

# **ENVIRONMENT SAFEGUARDS FOR THE AFRICAN 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 (JOUST) 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, issue of acceptability as well as minimal effects to the physical environment will require to be integrated in 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 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 below. 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 the ACE in INSEFOODs.

<b>INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK FOR THE ACE IN INSEFOODS</b>	
Country	Kenya
Project title	Sustainable Use of Insects as Food and Feeds (INSEFOODs)
Scope of Project and	This project involves capacity building through training, research, partnerships and

Activity	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
<b>SITE DESCRIPTION</b>				
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			
<b>LEGISLATION</b>				
Identify national & local legislation & permits that apply to project activity	Kenya has an environmental legal, regulation and policy instrument for safeguarding the environment. Environmental permit is required for any project that is likely to impact on the environment.			
<b>PUBLIC CONSULTATION</b>				
Identify where/ when public consultation process took place	Public consultations was carried out at the proposed project site (JOOUST Main Campus in Bondo township)			
<b>INSTITUTIONAL CAPACITY BUILDING</b>				
Will there be institutional capacity building?	<input type="checkbox"/> N or <input checked="" type="checkbox"/> Yes. There is capacity building program			

## Relevant Policy, Legal, Regulatory and Institutional Framework

### *Environmental Policy Framework*

Kenya 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 of 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 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 Environmental 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 include 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 legislation 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 Environmental Management Authority (NEMA), the Forestry Department, and 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 is 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 provide 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 project director will be the overall supervisor and will oversee environment 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 C since it is likely to have minimal or no adverse environmental impacts. Therefore, beyond screening, no further Environmental Assessment (EA) action is required. 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 measure 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 <ul style="list-style-type: none"> <li>• Site specific vehicular traffic</li> <li>• Increase in dust and noise from demolition and/or</li> </ul>	[ X ] Yes [ ] No	See Section <b>B</b> below

	<ul style="list-style-type: none"> <li>• construction</li> <li>• Construction waste</li> </ul>		
	<p>2. New construction</p> <ul style="list-style-type: none"> <li>• Excavation impacts and soil erosion</li> <li>• Increase sediment loads in receiving waters</li> <li>• Site specific vehicular traffic</li> <li>• Increase in dust and noise from demolition and/or construction</li> <li>• Construction waste</li> </ul>	[ X ] Yes [ ] No	See Section <b>B</b> below
	<p>3. Individual wastewater treatment system</p> <ul style="list-style-type: none"> <li>• Effluent and / or discharges into receiving waters</li> </ul>	[ ] Yes [X] No	See Section <b>C</b> below
	<p>4. Historic building(s) and districts</p> <ul style="list-style-type: none"> <li>• Risk of damage to known/unknown historical or archaeological sites</li> </ul>	[ ] Yes [X] No	See Section <b>D</b> below
	<p>5. Acquisition of land</p> <ul style="list-style-type: none"> <li>• Encroachment on private property</li> <li>• Relocation of project affected persons</li> <li>• Involuntary resettlement</li> <li>• Impacts on livelihood incomes</li> </ul>	[ ] Yes [X] No	See Section <b>E</b> below
	<p>6. Hazardous or toxic materials</p> <ul style="list-style-type: none"> <li>• Removal and disposal of toxic and/or hazardous demolition and / or construction waste</li> <li>• Storage of machine oils and lubricants</li> </ul>	[ ] Yes [X] No	See Section <b>F</b> below
	<p>7. Impacts on forests and/or protected areas</p> <ul style="list-style-type: none"> <li>• Encroachment on designated forests, buffer and /or protected areas</li> <li>• Disturbance of locally protected animal habitat</li> </ul>	[ ] Yes [X] No	See Section <b>G</b> below
	<p>8. Handling / management of medical waste</p> <ul style="list-style-type: none"> <li>• Clinical waste, sharps, pharmaceutical products (toxic and hazardous chemical waste), radioactive waste, organic domestic waste, non-organic domestic waste</li> <li>• On site or off-site disposal of medical waste</li> </ul>	[ ] Yes [X] No	See Section <b>H</b> below
	9. Traffic and Pedestrian Safety	[ ] Yes [X] No	See Section <b>I</b> below

	<ul style="list-style-type: none"> <li>• Site specific vehicular traffic</li> <li>• Site is in a populated area</li> </ul>		
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*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
<b>A. General Conditions</b>	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>B. General Rehabilitation and/or Construction Activities</b>	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 (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)
<b>C. Individual wastewater treatment system</b>	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
<b>E. Acquisition of land</b>	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
<b>F. Toxic Materials</b>	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 to 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

		<p>(b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching</p> <p>(c) The wastes are transported by specially licensed carriers and disposed in a licensed facility.</p> <p>(d) Paints with toxic ingredients or solvents or lead-based paints will not be used</p>
<b>G. Affects forests and/or protected areas</b>	Protection	<p>(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.</p> <p>(b) For large trees in the vicinity of the activity, mark and cordon off with a fence large trees and protect root system and avoid any damage to the trees</p> <p>(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, silt fences</p> <p>(d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.</p>
<b>H. Disposal of medical waste</b>	Infrastructure for medical waste management	<p>(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:</p> <ul style="list-style-type: none"> <li>▪ Special facilities for segregated healthcare waste (including soiled instruments “sharps”, and human tissue or fluids) from other waste disposal:</li> </ul> <p>a. Clinical waste: yellow bags and containers</p> <p>b. Sharps – Special puncture resistant containers/boxes</p> <p>c. Domestic waste (non-organic): black bags and containers</p> <ul style="list-style-type: none"> <li>▪ Appropriate storage facilities for medical waste are in place and;</li> <li>▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational</li> </ul>
<b>I Traffic and Pedestrian Safety</b>	Direct or indirect hazards to public traffic and pedestrians by construction activities	<p>(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:</p> <ul style="list-style-type: none"> <li>• Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards</li> <li>• 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.</li> <li>• Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement</li> <li>• Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public.</li> <li>• Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.</li> </ul>

## 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
	Wastes from research laboratories availability of waste disposal facilities,	Laboratories	safe containers labeled with details of composition, properties	Continually	safety of general public, timely detection of waste		Project Director, PI, Environmental Health Committee

	hazardous waste inventory		and handling information		disposal bottlenecks, public and workplace health and safety,		
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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 insure 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)
	<p>Prof. Adrian Mukhebi, The Centre Director  <a href="mailto:amukhebi@jooust.ac.ke">amukhebi@jooust.ac.ke</a>, 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.</p>

## 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	<ol style="list-style-type: none"> <li>1. Florence Awour, Majiwa CBO</li> <li>2. Caren Auma, Maranda CBO</li> <li>3. Judith Ngesa, Majiwa Group CBO</li> <li>4. Charless Acheing Apol, Maranda CBO</li> <li>5. Steven Otieno Opondo, Maranda CBO</li> </ol>	Current generation may be reluctant to eat insect products	Through training research and awareness they will know and 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 involve in this project will be
	15/01/2016	<ol style="list-style-type: none"> <li>1. Jared Airo, Ugadhi Primary School</li> <li>2. Esabwa Mamesa, Ministry of Agriculture, Livestock and Fisheries (Bondo)</li> <li>3. Elizabeth Olango, Ministry of Health (Bondo)</li> <li>4. David Ochola, IMPACT Research and Development Organization (Bondo)</li> <li>5. Ambrose Senga, Kenya Forestry Service (Siaya)</li> <li>6. Samson Ochweri, National Environmental Management Authority (Siaya)</li> <li>7. Joy Ouma, Plan International (Bondo)</li> <li>8. Peter Oyugi (Kenya Forestry Services (Siaya)</li> </ol>	Social acceptability of Cricket as food	The project has an anthropologist as a team member to lead research and address unforeseen challenges of acceptability. That traditional sources of food have been neglected and the training and research and community outreach there will be acceptability due to increased awareness creation by the project.
			Social issues and perception in feeding on cricket	Indigenous people fed on cricket and the project will create awareness on its nutritional benefits
			Food processing plants for mass production of the products	The INSEFOODs will mainly focus on training teaching and research but the project have partnership where the

				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
			What different variety of crickets species available	That are several species available but the type being promoted by the project is edible
			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 a key factors -Changing room with specific clothes that are regularly disinfected for those working/ entering in rearing sites
			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	There are no major challenges as they are grown in a controlled environment