural productivity in Eastern and Southern Africa leads to recurrent, chronic food insecurity, poor nutrition, and poverty for a significant proportion of the population. This low productivity can result from unimproved crop varieties; biotic and abiotic stresses; a lack of access to quality seeds, fertilizer, and other inputs; and poor agronomy. Conversely, the use of improved crop varieties by Africa's smallholder farmers can substantially boost their production in response to local and international demand for food and nutritional security. However, there is a critical shortage of well-trained crop scientists and plant breeders at the PhD level, in particular considering the multiple crops and agro-climatic zones in the region. The proposed *Makerere University Center for Crop Improvement* (MaCCI) will strengthen and expand a regional PhD program in Plant Breeding and Biotechnology that was initiated in 2008 by Makerere University and its partners. Makerere's MSc program has been highly successful, but a lack of funding and other resources have prevented the PhD program from reaching its full potential.

2. Project Objective

The overarching goal of the MaCCI is to expand, strengthen, and transform the PhD PBB program following the pattern of the highly successful MSc PBSS. Thus, the Center will provide Eastern and Southern African (ESA) nations with industry-ready plant breeders who can use cutting-edge science to develop and deliver new food crop varieties. These breeders are urgently needed throughout this region in order to improve food security, nutrition, rural incomes, poverty reduction, and economic development. Specifically, MaCCI will (1) Strengthen the training and research capacity in plant breeding and biotechnology within the region, and enhance regional and international collaboration, (2) Improve the content and delivery of the curriculum, in order to provide a strong theoretical and scientific foundation with an applied focus on product delivery. The curriculum will serve both the ESA private and public sectors (3) Increase the capacity and sustainability of Makerere University's regional program in plant breeding, in order to bring expertise together in one place. This will transform the program into the premier post-graduate training center of excellence for crop improvement in Africa (4) Train 30 new PhD-level plant breeders from the ESA region. Some students will be selected for full funding, and others will enroll with part or all of their own funding.

3. Project description:

Basic training and teaching infrastructure exist at the project location at the University's Research Institute at Kabanyolo. However, these need to be expanded and/renovated to better support teaching excellence. The following facilities have been identified for renovation and rehabilitation, namely, Seed quality Lab, students and visiting staff accommodation, Screen-houses, improvements and equipment at existing Molecular Biology& Microbiol labs.

The creation of a seed quality/plant health laboratory is important to enhance teaching excellence in plant breeding. Consultants from Iowa State University's Seed Science Center (ISU SSC) and experts from North Carolina State University (NCSU) will visit the Makerere campus and assist in identifying objectives and developing a plan for a seed testing facility. This facility will be used to train students in the basics of seed testing and seed health as well as to meet the needs of local researchers. The consultants will recommend appropriate seed testing equipment, facilitate the procurement process, advice on installation and procedures, and ensure that the facility is fully operational. Once operational, MaCCI leadership will assess the feasibility of making services publicly available for a fee.

An enhanced Bioinformatics Training Facility will be added at the existing molecular biology laboratory in addition to general improvements to building. This will be used to incorporate local learning exercises into the PhD Bioinformatics course, and be available for an MSc-level short course. Consultants from Cornell University and elsewhere will help plan and procure the equipment, identify the local staff training required, and be involved in continuing assessments and improvements of equipment needs, staff capabilities, procedures, and training methods. With advice from consultants, other facilities related to seed handling and storage will be improved to contribute to the teaching and research programs. These include a greenhouse, seed store, molecular lab, and field equipment (e.g., irrigation systems).

To contribute to the distance learning component of course delivery, MaCCI will develop videoconferencing capabilities in consultation with Cornell University and others. This activity will define the needs and costs, identify specific equipment and services, and identify providers of bandwidth. After initial setup, activities will focus on improving performance and seeking a lower-cost bandwidth provider if needed. Videoconferencing will also facilitate meetings of the student guidance committees or other meetings involving participants from other locations.

The expected increased number of students will required, expanded accommodation and lecture space. There are about 6-8 old buildings whose structures appear sound but that would need to be over-hauled - including but not limited to power & plumbing installation, painting and other improvement as found appropriate. Similar, a small guest-house that cater for visiting professors participating in the program will need to renovated to take care of about 4 - 5 visitors at any one time at the project campus.

4. Environment and social Footprint/Impact

The project aims at training students using modern instructional methods and developing their core skills. To do this, appropriate teaching and research infrastructure needs to be built. .The environmental footprint of the proposed activities is mainly local while the social footprint will extend regionally when the center is fully operational. The project site is in an existing training institution located the Makerere University Agricultural Research Institute at Kabanyolo (MUARIK) about 21 km from main campus and the location has no local or international conflicts or disputes, is accepted by the local host and workers in the location. Given the size of the proposed project and its location, the foreseen environmental and social risks and impacts are very minimal to negligible. The negative impacts are localized, site specific and easily manageable.

5. Policy, Legal and Administrative Framework

The phases of the proposed project that include preparation, construction and implementation are guided by national environmental legislation and the World Bank operational safeguard policies OP/BP 4.01 and OP/BP 4.12. The project will maintain compliance to the above requirements throughout the project lifecycle.

6. Relevant World bank Policies

Two World Bank operational safeguard policies OP/BP 4.01(*Environmental Assessment)* and OP/BP 4.12 (*Involuntary Resettlement*) are applicable to this project, due to minor civil works and temporary resettlement of the residents of the houses to be renovated under the project. The prepared ESMP therefore is a demonstration of compliance to the World Bank safeguard requirements.

7. Implementation Arrangements

The Center's general management will be administered through the College of Agricultural and Environmental Sciences at Makerere University. The Principal of the College, designated as the Center Director (CD), will provide overall oversight to MaCCI activities. Day-to-day operations will be managed by the Deputy Center Director (DCD), who is the Project Manager (PI). The DCD will provide regular technical and financial reporting as prescribed by the ACE II program. The DCD will oversee administrative procedures, coordinate academic affairs, and organize regular meetings with all collaborating partners, especially in regard to the students' progress toward their research goals in the various collaborating breeding programs.

The CD/Principal of the College of Agricultural and Environmental Sciences is the designated accounting officer for MaCCI at Makerere University. He/she will be kept abreast of progress through regular meetings with the DCD, personal participation in project meetings,

and receipt of project technical and financial reports. Using experience in previous projects, the MaCCI management team has identified the following improvements to existing management structures that will increase administrative efficiency.

First, a steering committee will be convened that is composed of representatives from Makerere University, U.S. partnering institutions, partner universities, National Agricultural Research Institutes (NARIs), seed companies, and CGIAR centers. The steering committee will meet at least once a year to guide the project planning, implementation, and progress in delivering critical outputs and outcomes. Regional organizations such as AGRA and RUFORUM, which are already heavily involved on capacity building, will be included in the steering committee leadership.

The Center management will follow an implementation plan that addresses both Makerere University and ACE II reporting requirements, as well as arrangements agreed upon with cooperating partners.

A competent Administrative Officer (AO) will be recruited to support the DCD in human resource management. The AO will be involved in the following duties:

(1) Supporting students/partners with guidance on routine university procedures such as student registration, linkage to faculty internet, library access, etc.
(2) Supporting students/partners in their compliance with immigration issues, obtaining appropriate medical insurance, and banking access
(3) Arranging for students/partners accommodations and other conveniences
(4) Arranging logistics for visiting lecturers
(5) Making logistical arrangements for key functions of the Center, e.g., proposal defenses, progress reports, seminars, and other functions

The DCD, with the help of the AO, will responsible for regular financial reporting following ACE II's reporting schedule. A standard accounting package, Ledger Works, will be acquired to improve management of project funds. A separate project bank account will be opened and maintained throughout the life of the project.

There may also be modest quarterly advances of funds to project partners (where students are attached for research) for costs incurred by students during field work, based on the mutual agreement of the partners. A separate detailed agreement of cooperation with the partners for such remittances will be developed, limiting the total remittance to an amount that will permit other necessary research expenses without exceeding the amount designated for each student's research costs.

8. Environmental and Social Screening, assessment and management

The preparation of the ESMP was based on the Environment and Social Management Plan for ACE, specifically sections C,D and E and the Screening form in Part II and Annex A(public Consultations)

9. Potential Environmental and Social Impacts

The impacts are mainly site specific in nature, localized and are negligible. Potential impacts include domestic wastes because of anticipated increase in student population, laboratory wastes, dust and noise. The ESMP has adequate provision for the mitigation of all possible impacts.

10. Environment and Social management Approach

The ACE proposal has attached EMP checklist that has been completed and disclosed at the institutional website to comply with environmental and social safeguard. The project team at Makerere University will work in consultation with the World Bank team to implement the ESMP. The Team at Makerere University has adequate knowledge on safeguard to implement the ESMP recommendations. Furthermore the contractor for the project will be required, as a part of contract, to implement specific environment and social mitigations during construction phases of the project. Since the site already has workers and other nearby activities such as a school, the community will be involved through awareness programme on safety and health to avoid accidents and other anticipated impacts. The construction work areas will be restricted, vehicle/trucks movements controlled, hazard and safety signposts installed, noise and dust levels minimized by implementing appropriate mitigation measures.

11. Monitoring and reporting

Monitoring and evaluation activities within MaCCI will contribute to all four project objectives, ensuring that development objectives are achieved. The results of the MaCCI Cmonitoring and evaluation activities will be the accomplishment of performance-based indicators, such as number of students enrolled and staff hired, facilities becoming fully operational, etc. Disbursement of funding will depend on meeting these indicators to the extent feasible.

Strengthen training and research capacity and enhance regional and international collaboration, will be evaluated by documenting the increase in staff; the capacity of active facilities and their usage in teaching and research (measured by hours of use, number of personnel

using each facility, and projects using each facility); and the increase in enrolled students from the region and an evaluation of the quality of their research projects. This data will be collected annually. Regional and international partnerships will also be documented.

Improve the content and delivery of curriculum, will be evaluated by the number of revised and new courses offered (residential or blended), the number of students taking each course, the content of each course, and feedback on the quality of courses based on student and faculty surveys. This data will be collected after the end of each course offering.

Increase the capacity and sustainability of Makerere University's regional program in plant breeding, will be measured by the number of new staff members who were initially grant funded but were moved to Makerere's payroll, the quality of staff as evaluated by University evaluation policies, and the activity of regional and international partners. This data will be collected annually. At the end of the project, industry, university, and employer partners will be surveyed on the quality of the students' education and research.

Train 30 new PhD-level plant breeders will be measured by graduation rates. The level of sponsorship of these students will be documented.

For overall Center activities, the monitoring and evaluation strategy (M&E) will address issues of compliance, progress monitoring, and learning within the project and with other actors. Specifically, by assessing adaptive competencies and resulting outcomes of performance, the M&E framework will assure (1) continued project relevance to outcomes, and (2) project quality. Continuous reference will be made to the Center's overall activities, input, and outcome framework using various levels of project results to ensure that key milestones are efficiently achieved. This will ensure the greatest impact on education and research excellence and a strong regional program and collaborative partnerships.

The Principal Investigator and Deputy Center Director (Dr. Richard Edema) will manage the project. The DCD will promote frequent contact (telephone, e-mails, visits, meetings) between the students and supervisors to monitor student progress, to facilitate the student's ongoing research, and to provide additional training experiences for the student. Collaborating partners, who include leading scientists and managers of seed companies, will host student research and other training activities as part of the students' training. In close collaboration with the University supervisors and project core team, these partners will backstop and provide all necessary technical

guidance for conducting field research activities. Regular scientific interaction will be ensured through monthly meetings, or as may be necessary, to assure quality of research and to address any scientific matters arising during the course of the study. These meetings will monitor progress and achievement of targets by individual students and their field supervisors.

(Details contacts of persons involved to be provided once project is initiated)

PART A: INSTITUTIONAL & ADMINISTRATIVE	**ESMP monitoring arrangements (names, Title, contact)**		
Institutional arrangement (Name and Contact	ACE-II RUF/WB officer	Center Director/ DCD-PI of Project	Others - contractor & service providers
Implementation Arrangement (Name & Contacts)	Safeguard supervision (ACE-II RUF/WB officer)	Center Director/ DCD-PI of Project	Others - contractor & service providers
Site Description: Makerere University Research Institute, Kabanyolo (MUARIK)			
Name of Site			
Location of site	• Rural • Planned • Low income surrounding	GPS reference NA36-14.	
Land ownership	Land is owned by Makerere University		
Geographical description	The location at Kabanyolo is in Wakiso District close to Kampala City (21 km). It is easily assessable via the city road network. However the road within Kabanyolo is unpaved		
Legislation			

Identify nation-al & local legislation & permits that apply to project activity	The policy and legislation is presented below – in separate table
Public Consultation	
	Public consultation used participatory appraisal and it was conducted on 12 January 2015 at Kabanolo. Stakeholders involved were the workers, students.

Policy and legislation relevant to the project activities

	ACT/STATUTE
1	The Constitution of the Republic of Uganda, 1995
2	The National Environment Act CAP 153, 2000
4	The Water Act CAP 152, 2000
5	The Public Health Act 2000
9	Local Governments Act, 1997
10	The National Wetland Policy, 1995
11	Land Act 1998
16	Water Resources regulation, 1998
17	Water Supply Regulations, 1999
18	The Water (Waste Discharge Regulations), 1998

	STANDARDS/REGULATIONS

i)	The Environmental Impact Assessment Regulations, 1998
ii)	The National Environment (waste Management) Regulations, 1999
iii)	The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999
iv)	The National Environment Instrument (Delegation of Waste Water Discharge Functions), 2000
vi)	The National Environment (Designation of Environmental Inspectors) Notice, 2001
vii)	The National Environment (Management of Ozone Depleting Substances and Production) Regulations, 2001
viii)	The Sewerage Regulations, 1999
ix)	The National Environment(Noise Standards and Control) Regulations, 2004
x)	Agricultural chemicals (Registration and control) Regulations 1994
Xi	Employment Act CAP 219, 2000
xii	National Social Security Fund Act CAP 222, 2000
xiii	Trade Union Act CAP 224, 2000

PART II

ENVIRONMENTAL and SOCIAL SCREENING			
	Activity and potential issues and/or impacts	**Status**	**Additional references**
	1. Building rehabilitation	[X] Yes [ ] No	See Section B below

Will the site activity include/involve any of the following issues and/or impacts:	• Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction. • Construction waste		
	2. New Construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	[X] Yes [ ] No	See Section B below
	3. Handling / Management of medical waste • Clinical waste, sharps, pharmaceutical products(cytotoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste.	[ ] Yes [X] No	See Section E below
	4. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and/or construction waste • Storage of machine oils and lubricants • Storage , removal and disposal/ incineration of laboratory wastes	[X] Yes [ ] No	See Section D below

	• Storage, removal and disposal of old equipment		
	5. Domestic solid waste • Storage, removal/transportation and disposal • Treatment of domestic waste	[X] Yes [ ] No	See Section D & E below
	6. Traffic and Pedestrian Safety • Site specific vehicular traffic • Site is in populated area (working and schooling area) • Traffic accidents, dust and noise	[X] Yes [ ] No	See Section F below
	7. Individual wastewater treatment system • Effluent and / or discharges into receiving waters	[X] Yes [ ] No	See Section C below
	8. Land and Water • Creation of standing water pools on construction site • Water abstraction for construction work • Land use practices associated with the project	[X] Yes [ ] No	See Section G below

ACTIVITY	**PARAMETER**	**GOOD PRACTICES MITIGATION MEASURES CHECKLIST**

A. General Conditions	Notification & Worker Safety	(a) Consult with the Regional Steering Committee and World Bank Task Team to discuss activities and the due diligence requirements (b) The local construction and environment inspectorates and communities have been notified of upcoming activities (c) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (d) All legally required permits (to include not limited to land use, water use, resource use, dumping, sanitary inspection permit) have been acquired for proposed activity (e) All work will be carried out in a safe and disciplined manner designed to minimize impacts on the environment and neighbouring residents (f) Workers' personal protective equipment (PPE) will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (g) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Temporary resettlement	(a) Moving assistance to be provided to the residents temporary relocated from the houses to be rehabilitated under the project. Assistance is to be provided and reported on before beginning of civil works on these houses.
	Air Quality	(b) During interior demolition use debris-chutes above the first floor (c) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (d) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (e) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (f) There will be no open burning of construction / waste material at the site (g) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers

	Waste Management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos
C. Individual waste water treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
D. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labelled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
E. Disposal of medical waste	Infrastructure for medical	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to:

	waste management	▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and If the activity includes facility-based treatment, appropriate disposal options are in place and operational
F. Traffic and pedestrian safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) The contractor shall provide the University with a traffic management plan including temporary loss of roadway, blockage due to deliveries and site related activities, including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the participating university and RFU. (b) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes with people or livestock movement
G. Land and Water	General land and water uses	(a) Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the University. (b) Internationally accepted good land use practices in place to minimize land degradation, and /or siltation in waterways (c) Minimize excessive groundwater extraction and put in place appropriate conservation of water measures which can contribute to significant water savings

PART C: MONITORING PLAN							

Phase	**What (Is the parameter to be monitored)**	**Where (Is the parameter to be monitored)**	**How (Is the parameter to be monitored)**	**When (Define the frequency / or continuous?)**	**Why(Is the parameter being monitored)**	**Cost (If not included in project budget)**	**Who (Is responsible for monitoring)**
During activity preparation	Resettlement of persons living in the houses to be renovated Safe disposal of used equipment and other items	Onsite and new residences Onsite	Measure of acceptability after resettlement Numerical counts and inspection of safe disposal	Once Once	Proof of resettlement For safe disposal of items with possible harm to environment		Project manager, Makerere university official Project manager Used equipment disposal expert
During activity implementation	Water quality Air quality Waste disposal	Offsite/nearby streams and rivers Onsite and areas surrounding the site	Water quality tests including mineral load and microorganisms population enhancement Air quality indicators such as percentage of dust/carbon	Twice a year during the project life time Twice monthly	Ensure safe water for use by downstream populations Environmental experts		Hydrological and water quality experts Project manager Project manager Site engineer

		On site Dumping site/land fills	monoxide and other industrial gases. Identify type and amount of waste and if properly disposed	Monthly especially after dumping	Soil experts Environmental experts		Site engineer Project manager
During activity supervision	All the arising issues during preparation and implementation	Onsite/offsite	Inventory of mitigation measures and environmental management plans	Once	All teams		Project manager and consultant

ANNEX A : PUBLIC CONSULTATIONS

Uganda – East African Center for Crop Improvement	**Date of consultative meeting**	**Stakeholders present**	**Issues raised**	**Response to the issues**
	12-1-16	Tweyambe C- (Assistant Farm Manager	Issues raised are summaries in table on « Environmental and Social Screening »	Issues raised are summaries in table on « Environmental and Social Screening »
	12-1-16	Wesiga Jimmy- (Farm Manager)		
	12-1-16	Dr. Stephen Lwasa (Assistant Farm Manager)		
	12-1-16	Ahangaana Julius (Assistant Farm Manager)		
	12-1-16	Achola Esther (MSc.Student)		
	12-1-16	Msiska Mercy (PhD Student)		
	12-1-16	Alice Candia (Project Administrative Assistant)		
	12-1-16	Oriba Alice (MSc Student)		
	12-1-16	Namasaka Roy (MSc Student)		
	12-1-16	Alladassi M.Elyse Boris (MSc Student)		
	12-1-16	Awio Bruno (MSc Student)		
	12-1-16	Agoyi Eric(PhD Student)		
	12-1-16	Saul Eric Mwale(MSc Student)		
	12-1-16	Winnifred Akech (Laboratory Technologist)		

African Centers of Excellence II

Environment and Social Management Plan (ESMP)

MAKERERE  **UNIVERSITY**

African Center of Excellence in Materials, Product Development and Nano-Technology, MAPRONAO, Uganda

February 2016

PART I: Activity Description

1. Introduction

The GDP of countries in the Great Lakes is still largely dominated by primary products which have led to unfavorable balance of payments, low skills transfer and development, low levels of employment and poverty. Today, technology development in Great Lakes countries is generally characterized by low levels of science and technology resulting in development of products that have low value, low quality and low standards. In addition to the problem of exporting primary products with limited value addition, the Great Lakes region is facing challenges related to low electricity coverage for both domestic and commercial use, dependence on unsustainable biomass particularly charcoal and wood as cooking fuel, inadequate clean water supply, inadequate sanitation facilities, and an increase in diseases like Cancer in addition to high prevalence of HIV and Malaria. Uganda's Vision 2040 highlights nanotechnology as a driver towards attaining middle income status. Such an approach on focusing on advanced technology has transformed the economies of China, Brazil, Taiwan and India.

To compound this, the current alignment of universities, research centers and higher institutions of learning in the Great Lakes region cannot contribute to solving any of these problems because of their self-imposed restrictions to a single area of study. This rigid non-translational structure has resulted in spectacular failure for the problems affecting the Great Lakes region to be researched and solved in a cross-cutting and multi-disciplinary way. In order to solve these challenges, the MAPRONANO ACE will provide training to over 80 Master's students in two new Master's programs in nanotechnology, Materials and Product Development. Short courses such as Health and Safety Engineering, Oil and Gas Technology, Product Design and Development and Welding Technology will be provided to 200 industry professionals and policy makers over a four-year timeline. The PhD training in the MAPRONANO ACE will focus on: Materials and product development; Nano-technology innovations for the Great Lakes region; and, Nano-medicine. The MAPRONANO ACE will train 12 PhD students. In order to build regional linkages half of the places available for Master's and PhD training will be reserved for students outside Uganda. The MAPRONANO ACE will develop state of the art Laboratories in Nano characterization and product development. These labs will provide testing and quality assurance services to industry in the great lakes region so that the products that they develop will be of high quality and standard. The MAPRONANO ACE has national, regional and international partners associated with it.

2. Project Objective

The MAPRONANO ACE will focus on enhancing materials and product development through value addition. The MAPRONANO ACE will utilise nanotechnology to solve problems in the areas of energy (e.g. in solar technology, wind, etc.), oil and gas production, medicine (for cancer therapy, diagnostics, and tissue engineering), material and product development (e.g. raw material extraction, value addition, etc.), and environmental applications (e.g. bio-remediation, water filtration and purification etc.), Nanotechnology presents possible solutions to mitigate these problems in the Great Lakes region.

3. Project description

The MAPRONANA ACE will develop two Master's programs which are Master of Science in Nanotechnology and Master of Science in Materials and Product Development. Each of these Masters programs is expected to train over 68 students over a period of 4 years which implies that over 68 Master's graduates will be produced by the MAPRONANO ACE. The intensive training provided through the Masters in Materials and Product development is intended to urgently fill the gap required in promoting value addition of primary produce in the Great Lakes region. It is expected that the trained graduate students will have a direct impact on industry. Additionally, both Masters programs will have about 10 places reserved for industry professionals and policy makers who will also enhance direct impact on value addition in materials and products produced. The Masters in Nanotechnology is important for the purpose of building a critical mass within the Great Lakes region with knowledge, skills and understanding on nanotechnology. The over 60 trained graduate students will produce nano-related solutions to problems of energy, water and environments affecting the Great Lakes region.

From a research view-point, the Materials and Product Development theme focuses on value addition of raw materials for the explicit purpose of enabling industries in the Great Lakes region develop products that are of high quality and of internationally accepted standards. This research theme is expected to train 4 PhD students. One interesting example is the transportation of oil and gas along the pipeline from Uganda to Kenya. The quality of Uganda's oil is known to be high; however, it also has abrasives. If not carefully catered for in the design of the pipeline, it is possible that these abrasives will cause the pipe to lose it structural integrity as a result of surface wear. The application of thin films at nano-scale which are wear resistant can increase the life of the pipeline. This is an example of how nanotechnology can be used to enhance product development and value addition for the nascent oil and gas sector in the region.

Nano-technology innovations will focus on state of the art research on energy, water and the environment. These are critical components in relation to combating climate change and yet they are also very important for both Human and National development. Nano-technology innovations in solar technology, water purification, environmental bio-remediation, thin film technology and applications in oil and gas production shall be sought. Another 4 PhD students shall be trained under this research theme. The third component of MAPRONANO ACE shall be Nano-medicine. The high incidence of certain diseases within the Great Lakes region like Ebola, Malaria, Cancer and HIV requires more effort be made locally to understanding the diagnostics and treatment options for these diseases. 4 PhD students shall be trained under this research theme. Nano-medicine is inherently linked to materials and product development because drug delivery systems and components, implants and tissue engineering need careful design considerations between the body, mechanical and electrical component in order to be effective and have potential applicability. In total the MAPRONANO ACE intends to train 12 PhDs in three different research themes over a period of 5 years. This will provide a potentially large number of highly trained researchers who will drive the research agenda in the Great Lakes region for the next 30 to 60 years. The MAPRONANO ACE will tap into its network of local, regional and international partners to ensure that the PhD students receive the best supervision. One major complaint from industry in the Great Lakes region is the low capacity to test the quality of their products against international standards. The MAPRONANO ACE will procure the latest state of the art equipment required for materials (nano) testing and characterization. Product development laboratories and rapid prototyping equipment will also be sought. Industry in the Great

Lakes region is willing to pay for testing if it will provide their products with a quality assurance mark that will be acceptable in the international market.

This collaboration with industry will also provide additional income to the MAPRONANO ACE.

4. Environment and Social Footprint/Impact

The project aims at research activities and training graduate students to developing their practical and academic skills for the regional and international market needs. The foreseen environmental and social risks and impacts are very minimal to negligible. The negative impacts are localized, site specific and easily manageable.

5. Policy, Legal and Administrative Framework

The phases of the proposed project that include preparation and implementation are guided by national environmental legislation and the World Bank operational safeguard policies OP/BP 4.01. The project will maintain compliance to the above requirements throughout the project period.

6. Relevant World Bank Policies

World Bank operational safeguard policy, OP/BP 4.01(*Environmental Assessment) is* applicable to this project. The prepared ESMP therefore is a demonstration of compliance to the World Bank safeguard requirements.

7. Implementation Arrangements

The governance structure of the MAPRONANO consists of a core management team, a national and international advisory board and 3-4 staff members. The management team consists of the center leader, deputy center leader, Projects coordinator and Monitoring and Evaluation Officer. The National advisory board consists of members from College of Health Science, Uganda Cancer Institute, Uganda Industrial Research Institute, and Uganda National Bureau of Standards. Uganda Industrial Research Institute and Uganda National Bureau of Standards are under the Ministry of Trade, Industry and Cooperatives and as such will provide policy guidelines to the MAPRONANO center. The international advisory board consists of members from University of Nairobi (Department of pharmaceutics and pharmacy practice, Department of pharmaceutical chemistry), University of Illinois at Chicago, CSIR-Indian Institute of Toxicology Research, Prime Business LLC and Malsch Techno Valuation. The ACE will focus on three major areas which include: Nano-medicine, Nanotechnology for innovation in great lakes and Materials and Product development. As such the center will employ 3 – 4 supervisors with expertise in these areas. This clear governance structure will enhance MAPRONANO ACE's ability to acquire more sustainable financing in the medium and long term.

The center will follow Makerere University Financial management and procurement policy infrastructure and manual. The center assistant accountant will serve as the link between the center and the University for Accountability and timely execution of financial transactions. Makerere University uses financial packages like Sage, Quick Book; it also has in place financial regulations and Grants Management units with highly qualified accountants with considerable experience in financial and management accounting. The center and the University will follow World Bank procurement policies and procedures. Makerere University has strong internal and external auditors responsible for the auditing of the accounts of the center.

Makerere University has the required procurement structures/systems in place and qualifies as a procurement entity. Each college has a highly qualified procurement Officer responsible for the Procurement processes for each college. The University is also guided by the legal framework of PPDA act, 2003. Furthermore, the entity has a Procurement committee, Procurement Evaluation panels and procurement boards. The procurement unit of the college has a fundamental role in ensuring that goods and services for externally funded projects are procured in a timely manner based on approved budget lines and specifications. The MAPRO-NANO ACE will adhere to highest standards of ethics and integrity in all its financial and procurement transactions. The World Bank's Policy on corrupt and fraudulent practices will be followed and the guidelines will be firmly enforced and all the MAPRO-NANO management team will be educated on these guidelines.

8. Environmental and Social Screening, assessment and management The preparation of the ESMP was based on the Environment and Social Management Plan for ACE

9. Potential Environmental and Social Impacts

The potential impacts include minimal to negligible disruption to air and water quality and noise pollution. The project will be housed in already existing building at the College of Engineering, Design, Art and Technology, some part of the activities will be housed at the College of Health Sciences, at Mulago hospital. The ESMP has adequate provision for the mitigation of all possible impacts.

10. Environment and Social Management Approach

The ACE proposal has attached EMP checklist that has been completed and disclosed at the institutional and World Bank website to comply with environmental and social safeguard. The project team at Makerere University will work in consultation with the World Bank team to implement the ESMP. The Team at Makerere University has adequate knowledge on safeguard to implement the ESMP recommendations.

11. Monitoring and reporting

Monitoring and evaluation activities within MAPRONANO ACE will contribute to all project objectives, ensuring that project development objective (PDO) is achieved. The results of the MAPRONANO monitoring and evaluation activities will be the

accomplishment of performance-based indicators, such as number of students enrolled and staff hired, facilities becoming fully operational, etc. Disbursement of funding will depend on meeting these indicators to the extent feasible.

PART II: ENVIRONMENTAL AND SOCIAL SCREENING

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
	Uganda– Africa Center of Excellence for Materials, Product development and Nanotechnology - MAPRO-NANO	Yes [√]	**1. Refurbishment** • Increase in dust and noise from demolition and/or construction • Construction waste generated during demolition of walls for creation of laboratory space • Equipment installation and optimization conditions	**Air Quality** (a) The MAPRO-NANO ACE will ensure that demolition debris is in a controlled area and spray with water to reduce debris dust (b) The workers will also wear Protective gears (mouth masks) to prevent inhalation of the dust. (c) The surrounding environment/corridors will be kept free of debris to minimize dust (d) Training of staff personnel in safety measures to avoid accidents that may arise from the demolition (e) The creation of space/demolition works will also follow University policy and guidelines. (f) The MAPRO-NANO ACE will subcontract a Waste disposal company for disposal of any waste that may arise from the demolitions; strict adherence to NEMA guidelines will also be followed. (g) For any burnings that may arise, the College of Health Sciences which is partner for the MAPRO-NANO ACE has well-built incinerator which will be used in case there is any hazardous waste that may need incineration. (h) The University has medical insurance for its entire staff and therefore for any emergencies/traumatic injuries or any respiratory complications that may arise from exposure to the dust (i) First Aid Boxes will also be implemented in all work sites as stipulated in University Guidelines. (j) works involved in repair of Equipment, installation, Refurbishment or any other construction activities (demolition/extensions) meet appropriate standards of responsible environmental management and safety practice (k) The MAPRO-NANO ACE project monitoring and Evaluation programme will also include inspection of safety equipment use

				Noise (a) The noise that may be generated during Equipment installation, demolition works will be limited to restricted times during day time and also ACE will strictly adhere to University policies for mitigation of Noise. people working in offices around the site are not adversely affected by noise due to the activities at the construction sites, quarry and borrow pit areas (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment will be closed, and equipment placed as far away from residential areas as possible (c) The MAPRO-NANO ACE will also hold focus group discussions with Hostel owners, shop attendants and other tenants at the University on possible ways to abate Noise pollution. (d) Sensitization and discussion with residential and office workers around the sites about the working hours and the impact of noise (e) use of hearing protection gears by workers when exposed to noise levels above 85 dB (A) (f) Fitting proper mufflers to construction equipment or any other equipment to minimize noise pollution (g) Noise abatement on refurbishment/demolition works for laboratory Equipment will be minimized through emphasizing working during day time

				Water Quality (a) Precaution measures will be put in place to avoid oil spillage from mechanics works or any other Equipment into the water system of the University (b) Standard operating procedures/Protocols for ensuring water safety as stipulated by NWSC guidelines and University policy will be adhered to (c) Safety measures under the University framework for protection of drinking water system such as avoidance of spillage of toxic chemicals /biological organisms in water drainage systems will be adhered by all staff in the ACE. **Fires** (d) Fire extinguishers will be installed in all laboratory and working environments of the MAPRO-NANO ACE (e) Staff will be oriented on safety measures for mitigating exposures to fire outbreaks and also good working practices within the University Safety Practices. (f) The MAPRO-NANO ACE will also have contacts with Fire Brigades so as to avoid the risk of property destruction or for timely interventions. (g) Highly combustible chemicals/consumables will be kept away from Non-combustible chemicals but also following standard laboratory practices such as ensuring the implementation MSDS (Materials Safety Data Sheet). (h) Smoke detectors have been installed in most of the labs /infrastructure as per the University framework. **Waste Management** (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) The records of waste disposal will be maintained as proof for proper management as designed.

			2. Handling/ management of medical waste in the MAPRO-NANO ACE • Biomedical waste from research work/ micro-organisms/biological samples • Clinical waste from patient samples • Consumable reagents used in the labs which toxic/corrosive • Radioactive waste, organic domestic waste • Disposal of all biomedical/medical waste during Nano-medicine research at the college of Health Sciences at Makerere University • Ethical issues on use of Human subjects/animals and test of new devices	**Medical waste management /Mitigation** (a) Standard Biosafety guidelines, SOPs/Protocols in the labs at the College of Health Sciences and College of Engineering will be adhered during research and all project activities (b) The College of Health Sciences is well equipped with an Autoclave for sterilization of all biomedical waste before disposal. (c) The transportation of any laboratory samples will follow standard operating procedures within the University framework. (d) Packaging and transportation of all biological samples will be in bio-hazard bags and will be approved by an accredited lab. (e) Transportation of samples internationally will follow IATA guidelines. (f) MSDS will be installed in all the upgraded labs. (g) The management of all waste will follow Mulago policies and NEMA guidelines (NEMA act, 1999). (h) Short courses on Good Laboratory Practice will be offered to all staff. (i) Vaccination of all staff working on biomedical waste is a must. (j) Medical insurance is part of the University policy for all staff. (k) Appropriate storage facilities for medical waste and disposal are in place; and If the activity includes facility-based treatment, appropriate disposal options are in place and operational such as incinerator at Mulago Hospital (l) The ACE will also use available IRB bodies at the College of Health Sciences and College of Engineering to mitigate any Ethical issues involving use of Human subjects/human samples, test of new devices or products on Humans, the ACE may also have to follow FDA

				guidelines for test of new devices/prototypes and Conducting clinical trials. (m) Ethical approval for research will also be sought from UNCST. (n) Standard protocols for respect of animal rights for use in Experimental studies especially during Nano-medicine research and innovations will be adhered to by all the staff.
			3. <u>Legal and social implications</u> • Societal aspects on Technology development • Government policies on technology and innovation • Technology standards development • IP issues	**<u>legal issues</u>** (a) The MAPRO-NANO ACE will follow NSTIP policy guidelines under the custody of Uganda National Council for Science and for materials, product development and Nanotechnology innovations and Nano-medicine. (b) The MAPRO-NANO ACE will also respect IP issues and copyrights that may arise from the research that is done collaboratively. (c) The University has a well streamlined policy framework on IP patents and copyrights and also works hand in hand with the UNCST (d) The ACE will also support staff for trainings in standards development for nanotechnology, materials and product development (e) The ACE will design short courses organize stake holder meetings in Nano-ethics and responsible nanotechnology development for the staff, students and the society.

PART C: MONITORING PLAN							
Phase	**What (Is the parameter to be monitored)**	**Where (Is the parameter to be monitored)**	**How (Is the parameter to be monitored)**	**When (Define the frequency / or continuous?)**	**Why (Is the parameter being monitored)**	**Cost (If not included in project budget)**	**Who (Is responsible for monitoring)**
During activity implementation	Water quality	Onsite monitoring	Water quality tests including mineral load	Once a year during the project life time	Safeguard safe water for use by population		Project Administrator
	Air quality	Onsite	Air quality indicators such as percentage of dust/carbon	Twice monthly	Safeguard clean air working environment		Project manager
	Waste disposal	On site trash bins	Identify type and amount of disposable waste	Weekly basis	For a clean and health working environ		Project Admin

ANNEX A : PUBLIC CONSULTATIONS

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Uganda- Africa Center for Materials, Product development and Nano –technology (MAPRO-NANO)	18th December, 2015	CEDAT and MakCHS management	Implementation and Review of existing MSDS to Cater for new Labaratory consumables that may come in as result of refurbishment and commissioning of new Equipment	Members agreed on reviewing of SOPs and MSDS documents in all the existing labs to cater for safety concerns
		MakCHS, CEDAT technical staff	Plan to have short courses for occupational health and safety for all students (MSc/PhD) and staff at the beginning of the programs	Members agreed to have short training courses on biosafety issues at the time of commissioning of new Equipment
		MakCHS, CEDAT technical staff	Plan to organise a consultative meeting with some of the Advanced partners on training on Biosafety issues associated with new Equipment	Members agreed this will form part of the activities at start of First year at the time of Equipment procurement.
		MakCHS, CEDAT technical staff	The need for a Project Occupational Health and (OHSA) Safety Officer	Members agreed to use the Safety Officer within the University framework
		MakCHS, CEDAT technical staff	Members highlighted on the existence of a Biosafety law at UNCST	Members agreed to consult the Biosafety law at UNCST

Eastern and Southern Africa Higher Education Centers of Excellence Project ACE II

IUCEA WORLD BANK GROUP

Environment and Social Management Plan

AFRICAN CENTRE OF EXCELLENCE IN AGRO-ECOLOGY AND LIVELIHOOD SYSTEMS

(ACALISE)

Uganda Martyrs University

January 2015

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Tables

List of Abbreviations/Acronyms

ACALISE	African Centre of Excellence in Agro-ecology and Livelihood Systems
ACE	African Centre of Excellence
AFLEG	African Forest Law Enforcement and Governance Agreement
CAADP	Comprehensive African Agriculture Programme
CBD	Convention on Biological Diversity
EAC	East African Community
EIA	Environment Impact Assessment
EOAI	Ecological Organic Agriculture Initiative
ESD	Education for Sustainable Development
ESCMC	Emergency, Security, and Crisis Management Committee
ESMP	Environment and Social Management Plan
GMO	Genetically Modified Organisms
NARO	National Agricultural Research Organization
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NOGAMU	National Organic Agricultural Movement of Uganda
PI	Principal Investigator
PPP	Public Private Partnership
PELUM	Participatory Ecological Land Use Management Association
SDGs	Sustainable Development Goals
SADC	Southern African Development Community
UMU	Uganda Martyrs University
UNBS	Uganda National Bureau of Standards

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Part I: Basic information about the Institution and overview of the ACE II Project

A. Institution

Name of Institution	Uganda Martyrs University
Physical Location/Country:	Main campus is located at Nkozi,(GPS: 0^0 00'58.09"N 32 02'40^0.20"E Elevation 3949ft) Mpigi district, 80km along Kampala-Masaka Highway P. O. Box 5498, Kampala, Uganda

Institutional Legal status and focus:	Uganda Martyrs University (UMU) is a State-chartered private not-for-profit University, owned by the Uganda Episcopal Conference. **Mission**: To provide quality higher education, training and research for the betterment of society guided by ethical values. **Vision**: To be a University that is nationally and internationally recognized for its excellence in teaching, learning, research, advancement of knowledge and community engagement. **Strategic Focus**: - Ethics and integrity to ensure the formation of the whole person in body, mind and soul/character. Ethics is mainstreamed in all academic programmes of the University. - Environmental sustainability and mainstreaming education for sustainable development - High quality/excellence in all services **Guiding Principles**: - Transparency, - Accountability, - Reliability, - Action based on Institutional Ethos, - Quality
ACE II Name:	African Centre of Excellence in Agro-ecology and Livelihood Systems (ACALISE)
Cluster:	Agriculture
Sub-Priority Area:	Climate and Environment-smart Agriculture

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Contact Details

Position	Name	Address	Office Phone	Mobile	Email
Head of Institution /Vice Chancellor	Prof. John Chrysostom Maviiri	P.O. Box 5498, Kampala	+256(0)382410611	+256(0)700171955	vcumu@umu.ac.ug, maviiri@gmail.com
Leader of Proposed Centre	Dr. Jude Ssebuwufu	P.O. Box 5498, Kampala	+256(0)382410611		jssebuwufu@umu.ac.ug, jssebuwufu@yahoo.com
Deputy Centre Leader/Principal investigator	Prof. Julius Mwine	P.O. Box 5498, Kampala	+256(0)393278711	+256(0)772648863	jumwi@umu.ac.ug/ mwinej@yahoo.com

B. Project description

The establishment of the Centre of Excellence in Agro-ecology and Livelihood Systems (ACALISE) is in line with the strategic objectives and needs of the University (cf. University Charter 2005, Strategic Plan 2010-2020), the State (cf. Strategic Plan of the Republic of Uganda – Vision 2040), the region and international agenda (Comprehensive African Agriculture Development Programme (CAADP), Agenda 21, Sustainable Development Goals(SDGs), and the African Union's Ecological Organic Agriculture Initiative (EOAI)).

Uganda Martyrs University (UMU) is establishing the Regional Centre of Excellence in Agro-ecology and Livelihood Systems to *widen and improve the production of a high level and well-motivated critical mass of Agro-ecology and livelihood systems experts to impact on prevailing agricultural, nutritional, developmental, and environmental challenges in the region*. This is in line with the overall Project Development Objective of the ACE II, namely, *to strengthen selected Eastern and Southern African higher education institutions to deliver quality post-graduate education and build collaborative research capacity in the regional priority areas.*

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This will be carried out through:

1. Training of a new breed of M.Sc. and PhDs envisioned to carry out relevant research in Agro-ecology and livelihood systems for innovation in the region and beyond
2. Integration of ecological approaches in Agriculture and related disciplines in the region to stimulate sustainable development and better livelihoods
3. Initiation of critical regional collaborations for strengthening multidisciplinary and multi-sectoral research for development.
4. Promotion of Public Private Partnerships (PPP) for innovation dissemination and impact enhancement in Agro-ecology for better livelihood strategies. ACALISE will promote action research, student-cantered learning techniques including problem solving, experiential research but also experimental methods to foster innovations in the field.
5. Creation of demonstration farms to facilitate the provision of hands-on skills and sustainable agricultural methods and technologies to the neighbouring communities involved in agriculture to enhance sustainable livelihoods and improve their standards of living and quality of life.

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C. Project beneficiaries

The project beneficiaries include: 1) Students in participating universities and their partner institutions in the region, 2) Faculty and Staff in the ACEs, 3) Employers and industries who will absorb the highly skilled personnel, 4) Communities, particularly rural women and the youth, that will benefit from world class extension services, technologies, and demonstrations, 5) Regional Institutions such as EAC and SADC that will benefit from improved capacity, and 6) Relevant agricultural and other disciplines where new knowledge and technologies will be added.

D. Institutional implementation arrangement

UMU will be in charge of the project. The central administration will assist with the fiduciary tasks. The ACE team led by the Center Leader and deputized by the Principal Investigator (PI) will provide leadership and management. The University is responsible for the implementation of environmental and social management plan under the supervision of the National Review Committee, IUCEA, and World Bank.

E. Project Environmental Category, screening, and management

The ACALISE Project could be categorized as B, namely, the proposed project is expected to have little or no potential adverse environmental and social impacts. This is due to the fact that:

i. UMU, the host of ACALISE, by policy may only involve herself in environmentally friendly and sustainable activities as per both the University Charter and the University's Strategic Plan:

   a. The fifth fundamental objective of UMU as stipulated by the Charter is "to engage the community in sustainable development activities" (University Charter 2005, Cap II, 10f).

   b. Environmental protection and mainstreaming of Education for Sustainable Development (EDS) is a key core value of the University: "*The University commits itself to sound environmental management practices. It recognizes itself to be part of the whole biotic community and wishes to live in harmony with its environment. The university is committed to the process of mainstreaming Education for Sustainable Development*." (Strategic Plan 2010-2020: Cap 1.6C).

ii. By design Agro-ecology is an environment-friendly technology that requires adoption of environment and climate smart methods, technologies, and activities, in its implementation.

iii. Adverse environmental and social impacts are an ethical issue; ethics and integrity are part and parcel of all academic programmes and activities of UMU. The modules of Ethics of the Environment and Sustainable Development, Bio and Environmental Ethics, Development Ethics, Ethics and Social Accountability, among others, are in place to guide development activities and projects to enhance environmental integrity or mitigation of negative effects and promotion of sustainable socio-economic development of communities.

iv. Limited modifications of existing structures and minor constructions will be undertaken. Moreover, only land already owned by the University and her partners will be used, guided by relevant national, local, and University policies. Back to Contents

v.

F. Institutional Capacity Building on adverse environmental and social management impacts

UMU propagates the protection of the environment and enhancement of sustainable development; therefore, there is a need for continuous capacity building in ESMP. Environmental consciousness is in the DNA of staff.

G. Institutional and legal framework

Though the project is likely to generate minimum negative environmental impacts, we are cognizant of the relevant existing laws and regulations of Uganda. The National Environment Act 1998, establishes the National Environment Management Authority (NEMA) as the overall body, charged with the management of environmental issues and provides for sustainable management of the environment. It provides for environmental monitoring and impact assessment; environmental audit; environmental restoration orders and improvement notices; environmental easements; environmental performance bonds; licensing and standard setting; use of economic and social incentives; civil and penal sanctions, Policy Committee on Environment; the National Environment Fund and a collaborative framework with lead agencies and other stakeholders in environmental management. ACALISE has partnered with NEMA and other relevant environmental institutions and recognizes the need for socio-economic development to be undertaken in such a manner that avoids environmental degradation. In particular, the following instruments are deemed relevant and will guide the operations of ACALISE:

- *The National Environment (audit) regulations 2009*: These Regulations prohibit the carrying out of environment audits without due certification and registration, except if the person is an environmental inspector. It also provides for the preparation of environmental audit reports; require owners or operators of facilities to establish environmental management systems; provide for enforcement environmental audits; and encourage voluntary environmental audits and compliance agreements to aid facility compliance to environmental requirements.
- *The National Environment (minimum standards for management of soil quality) regulations*: establish and prescribe minimum soil quality standards to maintain, restore and enhance the inherent productivity of the soil in the long term. They provide the minimum standards for the management of the quality of soil for specified agricultural practices; establish criteria and procedures for the measurement and determination of soil quality and measures and guidelines for soil management.
- *The National Environment (minimum standards for discharge of effluents into water or land) regulations*: These Regulations prohibit discharge of effluent or waste on land or into the aquatic environment contrary to established standards and without a waste discharge permit. They provide for the general obligation to mitigate pollution.
- *The National Environment (Access to genetic resources and the benefits sharing regulations 2005*: apply to access to genetic resources or parts of genetic resources, whether naturally occurring or naturalised, including genetic resources bred for or intended for commercial purposes within Uganda or for export, whether in in-situ conditions or ex-situ conditions.

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- *The National Environment (wetlands, riverbanks and lakeshores management) regulations*: provide for the protection of wetlands; their conservation and wise use; inventorying of wetlands; and wetland use permits for regulated activities. They also

provide for protection of riverbanks and lakeshores zones (100-200 metres from the low water mark for lakes and 30-100meters from the highest water mark for rivers).

- *The National Environment (Noise standards and control) regulations*: ensure the maintenance of a healthy environment for all people in Uganda, the tranquillity of their surroundings and their psychological wellbeing by regulating noise levels. Prescribe acceptable noise levels for different facilities and activities; provide for the control and mitigation measures for noise.
- *The National Environmental Forestry and Tree Planting Act*: promote conservation, sustainable management and development of forests for the benefit of the people of Uganda. The Act establishes forest reserves and provides for collaborative forest management and for the Environmental Impact Assessment process for developments intended in forest reserves. It also establishes a tree fund and licenses.
- *The National Environment Waste Management regulation, 1998*: applies to movement, disposal and storage of hazardous and non-hazardous waste. The Regulations also provide for conditional licensing of transportation of waste from one district to another. It prohibits the disposal of untreated waste into the environment.
- *The National Environment Impact Assessment Regulations, 1998*: deals with the environmental impact assessment (EIA) process, EIA review processes (general public comments and public hearings, and the decision of the Executive Director of the National Environment Management Authority in respect of the grant, rejection or cancellation of an EIA certificate).
- *The National Environment Water, Act*: provides for the use, protection and management of water use and supply. Important provision in this act include water rights; planning for water use; control on the use of water resources; water easements; and control over water works and water use.
- *The Environment Mining Act*: vests the ownership and control of all minerals in Uganda and provides for the acquisition of mineral rights and other related rights. It also provides for environmental protection standards, environmental restoration plans and environmental performance bonds in accordance with the Environment Act.
- *The Environment Ozone Depletion and Substances Products Regulations*: regulates production, trade and use of controlled substances and products; provides for a system of data collection to facilitate compliance with relevant reporting requirements under the Montreal Protocol on Substances that deplete the ozone layer; promotes the use of ozone-friendly substances, products, equipment and technology; and ensure the elimination of substances and products that deplete the ozone layer. These regulations also provide for controlled products, controlled substances and prohibition dates; application for licenses to import controlled substances and export them; declaration by the end user of controlled substances or products; and the need for records to be maintained for controlled substances.
- *The National Environment Hilly and Mountainous Areas Regulations*: facilitates sustainable utilization and conservation of resources in mountainous and hilly area. They promote the use of soil conservation and restrict the use of these areas (including cattle grazing), afforestation and reforestation, and prevent the introduction of alien or exotic species.

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In addition to the aforementioned, ACALISE recognizes the existence of by-laws and ordinances of the local government(s), the University Charter and the University Strategic Plan 2010-20, and the relevant World Bank's Safeguard Policies – OP 4.01 (Environmental

Screening), OP 4.04 (Natural Habitats), OP 4.09 (Pest Management) and other multilateral agreements, bio-diversity protocols, pesticides and hazardous chemicals protocols, cultural and natural heritage convention:

- Uganda is a signatory of several international and regional agreements and conventions, which are relevant to conservation of the environment among which t*he Convention on Biological Diversity (CBD),* the associated Cartagena Protocol on bio piracy, and the African Forest Law Enforcement and Governance Agreement (AFLEG), are associated regulatory frameworks that have domesticated application through the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (1994).
- The University is cognizant of the various pesticides and hazardous chemicals protocols including the Basel Convention on the Control of Trans boundary Movement of Hazardous Waste and its Disposal, 1989, Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants regulating the use of pesticides and hazardous chemicals.
- Though this action will not be implemented in cultural sites and areas of universal value, conservation of natural and cultural heritage is key principle, which will be observed by all members of the consortium.

In the same spirit strong collaborations have been established with the relevant line ministries and departments namely, Ministry of Agriculture Animal Industry and Fisheries, Ministry of Water and Environment, Ministry of Education and Ministry of trade and Industry, and the Office of the Prime Minister.

H. Public consultation process

This is an ongoing activity and included pre-project consultations and consultations during the implementation of the project. Relevant ACALISE stakeholders include students and staff of UMU, farmers, academicians, NGOs (e.g. NOGAMU, Environmental Alert) public and private institutions, were consulted using different approaches (email, telephone, face to face, and workshops) in the identification of the environmental and social issues and potential solutions during the preparation of the pre-project stage. The last consultative meeting on environment and agriculture was held on 30 October 2015. Issues of concern included among others, pollution, use of chemicals in meat and milk, biosafety issues, gender discrimination, pests and diseases, environment and agronomic practices, climate change, and loss of biodiversity. Possible mitigation measures were suggested and noted. Series of consultations (internal and external) will still be conducted to identify the training needs, development of relevant curriculum, identification of research priorities, and best dissemination of research outputs.

I. EMP Monitoring Plan of activities

An Environmental Monitoring Plan (EMP) has been elaborated under this section for purposes of mitigating potential environmental and social impacts including pollution (air, water and soil), increase pest and disease incidence, biodiversity loss, accidents, increase carbon footprint, biosafety issues, and noise. Back to Contents

Table 1: Summary of the methods to monitor and key activities to mitigate the identified adverse impacts

Key Activity	Potential Impacts	Mitigation measures	Monitoring method	Frequency of monitoring	Provisional Monitoring Cost in USD
Use and storage of lab equipment and chemicals	Physical injury, soil and air pollution	Use of protective gears, Proper waste disposal including incineration according to regulation	Inspection by skilled personnel	Routine	6000
Importing animal breeds	Pest and disease incidence	Pre-inspection before importation of animal breeds	Inspection by skilled personnel	On importation	4000
Construction and rehabilitation	Increase in dust and debris	Proper disposal of debris, recycling of materials, watering to reduce dust, Use of protective gears	Site inspection	Routine	3000
	Noise pollution	Working on special/located hours, no excessive idling of vehicles and equipment			
Work on the University's Eco-site	Water Pollution	Minimum disturbance for flora and fauna, use of ecological methods	Water analysis by experts, site inspection ; biodiversity audit	Routine	6000
	Proliferation of certain species				
Movement / and transportation of people	Accidents, c-footprint	Use safe mean, and minimum distance possible, competent drivers and regularly serviced vehicles	Pre-inspection of vehicle	Routine	6000
		Safety awareness campaigns			
Food processing unit (upgrading and restocking of the farm)	Pollution	Use of protected gears, Proper waste disposal including incineration according to regulation	Inspection by skilled personnel (UNBS)	Routine	5000
		Certification by UNBS			
Land preparation and clearing	Soil erosion and water pollution	Land clearing will be carried out during dry season, use of best soil and water conservation practices to minimise water pollution	Inspection	Adhoc	6000
Application of fertilisers and pesticides	Soil and Water pollution	Appropriate application of fertiliser and pesticides by skilled staff, Use of protective gears	Inspection and water testing	Routine	6000
Animal rearing	Zoonotic diseases such as brucella, FMD, avian influenza	Biosafety measures, early warning systems, Use of protective gears	Inspection	Routine	3000

Crisis and Emergency Responses

UMU has in place mechanisms to handle crisis and emergency issues. The purpose of this emergency response mechanism is primarily to safeguard lives and secondarily to reduce property damage of stakeholders. An Emergency, Security, and Crisis Management Committee (ESCMC) headed by the Director Human Resources is charged with the responsibility to rapidly respond to any emergency (cf. University Statutes, X, 1.C). ACALISE will have a Technical Emergency Committee which will liaise with the ESCMC to respond to any emergency or crisis.

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Part II: EMP Checklist for Activities

S/N	Centre Name	ESMP required?	Issues	Mitigation Measures
	Country: Uganda Centre Name: African Centre of Excellence in Agro-ecology and Livelihood Systems	Yes	New construction Excavation impacts and soil erosion Increase sediment loads in receiving waters Site specific vehicular traffic Increase in dust and noise from demolition and/or construction Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.

				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Not Apply	Handling / management of medical waste Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste On site or √off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: i. Clinical waste: yellow bags and containers ii. Sharps – Special puncture resistant containers/boxes iii. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		Yes **Yes**	Building rehabilitation Site specific vehicular traffic Increase in dust and noise from demolition and/or construction Construction waste New construction Excavation impacts and soil erosion Increase sediment loads in receiving waters Site specific vehicular traffic Increase in dust and noise from demolition and/or construction Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites (g) As much as feasible debris and other waste will be re-used or recycled.
		Yes	Building rehabilitation Site specific vehicular traffic Increase in dust and noise from demolition and/or construction	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible

			Construction waste	Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Construction waste will be collected and disposed properly by licensed collectors (c) The records of waste disposal will be maintained as proof for proper management as designed.
		Yes	6. Vegetation - Vegetation clearing resulting in loss of habitat, species diversity and population levels	(a) No siting and excavation in sensitive habitats (b) Careful planning and selection of sites (c) As much as possible preserve, restore, and enhance valuable habitats and species diversity

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Annex A: Public consultations

Country – Centre of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Republic of Uganda ACALISE	30th October, 2015	NARO, NOGAMU, KULIKA, PELUM, CARITAS, Hoima organic, Palisa farmers association, Mubende farmers; group, Uganda Catholic management and training institute, Agro-ecology master students, PhD student	Environmental degradation, pollution by agro-chemicals use of chemical in food, agronomic practices, biosafety, post-harvest interval, introduction of Genetically Modified Organisms (GMO)	Sensitization on environmental friendly practices Promotion of ecological organic agriculture practices
	30th October, 2015	UMU students	Pollution due to agro-chemicals, biosafety, post-harvest intervals, food security, food safety, curriculum review issues,	Sensitization on environmental friendly practices and biosafety, development and review of curricula
	December 2014	District officials and local communities	Control of pesticides, soil fertility management, water conservation, post-harvest handling; deforestation *,confirm income	Reforestation, irrigation, agroforestry, Field hygiene, use of organic pesticides, ecological organic agriculture practices
	11th January 2016	UMU management	Emission due to the energy supply/ (diesel generator)	Environmental friendly type of energy (solar)
	11th January 2016	Wildlife club of Uganda,	Contamination of ground water, emission of pollutants and noxious gases. Bo-diversity degradation	Sensitization on environmental friendly practices

* UMU Agro-ecology in practice evaluation consultative report

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Pharm-Biotechnology and Traditional Medicine Center (PHARMBIOTRAC)

Africa Centers of Excellence Project

Environment and Social Management Plan

15th January 2016

Mbarara University of Science and Technology

PHARMBIOTRAC Public consultation workshop participants, 13th January 2016 at MUST

Africa Centers of Excellence Project

Environment and Social Management Plan

- ***Part I:*** *constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented if needed.*

- ***Part II:*** *includes the environmental and social screening in a simple Yes/No format (Section A) followed by proposed mitigation measures for any given activity (Section B) and a template for a monitoring plan for activities during project construction and implementation (Section C). It retains the same format required for standard World Bank EMPs.*

PART I: Activity Description

A. PDO The Project Development Objectives (PDO)

The Project Development Objectives (PDO) for the proposed ACE II is to strengthen Eastern and Southern African higher education institutions to deliver quality post-graduate education and build collaborative research capacity in Health.

A1. Project Beneficiaries

1. The IDA credit beneficiaries are:

(a) Students in participating universities and their partner institutions across Eastern and Southern Africa who will benefit from high quality education and training in high growth sectors;

(b) Employers and targeted industries who will have easy access to high quality/skilled personnel, results of applied research, and scientific knowledge for productivity improvement; as well as knowledge partners (including companies, governmental or non-governmental organizations) who will use research produced by the ACEs;

(c) Faculty and staff in the ACEs who will benefit from improved teaching and research conditions and professional development opportunities;

(d) Regional institutions such as EAC and SADC will benefit from improved capacity of the ACEs; and

(e) Faculty and students in STEM and other priority-sector disciplinary areas who will benefit from fellowships/scholarships, exchange visits, and other knowledge-sharing activities across the ACEs organized by the ACE II Regional Facilitation Unit.

A2. Regional Priority Areas for ACEs:

Cluster	Priority Area
Health	Pharm-Bio technology (drug discovery, science-driven traditional medicine & development)

A3. Proposal development and Selection Process

The ACEs financed under the ACE II project has being selected through an open, objective, transparent, and merit-based competitive process. The Call for Proposals was issued on July 31, 2015 and a total of 109 proposals were submitted by the nine participating countries, out of which 92 were deemed eligible[1] by IUCEA. The eligible proposals which covered eight countries[2] were evaluated using a set of clearly defined criteria[3] by an Independent Evaluation Committee (IEC) consisting of over 60 African and international subject-matter experts. The technical evaluation where each proposal was evaluated by three experts produced a shortlist of 40 proposals which then moved into the second phase of the evaluation – onsite leadership evaluation. During the onsite evaluation, members of the IEC visited each of the 40 proposed ACEs and submitted their results to IUCEA. Reviewing the compiled scores from the technical and onsite evaluations, and considering geographical distribution and balance among priority areas, the RSC recommended the conditional selection of 23 ACEs. [***These conditionally selected ACEs are undergoing FM, procurement and safeguards review, and will be confirmed by the WB Board***]. The 23 conditionally selected ACEs were selected to ensure balance across countries, priority areas and importance of the proposal to the region's development.

The ACEs will have the autonomy to implement their own proposals, with the support from their host universities and governments as well as the RFU. For assuring the achievement of targeted results, the ACE II project will employ a performance-based financing mechanism to disburse funding from their respective Ministry of Finance (MoF) to each selected ACE against a set of agreed Disbursement Linked Indicators. To ensure regional collaboration for greater impact, the project will provide a mix of funding requirements and incentives to promote regional mobility of students and faculty, and partnerships with regional and international institutions as well as with the private sector. Each ACE will sign a performance and funding contract with its government (i.e., the Ministry of Education) which will be further developed during appraisal.

[1] Only those proposals submitted by the governments of the participating countries, with existing PhD programs, and in the defined regional priority areas are eligible for consideration. The eligibility screen was done by the Inter-University Council for East Africa (IUCEA) which is the designated RFU for the ACE II project.

[2] All the proposals submitted from MZ were deemed ineligible because they came from institutions that did not offer PhD programs, which is an eligible requirement.

[3] These criteria, together with proposal eligibility and evaluation process, are captured in the "Protocol for Proposal Assessment" that was approved by the RSC as a guideline for the Independent Evaluation Committee.

B. Institutional and Implementation Arrangements

B1. Hosting Institution:

About MUST

Mbarara University of Science and Technology (MUST), is the second oldest public University in Uganda, and was established by an Act of Parliament of the Republic of Uganda as body corporate with perpetual succession and a common seal and with power to sue and to be sued in it's corporate name. It aims at promoting relevant and quality education in science and technology for community transformation. MUST promotes transfer of scientific knowledge and innovations to the community for sustainable society transformation. The University delivers both undergraduate and graduate programmes. The Vision of MUST is "to be a centre of academic and professional excellence in Science and Technology" and the mission is "to provide quality and relevant education at national and international level with particular emphasis on Science and Technology and its application to community development". The main products of the university are the high quality graduates in the fields of medicine, science and technology for community transformation. The products of MUST continue to transfer scientific knowledge and innovations to the community for sustainable society transformation.

Mbarara University of Science and Technology (MUST) has vibrate graduate training programmes. Graduate programmes at MUST are tailored towards imparting practical knowledge, skills and competences through its strong faculties and institutes. These graduate programmes attract both national and international students in substantial numbers and are all aimed at the university playing important role in contributing to the well-being of humanity as well as to the national and regional socio-economic development and transformation of society. Over the years, MUST has won acclaimed national and international recognition for best practices in outreach and community relations, and as a Center of Excellence in Science and Technology from Association of Commonwealth Universities, European Union, Civil Society of Uganda, The East African Community, producing the best development workers and health care professionals.

MUST is a thriving residential campus and community where students live in ‘villages’. On campus are two halls of residence popularly referred to as the Gents and Ladies flats. The rest of the student population live around the University campus in private but accredited hostel facilities by the Dean of Students office in collaboration with the Mbarara District Police station. Learning and living are intimately intertwined at MUST. Extra-Curricular activities, professional student associations and clubs, performances, forums and sports and games beckon students as well as the communities around the University. The Student Government known as the Guild Government is a melting pot of young and ambitious leaders who seek for democratic mandate and offer leadership on behalf of the student population. The Students’ Guild mission is to improve the quality of student’s life at the university, both academically and socially by addressing student needs and concerns, providing financial structure for student clubs and organizations and representing the student body in a professional manner. There are also a number of well-known and established student activities, such as Kina-MUST, cultural gala, bazaar, freshmen and fresh women ball that add to the unique tradition and experience of being a student at MUST.

Project Site Location

The project will have two sites. The main project site will be located at Kimuhuro Mbarara University of Science and Technology New campus unit found on the left hand side of Mbarara-Bushenyi Highway about 7km from Mbarara Town and about 5km from the old MUST campus. Kihumuro Campus is located at S0°35'44.8" E030°36'08.2". The project offices, lecture theatres, library, pilot drug production and business incubation units will be placed on the fourth floor of the main block, block A at Kimuhuro. The site will also host the proposed project Living gene bank/herbal gardens which is planned to be in area around River Rwizi for easy water access.

The second site for project research laboratories and teaching laboratories will be established within the departments of Pharmacy, Pharmaceutical Sciences and Pharmacology at the old MUST campus which is 2km from the Mbarara Town along Mbaguta Street. The geographic location of the area are S0°.61'68.0" E030°65'57.6" and elevation; 1433 meters above sea level. The existing research and teaching laboratories will be expanded to cater for the activities of the PHARMBIOTRAC project for which the renovation works ESMP will have to be done before commencement of the civil works. This will be done according to the existing Ugandan legal frameworks such as the Constitution of Uganda, 1995, the Land Act 1998, the National Environment Act 1995, the Public Health Act, 1964, the Investment code 1991, the National Environmental (Discharge of Effluence) Regulations, 1999, the Occupational Safety and Health Act, 2006, the National Environment (Noise standards and control) Regulations, 2003, the Wetlands, River Banks and Lakeshores Management Regulations, 2000, the Water Act, 1995, the Workers Compensation Act, Cap 225 of the Laws of Uganda and other regulatory requires of Uganda as may be put in place with time.

Site climatic, soils and geology

Rainfall: Mbarara district where MUST is located receives average annual rainfall of 1200mm with two rainy seasons, February to May and the September to December. It also has two dry seasons, with temperature range of 17°C to 30°C.

Soils: The district has sandy loam, clay loam and slightly laterite loam soils.

Geology: The district is characterized by Precambrian rock of the following four types:

(i) The Buganda Toro system---age dating over 1800 million years

(ii) Wholly granitised or high to medium grade metamorphic formation

(iii) The Kararagwe—Ankole system—aged dating varies from 1300 million—1400 million years

(iv) The granitold and highly granitised rock.

Figure 1: Location of Kihumuro Campus on Google Map where PHARMBIOTRAC main offices, living Gene-Bank and pilot herbal medicines processing unit will be located

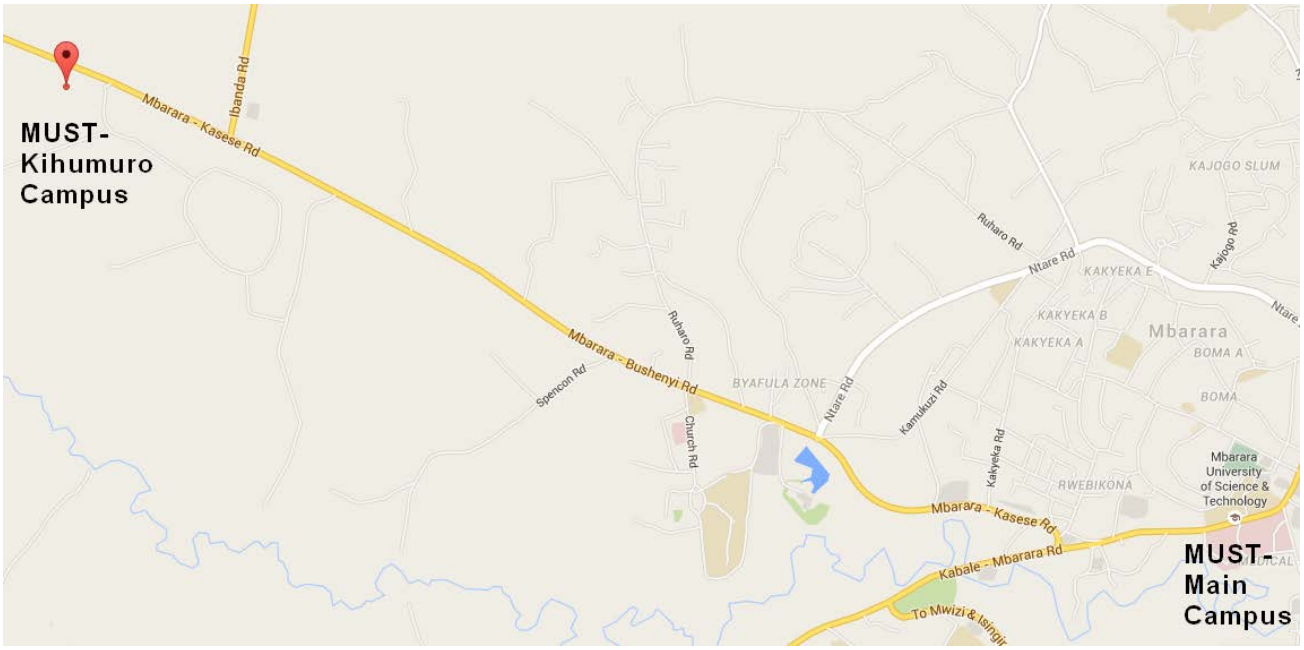

Figure 2: the location of the 2 campuses (Kihumuro and MUST main Campus)

Figure 3: Main Office Building where PHARMBIOTRAC will be located

1. **Mbarara University of Science and Technology will implement PHARMBIOTRAC an Africa Centers of Excellence project**. Further, administrative capacity, from the institutions' central administration and departments will assist with the fiduciary tasks. The PHARMBIOTRAC Team will be constituted, led by a Center leader (Dr. Casim Umba Tolo) who is a recognized educator/researcher and supported by the Deputy Centre Leader / Principal Investigator, different Centre Chairs within PHARMBIOTRAC and faculty from departments directly involved. The university will be responsible for the implementation of the environment management plan.
2. **The Uganda government will constitute a National Review Committee through the ministry or agency responsible for higher education**. It is tasked with a semi-annual review of performance and implementation support, including approvals of withdrawal applications and implementation planning (but with no day-to-day implementation or approvals). This committee will include members from Ministry of Finance, as well as relevant line ministries based on the focus area of PHARMBIOTRAC (e. g health): PHARMBIOTRAC together with the management of Mbarara University of Science and Technology will comply with the national review committee's work plan as appropriate.
3. The regional PHARMBIOTRAC Steering Committee will provide overall guidance and oversight for the project.

C. Environmental screening, assessment and management and World Bank applicable environment policies

C1. Environmental impacts are expected to be low to moderate

For PHARMBIOTRAC, the Environmental Assessment category is B (Partial Assessment), and OP/BP 4.01 (Environmental Assessment) is triggered. There will be some rehabilitation and extensions of the selected institutions. There will be no new land acquisition or new construction for PHARMBIOTRAC.

In general, the center will focus on quality enhancements of teaching and research, which primarily requires "softer items" i.e. faculty and curriculum development, and learning resources, while re-construction will be less than 10 percent of the funding. Further, ESMP has been prepared and disclosed to manage environmental and social impacts based on the submitted proposals. The civil works for refurbishment are minor and localized that they can be guided by national and local laws and procedures, and therefore no ESMP has been developed. The prepared ESMP are disclosed in country and on the World Bank infoshop. In addition, a general set of best practice guidelines for environmental and social management was disclosed in the region in the early stages of project preparation. The ESMP has undergone a public consultation, and the report is presented in Annex A.

C2. Environmental Management Approach

For PHARMBIOTRAC the attached EMP checklist has been completed and will be disclosed at the institutional website at later stage to comply with environmental and social safeguards.

D. Monitoring and reporting

D1. Monitoring and Reporting

PHARMBIOTRAC will have its own monitoring and reporting requirements for the ESMP in consultation with relevant national authorities. This will be consolidated and reported through the general reporting requirements for the national review committee and the World Bank supervisory team to monitor on a regular basis.

Contact of the officer in charge of internal quality assurance and monitoring of implementation of PHARMBIOTRAC including ESMP:

Institution	EMP monitoring arrangements (name, title, contact information)
Mbarara University of Science and Technology (MUST), ACE II Name: Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC)	Dr. Esther Atukunda Chair Quality Assurance Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC) Mbarara University of Science and Technology (MUST) Tel: +256-702-949832, +256-782-949832 Email: estheratukunda@gmail.com

Part II :	**ESMP Checklist for Activities**			
S/ N	**Center Name**	**ESMP required?**	**Issues**	**Mitigation Measures**
1	**Uganda** – Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC)	Yes [ ] No [√]	**1. New construction** • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
		Yes [ ] No [√]		Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
		Yes [ ] No [√]		Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
		Yes [ ] No [√]		Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)

		Yes [√] No [ ]	**2. Handling / management of medical waste** • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes [√] No [ ] Yes [ ] No [√]	**3. Building rehabilitation** • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste **4. New construction** • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (side walks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites

		Yes [√] No [ ]	**5. Building rehabilitation** • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
		Yes [√] No [ ]		Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. (b) The statutory 100 meters river bank buffer zone will be respected
		Yes [√] No [ ]		Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Yes [√] No [ ]	**6. Handling / management of medical waste** • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments “sharps”, and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

		Yes [ ] No [√]	**7. Hazardous or toxic materials** • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used
		Yes [√] No [ ]	**8. Handling / management of medical waste** • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste • On site or off-site disposal of medical waste	Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments “sharps”, and human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps – Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers ▪ Appropriate storage facilities for medical waste are in place; and (e) If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes [√] No [ ]	**9. Hazardous or toxic materials** • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants	Toxic / hazardous waste management (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used

		Yes [ ] No [√]	**10. Individual wastewater treatment system**	Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out

Annex A : Public consultations

Table 1: Stakeholders categories present at the public consultation

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Uganda Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC)	13th January 2016	• Local Community Leaders, • Traditional Medical Practitioners • Bio-Medical Practitioners • Politicians • Local Government leaders • Religious Leaders • National Environment Management Authority • Business Community • District Health Officer • National Agricultural Research Organization Officer • Project Partners • University Leadership • Academician • National Water and Sewerage Corporation	Table 2 in Annex A	Table 2 in Annex A

Table 2: Issues that arose during a public consultative workshop to discuss the EMP of ACE II Project "Pharm-Biotechnology and Traditional Medicine Centre (PHARMBIOTRAC)" held on 13th January 2016 at MUST

Name	Environmental issues raised	Suggestions for mitigation	Social impact issues raised	Suggestions for mitigation
Didas Tabaro	Some plants may not be environmentally friendly	Environmental impact assessment	Failure to differentiate traditional meds from spirits	Involvement of religious and local leaders in project planning
Not Indicated	Preservation of local plant species	……	Fear to disrupt social set up of traditional healers.	Adoption of trainees in existing traditional practices
Julius Tumusiime	Environmentally hazardous packaging materials	Follow standards for packaging that are healthy	Misunderstanding Biotech as GMOs only	Regular training with simplified models to improve understanding
Adrian Mwesigye	Pollution of water and air due waste disposal	- Use professional disposal recommended by NEMA - Use of incinerators	Conflict with traditional healers who prefer to remain mysterious	- Sensitization to bring them on board - Use religious leaders in sensitization
Ephraim Tumwijukye	- Purification of rain water for consumption - Waste from plant extracts - Soil erosion	- Preferably use piped water - proper waste disposal techniques	- Introduction of invasive species - Exposure to poisonous plants - Traditional knowledge erosion - Restricted access by locals	Networking with the communities to create awareness for the project and how they will benefit from it
Dennis Amwine Kizinduka	- Extinction of some herbs - Waste management - Noise pollution due to the plant	- Domestication of some herbs on site and in communities - Procurement of appropriate tools to use	- Perceived competition from existing herbalists - Some religions are biased against traditional medicines	- Train existing herbalists to become professional and inclusive in project - More sensitization needed to reduce bias on herbal meds
Robinah Florah Nakakeeto	Waste management and disposal	Use standardized waste management techniques	Concealing information due to fear of loss of ownership	Continuous engagement of all stakeholders in project implementation
Zakariah Gombekwa	Loss of habitat due to over exploitation	Planting medicinal plants	Exposure of children to some plants that may harm them	Community education and involvement
Nuwamanya Kalanzi George	Destruction of the environment	Plant trees with medicinal properties to protect environment	Completion with traditional healers/herbalists	Traditional healers should be given incentives for sharing knowledge
Ayub Ssali	Few medicinal plants available	Introduce plants from abroad that are medicinal	Lack of political backing of the project	Involve local and national leaders in policy formulation

Name	Environmental issues raised	Suggestions for mitigation	Social impact issues raised	Suggestions for mitigation
Dennis Zami Atibuni	- Over use of some species - Over cultivation of some species - Difficulty of protecting species in the wild - Wastes	- training and sensitization of people - Domestication and cultivation - contracting farmers (out growers)	- Fear of putting TMPs out of business - Penetrating the belief system and knowledge base - Concealing of info on some traditional meds - Dosage issues	- Botanical gardens - Sensitization - Pretesting concentrates
Peace Tindyebwa	- Soil erosion and sedimentation in the river - Introduction of weed species	- Soil and water conservation measures be put in place - Screening all species	- Phobia for strange species - cultural beliefs and myths against certain species	- Training and sensitization - Improve on the branding of products
Matthias Magoola	Destruction trees/forests and endangered species	Planting herbal gardens from which harvesting can be done	Global warming due to destruction of trees	Domestication and cultivation of medicinal plants
Celestine Barigye	- Weeds - Distance from the river - Special conditions needed	- Isolating these plants strictly - Use of greenhouses	- Contamination of local plants	Isolation, use of green houses and establishment of river banks (buffer zones)
Viola Nilah Nyakato	Over utilization of natural resources	- Value addition - Stakeholder networks	- changing values of traditional healers - creating competition	Skills and knowledge imparting
Juliet Mwanga Amumpaire	Creation of imbalance due to depletion of plants	- Identify special groups to grow some species - Collaboration with environmentalists	- reduce utilization of traditional healers causing them psychological torture	Incorporation of THs in the early stages collaborating with them as the experts
Francis Ndyaguma	Living gene banks may affect surrounding plants	Background information should be acquire before any introductions	Disagreements between THs and medics during research	Meetings be organized for researchers before research activity
Elvis Muhinda	- Waste management - Pollution especially noise	- Incinerators and standard waste management means - Silencers in machinery	- Over production of some plants resulting in lack of market - Out competing THs	- Contracting farmers to produce specified amounts - Sensitivity to local herbalists and mean of coexistence.

Name	Environmental issues raised	Suggestions for mitigation	Social impact issues raised	Suggestions for mitigation
Samuel Maling	Live animals may escape causing environmental problems	All animals be restricted to animal houses (enclosure)	Means of transportation from collaborating countries/institute	Use appropriate transfer materials
Not Indicated	- Over exploitation of some species in the wild - Biohazard chemicals/material	- Conservation and propagation - Proper lab use practices	- Toxic plants	- Plant far from water source and restricted areas from humans
Maud Kamatenesi	- Habitat change - Noise from machines	- Use indigenous species only - Use sound proof walls	- Job creation - Waste materials - Religious bias against herbs	- People benefit - Proper waste disposal - Encourage religious leaders and involve them

Table 3: Key project activities itemized as per project sub-component with ESMP Issues and Planned Mitigation Measures

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
NO	5.1 Learning excellence	Benchmarking of universities and institutes	**Environmental:** Pollution **Social:** Social-cultural behavior	• Using the shortest / direct route possible in economy class. • Using vehicles with low carbon emission. • Staff will be briefed on socio cultural norms and etiquette of destination location.
		Attracting specialized faculty	**Environmental:** Pollution **Social:** Social-cultural behavior	• Using the shortest / direct route possible, • Reduce number of flights: organizing longer visiting sessions per partner • Organize meetings and teaching back to back • Using vehicles with low carbon emission. • Visiting faculty will be briefed on socio cultural norms and etiquette of Uganda in line with the Public Service Code of conduct and Ethics.
		Training MSc/PhD students and graduates	**Environmental:**	• Training facilities will be equipped with white boards and LCD projectors to provide dustless teaching environment

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
			Dust generation using blackboard and chalk **Social:** Accessibility of facilities by physically challenged persons Social-cultural behavior	• Buildings are accessible with ramps and lifts • Faculty will be briefed on socio cultural norms and etiquette of Uganda and the region.
		Improved facilities (Building rehabilitation)	**Environmental:** Site specific vehicular traffic Increase in dust and noise from demolition and/or construction Construction waste	**Air Quality** (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites **Noise** (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible **Water Quality** (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers. **Waste Management** (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
				(d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Industry collaboration	License status (company act and NEMA act) Packing materials for products	• Student hosting companies /industries legal status checked and placement space evaluated before placement • Usage of National Drug Authority standards of human and animal medical products packaging
	5.2 Research excellence, predominantly student centered applied research	Use of laboratory chemicals, reagents and animals	**Environmental:** Leakage of laboratory chemicals, reagents. Escape of laboratory animals **Social:** Changing rooms Sanitary facilities	• Practice good laboratory practices (GLP) • Accreditation of laboratory • Conduct regular trainings and drills in GLP • Equip laboratories with appropriate safety cabins and drainage system • Appropriate safety equipment's (fire extinguisher, eye wash, emergency showers, Smoke/fire detectors • Well designed and protected animal house to prevent animal from escape • Separate changing rooms and sanitary facilities provided for different genders
			Waste Management	• Incinerator in place • Special facilities for segregated waste (including soiled instruments "sharps", and human/ animal tissue or fluids) from other waste disposal: - Clinical waste: yellow bags and containers - Sharps - Special puncture resistant containers/boxes

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
				- Other waste (non-organic): black bags and containers • NB: Appropriate storage facilities for medical waste are in place
		TM research clinics established Joint TMPs and community programs Patents and licensed products Collaborative projects initiated	**Environmental:** Over-utilization of medicinal plants **Social:** Utilization of Indigenous and community knowledge and materials **Environmental/ Social:** Transfer of materials	• Domestication of medicinal plants (ex-situ conservation and usage) • Establishment of living gene bank • Establishment of tree and plant nursery and providing planting materials • Training in sustainable harvesting and post-harvest handling • Training in good herbal medicine production practices to increase effectiveness and product losses • Obtain ethical clearance / informed consent • Access and benefit sharing agreements signed before commencement of research • Sharing outcome with Knowledge Holders • Training Traditional Health Practitioners in good clinical practice, record keeping, herbal medicine cultivation and medicine making • Providing economic incentives to knowledge holders and communities • Develop and sign Memoranda of Understanding with partnering organizations • Signing of material transfer agreements provided by national guidelines e.g. Uganda National Council for Science and Technology, National Environmental Management Authority
		Establishment of living gene bank and tree nursery	Temporary biodiversity loss (bush clearance for living gene bank) Invasive species	• Planting high diverse living gene bank for ex-situ conservation large enough to build a micro biotope • Apply appropriate containment procedure (seed maturation hindrance, rooting) • Observing NEMA guidelines on protecting river bank (100m buffer zone)

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
	5.6 Regional and national academic partners		Silting of riverbanks Habitat exhaustion	• Sustainable wild crafting technologies and practices accordingly with wild crafting guidelines
		Community outreach	**Social:** Stakeholder suspicious of center operation Accessibility to research findings	• Conducting sensitizing workshops involving opinion leaders like religious leaders, political leaders, herbalist associations, business community • Conducting regular research dissemination conferences and participating in regional, national and international exhibitions • Publications (Articles, brochures, training materials, local newspapers, Radio, TV, internet, social media)
	5.3 Quality Assurance 5.4 Equity dimensions 5.5 Attracting regional students and academic staff	Recruiting / attracting high talented graduate students and staff Graduates produced	**Social:** Highly qualified candidates not accessing opportunities Employability	• Advertising calls in broad spectrum channels – national, regional and international • Fair and non-biased selection procedure, fulfilling the quotas (gender and regional representation) • Graduate with employable skill set produced • Graduate trained in entrepreneurship and self-employment • Regular tracer studies with employers to adjust training curriculum to employers needs • Provide career guidance
	5.7 Regional and national sector partners including the private sector 5.8 International academic partners	Technology transfer,	Environmental: Out dated technologies Intellectual Property	• Equipment procured in line with current good laboratory practices and current good manufacturing practices • Select equipment with good after sales and maintenance services available • Develop and sign Memoranda of Understanding with partnering organizations • Signing of technology transfer agreements provided by national guidelines e.g. Uganda National Council for Science and Technology, National Environmental Management Authority

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
			Benefit sharing Licensing	
	5.9 Management and governance	Robust, efficient and transparent governance of PHARMBIOTRAC	**Social:** Gender and equity bias	• Employment in line with university and government human resource manuals and regulations
		ICT based governance and management systems established	**Environment:** e-waste	• Procurement of new and updated e-technologies with upgrade options
	5.10 Sustainable financing	Fee charged on training of herbalists and TM practitioners, MSc. and PhD students Sourcing research grants from donors and private sector	**Social:** High costs of training and services	• Charge affordable fees • Provide value for money services • Continuous sourcing for scholarships and Research &Development funds • Provide applicable skills appropriate to the trainees
		Sale of high value TM products produced in small scale produced by the center	**Environment:** Packing materials **Social:** Affordability	• Provide environmental friendly packing options • Use of locally acquired materials and inputs • Appropriate pricing structure
		Vibrant Business and fundraising arm at the center including lobbying	**Environmental:** Pollution **Social:** Social-cultural behavior	• Using the shortest / direct route possible in economy class. • Using vehicles with low carbon emission. • Staff will be briefed on socio cultural norms and etiquette of destination location.

ESMP	Project Sub-components	Key Activities	Issues	Mitigation Measures
	5.11 Monitoring and Evaluation System	Design and implementation of strategic plan	**Environmental:** Pollution **Social:** Social-cultural behavior	• The M&E team insure that all project activities are compliant with national and international guidelines • Using vehicles and equipment with low carbon emission. • Staff will be briefed on socio cultural norms and etiquette of destination location.

Annex B: Public Consultation Workshop Participants list:

Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
Mbarara University of Science Technology,
Public Consultative Workshop on Environmental and Social Management Plan,
Date: 13th January 2016, Venue: Kihumuro, MUST

Participant Registration Form
Please fill out this form and hand to the registration desk personnel

SN	Name/ Title	Sex	Institution & Department	Telephone/Email	Signature
1	Tindyebwa Peace	F	Bishop Stuart University	0772622022 us@bsu.ac.ug.	
2	Muziira Robert	M	NARO	0772472173	
3	Dr. Nkubooka Moses	M	NARO	0772593261	
4	Gom Cekura ZB	M	Rukerarwe	0776856580	
5	Muhinda Elvis	M	L.C.I Kyfunyo	0704573373	
6	Tumwijukye E	M	Rukarare	0750439024	
7	Dr Mugyenzi G	M	FOM	0772543238	
8	Robinah F. Nakakeeto	F	Planning (MUST)	0782818811	
9	Bernard Kankwatsa	M	IMS	0752504030	
10	Angella Nakato	F	DOS	0772692674	

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Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
Mbarara University of Science Technology,
Public Consultative Workshop on Environmental and Social Management Plan,
Date: 13th January 2016, Venue: Kihumuro, MUST

Participant Registration Form

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SN	Name/ Title	Sex	Institution & Department	Telephone/Email	Signature
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4	MAGOOLA MATTHIAS	M	DE: GROUP	0756577951	
5	Maling Samuel	M	FOM-MUST	0712700226	
6	Juliet Nwanga Ammpire	F	Epicentre	0793325748	
7	Viola N Nyakato	F	NIR-MUST	0772982535	
8	Julius Tumusiime	M	MUST - Biology	0785 886136	
9	Dr. Annabella H Ejiri	F	MUST / CS	0772571444	
10	Prof Amon G. Agaba	M	FOM- MUST	0701482843 agaba@must.ac.ug	

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Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
Mbarara University of Science Technology,
Public Consultative Workshop on Environmental and Social Management Plan,
Date: 13th January 2016, Venue: Kihumuro, MUST

Participant Registration Form

Please fill out this form and hand to the registration desk personnel

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2	David Kashaija	M	MUST	dkashaija@must.ac.ug	
3	Prof C. Obua	M	MUST	0712210937	
4	Kizito Kudua	M.	MUST	0772690953	
5	NAIGAGA OLIVE	F	NWSC	0751115370	
6	Muhereza John Innocent	M	MUST	0712285193	
7	Munanukye Patrick	M	MUST	0752203593	
8	BARYANTUMA J.M	M	Mbarara MC	0772601027	
9	Dr. Casim U. Tolo	M	MUST	0772837055	
10	Eng. Anke Weisheit	F	Excel Hort Consult	aweisheit@excelhort.de 0772888096	

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Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
Mbarara University of Science Technology,
Public Consultative Workshop on Environmental and Social Management Plan,
Date: 13th January 2016, Venue: Kihumuro, MUST

Participant Registration Form

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4	Tabaro Didas	M	Mbarara District local govt	tabarodidas@yahoo.com	
5	[illegible]	M	"	0772450723 [illegible]@gmail.com 0772438908	
6	Maud Kamatenesi	F	Bishop Stuart Univ.	VC@bsu.ac.ug	
7	Nuwamanya George	M	MBARARA CITY Authority	0774436240	
8	Musinguzi Jeconiah	M	Mbarara District local Govt	0772483352 jeconiahmusinguzi@gmail.com	
9					
10					

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Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
Mbarara University of Science Technology,
Public Consultative Workshop on Environmental and Social Management Plan,
Date: 13th January 2016, Venue: Kihumuro, MUST

Participant Registration Form

Please fill out this form and hand to the registration desk personnel

SN	Name/ Title	Sex	Institution & Department	Telephone/Email	Signature
1	Muhanguzi Fred	Male	MAZO	0772-894768/0702	
2	NUWAMPIRE EBOO	Male	B S U	0782292815	
3	BIRAKWATE JAMES	Male	B S U	0773715648	
4					

Pharm-Bio Technology and Traditional Medicine Centre (PHARMTRAC),
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SN	Name/ Title	Sex	Institution & Department	Telephone/Email	Signature
1	SSALI Ayub	M.	LC I	0753261495	
2	Theodora Nandu	F	MUST	0772821335	
3	NDYAGUMA Francis	M	MUST	0772685887	
4					

C. Annex C: Minutes of Public Consultation Workshop

MINUTES OF THE PUBLIC CONSULTATIVE WORKSHOP TO DISCUSS EMP OF ACE II PROJECT: PHARM-BIOTECHNOLOGY AND TRADITIONAL MEDICINE CENTER (PHARMBIOTRAC) HELD ON 13TH JANUARY 2016 AT KIHUMURO MAIN CAMPUS

Agenda

1. Agenda
2. Communication from the chair (Vice Chancellor)
3. Communication from other participants (VC, Bishop Stuart University)
4. Participants introduction
5. Presentation of the PHARMATRAC to the participants
6. General discussion
7. Group work parallel sessions
8. Plenary session and Remarks from NEMA Officer
9. Remarks on Traditional Medicine
10. Closing remarks

Min. 01/2016: prayer

The opening prayer was led Dennis Atibuni Zami, Lay chaplain from Mbarara Catholic Archdiocese

Min. 02/2016: Communication/remarks from the chair

The Vice Chancellor Prof. Celestino Obua welcomed the invited participants to the workshop.

He informed members that MUST is strong in Science teacher education and Medical education. He gave the background the ACEs highlighting the first phase in West Africa which started in 2013 with 19 centers running and now the phase for Eastern and Southern Africa for 23 centers have been conditionally selected. He informed the participants while PHARMBIOTRAC MUST has been conditionally selected, there are still steps to be accomplished before final acceptance and one of the steps is the need to provide environmental and social management plan. He informed the participant that MUST is a rural based university and its activities have direct impact of the rural masses. PHARMBIOTRAC activities will therefore greatly impact the rural masses and hence to need for a clear impact management plan. He called upon the participants to raise all the possible environmental and social issues related to project so that the project team and the participants can put in place an effective response and management plan.

Min. 03/2016 Remarks from VC Bishop Stuart University (BSU)

Prof. Maud Kamatensi, Vice Chancellor Bishop Stuart University promised that they will work hand in hand together with her institution and Makerere to support the project. There is need to expand networking so as to improve on traditional medicine.

She promised that BSU will give a big support as soon as the project starts. There is need for MoU with must so emphasize traditional medicine.

Min. 04/2016 The project Centre leader Dr. Casim Umba Tolo gave more light on the project background and highlighted the workshop purpose and objectives.

Min. 05/2016 The project Deputy Centre Leader/Principal Investigator Dr. Patrick, Engeu Ogwang then made presentation on the PHARMATRAC project highlighting the following;

The project objectives

- To strengthen the existing capacity to train highly skilled and specialized professionals and academicians.
- To strengthen the existing national and regional Universities.
- To develop models and framework for strengthening University industry linkage.
- To advance traditional medicine in communities through students and community/traditional medicine practitioners.

The project Activities

- Establishment of world class learning and research facilities at the center;
- Attracting high quality academicians and experts from the region to the center;
- Attracting highly talented young students from the region;
- Engaging high quality academicians and industry experts from the USA, Europe, South Africa, India and the region visiting lecturers;
- Establishing high standard and adequately equipped laboratories at the center, herbaria and living gene banks at the center and in partner universities;
- Engaging sector partners (Industry and research institutions) in joint research and product development to add value to traditional medicine and pharm-biotechnology products to feed national, regional and international markets and
- Training and involving the communities in improving and sustainability utilizing medicinal biodiversity to improve quality of life and productivity of the rural populations in the region.

The expected project outputs and Impacts

- Society benefits: Trained TM practitioners leading improved health
- Governments: Facilitate the integration of TM in national health systems
- Industries: Skilled man power in TM and biopharmaceutical research and products for commercialisation, patents etc.
- Academia and research institutions: Building capacity of staff (MSc and PhD)

Min. 06/2016 The project Chair of Innovations and Business Eng. Anke Weisheit then gave the presentation of the examples of ESMP and guidelines for the workshop participants.

Min. 04/2016 General discussion
Issues of concern from the discussion were;

- Site specific concerns
- Economic incentives
- Minimize habitant loss where we are getting those plants
- Intellectual property rights
- Strategic plan management and engagement of more stakeholders.

Min 05/2016: Plenary Session (Group work 01)
Presenter: Dr. Moses Dhikusookatefula, NARO livestock scientist -

Topic: Environmental and Social Management Issues
Discuss the Environmental and social management plan of PHARMBIOTRAC with focus on environmental issues**.**

- Network and linkages (local, national and international for success of the project)
- What issues related to joint research would we want to be considered?
- Network: Local, National, international networks

1. Issues related to joint research**.** Since this is going to be a center of collecting plants of all kinds.
- Care is to be taken to avoid plants from becoming a nuisance to the community
- Invasive species whose seeds may end up in the farm, the river, and go to other areas.

2. Living Gene bank establishment and use location of the gene bank should be properly identified for confinement source of materials:

3. Develop a screening process to avoid importing dangerous plants that are useful but have a risk of becoming a public nuisance.

4. Precautions: Need for guidance on the type and characteristics of plants to be planted in this area, through literature search.

Social impact of these plants and mitigation

- Increasing access to these herbs.
- By involving herbalists into the project we will reduce the fear that MUST is a competitor.
- Through Sensitization: To ensure that they can open up and help them disclose what they know to help them avoid fear of cultural taboos.
- Encourage researchers to engage with practicing herbalists to help them to open up and share this knowledge socially.
- There is no displacement of people from their land.
- The local traditional healers will be economic empowered through engagements, trainings and demonstrations on how they can benefit from this project.
- Build consumer confidence by helping them have well packaged plant drugs/herbs

Kind of plants to use

- We plan to use local plant species from within Uganda since we a have a rich bioflora to ensure we conserve all plant species.
- If it is necessary to research on plant materials from outside the country, then the necessary measures required for authorization shall be adhered to.
- Mitigation: involve local herbalists to plant them and maintain them in circulation, encourage them to earn a living
- Arrange for importing these species and try to propagate them here-may be in a green house.

Environmental issues

- Need for soil and water conservation guidelines from NEMA –gene back to be located at least 100m from the river banks.
- Do greenhouse farming , since this weather here may not be friendly
- Compartmentalize the gene bank for plants that may require isolation and group them according to their characteristics

If this gene bank is put here how will we be sure that this gene bank does not affect the local communities?

Mitigations

- Follows strict SOPs, drawn by research assistants, to avoid losing direction.

Identify Joint research activities to be done

- Conduct research on the active ingredients in these herbs.
- Mitigate extinction of specific plants for sustainable management or harvesting of the plants ie for those that we take roots: so trainings on effective propagation as opposed to genetic engendering.
- Research on the appropriate dosages, harvesting methods, preservation methods , handling
- Collaborative research with traditional healers, agriculturalists, pharmacists to label the products with the right ingredients
- Standardizing of the dose rates and ensure the herbal products on market have the right ingredients & are prepared and packaged properly

In case of using animals

- Put in place SOPs to manage containing the animals to limit them from escaping

Network and linkages

- There is need to network with Institutes (Uganda chemotherapeutic industries)
- Research organizations –local, international in West Africa
- Learning from other Centres of excellence
- Bring local authorities on board, Public Private partnerships
- Sign MOUs with privates like Proff, Sali renowned herbalists.
- Create websites , and join social networks

Group work parallel session 2
Topic: Environmental and Social Management issues presented by Dr. Ogwang Engua Patrick
(b). issues related to sustainability and utilization of herbal medicine and biodiversity.

- Establish our own gardens
- Competition from herbalists hence share information to reduce lack of knowledge.

- Traditional healers have now accepted and have come on board to share the knowledge on herbs.
- More trainings are required to speak one language in herbs
- Churches around still doubt the traditional herbs.
- Church leaders to be brought to board for sensitization.
- To always combine several herbs for treatment with proper dosages.

(c). Network and linkages (local, national and international for success of the Project.

- Transfer of materials to other laboratories
- Link to health professionals, religious leaders to traditional herbalists.
- Create good relationship with political leaders, for example LC's etc.
- Making MoU for mediating people on networks to come out with one common goal.
- Create websites, and join different social networks.
- Sign MoU with private traditional herbalists like TProf. Saali.

Min. 06/2016 Remarks from NEMA Officer

He emphasized on articulation of information so as to save money for the University on various action plans. That the university should coordinate well with locals/community.

Key issues from NEMA Officer

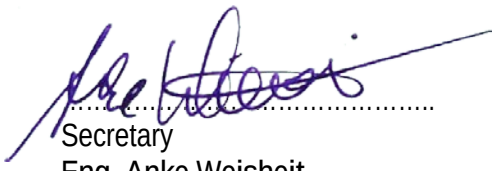
1. Site specific environmental and social concerns.
2. Economic incentives for herbalists.
3. Minimize habitant loss where we get medicinal plants.
4. Intellectual property rights e.g protection of human rights on environment or custodian of the knowledge.
5. Strategies of Habitat retention and post development restoration – maintenance and sustainability.
6. Manage habitant in psychological and ecological manner.
7. Systematic evaluation of the factor (species richness e.g to know their species.
8. Reality.
9. Availability of the species.
10. Addressing appropriate natural habitat.
11. Well-articulated Monitoring and evaluation &E Plan feedback for conservation outcome and give direction for mitigation.
12. Complimenting biodiversity improvement action of government.
13. 100m either site river banks should be untouched Opportunity to plant medicinal plant in Buffer zones.

Min. 07/2016 General discussion on Traditional Medicine by participants:

Traditional Medicine	Mitigation
Overutilization of Medicinal plants	Domestication of Medicinal plants and establishing living gene banks Provide seedlings and planting materials for communities
Farmer over-cultivating medicinal plants and displacing food crops	Contract Farming, only a portion of the farm can be used for Medicinal plant cultivation
Bad Traditional Medicine practice	Training in diagnostic and treatments
Fear of GMO introduction to community	Stakeholders informed no GMO will be introduced, • Conduct open door weeks • stakeholder information session
Packing materials	Describe standards of disposable
Issues of sustainability	Mitigation
Knowledge Utilization	Benefit sharing agreements Capacity building in record keeping
Who is owning the medicine Property of medicine	Be acknowledge for drug – property rights and benefit sharing rights
Dosage not known	Research can advise traditional healers in dosage and safety
Competition with traditional Medicine practitioners	Empowering Traditional medicine
Bringing on board religious leaders	Informing and engaging Traditional leaders to understand that this work is in line with cultural and religious norms
Negative attitude of allopathic medicine	Cooperation with medical practitioners
Confusion of Traditional Medicine	Clear Terminology used - using plants minerals and other tangible items
Changing status and role of TM practitioners	Is in line with the government initiative to build capacity
Industrialists	Benefit sharing agreements with industry
Networks	Mitigation
Transfer of Materials from various location and plants	Material Transfer agreements
Religious leaders / Medical Professionals	Bring together and de-mystify traditional medicine
Changing role / competing with NCSRL	Partnership
Political leaders	Policy formulation
Collaboration Conflicting Interest	MoU formulation on specific agreed terms

Min. 08/2016 Closing remarks

The Vice Chancellor, Mbarara University of Science and Technology thanked every stakeholder for active participation in the workshop and thereafter closed the workshop.



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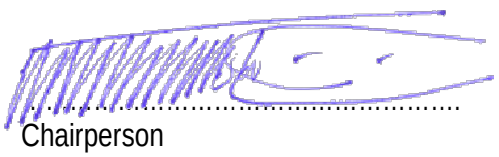
Secretary

Eng. Anke Weisheit

Date: 13th January 2016



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Chairperson

Dr. Casim Tolo Casim

Date: 13th January 2016

Pharm-Biotechnology and Traditional Medicine Center (PHARMBIOTRAC)

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Copperbelt University - Zambia
Africa Centers of Excellence Project
Environment and Social Management Plan

Part I: "Site Passport" that describes the World Bank/Copperbelt University African Centre of Excellence in Sustainable Mining Project

The Copperbelt University Centre of excellence in sustainable mining aims to solve crosscutting issues arising from the entire mineral value chain. Thus various impacts arising from mining activities such as water, land and air pollution, waste generation, disruption of ecosystems, displacement of local communities and destruction of heritage sites are minimized. Further, promotion of social welfare, health and safety of miners and the rights of local communities will be enhanced. The intention is to ensure sustainable mining, taking cognisance of the needs and welfare of local communities, strong corporate social responsibility culture, and engaging local businesses, and reclamation and restoration of mined environments and strengthening activities that reduce carbon footprint thereby minimizing global warming and climate change. This will be achieved through education, training, research, industry partnerships and increased national and regional collaboration.

1.1 Physical location

The Copperbelt University (CBU) is a public university located in Kitwe, Zambia. The Copperbelt University has a main campus located in along Jambo Drive in the Riverside area. The Copperbelt University also has a second campus that is 65 km away from Ndola International Airport, Zambia. This campus is the location of the Copperbelt University Medical School.

The Copperbelt University is located in the Copperbelt province, a region that is the epicenter of the Zambian mining industry.

1.2 Institutional and Legislative Aspects

The Copperbelt University is a public university established through an Act of Parliament No. 19 of 1987. Before 1987, the University was a campus (consisting of two Schools: School of Business and School of Industrial Studies) as part of the federal system of the University of Zambia (UNZA). The campus was known as The University of Zambia at Ndola (UNZANDO) until 1st December 1987. Subsequently Zambia Institute of Technology (ZIT) was incorporated in the Copperbelt University to form the School of Technology. The University has grown from two faculties at inception to the current ten faculties with a combined enrolment of over 9000 students.

In terms of the project environmental management plans for the CBU ACE SM, the Zambian Environmental policy prescribes the preventive approach to environmental management and emphasizes the need to promote socio-economic development within the context of acceptable environmental standards and safeguards. This Project's environmental impact assessment (EIA) will be undertaken in accordance with the legal framework on environmental management enshrined in the Environmental Management Act of 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations S.I.No. 28 of 1997. Section 3 (1) of the EIA Regulations

states that, "a developer shall not implement a project for which a project brief or environmental impact statement is required under these Regulations, unless the project brief or the environmental impact statement has been concluded in accordance with these regulations and the Zambia Environmental Management Agency has issued a decision letter."

EIAs are guided by an Act of parliament; currently the Environmental Management Act (EMA) No.12 of 2011 being the main principle legislative instrument. This Act establishes the Zambia Environmental Management Agency (ZEMA) and empowers it to provide for the conduct of strategic environmental assessments of proposed polices, plans and programmes likely to have an impact on environmental management. Other relevant legislation pertinent to the project include: Waste Management Regulations (Licensing of Transporters of Wastes and Waste Disposal Sites). S.I. No. 71 of 1993); Water Pollution Control (Effluent and Waste Water) Regulations (S.I. No. 72 of 1993); Statutory Instrument No. 20 of 1994 - Pesticides and Toxic Substance Regulations; Air Pollution Control (Licensing and Emissions Standards) Regulations (S.I. No. 141 of 1996); Ozone Depletion Substances Regulations 2000; Hazardous Waste Management Regulations (S.I. No. 125 of 2001); the National Council for Construction (NCC) Act of 2003; Zambia Institute of Architects Act (cap 442); Engineering Institution of Zambia Act of 2010; Quantity Surveyors Act (cap 438); the Occupational Health and Safety Act of 2010 and Public Health Act (cap 295).

The Copperbelt University, together with the Contractor and Site Engineer will be responsible for the overall implementation of the environmental/social management and monitoring plans and ensure their compliance with the Zambian and World Bank environmental and social safeguards.

1.3 Project Description

a) Need for Centre of Excellence in Sustainable Mining in the Region

In Zambia the mining sector contributes about 9-10 % of the country's Gross Domestic Product (GDP). This major economic contribution of the mining sector however, is associated with the region's serious environmental impacts and contributes to risks associated with climate change. Natural resource extractive industries associated with the Copperbelt, i.e., mining and forest resources, significantly impact on environment, climate change, biodiversity, and other cross-cutting issues associated with sustainable development. This project aims to consolidate knowledge and skills available in this region to foster impactful research and adoption of best practices in Sustainable Mining.

The CBU ACESM is expected to achieve numerous results and outcomes that include the following, amongst others:

i. Increased number of researchers and jointly supervised students at MSc and Doctoral and post-doctoral level actively pursuing research on sustainable mining and allied issues.
ii. Improved profile of teaching and research programmes in terms of quality and relevance in addressing key sustainable development in the region.
iii. Improved relevance and application of research and its results to solving key societal problems associated with mining and associated environments.

iv. Establishment and consolidation of collaborations and linkages between CBU and other institutions in the Africa region leading to enhanced mobility for staff and students.
v. Increased output in multi-disciplinary research outputs including publications, citation indices, and patents registered.

b) Description of the public consultation process.

The central policy of the EIA (EMA, No.12 of 2011) is to provide an opportunity for public participation in the project design and implementation throughout the entire EIA process. In this proposed project, stakeholders who included individuals from the Copperbelt University community, some representatives of key partners, student groups (both undergraduate and post graduate) of the Copperbelt University were consulted. Issues of focus in the consultations included people's views, concerns and expectations on the proposed CBU ACE SM. The issues raised are summarized in the Annex A provided within this document. The scanned list of stakeholders that attended the consultation meeting has been attached hitherto.

2.0 Environmental-Social Management & Monitoring of CBU ACESM Project

In the context of the proposed Copperbelt University Africa Centre of Excellence in Sustainable Mining (CBU ACESM), the focus is to enhance national and regional capacity to deliver quality education/training, research, exchange programmes and industry partnerships for Sustainable Mining. Consequently, these activities are planned to be supported by well equipped training and research facilities. The proposed environmental management and monitoring plans, therefore, relate to the stages associated with the development and establishment of these facilities.

The CBU ACESM plans to build a new administration office for the centre. The office will be constructed within campus on land owned by the Copperbelt University. Therefore, the construction will not involve the displacement of people. The centre will also need to rehabilitate and retrofit existing laboratories to accommodate the new equipment which will be purchased for the various research and training activities of the centre. The centre will also utilise various chemical and molecular biological reagents during its operation. Consequently, the main environmental and social safeguards of concern to the CBU ACESM are those associated with new construction, rehabilitation/retrofitting and utilisation of reagents. Therefore, the adverse environmental and social impacts of the project that require managing and monitoring pertain to the following:

- Air and water quality impairment
- Solid waste
- Noise pollution
- Land degradation
- Chemical wastes
- Toxic materials, and;
- Traffic

The probable adverse environmental and social impacts of the project are addressed in the environmental management and monitoring plans which are presented below. These plans highlight the anticipated adverse impacts and their appropriate mitigations measures, including the monitoring strategies to ensure that people and the environment are protected. The environmental management and monitoring plans have been formulated to ensure that the project will comply with all the relevant national environmental policies and legislation administered by Zambia Environmental Management Agency (Environmental Management Act of 2011) while adhering to the Environmental and Social Safeguards Policies of the World Bank (WB) for projects of this nature which are categorized as low-risk with minimal or negligible environmental impacts.

Part II : EMP Checklist for Activities

AFRICA CENTER OF EXCELLENCE (ACE) II PROJECT

S/N	Center Name	ESMP required?	Issues	Mitigation Measures
3	**Country–** Center Name **Zambia- Copperbelt University World Bank Centre of Excellence for Sustainable Mining**	Yes[√]	1. New construction • Excavation impacts and soil erosion • Increase sediment loads in receiving waters • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Yes[√]	2. Handling / management of medical waste • Clinical waste, sharps, pharmaceutical products (cytoxic and hazardous chemical waste),	Water Quality • Hazardous waste will be kept from entering the municipal water system in accordance with Zambia Environmental Management Agency

			radioactive waste, organic domestic waste, non-organic domestic waste • On site or √off-site disposal of medical waste	Waste Management Infrastructure for medical waste management (a) In compliance with national regulations the contractor will insure that rehabilitated laboratory facilities include sufficient infrastructure for medical and bio-hazardous waste handling and disposal; this includes and not limited to: (b) Special facilities for segregated medical and bio-hazardous waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal: i. Clinical waste: yellow bags and containers ii. Sharps – Special puncture resistant containers/boxes iii. Domestic waste (non-organic): black bags and containers (c)Appropriate storage facilities for medical waste are in place; and (d) If the activity includes facility-based treatment, appropriate disposal options are in place and operational
		Yes[√]	3. Laboratory Building rehabilitation and retro-fitting • Site specific vehicular traffic • Increase in dust and noise from demolition and/or construction • Construction waste	Air Quality (a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (f) There will be no open burning of construction / waste material at the site There will be no excessive idling of construction vehicles at sites
				Noise (a) Construction noise will be limited to restricted times agreed to in the permit During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
				Water Quality (a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.

				Waste Management (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
		Yes[√]	4. Hazardous or toxic materials • Removal and disposal of toxic and/or hazardous demolition and / or construction waste • Storage of machine oils and lubricants • Storage of machine oils and lubricants	Water Quality (a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out
				Waste Management (Toxic / hazardous waste management) (a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used (d) Contractors and suppliers will be required to comply with Zambian guidelines and regulatory standards

TABLE: MONITORING PLAN

Phase	What	Where	How	When	Why	Cost	Who

	(parameter to be monitored)	(location)	(method)	(frequency)	(Justification)	(budget)	(responsible officer)
During activity preparation	Traffic management, availability of waste disposal facilities, hazardous waste inventory (asbestos , paints / solvents), dust suppression, noise barrier, erosion and sediment control, emissions control, chute waste and debris	at the site, within vicinity of site, Contractor's store / building yard,	check design and project planning, procedures, physical inspection /analytical /consult toxic materials databases, record of waste collection and disposal, traffic signs and control personnel, visual checks,	before launch of construction, before start of rehabilitation, before approval to use materials.	safety of general public, timely detection of waste disposal impediments , public and workplace health and safety, protect sources from pollution	minimal and within budget, (reconciliation)	Contractor and Site Engineer and centre manager
During activity implementation and supervision	Dust Generation, noise emissions, waste and wastewater types, quality and volumes, surface drainage, Hazardous and radioactive materials	on site and in immediate vicinity of site, close to potential residents, at discharge points or in storage facilities.	, Physical inspection, analytical, count of waste removals off site, check flow rates and runoff routes for wastewater, specified storage time and disposal certificate	daily / continuous during working time	avoidance of public nuisance and health risk, avoidance of negative impacts on ground/surface waters, ensuring proper waste management and disposal	minimal and within budget	Contractor and site engineer

ANNEX A : PUBLIC CONSULTATIONS

Zambia - Copperbelt University World Bank Centre of Excellence for Sustainable Mining	14.01.16	Stakeholders present (see attached scanned copies)	Issues raised	Response to the issues
			Is the centre going to acquire new land for the new building?	The building site will be located on land owned by and within the boundaries of the Copperbelt University (CBU)
			What is the level of disruption to the ecosystem in the area earmarked for construction and the surrounding landscape?	The area of construction is of minimal size to cause major adverse impacts on ecosystem function
			How will you address the topographical (landscape) disturbance, air and water pollution during construction and operational stages? • Construction stage impacts – disturbance of landscape/topography; noise; air pollution; impacts on underground water sources • Operational stage impacts – waste from laboratories ; storage and disposal of samples brought from mine sites/industry for testing in the Centre laboratories	The environmental management plan for the ACE II contains mitigation measures to address these impacts.
			During operation, how will emissions and waste from the laboratories be addressed?	The environmental management plan for the ACE II contains mitigation measures to address these impacts.
			What are the employment opportunities that will be associated the Centre at CBU?	There will be job creation during construction and operation of the Centre, such as site workers, suppliers of materials, equipment and reagents, and contractors for waste disposal/waste management companies
			• How will the Centre remain sustainable after World Bank funding comes to an end?	• The proposal contains provisions for sustainable financing strategy. • The Centre will provide alternative availability of laboratory equipment for

			• What are the benefits of ACE II to undergraduate students?	students e.g students in the School of Mines and Mineral Sciences
			How will the centre contribute towards capacity building for the mining industry?	The Centre will produce graduates who will work in the mining and related industries in Zambia and the region.
			Will the design and construction of the centre incorporate Smart build standards and codes, which will assist in mitigating climate change?	The School of the Built Environment will provide green building designs for the Centre
			What are the benefits of ACE II to industry and other stakeholders?	• Renovated laboratories will provide analytical services to industry. • The Centre will provide training for mining companies employees as opposed to the current trend of sending them outside Zambia. • The centre will provide solutions to mining problems e.g. radioactivity; acid mine drainage, ore recovery, pollution; abandoned mines; non-rehabilitation of decommissioned mines.
			What is the role of the school of medicine in the setup of the centre?	• The school of medicine will address the occupational health aspects of mining

COPPERBELT UNIVERSITY ACE SM
PUBLIC CONSULTATION – EMP

14th January 2016

LIST OF PARTICIPANTS

Name	Title	Position	Organization	E-mail	Phone no.
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NAME OF ACE: CENTRE OF EXCELLENCE FOR INFECTIOUS DISEASE OF HUMANS AND ANIMALS IN ZAMBIA (CEIDHAZ)

Location: University of Zambia, Zambia

ANNEX

ENVIRONMENT SAFEGUARDS

1.1 Project's Environmental Management Plan

This ACE project is a low-risk minimal civil works involving construction of a office building, class rooms and laboratories. This project's environmental management plan (EMP) consists of set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. This plan also includes the actions needed to implement these measures. The EMP checklist-type has been used.

The EMP checklist has the following sections:

Part 1 includes a descriptive part that characterizes the project, specifies institutional and regulatory aspects, describes technical project content, outlines any potential need for capacity building and briefly characterizes the public consultation process.

Part 2 includes a screening checklist of potential environmental and social impacts, where activities and potential environmental issues can be checked in a simple Yes/No format. If any given activity/issue is triggered by checking be followed, which contains clearly formulated environmental and social management and mitigation measures.

Part 3 contains a simple monitoring plan to enable the Contractor as well as authorities and the World Bank specialists to monitor implementation of environmental management and protection measures and detect deviations and shortcomings in a timely manner. It is structured in a way to provide concrete and enforceable environmental and social measures,

which are understandable to non specialists (to check and enforce.

1.2 General and Site Information

The Table 1 below provides the institution and administrative framework for the project. It provides key information on the location of the University of Zambia and the legal requirement of this project.

Table 1 Institutional & Administrative for the Africa Centres of Excellence Project

Institutional and administrative framework for the ACE project	
Country	Zambia
Project title	Centre of Excellence for Infectious Diseases of Humans and Animals in Zambia (CEIDHAZ)
Scope of project and activity	This project involves training, research, exchange programme and industry outreach. To support and run these activities, there will be low-risk minimal civil works such as minor office/teaching-research building, rehabilitation works or refurbishment works of laboratory/classroom to provide space for postgraduate students.

Institutional arrangements (Name and contacts)	World Bank Task Team Leader (Professor Aaron S. Mweene)	Project Management	Local Counterpart and/or Recipient (Zambian Government/CEIDHAZ Project Team)	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision (UNZA-Resident Engineer Mr. Marvin Mwansa)	Contractor

SITE DESCRIPTION		
Name of site	University of Zambia	
Describe site location	Site is located at the eastern part of Lusaka, Zambia	Attachment 1: Site Map [ ]Y [x] N
Who owns the land?	The University of Zambia was established by the University of Zambia Act of 1965, whose major mandate was to produce the nation's high level human resource. Higher Education Act No.4 of 2013 provides a legal framework for university education	
Geographic description	The coordinate of the site is**:** 15.4000 S°, 28.3333°E	
LEGISLATION		
Identify national & local legislation &	Zambia has an environmental policy and regulation and legal instrument under the Zambia Environmental Management Agency (ZEMA) for safeguarding the environment.	

permits that apply to project activity	Permit is required for any project that is likely to impact on the environment.

PUBLIC CONSULTATION Identify when / where the public consultation

Table 1 : Public consultations

Country – Center of Excellence	Date of consultative meeting	Stakeholders present	Issues raised	Response to the issues
Country : ZAMBIA Centre of Excellence : Centre of Excellence for Infectious Diseases of Humans and Animals in Zambia (CEIDHAZ)	02/02/2016	1. Resident Engineer, University of Zambia	Emissions from solid waste-noted that improper disposal of biodegradable and all non-biodegradable waste would have an effect on the environment.	There is a clear policy on the disposal of degradable and non-degradable waste at UNZA and these will be adhered to strictly during the construction phase.
		2. School of Engineering	1. Noise from increased traffic	Only relatively moderate traffic load is expected. There have been other larger construction projects within UNZA and they did not pose any threat in terms of noise polution
		3. School of Agriculture Sciences	Fire risk-noted that there is always a likely risk of fire in new buildings.	Firefighting equipment will be installed in the building in consultation with resident Engineer's Department.
		4. School of Natural Sciences Department of Environmental	Impact on water quality-noted that the water will be	Spillages would be minimized as much as possible through

		Studies	obtained from the local UNZA boreholes. Improper discharge of the waste water could contaminate any ground water. The impacts on the water quality would arise from the effluent discharge. The effluent would come from the sewer, floor washings, and oil drops from vehicles entering premises.	consultations with resident Engineer's Department.
		5. School of Humanities and Social Sciences	HIV/AIDS-noted that the proposed project will have an impact on HIV/AIDS through the construction employees enjoying a salary for the duration of the contruction. This short term increase in income could result in negative social behaviour.	Mitigation will involve sensitization of the crew to HIV/AIDS cause and effects. HIV/AIDS policy already in place at UNZA

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INSTITUTIONAL CAPACITY BUILDING

Will there be any capacity building?	• Yes [x] or No [ ] The proposed CEIDHAZ will focus on the following objectives:- 1. Develop critical mass of skilled human resources that will contribute to development of innovative interventions for control and elimination of infectious diseases through training to MSc, PhD and Post-Doctoral levels. 2. Develop and strengthen capacity for high quality innovative research focusing on the control of NTDs emerging, re-emerging and zoonotic diseases 3. Develop capacity for high quality innovative research focusing on bacterial zoonoses and anti-microbial resistance 4. Develop advocacy programs for community and policy

	makers on infectious diseases 5. Strengthen network/linkages with local, regional and international institutions to foster high quality training, research and technological transfer for long term sustainability of CEIDHAZ. 6. Strengthen infrastructure for training, research and development of CEIDHAZ.

Environmental and Social Screening

The environmental and social screening in a simple Yes/No format followed by mitigation measures for any given activity and the monitoring plan for activities during project construction and implementation. Table 2 present the general list of activities and the potential impacts. The activities that are likely to be encountered in this project are building rehabilitation and new construction, so potential impact under section B will have to be addressed.

Table 2: Environmental and Social Screening

ENVIRONMENTAL /SOCIAL SCREENING			
Will the site activity	**Activity and potential issues and/or impacts**	**Status**	**Additional references**
include/involve any of the following potential issues and/or impacts:	1. Building rehabilitation □ Site specific vehicular traffic □ Increase in dust and noise from demolition and/or construction □ Construction waste	[X] Yes [ ] No	Table 3
	2. New construction □ Excavation impacts and soil erosion □ Increase sediment loads in receiving Waters □ Site specific vehicular traffic	[X] Yes [ ] No	Table 3

	□ Increase in dust and noise from demolition and/or construction □ Construction waste		
	3. Individual wastewater treatment system □ Effluent and / or discharges into receiving waters **Note:** The University of Zambia, where the proposed CEIDHAZ is going to be housed, has a proper Reticulation Network at both Sewage and Sewerage System which handles all waste water. All this waste water is centrally treated in Closed Maturation Tanks before it is discharged into the Municipal Waste Water Reticulation Network. The Municipal Council has an Open Maturation Ponds Site. The final stages having fish to determine both the Chemical Oxygen Demand (COD) and the Biological Oxygen Demand (BOD) of the water before release into an open stream. This is after all purification processes have been done, including removal of all solids, biological and non-biologicals which rendered harmless through various processes at the Municipal Site.	[] Yes [X] No	
	4. Historic building(s) and districts □ Risk of damage to known/unknown historical or archaeological sites	[ ] Yes [X] No	Table 3
	5. Acquisition of land[6] □ Encroachment on private property □ Relocation of project affected persons □ Involuntary resettlement □ Impacts on livelihood incomes	[ ] Yes [X] No	Table 3
	6. Hazardous or toxic materials[7] □ Removal and disposal of toxic and/or hazardous demolition and / or construction waste □ Storage of machine oils and Lubricants	[X] Yes [ ] No	Table 3
	7. Impacts on forests and/or protected areas	[ ] Yes [X] No	Table 3

□ Encroachment on designated forests, buffer and /or protected areas

[6] *Land acquisitions includes displacement of people, change of livelihood encroachment on private property t[redacted] and/or squatters [redacted]*

[7] *Toxic / hazardous [redacted] paint, etc.*

1.5 Mitigation Measures

Table 3 presents a checklist of good practice mitigation measures. Section B of these good practice mitigation measures will be applicable to this ACE project. The impacts such as air quality, noise, water quality and waste management will have to be mitigated.

The EMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.

	□ Disturbance of locally protected animal habitat	
	8. Handling / management of medical waste □ Clinical waste, sharps, pharmaceutical products (toxic and hazardous chemical waste), radioactive waste organic domestic waste, non-organic domestic waste □ On site or off-site disposal of medical Waste	[X] Yes [] No
	9. Traffic and Pedestrian Safety □ Site specific vehicular traffic □ Site is in a populated area	[X] Yes [] No

Table 3: Good Practices Mitigation Measures Checklist

ACTIVITY	PARAMETER	GOOD PRACTICES MITIGATION MEASURES CHECKLIST
A. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public will be notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits (to include not limited to land use, resource use, dumping, sanitary inspection permit) have been acquired for construction and/or rehabilitation (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighbouring residents and environment. (e) Workers' Personal Protective Equipment (PPE) will comply with international norms (f) Appropriate signage of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site
	Noise	(a) There will be no excessive idling of construction vehicles at sites (b) Construction noise will be limited to restricted times agreed to in the permit
	Water Quality	(a) There will be no risk of contaminating nearby streams and rivers

	Waste management	. (a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Construction waste will be collected and disposed properly by licensed collectors (c) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (no Asbestos will be used)
C. Individual wastewater	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Monitoring of new wastewater systems (before/after) will be carried out
E. Acquisition of land	Land Acquisition Plan/Framework	This activity will not take place
F. Toxic	Asbestos	No asbestos will be used

	Toxic / hazardous waste management	(a) All biological wastes will be autoclaved and thereafter incinerated and then safe disposal once all have been inactivated.
G. Affects	Protection	This work will not affect forests/protected areas
H. Disposal of medical waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: • Special facilities for segregated healthcare waste human tissue or fluids) from other waste disposal: a. Clinical waste: yellow bags and containers b. Sharps –Special puncture resistant containers/boxes c. Domestic waste (non-organic): black bags and containers • There is a high-octane incinerator that can burn up to 2,000°C
I Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to • Signage, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards • Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. • Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities

		during rush hours or times of livestock movement • Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. • Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

1.6 Monitoring Plan

The monitoring section of the EMP provides

(a) Specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and

(b) Monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

Table 4 presents the monitoring plan for the project by outlining what have to be checked

during activity preparation and implementation. For the monitoring of safeguards, a due diligence of the designated construction inspector is required. The key monitoring criteria have to be checked during and after works for compliance assurance.

Such parameters and criteria include:

- o dust generation and prevention,
- o amount of water used and discharged by site,
- o presence of proper sanitary facilities for workers,
- o waste collection of separate types (mineral waste, wood, metals, plastic, hazardous waste, e.g. spent engine oil), waste quantities, proper organization of disposal pathways and facilities, or reuse and recycling wherever possible.

To assure a degree of leverage on the Contractor appropriate clause will be introduced in the works contracts, specifying penalties in case of noncompliance with the contractual environmental provisions, e.g. in the form of

withholding a certain proportion of the payments, its size depending on the severity of the breach of contract.

Capacity Development

To support timely and effective implementation of environmental project components and mitigation measures, the EMP draws on the EA's assessment of the existence, role, and capability of environmental units on site or at the agency and ministry level. Specifically, the EMP provides a specific description of institutional arrangements - who is responsible for carrying out the mitigatory and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training).

Project Implementation

It is expected that the plan be specific in its description of the individual mitigation and monitoring measures and its assignment of institutional responsibilities, and it must be

integrated into the project's overall planning, design, budget, and implementation. Such integration is achieved by establishing the EMP within the project so that the plan will receive funding and supervision along with the other components.

For all three aspects (mitigation, monitoring, and capacity development), the EMP provides

(a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and

(b) the capital and recurrent cost estimates and sources of funds for implementing the EMP are also to be integrated into the total project cost.

Table 4 Monitoring Plan

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity prepara-tion	Traffic management, availability of waste disposal facilities, hazardous waste inventory	at the site, in site vicinity, building yard	check if design and project planning, procedures, visual /analytical if in doubt, visual /research in toxic materials databases	before launch of construction, before start of rehabilitation, before approval to use materials,	safety of general public, timely detection of waste disposal bottlenecks, public and workplace health and safety,	According to budget line	Contractor, Resident Engineer
During activity implement ation and supervision	Dust Generation, noise emissions, waste and wastewater types, quality and volumes,	on site and in immediate neighbourhoo d, close to potential residents at discharge points or in	consultation of locals, visual, analytical if suspicious, count of waste transports off site, check flow rates and	daily / continuous	avoidance of public nuisance, avoidance of negative impacts on ground/surface waters, ensuring proper waste	According to budget line	Contractor, Resident Engineer

	surface drainage	storage facilities	runoff routes for wastewater		management and disposal		

Table 5: The responsibility for monitoring of implementation of EMPs for CEIDHAZ is as follows:

Institution	**EMP monitoring arrangements (name, title, contact information)**
Zambia Environmental Management Agency (ZEMA)	Mr. Fredrick Muyano Principal Inspector Zambia Environmental Management Agency, Corner Church and Suez Roads Plot No. 6975, Lusaka 10101, Zambia **e-mail:** "Fredrick Muyano"<fmuyano@yahoo.com> **Phone:** +260 21 1254023
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