



NATIONAL AGRICULTURAL RESEARCH ORGANISATION
Co-ordinating, Overseeing and Guiding Agricultural Research in Uganda



Republic of Uganda
Ministry of Agriculture, Animal Industry and Fisheries

Regional Eastern and Central Africa Agricultural Transformation Project-
ECAAT P162416

Environmental and Social Management Framework-
ESMF, Pest Management Plan and Climate
Change Risk Analysis and GHG



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ACRONYMS

ACB	Agricultural Chemicals Board
ACDP	Agriculture Cluster Development Project
AEATREC	Agricultural Engineering and Appropriate Technology Research Centre
AGRIBUTECH	Agriculture, Business and Technology-Serere
ANPPCAN	African Network for Prevention and Protection against Child Abuse and Neglect
ASAL	Arid and Semi-Arid Lands
ASSP	Agriculture Sector Strategic Plan
ATAAS	Agricultural Technology and Agribusiness Advisory Services
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BMPs	Best Management Practices
BXW	Banana Xanthomonas Wilt
CCES	Control of Crop Epidemics Section
CAAAP	Comprehensive Africa Agriculture Development Program
CBB	Cassava Bacterial Blight
CBPP	Contagious Bovine Pleural Pneumonia
CBSV	Cassava Brown Streak
CECORE	Centre for Conflict Resolution
CERC	Contingency Emergency Response Component
CIAT	International Centre for Tropical Agriculture
CMD	Control of Mosaic Disease
CoE	Centre of Excellence
CRA	Climate Risk Analysis
CSA	Climate Smart Agriculture
DDT	Dichloro-diphenyl-trichloroethane
DAO	District Agricultural Officer
DCP	Department of Crop Protection-MAAIF
DCR	Directorate of Crop Resources-MAAIF
DEC	Directory of Energy Consumption
DEO	District Environment Officer
DFID	Department for International Development
DPO	District Population Officer
DSIP	Development Strategic Investment Plan
EAAPP	East African Agricultural Productivity Project
EAOPs	East African Organic Products Organization
EC	Emulsifiable Concentrate
ECAAT-P	East and Central Africa Agricultural Transformation Project
EIA	Environmental Impact Assessment
EIDs	Emerging Infectious Diseases
EIS	Environmental Impact Statement
ESIA	Environmental and Social Impact Assessment
ESSF	Environmental and Social Screening Form
ESMF	Environmental and Social Management Framework
ESMIS	Environmental and Social Management Information Systems
ESMP	Environmental and Social Management Plan
EWDP RR	Early Warning, Disaster Preparedness and Risk Reduction
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field Schools
FGM	Female Genital Mutilation

FMD	Foot and Mouth Disease
FTBIC	Food Technology Business Incubation Center
GAL	Government Analytical Laboratory
GHG	Greenhouse Gases
GDP	Gross Domestic Product
GoU	Government of Uganda
GRC	Grievance Redress Committee
HVA	Hazard Vulnerability Assessment
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HPAI	Highly Pathogenic Avian Influenze
HSE	Health Safety and Environment
H5N1	Avian Influenze Virus
IITA	International Institute for Tropical Agriculture
ICT	Information Communication Technology
IDA	International Development Association
IDPs	Internally Displaced Persons
IGAD	Intergovernmental Authority on Drought and Development
ILO	International Labor Organization
IPPC	International Plant Protection Convention
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPM CRSP	Integrated Pest Management Collaborative Research Support Project
ITPGRFA	International Treaty on Plant Genetic Resources for Agriculture
IVM	Integrated Veterinary Management
LASOPs	Laboratory Standard Operations Procedures
LBM	Live Bird Markets
LD ₅₀	Lethal Dose (kills 50% of target organisms).
LG	Local Government
LGRC	Local Grievance Redress Committee
LoU	Laws of Uganda
LPAI	Low Pathogeneci Avian Influenze
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
masl	meters above sea level
MDGs	Millenium Development Goals
MHHs	Men Headed Households
MLN	Maize Lethal Necrosis
MRL	Maximum Residual Limits
MSIP	Multi-Stakeholder Innovation Platform
MTEF	Mid-Term Expenditure Framework
MoH	Ministry of Health
MoTIC	Ministry of Trade, Industry and Cooperatives
MoWE	Ministry of Water and Environment
MoWT	Ministry of Works and Transport
MUARIK	Makerere University Agriculture Research Institute Kabanyolo
NAADS	National Agricultural Advisory Services
NaCRRRI	National Crop Resources Research Institute
NAGRC&DB	National Assisted Reproductive Technology Training Centre
NAP	National Agricultural Policy
NAPA	National Adaptation Plan of Action

NARIs	National Agricultural Research Institutes
NaFORRI	National Forestry Resources Research Institute
NARO	National Agricultural Research Organization
NaSSARI	National Semi Arid Resources Research Institute
NARO Sec	National Agricultural Reaserch Organization Secretariat
NCoE	National Centre of Excellence
NCoL	National Centre of Leadership
NCoS	National Centers of Specializations
NDA	National Drug Authority
NDP II	National Development Plan II
NEA	National Environment Act
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NER	National Enrolment Ratio
NGOs	Non-Government Organizations
NHPC	National Housing Population Census
NSCs	National Seeds Certification Centers
NUSAF	Northern Uganda Social Action Fund
OHS	Occupational Health and Safety
OPM	Office of the Prime Minister
OWC	Operation Wealth Creation
PPDA	Public Procurement and Disposal of Public Assets Authority
PAPs	Project Affected Persons
PCRs	Physical Cultural Resources
PPEs	Personal Protective Equipment
PDU	Procurement and Disposal Unit
PIC	Prio-Informed Consent
PIU	Project Implementation Unit
PFCU	Pesticides and Fertilizers Control Unit
PDO	Project Development Objective
PMP	Pest Management Plan
POPs	Persistent Organic Pollutants
RAPs	Resettlement Action Plans
RCP	Representative Concentration Pathway
RCoL	Regional Centre of Leadership
R&D	Research and Development
RYM	Rice Yellow Mottle
RWSD	Rural Water and Sanitation Department
SSA	Sub-Saharan Africa
SAICM	Strategic Approach to International Chemicals Management
SDG	Social Development Goals
SFR/SFE	Sites for Research/Sites for Education
SFTNB	School of Food Technology, Nutrition and Bio-engineering
SMC	Sound Management of Chemicals
SPCR	Strategic Program on Climate Resilience-Uganda
SWMS	Safe Work Method Statements
TASO	The Aids Support Organization
TERUDO	Teso Rural Development Organization
TIMPs	Technology, Innovations, Management and Practices

TFG	Technology for Production
TFR	Total Fertility Rate
ToRs	Terms of Reference
UBOS	Uganda Bureau of Statistics
UCA	Uganda Cooperative Alliance
UNADA	Uganda National Agro-inputs Dealers Association
UNBS	Uganda National Bureau of Standards
UNCTAD	United Nations Conference of Trade and Development
UNEP	United Nations Environment Program
UNESCO	United Nations Education Scientific and Cultural Organization
UNHCR	United Nations High Commission for Refugees
UPHIA	Uganda Population Based HIV Impact Assessment
USAID	United State Agency for International Development.
WAHIS	World Animal Health Information Systems
WBG	World Bank Group
WHHs	Women Headed Households
WHO	World Health Organization
ZARDI	Zonal Agricultural Research and Development Institute

EXECUTIVE SUMMARY

INTRODUCTION TO THE ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

Purpose and Scope

The ESMF provides guidance on how environmental and social aspects of ECAAT-P shall be identified, assessed and managed. Specific locations including Districts, Schools, and Link Farmers have not been identified at this stage; hence it provides a framework to assist project implementers to screen the projects at planning stage and institute measures to address adverse environmental and social impacts during implementation. The major safeguards focus in ECAAT-P will be on the use and management of pesticides and agricultural chemicals at the selected farmers and schools' gardens. In addition, issues of soil conservation will also be looked into the project especially in highland areas. This ESMF has therefore been revised as appropriate to largely cater for this focus/purpose.

Preparation of ESMF

The ESMF for ECAAT-P has been prepared in accordance with applicable World Bank safeguard policies and Uganda environmental impact assessment guidelines, which involved data literature reviews; field reconnaissance studies, public consultations and discussions with relevant sector institutions (Jimmy Sekasi Institute of Catering in Kabalagala in Kampala, Agributech Vocational Institute in Serere, NGOs especially TERUDO in Kumi, MAAIF, World Bank, NARO and its research institutes, private sector, statutory agencies such as NEMA, Uganda National Bureau of Standards-UNBS, NARO and its research institutes, NGOs and district authorities as well as farmers on whose lands NARO scientists conduct their experiments. The Consultant also met and held consultations with farmers who are 6km outside research institutes.

THE EAST AND CENTRAL AFRICA AGRICULTURAL TRANSFORMATION PROJECT (ECAAT-P P162416)

East and Central Africa Agricultural Transformation Project will, from Uganda's perspective, cover seven commodities, namely commodities earlier under the closed East African Agricultural Productivity Project (EAAPP): Cassava which Uganda hosts its Centre of Excellence (CoE) in the region), Rice (CoE in Tanzania), Wheat (CoE in Ethiopia) and dairy (CoE in Kenya) and the new commodities: beans, potato and beef. All these commodities will not only support income generation but also enhance regional food security. In addition, by promoting iron and zinc rich Bean varieties and vitamin- A rich cassava varieties which have been developed by NARO, there will be reduced nutrition deficiency in the region. Without food security, regional integration will not be possible when the population is hungry or malnourished.

Project Components

The project has the following components:

Component 1: Regional Commodity Programs

Component 2: Enabling Policies and Improving Access to Markets

Component 3: Contingency Emergency Response

Component 4: Regional Coordination and National Project Management

Component 1: Regional Commodity Program

The objective of this component is to enhance regional collaboration in the development of climate-smart agricultural technologies, innovations, and management practices (TIMPS) for selected commodities and to facilitate exchange and dissemination of the TIMPS across national boundaries – the TIMPs led transformation agenda. Agricultural technologies are developed for agroecological conditions and not national boundaries. The participating countries in the Eastern and Central Africa region not only share similar agroecological conditions but also face similar challenges on many aspects of agriculture, including crop and livestock pests and diseases and other climate-related risks. The adaptation and mitigation solutions to climate change are relevant across national boundaries, and likewise the effectiveness of measures to mitigate climate change depend on coordinated action across countries. The potential adaptation and mitigation activities that can help address climate change vulnerabilities include: (i) increased investments in research and development (R&D) of crop

varieties and animal breeds that are more resilient to climate variability and shocks, as well as in climate-smart soil and water management practices; (ii) increased production of adequate fodder crops to supplement rangeland pastures, as well as improved livestock management practices; and (iii) improved catchment management planning (land husbandry) and regulation of water abstraction. On the other hand, capacities for technology development and agricultural sciences is not equally distributed among countries. Regional collaboration provides a platform for faster development of technologies and faster technical change at the farm level. It also saves money and time, by eliminating duplicating efforts, and enables countries to leapfrog the hurdles of scientific trials and evaluations, by providing access to proven technologies. The Component is organized into two sub-components: (i) establishment and strengthening of regional centers of leadership and national centers of specialization; and (ii) collaborative development, transfer, and dissemination of agricultural technologies.

Component 2: Enabling Policies and Improving Access to Markets

The objectives of this component are (i) to create an enabling policy and regulatory environment for regional collaboration in development, transfer, and exchange of climate-smart technologies; and (ii) to improve smallholder farmer's access to regional and national markets for food commodities and products. In this regard, ECAAT, will generally invest resources in (a) regional and national meetings and dialogues among government and private experts to advocate for relevant policies, (b) the formulation of relevant regulations and policy harmonization activities in key areas that affect research, development and trade at national and regional level; and, (c) training to disseminate information about changes to stakeholders (d) capacity building, including operation plan and guidelines, for operationalization of the harmonized systems, policies and regulations that affect development, transfer, and exchange of technologies. Two sub-components are proposed: (a) enabling policies; and (b) improving smallholder farmers access to agricultural and food markets.

This Component includes additionally the next activities and investments: Support to Department of Crop Inspection and Certification under MAAIF; Uganda Semen Laboratory; Support to Sanitary and Phyto Sanitary Services; Construction of storage facilities; Equipping border post veterinary laboratories; Dairy cattle biosecurity export facility; and Accreditation of semen and embryo handling facilities (bull and dairy goat studs, semen and embryo laboratories. Some of these activities include civil works as storage facilities, laboratories, and equipment.

Component 3: Contingency Emergency Response

This zero-cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in the project countries. It is projected that climate change will exacerbate the frequency and intensity of droughts and floods in the region. In this regard, Contingency Emergency Response Component (CERC) is also an instrument for building resilience to climate change, through financing of the mitigation and recovery efforts. This contingency facility can be triggered through formal declaration of a national emergency by the government authority or a statement of facts from a designated authority in the government (statement of facts from the government to a declaration or action by a third party such as launch of a UN Flash Appeal) and upon a formal request from government of the participating country to the World Bank through the Ministry of Finance/National Treasury. In such cases, funds from other project components will be reallocated to finance emergency response expenditures to meet agricultural crises and emergency needs. The emergency response would include mitigation, recovery, and reconstruction following crises and disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others. Implementation of this component will follow a detailed Contingent Emergency Response Implementation Plan (CERIP), which is satisfactory to the World Bank to be prepared by the respective government for each Eligible Crisis of Emergency.

Disbursements will be made against a positive list of goods, works, and services required for supporting mitigation, response, recovery, and reconstruction needs. Should it be triggered, all expenditures under this subcomponent will be in accordance with Paragraph 12 of the World Bank OP 10.00 of the Investment Project Financing (IPF). The policy requires all expenditures to be appraised, reviewed, and found acceptable to the Bank before any disbursement is made. Eligible operating costs will include incremental expenses incurred for efforts arising because of the crises or emergencies.

Goods, Works, and Services under this subcomponent will be financed based on review of satisfactory supporting documentation presented by the government, including adherence to appropriate procurement practices in an emergency context. All supporting documents for reimbursement of such expenditures will be verified by the internal auditors of each government and by the national project coordination unit, certifying that the expenditures were incurred for the intended purpose; and to enable fast recovery following the damage caused by adverse natural or man-made crises or disasters, before the application is submitted to the World Bank. This verification shall be sent to the Bank together with the Withdrawal Application.

Component 4: Regional Coordination and National Project Management

The objective of this component is to coordinate the project across participating countries and collaborating institutions, promote continuous learning and feedback, and to manage project implementation in the participating countries. It has two sub-components as follows:

Sub-component 4.1: Regional Coordination and Learning whose objective is to facilitate regional collaboration and continuous learning process participating countries and technical components.

Sub-component 4.2: National Project Management and Evaluation with the objective of facilitating project implementation, management, and evaluation in each participating country.

National Management of Project

There will be a Project Steering Committee (PSC) from stakeholders chaired by the Permanent Secretary, MAAIF. The National Project Steering Committee will comprise of (Ministry of Agriculture, Animal Industry and Fisheries, Ministry of Trade, Industries and Commerce, National Agricultural Research Organization, and other relevant Ministries that may be co-opted). PSC will provide policy guidance for the project. It will also approve annual budgets and workplans. It will meet on quarterly basis and its decisions will be binding. ECAAT will be administered by NARO which will also house the ECAAT Coordination Unit. The Unit will consist of the National Project Coordinator, Accountant/Administrator, an Internal Auditor, M&E Specialist, Procurement Specialist, specialists in the project commodity areas, Specialists in Knowledge Management, Gender and Environmental and Social Safeguards, Project Administrative Assistant and Transport managers. For the efficient and effective implementation of the project, components or sub-components implemented under MAAIF headquarters and Ministry of Trade, Industries and Commerce a focal person from appropriate department (e.g. the planning department division) will be appointed. The focal person will provide the required linkage between the ministries and NARO and fast track the implementation of the project activities under their respective ministries. Other Government Ministries (such as Ministry of Gender Labour & Social Development) and Regulatory Bodies (such as National Environment Management Authority and Uganda National Bureau of Standards) will play their respective statutory roles, such as undertaking Health and Safety implementation including management of Labour and Social aspects by MGLSD, Management of Environmental aspects through review of Environmental Assessment reports and issuing required approvals, monitoring implementation of mitigation measures by NEMA, and undertaking quality assurance based on different standards for agricultural inputs such as pesticides by UNBS.

At the PCU, the National Project Coordinator will report to Deputy Director General, Research Coordination, NARO. On the other hand, the Cassava Centre of Excellence will have a Coordinator who will report to Director of Research, NaCRRI. Each of the implementing institutes, organization or department will have a focal person who will be charged with day to day operations of the project at that level. Regionally, the project will be a sub-regional organization (SRO) to be identified. In Uganda, however, the National Project Coordinator at the PCU will manage all resources and coordinate all activities of ECAAT at all levels; the project coordinator will be supported by the PCU, Coordinator of Cassava RCoE and the focal persons (with each implementing institution having a team of implementers). Project implementation will follow Government of Uganda procedures and World Bank Policy requirements.

LEGAL AND INSTITUTIONAL FRAMEWORK

Policy framework

Under the project the following applicable policies have been reviewed:

- a. The National Environment Management Policy 1994 (NEMP);
- b. The National Development Plan 2010-2015;
- c. The Uganda Vision 2040;
- d. National Agriculture Policy, 2015
- e. Agricultural Sector Strategic Plan and Investment Plan 2010/11-2014/15;
- f. Biotechnology Bill 2017
- g. The 2003 National Agricultural Research Policy;
- h. Uganda Organic Agriculture Policy, July 2009;
- i. Water Resources Policy, 1995;
- j. The National Gender Policy, 1997;
- k. The National HIV/AIDS Policy, 2004;

The Legal Framework

The applicable legal instruments to the ECAAT-P project include:

- a. Constitution of the Republic of Uganda, 1995
- b. The National Environment Act, Cap 153
- c. The Agricultural Chemicals (Control) Act, No. 1 of 2006
- d. The Occupational Safety and Health Act, 2006
- e. Control of manufacture, etc. of agricultural chemicals Act Cap 29
- f. The National Agricultural Advisory Services Act, 2001
- g. Employment Act, 2006
- h. The Children Act
- i. The Agricultural Seeds and Plants Act (Cap 28)
- j. Environmental Impacts Assessment Regulations, 1998
- k. National Environment (Waste Management) Regulations, 1999
- l. The Local Governments Act (Cap 243)
- m. Land Act, Cap 227
- n. The Public Health Act, 1964
- o. Uganda National Bureau of Standards Act, Cap 327
- p. The Workers Compensation Act, Cap 225

World Bank Safeguard Policies

The Project has been assigned Environmental Assessment Category B and triggers the following safeguards policies:

- a. OP 4.01 Environmental Assessment;

- b. OP 4.04 Natural Habitats (some project activities may rely on natural habitat areas such as wetlands);
- c. OP 4.04 Forests (some activities under Component 1 may involve forestry related activities).
- d. OP 4.09 Pest Management (application and handling of pesticides);
- e. OP 4.10 Indigenous People (because ECAAT-P) is a national project hence, its implementation assumes a national outlook, with possibility of being hosted by IP-areas;
- f. OP 4.11 Physical Cultural Resources (because of possible excavations during laboratories rehabilitations); and
- g. OP 4.12 Involuntary Resettlement (access of construction materials for lab works etc.);

Other safeguards tools for ECAAT-P

Under the study for ECAAT-P safeguards, the following other documents have been prepared in line with the World Bank safeguards policies triggered by the project.

These are:

- a. Pest Management Plan;
- b. Climate Risk Analysis and GHG Analysis report;
- c. Policy Framework for Vulnerable and Marginalized People;
- d. Gender Policy Framework; and
- e. Resettlement Policy Framework.

Positive Impacts of ECAATP

Some of the key positive impacts of ECAAT-P Project will include:

- a. ECAAT-P Project presents a window of opportunity for enhanced regional cooperation in areas of transforming agriculture and guaranteeing food security for the region's population who for long grapple with crude and rudimentary farming practices;
- b. ECAAT-P Project presents a window of opportunity for enhanced regional cooperation in areas of transforming agriculture and guaranteeing food security for the region's population who for long grapple with crude and rudimentary farming practices;
- c. The project will support conservation efforts towards cassava breeding by putting in place state-of-art facilities for the collection and conservation of cassava germplasm thereby buffering any potential catastrophic risks in case of epidemic outbreaks on the crop as did occur in 1980's and 1990's with the outbreak of Cassava Mosaic Disease (CMD);
- d. Implementation of project works will provide an avenue for short term employment especially for the local population which will be a source of short-term income and improved household livelihood;
- e. The project will generate critical skills in highly demanded and specialized trainings in artificial insemination, embryo transfer, non-pregnancy diagnosis and heat synchronization which will lead to production of good quality livestock breeds for improved beef and dairy production thereby transforming the sector;
- f. The project through its interventions will put in place, farm machinery in terms of tractors and their implements, irrigation facilities as well as threshers which will transform modes of production from traditional hand based to modern equipment assisted production with its attendant benefits in terms of increased acreages and production;
- g. Interventions in ECAAT-P will enhance research in poultry thereby improving breeds and production which directly translates to better income, food security and improved livelihoods at household levels since poultry is kept in virtually all homesteads;
- h. Enhancing technology of production along the entire commodity value chains, including providing farmers with access to technical knowledge and improved seeds and breeds;

- i. Developing critical skills to meet the growing needs of the current and future food systems, including skills required by the private and public sectors;
- j. The project will lead to increased scientific knowledge on climate vulnerability and GHG emission of the agricultural sector and put in place, measures to reduce such climate risks thereby ensure sustainability in production and productivity of the sector;
- k. Forming partnerships and alliances that are capable of connecting farmers with markets so as to enable farmers to understand market needs and produce for the market;
- l. The project will put in place, power interventions such as solar and standby generators that will guarantee power supply hence, ensure continued functioning of research programs. These interventions will likely be in forms of solar power which will reduce emissions of carbon dioxide from traditional power generation;
- m. Facilitating policy and regulatory environment that enables regional collaboration in developing solutions along the value chain and encourage private sector participation, including in Research and Development (R&D);
- n. The project will support the construction of satellite storage facilities to feed into the warehouse receipt system. Construction of storage facilities which is envisaged in the project will address lack of post-harvest processing and storage equipment as well as of in-appropriate marketing systems which make the agricultural smallholder producers vulnerable to middlemen especially during bumper harvests. The storage facilities will address postharvest losses which are up to 30% in some regions, smallholder farmers sell their product almost immediately after harvest, when prices are very low, thereby losing market share. This will allow smallholder farmers to store their products safely and conveniently as they wait for better market prices and to also ensure quality and standards in the traded commodities;
- o. ECAAT will support the equipping of six border post laboratories which is expected to reduce the transaction costs of sending samples to Kampala/Entebbe and facilitate regulation and control of trans-boundary animal diseases. This will increase confidence of exporters/importers of Ugandan livestock and livestock products. In addition, the transport facilities when provided to the laboratory staff will help in quick transportation of samples in cases where there is a need to conduct further analysis for particular diseases. They will also help staff to conduct regular monitoring of the border areas to ensure that there is no illegal trade in animal and animal products across the borders;
- p. Under ECAAT, it is proposed to establish a dairy cattle export biosecurity facility to enable quarantine of this germplasm that are leaving the country and those that are incoming. The only facility established in the 1960s has recently closed as a result of the expansion of the Entebbe international airport. The proposed facility will be established at Sanga field station which is strategically located connecting dairy farmers from a bigger part of the country. The facilities will offer quarantine services to both private and public farms;
- q. ECAAT will support Busitema to improve training infrastructure and equip the existing incubation center that lacks equipment for agricultural mechanization like Planters, subsoilers, Ridgers, weeders, harvester, chemical applicators, Lysimeters, open drip tubing, Sprinkler test facility, dryers, grinding machines, pressing machines etc.) which are all necessary in skilling students. The center will enhance professional skills of staff and students and adapt and transfer well researched technologies from the region. It will also offer refresher and short courses to professionals and the informal sector respectively including maintenance and repair of general machinery. These interventions will therefore provide much needed technologies for agricultural transformation;
- r. ECAAT will address the infrastructure needs at the School of Food Technology, Nutrition and Bio-engineering (SFTNB) at Makerere university by expanding the space to cater for the new businesses of graduate incubates thereby promote business start-ups among the youth and women for the commodities through a suitable funding mechanism to support youth and women in procuring equipment and working capital and also build national capacity for designing, fabricating and

maintaining agro-processing equipment-- currently, equipment for food processing is imported. ECAAT will now support the introduction of entrepreneurship across all disciplines; and

- s. Investments geared towards Industrial/commercialization of selected commodities in this project will bring about economic development both at household and national levels. For instance, a commodity like cassava presents a host of products for many uses and applications for improved livelihoods.

ECAAT PROJECT NEGATIVE IMPACTS AND MITIGATION MEASURES

Negative impacts of laboratories rehabilitation and their mitigations measures:

- a. Fears over land acquisition and related resettlement issues will not arise because, the facilities to be rehabilitated are existing i.e. laboratories, insectary rooms and entomology and greenhouses;
- b. Rehabilitation of laboratories works will likely attract laborers to the project areas which can trigger HIV/AIDS concerns and it is proposed that, the project will source local labor from within the nearby communities to reduce instances of relocating workers thereby increasing chances of HIV/AIDS;
- c. The process of demolition of sites to be rehabilitated will generate construction waste (debris etc). Where feasible, some of the usable demolition and excess construction material can be recycled wherever possible, and disposal of unusable material will be done in an environmentally sound manner with guidance of supervising engineer;
- d. The works will bring about extraction of construction materials which will lead to degradation of such sites especially borrow areas. This is to be mitigated by restoring the sites to acceptable standards by NEMA and the DEOs in such areas;
- e. Construction waste management which will be mitigated by restoration of sites through clean-up activities routinely and at the end of the project and such will be certified by NEMA and the DEOs;
- f. Temporary disruption in the delivery of services in the research laboratories during project implementation. This shall be addressed through advance relocation information which will be shared with both the workers and the affected researchers for purposes of preparing them for the relocations amongst other interventions;
- g. Fears of possible disruption of utility services in the laboratory and workshops facilities shall be addressed through working with utility providers i.e. electricity supplier (UMEME) to effect safe disconnection of power supply to avoid possible electrocution and after completion of works, undertake to restore power supply to the affected facilities. In such cases, utility companies/operators shall be notified in good time;
- h. Indoor air quality deterioration due to dust from renovation works: Contractors shall use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring;
- i. Improper management of construction works: waste hoarding at site before disposal shall be at designated places and considering site lay-out in order not to block any exit routes and emergency routes;
- j. Traffic safety issues while works are on-going will be addressed through contractors adhering to speed limit of 25km/hour while in the premises of the works;
- k. Health risks from improper laboratory waste management: these is being collected, stored and disposed by private service providers hired by NARO in line with NEMA as well as approved WHO guidelines and best practices;
- l. Potential risks on injury to laboratory/workshops staff through construction activities: the contractors shall cordon off areas under construction and regulate access to active sites by non-construction personnel at all times;

- m. Occupational safety and health (OSH) risks for contractors: contractors shall provide all workers with requisite protective gear. In addition, the workers will be inducted to safety drills on the project and a schedule for such will be put in place by the contractors;
- n. Potential loss of vegetation: stockpile areas shall be fully restored after project works to addressed through appropriate restoration of stock-pile sites after use of materials;
- o. Fears over possible use of hazardous construction materials will not arise because, a majority of materials for use in the rehabilitation works will be bought locally, and the contractors will ensure that, the materials fulfill the requirements for the intended use and do not contain any hazardous materials such as asbestos or lead;
- p. Public health concerns emanating from workers in terms of irresponsible urination amongst others is to be managed through use of existing public urinals in the facilities and incase this is not feasible; the contractors will provide their own public areas which must be on gender basis and such will be demolished and areas fully restored;
- q. Rehabilitation of laboratories will likely cause damage to public utilities in the laboratories. However, measures will be taken to minimize any damage of public infrastructures that exist in the laboratories (electricity, water supply, drainage) and the possibility of water retention/ponding that will provide breeding sites for disease vectors like mosquitoes;
- r. Potential risks of fire outbreaks likely to be triggered through cigar smoking, faulty power connections: measures such as warning signage, fire-fighting equipment shall be in place can be used to address such concerns;
- s. Payment of salaries and wages is sometimes of concern on sites and it is proposed that, workers be issued with contracts before commencement of work; and
- t. Following completion of the rehabilitation works, NARO and its stakeholder agencies as well the World Bank and Ministry of Works and Transport (its Department of Construction Management) will jointly inspect the laboratories facility, mobilizing relevant experts as may be necessary, to ascertain that the facility is safe, habitable, and ready for use. Training of facility staff will incorporate environmental health, environmental and social safeguards and quality considerations in all relevant areas of insectary management and will form a core component of the quality assurance and infection prevention approaches at the insectary.

Climate change in Uganda

A study on the Climate Change Profile for Uganda by the Dutch Sustainability Unit under the Norwegian Commission for Environmental Assessment, indicates that in comparison of records from 16 different climatic zones in the country over two 30-year periods, i.e. from 1951 to 1980 and from 1981 to 2010, the data overall indicate no clear changes in annual rainfall in Uganda (save for a modest decrease in the northern districts of Gulu, Kitgum, and Kotido, as well as Kasese in the west). However, rainfall patterns are expected to change –leading to a potentially less favorable rainfall distribution over the year. Analyses moreover identified a statistically significant increase in temperature between the two 30-year periods, ranging from 0.5-1.2°C across the country. Similar to the United States Geological Society (USGS) findings, observes that, the magnitude of observed warming, especially since the early 1980s is large and unprecedented within the past 110 years, representing a large deviation from the climate norm. The above indicates that most parts of the country can be said to be at risk of prolonged dry spells and droughts and occasional floods.

Greenhouse Gases-GHG

Between 1990 and 2012, Uganda’s GHG emissions grew 50% with average annual change of 4% from the agricultural sector. The agricultural sector has the highest emissions, contributing about 46.25% (22.38 Mt CO₂e) to the country’s total GHG emissions. The four main sources of GHG emissions from the agricultural

sector include enteric fermentation at 42.8%, manure left on the pasture 31.1%, burning savanna 12.9% and cultivation of organic soils at 4.8%. In spite of these low emissions rates, the country is highly committed to contribute to global efforts to reduce GHG emissions¹.

Project Negative Impacts

The likely negative environmental impacts of ECAAT-P are limited and mainly arise from: rehabilitation and improvement in the functionality of agricultural research laboratories; establishment of efficient water use storage facilities; storage, application and disposal of pesticides. The other issues will relate to access to and exit from lands for experiment research plots, this requires updating the framework template MoU in place. All aspects of pesticides will be managed through a Pest Management Plan which has been prepared as part of this ESMF. It is also important to note that, livestock related interventions if supported by ECAAT-P have potential to generate Greenhouse gases and those issues have been addressed under the Climate Risk Analysis report equally prepared alongside the ESMF.

PROCEDURES FOR ENVIRONMENTAL SCREENING AND ASSESSMENT

The classification of subprojects into their appropriate environmental categories will be based on the provisions of the World Bank Operational Policy on Environmental Assessment (OP 4.01). The environmental and social screening of each proposed sub-project will result in its classification in one of the three Environmental Assessment Categories - A, B or C, depending on the type, location, sensitivity and scale of the subproject and the nature and the magnitude of its potential environmental and social impact:

Category A: An ESIA is always required for projects that are in this category. Impacts are expected to be adverse, sensitive, irreversible and diverse. The impacts under this category affect broader area than the sites or facilities subject to physical works. **Such subprojects would require a full ESIA and detailed ESMP. Given the nature of the activities proposed under ECAAT project, there will be no project activities qualifying for this categorization.** **Category B:** Any project which is likely to have potential environmental and social impacts, which are less adverse than those of EA Category A projects, on human populations or environmentally important areas. **Although an ESIA is not always required, some environmental analysis is necessary. Such subprojects would require an ESMP. Given the nature of project components under ECAAT project, most of the activities fall under this EA Category B and will require preparation of an ESMP.** **Category C:** Any project which is likely to have minimal or no adverse environmental and social impacts. Beyond screening no further ESA action is required. **No assessment would be required under World Bank requirements. The ECAAT-P Project has been assigned Environmental Category B.** Therefore, no sub-project is expected to fall under EA Category A.

The key regulations for environmental and social assessment in Uganda include the National Environment Act, the EIA Regulations, 1998, the EIA Guidelines of 1997 and the National Environment (Audit) regulations, 2006. The National Environment (Environmental Impact Assessment) Regulations, 1998 define the role of ESIA as a key tool in environmental management, especially in addressing potential environmental impacts at the pre-project stage.

Key steps in Environmental & Social Assessment under OP 4.01

- a. **Step 1: Screening of Activities and Sites:** NARO, the national implementing agency), through its PIU will carry out scoping and screening of the sub-projects using the Environmental and Social Screening Form (ESSF). The ESSF should also identify the potential socio-economic impacts that will require mitigation measures and or resettlement and compensation.
- b. **Step 2: Assigning the appropriate Environmental Categories:** NARO will then assign the appropriate environmental category to the subproject based on the information contained in the ESSF and the national criteria for categorization.

¹ FAO 2015

- c. **Step 3: Carrying out Environmental Assessment:** The ESIA will be conducted by the consultancy firms registered by NEMA. However, Project Briefs may be prepared by non-NEMA registered persons. A Project Brief doesn't require preparation of ToRs but their approval is done by NEMA.
- d. **Step 4: Public Consultations and Disclosure:** will be initiated during the scoping and ESIA preparation stages and views of stakeholders (general public and lead agencies) have to be included in a Project Brief as well. Public consultation will also be an integral part of the process throughout the planning and execution of the project. MAAIF will interact closely with PAPs/communities, project personnel, government departments, NGOs right from the early stages of the project preparation on a regular basis for developing and implementing the respective project ESIA/ESMPs and RAP where applicable.
- e. **Step 5: Review and Approval:** Following internal review of the ESIA/ESMP or PB, by NARO and the Bank the ESIA or PB will be forwarded to NEMA for final review and decision (approval or disapproval).
- f. **Step 6: Environmental Monitoring:** Environmental and social monitoring aims at checking the effectiveness and relevance of the implementation of the proposed mitigation measures. The monitoring indicators will be developed by implementing agencies' Environmental Specialists based on the mitigation measures and the ESMP.

PROPOSED ECAAT-P ESMF IMPLEMENTATION

Indicative ESMF Budget for ECAAT-P

N ^o .	Item/Activity	Cost in USD				
		Year 1	Year 2	Year 3	Year 4	Year 5
01.	Mobilization and training in environmental and social safeguards requirements for NARO Secretariat, NCoL, NCoS and SFR/SFEs.	25,000	15,000	15,000	10,000	10,000
02.	Building the capacity of NARO to institutionalize safeguards management.	65,000	55,000	50,000	50,000	50,000
03.	Facilitation of Local Government to mobilize farmers, create awareness and provide technical guidance.	40,000	20,000	20,000	20,000	20,000
04.	Monitoring agro-chemicals aspects by UNBS and its stakeholders; ACB, GAL, and DCP	35,000	30,000	30,000	25,000	15,000
05.	Environmental Impact Assessments for industrial developments for some products	55,000	50,000	15,000		
07.	Environmental and Social Audits		15,000	15,000		25,000
Annual Total		220,000	185,000	145,000	105,000	120,000
Total Budget Estimate for ESMF Implementation		775,000				

ESMF DISCLOSURE

This ESMF will be disclosed in compliance with relevant Ugandan regulations and the World Bank Operational Policies. At the national level, once the ESMF is finalized, NARO will disclose it in the print media. A summary of the ESMF will be published in the newspaper dailies preferably the New Vision and the Monitor newspapers. Apart from the summary, the NEMA and NARO will upload the ESMF and other safeguards for ECAAT-P onto its website <https://www.naro.go.ug/> and invite the public to access and review the documents. NARO will also provide copies of the respective ESMF, PMP, RPF and other safeguards documents of the project to the public in its public libraries in its research institutes who will be participating in the project. The ESMF alongside other safeguards documents will be disclosed by the World Bank at their external website and made available to any interested persons for public access and for public information and comments/feedback as will be necessary.

1 INTRODUCTION

1.1 ECAAT Projection Description

Like its predecessor EAAPP-I, ECAAT is a regional project that will promote regional integration while meeting the eligibility criteria for International Development Assistance (IDA) of the World Bank. The eligibility criteria for regional IDA is met because: (i) the project includes more than three countries; (ii) the project generates goods of a public nature that will be shared widely among participating countries (and most probably beyond) while providing mechanisms to respond to common challenges (e.g. outbreaks of crop and animal pests and diseases and natural disasters such as drought); (iii) there is clear evidence of regional commitment to the project, building on the regional collaboration established in the first phase (EAAPP-I), and most recently demonstrated by very constructive consultations during the multi-country project identification mission workshop of April 2-13, 2017 which formed the basis for this proposal and where countries confirmed interest for the project and its proposed objectives and technical components; and (iv) the project will provide a platform for policy harmonization across the region to create an enabling policy and regulatory environment for regional collaboration in development, transfer, and exchange of technologies – as well as promote regional integration of markets for food commodities. Four countries have already requested the project in writing (Uganda, Tanzania, Kenya, and Burundi) and competent officials in three more countries have confirmed interest to participate in the project (DRC, RoC, and Rwanda).

1.1.1 International Partners involved in ECAAT

ECAAT will benefit from Consultative Groups in Agricultural Research (CGIAR). For instance, two members of CGIAR namely International Institute for Tropical Agriculture (IITA) and Centre for Tropical Agriculture (CIAT) that are already key partners in the development of cassava value chains for African, and Central and Southern American countries, respectively will be partners in this project. Through their sub-regional Offices, IITA and CIAT have established a strong functional partnership with National Agricultural Research organizations, Universities, International Non-Governmental Organization and key Private Sectors promoting cassava in the member countries. In addition, the project countries will benefit from the Global Cassava Development Strategy Consortium with over 21 agencies comprising CGIAR, UN, NARS, Universities, SRO, International NGOs across the Globe. The Consortium is coordinated by The Global Cassava Partnership for the 21st Century (GCP-21) which promotes interface through International Conferences where research break through and future prospects are shared with a view of promoting impact-oriented research efforts to transform society.

ECAAT will benefit from International Rice Research Institute (IRRI) and Africa Rice that are already key partners in the development of rice value chains in Africa and Asia. Through their sub-regional Offices, Africa Rice and IRRI have established a strong functional partnership with National Agricultural Research Organizations, Universities, International Non-Governmental Organization and key Private Sectors promoting rice in the member countries. AfricaRice is a pan-African intergovernmental research association of member countries that oversee research and development of rice. AfricaRice is also a member of the Consultative Group of International Agricultural Research (CGIAR). It is the only CGIAR whose operation is managed by member states. All the ECAAT countries ascribe to AfricaRice with Uganda, Rwanda, Ethiopia, DRC and Cameroun being member states. The mission of AfricaRice is to contribute to poverty alleviation

and food security in Africa, through research, development and partnership activities aimed at increasing the productivity and profitability of the rice sector in ways that ensure the sustainability of the farming environment in partnership with NARS. The NARS in partnership with AfricaRice work together in priority setting and implementation of research for development activities. Collaboration are reinforced through the establishment of Task forces mechanism with NARS and private sector personnel of each country. The task forces are collective R4D efforts on critical thematic areas in the rice sector based on the principles of sustainability and build-up of critical mass at the national and regional level. This give ECAAT a very good coordination platform. In addition, the project countries will benefit from International Network for the Genetic Evaluation of Rice (INGER) to ensure access to the best stress-tolerant germplasm from Asia and Africa.

In Eastern and Southern Africa wheat is traded through the Eastern Africa Grains council (EAGC) which has a presence in each of the Eastern and Southern Africa countries. It has stakeholder representation in the main sectors of the grain value chain including traders, farmers and processors. ECATP will collaborate with EAGC in supporting structured grain trade within the region. ECAAT project will also be strengthened through networking and collaborative research under CIMMYT, ICARDA, IAEA, FAO and universities such as University of Sydney, Minnesota University, University of Aarhus.

All the East African countries are members of the Pan Africa Bean Research Alliance (PABRA). This is an alliance of the International Centre for Tropical Agriculture (CIAT) with over 30 National Agricultural Research Institutions, and more than 350 partner organizations in Sub-Saharan Africa (SSA) that are engaged in public and private partnerships to develop bean value chains. The links amongst the countries and networks are maintained through a jointly developed framework, joint planning, agreed division of responsibilities, joint implementation of activities and reporting; which facilitate the sharing of knowledge, the exchange of germplasm and the dissemination of technologies and methods across national frontiers. PABRA and CIAT will support the project in efforts geared towards increased bean production and productivity for sustainable livelihood of particularly small holder farmers in Uganda and the region.

The mechanization and Irrigation component of ECAAT will collaborate with a number of international partners with whom NARO is already working. The key partners are AfricaRice, JICA, IRRI, FAO, IITA, CIAT, CIMMYT, EMBRAPA, BILL and MELINDA GATES. Through the collaboration, ECAAT will benefit from the long and versatile experience these partners have in smallholder mechanization and irrigation, specifically designs and prototypes of equipment and technical knowledge.

1.1.2 ECAATP Components (Figure 1)

1.1.2.1 Component 1: Regional Commodity Program

The objective of this component is to enhance regional collaboration in the development of agricultural technologies, innovations and management practices (TIMPs) and product utilization for selected commodities and facilitate exchange and dissemination of the TIMPs across national boundaries. It is also to strengthen selected centers to lead and guide in development and exchange of TIMPS and transfer of scientific knowledge across the region with a focus on two types of centers namely, regional centers with a regional mandate and the national centers with institutionalized linkages to the selected regional centers.

Sub-component 1: Establishment and Strengthening of Rgional Centers of Leadership and National Centers of Specialization

The objective of this sub-component is to strengthen selected centers to lead and guide collaboration in development and exchange of TIMPS and transfer of scientific knowledge across the participating countries. Two types of centers will be supported: (a) Regional Centers of Leadership (RCoL) with a regional

mandate on priority commodities and cross-cutting thematic areas; and (b) National Centers of Specialization (NCoS) that will develop institutionalized linkages with the RCoL. The core regional functions/activities of the RCoL are to: (i) lead the collaborative identification of regional priorities for Research and Development (R&D) to address current and emerging challenges in agriculture, and considering the specific roles of women in agriculture value chains; (ii) planning and implementation of priority regional R&D programs, including coordinating exchange/transfer of TIMPs across participating countries; (ii) developing climate-smart innovations and solutions along value chains, including post-harvest management, food safety, and development of food and agricultural products; (iii) establishing linkages with global sources of knowledge, including CGIAR centers, US land grant universities, and national and regional universities; (iv) establishing strong linkages with the private sector, especially agribusinesses involved in both input and output markets for food commodities and products, including for the purpose of planning, development, and dissemination of TIMPs; and (v) developing gender sensitive modules on how to work with women farmers as well as creating a role for women organizations (e.g. African Women in Agricultural Research and Development) in decision making at the commodity/thematic Networks. In Uganda, this sub-component covers the following:

Support Regional Centre of Leadership-RCoL

ECAAT will support *Cassava Regional Centre of Leadership* (RCoL) which has a regional mandate on cassava through improving its infrastructure, human and institutional capacities. The project will support the following developments:

Establishment of specialized regional plant growth facility to enable the study of interactions between plants and their environment and address the effects of climate change;

Establishment of an Insectary and Entomology laboratory;

Support building the capacity at NaCRRRI for indexing virus free materials;

Biosafety laboratory which a specialized Biosafety level II greenhouse for the conservation of regional germplasm under controlled growth conditions will be established; and

Acquisition of additional equipment to equip laboratories required for expanded and advancing research scope of the CRCOL.

Support to National Centers of Specialization/Leadership

Network of national centers of specialization collaborating with CRCOL: Under ECAAT, the project will provide support to the development of a network of national centers of specialization to collaborate with the CRCOL in the development of TIMPs along the cassava value chain. These centers of specialization will include: (i) National Centre of Specialization for Mechanization, Post-harvest Management and Irrigation; and (ii) the National Center of Specialization in Agri-food System and Agribusiness. Under the NCoS in Mechanization, Post-harvest Management and Irrigation consisting of two institutions; Namalere Agricultural Engineering and Appropriate Technology Research Center (AEATREC), and Busitema University, ECAAT will support strengthening of human and infrastructure capacity for mechanization and irrigation research and development. These investments will develop machinery products and services that enhance productivity, reduction of post-harvest losses, maintain product quality and improve marketable volumes. The mechanical workshops and testing laboratories capacity will be remodeled and equipped with equipment and tools to handle design, fabrication and testing. Investments will also include acquisition of selected prototype machinery and tools for post-harvest management, processing, and irrigation for customization to suit local conditions. Investments will include support to the workshops and testing laboratories to attain accreditation for design, evaluation and certification of agricultural machinery. The necessary skills development will be provided through the alignment with Busitema University.

In addition, ECAAT project will support the strengthening of selected institutions to become National Centers of Specialization that will be part of the networks of the various Regional Centers of Leadership for the different commodities that Uganda has prioritized. These NCoS will include: Dairy, Rice, Wheat, Beans

Poultry, Oil Seed crops and Land Husbandry. At the NCoS for Rice at NaCRRI, ECAAT will support strengthening human and infrastructure capacity; and develop platforms and avenues for information and knowledge management. Investment will also be made to increase capacity for mechanization and irrigation to produce breeder and foundation seed to meet the demand of the private sector.

Highlights of interventions NCoS in ECAAT will be as follows:

Rice National Centre of Specialization: The national institution that is leading rice research programme in Uganda is NaCRRI, Namulonge as such, resources under the ECAAT will be committed towards strengthening human and infrastructural rice-research capacity at NaCRRI with investments placed in civil works in the rehabilitation and maintenance of existing rice facilities at NaCRRI.

Wheat National Centre of Specialization i.e. Buginyanya Zonal Agriculture Research Institute (BuZARDI) is leading the research and development in wheat though it has capacity gaps requiring updating and equipping laboratories, infrastructure and support structures for wheat research and development through refurbishing and equipping the existing laboratory block, setting up of modern screen houses with storage facilities to enhance its capacity and avail high quality market preferred.

Dairy Research National Centre of Specialization: Dairy research activities are handled at NaLIRRI and NAGRC&DB. Under ECAAT, resources will be invested in the renovation, equipping and remodeling of the dairy cattle research facility at NaLIRRI-Nakyesasa into an accredited multi-user biosecurity level-2 research and technology validation facility. The project will rehabilitate the National Assisted Reproductive Technology Training Centre at NAGRC&DB-Ruhengere to offer highly demanded specialized training in artificial insemination, embryo transfer, non-pregnancy diagnosis and heat synchronization.

Beans National Centre of Specialization: The Ugandan bean research and development program has a good capacity for bean research along the bean value chain. However, ECAAT will need to invest in key areas for the beans research program especially in biofortification, drought tolerant bean research, snap bean breeding and seed production this will be through re-modelling and equipping laboratories.

Oil crops National Centre of Specialization: The oil seeds research at NaSARRI has a very advanced programme. For instance, NaSARRI is the regional center for breeding of groundnut rosette virus (the most important virus disease of groundnut in sub-Saharan Africa) and Leafminer research (a pest which is gaining importance throughout Africa). However, to augment its performance, the key infrastructural investments that ECAAT will support at NaSARRI include a multi-functional laboratory facility, modern drought screening and phenotyping facility, mechanization, Transport, and skilled human resources. With reference to mechanization interventions, ECAAT key areas of investment will include farm machinery, tractor and its implements and irrigation facility alongside threshers, planters.

National Center of Specialization for Poultry: The national center of specialization in poultry will be located at NaLIRRI-Nakyesasa. The project will support the center to develop/rehabilitate physical poultry infrastructure that will include housing structures for breeding stock, hatchery block and feed storage facilities as well as feed mixing machine. Other investment areas include machinery (tractor, ploughs, irrigation etc) and vehicles; a 50,000-capacity incubator for hatching 1-day old chicks. Others include installation of thermal power generation capacity (generators) to ensure unbroken cold chain where needed, heat and lighting.

National Centre of Leadership in Mechanization, Post-harvest management and Irrigation: ECAAT seeks to strengthen human and infrastructural mechanization and irrigation-research capacity at Namalere Agricultural Engineering and Appropriate Technology Research Centre (AEATREC). ECAAT mechanization and irrigation investments will provide machinery products and services that enhance productivity, reduce post-harvest losses, maintain product quality and improve marketable volumes. The mechanical workshops and testing labs will be improved by remodelling and equipping the facilities with selected specialised equipment and tools to handle design, fabrication and testing work. In addition, ECAAT will invest in the development of a fully-fledged small implements production facility.

National Centre of Specialisation in Agri-food System and Agribusiness: National Agricultural Research Laboratories (NARL), NARO's institute that leads in post-production value addition research, led the regional value addition research for supported commodities under EAAPP-1. Therefore, ECAAT will invest resources in equipping the food and product development laboratories with production lines, refrigerated vehicles and a laboratory maintenance unit for the whole of NARO. ECAAT investments will provide machinery products and service inputs including motorized cassava seed processors for cassava production; low cost irrigation motorized pumps, low-head drip irrigation kits, and greenhouse irrigation kits and sprinklers for smallholder farmers amongst others.

National Centre of Specialization in Land Husbandry Management: Land husbandry activities are mainly handled at the National Agricultural Research Laboratories (NARL)–Kawanda and the National Forestry Resources Research Institute (NaFORRI). At NARL – Kawanda, there is a need to refurbish the laboratories with civil works and state of the art analytical equipment, leading to an accredited regional soil and water analytical laboratory. At NaFORRI, the infrastructural development for agroforestry will be the establishment of a tree seed bank. In the face of climate change, a tree seed bank will ensure that valuable tree species are conserved thereby saving them from extinction. Tree species diversity ensures ecosystem resilience, giving ecological communities the scope required to withstand stress.

Sub-component 2: Collaborative Development, Transfer and Dissemination of TIMP's

The objective of this sub-component is to facilitate the planning, development, transfer, exchange and dissemination of TIMPs across participating countries—and in partnership with the regional projects for West Africa (WAATP) and Southern Africa (APPSA). In particular, this subcomponent will support technology generation and dissemination activities (extension, strengthening of innovation systems). Some of the salient interventions will include:

Priorities for Development of TIMPs – Cassava: Cassava production in the country and region is affected by a range of diseases and pests. In particular, viral diseases such as Cassava Brown Streak Disease (CBSD) and Cassava Mosaic Disease CMD form the main threat to cassava production in the country. As such the following are planned:

identifying resistant varieties to common pests and diseases in the eastern African region through participatory variety selection of regional germplasm for on-farm production;

establishment of incubation centers, which are intended to be used as engines for commodity commercialization;

introduce more appropriate technologies for processing cassava and to widen its utilization base through developing new processed products and their commercialization;

invest in regional participatory variety selection of elite provitamin-A clones identified under EAAPP to come up with superior provitamin A cassava varieties for on-farm production;

investments will therefore be made in development of pest and disease predictive systems for the region through seasonal monitoring survey of cassava diseases and pests;

investments will also be made towards development of suitable and cost-effective cassava pest management strategy for effective management of major cassava pests;

deployment of phyto-sanitation and host resistance will be enhanced through promoting community phyto-sanitation for CBSD control; and

To avoid a repeat of the catastrophic loss of over 500 cassava local germplasm that occurred in Uganda when CMD epidemic struck in the 1980's and 1990's, considerable investment will be made to further enhance the collection and conservation of core germplasm in Uganda initiated under EAAPP I.

Undertaking arrange of studies such as baseline, socio-economic, market and profitability analysis are necessary for understanding the complex setting of a farmers' decision-making as well as serving as benchmarks for measuring the success of the proposed project intervention areas and act as reference point for making management decisions.

Deliberate measures for gender mainstreaming occasioned through *gender studies and gendered-interventions, promotion of gender-responsive seed credit models, promotion of best-gender marketing aggregation, gender awareness creation and capacity building, capacity building in gender mainstreaming amongst others.*

1.1.2.2 Component 2: Enabling Policies and Improving Access to Markets

The objectives of this component are to: (i) create an enabling policy and regulatory environment for regional collaboration in development, transfer, and exchange of technologies; (ii) improve smallholder farmer's access to regional and national markets for food commodities and products; and (iii) promote effective models for service delivery. In Uganda there are many policy and regulatory issues that affect the agricultural sector from 'farm to fork' i.e. from the production stage to the end user/market. This will require going beyond policies and regulations that address the production challenges to include those that will enhance value addition and market access for the agricultural products identified by the project. ECAAT will address some of these concerns. In this regard, ECAAT, will generally invest resources in (a) regional and national meetings and dialogues among government and private experts to advocate for relevant policies, (b) the formulation of relevant regulations and policy harmonization activities in key areas that affect research, development and trade at national and regional level; and, (c) training to disseminate information about changes to stakeholders (d) capacity building, including operation plan and guidelines, for operationalization of the harmonized systems, policies and regulations that affect development, transfer, and exchange of technologies.

These interventions will include:

Agricultural input policy: there Draft Seed policy 2016 that needs to be merged with the Plant Genetic Resources(PGR) policy. Besides, there is no agricultural input policy in place to regulate actors and enforce standards (e.g. of biofertilisers);

Review and update of the Agricultural Chemical Control Act;

Retooling of Agro-dealers on Safe handling and Advisory Services with regards to inputs.

Review of Animal Feeds Policy 2005 and Animal Feeds Standards to include conserved animal feeds (hay and silage).

Other planned policies-based interventions will include:

National seed certification service, ECAAT will support efforts to popularize the seed policy, seed and plant regulations 2017 through printing and disseminating the seed policy, seed and plant regulations.

The national dairy development policy, the dairy sector in Uganda has been guided by the dairy master plan study of 1995 amongst others. ECAAT will support the development of the policy to effectively address bottlenecks to increased milk production, quality assurance, value addition and marketing, dairy institutional capacity. This will enable the dairy value chain stakeholders to respond to local and international milk market demands.

The national livestock policy, the livestock sub-sector has potential for delivering the dairy products identified under ECAAT and earning substantial foreign exchange and transforming the standards of living among the stakeholders that dependent on the subsector. However, its potential has not been fully exploited. Therefore, a national livestock policy will be formulated to address issues related to: good farm animal genetic resources, livestock nutrition, inputs, animal diseases and pests, livestock marketing inefficiencies, quality assurance of products, research, extension and food security.

Dairy breeding guidelines and animal breeding regulations: The Animal Breeding Act 2001 provides for; development of animal breeding guidelines., formulation of regulations governing artificial insemination., animal breeding and reproduction., trade in genetic materials. ECAAT will support the development of regulations and guidelines to operationalize the provisions of the animal breeding Act.

Marketing of livestock and livestock products policy: The nature of marketing and marketing infrastructure for livestock and livestock products is one of the major challenges to livestock development that is not backed by any policy. To improve this situation and the farmers' access to

lucrative markets, there is a need to formulate an appropriate 'Marketing of livestock and livestock products policy', publish it and disseminate to the public.

Border trade policies: Three of the targeted products namely rice, dairy products and wheat are sensitive products within the EAC Customs Union. The ECAAT project will support the process of negotiations and stakeholder consultations with a view of harmonizing the cross-border trade policies on these particular products and also strengthen the border enforcement to tackle smuggling, transit procedures and other related matters.

Anti-counterfeit bill: The project will also support the enactment of the trade remedies bill to address anti-dumping measures, subsidies and countervailing measures and safeguards for imported products. Dumping and subsidized imported commodities/ products from entering and distorting the market to the disadvantage of the domestic and regional producers. Furthermore, the project will support the development and finalization of the anti-counterfeit bill under the MOTIC which will go a long way in enforcing quality and standards by fighting counterfeit especially in the agro-inputs sector. In fighting the counterfeit products and agro-inputs the project will work closely with key stakeholders such as UNBS, Uganda agro-input dealers association (UNADA) and others.

National seed certification service: The policy and legal framework necessary in giving direction to the industry has glaring gaps. The seed policy that gives direction in the development of the seed industry requires finalization by submission to cabinet. Similarly, the seed and plant regulations 2017 were recently passed but have not been disseminated to stakeholders. The ECAAT will support efforts to popularize the seed policy, seed and plant regulations 2017 through printing and disseminating the seed policy, seed and plant regulations 2017 to various stakeholders in the seed sector. The project will support finalization of the plant variety protection regulations which will lead to establishment of office of registrar of varieties.

Support to Department of Crop Inspection and Certification under MAAIF

The Department of Crop Inspection and Certification (MAAIF) will be strengthened to improve on their operations especially in regulating the quality of agricultural inputs on the market through fighting counterfeits. This will be through the equipping of the various laboratories in the Department i.e the Pesticide Analytical Laboratory, the National Seed Testing Laboratory to International seed testing association (ISTA) standards for purposes of accreditation and the plant pest and disease diagnostic laboratory. Once the National Seed Testing Laboratory is accredited to ISTA, it will support the seed industry in providing seed testing facilities that are accepted at the international level hence access to a wider market. Through the project enforcement activities will be supported to fight counterfeit agricultural inputs (pesticides and seed) on the market.

Uganda Semen Laboratory

ECAAT will also support accreditation of the Uganda Semen Laboratory to enable it access the regional and international animal genetic resources market.

Support to Sanitary and Phyto Sanitary Services

ECAAT will support improvement of agriculture, food production and processing, quality control, and certification practices to give Ugandan producers access to new markets, leading to increased incomes and reduced poverty. This support focusing on public health (food safety), farm incomes (product value) and trade development (sanitary/Phytosanitary export requirements and harmonization of quality and grades standards) will also include training of farmers and processors to improve their ability to apply food safety and quality control tools. ECAAT will also support the working of the inter-institutional working group (Trade, Agriculture and Health) to draft and conduct wider stakeholder consultations on Sanitary, Phyto-sanitary and zoo-sanitary concerns before finalizing the relevant instrument(s).

Construction of storage facilities

Lack of postharvest processing and storage equipment as well as of appropriate marketing systems make the agricultural smallholder producers vulnerable to middlemen especially during bumper harvests. To avoid postharvest losses which are up to 30% in some regions, smallholder farmers sell their product almost immediately after harvest, when prices are very low, thereby losing market share. The project will support the construction of satellite storage facilities to feed into the warehouse receipt system. This will allow smallholder farmers to store their products safely and conveniently as they wait for better market prices and to also ensure quality and standards in the traded commodities. ECAAT will support an extensive field survey to map out the existing and potential small producer organizations that can be mobilized and supported to enter contractual obligations with major commodity buyers. This will be done for the selected products namely cassava, rice, wheat, dairy, beans, oil crops, maize and poultry.

Equipping border post veterinary laboratories

Animals and animal products destined for international markets must be inspected and confirmed to be disease free. During policy harmonization under EAAPP, it was recommended that each project implementing country establishes border post laboratories to facilitate analysis of samples of animal and animal products moving across the national borders. ECAAT will support the equipping of six border post laboratories. This will reduce the transaction costs of sending samples to Kampala/Entebbe and facilitate regulation and control of trans-boundary animal diseases. This will increase confidence of exporters/importers of Ugandan livestock and livestock products. In addition, the transport facilities when provided to the laboratory staff will help in quick transportation of samples in cases where there is a need to conduct further analysis for particular diseases. They will also help staff to conduct regular monitoring of the border areas to ensure that there is no illegal trade in animal and animal products across the borders.

Dairy cattle biosecurity export facility

Ugandan germplasm has been a source of breeding stock (mainly semen and live animals of Friesian crosses, Ankole longhorn cattle and short horn zebu breeds for the region (Rwanda, Burundi, Democratic Republic of Congo, Tanzania and South Sudan. This has fetched reasonable revenue for the breeders of these animals especially from districts of Bushenyi, greater Mbarara, Kiboga, Mukono and Masindi and could escalate as the demand from other regions and abroad is high. There is therefore need to improve the standards of export of live animals in order to tap into the regional and abroad markets at the same time facilitate germplasm exchange within the region. Under ECAAT, it is proposed to establish a dairy cattle export biosecurity facility to enable quarantine of this germplasm that are leaving the country and those that are incoming. The only facility established in the 1960s has recently closed as a result of the expansion of the Entebbe international airport. The proposed facility will be established at Sanga field station which is strategically located connecting dairy farmers from a bigger part of the country. The facilities will offer quarantine services to both private and public farms.

Accreditation of semen and embryo handling facilities (bull and dairy goat studs, semen and embryo laboratories)

Under ECAAT, it is proposed to upgrade these facilities and undertake accreditation to enable export of the highly demanded germplasm, especially of the Ankole longhorn cattle. The accredited facilities will also offer services to private farmers who require to export their germplasm.

1.1.3 COMPONENT 3: Contingency Emergency Response

This zero-cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in Uganda. This contingency facility can be triggered through formal declaration of a national emergency by the competent government authority; and upon a formal request from Government of Uganda to the World Bank, through the Ministry of Finance and Economic Development (MoFED). In such

cases, funds from either an unallocated category or project components will be reallocated to finance emergency response expenditures. The emergency response would include mitigation, recovery, and reconstruction following the disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others. Potential emergencies and the types of activities likely to be financed include the following:

- i. Weather related leading to widespread loses of crops and animal stock Drought, Flooding, Hail storms
- ii. Pest and disease epidemics; Pests such as the Fall Army Worm on cereals, Locusts or birds such as weaver birds devastating grain fields
- iii. Diseases such as Cassava Brown Streak Disease
- iv. Mistakes in seed and planting material labelling resulting in wide spread planting of susceptible
- v. Natural and man-made catastrophes, such as Wild fires, Land slides, Earth quakes, Civil wars.

No.s i and ii will have higher probability of occurrence.

1.1.4 COMPONENT 4: Regional Coordination and National Project Management

The objective of this component is to coordinate the project at the regional and national levels. This component will finance activities related to regional, national and county-level project coordination and management, including annual work planning and budgeting (AWP&B); fiduciary aspects (financial management and procurement); human resource (HR) management; safeguards compliance monitoring; development and implementation of web-based geo-referenced management information system (MIS) platforms; monitoring and evaluation (M&E); and communication strategy and citizen engagement. It has two subcomponents: (i) Regional Coordination and Learning; and (ii) National Project Management and Evaluation.

Sub-component 4.1: Regional Coordination and Learning

The objective of this sub-component is to facilitate regional collaboration and continuous learning process participating countries and technical components. The regional coordination will be undertaken by the ASARECA. Each ECAAT project country will contribute towards the cost of running the regional ECAAT coordination unit, which will be embedded within ASARECA. The ASARECA will ensure that it has adequate capacity to oversee the technical implementation of three main components and create an environment to develop partnerships among the different implementing agencies and participating countries. Uganda will contribute US\$1.0 million to finance the regional coordination and learning activities under ECAAT project. Therefore, ASARECA will coordinate Component 1 and 2 of the project, including the M&E system; and will be responsibilities convening the Regional Steering Committee (RSC) meetings and serve as a Secretariat.

Sub-component 4.2: National Project Management and Evaluation

The objective of this sub-component is to facilitate project implementation, management, and evaluation in each participating country.

National Management of Project

The projects institutional arrangements involve clear mechanisms for regional coordination and national project implementation. At the national level, the project will be managed through a Project Implementation Unit (PIU). The PIU would be responsible for managing implementation of project activities across all implementers in the country. The PIU will develop a robust Monitoring and Evaluation (M&E) and

geographic information system (GIS) to monitor project performance. The project will be managed by the National Agricultural Research Organization (NARO), which will also house the Project Coordination Unit (PCU). The PCU will consist of the National Project Coordinator (NPC), Accountant/Administrator, an Internal Auditor, M&E Specialist, Procurement Specialist, specialists in the project commodity areas, Specialists in Knowledge Management, **Gender and Environmental and Social Safeguards**, Project Administrative Assistant and Transport managers. There will be a Project Steering Committee (PSC) and Technical Advisory Committee (TAC) from stakeholders chaired by the Permanent Secretary, MAAIF. PSC will provide policy guidance for the project. It will also approve annual budgets and workplans. It will meet on quarterly basis and its decisions will be binding. ECAAT will be administered by NARO which will also house the ECAAT Coordination Unit. The unit will consist of the National Project Coordinator, Accountant/Administrator, an Internal Auditor, M&E Specialist, Procurement Specialist, specialists in the project commodity areas, Specialists in Knowledge Management, Gender and Environmental and Social Safeguards, Project Administrative Assistant and Transport managers. For the efficient and effective implementation of the project, components or sub-components implemented under MAAIF headquarters and Ministry of Trade, Industries and Commerce a focal person from appropriate department (e.g. the planning department division) will be appointed. The focal person will provide the required linkage between the ministries and NARO and fast track the implementation of the project activities under their respective ministries. Other Government Ministries (such as Ministry of Gender Labour & Social Development) and Regulatory Bodies (such as National Environment Management Authority and Uganda National Bureau of Standards) will play their respective statutory roles, such as undertaking Health and Safety including management of Labour and Social aspects, Management of Environmental aspects through review of Environmental Assessment reports and issuing required approvals, monitoring implementation of mitigation measures, and undertaking quality assurance based on different standards for agricultural inputs such as pesticides.

At the PCU, the National Project Coordinator will report to Deputy Director General, Research Coordination, NARO. On the other hand, the Cassava Centre of Excellence will have a Coordinator who will report to Director of Research, NaCRRRI. Each of the implementing institutes, organization or department will have a focal person who will be charged with day to day operations of the project at that level. Regionally the project will be a sub-regional organization (SRO) to be identified. In Uganda, however, the National Project Coordinator at the PCU will manage all resources and coordinate all activities of ECAAT at all levels; the project coordinator will be supported by the PCU, Coordinator of Cassava RCoE and the focal persons (with each implementing institution having a team of implementers). Project implementation will follow Government of Uganda procedures and World Bank Policy requirements.

At the regional level, the project would be coordinated by ASARECA. The role of ASARECA includes not only coordinating project activities across participating countries but also facilitating continuous learning through a robust M&E and communication systems. The coordinating team at ASARECA would include a Regional Coordinator and Managers for: (a) the two major technical areas (regional commodity programs and enabling policies and access to markets); (b) fiduciary; and (c) M&E. For each component consortia of collaborating organizations would be established, including regional and international organizations, and the RECs (COMESA, EAC, and ECAAS). The component managers would work directly with respective consortia. A Regional Project Steering Committee (RSC) would be constituted to provide oversight at the regional level and ensure that the project activities contribute to regional priorities and initiatives such as Africa Unions Agenda 2063 and the objectives of regional economic blocs (COMESA, EAC, and ECAAS). Each country would assign a representative from its National Steering Committees (NSC) to the Regional Steering Committee (RSC). In addition, the RSC would include representatives from the relevant RECs (EAC, COMESA, and ECAAS). These arrangements would facilitate a transparent decision-making process that is

owned at both national and regional levels and which contributes to the broader development agenda of the Africa continent

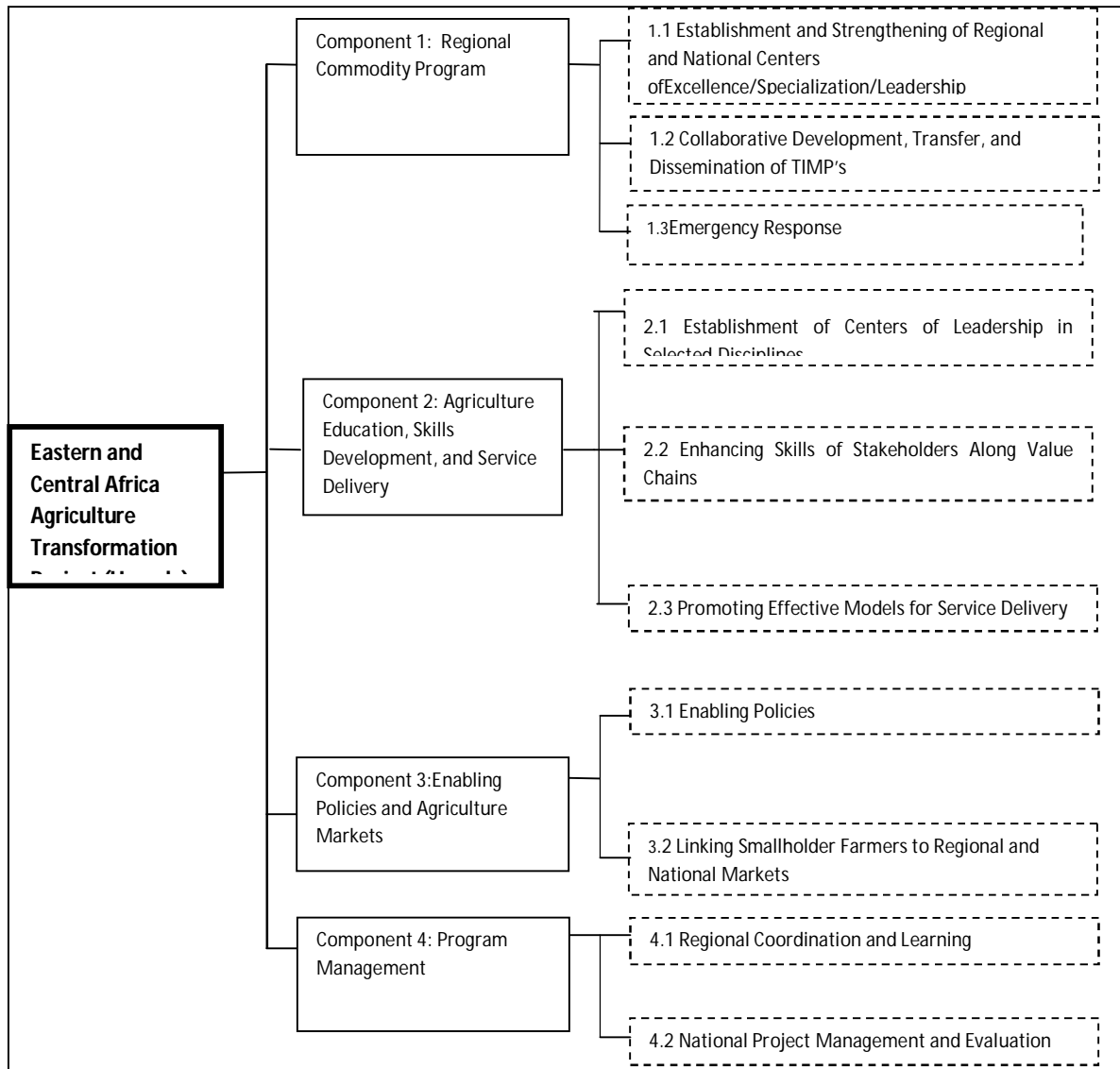


Figure 1: Summary of ECAAT Project²

²ECAATP Project Document, 18th January 2018

1.1.5 Project cost

Table 1: Project Cost Summary		Republic of Uganda	
Project Component		Amount	% Age
1. Regional Commodity Programs			
1.1 Establishing and Strengthening of Regional Centers of Specialization		35.49	35.5%
1.2 Collaborative Development, Transfer and Dissemination of Technologies		21.01	21.0%
Sub-Total		56.50	56.5%
2. Enabling policies and Improving Access to Markets			
2.1 Enabling Polices		4.78	4.8%
2.2 Improving Smallholder Farmers Access to Agricultural and Food Markets		21.72	21.7%
2.3 Promoting Effective Models for Service Delivery		7.00	7.0%
Sub-Total		33.50	33.5%
3. Contingency Emergency Response		0.00	0.0%
4. Regional Coordination and National Project Management			
4.1 Regional Coordination and Learning		1.00	1.0%
4.2 National Project Management and Evaluation		9.00	9.0%
Sub-Total		10.00	10.0%
Total Costs		100.00	100.0%

(Source: Adapted from ECAATP Draft PAD of April 2018 No. PAD2566)

2 The Environmental and Social Management Framework

2.1 Purpose of ESMF

Overall, the purpose of the ESMF is to ensure that interventions under the ECAAT-P will be undertaken in a manner that avoids and minimizes environmental and social impacts as much as possible. Specific project locations have not been clearly identified at this stage, hence it provides a general impact identification framework to assist project implementers to screen the projects and institute measures to address adverse environmental and social impacts. For future projects within the ECAAT-P framework, the ESMF describes the procedures to assess environmental and social risks. This ESMF also provides guidance on how environmental and social aspects shall be identified, assessed and managed.

2.1.1 Objectives

The objectives of the ESMF are:

- a. Establish clear procedures and methodologies for environmental and social planning, review, approval and implementation of ECAAT-P sub-projects under the ESMF;
- b. Prescribe project arrangements for the preparation and implementation of sub-projects in order to adequately address World Bank safeguard issues;
- c. Assess the potential generic environmental and social impacts of envisaged investments in the projects;
- d. Propose generic mitigation measures which will effectively address identified negative impacts;
- e. Specify appropriate roles and responsibilities, and outline the necessary reporting procedures for managing and monitoring environmental and social concerns related to subprojects;
- f. Determine any capacity building and technical assistance that could be needed to successfully implement the provisions of the ESMF in the institutions that have a role in the implementation of the ESMF; and
- g. Establish the funding requirements to implement the ESMF.

2.1.2 Approach in ESMF Preparation

The following were employed in the preparation of this ESMF:

2.1.2.1 Harmonization meeting

The consultant held a meeting on 22nd December 2017 at the World Bank Uganda offices to agree on the scope, deliverables and stakeholders to be consulted during the study. The meeting was attended by the World Bank staff namely; the Task Team Leader for Agriculture, Senior Social Specialist and Senior Environment Specialist. Other members included Deputy Director General NARO, Director for Research, Principal Budgeting Officer, Social Safeguards Specialist for NARO and the Environmental Specialist for ATAAS Project at MAAIF. The meeting provided clarifications on the deliverables, timelines and sounded the need for exhaustive consultations to be conducted during the study.

2.1.2.2 Document Review

Review of the existing baseline information and literature material was undertaken to gain an in-depth understanding of the proposed project. A desk review of the Ugandan legal framework and policies was also conducted in order to internalize the pertinent national legislation and policy framework that should be considered during project implementation. Among the key documents that were reviewed in order to collect baseline information included; ECAAT Draft Project Document of March, 2018; Center for Conflict Resolution (CECORE), 2011: Conflict Early Warning; the Ik of Kaabong District. <http://cecore.or.ug/wp-content/downloads/ik%20report.pdf>; Climate-Smart Agriculture (CSA) in Uganda, 2016; ESMFs from MAAIF for MAAIF, ESMF for Multi-Sectoral National Project, November 2014; Pest Management Plan for Multi-

2.1.2.3 Stakeholder Consultations

2.1.2.3.1 Objectives of the stakeholder consultations

The consultations with these stakeholders were carried out to specifically achieve the following objectives:

- a. To provide information about the project and to tap stakeholder information on key environmental and social baseline information in the project area;
- b. To provide opportunities to stakeholders to discuss their opinions and concerns and accordingly inform project design;
- c. To identify specific interests and the participation of the poor and vulnerable groups that can be enhanced; and
- d. To inform the process of developing appropriate management measures as well as institutional arrangements for effective implementation of the ECAATP.

Consistent with best practice in developing ESMFs, consultations were held during the study and the following highlights the persons met; as part of launch of the study, the ESMF Consultant met top management of NARO led by the Director General and in the company of Director of Research, Social Safeguards Specialist, MAAIF ATAAS Environmental Specialist and Senior Gender, Environmental and Social safeguards Coordinator to discuss the ECAAT-P Project requirements and most especially the ESMF preparation requirements. The meeting served to define the implementation framework for the ESMF and the project in general. Other stakeholder agencies met included NEMA Director for Environmental Compliance and Monitoring, MAAIF Director for Crops and staff from Plant Protection Department as well as staff from Irrigation Department.

2.1.2.3.2 Meetings with research scientists

Field visits were made to the areas where key crop researches will be based i.e. National Crop Resources Research Institute (NaCRRI) in Namulonge, Zonal Agricultural Research Institutes (ZARDIs) especially Kachwekano Zonal Agricultural Research Institute (Kachekwano ZARDI) in Kabale, Bulindi ZARDI, NaSARI and Buginyanya ZARDI. At NaCRRI the Consultant held meetings with senior research scientists for cassava, beans, wheat and rice on a range of aspects ranging from agronomic practices, pest related issues, value addition and working with the communities. The meetings with Coordinator Cassava Regional Centre of Leadership (RCoL) focused on envisaged rehabilitation works on some of its infrastructures especially, the laboratories and measures for management of obsolete equipment and contingency measures during rehabilitation of the laboratories.

2.1.2.3.3 Meetings with farmers

The consultant held meetings with farmer groups on whose lands, research institutes conduct their experimental researches and those who live close to the institutes (Figure 2). The farmers were met on gender basis (i.e. men and women separately) and the discussions centered on how the scientists access farmers lands, terms of usage of the lands, benefits farmers receive, intellectual property rights from research findings, sharing of crop harvests amongst others. The concern from the participating farmers is the increasing need for them to have agreements with the institute on the use of their lands.



Figure 2: Field trials of improved rice varieties in Busukuma outskirts of NaCRRI

2.1.2.3.4 Meetings with non-participating farmers

Two groups of non-participating farmers were met in areas of Busika 5km west of NaCRRI in Namulonge to discuss issues relating to their knowledge about the Institute, how they feel institute could help them improve their farming practices, how they could be part of the institutes work amongst others. It emerged that, the communities met are keen to be part of the institutes working and are willing to offer their lands for projects experimentations under agreed and clear terms.

2.1.2.3.5 Meetings with the private sector players

The Consultant also held meetings with the private sector players namely, Jimmy Sekasi Institute of Catering in Kabalagala in Kampala a highly recognized catering institute offering both certificate and diploma courses in Uganda and covering Food Production Management; food and beverage services, bakery and pastry studies. The Consultant also held meetings with the management of Agriculture, Business and Technology Institute (Agributech) in Serere. The meetings were aimed at discussing areas and modalities of involvement of the private sector in delivery of end services based of ECAAT-P Project.

2.1.2.3.6 Meeting with NARO stakeholders

The ESMF preparation took advantage of NARO stakeholders workshop which was attended by a cross section of scientists and experts from MAAIF, Operation Wealth Creation (OWC), State House; ATAAS project staff, scientists from NaCRRI, Kawanda Agricultural Research Institute (KARI), NAADS, Mukono ZARDI, Mbarara ZARDI, Nabuin ZARDI, Kachekwano ZARDI, Rwebitaba ZARDI, Nabuin ZARDI and Abi ZARDI. The Consultant was granted an opportunity to raise pertinent issues to the workshop and a number of issues relating to pesticides, land access for experiments, gender in research, vulnerable and marginalized groups and their participation in ECAAT-P were discussed and incorporated into the ESMF and other safeguards documents.

2.1.3 Some of the Key Stakeholder Concerns from the consultation meetings.

Some of the key stakeholder comments on the project arising from the discussions are summarized below with additional detailed ones documented in the Annex 5:

1. The work of the scientists is appreciated especially developing crop varieties that are helping communities cope with changing climate, diseases and food security challenges. This is commendable;
2. There are growing problems of climate variability which is affecting crop production and household food security. There are also growing problems of pests getting resistant to pesticides and sometimes, the pesticides are increasingly unable to fight pests due to adulteration, poor storage and lack/failure to give correct use/dosage information and a host of other limitations;
3. Unlike National Drug Authority (NDA) which is rigorously enforcing standards on human and veterinary drugs, the Agricultural Chemicals Board to a very large extent, has a lot more to do to bring order to the agro-chemicals dealership. The Board needs to be independent/autonomous, possess a national outlook and be able to effectively monitor the players in the trade, amongst others, which for now is far from reality regarding their functioning. Therefore, there is need for effective regulation in terms of their manufacture, packaging, storage and sale of agrochemicals. Some agro-chemicals outlets are manned by people who have no knowledge of the trade they are engaged in and the last person in the chain (farmers) have to rely on information from such staff which is given across the counter;
4. Issues of climate change are affecting water availability both for farming and livestock keeping. A project like this needs to come up with some interventions to ensure sustainable water supply;
5. There is need for extension staff to detach themselves from delivery of services especially those based in livestock work. More often they do more of private sector treatment of livestock and poultry than offering technical/advisory support to the farmers;
6. The concept of accessing research products (planting varieties) through the private sector who are profit driven is not effective. The local poor farmers are not able to pay for such materials and they find themselves with no option but continue to plant disease prone varieties which are also low yielding with the net result being food insecurity at households and poverty. This needs to be thought through in the ECAAT-P project;
7. In some areas especially in Serere, farmers are at times skeptical to adopt some technologies and varieties released by NaSSARI mainly due to limited information on the performance of such varieties and unreliable extension services needed to support agricultural production;
8. NARO scientists need to improve on their ways of accessing experimental lands by amending the current framework to emphasize the need for the land owners to fully understand what is to be done on their lands and should be done to family aware that, the land is owned customarily;
9. Most of NARO activities have lots of implications on the environment on a number of fronts namely; post-harvest issues, irrigation, mechanization, crop protection, livestock and agri-business amongst others. It is also evident that, for now most financing partners are keen on safeguards issues in the projects and the need for timely production of safeguards documents. In view of these, stakeholders feel that, the agency needs to institutionalize its environmental and cross-cutting issues, for management on sustainable basis. A deliberate Environmental and Social Management Unit should be set up and staffed with at least an Environmental and Social Management Specialist whose roles should be to institutionalize cross-cutting themes into the agency's functions and plans;
10. There are concerns on intellectual property rights raised by farmers especially where their lands are used for research experiments after which, their contributions seem to get lost. How should they be part of the intellectual properties from their own lands? Suggestions included agency to have some Corporate Social Responsibilities geared more to support education of children in the communities (improvement of schools etc.) and communicating breakthroughs in scientific research to the communities who participated in such work;
11. Waste from rice is a problem to dispose as compared to maize; under this project is it possible to do more research on such waste to ensure their sustainable management? The Lead Scientist on rice researcher on rice communicated that, work is on-going to generate oil from rice husks though limitation is on financing;

12. Though Uganda is developing early warning systems for disasters such as landslides amongst others, the sector should do something to develop its early warning systems not only on climate change but more embracing and capturing out breaks of diseases and pests. Last year, farmers had challenges with maize and potatoes pests and the problem was noticed when large acreages had been destroyed; and
13. Issues of climate change and GHG are a serious threat to sustainable agriculture in the country, what measures does the project have in place to check such threats? Secondly, paddy rice cultivation constitutes one of the avenues where GHG are emitted is it possible to do more research on upland rice and popularize it so that people get out of wetlands

4 BASELINE INFORMATION DESCRIPTION

4.1 Physical environment

4.1.1 Size and Location

Uganda is a land locked country, located in East Africa, lying between latitude 40 12' N and 10 29' S and longitude 290 34' E and 350 E astride the equator. It is bordered by South Sudan to the North, the Democratic Republic of the Congo (DRC) to the west, Tanzania and Rwanda to the South and Kenya to the East. Its total land area is 236,000km² of which, 33,926km² is permanent water and 7,674km² is permanent swamp, its dry land accounts for 194,000km². Administratively, Uganda is divided into 112 districts and the capital city Kampala.

4.1.2 Topography

Towards the South, the characteristic scenery consists of flat topped mesa-like hills and broad valleys frequently containing swamps. Towards the North, the landscape consists of gently rolling open plains interrupted by occasional hills, mountains and inselbergs. Most of the country lies within altitude 900–1,500m above sea level. The lowest point in Uganda is at Nimule on the Sudan border in North Western part of the country, where the altitude is 600 m.a.s.l and the highest point is Mt Rwenzori whose highest peak is 5 100 m.a.s.l.

4.1.3 Geology and Soils

Geological formations of Uganda reveal very old rocks formed in the pre-Cambrian era around 300 or 600 million years ago. The younger rocks are either sediments or of volcanic origin, formed from about 135 million years ago (cretaceous period) to the present. A number of parameters define the soils of Uganda and these include parent rock, and the age of soil and climate. The most dominant soil type in ferralitic soil, which accounts for about two-thirds of the soils found in the country.

4.1.4 Vegetation resources

The vegetation in Uganda is extremely diverse a result of the different microclimates of the country (Figure 3). Vegetation zones can be roughly classified according to the rainfall zones and are generally: lake region, northern region, and the highlands of the southeast. These are defined according to the climate of the particular areas. The bio-geography, climate and topography have contributed to the biological richness of the ecosystems of the country. The greater proportion of the original forest cover has been reduced and is degraded and therefore, no significant areas of the forest are completely original and natural.

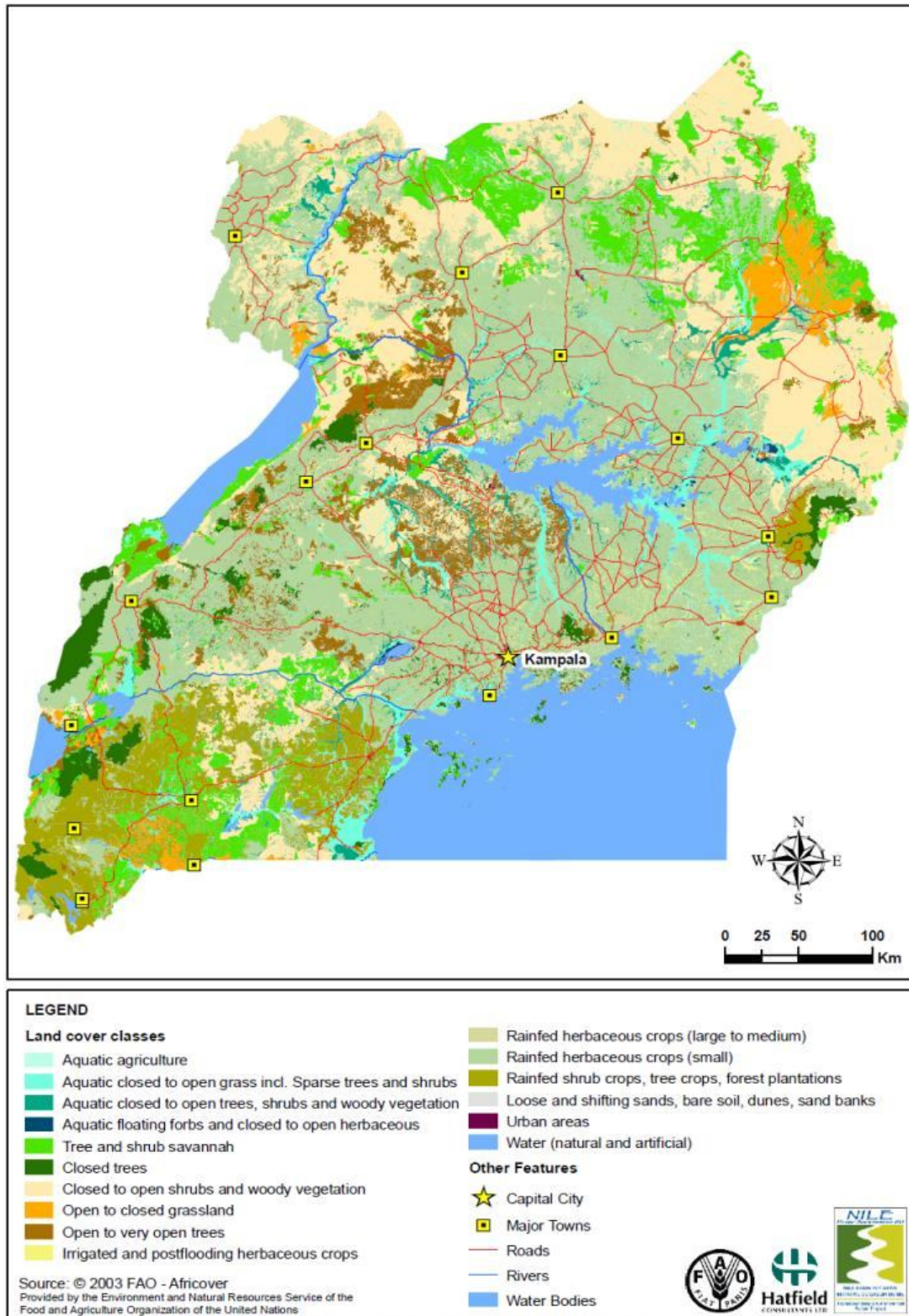


Figure 3: Generalized land cover map for Uganda (Source, FAO 2015)

4.1.5 Climate

Uganda's climate is characterized by temperatures ranging from 16-31⁰C. Most of the country has high moisture levels except the Karamoja region in the northeastern part of the country which experiences a semi-arid condition especially during the dry season. The average annual rainfall ranges from 600–2,500mm received in two seasons of March–June and October–December. The country lies within a

relatively humid equatorial climate zone, but the topography, prevailing winds, and water bodies cause large fluctuations in rainfall patterns across the country. Although there has been no discernible change in total annual rainfall beyond natural variability, there is a likely decrease during the long rains of March–May. These conditions make climate one of Uganda’s most valuable natural resources that supports the agrarian economy and farming households (MoLGSD, 2016)³. Climate determines the state of other natural resources such as water, forests, wildlife and biodiversity that form the basis for socio-economic development in other sectors such as agriculture, fisheries, tourism, transport and health. This dependency inherently makes Uganda highly vulnerable to the impacts of climate change.

The climatic conditions in the project areas are discussed under broad climate of Uganda (Figure 4). The country is characterized by equatorial climate with plenty of rain and sunshine moderated by the relatively high altitude. In most parts of the country, the mean annual temperatures range from 16⁰C to 30⁰C. Nevertheless, the northern and eastern regions areas of Alebtong, Apac, Kamuli, Mbale and Sironko) sometimes experience relatively high temperatures exceeding 30⁰C and while the south-western region areas of Hoima, Kabarole, Kamwenge and Kisoro sometimes have temperatures below 16⁰C. The Northern region receives one rainy season from April to October, and the period from November to March has minimal rain. Most of the country receives between 750-2100 mm of rain annually.

³*ESMF for Uganda Management of Social Risk and Gender Based Violence Prevention and Response Project, MoGLSD 2017*

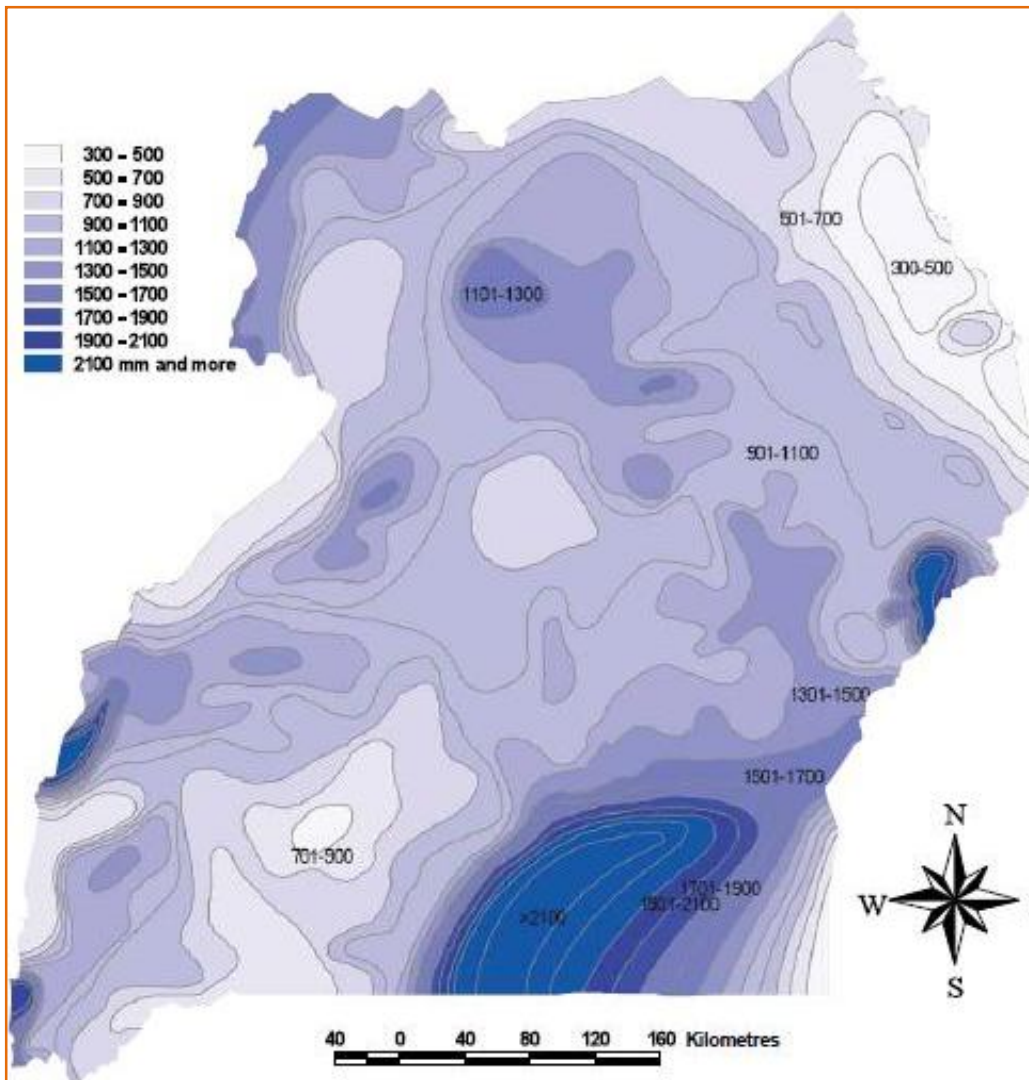


Figure 4: Uganda Rainfall Map (Source: ESMF, MoGLSD-2017)

Uganda's climate is significantly affected by the La Nina and El Nino phenomena. Climate change impacts on these phenomena are not clearly understood to make any climate change predictions with confidence. However, there is evidence that warming will increase the intensity or frequency of these phenomena. Temperature, on the other hand, varies mainly with altitude and changes very little from year to year, in the order of 0.5°C. However, it is observed that temperatures have been increasing by approximately 0.2°C per decade over the last 30 years.

4.2 Socio-economic environment

4.2.1 Population

Uganda's population has increased from 9.5 million in 1969 to 24.2 million in 2002 and between 1991 and 2002 the population increased at an average annual growth rate of 3.2%. Results from the 2014 National Housing and Population Census (NHPC) put Uganda's population at 34.9 million people and is one the fastest growing in the world. Overall, between 2002 and 2014, the population increased from 24 million to about 35 million representing an average annual growth rate of 3.0%. The population was projected to be 37.7 million by Mid-year 2017 (Figure 5).

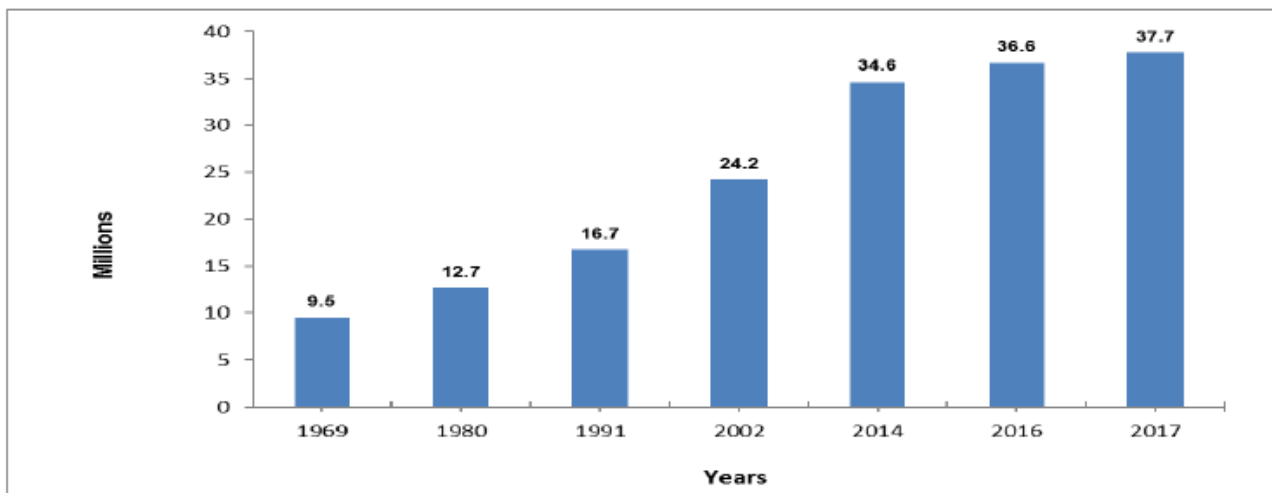


Figure 5: Uganda Population Census for the period 1969 to 2017⁴

4.2.2 Population Distribution

UBOS 2017⁵ indicates that, children aged below 13 years constitute 46% of Uganda's population while the age-group 14–64 years account for 51% of the population. The highest percentage of the population in both and urban areas was in the age-group 14–64 years (49% and 58% each respectively). Compared to other sub-regions, Kampala has the highest percentage of the population in the age-group 14–64 years (64%) while Karamoja has the lowest (42%). There has been a slight increase in the percentage of household population aged 14–64 years from 48% in 2012/13 to 51% in 2016/17.

4.2.3 Fertility

The Total Fertility Rate (TFR) which refers to the average number of children that would be born alive to a woman during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given period. The TFR declined from 7 children per woman⁴ to 5 children per woman between 1995 and 2016 as per UBOS 2017 findings.

4.2.4 Mortality

Infant and under Five Mortality rates between 2000 and 2016, declined by more than half, dropping from 88 to 43 deaths per 1000 live births and from 152 to 64 deaths per 1,000 live births respectively. A higher proportion of those over 5 years died due to injuries from road traffic accidents (2.9%) and cardiovascular diseases (2.9%) compared to the under 5. The proportion of death due to Tuberculosis among persons aged 5 years and above has more than doubled in the last one year, from 6.4% to 15.8%. On the other hand, the leading cause of death among persons aged below 5 years is malaria (19.9%) followed by pneumonia (12.4%) and anemia (12.2%)⁶.

4.2.5 Life Expectancy at Birth

Life expectancy at Birth is an estimate of the average number of years a person is expected to live if a particular pattern of mortality is maintained with the overall life expectancy at birth from 2002 Census then being 50 years. Males registered a lower life expectancy of 49 years compared to their female counterparts at 52 years. Overall, there was a gain of 2.3 years in life expectancy between 1991 and 2002.

⁴UBOS 2017: Statistical Abstract

⁵ Uganda National Household Survey 2016/2017

⁶ Uganda National Household Survey 2016/2017

4.2.6 Vulnerability in Uganda

Some of the vulnerable and marginalized groups in Uganda include:

4.2.6.1 Orphans and poor children

Orphans and poor children are the single largest group of Ugandans living in absolute poverty, constituting 59% of the absolutely poor. Often, orphans and poor children lack recognition, and are neglected and mistreated. There are a large number of AIDS orphans in Uganda who are likely to be poor because they have limited opportunities to attend school or to access health care. On the other hand, orphaned children also tend to be marginalized by their guardians and may end up as street children or child prostitutes. UBOS 2014 indicates that in 2013, about 1.2 million primary school pupils were orphaned though this number reduced by 1.5% between 2012 and 2013. Similarly, the proportion of orphaned pupils to the total primary school enrolment declined to 14.6 in 2013.

4.2.6.2 Women/Widows

In most Ugandan societies widows tend to be poor because of asymmetries in intrahousehold power, resulting in unequal access to and control over productive assets (Figure 6). They have little influence over household income, lack education and skills, are often exploited by “middlemen”, are marginalized by the labor market, have low participation in decision-making processes, and are adversely affected by the patriarchal system of inheritance. Widows with a large number of children to care for are most vulnerable.



Figure 6: Some of the urban poor in typical squalid living conditions

4.2.6.3 The Elderly

Studies that link old age to poverty in Uganda are very scarce though anecdotal information however suggests that, older people in both rural and urban areas fall steadily into poverty as old age sets in. Many in the rural areas depend on remittances from their children, relatives and neighbors, and exchanging what little they own for food. However, there are also other categories of elderly poor, particularly those who may not have accumulated property during their early life, those who have been low-paid wage earners, the uneducated and those impoverished by the burden of looking after orphans.

4.2.6.4 Internally Displaced People (IDPs) and Refugees

This category includes refugees, abducted children including child soldiers and people affected by drought and cattle rustling. They are vulnerable to poverty and disease. IDPs are susceptible to chronic poverty even after returning home since their livelihoods and property have often been destroyed and rebuilding of property and communities is a long-term process. As of October 2017, Uganda was hosting refugees (Table 3) and asylum seekers as follows:

Table 2: Summary of Refugee status in Uganda as of October, 2017⁷

District/Refugee settlement	Population of Refugees
Adjumani	239,335
Arua/Rhino Camp	223,097
Hoima/Kyangwali	48,543
Lamwo	35,535
Moyo	184,701
Kampala	99,962
Kiryandongo	56,835
Kyaka II	26,888
Nyakivale	100,561
Kampala	99,962
Nyakivale	100,561
Rwamanja	74,929
Oruchinga Settlement/Isingiro	5,787
Yumbe/Bid Bidi Settlement	285,014

The areas hosting refugees have unique challenges in terms of inadequate water supply, poor road network, lack of extension services, inadequate health services, remoteness, access to social services and a host of others.

4.2.7 Indigenous Groups and Population in Uganda

Primarily, these comprise:

4.2.7.1 The Benet

The *Benet*, who number around 20,000 people, live in the north-eastern part of Uganda and are former hunter/gatherers. These people live on the margins of society in very remote and inaccessible parts on the slopes of Mountain Elgon. They depend on the forest as hunter-gatherers and are excluded from mainstream society, which has resulted in forced dispossession of their forest land. They are said to have resided in the forest on Mountain Elgon for over 200 years, and while the colonial government moved to conserve this area, it accepted the residence of the Benet.

4.2.7.2 The Batwa

The 6,700 or so *Batwa*, who live primarily in the south-western region of Uganda, are also former hunter/gatherers. They were dispossessed of part of their ancestral land when the Bwindi and Mgahinga forests were gazetted as national parks in 1991. The Batwa are a minority group of people found in the South-Western districts of Kabale, Kisoro, Kasese and Bundibugyo. The Batwa lived near Echuya Forest and

⁷Source: OPM/NUSAF 3 ESMF, 2017.

Mgahinga and Bwindi Conservation Area as their ancestral homes. Following the 1990 Ugandan Government Policy of Biodiversity Conservation, the Batwa were evicted from these forests. These areas were gazetted as protected areas and the Batwa lost their original home land (forests). They were neither resettled nor compensated by government rendering them completely homeless. As squatters, the Batwa could only be allowed to construct a hut in which they lived as they guarded crops for the landlords. The huts were too small, poorly mudded and sometimes made of grass which acted as both the walls and roofs. These kinds of shelter made the Batwa vulnerable and subjected them to all forms of social discrimination and marginalization by the non-Batwa in their communities. In cases where they failed to abide by the landlords' requirements, the Batwa families were summarily chased away.

Due to these poor living conditions, the Batwa were perceived as backward and people of low caliber. The non-Batwa sometimes were not willing to associate with them or even share a meal. The Batwa had no concept of land ownership because they never stayed in one place for a long time.

4.2.7.3 The Tepeth

The Tepeth (or Tepes) who inhabit Mt. Napak in Karamoja Sub-region are nomadic hunters and gatherers. The Tepeth speak the **So** language. They reside in conical huts made of sticks, thatch and mud in the semi-arid savannahs and scrubby forests. The Tepeth are also said to have been the original people of Karamoja. They were once the occupants of Moroto but due to tribal wars with the Karimojong, they were driven up the top of mount Moroto and are now confined to the top of the mountain. They are one of the few peoples in Uganda who still under cover, practice Female Genital Mutilation (FGM) despite campaigns by Government against the practice. Their population is estimated at 17,000. In Moroto, the Tepeth occupy the sub-counties of Katikekile and Tapac, located in the mountain valleys of Mount Moroto at the border with the Republic of Kenya. They rear some animals on the slopes but come down to graze them. They have experienced marginalization due to their being a minority ethnic group and the geographical location of their area. A parish like Natumkalei has neither a primary school nor any health facility. They experience a lot of insecurity from some of the tribes that border them. To the North, the Turkana are their immediate neighbors with whom they have a lot of enmity. They are also accused of forming alliances with their Eastern neighbors, the Pokot, to attack and raid the Turkana.

4.2.8 The Ik Community

The Ik community is a small minority ethnic group in the Morungole highlands, Kamion Sub-county in Kaabong District in Karamoja Sub-region in the parishes of Kamion, Timu and Lokwakaramoe near the border with Kenya, along the escarpment between Timu forest in the South and Kidepo National Park on Uganda's northern frontier with Sudan. The Ik (meaning head/first to arrive) acquired the name 'Teuso' (meaning poor people, dogs, or those without cattle or guns) from their neighbors after they were evicted from Kidepo⁸. The Ik are divided into 10 clans (Jigeta, Komokua, Telek, Ngidoza, Ilengik, Kadunkuny, Ngibongorena, Uzet, Nyorobat and Ngibonga). Their population is estimated at 12,000 people with a fertility rate of about 4%. The Ik community is neighbored by the following tribes; the Turkana (living in western Kenya) to the east, Dodoth to the west, the Toposa (living in southern Sudan) to the north and the Napore to the South.

As a result of their location in relation to their neighbors, the Ik are incredibly vulnerable and liable to attacks from both Dodoth and Turkana warriors. They are historically a non-violent people and, as a result, they have become what one report has described as "the archetypal middlemen – unarmed,

⁸Minority Rights Group International, 2001: *Uganda: The Marginalization of Minorities*. Accessed at: http://www1.chr.up.ac.za/chr_old/indigenous/documents/Uganda/Report/Marinalization%20of%20Minorities-%20Wairama.pdf

non-combative and numerically weak". Their problems mainly arise, both directly and indirectly, from the activities of the Dodoth warriors. The Ik are geographically located between conflicting communities that are numerically strong and usually armed yet the Ik are numerically weak, not armed and their land is rich in pasture, a situation that makes them more vulnerable to constant attacks (CECORE, 2011)⁹. They are marginalized because they practice a culture different from most Karamojong, even their language is different. For example, while the Karamojong marry using cows, they marry with gourds, melons. They still use spears, arrows, and are predominantly agriculturalists. While Karamojong boys can marry Ik girls, Ik boys are not allowed to marry Karamojong girls¹⁰.

4.2.9 HIV/AIDS prevalence

According to Uganda Population Based HIV Based Impact Assessment -UPHIA 2016/2017 report, HIV prevalence among adults aged 15-64 years in Uganda is 6.2% i.e. 7.6% among females and 4.7% among males which corresponds to approximately 1.2 million people aged 15-64 years living with HIV in the country. The prevalence based on regional dimension shows that, West Nile Region with 3.1% while the broader Central with the highest with 8.0% (Figure 7).

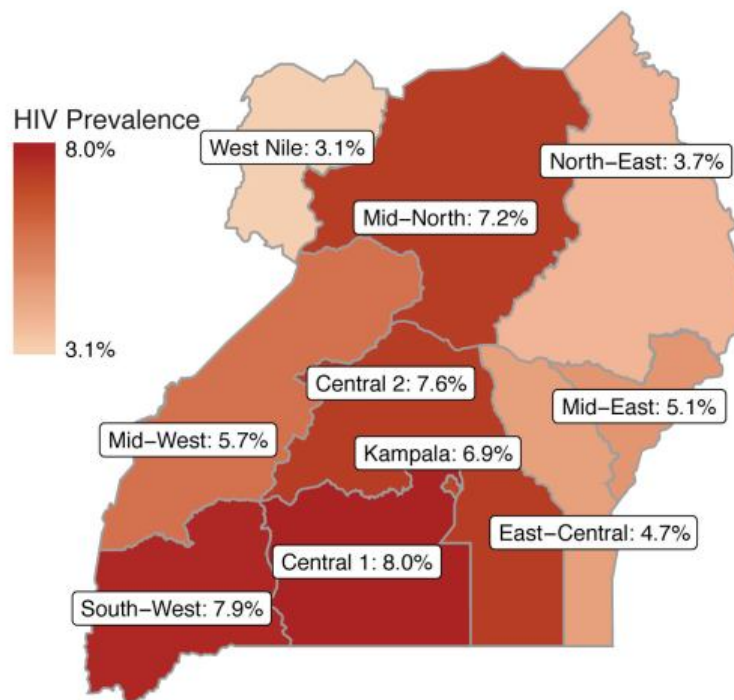


Figure 7: Regional Prevalence of HIV in Uganda¹¹

4.2.10 Prevalence of Gender Based Violence in Uganda

According to Lyndsay McLean et al., 2016¹² the prevalence of Gender Based Violence (GBV) in Uganda is relatively high. The latest Demographic Health Survey (2011) shows that 62.2 % of all women and 58.8% of all men aged 15-49 in Uganda reported experience of physical or sexual violence (by any

⁹Center for Conflict Resolution (CECORE), 2011: *Conflict Early Warning: The Ik of Kaabong District*. <http://cecore.or.ug/wp-content/downloads/Ik%20report.pdf>

¹⁰Indigenous People Policy Framework for Regional Pastoral Resilience Project for Uganda MAAIF, 2014

¹¹UPHIA 2016-2017 report

¹²Dr Lyndsay McLean and Dr Paul Bukuluki with Louise Jenkins and Ismael Ddumba-Nyanzi *Uganda Gender Based Violence 2016*.

perpetrator) at least once since the age of 15.¹³ By comparison the global average prevalence rates for violence against women (physical or sexual) aged 15-49 is estimated by the WHO at 35.6% and the regional (Africa) average is 37.7%¹⁴ and this can be as follows:

4.2.10.1 Physical violence against women and men

The best available dataset is from the 2011 Demographic and Health Survey, which (quite unusually) has data on violence against women and men. Beyond the DHS data, there is a small amount of data from smaller-scale surveys, but this is limited to specific regions and not representative. The DHS data on physical violence shows the following:

- a. 56.1 % of all women aged 15-49 and 55.7% of all men reported experience of physical violence (by any perpetrator) at least once since the age of 15.
- b. For ever-married women aged 15-49, the main perpetrators of physical violence were a current husband/partner (60%) or former husband/ partner (18.9%) thus indicating high rates of intimate partner violence in Uganda (see figure below).
- c. For ever-married men aged 15-49, the main perpetrators of physical violence were others (48%) and a current wife/partner (31.1%). The rates of violence against men are high compared to other contexts suggesting a violent context for men as well as women, including by their wives.
- d. 26.9 % of all women and 22.1% of all men aged 15-49 reported experience of physical violence (by any perpetrator) sometimes or often within the 12 months prior to the survey.

4.2.10.2 Variations

- a. For women, there is no clear variation by age when looking at lifetime experience of violence, but strikingly there is significant variation by age when looking at experience of violence during the last 12 months with younger women (34.7% of women aged 15-19) much more likely to have experienced violence sometimes or often than older women (17.7% of women aged 40-49);
- b. For women, there is also some variation by region (see figure 8 below) with lifetime experience and experience of physical violence in the last 12 months highest in the North. Overall, a greater proportion of women in rural areas compared to urban areas reported experience of violence in their lifetime (57.8% compared to 49.3%) and in the last 12 months (28.7% compared to 19.2%);
- c. There is also some variation in the prevalence of physical violence amongst women of different ethnic and religious groups with the highest lifetime prevalence rates among women who state their religion as Pentecostal (61%) and belong to the Iteso ethnic group (70%) and the highest prevalence rates of physical violence in the last 12 months among women who state their religion as Catholic (31%) and belong to the Iteso ethnic group (31%);
- d. In terms of wealth, poor women are more likely to experience physical violence. 63.3% of women in the lowest quintile compared with 47.0% in the highest quintile reported lifetime experience of violence. 36.2% of women in the lowest quintile compared with 19.5% in the highest quintile reported experience of violence sometimes or often in the last 12 months;
- e. The share of women who have experienced physical since age 15 (lifetime physical violence) does not vary much by employment status or education level – although there is some variation in the prevalence rates of physical violence in the last 12 months, which is higher amongst women who are unemployed (34%) and those with no education (33%); and
- f. For men, the strongest variation is by age with 34.2% of men aged 15-19 experiencing physical violence in the last 12 months compared to 13.8% of men aged 40-49.

¹³ Figures are for men and women aged 15-49 whether never married, married /living together or divorced /separated / widowed.

¹⁴ World Health Organization (2013). Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. Geneva, World Health Organization.

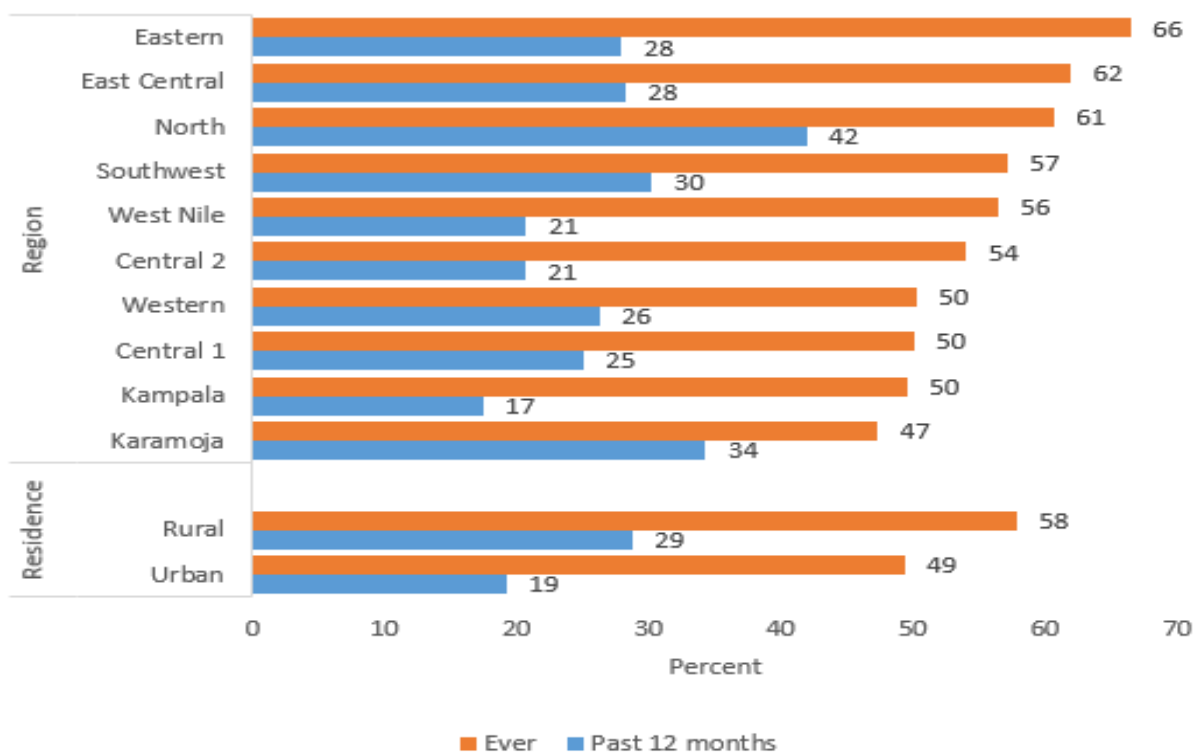


Figure 8: Percentage of Women Aged 15-49 Reporting Experience of Physical Violence by Region

A comparison of data from the 2016 UDHS with the 2016 report shows that there has been little change in the rates of physical violence experienced by women. The proportion of women aged 15-49 who had ever experienced violence (lifetime prevalence) declined only 4% points from 60% in 2006 to 56% in 2011. The decline was similar in rural and urban areas overall but declined most in central 1 and eastern regions. Lifetime prevalence increased in the north and southwestern regions over this period.

4.2.11 Child labour: National Context

In Uganda, a child is legally defined as a person below the age of 18 years. The total number of children aged 5-17 years is estimated to 7.9 million. According to the Child Labour Report, it is estimated that there are about 2.7 million working children in Uganda, giving an overall participation rate of 34.2%. More than half of the working children (54%) are aged 10-14 years, with about one third of them being less than 10 years. The number of working children aged 5-17 years who were currently attending primary school was estimated to be about 1.9 million, with more than 300,000 in the same age bracket having no formal education. According to the African Network for the Prevention and Protection against Child Abuse and Neglect (ANPPCAN) Uganda Chapter Report of 2013, there are two types of child labourers identified in Uganda. The first category comprises of boys and girls who are exploited by adults, to provide cheap labour, whereas the second categories are those who are forced into child labour due to harsh conditions and desperation. The regional distribution of child labour in Uganda indicates that eastern region has a relatively higher proportion of working children aged 5-9 years and reveals the highest number of working children compared to other regions (Figure 9).



Figure 9: Children Digging During School Hours in Iganga District¹⁵

4.2.12 Water and sanitation

4.2.12.1 Safe water coverage

A household is considered to have safe drinking water coverage if there is a safe water source within 1.5km from the household. The main technology options used for water supply improvements in rural areas include protected springs (18%), shallow wells (23%), deep boreholes (44%), piped water schemes (gravity-fed) and piped water schemes (pumped) (11%), valley tanks and rainwater tanks. As of June 2016, the national safe water coverage in rural areas was estimated at 67% and in urban areas it stands at 71% (Annual Sector Performance Review Report, 2016).

4.2.12.2 Sanitation

It is estimated that almost 75% of Uganda's disease burden is preventable and linked to poor hygiene and inadequate sanitation facilities and practices. Access to proper sanitation ensures dignity and helps prevent the spread of diseases such as cholera that are associated with fecal contamination. UBOS 2016 reports that, overall, in Uganda, 83% of households used pit latrines while seven percent used bushes/did not use any toilet facilities. Only three percent of households used flush toilets. In both rural and urban areas, the percentage of households that used pit latrines was high (86% for rural and 74% for urban respectively). A higher proportion of households in urban areas (17%) than rural areas (3%) used VIP latrines. Conversely, a higher proportion of households in rural areas did not use any toilet facilities at all (9%) compared to households in urban areas (2%). The proportion of households that used pit latrines remained the same

¹⁵ *International Programme on the Elimination of Child Labour (IPEC). Child Labour in Uganda: A Report on Linking Child Labour in Uganda to Agriculture.*

between 2012/13 and 2016/17 (83%). There was a slight increase in the percentage of households that used VIP latrines from six percent in 2012/13 to eight percent in 2016/17.

4.2.13 Education

The quality education is key in acceleration of the country's socio-economic development through making the populace functionally literate and productive. Of late, the Ministry of Education and Sports has focused on closing the gap between the girl and boy child with less attention to retention and achievement; and quality of education. Primary school enrolment increased from about 8.3 million in 2012 to about 8.7 million pupils in 2016. However, 2014 registered the highest enrollment of 8.8 million in the five-year period under review. As a result, Gross Enrolment Ratio (GER) was 117 in 2014 but fell to 109 in 2015. National Enrolment Ratio (NER) stood at 91% in 2015 compared to 97% in 2014.

Table 3: Primary School Enrolment by Class for the period 2012-2016

Class	2012	2013	2014	2015	2016
P1	1,877,801	1,883,803	1,932,489	1,842,006	1,888,847
P2	1,284,122	1,307,745	1,349,233	1,277,974	1,352,893
P3	1,291,268	1,312,592	1,362,786	1,283,194	1,349,293
P4	1,299,994	1,317,315	1,359,448	1,272,522	1,328,035
P5	1,118,900	1,138,789	1,178,273	1,101,698	1,156,465
P6	892,338	920,045	963,083	901,939	958,298
P7	564,217	579,431	627,343	584,984	622,093
Total	8,328,640	8,459,720	8,772,655	8,264,317	8,655,924

(Source: UBOS, 2017)

4.2.13.1 Primary School Education Facilities

Provision of adequate infrastructure for the children enrolled in primary school is key and remains a challenge to the education sector. UBOS 2017 reports that, two thirds of the pupils attending primary school had adequate sitting space. It further shows that, a lower proportion of pupils in lower classes had adequate space compared to those in upper classes. According to UBOS 2017, the literacy rate among persons aged 10 years and above has generally increased over time from 2002 to 2015 with about seven (7) in ten (10) of the persons literate. Females were found to be more literate than their male counterparts with a literacy rate of 77 in 2002 percent and 66 percent in 2014, respectively.

4.2.14 Land use

Uganda has a total area of 241,550,000 ha of which, agricultural land occupies of 14,415,000 ha (72%) in 2013. Notably in the last decade, agricultural land has steadily increased at a rate of 1% per annum, and if this rate continues agricultural land will account for 90% of Uganda's land by 2040. Natural forest cover has declined drastically from 54% in the 1950s to 20% of the total area, while grassland has increased by 28.18% during 1996–2013 (Figure 10). About 41% of the country's total area is experiencing degradation, of which 12% is in a severe state of degradation¹⁶.

¹⁶Climate-Smart Agriculture in Uganda, 2016

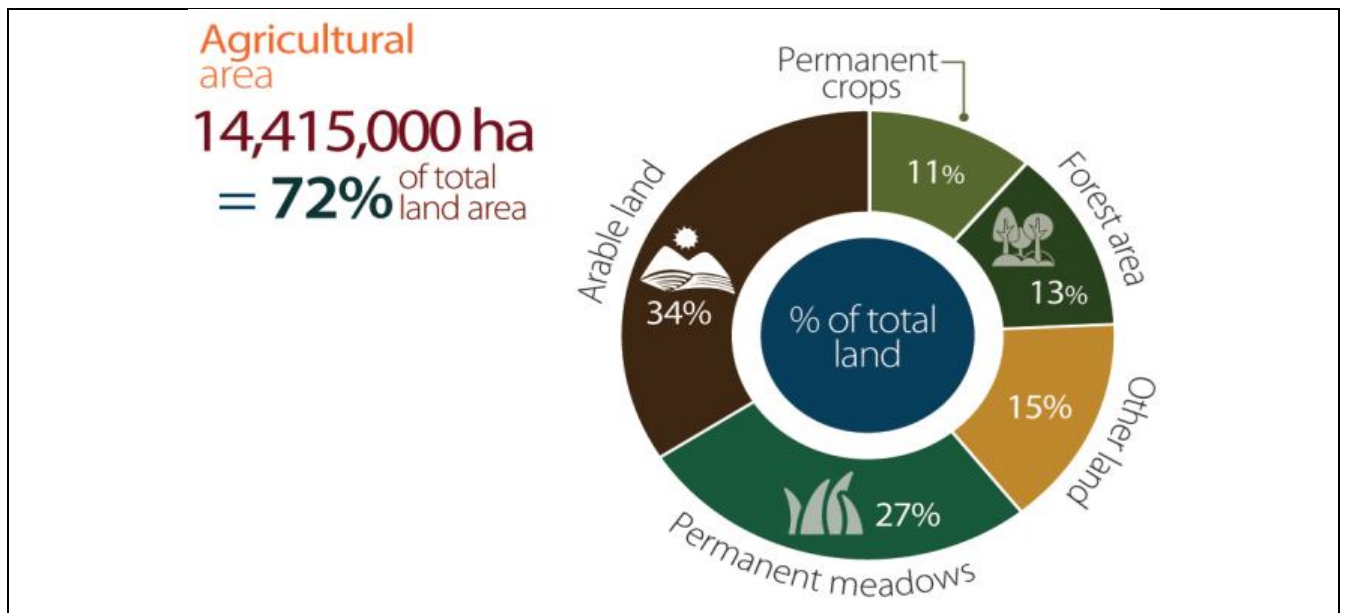


Figure 10: Summary of main land use in Uganda¹⁷

4.2.15 Agriculture

Agriculture is the main economic sector, accounting for 27% of the national gross domestic product (GDP) and employing 73% of the labor force (Figure 11). Since the 1980's, agriculture share to GDP on average has experienced a slow but almost steady decline from 53.7% in 1982 to 23.7% in 2015. Despite this decline, agriculture remains the key source of exports contributing 46% of total export products.

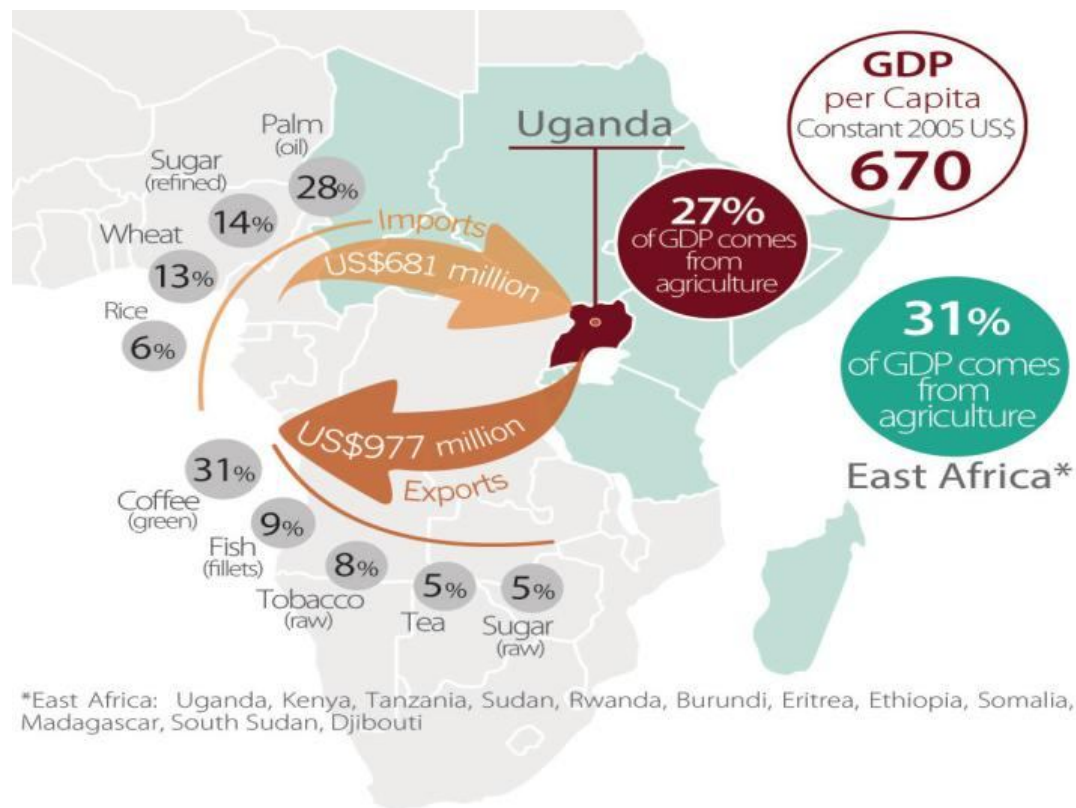


Figure 11: Contribution of agriculture to the national economy (Source: CSA, 2016).

¹⁷Climate-Smart Agriculture in Uganda, 2016

4.2.15.1 Risks of pests and diseases

Crop pests, diseases and weeds are identified as the greatest risk to Ugandan agriculture and, unless addressed, the ASSP objectives are at risk¹⁸. Losses due to pests and diseases are estimated at: 10-20% (preharvest); 20-30% (post-harvest); and up to 100% for perishable crops and export crops. Annual losses in the priority crops suffering the highest monetary loss due to pests are estimated at: US\$ 35-200 million (bananas), US\$60-80 million (cassava), US\$10 million (cotton) and US\$8 million (coffee). Examples of key pests that are seriously constraining any increases in agricultural productivity in priority crops, include: Coffee Wilt Disease (CWD), Banana Xanthomonas Wilt (BXW), Cassava Brown Streak Virus (CBSV), Fruit Flies and Citrus Canker. Pest spread and potential economic impact depends on various factors including: the value chain affected; geographical location; management practices available at farm level and; whether the pest is categorized as well established or new. Actual economic losses from plant diseases are hard to find in Uganda and in many other African countries. However, the Agricultural Risk Assessment Study by PARM/IFAD (PARM 2016) concluded that crop pest and diseases have very high frequency and very high average and maximum severity. Crop pest and diseases have the highest risk score in that report and deserve to be a priority.

4.2.15.2 Food security and nutrition

According to the Global Hunger Index 2015, a score of 27.6 suggests that Uganda is not yet self-sufficient in food production. Many households and specific segments of the population suffer from food insecurity and high levels of malnutrition. The most food-insecure region of the country is the Northern followed by the Eastern region with the lowest levels of dietary energy consumption. The sub-region estimates reveal that 59%, 19% and 11% of households in the North East, Mid-North and West Nile, respectively, consume one meal per day. Uganda's median dietary energy consumption (DEC) stands at 2,160 kcal/person/day in urban areas consuming slightly more than their rural counter parts at 2,156 kcal/person/day. Uganda's food security projections indicate that the number of food-insecure people will grow from 7 million (20%) in 2015 to 30 million (60%) in 2025. Mainly driven by the country's high population growth of 3.4% per year in the near term and 3% per year by 2025.

4.2.16 Gender Issues in the Agriculture Sector in Uganda

4.2.16.1 Gender Issues in Land Tenure and Access to Farmland

Uganda's divergent land tenure system and overlapping land rights have impacted negatively on different gender and on long-term investments in the agriculture sector. Many landless potential farmers (especially the women) cannot easily access land because of the costs involved, cultural norms and the threats imposed by the existing overlapping land rights. Women provide from 70-80% of agricultural labor and yet few have rights to own (7%) or control use of land. According to the Land Policy for Uganda, the gender structure of the land rights varies across the country but in general it is highly unequal. The women's rights tend to be limited to access, while men are more inclined to enjoy ownership rights. Available literature indicates that, only 30% of women have access to and control over proceeds from land but ownership and control over land is ultimately with men. In general terms, women's access to land is usually through their spouse or male members of their family. Loss of the spouse increases the chances of violation of their rights to land. However, in urban areas, some working women are able to purchase land and in cases where poor women have taken on the role of family breadwinner such as when widowed, women have full control of land.

4.2.16.2 Gender Dimension in Crop Farming

The majority of households involved in agriculture in Uganda are engaged in crop farming; with almost equal representation of adult WHHs (98.4%), (MAAIF 2014). Almost all the elderly headed households, irrespective of sex are engaged fully in crop farming as a livelihood means, possibly due to the fact that,

¹⁸ MAAIF/CABI 2017: Crop pests and disease management in Uganda: status and investment needs

they cannot offer their labor for other productive activities due to limited physical energy and age constraints. Most households do allocate land to growing cash crops such as coffee, cotton, maize, beans and cassava. In many cases, WHHS normally allocate less land to growing cash crops giving more land to food crop growing and the reverse is true for the MHHs (Figure 12).

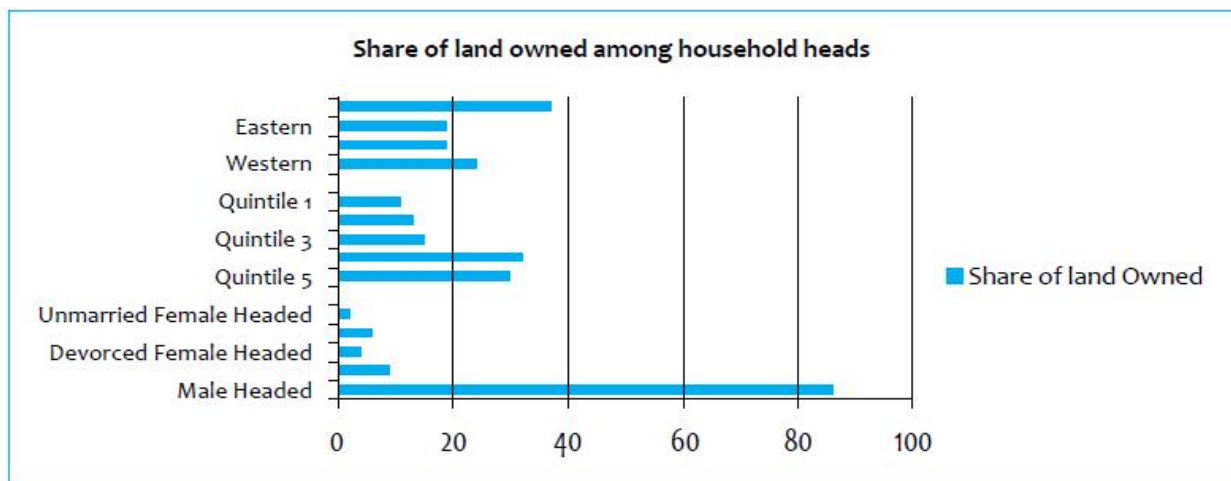


Figure 12: Share of land owned among household heads (Source: ESMF, MAAIF, 2014)

4.2.16.3 Livestock

Livestock plays an important role in the country's food security and it is the main source of proteins. There was a 2.4% increase in the cattle population from 14,031,000 in 2015 to 14,368,000 in 2016. In addition, sheep and goat numbers increased from 4,198,000 to 4,307,000 and from 15,312,000 to 15,312,000 respectively in the years 2015 and 2016. This was a 2.6 and 2.7% increase respectively for the small ruminants. The pig population also increased from 3,916,000 in 2015 to 4,037,000 in 2016 while poultry numbers increased from 45,145,000 in 2015 to 46,291,000 in 2016¹⁹.

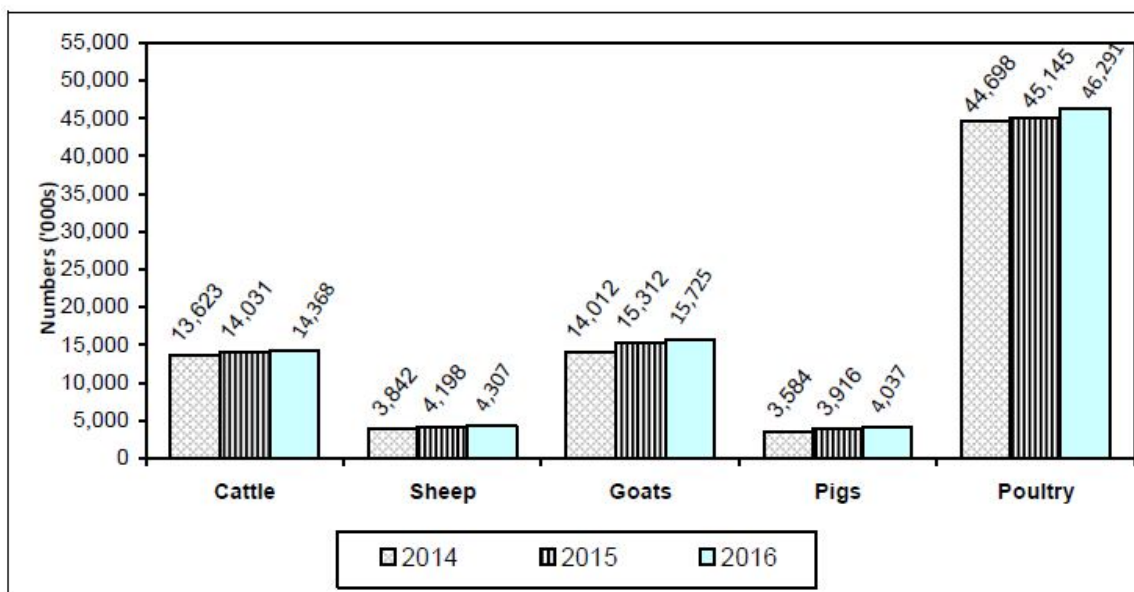


Figure 13: Livestock Numbers ('000s) for 2014-2016 (Source: UBOS, 2017)

¹⁹UBOS Statistical Abstract, 2017

4.2.16.4 Agricultural greenhouse gas emissions

Between 1990 and 2012, Uganda's GHG emissions grew 50% with average annual change of 4% from the agricultural sector. The agricultural sector has the highest emissions, contributing about 46.25% (22.38 Mt CO₂e) to the country's total GHG emissions. The four main sources of GHG emissions from the agricultural sector include enteric fermentation at 42.8%, manure left on the pasture 31.1%, burning savanna 12.9% and cultivation of organic soils at 4.8%. In spite of these low emissions rates, the country is highly committed to contribute to global efforts to reduce GHG emissions.

It is also noted by USAID²⁰ that, land use trends in the country are increasingly showing forested land to be decreasing while crop land and bush increasing. Forest degradation was highest outside of protected areas and in areas where agriculture expanded. Fires were also a major source of degradation of land cover, with fires commonly seen in central and northern Uganda. Direct drivers of deforestation and forest degradation are subsistence agriculture and biomass extraction for timber, charcoal amongst others. Activities that drive agriculture sector emissions are livestock production, inefficient animal waste management systems under pasture range and paddock, and the cultivation of organic soils. Paddy rice production and use of nitrogen fertilizers are also included in the list of drivers of GHG.

However, activities that would reduce agriculture emissions are intensive livestock management systems using improved breed quality and improved feed, fodder and pasture quality that is more digestible; adoption of manure management practices including biogas production and utilization; adoption of minimum tillage practices on cultivated land (including organic soils); and increased use of fertilizer accompanied by precision planting techniques to enhance efficiency.

4.3 Poverty

4.3.1 National Incidence of poverty

Based on UBOS 2017, it was estimated that 19.7% of Ugandans are poor, corresponding to nearly 6.7 million persons with the incidence of poverty remaining higher in rural areas than in urban areas. The poor in the rural areas represent 22.8% of the population compared to only 9.3% in the urban areas. The rural areas with about 77.4% of the population constitute 89.3% of the national poverty. On the other hand, the urban areas represent 22.6% of the population and constitute 10.7% of national poverty.

4.3.2 Regional incidence of poverty

In 2006, approximately 68% of the poor lived in the Northern and Eastern regions of the country though seven years later, this proportion increased to 84%. About 47% of the poor live in the Northern region and another 37% live in the Eastern region. In particular, sub regions in the north, the North East and West Nile sub regions, have a very high poverty headcount. Almost three in four residents (74%) in North East sub region live below the national poverty line. The North-East sub region is also the least populous. By and large has become increasingly concentrated in the Northern and Eastern regions of Uganda as the Central and Western regions have experienced more rapid poverty reduction.

4.3.3 Ownership of assets

Households in Uganda's Northern, Eastern, and Western regions have much lower levels of human capital, fewer assets, and more limited access to infrastructure than those in the Central region. The Northern region is least in terms of assets ownership, largely because the conflict took lives, destroyed assets, and had lasting effects on the aspirations of many individuals. Households in the north are larger and more likely to be headed by a woman and are more likely to have a household head with no education. Most households own land but they are less likely to own other assets and have lower access to infrastructure

²⁰USAID, 2012 Greenhouse Gas Emissions in Uganda

services. The Eastern region also lags behind the Central and Western region in nearly all of these measures.

4.3.4 Access to social services

Households in the Northern region have limited access to markets and services. For households in these regions, distances to schools and health services are much longer as distances to the markets. The provision of agricultural extension and veterinary services is much lower and this is of concern given the reliance of these households on agriculture and livestock income. Rural financial institutions are scarce in the north. These constraints have limited the accumulation of human capital and the extent to which households can use their assets to earn a return in these regions. Household income among the bottom 40% is low in the Eastern and Northern regions and heavily reliant on food crops and livestock farming. Livestock income comprises 39% of the agricultural income of the bottom 40% who live in the north. In addition, rainfall is lower and more volatile in the north increasing the vulnerability of households in this region, while households in the east are particularly vulnerable to the collapse of maize prices²¹.

Table 4: Human capital, asset ownership, and access to infrastructure across regions

Characteristics	Regions			
	Central	Eastern	Northern	Western
Household size	4.2	5.4	5.0	4.8
Dependency ratio	101	130	134	116
Household is headed by a female (%)	30	30	35	31
Head has no education (%)	14	19	27	25
Head has some primary education (%)	43	50	41	41
Head has completed primary education (%)	9	7	8	11
Head has some secondary education (%)	19	15	12	11
Head has completed secondary education (%)	7	5	3	5
Head has tertiary education (%)	6	3	5	5
Literacy rate among 18+ years old (% literate)	79	60	56	72
Owns a mobile phone (%)	82	52	35	63
Has electricity (%)	40	6	3	8
Has piped water (%)	20	5	1	6
Availability of tarmac roads (%)	53	21	19	27
No toilet (%)	5	8	29	2
Owns land (%)	59	78	80	86

(Source: UBOS Statistical Abstract, 2017)

4.4 Energy usage in rural areas

UBOS 2017²² reports that, Overall, two thirds of households in Uganda (64%) used firewood for cooking while three in every ten households (30%) used charcoal. Combined, biomass fuels constitute the main fuel for cooking for 94% of the households. The other sources of energy for cooking (electricity, kerosene, gas, etc.) account for only 6%. There were variations by residence whereby 96% of households in rural areas used biomass fuels compared to 89% of households in urban areas. The majority of households in urban areas use charcoal for cooking (66%) compared to households in rural areas (16%). One in every ten households (11%) in urban areas also use other sources of energy for cooking (electricity, kerosene, gas, etc.).

²¹ (Source: World Bank, 2016)

²²UBOS 2017: Uganda Household Survey Report for 2016/2017

5 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Policy Framework

5.1.1 The National Environment Management Policy 1994 (NEMP)

The key policy objectives include the enhancement of the health and quality of life of Ugandans and promotion of long-term, sustainable socio-economic development through sound environmental and natural resource management and use; and optimizing resource use and achieving a sustainable level of resource consumption. ***With regard to ECAAT-P, aspects of Environmental Assessment have been integrated into the project with the objective of ensuring sustainability in the project.***

5.1.2 National Development Plan

The Second National Development plan (NDPII) covers the period 2015/16 to 2019/20. Agriculture is one of three prioritized areas (along with tourism and minerals, oil and gas). Although growth during the first National Development Plan was only around 1% per annum, attributed to a range of factors including crop pests and diseases, in line with the Comprehensive Africa Agriculture Development Program (CAADP), the sector is seen as critical to economic development. Under agriculture, 12 value chains are prioritized for investment of which, a number fall in those being considered under ECAAT-P project namely; maize, rice, cassava, beans.

5.1.3 Agriculture Sector Strategic Plan (ASSP)

The Agriculture Sector Strategic Plan 2015/16-2019/20 (ASSP) is still in draft; this analysis is based on the April 2016 version. The ASSP follows on from the Agriculture Sector Development Strategy and Investment Plan (DSIP) for the period 2010/11 to 2014/15 and is based on a review of the DSIP. So, the ASSP, NAP and NDPII have much in common. In general, ASSP documents that, the performance of the agriculture sector over the period of the DSIP was disappointing. Productivity of some crops reportedly increased only slightly, while for others productivity actually declined.

Therefore, ASSP vision is ***'A competitive, profitable and sustainable sector'*** which is hinged on its mission which is to 'Transforming the sector from subsistence farming to commercial agriculture'. In contrast to the sluggish performance over the last 5 years, the goal is an average growth rate of 6% per year over the period of the plan. The ASSP has four strategic objectives namely: increasing agricultural production and productivity; increasing access to critical farm inputs; improving agricultural markets and value addition; and improving service delivery through strengthening the institutional capacity of MAAIF and its agencies. ***No doubt, the key aspirations of ECAAT-P being transforming agriculture very much resonate with ASSP objectives.***

5.1.4 National Agricultural Policy (NAP) 2013

The vision of the NAP is "a Competitive, Profitable and Sustainable Agricultural Sector" and the mission being "to transform subsistence farming to sustainable commercial agriculture." Its policy is hinged on 5 objectives namely: ensure household and national food and nutrition security for all Ugandans; increase incomes of farming households from crops, livestock, fisheries and all other agriculture related activities; promote specialization in strategic, profitable and viable enterprises and value addition through agro-zoning; promote domestic, regional and international trade in agricultural products; and ensure sustainable use and management of agricultural resources. These have much in common with the agriculture component of NDP II, which built on the NAP. As in the NDP II, pests are mentioned as a cause of limited production, and something that will be addressed. The policy also describes the roles of key stakeholders, and notes that as a result of the creation of a number of agencies, several divisions and departments have been re-organized, including those with responsibility for disease and pest control. ***It thus aims at ensuring the coordination of the multi-sectoral interventions to remove any constraints to agricultural transformation which is consistent with ECAAT-P.***

5.1.5 The National Land Use Policy

The overall policy goal is to achieve sustainable and equitable socio-economic development through optimal land management and utilization in Uganda. ***ECAAT-P took into consideration the provisions of this policy by restricting its operations to schools and farmers who have their own land.***

5.1.6 The National Gender Policy, 1997

The government adopted a National Gender Policy of 1997, a tool to guide and direct the planning, resource allocation and implementation of development programs with a gender perspective. The adoption of the gender policy has facilitated Uganda's gender mainstreaming programs in all sectors of the economy (implying, the planned works project should equally integrate gender into the implementation of works. ***ECAAT-P has mainstreamed gender dimensions into its formulation, planning and implementation framework hence, its compliance with the National Gender Policy for Uganda.***

5.1.7 The National HIV/AIDS Policy, 2004

The policy provides the principles and a framework for a multi-sectoral response to HIV/AIDS in Ugandan's world of work. The policy applies to all current and prospective employers and workers, including applicants for work, within the public and private sectors. It also applies to all aspects of work, both formal and informal. ***ECAAT-P will mainstream HIV/AIDS interventions into its plan, programmes and activities more so in its Project Implementation Manual (PIM).***

5.2 Legal Framework

5.2.1 Constitution of the Republic of Uganda, 1995

The right to a clean and healthy environment is enshrined in Article 39 of the Constitution of Uganda, 1995. ***To ensure ECAAT-P compliance with the Constitutional obligations on sustainability, an ESMF has been prepared which outlines mechanisms for environment assessment and mitigation measures included therein.***

5.2.2 The National Environment Act, Cap 153

Section 20 of the Act makes it a legal requirement for every developer to undertake an environmental assessment for projects listed in the Third Schedule of the Act. In this case, agriculture amongst others, including large scale agriculture, use of new pesticides are some of the projects in the Third Schedule to the Act that require an ESIA to be conducted before they are implemented. ***ESMF outlines some of the salient impacts in ECAAT-P as well as mechanisms for conducting further assessments on the project sub-components.***

5.2.3 The Plant Protection and Health Act, 2016

The preamble identifies the purpose of the new act which is to consolidate and reform the law relating to protection of plants against destructive diseases, pests and weeds. It also aims at preventing the introduction and spread of harmful organisms that may adversely affect Uganda's agriculture, the natural environment and livelihood of the people. In addition, the Act seeks to ensure sustainable plant and environmental protection and regulate the export and import of plants and plant products and introduction of new plants in accordance with international commitments on plant protection. When implemented, its objective is also to protect and enhance the international reputation of Ugandan agricultural imports and exports amongst others.

5.2.4 The Agricultural Chemicals (Control) Act, No. 1 of 2006

This Act was enacted to control and regulate the manufacture, storage, distribution and trade in, use, importation and exportation of agricultural chemical and other related matters. Under this Act, the requirement of packaging, labeling or advertisement of agricultural chemicals is relevant in pesticides

management to prevent illegal activities related to mislabeling and mis-packaging. In addition, section 13(2) provides for the period in which the seized agricultural chemicals can be detained and the power to dispose them off. The person in whose possession the chemicals were got has to consent in writing for these chemicals to be destroyed by the Government. ***It is therefore important to put in place an effective and efficient mechanism for disposal of the seized/expired chemicals. Similarly, a Pest Management Plan has been developed as party of this ESMF to among others to guide the use of pesticides.***

5.2.5 Biosafety and Biotechnology Bill 2012

There has been much debate about the pros and cons of biotechnology, especially genetic modification. This is relevant to crop protection because, some of the most widely used modifications confer pest resistance, and in Uganda a number of such traits have been engineered and tested. Enactment of the Bill would provide the necessary regulatory framework for the commercialization and release of these materials, which would have substantial implication for the way in which pest problems are managed.

5.2.6 The Employment Act, 2006

This Act spells out general principles regarding forced labor, discrimination in employment, sexual harassment and provisions to settle grievances. It further provides that, a child under the age of twelve years shall not be employed in any business, undertaking or workplace. No doubt, this law is consistent with a number of other laws employment subject such as:

5.2.7 Children Act 1997

This Act consolidates the law relating to children and provides *inter alia* for the care, protection and maintenance of children. Section 8 of the Act prohibits the employment or engagement of children "in any activity that may be harmful to his or her health, education or mental, physical or moral development" which is in line with IFC PS 2 and ILO Core Labor Standards addressing non-employment of children. Contractors under ECAAT-P will not engage in employment of children.

5.2.8 The Occupational Safety and Health Act, 2006

The Act provides for the prevention and protection of persons at all workplaces from injuries, diseases, death and damage to property. ***The ESMF provides for provision of safety gear for workers during implementation of ECAAT-P activities.***

5.2.9 Control of Manufacture Agricultural Chemicals Act Cap 29

The Act provides for safe manufacture, packaging, store, display, distribution agricultural chemicals. It also has provisions governing the Importation and export of agricultural chemicals. The Act in its Section provides for the establishment, constitution and operation of Agricultural Chemicals Board which has the responsibility to advise government on matters pertaining to agricultural chemicals. ***The ESMF provides guidance on the use and management of pesticides in ECAAT-P.***

5.2.10 Environmental Impacts Assessment Regulations, 1998

The EIA Regulations gives a systematic EIA procedure in Uganda. It gives EIA a legal mandate, thus paving the way for an enabling environment for it to use as a tool for environmental protection. The regulation also has punitive measures of offenders. It recognizes three levels of EIA:

- a. An environment impact review shall be required for small scale activities that may have significant impact;
- b. Environmental impact evaluation for activities that are likely to have significant impacts; and
- c. Environmental impact study for activities that will have significant impacts.

In all, issues of EIA are being addressed in the project in line with these Regulations.

5.2.11 National Environment (Waste Management) Regulations, 1999

The National Environment (Waste Management) Regulations, 1999 apply to all categories of hazardous and non-hazardous waste and to the storage and disposal of hazardous waste and its movement into and out of Uganda. The regulations promote cleaner production methods and require a facility to minimize waste generation by eliminating use of toxic raw materials; reducing toxic emissions and wastes; and recovering and reuse of waste wherever possible. ***The Regulations oblige the Developer to put in place measures for proper management of waste and of which basic guidance on handling and disposal of any waste arising from the use of pesticides has been provided in the ESMF.***

5.2.12 The Local Governments Act (Cap 243)

The Act creates a decentralized system of government based on the district as the main unit of administration. Administrative powers and functions are devolved from the central government to the local governments. The Act allocates responsibility for service delivery of a number of functions to local government councils (districts, cities, municipalities or town councils) and to lower local government councils (sub-counties/divisions). ***In conformity with this Act, the respective District Local Governments shall be involved in the implementation of ECAAT-P.***

5.2.13 Land Act, Cap 227

The Land Act vests land ownership in Uganda in the hands of Ugandans and that, whoever owns or occupies land shall manage and utilize the land in accordance with the Forest Act, Mining Act, National Environment Act, the Water Act, the Uganda Wildlife Act and any other law [section 43, Land Act]. ***The planned ECAAT-P has integrated Environmental Assessments in its ESMF in compliance with the Act provisions.***

5.2.14 The Public Health Act, 1964

Section 7 of the Act provides local authorities with administrative powers to take all lawful, necessary and reasonable practical measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of any infectious, communicable or preventable disease to safeguard and promote public health; and to exercise the powers and perform the duties in respect of public health conferred or imposed by this Act or other relevant laws. ***Public health and hygiene are key in ECAAT-P with regard to waste management arising from agro-chemicals use, including use of pesticides.***

5.3 Related International Conventions, Agreements and Guidelines/Instruments

5.3.1 Basel Convention

The Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal was concluded in Basel, Switzerland, on March 22, 1989, and entered into force in May 1992. Now ratified by 149 countries including 32 of the 53 African countries, the focus of this convention is to control the movement of hazardous wastes, ensure their environmentally sound management and disposal, and prevent illegal waste trafficking (UNEP, 2006). The parties to this convention recognize the serious problems posed by stockpiles of unused and unwanted chemical products which, as a result of their obsolescence, are now considered wastes. At a ministerial-level meeting held in Rabat, Morocco, in January 2001, African countries declared their intent to work with other interested parties from all sectors of civil society to rid all 53 countries of Africa of these stockpiled wastes over the next 10 years. ***Therefore, any efforts to export obsolete pesticides in ECAAT-P for disposal have to be in line with the Basel Convention.***

5.3.2 Rotterdam Convention

The Rotterdam Convention aims to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the

environment from potential harm and to contribute to their environmentally sound use. Governments began to address the problem of toxic pesticides and other hazardous chemicals in the 1980s by establishing a voluntary Prior Informed Consent procedure (PIC). PIC required exporters trading in a list of hazardous substances to obtain the prior informed consent of importers before proceeding with the trade. The convention establishes a first line of defense by giving importing countries the tools and information they need to identify potential hazards and exclude chemicals they cannot manage safely. When a country agrees to import chemicals, the convention promotes their safe use through labeling standards, technical assistance, and other forms of support. ***ECAAT-P will observe these provisions when importing agrochemicals.***

5.3.3 The FAO International Code of Conduct on the Distribution and Use of Pesticides

It establishes voluntary standards for public and private institutions involved in the distribution and use of pesticides. The revised version of the Code, adopted in 2002, has become the globally accepted benchmark for pesticide management and has enabled many countries to establish and strengthen their pesticide management systems. The Code sets out a vision of shared responsibility between the public and private sectors, especially the pesticide industry and government, to ensure that pesticides are used responsibly, delivering benefits through adequate pest management without significant adverse effects on human health or the environment. ***The ESMF of ECAAT-P takes into considerations these provisions to ensure safety in the project.***

5.3.4 The Safety and Health in Agriculture Convention

The Safety and Health in Agriculture Convention (Convention 184) adopted by the conference of the International Labor Organization (ILO) addresses the protection of workers in the agricultural sector. More people work in agriculture than in any other sector, more workers are injured in agriculture than in any other sector, and pesticides are a major cause of injury and death. In addition, more children work in agriculture than in any other sector and they are differently and particularly vulnerable to the toxic effects of chemicals such as pesticides. A specific section of the convention deals with the sound management of chemicals and advises governments to adopt good management practices for chemicals, to inform users adequately about the chemicals they use and to ensure that adequate mechanisms are in place to safely dispose of empty containers and waste chemicals. Application of the Convention is an important step in improving pesticide management and preventing some of the problems that arise from pesticide distribution and use in developing countries. ***These are outlined in this ESMF to guide use of pesticides in ECAAT-P.***

5.3.5 IFC Instruments

5.3.5.1 IFC EHS Guidelines for Pesticide Manufacturing, Formulation, and Packaging

The IFC Environmental, Health and Safety (EHS) guidelines for pesticides manufacturing and formulation address the synthesis, optimization of the active ingredients, process development (manufacturing), the formulation and packaging of pesticides from these active ingredients. According to these Guidelines, pesticide manufacturing, formulation, packaging and distribution should be conducted in compliance with applicable international standards including:

- a. Stockholm Convention on Persistent Organic Pollutants (POPs), which bans or restricts the manufacture and trade of intentionally produced POPs, including some pesticides;
- b. World Health Organization (WHO) Recommended Classification of Pesticides by Hazard, which lists active ingredients considered to be obsolete or discontinued for use as pesticides;
- c. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;
- d. Food and Agriculture Organization's International Code of Conduct, which includes requirements on the application of the life-cycle concept in the production, management, packaging, labeling,

distribution, handling, application, use, and control, including post registration activities and disposal of all types of pesticides, including used pesticide containers; and

e. Food and Agriculture Organization's Revised Guidelines on Good Labeling Practice for Pesticides.

In ECAAT-P, aspects of pesticides and related considerations are addressed by having in place, a Pest Management Plan as part and parcel of the project ESMF, including guiding instructions that will be incorporated in the Project Operational/Implementation Manual.

5.3.5.2 FAO Guidelines on Good Practice for Ground Application of Pesticides, 2001

In 2001, FAO produced a new, revised and expanded series of pesticide application equipment-related guidelines to cover the application of pesticides using any ground-based field crop sprayers, including operator carried and tree and bush crop sprayers. Other related guidelines by FAO include:

- a. Guidelines on good practice for aerial application of pesticides; Guidelines on minimum requirements for agricultural pesticide application equipment;
- b. Guidelines on standards for agricultural pesticide sprayers and related test procedures;
- c. Guidelines on procedures for the registration, certification and testing of new pesticide application equipment;
- d. Guidelines on the organization of schemes for testing and certification of agricultural pesticide sprayers in use; and
- e. Guidelines on the organization and operation of training schemes and certification procedures for operators of pesticide application equipment.

These have been domesticated in Uganda through the Control of Agricultural Chemicals Act Cap 29 whose provisions have guided the pesticides aspects covered in this ESMF.

5.4 World Bank Safeguard Policies

The Project is rated as a category B type and triggers the policies as summarized on Table 5 below:

Table 5: Summary of WB safeguards polices in relation to the project

Safeguard Policies	Triggered?		Remarks
	Yes	No	
OP4.01 Environmental Assessment	√		ECAAT-P will involve reconstruction and rehabilitation of storage facilities, and agricultural laboratories which will involve construction works hence triggering this safeguard policy which will necessitate some level of Environmental Assessment which includes preparation of this ESMF. The ESMF will guide screening and any required environmental and social assessment, including development of ESMP, during implementation. The WBG-EHS Guidelines shall also be applied during project implementation to safeguard both the workers and general public.
OP4.04 Natural Habitats	√		Component 1: Has sustainable environmental management activities which may involve forestry, water catchment management and thus likely encompass some natural habitats such as forests, wetlands, rivers, etc. The requirements of this policy shall be met during site specific screening and where necessary included as part of any required ESIA/ESMPs. The project shall not support any activity that may degrade any natural habitat.
OP4.09 Pest Management	√		Under Components 1 and 3 project activities are likely involve the application of agro-chemicals (insecticides, herbicides, fertilizers, etc). A Pest Management Plan (PMP) has been developed as part of

			this ESMF.
OP 4.10 Indigenous People	√		Being a national program, it has to benefit all the population including the indigenous groups such as the Batwa, Iki and the Benet. As such an Indigenous Peoples Planning Framework (IPPF) has been prepared alongside this ESMF.
OP4.11 Physical Cultural Resources	√		This safeguard is triggered because project components are likely to have/involve infrastructure developments with civil works/excavations which may occasion accidental discoveries of PCRs. Therefore, a Chance Finds Procedure has been prepared as part and included in Annex 5 of this ESMF.
OP 4.12 Involuntary Resettlement	√		The project will not undertake any activities that will displace people. However, it will support small-scale infrastructure that might affect land holdings of individual farmers. While these interventions are yet to be identified, a separate Resettlement Policy Framework (RPF) has been prepared and is to be disclosed prior to appraisal to address any land take issues which might arise.
OP 7.50 Projects on international waters		X	This policy is not likely to be triggered because the project activities are not likely to use shared/transboundary or international waters.
OP4.36 Forests	√		Component 1: Has sustainable environmental Management activities which may involve forestry related activities as part of Climate Smart Agriculture. The requirements of this policy shall be met during site specific screening and where necessary included as part of any required ESIA/ESMPs. The project shall not support any activities that may degrade any forest.
OP4.37 Safety of Dams		X	The project has aspects addressing irrigation BUT the focus is on fabrication of basic irrigation equipment for small-scale/handheld irrigation and not dams etc. This policy is not triggered therefore.
OP/BP 7.60 Projects in Disputed areas		X	ECAATP activities will not be implemented in disputed areas, hence this safeguards policy is not triggered.

5.5 Gap Analysis Between Key World Bank Safeguards Policies and Government of Uganda's Safeguards Policies requirements

It is worth noting that environmental management in Uganda has been largely supported by the World Bank, right from the development of the National Environment Management Policy in 1994, the National Environment Act in 1995 and the accompanying Regulations. Owing to this, most of the environmental requirements are largely influenced by the World Bank's Environmental and Social Safeguard Policies. Most of the provisions of OP 4.01 were adopted and as such the screening and assessment methodology is virtually the same as seen in the Uganda's EIA Guidelines of 1997.

However, some of the differences include the following:

- a. The Ugandan Laws do not provide for Framework Approach (ESMF and RPF) but rather only, specific instruments (ESIA, ESMP, Environmental Audits). This ESMF prepared for ECAAT-P in line with OP 4.01 will guide the preparation of the specific instruments;
- b. Independent Review is not specifically provided for under EIA Regulations of Uganda and as a result the review of ESIA is commonly reviewed by government agencies, whereas the OP 4.01 provides for Panel of Experts to for Category A type projects;
- c. Under OP 4.04 Natural Habitats, Uganda lacks Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act. Therefore, OP 4.04 on Natural Habitats and OP 4.36 on

Forests shall be used to assess any impacts on natural habitats. Issues of occupational health and safety are spelt out clearly in related Acts such as Occupational Act 2006, the The Environmental Health and Safety, including all issues related with labour influx and sexual harassment are explicitly included in the OP/BP 4.01, as part of the environmental and social management. The specific references are included in the Environmental, Health and Safety Guidelines (ESHSG) of WBG Guidelines containing the performance levels and measures that are normally acceptable and that are generally considered to be achievable in new facilities at reasonable costs by existing technology; and

- d. On OP 4.11 Physical Cultural Resources, the Ugandan legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage.

These are some of the salient environmental gaps between the Environmental Safeguard Policies and the Government of Uganda Environmental requirements specifically on the levels of details required during the consultative process during ESIA i.e. prior informing the persons to be consulted, providing details of programs of consultations, records of meetings amongst others. These are explicitly required by the Bank as compared by the national level. However, where such gaps exist, the World Bank Safeguard Policies shall take precedence especially on matters of preparation, review and approval of instruments developed during the implementation of the ESMF.

The other area is under OP 4.12 (Involuntary Resettlement) whereby Uganda’s Land Act legal framework is restricted to fair, adequate and prompt compensation (cash), while the World Bank policy requires the need to provide alternative land, resettling the Project Affected Persons (PAPs) to levels or standards of livelihood similar to or better than before compensation. The Ugandan legislation also does not provide for restoration of livelihoods, resettlement assistance and compensation at replacement value. Under circumstances like these regarding short-comings in the Uganda law on compensation process, the provisions of OP 4.12 shall be applied.

The existing gaps are summarized in the Table 6 below:

Table 6: Summary of Gap Analysis between Uganda and World Bank Safeguards

World Bank’s Safeguard Policies	Uganda’s Legal and Regulatory Framework	Gaps identified in Uganda legal and regulatory framework
Environmental Assessment (OP 4.01)	<ul style="list-style-type: none"> • National Environment Management Policy, 2014 • National Environment Act Cap 153 • EIA Regulations, 1998 	<p>The Bank’s classification and use of project categories i.e. A, B and C for a high, moderate and low potential environmental and social impacts. At the national level, projects are listed according to sectors but based on intensity of their impacts which is a salient gap in the national law.</p> <p>The levels of Environmental Assessment are based on the judgement of the Executive Director NEMA who approves whether a project will require a full ESIA, Project Brief or an ESMP. Such a decision is arrived taking into account, proposed project activities, location of the project and in-puts and other aspects as contained in EIA Regulations of 1998;</p>

		<p>independent review is not specifically provided for under EIA Regulations of Uganda and as a result, the review of EIAs is commonly reviewed by government agencies</p> <ul style="list-style-type: none"> · In the EIA review process, there is no specific legal/regulatory framework that caters for examination of the quality of the EIA reports. Only conditions of approval/reasons for non-approval of EIAs are provided by NEMA; · There are no administrative mechanisms for appealing a decision taken on a particular EIA.
<p>There is an on-going process to amend the National Environment Act and EIA Regulations, and Strategic Environmental Assessment Guidelines and Uganda Association for Impact Assessment Bill have been drafted. The proposed amendments in the National Environment Act cover the following:</p> <ul style="list-style-type: none"> · Technical committee on environmental assessment; · Strategic environment assessment; · Basis for environmental impact assessment and environmental risk assessment; · Projects for which project briefs are required; · Measures on climate change; and · Establishment and composition of the environment tribunal. 		
<p>Natural Habitats (OP 4.04) and Forests (OP 4.36)</p>	<ul style="list-style-type: none"> · The Constitution 1995 as amended; · the National Environment Act Cap 153; · The National Forestry and Tree Planting Act, 2003; · The Uganda Wildlife Act Cap 200; · The Land Act Cap 227; · The Fish Act Cap 197; · The Plant Protection Act Cap 31; 	<p>There are general gaps which include lack of Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act.</p>
<p>Physical Cultural Resources (OP 4.11)</p>	<ul style="list-style-type: none"> · The Constitution · The National Environment Act, Cap 153 · The Historical Monuments Act, Cap 46 · The Institution of Traditional or Cultural Leaders Act, 2011 	<ul style="list-style-type: none"> · The legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage · There is no strong institution to regulate and manage heritage resources; · The sites and monuments are not adequately maintained, documented and in addition, some of the antiquities are not collected · There is limited enforcement of the legal framework related to Physical Cultural Resources in Uganda because most developers

		and government officials do not understand the importance of conserving physical cultural resources.
The current Historical Monuments Act is being reviewed to provide for an efficient law for the protection of the cultural resources of the country. The new law shall be inclusive of all aspects of culture, the tangible, intangible heritage of the country. The revised Environmental Impact Assessment Regulations provide that risk assessment should include risks to cultural heritage.		

(Source: ESMF for Integrated Water Management and Development Project MoWE March, 2018)

Involuntary Resettlement OP 4.12 (Adopted from the IWMDP-RPF)

Gaps between World Bank and Ugandan legislation applicable to each impact

Category of PAPs/ Type of Lost Assets / Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions included in the RPF
Land Owners	<p>The Constitution of Uganda, 1995 recognizes four distinct land tenure systems, Customary tenure, Freehold tenure, Leasehold tenure and <i>Mailo</i> land tenure.</p> <p>Land is valued at open market value and a 15% to 30% disturbance allowance must be paid if six months or less notice is given to the owner. Cash compensation is the recommended option.</p>	<p>World Bank Policy recognizes the rights of those affected people:</p> <ul style="list-style-type: none"> • Who have formal legal rights to the land or assets they occupy or use • Who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law • Who have no recognizable legal right or claim to the land or assets they occupy or use. <p>Compensation of lost assets at full replacement costs. Cash compensation is recommended where there are active land markets and livelihoods are not land based.</p>	<p>The Ugandan law does not compensate those without legal right or claim to the land. WB OP 4.12 does not consider disturbance allowance. Uganda laws and the WB O.P 4.12 are consistent in compensation at full replacement cost and cash compensation.</p>	<p>Cash compensation at replacement value (based on market value + 15% disturbance allowance). All forms of tenancy based on formal or informal rights/ agreements between the land owner and tenant</p>

Category of PAPs/ Type of Lost Assets / Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions included in the RPF
Land Squatters / Land Tenants	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation based upon the amount of rights they hold upon land.	Must be compensated for all losses, whatever the legal recognition of their occupancy. But non-title holders will not be compensated for land.	The Ugandan law does not compensate those without legal right or claim to the land or	All forms of tenancy based on formal or informal rights/ agreements between the land owner and tenants + 15% disturbance allowance. Land squatters will be compensated for loss of assets at replacement value
Owners of non-permanent buildings	Cash compensation based upon rates per m ² established at District level, disturbance allowance (15% or 30%).	Recommends in-kind compensation or cash compensation at full replacement cost. Recommends resettlement assistance.	O.P 4.12 does not provide for the disturbance allowance. Ugandan law does not provide for resettlement assistance.	District compensation rates + 15% disturbance allowance. Cash compensation
Owners of permanent buildings.	Valuation based on replacement value and guidance from CGV & disturbance allowance (15% or 30%).	Compensation at full replacement cost.	The Ugandan laws are consistent with O.P 4.12 in regard to replacement cost. O.P 4.12 does not provide for the disturbance allowance.	Cash Compensation at replacement value + 15% disturbance allowance.
Perennial Crops	Cash compensation based upon rates per m ² /bush/tree/plant established at District Level and disturbance allowance (15% or 30%).	Compensation at full replacement cost. Income restoration.	O.P 4.12 does not provide for the disturbance allowance.	Cash compensation using Arua and Yumbe District rates + disturbance allowance

Category of PAPs/ Type of Lost Assets / Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions included in the RPF
Seasonal crops	No compensation. 3-6 months' notice given to harvest crops.	No specific provision		No compensation. Expected to be harvested. In the absence of notice, will be compensated for the crop that could not be harvested.
Loss of income	No specific provision	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better.	The Ugandan legislation does not provide for restoration of livelihoods.	In the context of this project, practical livelihood restoration measures have been proposed.
Vulnerable groups	The 1995 Uganda Constitution stipulates that: "the State shall take affirmative action in favor of groups marginalized on the basis of gender, age, disability or any other reason [...] for the purpose of redressing imbalances which exist against them". This regulation is not fully described in the context of resettlement and land acquisition.	Particular attention should be paid to the needs of vulnerable groups among those displaced such as those below the poverty line, landless, elderly; women and children and indigenous peoples and ethnic minorities.	Both the Ugandan Constitution and WB OP 4.12 favor vulnerable groups. However, the Ugandan law, vulnerable groups are not fully described in the context of resettlement and land acquisition.	Special attention will be paid to vulnerable persons affected. And compensated accordingly.
Relocation and Resettlement	Both the Constitution, 1995 and The Land Act, 1998 give the government and local authorities, power to compulsorily acquire land. The Constitution states that "no person shall be compulsorily deprived of property or any interests in or any right over property of any description except" if the taking of the land is necessary "for public	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation,	There is no requirement under the Ugandan law to minimize land acquisition.	Measures to minimize involuntary resettlement have been considered as shown in Section 5.10 of this RPF report.

Category of PAPs/ Type of Lost Assets / Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions included in the RPF
	use or in the interest of defense, public safety, public order, public morality or public health.”	whichever is higher.		

6 PROCEDURES FOR ENVIRONMENTAL SCREENING AND ASSESSMENT

6.1 Environmental Screening under OP 4.01 Environmental Assessment

The classification of each subproject under the appropriate environmental category will be based on the provisions of the World Bank Operational Policy on Environmental Assessment (OP 4.01). The environmental and social screening of each proposed sub-project will result in its classification in one of the three Environmental Assessment Categories - A, B or C, depending on the type, location, sensitivity and scale of the subproject and the nature and the magnitude of its potential environmental and social impact:

Category A: An ESIA is always required for projects that are in this category. Impacts are expected to be ‘adverse, sensitive, irreversible and diverse with attributes such as pollutant discharges large enough to cause degradation of air, water, or soil; large-scale physical disturbance of the site or surroundings; extraction, consumption or conversion of substantial amounts of forests and other natural resources; measurable modification of hydrological cycles; use of hazardous materials in more than incidental quantities; and involuntary displacement of people and other significant social disturbances. The impacts under this category affect broader area than the sites or facilities subject to physical works. **Such subprojects would require a full ESIA and detailed ESMP. Given the nature of the activities proposed under ECAAT project, there will be no project activities qualifying for this categorization.**

Category B: Any project which is likely to have potential environmental and social impacts, which are less adverse than those of EA Category A projects, on human populations or environmentally important areas including wetlands, forests, grasslands and any other natural habitat. The impacts are usually site specific, few or none of them are irreversible, and most of them are mitigated more readily than impacts from EA Category-A sub projects. **Although an ESIA is not always required, some environmental analysis is necessary. Such subprojects would require an ESMP. Given the nature of project components under ECAAT project, most of the activities fall under this EA Category B and will require preparation of an ESMP.**

Category C: Any project which is likely to have minimal or no adverse environmental and social impacts. Beyond screening no further ESA action is required. **No assessment would be required under World Bank requirements.**

The ECAAT-P Project has been assigned Environmental Category B. Therefore, no sub-project is expected to fall under EA Category A.

6.2 Environmental and Social Assessment in Uganda

The key regulations for environmental and social assessment in Uganda include the National Environment Act, the EIA Regulations, 1998, the EIA Guidelines of 1997 and the National Environment (Audit)

regulations, 2006. The National Environment (Environmental Impact Assessment) Regulations, 1998 define the role of ESIA as a key tool in environmental management, especially in addressing potential environmental impacts at the pre-project stage. The regulations define the ESIA preparation process, required contents of an ESIA, and the review and approval process including provisions for public review and comment. The regulations are interpreted for developers and practitioners through the Guidelines for Environmental Impact Assessment in Uganda (1997). Although assessments nowadays conducted and submitted to NEMA are now termed “Environmental and Social Impact Assessment”, in common with best international practice, this term is not used in the environmental Regulations or Guidelines. The acronyms EIS and EIA are used in reference to environmental impact statement and environmental impact assessment respectively. However, the acronyms ESIS and ESIA are used herein to refer to environmental and social impact statement and environmental impact and social assessment respectively to include the social component in line with best international practice. The section below illustrates the steps involved during environmental and social assessment and management process as per Ugandan regulations that will lead to the review and approval of subprojects under the ECAAT-P.

6.3 Key steps in Environmental & Social Assessment under OP 4.01

The section below illustrates the steps involved during environmental and social assessment and management process as per Ugandan regulations and to a larger extent World Bank safeguard policy that will lead to the review and approval of subprojects under the ECAAT-P.

6.3.1 Step 1: Screening of Activities and Sites

NARO (who is the national implementing agency), through its PIU will carry out scoping and screening of the sub-projects using the Environmental and Social Screening Form (ESSF) in Annex 3. The ESSF requires information that determines the characteristics of the prevailing local bio-physical and social environment with the aim of assessing the potential project impacts on it. The ESSF should also identify the potential socio-economic impacts that will require mitigation measures and or resettlement and compensation.

6.3.2 Step 2: Assigning the appropriate Environmental Categories

- a. NARO will then assign the appropriate environmental category to the subproject based on the information contained in the ESSF and the national criteria for categorization. The potential categories, have been described under Section 4.1 above and are in principle in line with the National Environment Act and EIA Guidelines are of Government of Uganda:
- b. Activities that require a full Environmental and Social Impact Study (ESIS), either because (i) they meet the general criteria in the Third Schedule of the National Environment Act, NEA are out of character with their surroundings, are of a scale not in keeping with surroundings, or involve major changes in land use; (ii) are types of projects listed in the Third Schedule; (iii) are located in a nature conservation area; or (iv) are identified in other laws or regulations as requiring EIA because of their location. Under the World Bank categorization, these are likely to fall under Category A. However, there are not expecting investments that will require full scale ESIA's because the planned investments are likely to be of small-scale in nature and their impacts being localized as such, most of the interventions will necessitate either ESMPs/Project Briefs (Category B) or may be exempt (Category C).
- c. Activities for which additional information is needed to determine what level of environmental analysis and/or management is appropriate and for which mitigation is easily identifiable. These will likely be Category B under the World Bank categorization. Under GoU requirements, a Project Brief suffices and under the World Bank requirements, an ESMP suffices.
- d. Activities that are determined by the ESIA Consultant and in the opinion of the Executive Director NEMA, that, such activities will not have any significant or adverse potential impact on the environment, (First Schedule in the National Environment Act Cap. 135) will require a Project Brief or an ESMP to be prepared based a review of the Scoping Report for the proposed project. Such projects are most likely Category B or types as per the World Bank categorization.

6.3.3 Step 3: Carrying out Environmental Assessment

The ESIA will be conducted by the consultancy firms registered by NEMA. However, Project Briefs (equivalent of an ESMP as per OP 4.01) may be prepared by non-NEMA registered persons. A Project Brief doesn't require preparation of ToRs but their approval is done by NEMA. However, in case an ESIA needs to be undertaken, the ToRs for the study will be prepared by NARO PIU and reviewed and approved by NEMA. The ESIA report will identify and assess the potential environmental and social impacts for the planned activities, assess the alternative solutions, and will design the mitigation, management and monitoring measures to be implemented.

According to the National Environment Act, "project brief" means a summary statement of the likely environmental effects of a proposed development referred to in section 19. Unlike the ESIA, a project brief does not require a scoping report and neither submission of terms of reference for approval by NEMA. The ESMP or Project Brief will for each potential impact include: mitigation measures, monitoring indicators, implementing and monitoring agencies, frequency of monitoring, cost of implementation, and necessary capacity-building. It is possible that after completing the Checklist, the Environmental Specialist may recommend that the subproject concerned should be subjected to a full ESIA and submitted to NEMA for review and decision making.

According to Regulation 5 of the EIA Regulations, 2006, a Project Brief is to contain amongst others, the following:

- a. the nature of the project in accordance with the categories identified in the Third Schedule of the Act;
- b. the projected area of land, air and water that may be affected;
- c. the activities that shall be undertaken during and after the development of the project;
- d. the design of the project;
- e. the materials that the project shall use, including both construction materials and inputs;
- f. the possible products and by-products, including waste generation of the project;
- g. the number of people that the project will employ and the economic and social benefits to the local community and the nation in general;
- h. the environmental effects of the materials, methods, products and by-products of the project, and how they will be eliminated or mitigated; and
- i. Any other matter which may be required by the Authority.

In addition to the above, it is currently a practice and requirement by NEMA to include details of stakeholder consultations in Project Briefs.

6.3.4 Step 4: Public Consultations and Disclosure

Public consultation will be initiated during the scoping and ESIA preparation stages and views of stakeholders (general public and lead agencies) have to be included in a Project Brief as well. Public consultation will also be an integral part of the process throughout the planning and execution of the project. MAAIF will interact closely with PAPs/communities, project personnel, government departments, NGOs right from the early stages of the project preparation on a regular basis for developing and implementing the respective project ESIA/ESMPs and RAP where applicable. For this purpose, public contact drives shall be organized by MAAIF and public awareness shall also be created with NGO's and other social organizations active in the affected areas. During the public awareness drives, it will be ensured that only accurate information is given about the project and its possible environmental and social impacts. The opinion/suggestions made by the community/affected groups shall be incorporated in the respective ESIA/ESMP and Resettlement Action Plans. After clearance, the assessment reports (ESIA/ESMP, RAPs, and

PBs etc.) shall be disclosed both in Uganda through the daily print media by Implementing Agency and at WB's *Infoshop* by IDA.

6.3.5 Step 5: Review and Approval

Following internal review of the ESIA/ESMP or PB, by NARO and the Bank the ESIA or PB will be forwarded to NEMA for final review and decision (approval or disapproval). If the Executive Director is satisfied that the subproject will have no significant impact on the environment, or that the assessment (Project Brief or ESIA/ESMP) discloses sufficient mitigation measures to cope with the anticipated impacts, s/he may approve the project. The Executive Director of NEMA or his delegated official shall then issue an EIA Certificate of Approval for the project. Similarly, when submitted to the World Bank, the Bank will review, provide guidance on content and compliance with Safeguard Policies, and either clear or decline to clear with justified technical reasons.

It is important to note that this review and approval process is to be carried out in parallel with the review and approval of the technical, economic, financial and other aspects of the subprojects. Implementation of subprojects cannot commence until the environmental and social aspects have been reviewed and appropriate mitigation measures have been adopted. As possibilities of social impacts regarding land acquisition, the implementation of subprojects cannot proceed until the resettlement and/or compensation plans have been prepared and implemented after clearance by the Chief Government Valuer in the Ministry of Lands, Housing and Urban Development (MoLHUD).

6.3.6 Step 6: Environmental Monitoring

Environmental and social monitoring aims at checking the effectiveness and relevance of the implementation of the proposed mitigation measures. Monitoring exercises should be undertaken in sequences and frequencies stipulated in the ESIA, PBs, RAPs, or ESMPs. Local Government leaders, District Environment Officers, Community Development Officers as well as NGOs and CBOs will undertake monitoring exercises as required by the National Environmental Act. The Environmental and Social Development Specialists in the Project Implementation Unit will be responsible for monitoring project compliance. However, on a day to day basis, the District Environment Officers in conjunction with the District Community Development Officers will conduct the monitoring and report to NARO Project Implementation Unit where the two safeguards specialists will be compiling the reports (after verification on ground) and submit to NEMA.

The monitoring indicators will be developed by implementing agencies' Environmental Specialists based on the mitigation measures and the ESMP. Each subproject progress report will include monitoring of the RAP where applicable and other social issues covered by the ESMF. In case of any civil works, at the end of subproject construction phase, a Certification for Compliance integrating Environmental and social issues for the completion of works is issued by NARO.

MAAIF will have the lead role in monitoring to ensure that various project environmental and social obligations are met and will ensure that the requirement for an environmental and social audit is fulfilled not less than 12 nor more than 36 months after project completion or commencement of operations respectively in line with the National Environment Act and the Audit Regulations of 2006. It is critical to note that NEMA has a regulatory coordinating role in monitoring of compliance with permits, standards, regulations and all approval conditions. It is also worth noting that World Bank will also from time to time, as part of its Project Support Supervision, be involved in monitoring and providing technical guidance throughout project implementation.

7 ECAATP IMPACTS

7.1 Project Impacts

7.1.1 Positive Impacts

By and large, ECAAT-P is expected to have significant positive impact on social and poverty conditions by increasing productivity and production of nutrient rich foods including promoting their consumption. It seeks to add value and to optimally explore the benefits that are likely to be generated from adding value to such products (Figure 14).

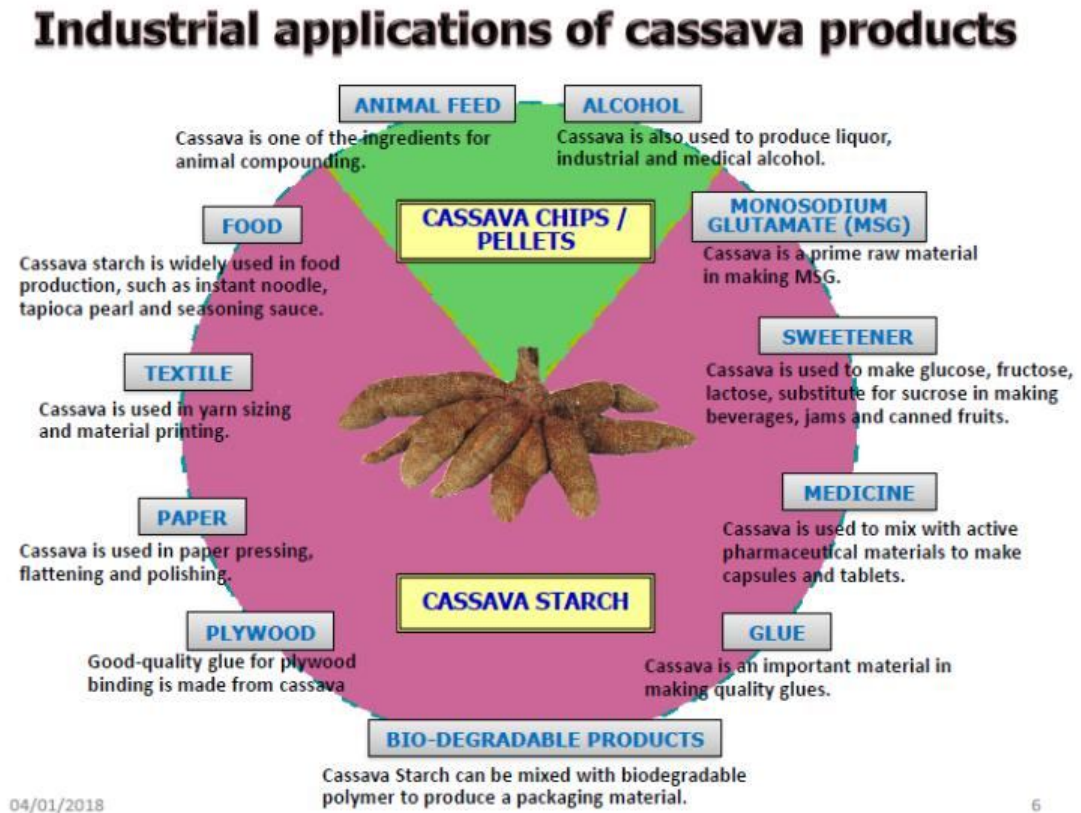


Figure 14: Potential Industrial applications of cassava²³

Other positive benefits of the project include:

- a. ECAAT-P Project presents a window of opportunity for enhanced regional cooperation in areas of transforming agriculture and guaranteeing food security for the region's population who for long grapple with crude and rudimentary farming practices;
- b. The project will support conservation efforts towards cassava breeding by putting in place state-of-art facilities for the collection and conservation of cassava germplasm thereby buffering any potential catastrophic risks in case of epidemic outbreaks on the crop as did occur in 1980's and 1990's with the outbreak of Cassava Mosaic Disease (CMD);
- c. Implementation of project works will provide an avenue for short term employment especially for the local population which will be a source of short-term income and improved household livelihood;
- d. The project will generate critical skills in highly demanded and specialized trainings in artificial insemination, embryo transfer, non-pregnancy diagnosis and heat synchronization which will lead

²³ECAAT-P Introductory Presentation to Safeguards Consultants by Prof. Larry Adupa on 4th January, 2018

- to production of good quality livestock breeds for improved beef and dairy production thereby transforming the sector;
- e. The project through its interventions will put in place, farm machinery in terms of tractors and their implements, irrigation facilities as well as threshers which will transform modes of production from traditional hand based to modern equipment assisted production with its attendant benefits in terms of increased acreages and production;
 - f. Interventions in ECAATP will enhance research in poultry thereby improving breeds and production which directly translates to better income, food security and improved livelihoods at household levels since poultry is kept in virtually all homesteads;
 - g. Enhancing technology of production along the entire commodity value chains, including providing farmers with access to technical knowledge and improved seeds and breeds;
 - h. Developing critical skills to meet the growing needs of the current and future food systems, including skills required by the private and public sectors;
 - i. The project will lead to increased scientific knowledge on climate vulnerability and GHG emission of the agricultural sector and put in place, measures to reduce such climate risks thereby ensure sustainability in production and productivity of the sector;
 - j. Forming partnerships and alliances that are capable of connecting farmers with markets so as to enable farmers to understand market needs and produce for the market;
 - k. The project will put in place, power interventions such as solar and standby generators that will guarantee power supply hence, ensure continued functioning of research programs. These interventions will likely be in forms of solar power which will reduce emissions of carbon dioxide from traditional power generation;
 - l. Facilitating policy and regulatory environment that enables regional collaboration in developing solutions along the value chain and encourage private sector participation, including in Research and Development (R&D);
 - m. The project will support the construction of satellite storage facilities to feed into the warehouse receipt system. Construction of storage facilities which is envisaged in the project will address lack of post-harvest processing and storage equipment as well as of in-appropriate marketing systems which make the agricultural smallholder producers vulnerable to middlemen especially during bumper harvests. The storage facilities will address postharvest losses which are up to 30% in some regions, smallholder farmers sell their product almost immediately after harvest, when prices are very low, thereby losing market share. This will allow smallholder farmers to store their products safely and conveniently as they wait for better market prices and to also ensure quality and standards in the traded commodities;
 - n. ECAATP will support the equipping of six border post laboratories which is expected to reduce the transaction costs of sending samples to Kampala/Entebbe and facilitate regulation and control of trans-boundary animal diseases. This will increase confidence of exporters/importers of Ugandan livestock and livestock products. In addition, the transport facilities when provided to the laboratory staff will help in quick transportation of samples in cases where there is a need to conduct further analysis for particular diseases. They will also help staff to conduct regular monitoring of the border areas to ensure that there is no illegal trade in animal and animal products across the borders;
 - o. Under ECAATP, it is proposed to establish a dairy cattle export biosecurity facility to enable quarantine of this germplasm that are leaving the country and those that are incoming. The only facility established in the 1960s has recently closed as a result of the expansion of the Entebbe international airport. The proposed facility will be established at Sanga field station which is strategically located connecting dairy farmers from a bigger part of the country. The facilities will offer quarantine services to both private and public farms;
 - p. ECAATP will support Busitema to improve training infrastructure and equip the existing incubation center that lacks equipment for agricultural mechanization like Planters, subsoilers, Ridgers,

weeders, harvester, chemical applicators, Lysimeters, open drip tubing, Sprinkler test facility, dryers, grinding machines, pressing machines etc.) which are all necessary in skilling students. The center will enhance professional skills of staff and students and adapt and transfer well researched technologies from the region. It will also offer refresher and short courses to professionals and the informal sector respectively including maintenance and repair of general machinery. These interventions will therefore provide much needed technologies for agricultural transformation;

- q. ECAAT will address the infrastructure needs at the School of Food Technology, Nutrition and Bio-engineering (SFTNB) at Makerere university by expanding the space to cater for the new businesses of graduate incubates thereby promote business start-ups among the youth and women for the commodities through a suitable funding mechanism to support youth and women in procuring equipment and working capital and also build national capacity for designing, fabricating and maintaining agro-processing equipment-- currently, equipment for food processing is imported. ECAAT will now support the introduction of entrepreneurship across all disciplines; and
- r. Investments geared towards Industrial/commercialization of selected commodities in this project will bring about economic development both at household and national levels. For instance, a commodity like cassava presents a host of products for many uses and applications for improved livelihoods.

7.1.2 Project Negative Impacts and their mitigations

7.1.2.1 Impacts of regional collaboration arrangements

7.1.2.1.1 Cross border transmission of plant and animal diseases

The ECAAT-P is a regional program which entail trade and movement of plant-based resources across regional borders of participating countries. No doubt, this will enhance scientific and economic benefits across participating countries and institutions. However, this presents a risk of cross border transfer of crop and animal diseases through movement/transportation of crop varieties and animal breeds. This is to be mitigated through vigilance on observance of phytosanitary and zoo sanitary measures at the border posts between the countries. Surveillance efforts should be supported in the ECAAT-P

7.1.2.2 Risks associated with control of crop and animal pests and diseases

It's known that, the region has pressure of pests and diseases occasioned by a host of factors which inevitably leads to application of agro-chemicals to control pests and diseases on both crops and animals. However, there are a number of concerns regarding formulation, transportation, handling, application and disposal of agrochemicals which if not well addressed will compromise the sustainability of ECAAT-P and agricultural interventions at large. Mindful of such concerns, under this project, a comprehensive Pest Management Plan has been prepared to guide on such aspects.

7.1.3 Impacts of poultry development-based enterprises

7.1.3.1 Impacts relating to odors

Poultry facilities are a source of odor and attract flies, rodents and other pests that create local nuisances and carry disease. Odor emissions, caused by a large number of contributing compounds including ammonia (NH₃), volatile organic compounds (VOCs), and hydrogen sulphide (H₂S), from poultry farms can affect the life of people living in the vicinity as such, poultry enterprises ought to observe strict hygienic conditions.

7.1.3.2 Risks of vectors nuisance

Flies are additional concern for residents living near poultry facilities. There are reports that, residences in close proximity to poultry facilities equally suffer health impacts arising from nuisance by flies and

mosquitoes emanating from such enterprises because dampness due to poor handling of water and poor drainage. Flies nuisance is mainly enhanced by the poor handling and management of animal-feeds. This is to be addressed through observation of good hygiene in such enterprises supported by active extension arm.

7.1.3.3 Management of waste water from poultry farms

The most significant environmental issue relating to poultry farms result from slaughterhouse operations and discharge of wastewater into the environment. Like many other food-processing activities, the necessity for hygiene and quality control in meat processing results in high water usage and consequently high levels of wastewater generation, having high biochemical and chemical oxygen demand (BOD and COD) due to the presence of organic materials such as blood, fat, flesh, and excreta which in turn may lead to reduced levels of activity or even death of aquatic life. Waste from poultry farms need to be properly monitored and managed.

7.1.3.4 Management of diseased and dead carcasses

In the operations of the poultry farms can have challenges of sick/diseased birds and dead ones. To avoid spread of disease and loss of poultry, it is suggested that:

- a. Sick/diseased birds be isolated from the rest of the stock into an isolation area in the farm where such birds will continue receiving treatment;
- b. Dead birds should be subjected post-mortem examination to ascertain cause of death before their disposal;
- c. Dead birds should be buried and such sites properly back-filled to reduce dogs and scavengers exhuming such carcasses and releasing disease germs to the air; and
- d. All workers in the poultry farm to have changing rooms where they thoroughly clean up before setting to their homes to avoid carrying disease agent to their areas and the communities.

7.1.4 Impacts on commodities industrialization and commercialization drives

7.1.4.1 Production processes-based wastes

The commercialization of commodities will lead to generation of industrial waste whose details cannot be exhaustively outlined in this ESMF. It is proposed that, when details of such ventures are fully developed, separate and appropriate levels of ESIA's will be conducted and such could assume forms of Project Briefs/ ESMPs amongst others.

7.1.4.2 Generation of crop-based wastes

This intervention will generate a range of waste including husks from rice and cassava peelings which if not well managed will turn to be a public health risks to the communities (Figures 33-34). In most rice hullers there are huge heaps of rice husks which farmers try to dispose through burning which adds to carbon emissions generation. Rice husk decomposes slowly due to their rich silica content and can therefore not be considered for use as fodder though has a high calorific value which makes it a good source of renewable energy (Jimmy Lamo *per com.*). It is recommended and after discussions that, ECAAT-P could support research on how rice husks can be put to industrial use and already potential of producing oil from them presents a viable venture.

7.1.4.3 Risks of food insecurity at household levels

Industrialization and commercialization of the commodity crops will have economic benefits at household and national levels and no doubt, increase income at household levels. However, this must be balanced in such a way that, households don't focus on industrial market at expense of household food security.

7.1.4.4 Environmental concerns from ECAATP based commodities industries

Once industrial ventures are started, the operations of such facilities will generate a host of environmental and social impacts which can compromise the investment objectives. It is recommended that; the developers of such ventures conduct appropriate ESIA's to ensure sustainability of such enterprises and their operations under Standard Operational Procedures for such industries.

7.1.5 Negative Impacts of rehabilitation of laboratories and workshops

Key Rehabilitation considerations in the laboratories and workshops will include:

- a. Implementation of works will likely attract laborers to the project areas which can trigger HIV/AIDS concerns and it is proposed that, the project will work with nearby HIV/AIDS service providers to provide counselling and supply of condoms to the workers at agreed terms with the project contractors;
- b. The rehabilitation of laboratory facilities will involve rehabilitation of pre-existing room/laboratories spaces in the institutions including for insectary/entomology and greenhouses;
- c. All equipment necessary for carrying out the rehabilitation works and ensuring adequate safeguards to prevent destruction of vegetation and soil erosion shall be on site;
- d. Demolition and excess construction material will be recycled wherever possible and disposal of unusable material will be done in an environmentally sound manner;
- e. The majority of materials for use in the rehabilitation works will be bought locally, and the contractors will ensure that, the materials fulfill the requirements for the intended use and do not contain any hazardous materials (such as asbestos or lead);
- f. All materials, including those for electrical and water installations, will be installed according to the code of practice and good construction as applicable in Uganda;
- g. Demolition and excess construction material will be recycled wherever possible, and disposal of unusable material will be done in an environmentally sound manner;
- h. The contractor will bring to the site all equipment necessary for carrying out the works and ensure proper safeguards to prevent destruction of vegetation and soil erosion. The pathways/access routes have to be managed in accordance with sound environmental practices;
- i. Measures will be taken to minimize any damage of public infrastructures that exist on the site (electricity, water supply, drainage) and the possibility of water retention/ponding that will be ideal for vectors breeding;
- j. Payment of salaries and wages is sometimes of concern on sites and it is proposed that, workers be issued with contracts before commencement of work;
- k. Issues of gender-based violence (GBV) which will likely arise when women get involved in working in the project as such they earn salaries and the men/husband prevail over them to take their earnings. In some cases, women get battered when trying to defend their earnings. This is to be mitigated through sensitization of men and working with police to curb domestic violence;
- l. There should be employment of children in the project works or even at household levels children should not be employed in the farms supported by the project; and
- m. Following completion of the rehabilitation works, NARO and its stakeholder agencies as well the World Bank and Ministry of Works and Transport (its Department of Construction Management) will jointly inspect the laboratories and workshops facilities, mobilizing relevant experts as may be necessary, to ascertain that the facility is safe, habitable, and ready for use. Training of facility staff will incorporate environmental health, environmental and social safeguards and quality considerations in all relevant areas of insectary management, laboratories and workshops and will form a core component of the quality assurance and infection prevention and safety approaches at the facilities.

7.1.5.1 Impacts during rehabilitation phase for laboratories and workshops

7.1.5.1.1 Management and preservation of germ plasm materials during the rehabilitation phase

All materials in freezers including enzymes, sample tissues of leaves or roots, or any genetic material (extracted DNA/RNA) shall be preserved on dry ice or ice, and such freezers shall then be moved into facilities that are not being renovated hence, the movement of such materials will be preserved. For germplasm in growth rooms/chambers, phased renovation will be suggested, for instance working on one growth room at a time to allow for plantlets to be moved to other growth facilities that are not being renovated.

7.1.5.1.2 Risks of public intrusion to the sites

There are risks of the public and unauthorized persons to enter the sites which can have its own impacts on the progress and execution of works as well as theft of construction materials. This is to be checked through securing the site and posting signs that keep off the public from accessing the sites (Figure 15).



Figure 15: Signs to keep off un-authorized personnel to the site.

7.1.5.1.3 Waste generation (improper construction waste management)

Solid waste will be generated at the site during site preparation and rehabilitation phases. The waste may consist of timber or metal cuttings, excavated materials, paper/cement bags, empty paint and solvent containers, broken glass among others. Construction waste will be managed through proper site clearance and restoration.

7.1.5.1.4 Pressure on existing resources

During the rehabilitation works, laboratory and workshops services will likely be jeopardized when the operation space/room is closed for works. It is proposed that; alternative arrangements be made for continued delivery of laboratory services during the period of rehabilitation without causing total closure.

7.1.5.1.5 Management of obsolete laboratory and workshop equipment

Rehabilitation of the laboratories and workshops will generate some obsolete equipment upon acquisition of state-of-art technologies. The disposal of such obsolete equipment can be an environmental hazard. It is suggested that, NaCRRRI will avail such equipment to its ZARDIs and some will be disposed following Procurement and Disposal of Assets.

7.1.5.1.6 Generation of noise

Noise will be one of the most undesirable consequences of the rehabilitation phase. Considerable levels of noise and vibrations will mainly result from use of equipment during breakages for modification of spaces inside the facilities. Though the level of discomfort caused by noise is likely to be subjective, the most commonly reported impacts of noise levels will be interference in oral communication in the vicinity of the institutes. The impact *intensity* will be *medium* if an experienced contractor is contracted to carry out the

rehabilitation works, planning of works and more so, the scope will be limited hence, localized and short-term impact.

7.1.5.1.7 Traffic and associated impacts

Traffic impacts will relate to transportation of construction materials to the site and ferrying out of construction wastes. These will likely generate dust emissions will likely have impact on the work environment in the laboratory and workshop areas. The contractors will screen off the worksites inside the facilities and on the access routes to the institutes, the drivers have to observe speed limits.

7.1.5.1.8 Occupational health safety (OHS) Risks for the project workers

Construction activities have potential to pose occupational risks such as fatal falls if workers do not use safety latches when working at heights. Working with high voltage and hot works (welding) pose a risk of electrocution. In addition, falling debris could injure workers if personal protective equipment (PPE) are not provided or properly used. In all, the workers will be provided with PPEs, work areas be clear of obstacles and proper lighting of the rehabilitation sites (Figure 16).



Figure 16: Illustration of PPEs for welders and warning safety signs on site

7.1.5.1.9 Risks of electrocution and related accidents

The laboratories and mechanical workshops have power supply connections as such, when works are to start, there will be need to manage power supply amidst works. Power supply will be disconnected from sections to be rehabilitated and incase electricity will be required for drilling; the tapping cables will be insulated to reduce risks of electrocution. There will be clear warning signs to keep off the public and staff from accessing such sections (Figure 17).



Figure 17: Sample warning sign inside rehabilitation section in the laboratory

7.1.5.1.10 Social misdemeanor by construction workers

While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS. Irresponsible sexual relationships in project communities can break families thereby triggering risks of contracting HIV/AIDS. All work areas will have condoms in strategic places and occasionally, agencies such as TASO will be invited to sensitize the workers on HIV/AIDS risks.

7.1.5.2 Risks during laboratories and workshops operations

7.1.5.2.1 Management of solid wastes

Solid waste from laboratories will be disposed based on its nature and hence, in a manner as follows:

7.1.5.2.1.1 Waste to be disposed by a contracted waste handler

It is the responsibility of all laboratory staff to properly segregate laboratory waste because different types of wastes have different treatment standards. All waste in the laboratory will hence be laid in the waste bins as per bin labels. Improper and irresponsible disposal of chemical wastes down drains, to the Local Authority refuse collection, or into the atmosphere is forbidden by law. The laboratories have separate bins for separate types of waste as shown on Figures (18-21).



Figure 18: Gloves and plastic based waste



Figure 19: Gels and fluid-based wastes



Figure 20: Metallic containers for sharps



Figure 21: Paper and paper-based wastes

7.1.5.2.2 Disposal of fabrication wastes

Fabrication works in the workshops will generate metal cuttings and a host associated metallic waste which should be disposed by selling off to scrap dealers by the cleaners especially where quantities are likely to be minimal not require application of PPDA rules.

7.1.5.2.3 Incineration

All other items that are deemed unsuitable to be put in the normal waste bins in the laboratories, will be placed in a special waste-bin supplied in each of the laboratories and such items include: broken laboratory glassware, sharp objects of metal or glass, dirty sample tubes or other items lightly contaminated with chemicals and such will all be incinerated (Figure 22). Incineration will also be used to dispose used and obsolete agro-chemicals.



Figure 22: Operational incinerator at NaCRRRI

7.1.5.2.4 Misuse and inability to operate installed equipment

There are also risks of laboratory staff abusing the equipment and reagents which has some economic implications on the costs operations. This is already addressed through having in place, Standard Operational Procedures for any investigations, training and re-training and ensuring staff operate under hierarchy of supervision and accountability.

7.1.5.2.5 Risks of fires

Risks of fires in laboratories can be occasioned through spillages, irresponsible storage, handling and application of inflammable reagents, irresponsibly carrying around naked flames, smoking cigarettes and faulty electricity connections. All these will be addressed through SOP, having appropriate and functional fire extinguishers (Figure 23) and skills in firefighting. Laboratory staff be regularly subjected to fire/rescue drills amongst others.

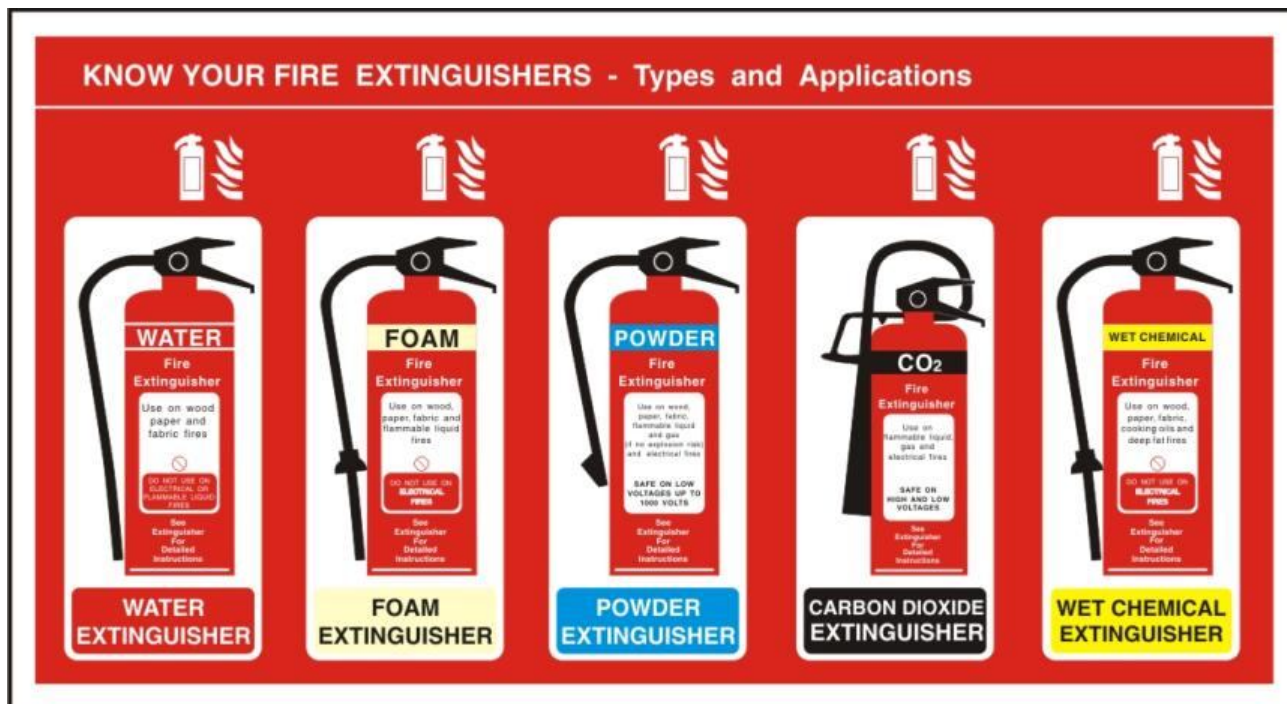


Figure 23: An array of fire extinguishers for use in a given fire situation

7.1.6 Rehabilitation of Insectary laboratories

An insectary laboratory is one of the prerequisite for effective entomology research and provides a controlled environment to rear insects for experimentation and monitoring research. NaCRRRI will provide insectary staff who will undergo additional on job training on insectary under ECAAT-P.

- The training will cover all critical entomological monitoring methodologies, laboratory rearing of insects, insectary maintenance and relevant laboratory procedures, as well as biosafety precautions. Entomology laboratory and Insectary, in strict compliance with local Uganda procurement regulations;
- The insects to be housed in the insectary are those already available in the general environmental settings hence, no special needs for importation of insects. However, where such need arises, importation procedures and clearances will be sought through appropriate customs and zoo sanitary processes;
- Escape of vectors can happen during transportation to or from the insectary, insectary staff must assure full application of standardized safeguards to eliminate escape of test insects to the environment;
- Staff and all handlers of insecticides within the insectary and entomology laboratories will ensure appropriate protection through use of appropriate personal protection equipment-PPEs; and
- The insectary will be exclusively used to raise and maintain colonies of wild-caught insects' local mosquito vector(s), as well as fully susceptible species, under laboratory conditions. The controlled catching and raising of insects for experimentation will exclusively be for the purpose of entomological evaluation, following procedures and controls that will reduce the risk for possible escape of mosquitoes into a different habitat.

Rehabilitation of Insectary

Potential Environmental Impacts

- a. Rehabilitation work may involve demolishing some old sections of the existing laboratories buildings, which will generate solid wastes that can contaminate the environment, and the noise and dust may impact on the surrounding settings, including affecting their health;
- b. Excavation work may cause erosion, siltation, changes in natural water flow, and/or damage to aquatic ecosystems when excavated soil is piled inappropriately;
- c. Construction work may cause people to camp elsewhere away from their homes, increasing the risk of introduction of new behaviors or spread of communicable diseases;
- d. If renovation includes addition of toilets facilities, there is health risk to health and environment if not constructed to standard design; and workers may be exposed to hazardous substances during construction, e.g., dust, hazardous paints.

7.1.6.1 Management of obsolete and expired reagents

7.1.6.1.1 General procedure for disposal expired reagents

NARO has in place, guidelines for the management and disposal of expired and obsolete reagents which are applicable to all laboratories and screen houses in the Biosciences facilities which procedure is as follows:

- a. At the end of every quarter (3 months), management of the laboratories prepare a list of materials which have expired;
- b. A chemical Disposal Form is filled with all key information which include: name of the chemical(s), its/their percentage purities, date at which the chemical expired. The same information is filled on a label and attached to the chemical intended for disposal;
- c. Such chemicals/reagents are placed in designated rooms i.e. rooms designated for waste storage, with the label facing outwards and clearly visible;
- d. Laboratory Manager will be informed of such chemicals intended for disposal;
- e. The Laboratory Manager then informs the contracted licensed waste disposal agent who arranges for safe transportation and disposal of such wastes within a month of notifying him/her of such development.

7.1.6.1.2 Procedure: Expired solvents, working reagents and media

- a. At the end of every month, check for time-sensitive reagents that have expired.
- b. Carefully drain non-hazardous solvents into the sinks labelled for chemical disposal. This must be done with continuous flow of water into the sink.
- c. Solid, non-hazardous chemicals are to be collected in polybags, tied and incinerated.
- d. Microbiological nutrient media waste will also be collected, gathered in a polybag and incinerated.

Overall, NARO is also embarking on control in the purchase of its the required laboratories consumables to ensure that wastage does not occur as a result of expiration.

7.1.6.1.3 Theft and abuse of laboratory equipment and consumables

All staff working in the laboratories be screened based on referral letters form their areas as well as briefing on security requirements.

7.1.6.1.4 Management of reagents spills

NARO laboratories have adopted strategies for managing reagents spills and as part of their Standard Operating Procedures (SOPs). When a spill occurs, the area is cleared of any users, and the spill cleaned up immediately. Waste from spill clean-up is then disposed of appropriately depending on the kind of chemical. After floor spill has been thoroughly cleaned up appropriately, the area is mopped dry to minimize the risk of slipping and falling. Other details are summarized in Annex 03.

7.1.7 Application and Disposal of Pesticides

It is clear, intensified agricultural production amidst changing environment will inevitably imply, increased pest problems necessitating enhanced pest management technology which can lead to possible human and environmental risks. However, the Agricultural Chemicals Statute gives adequate guidelines and rules on how pesticides should be used, the precautions that should be taken before, during, and after application, and how pesticides should be disposed of.

On aspects of their application, the Statute provides the following measures which ought to be followed under the ECAAT-P project:

- a. Protective clothing shall be worn whenever applying pesticides (Figure 24-25);
- b. Recommended applicators shall be used to apply pesticides;
- c. Pesticides shall be used in such way as to safeguard the environment;
- d. Pesticides shall not be disposed into open waters or any waterway;
- e. Pesticides shall be used only when they cannot be avoided;
- f. Indiscriminate use of pesticides is prohibited; and
- g. Pesticides least damaging to the environment shall be encouraged.



Figure 24: Applying pesticides in a rice field without any PPEs in the countryside in Uganda



Figure 25: Appropriate PPEs for pesticides application in a cereal garden

7.1.8 Negative Impacts of Power Back up Investments

These will take forms of back-up generators and solar installations and some of the anticipated negative impacts will include:

7.1.8.1 Investments in solar systems and their impacts

7.1.8.1.1 Visual Impacts

There will be visual intrusion impacts (Figure 26) depending on the type of the scheme and its set up. However, visual intrusion is highly dependent on the frame design and the surroundings of the PVs.



Figure 26: Typical solar panel set up

7.1.8.1.2 Noise Intrusion

Solar cells do not make a noise during operation. But during the construction phase, there will be a little noise as usual in other construction activities. This will be a short term negative impact.

7.1.8.1.3 Impacts on Natural Resources

Solar cells have some negative impacts on the environment during their production phase like many other systems. Especially, the solar cell batteries pose a threat on natural resources by having a short lifespan and containing heavy metals such as cadmium. It is proposed that, the entity that installs the solar panel farm should be responsible for the disposal of used solar batteries.

7.1.8.1.4 Hazardous Waste

Solar photovoltaic panels may contain hazardous materials that could be released when a panel is damaged or disposed of improperly. Concentrating solar energy systems may also use potentially hazardous materials like oils and molten salts, creating the potential for spills.

7.1.8.1.5 Discharge of Pollutants

Solar cells do not emit any pollutants during their operations. However, solar cell modules contain some toxic substances, and there is a potential risk of releasing these chemicals to the environment during a fire. Necessary precautions should be taken for emergency situations like fire. The possibility of an accidental release of the chemicals of the solar cell modules to soil and groundwater poses a great threat for the environment as such, emergency response measures be put in place in the project to address such risks.

7.1.8.2 Investments in standby power generators and the impacts

7.1.8.2.1 Air quality impacts

The Proposed Action construction would temporarily impact air quality in the immediate area of the installation site by increasing vehicular and machinery emissions. These increased emissions would be short-term in nature. Emissions from operation of the generator set would be minimal and temporary due

to the limited use of the generators. Air emissions would be limited to periodic generator start-up to ensure generators are functioning properly, and any emissions would short-term in nature.

7.1.8.2.2 Noise impacts

Operations of the standby generators will likely be of concern in relation to its operations. It is proposed that, NaCRRRI procures standby generators manufactured in the state of art technologies in terms of minimal noise generation and vibrations. Construction noise would be short-term and limited to normal construction hours.

7.1.8.2.3 Hazardous Materials and waste

If the intervention is standby generators, it is likely that, servicing the generators will likely generate hazardous wastes such as oil filters, used oils and obsolete batteries amongst others. It is proposed that, the entities will retain the services of a service provider who will be responsible for maintenance and servicing of generators as such, take up disposal of wastes that will likely be generated.

Table 7: Summary Generic ESMP and Monitoring Measures for ECAAT-P Project based on commodities/activities.

No.	Environmental/Social Issue	Mitigation Measures	Monitoring Indicators	Agency Responsible for Monitoring	Unit Cost ²⁴
A. Impacts of regional collaboration arrangements in ECAAT-P Project					
1.	Cross border transmission of plant and animal diseases	<ul style="list-style-type: none"> v Strengthen border phyto-sanitary and zoo sanitary inspections 	<ul style="list-style-type: none"> v Documentations of plant breeding materials cleared. v Phyto-sanitary Staff at border posts. 	MAAIF	Will be worked out in the project budget financing.
2.	Outbreaks of crop and animal diseases across the region.	<ul style="list-style-type: none"> v Operationalization of PMP provisions. v Strengthen ACB, UNBS to step up surveillance. 	<ul style="list-style-type: none"> v UNBS with ACB, MAAIF monitoring agro-chemicals 	MAAIF UNBS UNADA	Will be worked out in the project budget financing
B. Impacts of poultry development-based enterprises					
Impacts 1.	Impacts relating to odors	<ul style="list-style-type: none"> v The poultry farms need to operate under acceptable standards for such enterprises. v All potential sources of odors need to be regularly cleaned. v The units housing poultry should be leak proof. 	<ul style="list-style-type: none"> v Farmers 	District Extension workers	Part of their operational role.
2.	Risks of vectors nuisance due to unhygienic operations of the units.	<ul style="list-style-type: none"> v The poultry units need to be kept and operated under hygienic conditions. v The deep liter needs to routinely changed and the older one dumped as organic manure under guide of 	<ul style="list-style-type: none"> v State of cleanliness of the poultry enterprises. v Poultry unit with secure fence and adequate lighting. 	Extension workers.	Part of their operational role.

²⁴ It is noted that, at this stage of ESMF, specifics on activities in the project and their impacts cannot be adequately quantified and costed.

No.	Environmental/Social Issue	Mitigation Measures	Monitoring Indicators	Agency Responsible for Monitoring	Unit Cost ²⁴
		extension workers. v The poultry unit should be well fenced to keep off vermin and snakes.			
3.	Water pollution risks from agro-chemicals used in poultry farms.	v Treatment of poultry be done by qualified staff who should ensure safe disposal of used agro-chemicals containers.	v Checking in and around the farm for any used containers of agro-chemicals.	Extension staff	Part of their operational role.
4.	Management of wastes from poultry enterprises	v All waste such as old deep litter, broken eggs and the like should be routinely removed and disposed as manure.	v Regular checking of a poultry unit.	Extension staff	Part of their operational role.
5.	Disposal of diseased or dead birds	v Dead birds should be quickly buried after post-mortem by qualified veterinary person to ascertain the cause of such death. v Sick birds be isolated from the rest.	v Site in place for disposal of dead birds, v Isolation sections for diseased birds.	Extension staff	Part of their operational role.
C.	Impacts of commodities industrialization/processing				
1.	Production based wastes	v Operations of the processing facilities need to be under standard operations standards for such facilities. v Separate ESIA be done for such enterprises to come up with responsive mitigation	v Industries with operations guidelines in place. v ESIA reports in place.	NEMA NARO UNBS	Costs in budget under ECAAT-P.

No.	Environmental/Social Issue	Mitigation Measures	Monitoring Indicators	Agency Responsible for Monitoring	Unit Cost ²⁴
		measures.			
2.	Generation of crop-based wastes	<ul style="list-style-type: none"> v Mainly rice husks be used for oil, energy and other products. v Wastes be composed to manure. 	<ul style="list-style-type: none"> v Plans for transforming rice into industrial products in place. v Waste composting. 	NARO MAAIF District Extension staff	Part of ECAAT-P investment budget.
3.	Risks of household food insecurity	<ul style="list-style-type: none"> v Households to dedicate portions of produce for food at the household. v Sensitization 	<ul style="list-style-type: none"> v Households portioned for food and commercial needs. v Seminars on food security held. 	<ul style="list-style-type: none"> v NARO v MAAIF v Extension staff at district. 	
D.	Impacts of improvements/rehabilitation of laboratories and workshops				
1.	Potential disruption in delivery of laboratory research services	<ul style="list-style-type: none"> v Contractor to prepare his rehabilitation plan in consultations with management of the NARO laboratory facilities; v Contractor to schedule works while allowing for operation of the facilities; v Shifting equipment and services to some available rooms in the facility; v Appropriate notices in both in English and local languages to be displayed strategic places in the facility with messages on rehabilitation 	<ul style="list-style-type: none"> v Contractor schedule in place; v Plan for shifting agreed v Notices directing patients in local language of the areas and English in place. 	Contractor and NARO laboratory management	Will be part in the budget for the project.

No.	Environmental/Social Issue	Mitigation Measures	Monitoring Indicators	Agency Responsible for Monitoring	Unit Cost ²⁴
		programs.			
2.	Impacts on conservation of germ plasm	<ul style="list-style-type: none"> v Preservation in dry ice v Scheduling rehabilitation works to allow secure shift of germ plasm. 	<ul style="list-style-type: none"> v Measures for germ plasm handling in place. 	Site inspections.	Part of works budgets.
3.	Safety of the public from construction works	<ul style="list-style-type: none"> v Hoarding and sealing of the work areas. v Speed limits for construction fleet. v Signs guiding the public in place. 	<ul style="list-style-type: none"> v Work site hoarded and with signs in place. 	<ul style="list-style-type: none"> v Contractor, Supervising engineer v NARO v DEOs 	Part of works budgets.
4.	OSH of workers	<ul style="list-style-type: none"> v Provide PPEs v Conduct Safety and health trainings. v Provide Occupational health services. 	<ul style="list-style-type: none"> v PPEs purchased v PPEs worn by workers v Training records 	<ul style="list-style-type: none"> v Contractor, Supervising Engineer v NARO 	Part of works budgets.
5.	Traffic accidents	<ul style="list-style-type: none"> v Speed limits set v Traffic guides. 	<ul style="list-style-type: none"> v Speed limits furniture in place (15km/h) 	<ul style="list-style-type: none"> v Contractor, Supervising Engineer v NARO 	Part of works budgets.
6.	Management of construction waste	<ul style="list-style-type: none"> v Routine removal of construction and demolition debris. v Dumper trucks to have tarpaulins to cover the rubble. 	<ul style="list-style-type: none"> v Rubble readily and routinely transported outside the site. v Dumper trucks with tarpaulins on. 	<ul style="list-style-type: none"> v Contractor, Supervising Engineer v Project Manager v OHSD -MoGLSD 	Part of works budgets.
7.	Dust nuisance	<ul style="list-style-type: none"> v Hoarding of the sites. v Sprinkling of water on access routes in the hospitals. 	<ul style="list-style-type: none"> v Sites hoarded v Schedule for water sprinkling in place. 	<ul style="list-style-type: none"> v Contractor, Supervising Engineer v OHSD -MoGLSD 	Part of works budgets.

No.	Environmental/Social Issue	Mitigation Measures	Monitoring Indicators	Agency Responsible for Monitoring	Unit Cost ²⁴
8.	Damage to vegetation	<ul style="list-style-type: none"> v Areas for construction materials be clean up and restored fully after works. 	<ul style="list-style-type: none"> v No. of trees planted and caged 	<ul style="list-style-type: none"> v Contractor, v NARO Supervising Engineer v 	Embedded in contract for works sums.
9.	Management of old laboratory equipment	<ul style="list-style-type: none"> v Such materials will be assessed and usable ones will be handed to ZARDIs, v Obsolete ones will be disposed-off through PDU Act procedures. 	<ul style="list-style-type: none"> v Records of such equipment in place. 	<ul style="list-style-type: none"> v NARO 	No costs for such activity.
10.	Risks of fires	<ul style="list-style-type: none"> v Have in place, routinely serviced fire extinguishers. v Training of staff in First Aid aspects. v Laboratory Standard Operation Procedures (LSOPs) be followed to ensure issues of fires are checked. 	<ul style="list-style-type: none"> v LASOPs in place v Fire Extinguishers in place. v First Aid kits in place in the laboratories. 	<ul style="list-style-type: none"> v NARO 	Budget/costs are part of laboratory operations.

7.2 Other Safeguards Guiding Documents

7.2.1 Pest Management Plan

Since the ECAAT-P Project triggers OP 4.09 for Pest Management as such, a Pest Management Plan (PMP) has been prepared as part of this ESMF (Annex 1). However, the use of pesticides will be very limited because the GoU envisages to ensure other non-pesticide-based disease and pest control approaches be employed in plant protection programs. The PMP prepared as part of this ESMF is meant to enhance Integrated Pest Management (IPM) within Uganda to ensure a guided acquisition, storage, handling and application of pesticides. The Plan includes development of comprehensive strategies for handling, transportation, application and disposal of pesticides in compliance with national and international requirements relating to different agrochemicals. The PMP addresses relevant stakeholder concerns about pests and pesticides. It stresses the need to monitor and mitigate negative environmental and social impacts of the ECAAT-P (which includes the use of pesticides) and emphasizes the need for an integrated approach to the management of pests in line with Uganda's strategies on IPM adoption as well as World Bank requirements on pest management and makes provision for adequate measures to enable the Project sustain the adoption of IPM techniques.

7.2.2 Grievance Redress Mechanism

The Grievance Redress Mechanism (GRM) will provide a way to an effective avenue for expressing concerns and achieving remedies for communities. The goal is to promote a mutually constructive relationship and enhance the achievement of project development objectives. The GRM is to ensure that complaints are directed and expeditiously addressed by the stakeholder agencies such as NARO ZARDIs, MAAIF, Ministry of Trade, Industry and Cooperatives) to enhance responsiveness and accountability. While a project-specific feedback and complaints mechanism is set up, the ECAAT-P will incorporate the existing grievance mechanism that uses the settlements and host communities' administrative structure.

7.2.2.1 Common Grievances in ECAAT-P

Likely common grievances in ECAAT-P will include:

- a. Complaints on the use of experiment fields by the research scientists;
- b. Access to water for irrigation under water use efficiency sub-component;
- c. Construction materials;
- d. Employment opportunities offered by the projects to the locals;
- e. Waste management especially possible irresponsible dumping of waste on farmers lands, wetlands and the like;
- f. Abuse of workers by contractors; and
- g. Possible assaults amongst workers in infrastructure works.

On project level, NCoL or SFR/SFE alike will have a process for handling feedback and complaints which ought to be effective, accessible and transparent procedures to receive and resolve complaints. Feedback/complaints shall be encouraged among all workers and community members throughout the project and should be resolved without undue delay. This will also be closely monitored and reported. It is important that concerns are raised at project level before they are brought to the funder's level.

7.2.2.2 Principles of GRM

The grievance mechanism should follow the following principles: it should be scaled to address the risks and impacts on affected persons, be culturally appropriate, be clear and accessible for any individual or group at no cost (vulnerable groups), be transparent and including regular reporting, and preventive of retribution and should not impede access to other remedies. Furthermore, the grievance mechanism should be designed to provide access to specific target groups, e.g. girls and women who, might be subject

to sexual harassment during construction, would need avenues to submit grievances that protect their privacy.

7.2.2.3 Steps of grievance redress

A verbal or a written complaint from aggrieved person will be received by the Project Manager or a person assigned in the project as the Grievance Officer (GO) and recorded in a grievance log (electronically if possible). Grievances can be lodged at any time, either directly to the Contractor, Sub-county/District Office or via the grievance committee member. The process for lodging a complaint is outlined below:

- a. The GO will receive a complaint from the complainant.
- b. The GO will ask the claimant questions in their local language write the answers in English and enter them in English onto the Grievance Form.
- c. A representative of the community and LC-1 Chairman shall witness translation of the grievance into English.
- d. The GO reads the complaint in English and translates it into the complainant`s local language on the Grievance Form.
- e. The local leader and the complainant both sign the Grievance Form after they both confirm the accuracy of the grievance.
- f. The GO lodges the complaint in the Grievance Log.

7.2.3 Mechanism under ECAAT-P

Local grievance redress committees (LGRC) will be initiated at the school/village level to record grievances and also help in mediation. This committee will comprise the LC I Chairperson, a trusted village elder, a religious representative, and specific vulnerable group representatives of relevance to the village i.e. women and the disabled. Disputes will be resolved at the village level as far as possible. The GRC at the Sub County level will comprise the LC III Chairperson, Sub County Chief, a representative of vulnerable groups (women etc.) and the Councilor of the Parish. At the District Level, the Grievance Redress Committee will be established to deal with any grievances unsettled at the village level. The Grievance Redress Committee at the district will at a minimum comprise the LC3 representative, representatives of vulnerable groups, District Land Officer/Surveyor, District Community Development Officer and a Grievance Officer from the implementing agency who will oversee and coordinate grievance issues at the village level including setting up of LGRCs, provision of Grievance Logbooks and related logistics, training and orientation of LGRCs, and providing advice on grievance resolution as well as compiling records of all grievances raised and their mediation for the whole district.

The grievance mechanism for the implementation process is as follows:

- a. The LGRC will interrogate the PAP in the local language and complete a Grievance Form which will be signed by the leader of the LGRC and the PAP/complainant. This will then be lodged in the Grievance Log/Register provided by the Grievance Officer;
- b. The PAP should expect a response from the LGRC within seven days of filing the complaint. If the issue is not resolved, the LGRC will forward the complaint to the GRC at the Sub County;
- c. The GRC at the Sub County will be given a fourteen-day notice to hold a meeting. Two days after the meeting, the Sub County GRC will call the PAP and LGRC for discussions and resolution. The resolution will be presented to the PAP in written form within the same day of the meeting. If there is no resolution to the grievance, the GRC at the Sub County and the PAP shall then refer the matter to the GRC at the District;
- d. The GRC at the District will be given a fourteen-day notice to hold a meeting. Two days after the meeting, the GRC will call the PAP and LGRC for discussions and resolution. The resolution will be presented to the PAP in written form within the same day of the meeting;

- e. If there is no resolution to the grievance, the GRC at the district and the PAP shall then refer the matter to the District Land Tribunal for land-related issues and to NARO head office for all other grievances;

More serious grievances must immediately be referred to the police. It is important to note that, not all conflicts and grievances will be addressed by the Project GRM. Cases that involve assault, gender-based violence, rape and “serious” theft are not resolved under this framework but are instead referred to the police for appropriate prosecution process.

Appeal to Court - The Ugandan laws allow any aggrieved person the right to access to Court of law. If the complainant still remains dissatisfied with the District Land Tribunal or NARO top management in Kampala, the complainant has the option to pursue appropriate recourse via judicial process in Uganda. Courts of law will be a “last resort” option, in view of the above mechanism.

7.3 Contingent Emergency Response

Over the last two decades, Uganda has observed a significant trend of increased exposure to disasters, in particular to floods, droughts, pest and diseases, and storms but also to other hazards. Just within the last decade, the country experienced more than twice severe droughts, floods and pest infestations. These phenomena cause damages to and losses of lives, properties, infrastructure, and livelihoods; they impede and set back development efforts and divert development funds. Millions of dollars are spent to save lives and rehabilitate and recover people’s livelihoods. Agriculture is one of the most affected sectors by all disasters. Agricultural production and livelihoods, particularly of the majority of smallholder farmers in the country are recurrently affected by a variety of natural hazards. Smallholder farmers in Uganda are particularly vulnerable to natural hazard impacts since their hazard exposure is high, especially with regards to paddy rice most often planted under rain fed conditions, and the fact that the per/ha agricultural production of rice is still significantly low. No doubt, the high hazard exposure coupled with low production levels threatens livelihood security of thousands of smallholder farmers in the country, particularly during and after the emergency period.

Accordingly, a zero-cost component has been included under ECAAT-P that will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in the project countries. It is projected that climate change will exacerbate the frequency and intensity of droughts and floods in the region. In this regard, Contingency Emergency Response Component (CERC) is also an instrument for building resilience to climate change, through financing of the mitigation and recovery efforts. This contingency facility can be triggered through formal declaration of a national emergency by the government authority or a statement of facts from a designated authority in the government (statement of facts from the government to a declaration or action by a third party such as launch of a UN Flash Appeal) and upon a formal request from government of the participating country to the World Bank through the Ministry of Finance/National Treasury. In such cases, funds from other project components will be reallocated to finance emergency response expenditures to meet agricultural crises and emergency needs. The emergency response would include mitigation, recovery, and reconstruction following crises and disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others.

In accordance with para 17 of the CERC Guidance Note, all activities financed through CERC are subject to World Bank safeguards policies. **Implementation of this component will follow a detailed Contingent Emergency Response Implementation Plan (CERIP), which is satisfactory to the World Bank to be**

prepared by MAAIF for each Eligible Crisis of Emergency during project implementation. The Project Operation Manual shall provide clear guidance on development and implementation of CERIP. The CERIP shall be developed in consultation with the responsible Government Agencies, Development Partners and the affected/beneficiary Communities. The development of CERIP and POM shall use and apply the Environmental and Social Screening criteria included under this ESMF. CERIP shall among others include description of potential emergencies and the types of activities likely to be financed, evaluation of the potential risks and mitigation measures associated with them. It will also identify likely vulnerable locations and/or groups and include, where needed, some social assessment to guide emergency responses (e.g. what existing social conflicts could be exacerbated by an emergency situation?). The CERIP shall include the institutional arrangements for environmental and social due diligence and monitoring, any needed capacity-building measures, and generic guidance on emergency small-scale civil works. Finally, the CERIP shall indicate which kinds of emergency response actions can proceed with no additional environmental or social assessment, and which ones would require assessment (and at what level) prior to being initiated. It may also identify trade-offs, where required short-term responses could create longer-term risks that need to be managed. Based on the current Institutional Capacity at MAAIF and NARO, there is sufficient Environmental and Social Safeguards Capacity offered by the Environmental and Social Specialists of two Bank-financed projects (ACDP & RPLRP) and ASARECA Safeguards Unit.

A preliminary evaluation of potential risks and mitigation measures associated with them, presented herebelow in Table 7-3:

Emergency	Activities	Potential Risks	Generic Mitigation Measures	Responsible
Weather-based Risks Drought, Flooding, Hailstorm	Irrigation Improved crop varieties Catchment restoration activities Providing restocking/replanting materials	Health & Safety Waste & sanitation Seed & stocking material quality	OSH & sanitation mgt to be part of CERIP Catchment restoration activities Drainage works Certified seed suppliers	MAAIF, NARO, District local Govts
Pests & disease epidemics	Surveillance & early warning Extension services Procurement & use of pesticides Providing restocking/replanting materials	Health & safety	Part of CERIP Use of pesticides following guidance provided in the PMP Introduction & use of improved seed varieties Use healthy and disease-free cuttings for planting Remove and destroy any plants with symptoms of the disease including alternative hosts. Disease surveillance & quarantine	MAAIF, NARO, & DLGs
Natural & Man-	Early warning systems	Health & safety	Part of CERIP	MAAIF,

made such as landslides, wild- fires, civil wars	Catchment management Surveillance mechanisms Community engagement	Social impacts	Social Impacts screening as per ESMF guidance	NARO, & DLGs
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8 ESMF IMPLEMENTATION FRAMEWORK

8.1 Regional Coordination mechanism

The ECAAT-P coordination arrangements will be vested with Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) which will have a Regional Steering Committee. Under ASARECA, the projects National Steering Committees (NSC) established in each country will be linked to the Regional Steering Committee (RSC) to facilitate a transparent decision-making process that will be owned at both national and regional levels. In order to ensure sustainability of its projects and activities, ASARECA has established its Environmental and Social Safeguards Unit (ESSU). This unit provides operational support to ASARECA projects to enable them fulfill the compliance requirements of ASARECA's environmental guidelines, the implementations of the countries ESMFs, and effectively integrate environmental and social concerns into project activities including those under their docket as a fiduciary agent. It is established that ASARECA's ESSU has two specialists namely; Gender and Environmental Specialists who take lead in mainstreaming environmental and social sfaguards issues into its activities, plans and policies and also play interphase role between the entity and its stakeholders on matters of cross-cutting issues.

With regard to ECAAT-P, ASARECA will take a lead in terms of: a. Gender Mainstreaming and Youth Inclusion:ASARECA will provide support towards the profiling of gender inequality for the ECAAT value chains across countries. Capacity will be built towards addressing key gender issues, assessing impacts of gender sensitive interventions and institutionalizing gender mainstreaming; and supporting country teams in developing gender sensitive M&E frameworks and tools; and b. *Environmental and Social Safeguards*:ASARECA will ensure the proper implementation of the country's ESMFs to assure the environmental and social sustainability of the sub regional projects and ensure environmental sustainability.

ASARECA working with NARO especially the PIU at National level will coordinate:

- a. identification of potential environmental and social impacts likely to be experienced in implementation of ECAAT;
- b. screening of sub projects proposals submitted for financing, conducting appropriate site-specific ESIA/ESMP and appropriate implementation of RAP;
- c. development of the appropriate ESS plans (ESMPs and IPMPs);
- d. monitoring for compliance with the safeguard plans; (v) development of the ESS manual to support capacity building initiatives; (vi) strengthening national capacities to implement mitigation measures to minimize risks as well as broker partnerships; and (vii) monitoring and supervision of safeguards performance.

8.2 National implementation framework

8.2.1 Ministry of Agriculture, Animal Industry and Fisheries

MAAIF will be the focal point for implementation of the ESMF and especially the ECAAT-P Pest Management Plan interventions especially through its Department of Crop Protection through its consituent Divisions and Units.

8.2.1.1 MAAIF Department of Crop Protection

The Department is in charge of all matters related to plant health, including issuance of import and export phytosanitary certificates for live plant material and horticultural crops, as well as for plant pest prevention or eradication programmes. The Department is also responsible for enforcing regulations on registration and the use of pesticides and other agrochemicals. The Department has two divisions and each namely; Division of Regulation and Certification (R&D) and Diagnostics and Epidemiology (D&E). This Department plays the policy role of ensuring instruments are in place to regulate movement of planting materials inside and out of the country and has oversight role in the manufacture, distribution and sale of agro-chemicals in the country.

8.2.1.2 Agricultural Chemicals Board

The Agricultural Chemicals Board is established by the Agricultural Chemicals (Control) Act of 2006 to regulate the manufacture, storage, distribution and trade in, use, importation and exportation of agricultural chemicals and for other related matters. Overall, the effectiveness of the Board is glaringly lacking amidst seemingly unregulated trade and handling of agro-chemicals in the country. The Board's presence and effectiveness needs to be given a serious thought if agro-pesticides is to be one of the effective approaches to curb pests and diseases in crops in Uganda.

8.2.2 Government Analytical Laboratory, Ministry of Internal Affairs

In this project, it is envisaged that, Government Analytical Laboratory (GAL) will play a role in the verification tests and analysis of agrochemicals sold to the farmers and to control adulteration. In addition, GAL and other laboratories will be useful in testing of samples to monitor pesticide contamination and food safety issues. It is important to note that, GAL will discharge this role as per their mandate i.e. do independently conduct the verification tests on samples forwarded to but not ideally to enforce any standards.

8.3 National Agricultural Research Organization

Under NARO, ECAAT-P will be implemented through its Regional Centre of Leadership (RCoL) in Namulonge to conduct research into cassava while in its National Centers of Specialization (NCoS) as well as in its Sites for Research (SFR)/Education (SFEs) will equally research on other commodities. At the national level, NAROs designated an officer to be responsible for matters of environment and social safeguards. The designated Environmental and Social safeguards officer plays an interface role between NARO and its stakeholders including NEMA, development partners and also links the Agency with its research institutes on matters of environmental and social safeguards compliance. The Environmental and Social Safeguard Officer also works closely with the environmental and safeguards focal persons in the SFRs/SFEs.

However, it is noted that, the current arrangement does not guarantee sustainability of mainstreaming environment and social issues into the Organization's establishment since this responsibility is largely an added responsibility. Therefore, in order to institutionalize environmental safeguards into NARO, the organization should create in its establishment, an Environmental and Social Management Unit and staff it with at least 2 full-time key staff i.e. an Environmental Specialist and Social Development Specialist. Based on discussions with Bank's Environmental and Social Safeguards Unit, it is strongly recommended that, ECAAT project hires Environmental and Social Specialists to take part in project implementation.

This is important in view of increasing environmental and social challenges triggered by agricultural research and activities under the wider sector.

8.3.1 Ministry of Trade, Industry and Commerce

Ministry of Trade, Industry and Commerce is responsible amongst others, for developing, coordinating, regulating, promoting and facilitating domestic and external trade with particular emphasis on export promotion and access to regional and international markets.

8.3.2 National Environment Management Authority

One of the key institutional mandates of NEMA include among others ensuring the observance of proper safeguards in the planning and execution of all development projects including those already in existence that have or are likely to have significant impact on the environment. The role of NEMA will be to review and approve Environmental Impact Assessments and Project Briefs as well as monitoring records submitted in accordance with the National Environment Act and the respective regulations.

8.3.3 The private sector players

In the delivery chain of the agricultural transformation agenda under ECAAT-P project, the private sector will be at the end of the research chain mainly to take over the multiplication of the resultant breeds and varieties and to sell such to the farmers in keeping with government policy of public-private-partnerships (PPP). The private sector players will include seed dealers and dealers in agro-inputs. In addition, there are a number of training institutes which are churning out man-power in areas of hotel and catering, extension services in crop and animal husbandry which are all key in the delivery of ECAAT-P PDO of transforming agriculture in the country. For instance, Jimmy Sekazi Institute of Catering in Kabalagala, Kampala has a proven record in delivery of catering-based training and value additions to foods. Agributech in Serere is well placed to train farmers and extension in adoption and application agricultural technologies amongst others.

8.3.4 Uganda National Bureau of Standards

The role of UNBS is mandated to formulate and promote the use of standards; enforcing standards in protection of the public health and safety and the environment against dangerous, counterfeit and substandard products amongst others. Therefore, in view of the daunting challenges surrounding trade in agro-chemicals, UNBS is well placed to monitor agro-chemicals trade in consultations with ACB, DCP in MAAIF.

8.3.5 Local Government Administration Structures

Local Government Local governments are responsible for local agricultural activities including pest management since extension is also the responsibility of local government. MAAIF's responsibility is to support and build the capacity of district authorities so that they can better deliver regulatory and quality assurance services, as well as collect agricultural statistics.

8.3.6 Role of NGOs

In a number of places and more so in the rural areas there are a number of NGOs who are working on a number of agricultural interventions in the community with commendable results. In particular such groups have bridged the gap in the delivery of extension services and resource mobilization. No doubt, some of the ECAAT-P interventions can be delivered to the beneficiary communities through the NGOs. During this study, meetings were held with TERUDO in Ngora District an NGO working is greater Teso with communities to help build resilience at households in areas of food security, adoption of animal traction (a form of mechanization). The NGO also trains women in areas of vegetable growing in their backyards. NGOs can work with farmers to raise awareness among the smallholder farmers about the dangers of pesticide use.

8.3.7 World Bank

The World Bank will independently review and clear safeguards documents on ECAAT-P project as well as independently monitor the project's environmental and social performance in relation to the respective safeguards during implementation process. Once the World Bank clears the ESMF, it will then be officially disclosed on its website. Government of Uganda will also be expected to disclose the Safeguards Documents internally. Technical guidance may also be provided by World Bank to MAAIF and NARO during the phases of the project.

9 CAPACITY BUILDING FOR ESMF IMPLEMENTATION AND ITS BUDGET

It is noted that, with time, Organizations such as NARO needs to move away from the use of external systems for ensuring environmental and social safeguards in its development projects and to enhance its own reliance on its own institutional systems for environmental and social safeguards management. The following are some of the suggested strategies for safeguards enhancement in NARO and its establishments:

9.1.1 Environmental and Social Safeguards Unit in NARO

9.1.1.1 Need for the ESMU in the Organization

In view of increasing environmental and social concerns in development process, NARO has already taken strides by appointing one of its staff i.e. Senior Gender Officer to be a safeguards coordinator in the Organization. The Senior Safeguards Officer reports directly to the Director Corporate Affairs which gives her direct access to senior management for timely handling of any environmental and social issues as well as the clout for her voice to be heard by scientists. Despite these, it is evident that, this arrangement would work better by NARO creating an Environmental and Safeguards Unit (ESMU) in its Directorate of Corporate Affairs and such a unit will be responsible for mainstreaming environmental and social issues in all NARO plans, policies and activities. It will also champion environmental awareness and capacity building within the various ranks of NARO; and play a liaison role between NARO, NEMA and development partners in the areas of environmental and social safeguards. ***This proposal was advanced based on discussions during the ATAAS Quarterly Review and Planning Workshop by NARO and its stakeholder institutions in Mukono on 17th January, 2018 in which the Deputy Director General asked the Consultant to guide on a more feasible scenario for the institutionalization of safeguards in the Organization.***

9.1.1.2 Operationalization of the ESMU in NARO

For operationalization of the Environmental and Social Safeguards Unit, under ECAAT-P it is proposed that:

- a. Funds be allocated for recruitment of Environmental Specialist (1N^o.) to the Unit;
- b. Provide resources for equipping and facilitating the kick-start of the Unit operations;
- c. Provide funds for specialized trainings for the staff (2N^o.) of the Unit in areas such as climate change, GIS, early warning systems and technologies, environmental planning, sustainable waste management options and technologies. Details of such trainings can be finalized based staff needs once in the Unit;
- d. Offer introductory safeguards trainings to NARO staff and such trainings should responsive to environmental challenges in work places in the Organization; and
- e. Set up an Environmental and Social Management Information System (ESMIS) for NARO Specialist be recruited as part of project funding and such a specialist should give back-up skills on aspects of mainstream environment (climate change etc).

9.1.2 Capacity building for collaborating institutions

The collaborating institutions under the project will include National Centers of Specialization (NCoS), Sites for Research and Education (SFR/SFEs), collaborating NGOs, private sector players and participating farmers. Each of these categories will require responsive capacity enhancement in safeguards issues based largely their levels involvement in ECAAT-P project activities.

Capacity Building: Will be inform of training on safeguards mainstreaming and reporting.

9.1.3 Support towards agro-chemicals management

At the moment, there are more issues on agro-chemicals which appear to emanate from the handling, manufacture, transportation, importation, labeling, storage, use and disposal of these inputs. No doubt, the functioning of Agricultural Chemicals Board (ACB) needs a major policy decision which could calls for a review of its position and mandate as a long-term remedy to curb “gangsters hijack of agro-chemicals business” *Robert Kawuki PhD of NaCRRRI during comment during consultations.* In the short and medium term, Uganda National Bureau of Standards (UNBS) working with ACB and Department of Crop

Protection (DCP) alongside its constituent Units i.e. Pesticides and Fertilizer Control Unit (PFCU) and National Seed Certification Services (NSCS) and should be supported to monitor the labeling, shelf life (expiry), storage and handling of agro-chemicals imported to Uganda under the ECAAT-P to verify if they meet the prescribed standards as per guidance of the ACB and UNBS.

9.2 Monitoring, Evaluation, and Reporting

9.2.1 Monitoring

Monitoring is required to ensure that all the required environmental and social mitigation measures, set out in the ESMF for the project are implemented satisfactorily. The objective of monitoring is to ascertain that, the proposed mitigation measures are being implemented and that, there is compliance to the terms and conditions for approval

The purpose of the environmental and social safeguards monitoring includes:

- a. Ensure that proper appraisals on the effects of sub-projects takes place and that proper measures are put in place to mitigate the effects;
- b. Set out the basis for compliance and enforcement of terms and conditions for approval;
- c. Design compliance strategies;
- d. Assess compliance with and management of the environment and social safeguards; and
- e. Ensure that all stakeholders participate in the sub-project processes

The environmental and social safeguards monitoring will be carried out by the staff of ESMU in NARO and the District Environment Officers in the districts where ECAAT-P activities are to be implemented this is in line with their mandates as enshrined in the National Environment Act Cap 153. It will also be carried out during project implementation entities themselves and their findings with regard to the safeguards will be reported under the component reporting obligations.

Monitoring, evaluation and reporting on environmental and social issues will form part of the overall - project implementation processes. It is expected that; the District Environment Officers will capture and report on environment and social issues on a monthly basis. The monitoring reports will then be compiled and sent to ESMU NARO for review and who will then prepare a consolidated quarterly monitoring report and share it with the Bank.

The NCoS will have the first responsibility for monitoring through their daily site activities. They will monitor the implementation of the mitigation measures specified in the ESMF as part of their site supervision procedures. Environmental and Social considerations will be reported to the Bank as part of the regular reporting.

The ESMU staff verifies the application of mitigation measures as contained in the field reports submitted to the Unit. In this case, the ESMU staff will undertake regular visits to project sites to provide technical support and document progress in implementing mitigation measures. Where feasible, the District Environment Officers will support monitoring in line with mandates which is to oversee compliance of development project in the districts with environmental provisions. The reporting on environmental monitoring will be included in the overall project progress report which will be shared with the World Bank, NEMA and line stakeholders as necessary.

9.2.2 Reporting

Implementing agencies for ECAAT-P project will be required to report on the progress of project implementation in line with financing agreement. It is expected that, such reports should capture the experience with implementation of the ESMF provisions and the reports will amongst others, provide:

- a. an assessment of extent of compliance with ESMF procedures, learn lessons, and improve future

- ESMF performance;
- b. to assess the occurrence of, and potential for, cumulative impacts due to project-funded and other development activities; and
- c. A record of progress, experiences, challenges encountered, lessons learnt and emerging issues from year-to-year implementation of ESMF that can be used to improve performance.

The reports shall include the following key information:

- a. An introduction, Reporting period and monitoring locations
- b. Scope of works and status of implementation of activity being reported on
- c. ESMF management actions undertaken during the reporting period
- d. Progress to date in implementing the ESMF, including key aspects monitored: such as waste management, health and safety practices, procurement/storage/and use of pesticides including their disposal, dust management, water quality, other environmental incidents and accidents, environmental awareness and training undertaken, etc.
- e. Key recommended follow up issues, actions, time frame and responsibility centre(s).

9.3 ESMF Budget and Disclosure

9.3.1 ESMF Budget

Financial resources are required to support implementation of the ESMF. Below are estimates to successfully implement the ESMF for ECAAT-P.

Table 8: Indicative ESMF Budget for ECAAT-P

N ^o .	Item/Activity	Cost in USD				
		Year 1	Year 2	Year 3	Year 4	Year 5
01.	Mobilization and training in environmental and social safeguards requirements for NARO Secretariat, NCoL, NCoS and SFR/SFEs.	25,000	15,000	15,000	10,000	10,000
02.	Building the capacity of NARO to institutionalize safeguards management.	65,000	55,000	50,000	50,000	50,000
03.	Facilitation of Local Government to mobilize farmers, create awareness and provide technical guidance.	40,000	20,000	20,000	20,000	20,000
04.	Monitoring agro-chemicals aspects by UNBS and its stakeholders; ACB, GAL, and DCP	35,000	30,000	30,000	25,000	15,000
05.	Environmental Impact Assessments for industrial developments for some products	55,000	50,000	15,000		
07.	Environmental and Social Audits		15,000	15,000		25,000
Annual Total		220,000	185,000	145,000	105,000	120,000
Total Budget Estimate for ESMF Implementation		775,000				

9.3.2 ESMF Disclosure

This ESMF will be disclosed in compliance with relevant Ugandan regulations and the World Bank Operational Policies. At the national level, once the ESMF is finalized, NARO will submit it to the World Bank for their review, clearance and disclosure in their website and Government's disclosure in the print media. NEMA and NARO will upload the ESMF and other safeguards for ECAAT-P onto its website <https://www.naro.go.ug/> and invite the public to access and review the documents. NARO will also provide copies of the respective ESMF, PMP, RPF and other safeguards documents in the project to the public in its public libraries in its research institutes who will be participating in the project. The ESMF, PMP & RPF

alongside other safeguards documents will be disclosed at the World Bank's website and made available to any interested persons for public access and for public information and comments/feedback as will be necessary.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

1. As stated, ECAAT-P aims at agriculture transformation is to improve the effectiveness of the sector to regain its role as the largest employer of Ugandans, main source of GDP for the country and contribute to food security at household levels and in the end, bring economic empowerment at the doorsteps in the households. This evident in amongst others, integration of environmental and social safeguards into ECAAT-P planning and implementation which are all key in guaranteeing sustainability;
2. Waste management across a production chain of some the ECAAT-P commodity crops such as rice is no doubt, a subject of research to come up with sustainable methods of its disposal which is of importance especially if interventions under ECAAT-P bring about improved production making waste management form a crop a challenge;
3. The ECAAT-P Projects has been assigned Environmental Category B. Some of the associated negative environmental and social impacts include poor handling and application of pesticides. Most of these impacts are minor or of low-intensity, site-specific and thus, relatively straight forward to manage, mainly based on sensitization activities, information dissemination, training and observance of safety practices while purchasing, transporting, storing and applying pesticides;
4. Over recent past, it is evident that, weather variability is taking a toll on agriculture which is evident in terms of prolonged droughts, floods and pest and diseases outbreaks. These have affected the country at its various levels including households in terms of food security and poverty;
5. It is also evident that, in attempts to stem off problems of pests and diseases, farmers try and apply agro-pesticides which has been a success process for time. However, the whole chain of agro-pesticides manufacture, packaging, transportation, storage, application and disposal of residues amongst others is posing a challenge from a number of fronts including environmental, social and public health amongst others; and
6. Once the design of the project is accomplished, it important that, some of the industrial enterprises such as crop processing and the like be subjected to appropriate environmental assessment and approval requirements be undertaken.

10.2 Recommendations

Adoption of climate smart agriculture

In view of challenges of climate change and variability, there is need to adopt Climate-Smart Agriculture (CSA) with a focus on increase in productivity, enhanced resilience, reduced GHGs emission with a view to enhancing achievement of national food security and reduced poverty at household levels. Measures such as water harvesting, storage, irrigation; growing of drought resistant crop varieties and adoption of technologies for sustainable waste management in agriculture production (for instance in rice production) will go a long way to ensuring resilience at national and household levels.

Need for Environmental and Social Safeguards Management in NARO

Agricultural transformation activities will entail an interplay of technologies and innovations which will be undertaken in a rapidly changing environmental, social and climatic settings which inevitably will generate impacts that compromise environmental and social sustainability. This therefore calls for NARO to have within its establishment, a staffed and equipped Environmental and Social Safeguards Management Unit to timely and adequately address such challenges hence, a strong recommendation for an ESMU to be set in the Organization.

Use of pesticides

No doubt, the current climatic variabilities amongst others has come along with emergence and proliferation of pests and diseases on both livestock and crops which leaves the farmers with limited options for their control including possible use of pesticides amongst the options at hand. Therefore, under ECAAT-P, the criteria for pesticide application should be in line with Bank's OP 4.09 which focuses on an assessment of the nature and degree of associated risks, proposed use and intended users. Most important, the pesticides must conform to WHO Guidelines (WHO (1988): ***The WHO recommended Classification of pesticides by Hazard and Guidelines to Classification***. WHO/VBC/88.953. WHO, Geneva. WHO 2010: ***The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification***2009. http://www.inchem.org/documents/pds/pdsother/class_2009.pdf;

Need for monitoring of agro-chemicals by UNBS

This study has shown that, that local pesticide dealers and stockists are the main source of information on pesticide application for farmers. They prescribe how pesticides are to be used such that, in the eyes of local farmers, stockists are the experts in pesticide application amongst others. Unfortunately, the business of pesticides seems to have long slipped into the hands of ...gangsters.... who adulterate, alter labels and other fraudulent and utter abuse of pesticides for their selfish gains at the detriment of the sector. In view of these and under ECAAT-P, and as short-term measure, it is proposed that, UNBS works with DCP and ACB to monitor importation and trade in project agro-chemicals.

Use of farmers lands for research experiments

Whereas NARO has an explicit guide on access, use and exit from farmers lands where scientists conduct research, there is a feeling that, thorough consultations be done starting with establishing the modus of land ownership in the families in view of intricacies that now surround land equation in the country. In particular, there is a need for the MoUs to be improved to reflect benefits that farmers expect to get from such understandings as well as some safeguards in cases of faulting to honor the obligations therein by either party.

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13 ANNEXES

13.1 ANNEX 1: PEST MANAGEMENT PLAN

13.1.1 The proposed ECAAT Project

It aims at agriculture transformation is to improve the effectiveness of the sector in raising incomes, reducing poverty, improving nutrition outcomes, addressing the challenges of changing climate, fostering regional integration of markets for food commodities and products, and providing better jobs –including to skilled youth and women. This is a strategic shift from previous regional agricultural projects that had focused primarily on productivity.

13.1.2 Risks of pests, Diseases and Weeds

Crop pests, diseases and weeds are identified as the greatest risk to Ugandan agriculture and, unless addressed, the ASSP objectives are at risk²⁵. Losses due to pests and diseases are estimated at: 10-20% (preharvest); 20-30% (post-harvest); and up to 100% for perishable crops and export crops. Annual losses in the priority crops suffering the highest monetary loss due to pests are estimated at: US\$ 35-200 million (bananas), US\$60-80 million (cassava), US\$10 million (cotton) and US\$8 million (coffee). Examples of key pests that are seriously constraining any increases in agricultural productivity in priority crops, include: Coffee Wilt Disease (CWD), Banana Xanthomonas Wilt (BXW), Cassava Brown Streak Virus (CBSV), Fruit Flies and Citrus Canker. Pest spread and potential economic impact depends on various factors including: the value chain affected; geographical location; management practices available at farm level and; whether the pest is categorized as well established or new. Actual economic losses from plant diseases are hard to find in Uganda and in many other African countries. However, the Agricultural Risk Assessment Study by PARM/IFAD (PARM 2016) concluded that crop pest and diseases have very high frequency and very high average and maximum severity. Crop pest and diseases have the highest risk score in that report and deserve to be a priority.

13.1.3 Vulnerability of Uganda to pests and disease attacks

13.1.3.1 Present situation

Danielsen *et al.* (2014) notes: “Like most African countries, Uganda is ill equipped to safeguard crops against existing and emerging pest and disease risks associated with climate change, increasing globalization and human mobility. Diagnostic services, for example, are scarce and poorly coordinated.” Also, that “Public crop protection measures are mainly restricted to border control and sporadic field inspections with hardly any services to deal with farmers’ day-to-day crop health problems. There is a pervasive feeling among Ugandan extension organizations and line ministry officials that farmers have been abandoned in their struggle against an escalating plant pest and disease burden”. Meanwhile, Kroschel *et al.* (2014) noted “major pest and disease outbreaks create shocks at local and larger scales and erode resilience of farming systems, perpetuating and deepening poverty. Such events are characterized by weak phytosanitary capacity in pest and disease risk analysis, diagnostics, surveillance and control and policy interventions. This predisposition is projected to become more acute under scenarios of climate change, increased trade, human movement and due to intensified agriculture to meet demand for food and feed from an increasing population.”

Various stakeholders in Uganda, including researchers, argue that changes in weather patterns including drought, unpredictable and varied rains and temperature changes are causing alterations in the appearance

²⁵ MAAIF/CABI 2017: Crop pests and disease management in Uganda: status and investment needs

and severity of newer pests e.g. black twig borer (*Xylosandrus compactus*(Eichhoff)). In addition, existing diseases are migrating to ecological zones where previously they did not exist. For example, coffee leaf rust (*Hemileia vastatrix*), traditionally limited to higher elevations, is now appearing at all elevations, whereas stem and bean borers are moving up to higher altitudes. Although credible data on the levels and spread of these diseases and pests is not available, the potential risk cannot be underestimated. The outbreak of Coffee Wilt Disease (CWD) (*Gibberella xylarioides*) in 1990s, for example, destroyed more than 10 million Robusta coffee trees countrywide, in a period of less than 20 years, making the country lose billions of shillings.

The pests and disease problem in Uganda is exacerbated by limited resources for research and extension in Uganda. The inability to identify and monitor infestations in a timely manner, insufficient research capacity to evaluate and respond to problems, insufficient extension services to promote good agricultural control practices, and limited access to inputs suggest that the sector is presently not sufficiently prepared to address pest and disease risks in an effective manner that would adequately mitigate potential losses.

13.1.3.2 Factors contribution to vulnerability

Based on review of the literature, interviews with key informants and personal experiences of the consultants, increasing vulnerability to pests and diseases is occasioned by an interplay of factors which can be summarized as follows:

- a. **New pests spread:** this takes place primarily due to a set of under-lying causes related to a) spread through marketing and material movement; and b) outbreaks going unnoticed due to limited information and surveillance measures;
- b. **Marketing and material movement:** affects movement of plants and plant materials both internally and across borders either through grain, seed/planting material or fresh produce such as fruits taken to the market. Traders move diseased plant materials either knowingly (to avoid income loss) or unknowingly. Movement of viable plant material, whether for sale or just exchange, has been responsible for pest spread);
- c. **Outbreaks that go unnoticed:** Mechanisms to anticipate and respond to pest problems before they become serious are needed but are currently insufficient as a result of: inadequate personnel and budget to undertake pest and disease monitoring and response; inadequate and non-coherent monitoring and reporting of pest situations; and inadequate diagnostics services all make pests/diseased materials to go unnoticed across borders;
- d. **Poor farm level management:**
The principle causes of poor pest management at farm level were identified as; a) limited awareness of pest management solutions, b) sometimes farmers don't follow advice, c) lack of practical solutions, d) counterfeit chemicals e) poor quality seed, and f) poor soil fertility and nutrient management;
- e. **Limited awareness of pest management solutions:** farmers have limited capacity to identify, differentiate and diagnose disease problems and effectively respond to them and in situations where they can identify the problems, they fall short on management practices both pre- and post-harvest which is partly blamed on inadequate supporting extension system;
- f. **Lack of practical and workable solutions:** interactions with scientists and researchers revealed a general lack of practical solutions for management of key pests and diseases. Successful linkages have been recorded in the management of Cassava Green Mite and Cassava Mealy Bug employing classical biological control using natural enemies already developed by the International Institute for Tropical Agriculture (IITA) in West Africa;
- g. **Prevalence of counterfeit agro-chemicals:** It has been reported that the probability of buying fake seed or fake pesticides in Uganda is high and that, counterfeits and fake agro chemicals account for

10% to 15% of the national agrochemicals in the market valued at US\$ 6 million per year (ASARECA, 2010). Counterfeit pesticides coupled with poor application methods by farmers have reportedly led to pesticide resistance in some instances. This means that certain pests cannot easily be managed by existing pesticides in the market;

- h. **Poor farm level soil fertility and nutrient management:** Research shows that, the ability of a crop plant to resist or tolerate insect pests and diseases is tied to optimal physical, chemical and mainly biological properties of soils (Altieri and Nicholls, 2003). On the other hand, farming practices which very much ties with limited extension to adequately address farmer production constraints;
- i. **Farmers don't follow advice:**
There are many reasons why farmers do not follow advice. Professor Anthony Mugisha, from Makerere University Veterinary and Animal Research Department blames farmers for breeding drug resistant organisms by ignoring instructions from the manufacturers and their failure to read instructions from the manufactures;
- j. **Poor quality of planting seed:** ideally, seed inspection and certification has not adequately been done by MAAIF due in part to inadequate inspection staff to cover the entire country, inadequate logistics for inspection and seed testing, and limited enforcement of by-laws related to seed counterfeiting. This gap in inspection and certification contributes to the proliferation of fake seed and unscrupulous seed dealers on the market.

13.1.3.2.1 Other factors

Other factors contributing the pest problem include; climate change which is now attributed to the prevalence of pests than it was in the past. However, other factors include to the open borders without full control to manage movement of materials through it. Also lack of collective action by the part of the farmers gives pests and diseases a leeway to cross from one field to the other thereby escaping control actions.

13.1.4 Justification for Integrated Pest Management Plan

It is anticipated that during the implementation of ECAAT-P activities, use of pesticides and agrochemicals will increase to improve productivity, therefore an integrated pest management (IPM) centered on farmer needs and is sustainable, appropriate, environmentally safe and economic use is needed. The requirement for adoption of IPM in farming systems is emphasized in the World Bank operational policy, WB OP4.09, which supports safe, effective, and environmentally sound pest management aspects, such as the use of biological and environmental friendly control methods.

13.1.4.1 Why PMP?

One of the most logical steps to increase food production is the reduction of current yield losses caused by pests, pathogens, and weeds in the field and during storage. The activities funded under the ECAAT-P are aimed at transforming agriculture and increasing production which is likely to come along with increased prevalence of pests and diseases hence, inevitable application of agricultural pesticides. To ensure these issues are managed in an integrated manner and are mainstreamed nationally across the sector and also to comply with national legislation and World Bank's Safeguard Policies, it is imperative to have in place an effective and sustainable Pest Management Plan. The goal of this Pest Management Plan is to reduce the impact of pests to crops, create a list of options based on location and types of crops, and to create a plan that will provide agricultural practices which can reduce problems associated with pesticide usage.

13.1.5 Methodology for Preparation of the PMP

The PMP was prepared by the consultant through working with scientists from National Agricultural Research Secretariat (NARO-Sec.), National Crop Resources Research Institute (NaCRRI) and consultations with National Environment Management Authority (NEMA), Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) especially its Department of Crop Protection and Ministry of Trade, management of Uganda National Agro-inputs Dealers Association (UNADA) and Ministry Industry and Cooperatives (MoTIC) and Teso Rural Development Association (TERUDO), Agriculture, Business and Technology Institute (AGRIBUTECH-Serere) as well as those farmers who collaborate with agricultural research institutes in Kawanda, Kabanyolo and NaCRRI.

Consultations with various communities in selected districts were also conducted. Key informant and lead farmer interview questionnaires were specifically developed as data collection tools to gather the relevant primary data required for developing the PMP. Structured, semi-structured and open-ended interviews with farmers' organizations/farmers clubs and agrochemical companies were also conducted.

Literature review was undertaken to identify priority concerns on pests/diseases, the legislation; and use of pesticides as well as IPM initiatives currently being undertaken or envisaged. Various project, legislative, and policy documents.

13.1.6 Potential Values and Pest Risks on some of the ECAAT-P Target Crops

13.1.6.1 Cassava

Cassava is a very important staple food crop in Uganda especially in West Nile, Northern and Eastern Uganda especially in the districts of Mbale, Iganga, Apac, Kamuli, Lira, Tororo and Kumi. Mainly referred to as a "poor man's crop" and mostly considered a famine reserve crop, cassava is grown on plots averaging 1-3 acres mostly in mixtures involving either of the cereals; maize, sorghum, finger millet or legumes; beans, groundnuts, cowpeas, soybeans. Cassava contributes a substantial proportion of caloric requirements.

13.1.6.1.1 Diseases and pest risks on cassava

Cassava Mosaic Disease (CMD) is a viral disease spread by the whiteflies. The disease is common in all major cassava growing regions in the country. Symptoms of CMD infected plants include mosaic, mottled, deformed and twisted leaflets. There is observed overall reduction in size of leaves and plants and such plants normally produce few or no tubers although this is dependent on the severity of the disease and the age of the plant at which it was infected. Cassava Brown Streak Disease (CBSD) is another viral disease transmitted by the whitefly and causes serious economic losses in the yield and quality of the roots. CBSD symptoms are observable on the leaves, stems and roots however; on the leaves, the symptoms are more prominent on older leaves than young ones. Unlike CMD, infected leaves do not become distorted. The characteristic symptom on the leaves appear as patches of yellow areas mixed with normal green colour which may enlarge and joint to form comparatively large yellow or necrotic patches. The cassava green mite (*Mononychellustana joa*) is a spider mite, which causes serious infection on cassava. It feeds on young leaves and green stems and can easily be confused with effects cassava mosaic disease.

13.1.6.1.2 Rice

13.1.6.1.2.1 Value of rice

Rice is among the emerging staples and commercial crops in Uganda. It is the third most important cereal after maize and wheat. The crop is not only increasingly replacing some staple foods in the country but also becoming the preferred cash crop in some regions. Area under rice cultivation has increased from 1,500 hectares in the early 2000s to 220,000 hectares in 2011. Consequently, production has increased from 154,000 tonnes in 2006

to 237,000 tonnes in 2016 (FAOSTAT). The increase in production is partly attributed to the introduction of upland rice especially the NERICA varieties especially NERICA 4 although NERICA 1 and 10 have also been widely adopted in the country. The NERICA 4 variety is preferred for its hardiness, high yields, and shorter maturation time compared to traditional rice varieties. This has reduced rice imports to the country by one third saving the country very important foreign exchange revenue.

13.1.6.1.2 Risks to rice

Rice yields are decimated by Striga especially in Eastern Uganda, and three key diseases; rice yellow mottle virus, a Sobemovirus vectored by the Chrysomelids, bacterial blight caused by *Xanthomonas oryzae* pv. *oryzae* and rice blast caused by *Magnaporthe oryzae* (Anamorph: *Pyricularia oryzae*) significantly affect yields. These diseases have been recorded where ever rice countrywide.

13.1.6.1.3 Beans

Beans are the most important legume for human consumption in the world. They are estimated to be the second most important source of dietary protein and the third most important source of calories. It is estimated that about 20 million MT of beans are produced annually with a market value of US \$10 billion (FAOSTAT, 2012). The leading countries in the production of beans in 2010 by volume were India, Brazil, Myanmar, USA and China. In Africa, the leading producers of beans are Tanzania, Uganda and Kenya whose production volumes in 2010 were estimated at 950,000MT, 455,000MT and 390,598MT respectively.

In 2010, Uganda was ranked second highest producer of beans after Tanzania in the East Africa Community region. Beans provide 25% of the total dietary calorie intake and 45% of the protein intake. They are also a major source of complex carbohydrates, essential micronutrients, dietary fibre, vitamin B and antioxidants in the nutritionally challenged diets of both the rural and urban poor. For centuries, beans have been produced mainly for food security at household level but currently producers are producing beans as a major source income security.

13.1.6.1.3.1 Beans Pests and Diseases

The common pests and diseases on beans include; cutworms whose several species belong to the genera *Agrotis* and *Spodoptera*. Attack by cutworms is usually sporadic: they appear to suddenly invade a young field and cut young seedlings at the base, near the ground. Others are **Bean Stem Maggots or Bean Fly** which is susceptible to three pests namely; *Ophiomyia phaseoli*, *O. spencerella*, *O. Centrosematidis*. Severe damage is indicated by wilting and dying of seedlings. The attack disrupts nutrient transportation, causing the tap root to die. Bean fly damage is aggravated by environmental stresses such as infertile soils, drought or moisture stress, the presence of soil borne diseases and other causes. Chemical seed dressing with systemic insecticides such as Endosulfan, Acephate, etc. before planting will protect young seedlings, which are the most susceptible, from attack.

13.1.6.1.4 Wheat

Is mainly produced in the districts of Kapchorwa, Kabale, Kisoro, Kabarole, Kasese, Bushenyi and Mbarara. Small quantities are also produced in Nebbi and West Nile districts. Wheat in Uganda is adapted to the highland areas of Mt Elgon in eastern Uganda and the highlands of south-western Uganda. Experts say wheat production in these areas is largely breeding even with the characterized use of rudimentary cultivation techniques, unreliable seed sources and lack of extension information, which have limited the yield potential of wheat. If production is boosted, it will cut down on the amount of foreign exchange spent on importing wheat every year. That is why campaigns to revamp wheat production are being undertaken in the growing areas. This will not only save on huge import bill but will also create incomes for people will

be improved. Experts say this can be stopped if serious production is done especially in the areas where wheat grows. However, Uganda's challenge is that the demand for wheat is higher than its supply and this is the reason behind large amount of imports. One of the major challenges in raising 33-45% of land for the increased wheat growing areas is poverty, food insecurity, and high rate of unemployment especially among the youth.

13.1.6.2 Current Pest Management Options on ECAAT-P Value Crops

As noted, Uganda is vulnerable to pest and disease attacks especially due to environmental conditions that favor availability of crops in most parts of the region. The weather also favors the pests and diseases. Virtually every crop is affected by pests and therefore requires some form of pest management during cultivation. For cassava, the problem has been the cassava mosaic disease, now the new challenge is the Brown Streak diseases.

Table 9: Summary of key crop pests and available pest management options.

Crop	Major Pest/Disease	Available Management Options
Cassava (<i>Manihot esculenta</i>)	Cassava brown streak disease [CBSD]	<ul style="list-style-type: none"> a. Use only healthy and disease-free cuttings for planting b. Plant tolerant/resistant varieties e.g. NASE 12. c. Remove and destroy any plants with symptoms of the disease including alternative hosts. d. Early harvesting. e. Disease surveillance & quarantine. f. Control of whiteflies (insect vector).
	Cassava mosaic disease [CMD]	<ul style="list-style-type: none"> a. Inspect plants regularly for symptoms of disease and remove (roguing) and destroy any plant showing symptoms. b. Use resistant varieties. c. Use clean planting materials and avoid planting cuttings from plants showing symptoms of the disease.
	Cassava mosaic disease [CMD]	<ul style="list-style-type: none"> d. Inspect plants regularly for symptoms of disease and remove (roguing) and destroy any plant showing symptoms. e. Use resistant varieties. f. Use clean planting materials and avoid planting cuttings from plants showing symptoms of the disease.
	Cassava bacterial blight [CBB], (<i>Xanthomonas axonopodis</i> sp. <i>manihotis</i>)	<ul style="list-style-type: none"> a. Crop rotation with non-host. b. Intercropping with maize and melon. c. Field sanitation: plough crop debris into soil after harvest or remove and burn, pruning infected parts of the plant. d. Use clean planting cuttings obtained only from healthy plants.
	Cassava green mite (<i>Mononychellus tanajoa</i> , <i>M. progresivus</i>)	<ul style="list-style-type: none"> a. Together with Cassava mealybug (<i>Phenacoccus manihoti</i>), the green mite has been effectively controlled using biological control (<i>Typhlodromalus aripo</i>). b. Crop rotation, early planting, and intercropping.
Rice	Bacterial Blight	<ul style="list-style-type: none"> a. Resistant varieties. b. Cultural practices – burn crop residue after harvesting heavily infested fields, destroying the surrounding weeds that serve as a reservoir of the pathogen, and management of fertilizers, particularly nitrogen.
Beans	Angular Leaf Spot Bean Rust	<ul style="list-style-type: none"> a. Often, angular leaf spot and bean rust occur simultaneously. b. Can be controlled using fungicides, resistant varieties, biological control and cultural practices such as intercropping, crop rotation, optimum plant spacing and use of

		soil amendment that promote soil health and plant nutrition. c. Use of fungicide in Uganda is however limited to beans with high commercial value e.g. snap beans.
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13.1.6.3 Losses and costs associated with pest attacks on selected crops in Uganda

13.1.6.3.1 Definition of Losses

Subsistence farmers throughout Uganda continue to have problems of protecting their crops in the field against pests, diseases, and weeds. As a result, field losses of crops are common and pose a big threat to food security and household incomes (Mugisha-Kamatenesi et al. 2008). The economic costs associated with a biological problem such as crop pests and diseases comprise the direct losses from predation or competition for resources and the expenditure incurred to control the pests and diseases. When pests and diseases cause agricultural losses, they reduce welfare.

13.1.6.3.2 Impact of Losses

The attacks of major pests and diseases invariably result into quantitative, qualitative, food insecurity, economic loss and environmental damage. There are several ways in which diseases and pests affect crop production but primarily their effects are through reduced yields whose knock-on effects include diminished food availability, access and utilization (FAO, 2009). There is direct monetary loss as a result of expenditures on acquisition and application of pesticides, buying foods at later date more expensively as a result of short-term storage.

13.1.6.3.3 Household Level

Crop failures due to disease and attack also reduce households' income and evidence shows that income loss is indeed significant.

13.1.6.4 Estimated Monetary Value of Losses

Much as data on losses caused by specific pests and diseases on specific crops is scarce; below is a sample of estimation of losses and cost of mitigations for different crops in Uganda due to pests and diseases as highlighted below:

13.1.6.4.1 Rice Losses

Birds cause damage by eating the rice grains and yield losses in the range of 30 -100 % depending on time of planting (late planted rice suffers great damage), whether rice field is in isolation or not and whether birds are controlled or not. Rats cause yield loss in the range of 10-30%. Farmers control rats through field hygiene and baits containing rat poison. In 1997 the Rice Yellow Mottle virus (RYMV) disease caused 100 % loss at TILDA rice scheme and Rice Blast disease was reported to cause 100 % yield loss for the old Bungala upland variety.

13.1.6.4.2 Cassava Losses

A new and highly virulent strain of the Cassava Mosaic Disease (CMD) virus appeared in Uganda in 1988, which subsequently spread to epidemic proportions from 1989 to 1999 over much of Africa. It was estimated that losses of about 60,000ha of cassava were incurred, equivalent to over 600,000 metric tonnes (US\$60 million) of fresh cassava roots. ***The estimated annual cassava loss to pests and diseases has also been estimated at about UGX 200 billion (\$ 80 million).***

13.1.6.4.3 Losses by Quelea Birds

With an estimated adult breeding population of at least 1.5 billion, FAO estimates the agricultural losses attributable to the quelea in excess of US\$50 million annually in Africa alone. There has been an upsurge of Quelea birds in eastern Uganda that eat and destroy cereals such as sorghum and rice resulting into massive food losses and hunger. ***It was reported that while in Kween District in 2013, the birds destroyed over 1,000 acres of sorghum leading to a loss of over UGX 1 billion.*** In June 2013, the Crop Protection Department of the Ministry of Agriculture conducted an aerial bird control operation at Tilda Uganda Limited in Kibimba, Bugiri district in which a large number of quelea birds were wiped out. ***It was reported that Tilda had been losing over 1.5 tonnes of rice per day to the birds valued at UGX 40-45 million per day.***

13.1.6.5 Some Common Practices of pests and Diseases Control in Uganda

In attempts to control pests and diseases in Uganda, the common methods employed include:

13.1.6.5.1 Use of pesticides

Over 300 products are registered in Uganda though there are no agricultural pesticides manufactured or formulated in Uganda. Suppliers of imported pesticides coming mainly from India, China, Taiwan, Israel, Europe or branch offices of international companies in Kenya. The market is dominated by generic companies which manufacture pesticides that sometimes have gone off patent (> 20 years). Many active ingredients have been on the world market for some 30-50 years. These are less expensive but are more hazardous and include organo-phosphates, carbamates, and synthetic pyrethroids. There are some newer pesticides (e.g. Polo, Tordon, Milraz) but these are much more expensive and mostly aimed at and used by the floriculture industry or vegetable exporters. Some shops also have a selection of biological and botanicals imported from India (PARM, 2017).

13.1.6.5.1.1 Distribution of pesticides

The private sector plays a key role in importation, distribution and sale of agro-pesticides in Uganda with MAAIF occasionally being engaged in pesticides importation incases of emergencies. There are a number of wholesalers, who distribute to small scale stockists (dealers), mostly in Kampala but also in the interior. Nakivubo, a section near the Balikuddembe (formerly called Owino) market in Kampala, that sell either agricultural, public health, or veterinary supplies. There are stockists in the rural areas maintaining store sites, but much pesticide is sold in public markets sometimes in unlabeled containers such as beverage bottles. This is in part due to the inability of farmers to purchase a liter or even a half liter, as they want an amount for one sprayer load. Due to the ignorance of the farmers there are new brand names being introduced each year, most of which are the same as existing pesticides, but as the farmer thinks they are a new product he is willing to give it a try.

13.1.6.5.2 Challenges with agro-inputs by the farmers in Uganda

No doubt, agro-inputs will play a key role in the transformation of agriculture in Uganda in view of rampant diseases and pests weather variability, deteriorating soils and a host of other challenges. However, there are a number of issues militate availability and application of these products in the country and such aspects threaten the sector.

These include:

- a. **Weak policing of the borders to curb illicit entry of agro-inputs:** From Uganda National Agro-input Dealers Association (UNADA), many contraband agro-chemicals enter Uganda through its porous borders. Ideally the borders are meant to be inspects every month, but currently, inspections are

undertaken quarterly or whenever complaints arise from the public on matters of the trade. MAAIF blames this on lack of sufficient resources;

- b. **Continued use of banned agro-chemicals:** From the consultations meetings during the preparation of this PMP, it emerged that, there are still some banned agro-pesticides in Uganda market moreso, in Kampala. For instance, the media reports have reported continued sale of Furadan 5G (Figure 27) an agro-chemical was recalled by its manufacturers, FMC Company, in 2009. However, farmers can still easily get it in Kampala shops.



Figure 27: Furadan 5G in an agro-input shop in Kampala.

- c. **Farmers insensitivity to problems of counterfeit agro-products:** In 2012, International Fertilizer Development Centre in collaboration with CropLife and other partners in Uganda introduced ways to reduce counterfeits. Among these was a mobile authentication service. Three products Roundup, Dursban and Mamba (most counterfeited) were stuck with a scratch panel bearing a 12-digit code. Farmers were required to look for it on the container, scratch and send the code by SMS to 6799 and receive confirmation whether the product is fake or genuine. However, the response was minimal despite the huge sales made;
- d. **Lack of functioning extension services:** Reports indicate that, farmers have tended to apply pesticides even at times when the threat is not that enormous. It is reported that, about 45% of the farmers surveyed in various parts of the country received information about which pesticides to use from other farmers with only 2% reported to have received their information directly from agricultural extension staff;
- e. **Proliferation of unregulated agro-chemicals outlets in the market:** To date, the number of outlets in the country dealing in pesticides cannot be established with certainty due many factors still clouded around the supply chain of the products. As such, it is established that some urban areas are keen on collecting license dues at the expense of demanding a number of requirements for an agro-chemical shop which contributes to the compounding problems in pesticides trade;
- f. **Mislabeling:** This is where the label does not reflect contents in the package. This is often with imports where or genuine agro-in puts are deliberately given wrong names with the objective of misleading the users to think they are purchasing an original product.



Figure 28: Agro-input dealer explains how to spot a fake pesticide during Harvest Money Show in Namboole, Kampala in 2017.

- g. **Adulterated products:** An adulterated product is one in which, the authentic product that has been diluted or entirely a fake product may be packaged in re-used branded or in imitation packaging/labels (Figure 29);



Figure 29: The 1st container with an authentic agro-chemical while the 2nd has a counterfeit product

- h. **Label imitation:** Where a premium brand is imitated but a sub-standard product or an adulterated one or sometimes the labels and packages are tampered with, and the product itself may look and smell like an authentic product which is common in seeds of maize.
- i. **Continued sale of expired pesticides:** Lack of sufficient human resources and limited facilities to inspect and enforce the regulations are some of the main causes of non-compliance of many pesticide dealers. It is estimated that, almost 30% of pesticides sold in 2014 in Uganda markets were substandard (MAAIF, 2014). Unlike human and veterinary drugs regulated by National Drug Authority (UNDA), agro-chemicals regulation is weak as such the trade is erratically regulated. For instance, in September 2016 NDA closed more than 3,000 drug outlets and shops that did not conform to the required standards and regulations (Figure 30).



Figure 30: UNDA Enforcement Team carrying away an assortment of confiscated drugs in Kalerwe a Kampala suburb.

13.1.6.6 Integrated Pest Management and its Advantages

IPM fundamentally differs from the traditional pest control programs in that, IPM emphasizes the growth of a healthy crop and livestock with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms (FAO, 2014) while conventional pest management basically relies on chemical pesticides only. The advantages of IPM are; its environmentally friendliness, it reduces human health risks (exposure to chemical pesticides, by comparison, it is relatively cheaper and it is more effective in controlling pests over long periods.

13.1.6.6.1 Some of common IPM practices

These include:

- a. **Use of Resistant Species:** Scientists are currently experimenting with different mixtures of these varieties to see if certain combinations can prove to be more effective in controlling pests and diseases. This means that even though certain pests and diseases might affect crops on a farm, overall, the risk of having a severe infection or pest outbreak is lowered. This means, choosing a crop that is naturally suited to the soil type and environmental conditions of the farm, rather than trying to adapt the farm to suit the chosen crop.
- b. **Use of Biological Control Agents:** Involves use of living organisms to suppress pest populations and damage. These living organisms can be parasitoids, predators and use of sterile males during breeding or pathogens. This tactic takes advantage of the fact that organisms depend or even feed on each other

for survival. Thus, biological control method tries to ensure that pests are reduced by organisms which are their natural enemies.

- c. **Cultural Control Practices:** This method involves use of usual crop and livestock production practices to suppress pest population and damage in the field. These practices include ploughing to expose and kill soil pests, using pest and disease-free seed, planting in time, intercropping, timely weeding, mulching, field sanitation, harvesting in time to minimize exposure of the crop to pests, practicing crop rotation, selection of breeding livestock with the desired traits, general hygiene for livestock and practicing all-out livestock production systems.
- d. **Use of urine and ash to control crop pests and diseases:** As one of the traditional practice in Uganda, farmers use ash and urine to control a wide range of crop pests and diseases. The dilution and storage of urine involves two key steps that a farmer needs to keep note of when using this practice though urine can also be used with or without dilution.

Other advantages of urine and ash to plants

- i. Urine and ash are rich in several plant nutrients.
- ii. Urine is specifically a rich nitrogen source while ash is a rich potassium source.
- iii. On top of preventing/controlling pests and diseases, applying this preparation helps to boost soil fertility.

Health concerns with respect to use of urine

Urine especially if collected from humans according to reports, can be a source of diseases such as Schistosomiasis and typhoid though storing urine for at least one week reduces the risk of disease spread. To reduce this risk further, the following safety precautions should be taken when handling and using urine preparations:

- a. Wear rubber gloves when handling and applying urine;
- b. Wash hands and all equipment used with soap and water after handling urine;
- c. When using human urine, observe a one month withdraw period from the time of last application to harvesting; if urine is applied on the harvestable parts;
- d. All urine should be stored in covered containers out of reach of children and domestic animals;
- e. Never pour urine or water used to wash its containers in streams, swamps and other water sources; and
- f. Use of human urine collected from different household or public places should be avoided as much as possible since this can increase the risk of disease transmission.

Other sources of information on this practice can be found on: http://www.ecosanres.org/pdf_files/ESR2010-1-PracticalGuidanceOnTheUseOf.

13.1.6.6.2 Pest Preventive Measures

Some measures used to prevent pests include:

- a. **Phytosanitary measures**, such as physical removal of pests, affected plant parts, infected plants (virus-infected plants, severely disease-infected or pest-infested plants should be undertaken. It may also be possible for farmers to minimize pest attack through good timing;
- b. **Mechanical control methods:** This involves handpicking, netting and bagging of fruits and use of traps. Where applicable, the technique may still be used prior to use of chemicals.
- c. **Physical control methods:** Mainly by way of physical control through killing pests or suppressing their population by modifying physical factors of their environment to their detriment. Other physical means include bird scaring which is common in rice fields. Scare crows and bird chasing (typically by children) are the methods jointly used to keep birds off the rice fields. Others use empty mineral water bottles in which they place stones and the bottles tied on strings which are

suspended on poles. These are then placed around the field and when a person shakes the string at one point, it shakes all the bottles to make a sound that scares away the birds.



Figure 31: Young men setting up empty bottles and stones for bird scare in sections of Tild Rice Scheme, Bugiri.

13.1.6.7 Proposed ECAAT-P Interventions and the need for a PMP

In order to address some of the above constraints, the ECAAT-P includes particular components to solve the some of the above bottlenecks as discussed below:

- a. **Finalization of seed and agro-inputs bills:** Currently, there is a Draft seed policy 2016 that needs to be merged with the Plant Genetic Resources (PGR) policy. Besides, there is also need to put in place, agricultural input policy to regulate actors and enforce standards (e.g. of biofertilizers) through review and update of the Agricultural Chemical Control Act and the re-tooling of agro-dealers on safe handling and advisory services with regards to inputs.
- b. **Development of technologies for pest management:** ECAAT envisages to put in place interventions which trigger requirement for PMP and these include:
 - i. Technologies to aid generation of efficacious and cost-effective technologies, livestock vaccines, ethno-vet-drugs and bio-acaricides;
 - ii. Knowledge of pest and disease occurrence in time and space is paramount for effective control. Investments will therefore be made in development of pest and disease predictive systems for the region;
 - iii. The Pest Management Plan is meant to enhance IPM within Uganda to ensure a guided pesticides-use planning, acquisition/procurement, storage, handling and application of pesticides. It stresses the need to monitor and mitigate negative environmental and social impacts of the ECAAT-P (which includes the use of pesticides) and emphasizes the need for an integrated approach to the management of pests in line with Uganda's strategies on IPM adoption as well as World Bank requirements on pest management and makes provision for adequate measures to enable the Project sustain the adoption of IPM techniques.
- c. **Build capacity of seed certification centre:** ECAAT will support recruitment of 1 Seed Analyst and build their capacity to pass the proficiency tests, update protocols and quality management so that accreditation can be concluded.

- d. **Institutional support:** The Department of Crop Inspection and certification in MAAIF will be strengthened to improve on their operations especially in regulating the quality of agricultural inputs on the market through fighting counterfeits.

13.1.6.7.1 Overall Standards for Pesticides to be procured and used under ECAAT-P

The World Bank has been a longtime partner in the agricultural sector. Given its safeguard policies, it has to ensure that the procurement/use of pesticides is done as cautiously as practicable, with proper safeguards in place, and through the use of the least toxic means of effective pest control. In that regard, the following criteria will apply to the selection and use of pesticides in activities under ECAAT-P:

- a. Pesticide financed under ECAAT-P must be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards that, at a minimum, comply with the FAO's Pesticide storage and stock control manual (FAO, 1996), Revised guidelines on good labeling practice for pesticides (FAO, 1995), Guidelines for the management of small quantities of unwanted and obsolete pesticides (FAO, 1999), Guidelines on Management Options for Empty Pesticide Containers (FAO, 2008), and Guidelines on personal protection when using pesticides in hot climates (FAO, 1990).
- b. Consistent with World Bank OP 4.09, ECAAT-P financing will not be used for formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.
- c. ECAAT-P financing will not be used for any pesticide products which contain active ingredients that are listed on Annex III of the Rotterdam Convention (on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade), unless the Country has taken explicit legal or administrative measures to consent to import and use of that active ingredient.
- d. ECAAT-P financing will not be used on any pesticide products which contain active ingredients that are as per the Stockholm Convention on Persistent Organic Pollutants, unless for an acceptable purpose as defined by the Convention, or if an exemption has been obtained by the Country under this Convention.
- e. ECAAT-P financing will not be used for any pesticide products which contain active ingredients that are listed on Annex III of the Rotterdam Convention (on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade), unless the Country has taken explicit legal or administrative measures to consent to import and use of that active ingredient.

13.1.6.7.2 Use of pesticides

An approved list by the Agricultural Chemicals Board exists will be used according to their labeled uses when all of the following criteria are met:

- a. The activity is part of an IPM strategy that seeks to minimize pesticide use or use pesticides as a last resort;
- b. Best technology-based practices are followed, leaks or spills are reduced, and application equipment is maintained in good working order;
- c. Timing of pesticide application corresponds to the life cycle of the pests to be treated, and the life cycle is monitored appropriately;
- d. Pest population action thresholds are determined, and monitoring ensures treatment only when the threshold is exceeded;
- e. Weather conditions are appropriate for the application;
- f. Applicators adhere to all of the label requirements concerning the safe and effective use of the pesticide(s);

- g. Persons applying the pesticide are fully trained or are under instructions from MAAIF, UCDA or NAADS or any other competent Extension Staff; and
- h. Activity minimizes pesticide application within 50 meters buffer of streams or other water bodies.

13.1.6.7.2.1 Pesticide Application Decisions and Procedures

Pesticides should be applied by directed, low volume, single wand sprayers, wiping, daubing and painting equipment, or injection systems. Boom application shall be limited to large scale (>5 acres) natural resources enhancement or farming activities. It is important to manage pesticide drift when surface waters or beneficial plants are nearby. Control nozzle size, pressure and droplet size to minimize drift.

Application checklist shall include the following procedures:

- a. Read pesticide label.
- b. Check and calibrate application equipment for safety and efficiency.
- c. Check the weather conditions. Unless otherwise indicated on the product label, avoid pesticide use if it is raining or expected to rain within 24 hours, or wind speed is very high
- d. Post notification signs at all entrances to sites associated with pesticide applications.
- e. List re-entry specifications on the signs if required by the label.
- f. Apply material according to the label.
- g. Record pesticide application on application forms.
- h. Remove signs when the liquid pesticide has dried, unless indicated otherwise on the label.

13.1.6.7.2.2 Rules and Procedures for Application of Pesticides

- a. **Safety and protection:** There are certain measures which should always be undertaken by pesticide operators to help protect against contamination during the handling and application of pesticides. These measures should always be followed.
- b. **Reading and Understanding Labels:** The first principle is to always read and follow the label recommendations on the pesticide container. If the label information cannot be read or understood for any reason, then the operator should find someone who can explain the instructions to him. Apart from the written instructions, the operator should also look for pictorial information on the label which will indicate the degree of hazard presented by the pesticide formulation. Similarly warning symbols, such as skull and crossbones, give information on the type of chemical hazard.
- c. **Avoiding Contamination:** When pouring and mixing the concentrated product, every effort should be made to avoid splashing or spilling onto skin or clothing. If any product falls on the skin, or into the eyes, then this should be washed off as soon as possible. Heavily contaminated clothing must be removed and washed with detergent and water. The likelihood of contamination can be greatly reduced by using suitable equipment for measuring out and transferring the product. In particular the hands must never be used as scoops nor should the hands or arms be used to stir liquids.
- d. **Personal Hygiene:** Another basic principle of personal protection is good hygiene when working with pesticides to ensure that if any contamination occurs then it is removed in good time. Operators should not eat, drink or smoke during work and should not touch their face or other bare skin with soiled hands or gloves. They should always wash their hands and face after handling pesticides and before eating, drinking, smoking or going to the toilet. When they have finished work for the day they should then wash themselves thoroughly. Their work clothes should also be washed after work, separately from other clothing, and then dried.
- e. **Safety Gear:** For the effective safety and protection of the workers handling agro-chemicals (Figures 21-22), the provision of the following is deemed necessary.
 - i. Helmet or cloth cap
 - ii. Safety spectacles, goggles or face shield (attached to helmet)
 - iii. Dust or light fume masks

- iv. Emergency vapor masks or half-face respirators with organic vapor cartridges
- v. Nitrile rubber or neoprene gloves or gauntlets
- vi. Overalls
- vii. Nitrile rubber or neoprene aprons
- viii. Strong rubber or neoprene boots

Selection, care, and maintenance of work clothing and protective equipment will be paramount given the hot conditions in some parts of Uganda. This is because the wearing of additional protective clothing and other equipment can cause severe discomfort and even physical distress due to heat stress if they are made of inappropriate materials. In addition, because of the discomfort, operators may dispense with protective apparel and become subject to greater exposure and possible contamination. There are certain measures which can help reduce this problem, namely:

- a. Where possible using a pesticide formulation which does not require the wearing of additional items of protective clothing;
- b. Applying the pesticide in the cooler hours of the day when it is more comfortable to wear protective equipment.

13.1.6.7.2.3 Instructions on Wearing of PPE

Wear protective equipment as described in Table 10 below.

Table 10: Appropriate PPEs for handling Agro-pesticides

Equipment	Protection	How to wear it
Coveralls	There are two types of coveralls: disposable and reusable. Disposable coveralls are lightweight and comfortable on warm days. They can be worn for mixing and applying pesticides, and then discarded at the day's end. If they become contaminated, they should be discarded at once. The second type of coverall is made of washable fabric and may be reused many times. These fabric coveralls are adequate for use with all but the most highly toxic and concentrated pesticides.	Button (or zip) right up to the neck. Loose coveralls around the neck will suck and blow pesticide in and out of the interior of the coveralls as you bend and move. Wear coveralls over a long-sleeved shirt and pants.
Aprons	When pouring or otherwise handling concentrated pesticides, it makes good sense to wear protection in the form of an apron. The apron protects the front of your body from spills or splashes of the concentrate. The apron should be made of rubber or synthetic liquid-proof material that will resist the solvents used in formulating the pesticide.	Make sure the apron covers your body from your chest to your boots.
Gloves	Protect your hands by wearing chemical-resistant gloves. Neoprene gloves provide the best protection. Natural rubber gloves may be used when handling organo-phosphorus or carbamate pesticides. Be sure that they are designed for use with solvents and pesticides. Never use lined gloves, gloves with wristbands or leather gloves.	Put gloves on and roll up the first inch or two of the cuff. That way when you lift your hands, any liquid on the gloves won't drip down your arms.
Hats	Use a chemical-resistant hat, preferably made of washable plastic. The hat may be a hard hat or made of flexible plastic. In either case, it should have a plastic sweatband. Wash and dry entire hat after each use and before storing. Ordinary baseball caps with cloth sweatbands are dangerous as they absorb the pesticide and re-contaminate the forehead each time you wear them. Even small amounts of moderately or slightly toxic pesticides may cause severe skin irritation or	

	other illness if exposure continues for several days.	
Boots	Wear chemical-resistant, unlined boots. These boots are available in a variety of styles and materials. Neoprene boots are the best. Knee-length boots offer greater protection because they extend above the lower end of the apron. Avoid leather or fabric boots and shoes because these will absorb pesticides and cannot be cleaned effectively.	Wear your trouser legs outside the top of your boots. This will prevent spills and splashes from running into the boot and onto your leg.
Goggles	Chemical-resistant goggles keep your eyes safe from both splashing and, if using dry formulations, dusts or granules. Don't use goggles with cloth or elastic headbands as these will absorb pesticides.	Wear goggles snugly on your face so that the sides of your head are protected from splashes. If you wear glasses, make sure you purchase goggles that fit snugly over them. Never wear contact lenses when working around pesticides.
Respirators	Only approved respirators should be used. Do not exchange parts of different respirators. (For example, do not use a cartridge produced by Company "A" with a respirator produced by Company "B" as the combination may not provide adequate protection to the user). Dust masks are ineffective in protecting against herbicide vapours. Similarly, the filters on tractor cabs are intended to remove dust and are not designed to protect against herbicide vapours or mists. Chemical cartridge respirators are recommended for outdoor use when mixing and applying herbicides.	When carrying out operations, change filters each day. The cartridge should be replaced when chemical odour becomes apparent or when breathing becomes difficult. New cartridges should always be installed at the beginning of the spray season. Prior to commencing work, check the face seal while the respirator is on the wearer's face. Regardless of design, respirators cannot be worn securely by people wearing beards, moustaches or sideburns.
Face Shields	Goggles offer some protection, but frequently full-face protection is advised or required according to the pesticide label. It is especially important to protect your eyes and face when pouring or mixing liquid concentrates. Effective face shields are made of clear plastic.	Since the shield attaches to the hard hat, you can raise or lower it as needed.

Note: The key danger times are during mixing and when walking through the spray path. Eye and feet protection are the greatest priority. Goggles, long pants, and rubber boots are most needed. Due to the use of knapsack sprayers by small-scale farmers and being unaccustomed to wearing protective equipment, only pesticides which meet World Bank standards of minimum mammalian toxicity ("least toxic"), yet still effective, will be recommended for use under the project.

Post-application Visual Assessment: All operators must conduct visual assessments of application sites. Visual assessments will consist of spot checks in the area in and around where pesticides are applied for possible and observable adverse impacts caused by an application of pesticides. Possible and observable adverse impacts include, but are not limited to, the unanticipated death or distress of non-target organisms, disruption of fish and wildlife habitat.

13.1.6.7.2.4 Records Keeping

All records will have to be documented as soon as possible but no later than 14 days following completion of each pesticide application in a treatment area. On or before the 14th day after any pesticide application, a copy of the below information will need to be on file with the Extension Workers. Information for each treatment area to which pesticides are discharged as follows:

- a. Surveillance methods used, dates of surveillance, and findings of surveillance
- b. Target pest(s) and explanation of the need for pest control
- c. Pest or site-specific action thresholds prior to pesticide application
- d. Description of pest management measures implemented prior to the first application
- e. Company name and contact information for pesticide applicator
- f. Pesticide application dates and time of day of application
- g. Description of treatment area, including location and size of treatment area and identification of any waters
- h. Name of each pesticide product used to include ACB registration number
- i. Quantity of pesticide applied
- j. Concentration (%) of active ingredient
- k. Effective concentration of active ingredient
- l. Any unusual or unexpected effects identified to non-target organisms
- m. Was a visual assessment conducted? Was it done during or post pesticide application, if not explanation why not
- n. Assessment of environmental conditions relating to proper pesticide use

13.1.6.7.2.5 Disposal of expired pesticides and empty containers

Key Challenges

Re-use and poor storage of pesticide containers

There is widespread re-use of containers for storing food or water for humans or livestock. Indeed, this may well be the most hazardous practice associated with pesticide use in Uganda. Many farmers wash the containers before re-use, but often less thoroughly than is needed.

Limited Capacity to dispose Expired pesticides

The only thermal processes that are able to destroy plastics and pesticides are high temperature incinerators and cement kilns with effective emission controls (WHO, 2008). However, Uganda has only one incinerator fit for safe pesticide disposal whose cost of UGX 1500 per kg of pesticide is highly prohibitive for large quantities.

13.1.6.8 Possible Interventions and Options for disposal of expired pesticides

- a. **Utilization of Luwero Industries:** One incinerator thought to meet the required pesticide incineration standards is Luwero Industries located at the Nakasongola Military Base (Luwero Industries) but its specifications were not ascertained due to issues of access to a military facility. Although MAAIF had been allowed to utilize the facility for pesticide disposal, the UGX 1500/= per Kg incinerated was too expensive for MAAIF to afford. There have also been concerns over access to the facilities by NEMA to monitor its operations. ***NEMA licensed Waste Disposal service providers that have access to the incineration facilities at Nakasongola and MAAIF will work with these licensed service providers. MAAIF should engage Luwero Industries to explore the possibility of upgrading the facility to the standard required for pesticide disposal.***
- b. **Use of Hospital Incinerators:** Hospital incinerators have been identified as potential solutions but they do not meet the required standards. It is recommended that such incinerators SHOULD NOT be used for solid pesticides, agro-chemicals containing chlorine, sulphur or nitrogen, agro-chemicals containing metals and large quantities of agro-chemicals in general (FAO, 1996).
- c. **Utilization of Locally Fabricated Incinerators:** A local company Technology for Tomorrow Technology Ltd (T4T) www.T4Tafrica.com manufactures batch type incinerators with a trade name MAK. They come in three sizes: small (20 kg/hour), medium (30 kg/hour) and large (40 kg/hour). When considered over an operating period of say 12 hours, the destruction would be: small (240 kg),

medium (360 kg) and large (480 kg). Their operating temperature ranges from 850 to 1,080 °C. The target of these incinerators has been disposal of medical waste and many of such incinerators are being used at major hospitals in Uganda. **Therefore, NARO could engage local fabricators to fabricate small-scale incinerators to help smallholder farmers to safely dispose obsolete pesticides.**

- d. **Incineration using research institutes facilities:**At NaCRRRI and Kawanda Agricultural Research Institute (KARI), some items that are deemed unsuitable to be put in the normal waste bins in the laboratories, are placed in special waste-bin supplied in each of the laboratories and such items include used gloves, waste reagents, as well as wastes relating to agro-pesticides which are all collected and taken for incineration within the institutes.

13.1.7 Impacts of Pest Management Practices

IPM will play a key role in the agricultural productivity; leading to a wider range of socio-economic impacts and overall economic development of the country. Agricultural productivity in Uganda is closely related to reduction of poverty and malnutrition. Hence, small-scale farmers in particular, will play an important role in reducing poverty and malnutrition and creating widespread growth through the implementation of IPM for the ECAAT-P.

On the other hand, pest management practices, if not implemented properly, will have negative impacts on the environment as well as harmful effects on human beings and animals. The following sections provide positive and negative impacts of pest management practices.

13.1.8 Some of the on-going IPM Initiatives in Uganda

13.1.8.1 IPM Collaborative Research Support Project in Uganda

The Integrated Pest Management Collaborative Research Support Program (IPM CSRSP) is one of nine collaborative research support programs, or CRSPs, set up to leverage the expertise found at American land grant universities in developing countries around the world. The Regional IPM CRSP for East Africa (Kenya, Tanzania, and Uganda) aims at developing a shared IPM strategy to improve the productivity of higher value marketed horticultural crops in the region using a specialized program that is dedicated to ecologically based IPM research on horticultural crops. The IPM CRSP is being implemented by a consortium of U.S. and East African institutions, with The Ohio State University (OSU) serving as the lead university and Virginia Tech as the management entity. A coordinating unit is headquartered at Makerere University School of Agriculture in Uganda which co-ordinates IPM research, training, extension and technology dissemination activities in Uganda and the East African region. The IPM CRSP has been applying a farmer participatory IPM strategy at on-farm research sites in Eastern Uganda since 1995.

The IPM CRSP crop focus has expanded to include key food crops many of which were grain crops - Beans, Maize, Cowpeas, Sorghum and Groundnut. Other additions to IPM CRSP trials in Uganda included disease and pest control strategies on two horticultural crops i.e. tomatoes and potatoes. Mold incidence on stored maize and groundnuts and coffee wilt incidence are currently being investigated. Among the crops the IPM CRSP has had active programs on a long-term basis include sorghum, groundnuts and cowpeas.

13.1.9 PMP IMPLEMENTATION FRAMEWORK

The Government of Uganda and other stakeholders are responsible for ensuring that the pesticides used nationally are safe; are marketed, applied, handled and disposed of appropriately; and, if used judiciously, do not leave harmful residues on agricultural produce and in the environment.

13.1.9.1 Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

The Crop Protection Department is in charge of all matters related to plant health, including issuance of import and export phytosanitary certificates for live plant material and horticultural crops, as well as for plant pest prevention or eradication programmes. The Department is also responsible for enforcing regulations on registration and the use of pesticides and other agrochemicals. The Pesticide and Fertilizer Control Unit (PFCU) under Crop Protection Department has the following functions:

- a. Initiate formulation and review of policies, laws, regulations strategies and plans related to agro-chemicals and their use in Uganda;
- b. Inspection, monitoring and enforcement of regulations and standards for compliance and to take the necessary action in cases of non-compliance;
- c. Equip, operate and build capacity to operate the Pesticide Analytical laboratory to establish accurate pesticide residues in plants used for food and other food and feed items;
- d. Develop and participate in pesticide residue monitoring plan to ensure adherence to the official Maximum Residue Levels (MRLs);
- e. Conduct tests and efficacy field trials on agricultural chemical formulations to compliance to approved specifications and quality the registration process;
- f. Participate in National, regional and international fora to promote sound management of agricultural chemicals;
- g. Secretary to the National Agricultural Chemicals Board and its subsidiary body, the Agricultural Chemicals Control Technical Committee Build capacity for inspection and certification of agro-chemical trade in Uganda and assessing and seeking solutions to the trade constraints and use of the agro-chemicals;
- h. Establishing a database of registered and approved products, dealers, and premises; and
- i. Ensure that the public and the farming communities and dealership communities have access to information on safe and responsible use of agricultural chemicals and that the necessary training programs are in place

The Control of Crop Epidemics Section (CCES) has the following functions:

- a. Surveillance for weeds, pests and diseases that are of epidemic proportions;
- b. Mobilizing and organizing researchers, Local Government Staff, Local NGOs, and farmers to control weeds, epidemic pests (including migratory pests) and diseases;
- c. Purchasing Equipment, agro-chemicals and mobilizing stand-by funding to intervene in case of outbreaks of a weeds, pests or diseases;
- d. Forecasting, and providing an early warning on epidemic pests and diseases and sending alert messages to the stakeholders to be ready for outbreaks;
- e. Liaising with regional and international organizations in weed, pest and disease forecasting, monitoring and management;
- f. Training and building capacity for the Department, Local Governments and farming communities in pest and disease epidemic control;
- g. Creating awareness for weeds, crop pests and diseases, their management and follow up;
- h. Keeping and updating a database of information on epidemic pests and diseases and their control; and
- i. Formulating guidelines based on the Crop Protection act 1962, to guide lower administrative units to make by-laws to improve pest and disease control strategies in the affected districts.

MAAIF will be the focal point for implementation of the PMP and shall coordinate its implementation through a harmonized information management system, financial mechanism and a monitoring and evaluation framework. The ministry will:

- a. Liaise with statutory bodies including URA and UNBS to ensure the importation of pesticides allowed for use in Uganda and to ensure they are of high quality
- b. Liaise with NEMA and GAL to monitor pesticide contamination
- c. Through its inspectors monitor condition of pesticide storage and transport
- d. Together with NAADS link-up with the district to collect empty pesticide containers

All pesticide shops will be inspected regularly by MAAIF inspectors to ensure that they are registered or licensed by ACB and that they follow safety regulations. Inspectors will also be required to take samples of pesticides that are suspected of being adulterated.

13.1.9.2 Ministry of Water and Environment

The Directorate of Water Resources Management is responsible for managing the water resources of Uganda in an integrated and sustainable manner in order to secure and provide water of adequate quantity and quality for all social and economic needs for the present and future. The directorate has two departments the Rural Water Supply (RWSD) and Urban Water and Sewerage Department (UWSD). ***The MWE through its Water Resources Department will collaborate with GAL in monitoring pesticide contamination of water bodies.***

13.1.9.3 Ministry of Health

Currently, the data on pesticide poisoning and accidents resulting from pesticides use or disposal is fragmented and still remains in the various newspapers that have reported such cases, and various hospital cases. There is the need to create awareness raising actions that will target the different pesticide users in order to avoid accidents and incidents. ***Under the ECAAT-P, the Department of Environmental Health in the Ministry of Health will be supported to collect and keep accurate statistics on pesticide poisonings events. In addition, it will create awareness raising actions that will target the different pesticide users in order to avoid such accidents and incidents***

13.1.9.4 Role of NARO and its Research Institutes

Agricultural research is carried out by the MAAIF regional research stations under NARO. The three largest stations include National Agricultural Research Laboratory -Kawanda (horticulture and post-harvest) and Namulonge Agricultural and Animal Research Institute (NAARI) (root crops) both outside Kampala as well as NaSARRI Serere (dry land crops) in the northern zone of lower rainfall. Also important is the Crop Science Department of Makerere University which has support from the USAID IPM-CRSP. NARO will coordinate all integrated agricultural research and development (R&D) activities required under the ECAAT-P. When pest problems occur that are novel or beyond the scope of NAADS in-house experts and the UCDA Extension Staff at the district level, advice will be obtained from NARO.

13.1.9.5 National Environment Management Authority

NEMA has Monitoring and Compliance Department as well as Environmental Inspectors who are expected to ensure compliance with permits, standards, regulations and all approval conditions.

13.1.9.6 Agricultural Chemicals Control Board (ACB)

This is a statutory body established under the Agricultural Chemical Control Act 2006 and charged with overseeing, deciding or advising the Minister on the registration and control of agricultural chemicals and exercising responsibility for all policy matters affecting agricultural chemicals. However, the bulk of the enforcement, monitoring and technical capacity infrastructure rests in the hands of the staff in the directorates for crop and in particular department of crop inspection and certification. Apart from the ACB, the other agencies are likely to play enforcement and monitoring roles for chemicals use. However, the bulk of the technical capacity infrastructure rests in the hands of the ACB and staff in the directorates for

crop and livestock protection. This body regulates: (i) herbicides; (ii) pesticides; (iii) fungicides; (iv) fertilizers; (v) insecticides; (vi) plant growth regulators; (vii) seed treatment chemicals; (viii) bio pesticides; (ix) chemicals for wood industry (petroleum and wood treatment); and (x) vector control-the Board also handles chemicals for the control of epidemic pests and diseases. The Agricultural Chemicals Board also gives permits to suitable and approved importers of agrochemicals. The Board also maintains a statistical database of these chemicals.

The responsibilities of the Agricultural Chemicals Board under the ECAAT-P will include:

- a. Registration of new pesticides required under the project.
- b. Licensing on new pesticides suppliers
- c. Development of the project specific IPM Pesticides List
- d. Work with MAAIF inspectors to enforce the pertinent laws

13.1.9.6.1 Capacity of ACB

MAAIF has a low laboratory staff capacity with only one or two fully qualified staff and no laboratory equipment for assessing pesticides chemicals. In addition, the ACB is unable to regularly sit to assess the chemicals imported in the country and make decisions; and there are no regular field inspections and surveillance due to a limited budget. ***The ECAAT-P will set aside resources for laboratory and technical capacity enhancement for the key stakeholders and a plan to harmonize activities and share resources where capacity is higher. Also, this Plan has highlighted the need to train key staff at ACB.***

13.1.9.7 Uganda National Bureau of Standards (UNBS)

The UNBS is mandated to develop and promote standardization; quality assurance; laboratory testing; and metrology to enhance the competitiveness of local industry and to strengthen Uganda's economy and promote quality, safety and fair trade. UNBS also ensures quality imports through implementation of the Import Inspection and Clearance Regulations 2002 by carrying out inspection of imports to:

- a. Safeguard the health and safety of the consumers and the environment against imported substandard, shoddy and hazardous products;
- b. Safeguard our industries from cheap counterfeit imports that can be a threat to our infant industries;
- c. Ensure that Uganda's hard-earned foreign exchange is not wasted on shoddy, substandard and sometimes dangerous products, which may not only further impoverish the people but also cause ill health sometimes resulting in death.

UNBS will work hand in hand with ACB, NDA, URA and MAAIF to address issues of pesticides quality.

13.1.9.8 Uganda National Agro-Input Dealers Association (UNADA)

As a pre-requisite before registration, a dealer must attend, pass examination and obtain a certificate on safe use and handling of pesticide. The training is done on behalf of ACB by Makerere University (Crop Science Department). UNADA only mobilizes their members to be trained. ***Under ECAAT-P, funding will be provided to strengthen MAAIF to work with UNADA to address the issue of fake and adulterated pesticides as well as to train more UNADA members in safe agrochemical use.***

13.1.9.9 Role of NGOs

NGOs will be fully recognized and brought on board as serious partners in all efforts to ensure safe use of pesticides. In terms of capacity, NGOs in Uganda lack the financial and technical resources required to adequately manage pesticides and related issues. Therefore, there is need for a concerted effort to develop their capacity and other interested players to undertake public awareness on the hazards associated with pesticides and how to safely handle them. ***Under the ECAAT-P, the NGOs working with farmers will:***

- a. Raise awareness among the smallholder farmers about the dangers of pesticide use;
- b. Work with extension staff to teach farmers about safe pesticide use and storage;

- c. Work with farmers to develop community monitoring of the use and impacts of pesticides in order to alert the authorities as to the health and environmental impacts of pesticide use; and
- d. Empower the smallholders through training and other support to engage with the local government to address their concerns on pesticides use.

13.1.10 Pest Monitoring Plan

Successful implementation of the ECAAT-P Integrated Pest Management Plan in the project locations will require regular monitoring and evaluation of activities undertaken by the farmer to be involved in the project. Indicators that require regular monitoring and evaluation during the programme implementation include the following:

- a. Number of farmers engaged in IPM capacity building in the project locations;
- b. Number of farmers who have successfully received IPM training in IPM methods
- c. Number of trainees practicing IPM according to the training instructions
- d. Number of women as a percentage of total participating in IPM and successfully trained
- e. Number of youth as a percentage of total participating in IPM and successfully trained
- f. Number of farmers as a percentage of total applying IPM
- g. Rate of IPM adoption (number of people as a percent of total) every year
- h. Improvement in farm production due to adoption of IPM as a percent of production without IPM
- i. Improvement in the health status of farmers
- j. Extent to which crops and livestock are produced using chemical pesticides compared with total crop production
- k. Efficiency of pesticide use and handling
- l. Reduction in chemical pesticide poisoning and environmental contamination
- m. Number of IPM participatory research projects completed
- n. Overall assessment of activities that are going according to IPMP; activities that need improvement; and remedial actions required.

13.1.10.1 *Estimated Costs for Pest Management and Monitoring Estimated Costs for PMM*

It is assumed that some of the mitigation measures will be part of the normal responsibility of the respective government ministries, agro-dealers, transporters, farmers and other relevant stakeholders, within their institutional mandates and budgets. The cost of training for the managing impacts has been provided for in Table 12. The table also includes costs for conducting awareness and sensitization campaigns on pesticides application, management and adoption of IPM in the project areas.

Table 11: Integrated Pest Management and Monitoring Plan

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district (\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
1.0 Positive impacts of chemical pesticides							
1.1	Increase in crop and livestock yield		Implement long term IPM program to sustain productivity and combat negative effects of chemical pesticides.	ECAATP, participating institutions and farmers Cost included in the IPMP overall cost	IPMP	NARO/MAAIF	Bi-Annual
1.2	Increase in economic growth		Implement long term IPM program to sustain productivity and combat negative effects of chemical pesticides.	ECAAT, participating institutions and farmers Cost included in the IPMP overall cost	IPMP	NARO/MAAIF	Bi-Annual
2.0 Negative Impacts of chemical pesticides							
2.1	Soil degradation	Persistent use of chemical pesticides	Apply soil conditioning measures which include IPM. Train farmers in proper handling and application of pesticides.	Farmers	IPMP	NARO/MAAIF	Quarterly
2.2	Poisoning of non-target species including natural biological agents	Lack of knowledge of chemical pesticide potency. Equipment malfunction	Supervise and control use of chemical pesticides so that only approved and recommended	NARO and participating farmers	IPMP	NARO/MAAIF	Quarterly

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
		Use of wrong type of equipment. Wrong time and method of application (spraying)	ones are used. Provide PM Equipment. Regularly maintain and clean equipment as recommended by supplier. Dispose old equipment as recommended by manufacturer. Provide recommended protective gear. Use recommended and appropriate protective gear. Conduct trainings in IPM				
2.3	Health and safety risks	Exposure to pesticides handling. Routine medical examination	Provide protective clothing and ensure it is used. Train farmers in proper.	Agro-dealers v Transporters v Farmers	Labor regulations OHS Act 2006	Ministry of Labour, Gender and Social Development-MoLGSD	Bi-Annual
2.4	Water, soil and environmental pollution	Inappropriate building for storage of pesticides. Cleaning of	Construct suitable warehouse. Construct bio-beds, draining channels and	Pesticides Transporters and Suppliers. NARO/Farmers ECAATP/Farmers	Pesticides and equipment manufacturer's recommendations. Water pollution	NEMA MoWE DEOs	Quarterly

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
		equipment, Disposal of remains of pesticides. Disposal of containers and equipment	draining dams. Use chemical remains to re-spray. Clean equipment in one designated place. Take regular stock of pesticides. Use PPM. Train farmers not to spray toxic chemicals close to water sources. Train farmers to maintain spray equipment in safe operational order.		standards.		
Air pollution and contamination	Exposure of pesticides to air. Disposal of pesticides remains in the open. Disposal of pesticides containers and equipment in the open	Store pesticides in closed containers. Dispose chemical remains according to supplier recommendations. Train farmers in appropriate spraying techniques to avoid chemicals being blown away by wind. Train farmers to maintain spray equipment in	Pesticides Suppliers Farmers	Pesticides and equipment manufacturer's recommendations. Air pollution standards.	NEMA	Quarterly	Air pollution and contamination

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
		efficient operational order					
		Bad housekeeping	Provide adequate and enclosed storage space for pesticides	Agro-dealers	MAAIF regulations, Manufacturer's Guidelines.	MAAIF	Half yearly
		Illegal disposal of pesticides	Prohibit disposal of pesticides wastes into open dumps where they will be blown away by wind	Agro-dealers NARO/MAAIF	NEMA Pesticides Act	Districts	Half yearly
		Equipment malfunction Wrong type of equipment.	Regular maintenance of equipment.	Farmers NARO/MAAIF	Manufacturer's recommendations.	NEMA	Annually
		Time and method of application (spraying)	Time and method of application (spraying)	Time and method of application (spraying)	Time and method of application (spraying)	Time and method of application (spraying)	Time and method of application (spraying)
2.6	Health risk from chemical pesticide misuse (over /under use)	Lack of appropriate knowledge	Training and awareness campaigns	ECCAT-P	Pesticide manufacturers regulations, IPMP	NEMA	Annually
2.7	Accidental or Intentional poisoning	Improper labelling or storage Frustration, Social pressures.	Label and store chemicals in properly labelled shelves Ensure responsible, mentally sound and	Farmers Agro-dealers	Pesticides Act	NEMA MoLGSD	Annually

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
			mature persons are given charge and control of pesticides. Restrict accessibility to pesticides. Spot checking				
2.8	Pest resistance	Lack of appropriate knowledge in pesticides application	Train farmers in correct application of pesticides. Initiate education programmes	Farmers MAAIF	Pesticides Act	MAAIF	Half yearly
3.0 Positive Impacts of Biological Impacts of Biological Control Agents							
3.1	Reduced environmental and health risks		Establish demonstration plots to disseminate information on environmental and health benefits of biological control agents to the communities for them to appreciate the advantages	NARO	NEMA	-MAAIF	Quarterly
3.2	Reduction in time spent on application of chemical pesticides		Prepare an inventory of indigenous and established biological control methods and conduct community	NARO	IPMP	Department of Land Resources	Annually

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
			awareness seminars to enhance and spread knowledge base.				
3.3	Resistance to pest through improved varieties/species	Rural people have a tendency of resisting to introduction of new varieties and sticking to traditional seed varieties.	Awareness campaigns on the benefits of new and improved seed varieties, which are resistant to pest will help reduce application of chemical pesticides	NARO	IPMP	MAAIF	Annually
3.4	Increase in soil stability and reduction of soil erosion	Increasing tree cover as biological control of pests will result in increase in soil stability and reduction of erosion.	Conduct awareness campaigns on the importance of using new and improved and pest resistant seed varieties in controlling pests	NARO	IPMP	MAAIF	Annually
4.0 Negative Impacts of Biological Control Agents							
4.1	Risk of damage to crops	The slowness of biological agents to act may frustrate IPM programmes as farmers are used to the rapid results of chemical pesticides	Educate farmers on the long term benefits of the biological methods to facilitate their adoption; and Phase transition from biological to IPM methods to ensure no	NARO	IPMP	MAAIF	Annually

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
			appreciable loss of production during transition				
5.0 Positive Impacts of Mechanical Methods							
5.1	Reduced pollution on the environment		Train farmers on the appropriate and efficient use of simple farm implements to significantly minimize environmental pollution	NARO	IPMP	MAAIF	Annually
6.0 Negative Impacts of Manual methods							
6.1	Human health risks	Snakebites, attacks Non-chemical methods are generally slow.	Provide protective clothing to workers and ensure it is properly used; Train farmers in proper operations and handling of farm equipment; and Promote IPM to replace mechanical methods.	NARO	N/A	NARO/MAAIF	Annually
6.2	Poor crop development		Encourage use of transparent bagging to allow entry of light Train farmers in timely and appropriate use of	NARO	N/A	MAAIF	Annually

N ^o .	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
			pest management techniques to protect maize from the great grain borer and other pests; and to protect other crops from pest damage				
7.0 Positive Impacts of IPM							
7.1	Increase in agricultural yields			NARO	IPMP	MAAIF	Annually
7.2	Contribution to Food Security	Non-chemical methods are generally slow	Train pesticides marketers in selection and handling of approved pesticides Train farmers in the appropriate application of the various IPM practices Educate farmers on preservation techniques and timeframes of different integrated pest management options.	NARO	IPMP	MAAIF	Annually
7.3	Saving in foreign exchange	Banned chemicals	Train pesticides suppliers in selection of appropriate pesticides to	NARO	Pesticides Act	MAAIF	Quarterly

N°.	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per year per district(\$)	Standards/Regulation	Monitoring Institution and Cost per district per year	Monitoring Frequency
			<p>be eligible for supplying to UNADA;</p> <p>Train farmers in the appropriate application of the various IPM practices to reduce application of chemical pesticides; and</p> <p>Enforce regulation prohibiting importation of banned chemical pesticides</p>				
7.4	Contribution to offsetting rural/urban migration	Banned chemicals	<p>Enforce regulation prohibiting importation of banned chemical pesticides; Educate farmers on harmful consequences of banned chemical pesticides; and</p> <p>Assist local communities to establish cooperatives and to market produce to potential markets for additional income.</p>	Farmers NARO MAAIF Districts	Pesticides Act	MAAIF	Quarterly

N°.	Potential Issues/Concerns	Cause of Concern	Control/Mitigation Measure	Responsible Person/Institution and Cost per yearper district(\$)	Standards/Regulation	Monitoring Institution and Cost per districtper year	Monitoring Frequency
7.5	Improved environmental protection		Enforce regulation prohibiting importationof banned chemical pesticides; and Educate farmerson harmful consequences of banned chemical pesticides.	NARO	IPMP	NARO	Annually

13.1.11 Capacity, Training Needs and Budget for PMP Implementation

13.1.11.1 Capacity Needs

IPM is an knowledge-intensive and interactive methodology which calls for a precise identification and diagnosis of pests and pest problems. Comprehending ecosystem interplays equips farmers with biological and ecological control knowledge and assists them in making pragmatic pest control decisions.

The success of IPM is largely dependent on developing and sustaining institutional and human capacity to facilitate experiential learning. Experiential learning is a prerequisite to making informed decisions in integrating scientific and indigenous knowledge. This assists in tackling district, ward and village specific problems.

Ineffective communication between farmers, extension agents and researchers from research institutes and universities has often translated into poorly-targeted research or top poor adoption of promising options generated by research. Essentially, the full potential of agricultural research is compromised.

Closer farmer-research investigator interaction, adaptive research and participatory learning approaches in capacity building effort serves as a remedy to narrowing this gap, making research results more applicable to farmers. Farmers must at least be trained in:

- a. Biological and ecological processes underpinning IPM options;
- b. The practical application of newly acquired knowledge, to choose compatible methods to reduce production and post-harvest losses, through frequent field visits, meetings and demonstrations; and
- c. Adaptive research trails.

Capacity building will be achieved through farmer-based collaborative management mechanisms where all key stakeholders shall be regarded as equal partners. Beneficiary farmers shall be the principal actors facilitated by other actors from research institutes, academic institutions, sector ministries, NGOs, etc. as partners whose role will be to facilitate the process and provide technical direction and any other support necessary for the implementation of IPM.

Training

Farmers should have the capacity to accurately identify and diagnose pests and pest problems, understand trophic relationships that underpin biological control opportunities, and use such knowledge to guide pesticide and other kinds of interventions. Through the participatory approaches, the Project will build local capacity to ensure rapid spread and adoption of ecologically sound and environmentally friendly management practices among the smallholder farmers. They will learn cultural, biological and ecological processes underpinning IPM options, and use the newly acquired knowledge to choose compatible methods to reduce losses in production and post-harvest storage.

Training will be provided to targeted farmers organizations and retailers within the project area through a training of trainers (ToT) scheme. Development and implementation of ToT courses will be outsourced through competitive bidding processes with MAAIF providing technical backstopping and securing transparency and compliance with procurement procedures. Most activities of Component 1 at district level will be implemented by NAADS, which will be represented in the DCT.

Training for Trainers of Trainers

Target Audience: Field officers of ECAAT-P, District Agriculture Officers designated as subject matter specialists in crop protection.

Justification: In the process of implementing various development projects, field officers act as extension agents as they come in contact with the farmers. There is, therefore, a need to equip the field officers with sound information on pest management strategies and safer pesticide use. They will in turn train assistant field extension officers. The assistant field officers will then be responsible for training farmers at the grassroots level.

Course content –The course would consist of two main parts: (I) Principles of Pest Management and (II) Pesticide Management. The Principles of Pest Management course will emphasize pest management decision tools (including concepts of sampling and pest monitoring), ecological/cultural management, biological control, host plant resistance, genetic control, and a theoretical approach to integrated pest management, differentiating between IPM approaches for resource-poor farmers and resource-rich farmers. The Pesticide Management Course will emphasize various types of pesticides, pesticide formulations, active ingredients, pesticide application, calibration of sprayers, calculation of application rates, pesticide fate and toxicology, safety in pesticide handling, impact of pesticides on the environment, non-target organisms, and human beings, pesticides as part of integrated pest management, and pesticide regulations.

Extension Agents

Target group – Assistant agricultural field extension officers

Justification – There is need for training of public sector extension agents to become better at providing objective and research-based knowledge of crop production and protection practices and strategies, including non-chemical alternatives. Field extension agents at sub-parish levels are concerned with advising farmers on all aspects of agricultural production, including pest management. Consequently, if field extension officers are to effectively advise on judicious use of pesticides, they need to be well-equipped with sound information on pesticides use and pest management systems. All Extension Staff will be trained in integrated pest management and safer pesticide use who will in turn train the farmers and those directly below them.

Recommended Course Content

Extension workers need training in areas of pest and disease identification, IPM and alternatives to pesticide use as well as in-service training i.e. new areas of science to help them do their job. The following is recommended:

- a. General introduction to causes of pest problems,
- b. Introduction to use of participatory methods in understanding pest problems.
- c. Introduction to insect pest sampling/monitoring and use of action thresholds.
- d. Overview on use of cultural, biological, host plant resistance methods in control of crop pests.
- e. Introduction to elements of pesticide control tactics
- f. Impact of pesticides on the environment and
- g. Integrating pesticides in an IPM program.

Pesticides Use Training

Need for Training

It is one thing to have pesticide regulations in place, and another to have them adhered to. The only way of raising the population's awareness of problems associated with pesticides, and how those problems can be avoided, is through continuous training. Training for "safer pesticide use" is a common approach to mitigating the potential negative health and environmental impacts of pesticides. This conventional approach will promote reducing health risks of pesticides by safer use of the products through training, use of protective equipment and technology improvements, as well seeking to reduce pesticide hazards via regulations and enforcement.

Training Aspects and Levels

There is therefore great need for capacity building and human resource training in almost all areas of pesticides management. However, the key training needs that have been identified among others include the following with respect to pesticides management: storage; disposal as well as safe use and handling of pesticides. Not all workers need the same level of training since the intensity and length of exposure varies with different types of jobs. All individuals who may come in contact with pesticides as part of their work should receive a certain basic level of training, increasing in direct proportion to the exposure use level. Certainly, there is much useful information available, but until it is transmitted to the users, it is of little value.

Training of Trainers in Safer Pesticide Management

In the process of implementing various development projects, field officers act as extension agents as they come in contact with the farmers. There is, therefore, a need to equip the field officers with sound information on safer pesticide use. One of the most common problems with pesticide use is over-dosing, with farmers failing to mix the correct amounts of pesticide and water. This can cause damage to the crop and the environment, and increases the risk to human health, both for farmers and consumers. It is also a waste of money. Safe and appropriate use of pesticides requires the farmer to have a good understanding of the pest problem. For example, what kind of insect pest is present, what level of damage is it doing, and how is that damage likely to worsen if left untreated? All NAADS Extension Staff will be trained in safer pesticide use who will in turn train District Model Farmers and those directly below them.

The Pesticide Management Course will emphasize various types of pesticides, pesticide formulations, active ingredients, pesticide application, calibration of sprayers, calculation of application rates, pesticide fate and toxicology, safety in pesticide handling, impact of pesticides on the environment, non-target organisms, and human beings, pesticides as part of integrated pest management, and pesticide regulations.

Pesticide management training of pesticide dealers

Recommended Course Content

The target group is mainly business persons, whose main interest is making money. Consequently, this group has minimal interest in theoretical background and needs to be introduced to the practical aspects of pesticide management. Therefore, the course recommended here include types of pesticides, pesticide formulations, toxicity classification, types of pesticide labels, concentration mixing, fate of pesticides in the environment, safer use of pesticides (including selection, handling, application, storage, and protective clothing), and combining pesticides with non-pesticide methods.

Booklet/Manual on Safe Pesticide Use

In addition to the above training, a well-illustrated booklet designed for self-learning will be developed and distributed to stockists and their staff. The booklet will contain information on how to read pesticide labels as well as general information about safe pesticide use and first aid practices. In addition, MAAIF will assemble the recommended pest control practices in summary form for major crops that will also be very useful to stockists when advising farmers. This same booklet will also be used by extension workers.

Training Responsibilities

The PIU at MAAIF with input from NAADS, UCDA and NARO and other interested stakeholders will standardize training needs assessment across the clusters and organize appropriate workshops to develop more detailed learning modules. The Crop Protection Department with input from the NAADS, will liaise with appropriate farmers' associations to:

- a. plan training implementation

- b. provide technical support such as in preparing and delivering specific training materials and evaluating resource materials,
- c. identify and select suitable local training resource persons and materials, and
- d. Prepare training progress reports.

The respective District Agricultural Officers will collaborate with farmers' associations to:

- a. identify and organize farmers groups for training (i.e. use of farmer field school to teach farmers on the efficient and responsible use of pesticides),
- b. prepare, organize and supervise training implementation plan,
- c. verify reports of persisting pest problems and farmers training needs,
- d. monitor performance of farmer trainers and post-training assignments, and
- e. Prepare training progress reports.

Farmers/local communities as the principal beneficiaries will be organized into farmer groups for training and adoption of IPM practices. The farmers will be facilitated to set up Community IPM Action Committees to coordinate IPM activities in their areas.

Table 12: Training areas for key role players and stakeholders of IPM

Participants in the training	Roles of participants in IPMP	Training content	Cost US\$
<p>National level institutions</p> <ul style="list-style-type: none"> a. MAAIF b. NARO c. MoH d. NEMA e. ACB f. DEOs g. Private sector 	<ul style="list-style-type: none"> a. Providing capacity and policy guidance and/or oversight for IPMP implementation; b. Monitoring and evaluation of IPMP implementation; c. Providing logistical and technical support for training; d. Monitoring of IPM inputs supply by the dealers; and e. Monitoring illegal stock of pesticides in border regions of Uganda. 	<ul style="list-style-type: none"> a. General overview of the project; b. Roles of IPMP stakeholders; c. Institutional IPMP supportive roles in IPMP implementation; d. IPMP and environmental and social management pesticide regulation on: <ul style="list-style-type: none"> i. imports, ii. transportation, iii. use, iv. registration and disposal of residues. 	55,000
<p>Training of Trainers:</p> <ul style="list-style-type: none"> a. NARO b. ACP c. MAAIF, Service Providers and NGOs 	<ul style="list-style-type: none"> a. Supervising IPMP implementation. b. Preparation of IPM training materials. c. Training extension workers. d. To be fully abreast with ECAAT-P IPMP and to conduct research in IPM. 	<ul style="list-style-type: none"> a. General overview of the project and the IPMP for the ECAAT-P; b. IPMP stakeholders and their roles; c. Pesticides (types, classification, labelling registration etc.) 	40,000
<p>District level</p> <ul style="list-style-type: none"> a. District staff b. Extension workers c. Members of the extension services. d. Farmers 	<ul style="list-style-type: none"> a. Supervision of farmers and provision of extension support; b. Preparation of farmer training materials, leaflets, demonstration material, radio and TV messages etc, c. Training farmers and community leaders in IPM and safety, d. Organizing farmers for participatory learning and knowledge sharing events. 	<ul style="list-style-type: none"> a. General overview of the project and the IPMP for ECAAT-P IPMP stakeholders and their roles; b. Pesticides (types, classification, labelling registration etc.), c. Skills in preparing IPMP work plans and budgets. d. Pesticides and environmental and social impacts; and mitigation measures. e. Indigenous and other pest management methods. f. Safety and precautionary measures while handling pesticides. g. Management of outbreak and migratory pests. h. Pesticide regulation on: imports, transportation, use, registration and disposal of residues. 	60,000

		i. Farmer/Trainer coordination	
Farmers	a. Attending IPM trainings and demonstrations b. IPM implementation	a. General overview of the project and the IPM for the ECAAT-P. b. IPM stakeholders and their roles. c. Pesticides (types, classification, labelling registration etc.). d. Pesticides and environmental and social impacts; and mitigation measures. e. Indigenous and other pest management methods. f. Safety and precautionary measures while handling pesticides. g. Management of outbreak and migratory pests. h. pesticide regulation on: imports, transportation, use, registration and disposal of residues. i. Farmer/Trainer cooperation	55,000
Total			210,000

13.1.12 Estimated PPMP BUDGET

The Consultant estimates the budget below to implement the PMP.

N°.	Activity/Program	Cost (USD)
1.1	Orientation workshops (on PMP, IPM, and for project registered agro-input dealers)	55,000
1.2	Training of trainers	40,000
1.3	Farmers' groups and extension staff training in IPM	60,000
1.4	Capacity building of ACB	55,000
<i>Subtotal</i>		210,000
2.1	Registration of pesticide suppliers	40,000
2.2	IPM Booklets, Guides + other materials (4 million copies)	60,000
2.3	Public awareness/sensitization campaigns	250,000
2.4	Pest/disease surveillance	120,000
2.5	Laboratory analysis support	100,000
2.6	Emergency response support	150,000
<i>Subtotal</i>		720,000
3.1	Pesticide monitoring in surface water bodies in or around project areas	100,000
3.4	Disposal of expired pesticides and empty containers	210,000
<i>Subtotal</i>		310,000
4.1	PMP coordination	150,000
4.2	Monitoring and evaluation	110,000
4.3	Reviews and reporting	50,000
<i>Subtotal</i>		310,000
	Grand Total	1,550,000

13.3 Annex 03: CONTINGENCY EMERGENCY RESPONSE COMPONENT (CERC)

Over the last two decades, Uganda has observed a significant trend of increased exposure to disasters, in particular to floods, droughts, pest and diseases, and storms but also to other hazards. The number of natural disasters augments with increased intensity. Just within the last decade, the country experienced more than twice severe droughts, floods and pest infestations. These phenomena cause damages to and losses of lives, properties, infrastructure, and livelihoods; they impede and set back development efforts and divert development funds. Millions of dollars are spent to save lives and rehabilitate and recover people's livelihoods. Agriculture is one of the most affected sectors by all disasters. Agricultural production and livelihoods, particularly of the majority of smallholder farmers in the country are recurrently affected by a variety of natural hazards. Smallholder farmers in Uganda are particularly vulnerable to natural hazard impacts since their hazard exposure is high, especially with regards to paddy rice most often planted under rain fed conditions, and the fact that the per/ha agricultural production of rice is still significantly low. No doubt, the high hazard exposure coupled with low production levels threatens livelihood security of thousands of smallholder farmers in the country, particularly during and after the emergency period.

13.3.1 Weather Based Risks

For weather risk management purposes, there are two main types of risk to consider. Those related to sudden, unforeseen events such as, windstorms and heavy rains and those related to cumulative events occurring over an extended period of time such as drought. The impacts that these risks have varies widely according to the farming system, available water resources, soil and crop type, the scope of these risks and the use of other risk management tools such as irrigation and improved crop varieties.

Table 13: Main weather risks affecting agriculture production in Uganda (1933-2015)²⁶

Hazard	Event	% Share
Flood	771	31.75
Drought	613	25.25
Hail storm	439	18.08
Storm	327	13.47
Landslide	256	10.54
Wind storm	14	0.58
Thunderstorm	4	0.16
Flash flood	1	0.04
Cyclone	1	0.04
Frost	1	0.04
Other	1	0.04

It is important to note that livelihoods in different regions of the country may be affected by a diversity of climate-related hazards and disasters at any one time (Figure 32).

²⁶MAAIF: *Agricultural Risk Assessment Study* | Uganda, October 2015

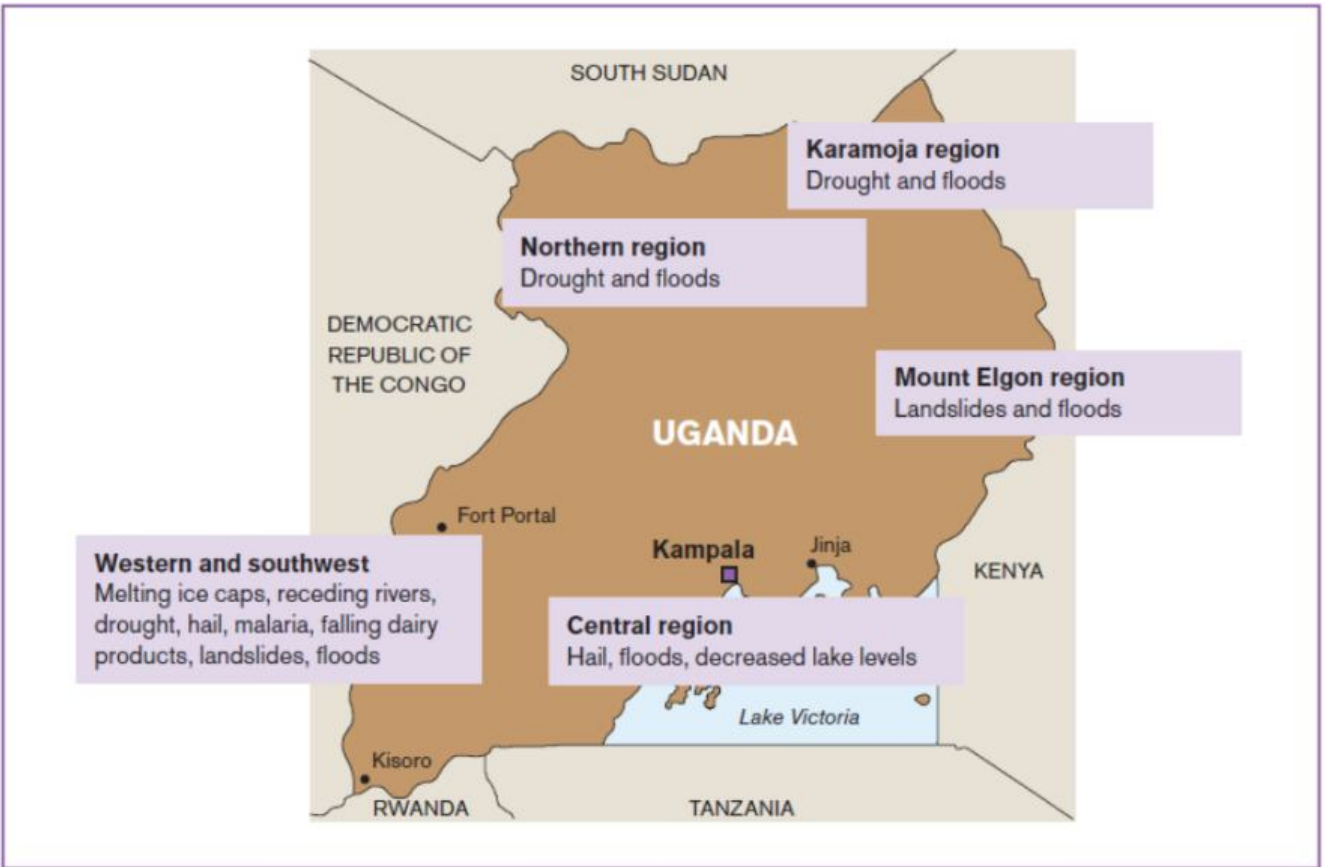


Figure 32: Common Climate Related Risks Across in Uganda (Dr. Kitutu, 2013)

13.3.1.1.1 Drought

Drought According to UNISDR (2012)²⁷, a broad definition of drought is a deficiency of precipitation over an extended period of time, usually a season or more, which results in a water shortage for some activity, group, or environmental sectors. In Uganda, agriculture contributes about 20% to the gross domestic product (GDP), 48% to export earnings and employs about 73% of the population. More than four million households depend on small-scale farming for their livelihoods, with poverty reduction contingent on improvements in agriculture. Agricultural systems in Uganda are highly sensitive to climatic conditions, and major droughts in the last decade have had significant impacts, including in 2006 that resulted in higher food prices and droughts in 2008, 2009, 2010 and 2011, which even compromised hydro-power generation and livestock and food production. The damages associated with the 2010 and 2011 droughts led to a deficit of 2.8 trillion Uganda shillings, an equivalent of US\$ 1.2 billion; or 7% of Uganda's GDP²⁸.

²⁷ United Nations International Strategy for Disaster Reduction Regional Office for Africa (ISDR) 2012: *Drought Contingency Plans and Planning in the Greater Horn of Africa A desktop review of the effectiveness of drought contingency plans and planning in Kenya, Uganda and Ethiopia*

²⁸ Vulnerability of Maize Yields to Droughts in Uganda *Water* 2017, 9, 181; doi:10.3390/w9030181 (<https://www.researchgate.net/publication/313850708>)

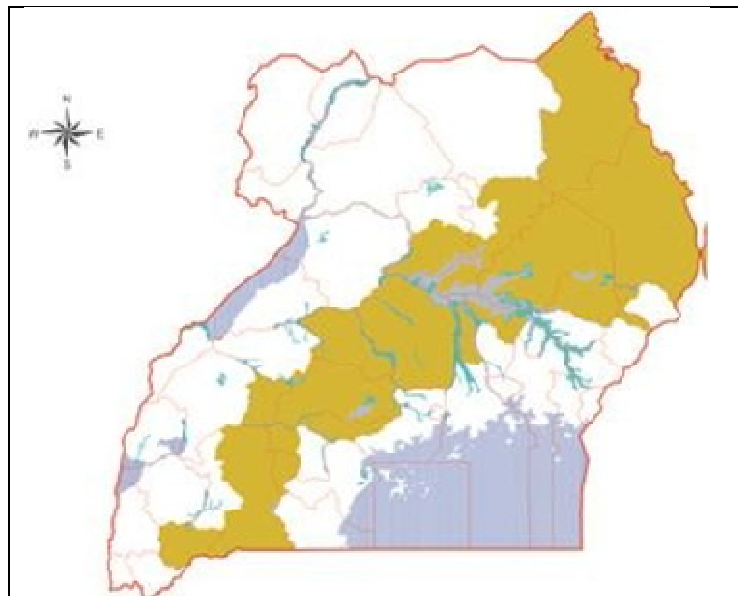


Figure 33: Drought prone areas in Uganda's cattle corridor²⁹

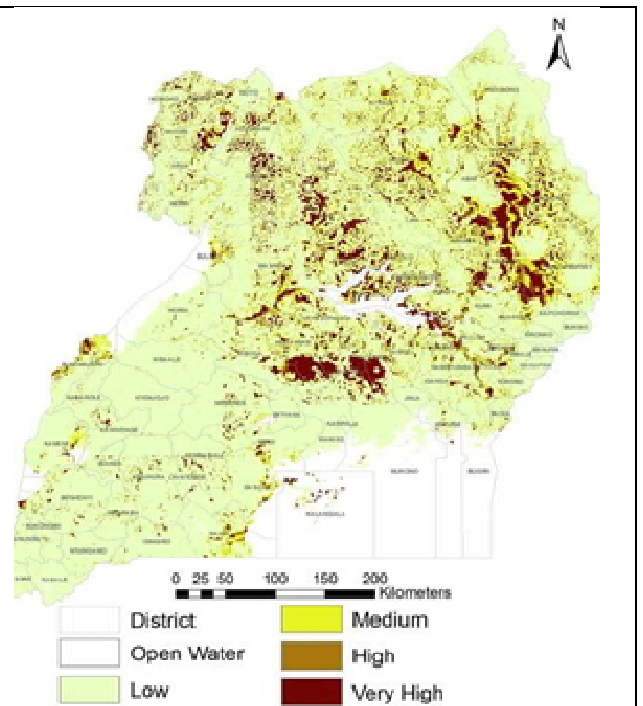


Figure 34: Flood prone areas in Uganda (NEMA, 2008)



Figure 35: Maize field destroyed by drought in the areas of Lamwo in Acholi region in 2017

13.3.1.1.2 Flooding

Generally, locations along riverbanks and low-lying areas are increasingly being exposed to risks of flooding. In eastern Uganda, the courses of rivers such as Sironko, Namatala, Simu, Sisi, Ngenge, Cheborom, Kiriki, Tabok, Sipi and Muyembe are particularly prone to flooding. Specific locations with high flood incidence include Cheringir valley, Tuyobei, Kaibeyos, Sikwo, Seretyo, Kaimareng, Moroto, Sundet and Cheborom in Kween district; Muturo and Chebchebai streams in Kapchorwa district; Bukalu, Nabongo, Muyembe and

²⁹MoWE 2017: *Uganda Strategic Program for Climate Resilience (Uganda SPCR)*

Simu parishes in Bulambuli district; and Karawa, Buyi and Nakiwombe parishes in Sironko district (Mt Elgon VIA, 2013). Flooding is increasingly affecting food availability especially root crops such as cassava which rots in flooded fields.

In western region, adequate rains are normally received during the first season which continue into the second season with mainly Kasese district experiencing early onset of a dry spell in the months of May and flooding due to interference with the river beds. Floods and associated hazards (in Ntoroko and Kasese) are frequent towards end of the year (Figures 36 & 37). Waterborne diseases tend to occur due to frequent flush floods in Kasese, Ntoroko and Bundibugyo. Disease prevalence among the refugee population is high with 61.2% malaria, 50% diarrhea and 73.5% acute respiratory tract infection (ARTI). The New vision report of 12th Sept 2014 reported that over 2,000 people in Butaleja district were affected by floods. It is expected that incidences of floods and landslides will be experienced in low-lying areas and around the slopes of Mt. Elgon respectively.



Figure 36: Flooded rural home in Eastern Uganda



Figure 37: Maize garden under water in western Uganda areas 2017

13.3.1.1.3 Hail storms

Heavy storms in Uganda are often accompanied by hailstorms, thunder storms and violent winds. Hailstorms can cause flooding and related public health hazards. Various parts of Uganda are prone to hailstorms to varying degrees. While in some areas the occurrence and magnitude is low, a number of places are highly susceptible to hailstorms characterised by heavy tropical rains, strong and violent winds. Hailstorms and thunderstorms result in immense destruction of crops, animals, public infrastructure and human settlements often leading to deaths and disruption of social services. Lightning has a serious effect on human life and may be reduced through following standard construction codes (with gadgets against lightening).

Report from OPM in May 2014 shows that 3,915 households in the country were affected by hailstorms with the effect being on loss of crops and livestock. In some areas, these hazards resulted in deaths and destruction of schools. Generally, hailstorms destroy crops in gardens thus disrupting food production in the affected areas. In central region, hailstorms are reportedly common in the districts of Luwero, Nakaseke, Nakasongola, Masaka, Kayunga, Mukono, Kiboga and Kyankwanzi were the major disasters in the Central zone (Figure 38).



Figure 38: Banana garden destroyed by a storm in Masaka in central Uganda in 2016.

13.3.1.2 Pests and Diseases Epidemics

Crop and animal disease epidemics are strongly linked to climatic conditions and therefore, some diseases may disappear or lose their predominance in a given production system and new pathogens or new strains may become more important. Climate variables control the geographical distribution of pests and diseases, and therefore expand their distributions to new areas. Temperature rise in cold mountain areas enables vector and pests to increase their ecological range to areas where they would otherwise be limited by low temperatures (GoU, 2007). Pest and disease pressure is likely to continue in many regions of Africa, moving into some new regions, as well as reducing pressure in other regions (Jarvis et al. 2012). This causes more infestation during the following production season, as the new hosts will not have had immunity. Altered wind patterns also change the spread of wind-borne pests, vectors and pathogens for crops (GoU, 2007).

13.3.1.2.1 The Fall Army Worm

“The Fall Army Worm was due to delayed rains; the rain chokes the larva but the long dry spell in early 2017 was favorable for the larva to go into the pupa.”—Mr. Abal Peter, DAO–Kitgum (Figure 39&40). *“I slashed the maize after attack by the Army Worm and planted pigeon peas”*—Farmer in Kitgum. *“My chilli is being destroyed by a disease which I do not know”*—Farmer in Atyeneowe Village, Barr S/C–Lira District. The emerging pests and diseases include the Fall Army Worm. The economic costs associated with a biological problem such as crop pests and diseases comprise the direct losses from predation or competition for resources and the expenditure incurred to control the pests and diseases.

The impact of these outbreaks is not limited to immediate and local food shortages, but can destabilize markets, both locally and overseas over extended periods of time. The shock event of a pest outbreak also undermines confidence in the farming and food sectors to risk investment that may otherwise realize a more resilient and profitable cropping and food system (Smith, 2013). The upstream as well as downstream impacts of disease-induced crop failures are significant and can have profound consequences on the survival of poor households. Losses due to crop pests and diseases are not only felt in terms of volume lost, and potentially the most significant impacts due to pests are not in the main felt around the scale of these norms, but in the extremes of unusual events. Examples include impacts on food security when produce is scarce, or on price when in excess, or when a pest outbreak triggers a quarantine and trade embargo on an exporting nation.



Figure 39: The Fall Army Worm



Figure 40: A maize garden infested by the Fall Army Worm and prolonged dry spell conditions in areas of Lira

Farmers are generally vulnerable to pests largely because of the following reasons:

- a. No knowledge of pest or diseases attacking their crops;
- b. No idea what to do (response);
- c. Low/late response from extension staff; and
- d. Cannot afford pesticides/no knowledge of organic pesticides.

13.3.1.2.2 Diseaserisks on cassava

Cassava Mosaic Disease (CMD) is a viral disease spread by the whiteflies. The disease is common in all major cassava growing regions in the country and virtually all East African region. Symptoms of CMD infected plants include mosaic, mottled, deformed and twisted leaflets (Figures 41-43). There is observed overall reduction in size of leaves and plants and such plants normally produce few or no tubers although this is dependent on the severity of the disease and the age of the plant at which it was infected. Cassava brown streak disease (CBSD) is another viral disease transmitted by the whitefly and causes serious economic losses in the yield and quality of the roots (Figure 43). Especially in susceptible varieties, infestation renders the roots unusable particularly when left in the ground for longer periods. CBSD symptoms are observable on the leaves, stems and roots however; on the leaves, the symptoms are more prominent on older leaves than young ones. Unlike CMD, infected leaves do not become distorted. The characteristic symptom on the leaves appear as patches of yellow areas mixed with normal green color which may enlarge and join to form comparatively large yellow or necrotic patches.



Figure 41: Severely affected cassava grown from a healthy cutting and subsequently infected during growth by *Viruliferous whiteflies*³⁰



Figure 42: Severe CMD in an initially healthy planting of cassava³¹



Figure 43: Cassava Tuber Necrosis caused by Cassava Brown Streak

³⁰J. M. Thresh and R. J. Cooter *Plant Pathology (2005): Strategies for controlling cassava mosaic virus disease in Africa* 54, 587–614 Natural Resources Institute, University of Greenwich, Chatham ME4 4TB, UK

³¹J. M. Thresh and R. J. Cooter *Plant Pathology (2005): Strategies for controlling cassava mosaic virus disease in Africa* 54, 587–614 Natural Resources Institute, University of Greenwich, Chatham ME4 4TB, UK

Table 14: Summary of Cassava Diseases and Pests and their control options.

Major Pest/Disease	Available Management Options
Cassava brown streak disease [CBSD]	<ul style="list-style-type: none"> g. Use only healthy and disease-free cuttings for planting h. Plant tolerant/resistant varieties. i. Remove and destroy any plants with symptoms of the disease including alternative hosts. j. Early harvesting. k. Disease surveillance & quarantine. l. Control of whiteflies (insect vector).
Cassava mosaic disease [CMD]	<ul style="list-style-type: none"> g. Inspect plants regularly for symptoms of disease and remove (roguing) and destroy any plant showing symptoms. h. Use resistant varieties. i. Use clean planting materials and avoid planting cuttings from plants showing symptoms of the disease.
Cassava mosaic disease [CMD]	<ul style="list-style-type: none"> a. Inspect plants regularly for symptoms of disease and remove (roguing) and destroy any plant showing symptoms b. Use resistant varieties c. Use clean planting materials and avoid planting cuttings from plants showing symptoms of the disease
Cassava bacterial blight [CBB], (<i>Xanthomonas axonopodis</i> sp. <i>manihoti</i>)	<ul style="list-style-type: none"> e. Crop rotation with non-host f. Intercropping with maize and melon g. Field sanitation: plough crop debris into soil after harvest or remove and burn, pruning infected parts of the plant h. Use clean planting cuttings obtained only from healthy plants
Cassava green mite (<i>Mononychellus tanajoa</i> , M. <i>progresivus</i>)	<ul style="list-style-type: none"> c. Together with Cassava mealybug (<i>Phenacoccus manihoti</i>), the green mite has been effectively controlled using biological control (<i>Typhlodromalus aripo</i>) d. Crop rotation, early planting, and intercropping

(Source: PMPP Ghana Commercial Agriculture Project, Ministry of Agriculture, 2011)

13.3.1.2.3 Rice diseases of rice

The major insect pests of rice in Africa include stem borers, African rice gall midge and termites. Pests cause considerable crop losses in the field and in storage. It is estimated that each year insects destroy between 10% and 30% of all food produced in Africa. The estimates of rice yield loss due to insects in Africa range between 10% and 15% (FAO, 2017). The major insects and associated damage differ regionally, by country and by rice variety, and in some years may exceed 90% (FAO, 2017).

Table 15: Summary of Major Pests and Diseases of Rice

Major pests and Diseases	Comments
Armyworms (<i>Spodoptera exempta</i>)	Causes serious defoliation in upland rice plants, leaving only the stems. Are regarded as occasional pests but when there is outbreak they completely devastate farms.
African gall midges (<i>Orseolina oryzivora</i>)	bore into stems and up to the apical or lateral buds, feeding on the tissues of the buds. Attack young rice plants.
Stalked-eye shoot flies (<i>Diopsis</i> spp)	Dark brown fly. Lay eggs at the base of rice plants and hatched maggots feed on the stem tissues.

Stem borers (<i>Chilo spp</i> , <i>Maliarpha separata</i> , <i>Sesamia calamistis</i>)	Caterpillars bore into the stem of rice, attack rice at full tillering stage prevent the grains from filling up and ripening. (e.g. white borer, striped borer, pink borer and yellow borer).
Rice blast (<i>Pyricularia oryzae</i>)	Most widespread and destructive disease. Affects all the leaves and stem of plant, starting with spots on leaves.
Rice brown leaf spot (<i>Helminthosporium oryzae</i>)	Fungus disease which starts as tiny brown spots on rice leaves. Attack seedlings more often.
Rice yellow mottle virus (RYMV)	Attacked rice plants show yellow leaves and stunted growth.

(Source: PMPP Ghana Commercial Agriculture Project, Ministry of Agriculture, 2011)

13.3.1.2.4 Wheat rusts

Wheat rust diseases (yellow, leaf and stem rust) with continuous evolution of new pathotypes and airborne nature pose a serious threat to wheat production worldwide. Their impact is more pronounced across the major wheat growing regions including East Africa. It is estimated that 37% of world's wheat is under risk of potential epidemics of yellow, stem or leaf rust diseases. Wheat rust diseases are the most important diseases of wheat occurring in almost all wheat growing countries. Wheat rusts, like other pathogens, over time can evolve into new strains that are more virulent and damaging to wheat crops. Ug99 is one such strain of stem rust, which emerged in Uganda in 1999. It has since spread beyond East Africa as far as Iran. The major concern is that majority of the wheat varieties across East Africa, West and South Asia is susceptible to this virulent strain or its derivatives. Similarly, the Yr 27 virulent strain of yellow rust has caused significant losses in some countries in North Africa, Near East and Central and South Asia during the serious epidemics in 2009, 2010 and 2013 indicating that there is no room for complacency and continuous fight is necessary.

13.3.1.2.5 Rodents nuisance

Rodents, particularly the field rats (*Rattus rattus*), the small house mice (*Rattus norvegicus*) and multi-mammate shrews (*Mastomys natalensis*) are key pests of food crops. The most affected crops are maize, millets, paddy and cassava. The damage caused by rodents starts at early booting and continues through the mature grain stage as well as the storage stage. Rice is the most susceptible of all the crops. At the pre-harvest stage, rice is attacked at planting (the rodents retrieve sown seeds from the soil causing spatial germination). The rodents cut and eat the fresh stems and part of the panicle.



Figure 44: A mazing catch of rats using net traps in a rice field

13.3.1.2.6 Problems of swarming birds

It is recognized that, birds are serious migratory pests of cereal crops, namely rice, maize, sorghum and millet. With birds, the time of damage starts at heading (formation of the grains) or the early milk stage. Damage involves the sucking of juice from grains or the removal of whole grains from the plant's spike. The major culprits are the weaver birds and the *quelea quelea* (Figure 45). Bird pest problems in agriculture have proved difficult to resolve due in large part to the behavioral versatility associated with their flocking ability as well as the array of food choices available to the flocking birds. Based on these two factors, effective control is intensive and therefore rather challenging. Several techniques have been tried to reduce bird population to levels where crop damage is minimal. Traditional methods, slings, bird scares, and scarecrows, are still being used in many parts.



Figure 45: Swarming Birds in rice fields

13.3.1.2.7 Swarming Locusts

During periods with favorable weather, locusts multiply rapidly and form large swarms that can cause huge damage to plants in a very short period of time. Grasshopper has become increasingly damaging on cereal crops especially maize and rice in parts of the country (Figure 46). Sometimes when locusts have struck, farmers have no choice in their means on how to control them except, resort to use any available insecticide whenever outbreaks occur.



Figure 46: Section of locusts swarming on rice fields

13.3.1.2.8 Risks of planting susceptibles

Access to quality inputs remains a key constraint in Uganda. The problem is a consequence of a poorly developed seed sector where the informal seed system accounts for an estimated 87% of planted seed. There are 23 seed companies licensed and certified by the Uganda Seed Trade Association (USTA). The total demand for grain crop seeds is estimated at approximately 110,580 MT, while total sales from the formal seed market account for only 12,000 MT. The supply shortages create incentives for substandard and/or counterfeit seed; studies suggest counterfeiting affects 30-40% of purchased seed (Bill and Melinda Gates Foundation, 2015). The formal system consists of agro-dealers, manufacturers, government entities and Non-Governmental Organizations (NGOs) that distribute seeds.

The informal system consists of three elements:

- a. Farmers saving seed for own use (no trade involved);
- b. Farmers exchanging seed with neighbours;
- c. Farmers and farmers' groups growing seed (improved or otherwise) for sale through informal channels, including local markets, NGOs, seed fairs, and development projects (Joughin, 2014).

The input risk is a structural problem of the agricultural sector: it can be assumed that the sector is affected each year by more or less the same extent (to the tune of USD 10.7 million to USD 22.4 million). The risk is also geographically systemic as it often affects a large number of farmers in a district or area where a criminal gang operates. Overall, the risk remains idiosyncratic as not all low-quality inputs lead to failed crop (only 30% of fake seeds fail to germinate according to recent studies). The frequency of the risk is high

(i.e. annual) with a high probability for farmers that buy improved inputs. The risk affects between 3% and 4.5% of the farming population every year (Bill and Melinda Gates Foundation, 2015).

Evidence from research trials indicates that average yields in Uganda are well below their attainable potential. The analysis shows that current yields for maize, millet, rice, and sorghum are only 20% to 33% of the potential yield for rain-fed agriculture and even less for irrigated agriculture. A major factor is the lack of good-quality, higher-yielding, more vigorous, drought-resistant, and disease-free seeds and planting material. It is reported that, about 90% of crops are produced using home-saved seed and vegetatively propagated planting materials (Joughin, 2014).

According to Transparency International Ugandan farmers lose between USD 10.7 and USD 22.4 million annually due to counterfeit maize, herbicide and inorganic fertilizer sales (Transparency International, 2014).

In addition to these losses, counterfeit inputs are also one major reason why many farmers still rely on home-saved seed and vegetatively propagated planting materials. This, in turn, leads to low yields and significant losses in terms of potential revenue for Ugandan farmers.

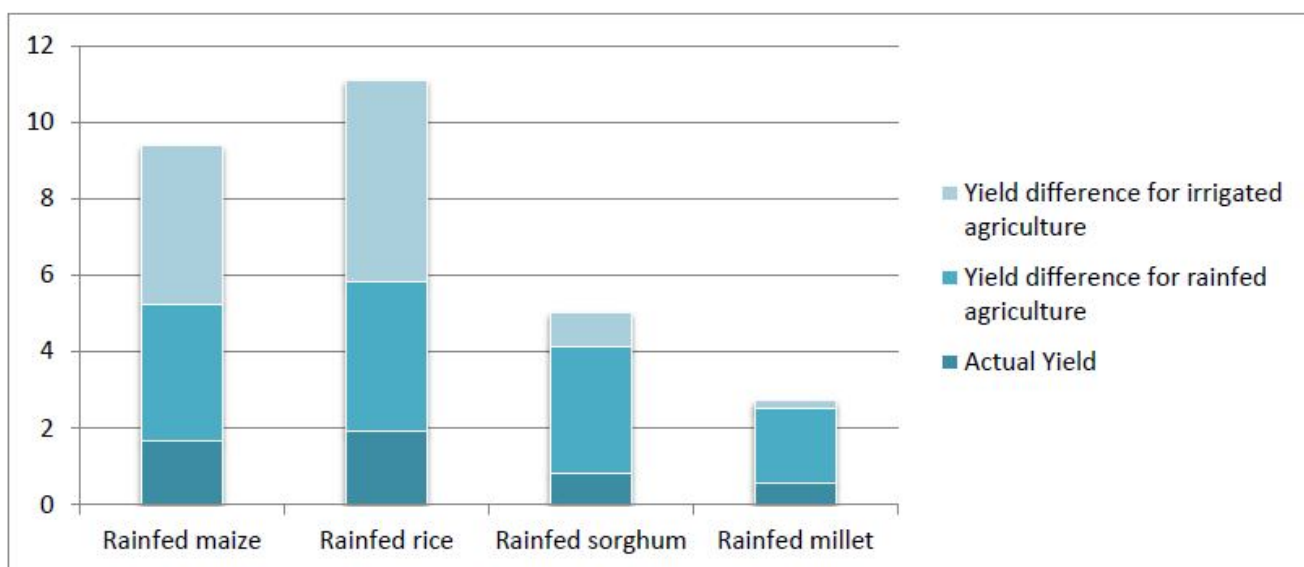


Figure 47: Yield gap for important food crops in Uganda³²

13.3.1.2.9 Post harvest losses

The lack of infrastructure, in particular storage facilities, markets, and roads, is rather a constraint than a risk to agricultural production in the country. However, these limitations are often closely correlated with other risk factors: for example, lack of storage leads to higher losses for farmers in seasons with wetter conditions during and after harvest as crops are rotting more easily. In 2012, a total of 0.62 million tonnes (i.e. 18.3% of a total cereal production of app. 3.4 million tonnes) is estimated to have been lost. Over the period 2008-2012, the estimated weight losses of wheat and barley due to improper storage was 12-13%. Other cereal crops had higher and more variable weight losses: maize 17-25%, millet, rice, and sorghum 12-24%. In the case of wheat and barley the loss values have been stable over recent years. The incidence of damp weather during the period of harvesting and field drying is the major factor in annual variation and, in the case of maize, the longer periods of farm storage also had an impact.

³²MAAIF: *Agricultural Risk Assessment Study | Uganda, October 2015*

For example, in 2012 damp weather at harvest time was observed that prevented millet and rice crops in Central province and in maize and rice in Western province from drying well, leading to higher than average losses (APHLIS). The following graph shows the variation in post-harvest losses for maize for the period 2004 to 2012. Therefore, even though lack of storage is a structural problem, climatic effects vary from year to year, leading to a higher or lower than average weight loss. This variation is a risk that impacts on the revenue of farmers.

All these figures have to be handled with care: a more recent World Bank study concluded that postharvest losses are less wide-spread than previously thought. The study concludes that postharvest loss for maize is concentrated among only 21.5% of the population. The probability of losses increases with humidity and temperature and declines with better market access, post-primary education, higher seasonal price differences, and possibly improved storage practices. The average losses for those households that reported losses was 27.4%, thus, in sum postharvest losses for maize would amount to 5.9% only, which is considerably lower than the figures stated earlier.

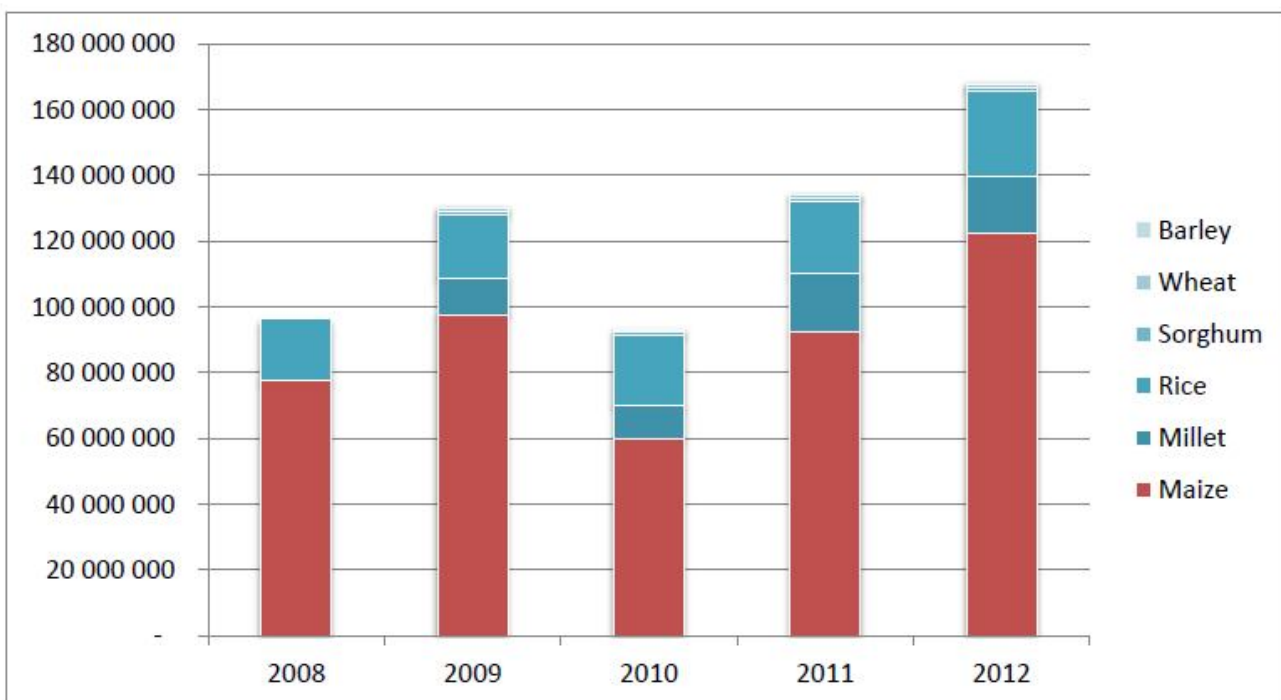


Figure 48: Annual Revenue Loss from Post-Harvest Loss in Uganda³³

The overall effect of the infrastructure risk is hard to quantify: as has been shown, there are different estimates on the amount of produce lost due to insects, etc. In addition, the increasing price in the months after harvest will often compensate farmers, at least in part, for the weight loss suffered. But assuming that the weight loss outweighs the effect of increasing prices, the average annual revenue loss for farmers based on APHLIS figures is USD 97,179,571. As can be seen from the following graph, the majority of losses derive from maize (72.34% on average).

13.3.1.2.10 Diseases in poultry

Poultry is one form of farming in Uganda which many people have taken part. However, poultry has been highly affected by various diseases drawing back poultry production not as expected. Coccidiosis is the common disease that has infected approximately 20% of the total poultry in Uganda according to the findings from central diagnostic laboratory at Makerere university veterinary medicine, the killer disease is caused by Coccidian, a parasitic protozoan organism and spreads from one bird to another mostly through

³³ MAAIF: *Agricultural Risk Assessment Study* | Uganda, October 2015

droppings that are already infected. The spreading of the disease is caused by infected droppings, which are consumed by other birds. These droppings contain the eggs of the coccidian which birds pick and eat while feeding on the ground leading to their infection. Besides coccidiosis, other diseases such as *Collibalillossi*, Cannibalism, New castle, Gumbaro disease, and Oomphalitis are as well affecting poultry farming in Uganda. Also, newly avian leukosis, nutritional deficiencies, necrotic enteritis, foreign bodies, fowl pox, mycoplasmosis, Avian encephalomyelitis, Gout, Mareks disease, broiler ascites, infectious bronchitis, external parasites, Bumble feet, suffocation and vaccine reaction.

Some of the environmental related causes of poultry diseases include; too hot or too cold conditions (Figure 50), wet litter, dusty bedding, high build up of chicken droppings, no/poor air circulation and sharp wires or objects in the cages.



Figure 49: Poorly built poultry unit

13.3.1.2.11 Avian influenza

Uganda is a seasonal shelter of about 240,000 of the estimated 50 billion birds that make predictable seasonal movements between the temperate zone and the tropics including about 5.4 million ducks. Due to the favorable climate and numerous fresh waterbodies, Uganda serves as a migratory destination for both Palearctic and intra-Africa migratory species of birds with many wintering in the area for several months. Among the regularly observed birds are eight bird species which are regarded high risk species in the spread of influenza viruses around the world. These include Tufted duck (*Aythya fuligula*), long-tailed Cormorant (*Phalacrocorax africanus*) Great Cormorant (*Phalacrocorax carbo*), Northern Shoveler (*Anas clypeata*), Garganey (*Anas querquedula*), Black-headed Gull (*Chroicocephalus ridibundus*) and Eurasian Wigeon (*Anas penelope*). Waterfowl can be a source of low pathogenic avian influenza (LPAI) viruses for domestic avian populations, in which they can evolve into highly pathogenic avian influenza (HPAI) strains. Spread of these viruses to domestic species can be favored by the large number of non-wetland dependent groups ("bridge species" such as cattle and little egrets) that move between free-living waterfowl and human settlements and may interact with domestic birds. The other factors that may facilitate spread of these viruses are the numerous live bird markets (LBMs) scattered across the country. Outbreaks due to HPAI subtypes cause death in poultry and sometimes also in humans.

Due to these factors, health experts in Uganda are on high alert and ready to counter any outbreak of H5N1 avian influenza, (bird flu), following some reports of its outbreak in neighboring southern Sudan in 2006. In response to the threat of bird flu, the Ugandan government has put emergency response measures in terms of facilities and teams in its entry points/ border districts in the event of an outbreak. Six more rapid response teams from the agriculture ministry have been strengthened to give support to other "higher-risk" districts bordering water bodies.

13.3.1.3 Natural and man-made catastrophes

These include; wild fires, land slides, earth quakes and civil wars which are discussed as follows:

13.3.1.3.1 Bush Burning

Many parts of the country especially the north and north-eastern are usually prone to bush burning during the dry seasons (Figures 50&51). Bush burning is used as land management practice to clear land for cultivation though hunters also set fires in order to flush out their prey. Wildfires are used to control grazing fields in some cattle keeping communities however; these have turned out to be disasters. Bush burning destroys vegetation and biomass thereby exposing soil to water and wind erosion. The fires burn the grass the locals usually collect during the dry season to use for thatching houses during the rainy season. To curb such acts, some district local governments such as Gulu are passing by-laws to regulate the vice.



Figure 50: Bush burning in Lamwo District



Figure 52: Part of landslide area where estimated 365 people perished in Bududa, Uganda in 1st March 2010³⁴

13.3.1.3.3 Earthquakes

Earthquakes result from sudden violent movements of the earth's surface, sometimes causing tremendous loss of lives and property. Available seismic information indicates that parts of Western and Central Uganda are prone to seismic activity. Whereas the probability of occurrence of an earthquake can be determined by existing technology, its exact timing is not easy to ascertain. This makes it imperative to have adequate preparedness for disasters related to earthquakes. The vulnerability to earthquakes and seismic related hazards increases with the construction of storied structures. Forecasting based on monitoring of seismic activity, and historical incidence and observation need to be carried out. Besides, risk reduction measures such as public awareness and training, reduction of structural vulnerability through construction of resistant shelters based on enforceable building codes, and earthquake warning and preparedness programmes must be carried out. In 1994, for example a strong earthquake hit districts in Rwenzori region affecting over 50,000 people.

Uganda lies in an earthquake zone but the quakes that have occurred in the region have all been relatively weak in the past two decades. In 1994 an earthquake (6.2) struck near Fort Portal and affected about 50 thousand people in the region leaving extensive damage yet casualties were limited³⁵. Earthquakes impact on food security and agriculture-based livelihoods through:

- a. loss and injury of family members and workforce;
- b. loss of crop yields and livestock;
- c. damage to irrigation systems; and
- d. damage to people's homes, animal shelters, stock areas and business premises.

³⁴ Source: <https://www.researchgate.net/publication/273136616>

³⁵ 9 ReliefWeb (1994). Uganda Earthquake Feb 1994 UN DHA Situation Report 1-4. <http://reliefweb.int/node/34498> viewed on 30.11.2011.

13.3.1.3.4 Civil wars and influx of refugees

Since independence, Uganda has been characterised by successive internal armed conflicts which have led to loss of lives and massive displacement of communities. The major conflicts have included the 1979 war that ousted the government of Idi Amin, the 1980-1986-armed struggles that took place mainly in the central parts of Uganda, and the 1986-2007-armed conflicts in Northern and Eastern parts of the country. Other forms of unrest have taken place in form of cattle rustling in Karamoja areas and its neighboring districts in the region.

Then there was the Lord's Resistance Army led conflict which many atrocities in Northern Uganda. Apart from internal led conflicts, the neighboring countries of DRC, South Sudan, Somalia, Eritrea and Burundi have had their share of unrest which have brought about massive migration of their nations to Uganda and by October 2017 UNCHR records showed that, Uganda was hosting estimated 1,300,00 refugees. Before the refugees arrived, Bidi Bidi was a forest. Currently, the rate of firewood consumption is 952 tonnes per day which corresponds to 347,480 tonnes of firewood per day. Within 3 years, Bidi Bidi will be bare if the rate continues—Mr. Andama Swaibu Solo, District Environment Officer—Yumbe. The presence of refugees has come with a host of challenges in terms of:

- a. Increasing pressure of on natural resources such as wood for fuel and construction needs;
- b. Land disputes, during the civil war, large parts of the population were displaced into internally displaced people camps (IDPs). After the war, many IDPs returned to their villages and issues of boundary settings for their lands have been bitter sources of conflicts amongst communities;
- c. Livestock thefts and killings;
- d. Conflicts over access to water in view of limited water availability in the areas; and

Conflicts over livelihoods sources. **These issues have necessitated GoU and the WB to put in place, a project to support interventions in the host communities.**

13.3.1.3.5 Political and security risk

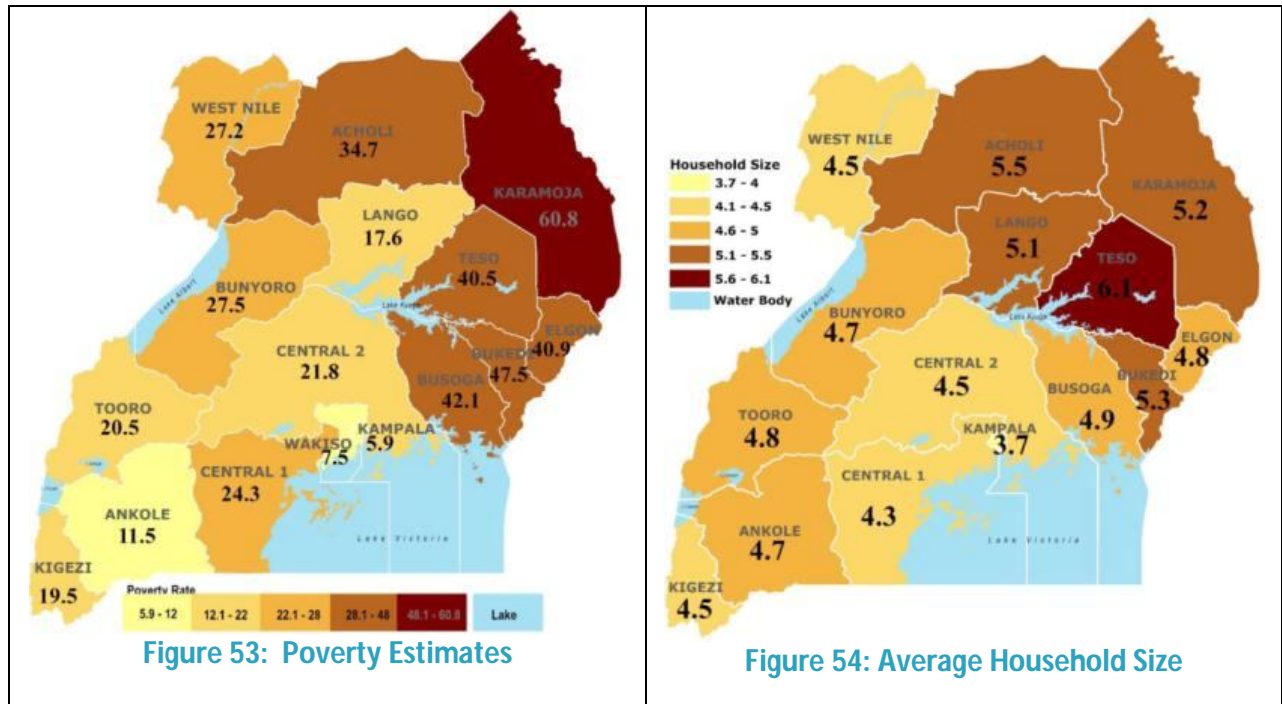
In Uganda, the Northern region has suffered the highest incidence of political risk but this has decreased greatly due to the containment of the Lord's Resistance Army. Between 1988 and 2008, the northern region of Uganda has been terrorized by the LRA, a rebel group lead by Joseph Kony, a self-proclaimed prophet. During this time, they have abducted children as slaves, killed entire villages and caused the displacement of thousands of people from their homes and land. As a result, people have been away from their property and land and have thus not carried out any farming for two decades in addition, the younger generation having no skills in farming their land. This led to a severe drop in agricultural production and increase in food scarcity and insecurity. Food aid was necessary to sustain the population that was largely in Internally Displaced Peoples (IDPs) camps. More than 90% of the 1.8 million displaced people who lived in camps during the height of the crisis have returned to their homes or settled somewhere else. An estimated 180,000 people remain in camps after end 2010. Many have returned to areas lacking in basic services, healthcare and education and challenging agricultural production due to mechanization limitations to open up farm lands.

13.3.2 Other Considerations on Climate Change and Vulnerability

13.3.2.1 Contribution of poverty to climate change vulnerability

Vulnerable populations usually include those with low incomes; individuals who may be chronically or terminally ill, physically or mentally disabled, homeless, or uninsured or underinsured; and the elderly, children, and pregnant women. Generally, over 80% of the population in the country derives their livelihoods from agriculture and related activities. Poverty levels nationwide declined from 56 % in 1992/1993 to 34% in 1999/2000, to 31.1% in 2005/2006, to 24.5% in 2009/2010 and to 19.7% in 2017 (UBOS, 2017). Though this trend is a cross the country, in Eastern region, poverty level in 2013 was 24.5%.

The household survey of 2016/17 has shown a reversal in trend of poverty level in the country. Instead, there has been an increase to 22% from the 19.7%. The worst situation is reported among crop farmers. For the households headed by subsistence farmers, the percentage of the poor increased from 20.3% to 38.2% between 2012/13 and 2016/17. Poverty level increased from 23% to 36% among crop farming/subsistence farming households, who this is their main source of income. The Teso, Lango and West Nile sub-regions recorded 40.5%, 17.6% and 27.2% respectively.



The persistence of poverty in many rural areas of Uganda is partly attributed to relatively large family sizes and yet depending on crop subsistence farming. In 2016/17, for instance, the average household size in Teso sub-region was 6.1, Elgon sub-region was 4.8, and Acholi region was 5.5 compared to the national average of 4.7. Many regions remain poor. For example, in Lamwo District is typically rural. Over 90% of the population depend on subsistence agriculture. The poverty level in the district is generally high. In 2014, poverty level measured by those living below one US dollar day stood at 60%. The causes of poverty then included the effects of displacement of people into the protected camps, the Karamojong cattle rustling and adverse weather conditions. Poverty is remains big issue. The recent poverty study (2016/2017) indicates that 34.7% of people in Acholi sub-region live below poverty line (one dollar a day).

13.3.2.2 Over-dependence on Natural Resources for livelihoods

Typically, and increasingly, in rural areas in Uganda, there is very heavy dependency on natural resources for livelihood and source of income, the main source of income being subsistence farming. This partially explains inadequate and unreliable income for livelihood and their vulnerability of the people to climate changes. Generally, the vulnerability of households to either remain in or fall into poverty is positively associated with sources of income. The arable land is intensively cultivated in ways that increase exploitation and degradation of the soil and environment.

In most of the rural districts in the country, agriculture is the mainstay economic activity though done under subsistence. Agriculture is carried out based on the households on smallscale including crop production and animal husbandry. Over 90% of the farmers are engaged in crop production as a major activity. Produce buying is main trading activity done by both individual and organised groups in cereal producing areas such as Kamwenge, Teso, Kasese, Masindi and Kiryandongo amongst others. In the

swamps, there is increased growing of vegetables such as onion, sugar cane, tomatoes especially during dry season.

13.3.3 GHG Emissions

Between 1990 and 2012, Uganda’s GHG emissions grew 50% with average annual change of 4% from the agricultural sector³⁶. The agricultural sector has the highest emissions, contributing about 46.25% (22.38 Mt CO₂e) to the country’s total GHG emissions (Figure 55). The four main sources of GHG emissions from the agricultural sector include enteric fermentation at 42.8%, manure left on the pasture 31.1%, burning savanna 12.9% and cultivation of organic soils at 4.8%. In spite of these low emissions rates, the country is highly committed to contribute to global efforts to reduce GHG emissions.

It is also noted by USAID³⁷ that, land use trends in the country are increasingly showing forested land to be decreasing while crop land and bush increasing. Forest degradation was highest outside of protected areas and in areas where agriculture expanded. Fires were also a major source of degradation of land cover, with fires commonly seen in central and northern Uganda. Direct drivers of deforestation and forest degradation are subsistence agriculture and biomass extraction for timber, charcoal amongst others. Activities that drive agriculture sector emissions are livestock production, inefficient animal waste management systems under pasture range and paddock, and the cultivation of organic soils. Paddy rice production and use of nitrogen fertilizers are also included in the list of drivers of GHG.

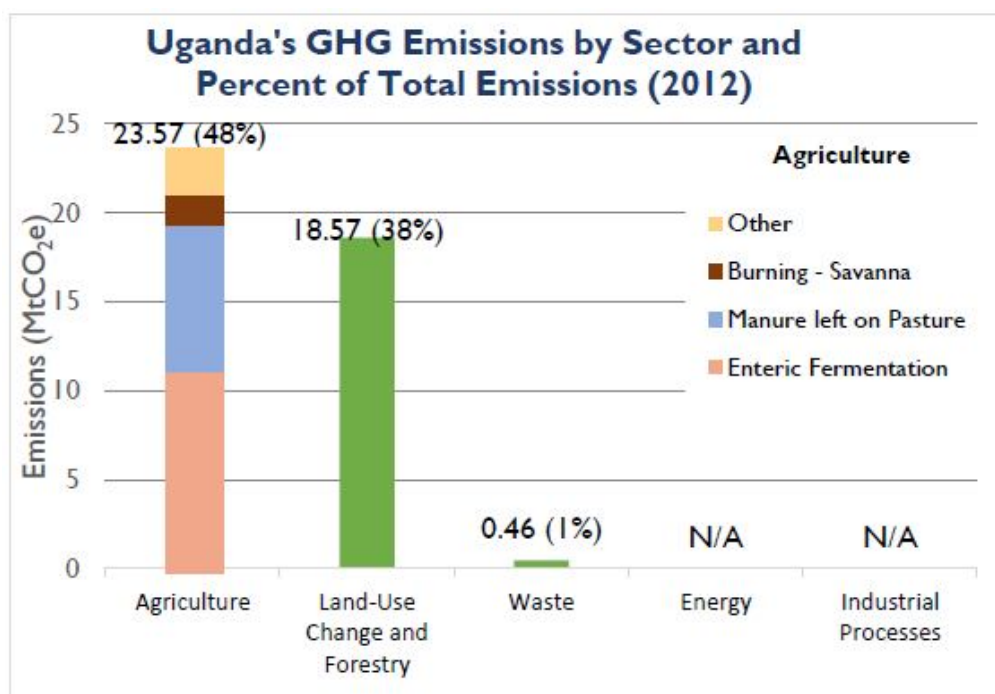


Figure 55: Greenhouse gas emissions by sector (FAO STAT, 2015)

13.3.4 Impacts of the Disasters to agricultural production in Uganda

³⁶ FAO 2015

³⁷ USAID, 2012 Greenhouse Gas Emissions in Uganda

13.3.4.1 Impacts from GHG Emission

Emissions from agriculture come from four principal sectors, namely, agricultural soils, livestock and manure management, rice cultivation, and the burning of agricultural residues and open burning from land use clearing. The largest shares of emissions originate from agricultural soils (N₂O), enteric fermentation (the natural digestive processes of ruminants such as cattle and sheep) and rice production associated with CH₄ emissions. It is expected that these emissions will increase because of increased food demand and increased prioritization of rice, meat and dairy production (MAAIF, 2010). This shift will also lead to increased pressure on natural land resources notably, forests, wetlands, and grasslands from agricultural expansion.

Table 16: GHG Emission from agriculture and other activities

Sector	GHGs	Total sector emission (GgCO ₂ eq.)	% of total emissions
Agriculture	N ₂ O, CH ₄	20,970	57.4
LUCF	CO ₂ , N ₂ O, CH ₄	10,465	28.7
Energy	CH ₄ , CO ₂ , N ₂ O,	3,634	12.2
Waste	CH ₄	808	1.7

Source: MoWE (2014) Uganda Second National Communication to the United Nations

13.3.4.2 Climate change Impact on Crops

Uganda's crops sub-sector contributed 13.7% to national GDP in FY 2014/1529. Current statistics indicate that 16 major crops are grown including cereals, root crops, oil crops, bananas, tea and coffee. Coffee and tea contributes 15% and 3% to total export revenues respectively. Crops are grown according to different agro-ecological zones (AEZs), which are characterized by different farming systems determined by soil types, climate, and socioeconomic and cultural factors. The crops are grown alongside livestock production.

Increased temperatures will also lead to greater rates of evaporation and transpiration, which can cause greater moisture stress and rainfall deficits. Most recently in 2010-2011 damages and losses from rainfall deficits in the agricultural sector were valued at USD 907 million accounting for 77% of the total damages and losses across all economic sectors (World Bank, 2010-11 integrated Rainfall variability impact needs assessment by the Dept. of Disaster Management OPM).

In all, the impact of weather-related disasters on crops has been reported by Kaggwa (2009)³⁸. The report indicates that 800,000 hectares of crops are destroyed annually resulting in economic losses of more than US\$ 120 billion (US\$ 71 million). Rainfall deficits during 2010-2011 led to damage and production losses of US\$ 565 million in the crops sub-sector.

Based on available information, it is clear that, climate change impacts on crops is dependent on the crop. For instance, beans are projected to experience the greatest decreases due to climate change, with the potential for a decrease of up to a 70% in suitable for production by 2040-2069 (Figure below). In contrast, millet, banana and groundnut is projected to increase in suitable area, albeit only slightly (5-10%). Above

³⁸ Kaggwa, R., Hogan, R., and Hall, B. (eds). (2009). *Enhancing the Contribution of Weather, Climate and Climate Change to Growth, Employment and Prosperity. UNDP/NEMA/UNEP Poverty Environment Initiative: Uganda.*

ground biomass is also projected to decrease across most of Northern Uganda (Figure 5), which would have great negative implications for livestock in those areas.

Changes in temperature have also had significant impacts on health and agriculture. The country has also seen unprecedented outbreaks of pests and diseases, such as the Coffee Wilt Disease, Banana Bacterial Wilt, etc. in recent years that are likely to be a consequence of climatic change. Other outbreaks of pests and diseases that have occurred possibly due to climate change include: the Rift Valley Fever, Foot and Mouth Disease (FMD), East Coast Fever (ECF), Cassava Mosaic, etc. Uganda's ecosystems are also changing and biodiversity loss is on the increase due to extreme droughts and unsustainable agricultural practices. There has also been unprecedented disappearance of plant species, particularly medicinal plants and pastures and increase in invasive weeds.

13.3.4.3 Climate change Impacts on livestock sector

Livestock share to the GDP is currently projected at 1.7%. In recent years livestock population growth rates have been estimated to grow at 1.4, 2.5, 4.3 and 3.0 for cattle, sheep, goat and chicken, respectively. Productivity of livestock is still low. The most recent livestock census projected average milk production per milked cow per week to be around 8.5 litres and egg rates per week at 4 and 5 for exotic layers and indigenous chicken, respectively. The low productivity was mainly attributed to the dominance of indigenous breeds estimated at 93.6 percent and 87.7 percent for cattle and chicken, respectively.

The livestock sub-sector contributed 4% to the GDP in FY 2014/1536. In recent years while the total livestock population was increasing, productivity was still low. Current statistics project average milk production per cow per week at about 8.5 liters and egg production per week at 4 and 5 for exotic layers and indigenous chicken, respectively. The challenges responsible for low livestock productivity are given in Annex 3. The challenges are likely to be exacerbated by climate change and variability. Pastoralism is the dominant form of livestock-keeping in Uganda, especially in the "cattle corridor" inhabited by 13.3 million people, which is 38.4% of the country's total population (UBOS, 2016).

The increased frequencies of extreme weather events (mainly droughts) resulting from climate change and variability adversely affect the productivity of livestock and farmers' livelihoods. The growth in population and corresponding increase in the number of livestock have extended grazing into marginal lands and forests thereby causing severe land degradation, vegetation loss and reduced livestock productivity. Prolonged drought in livestock grazing systems causes severe water shortage, leading to mortality of animals, low production of milk and meat, food insecurity, increased food prices, and a general negative effect on the economy. Heat distress suffered by animals reduces the rate of animal feed intake and results in poor growth performance and low meat and milk production. Climate change also influences incidence of livestock vectors and diseases thereby reducing livestock productivity in the country.

13.3.4.4 Impact on Water

The **Water Sector** is highly vulnerable to the impacts of climate change, with persistent droughts causing water stress. The predicted impacts of climate change; rising temperatures, evaporation and persistent drought are likely into increase water stress, competition for water uses which could result into conflicts over water resources. Climate change is also one of the causes of reduced water tables, drying up of streams and wetlands all which affect agriculture and water access. Given that wetlands are highly vulnerable to changes in the quantity and quality of their water supply, climate change will most likely substantially alter ecologically important attributes of wetlands and will exacerbate the impacts from human activity³⁹. On the other hand, the loss of wetlands could exacerbate the impact of climate change in as they provide fundamental services that contribute to mitigation of such impacts.

³⁹ UNPD Building Resilient Communities, Wetland Ecosystems and Associated Catchments in Uganda" project

No doubt, efforts towards development and utilization of water resources for productive use in crop irrigation, livestock, aquaculture and agribusiness need to be integral to ECAAT-P which if not envisaged, will likely compromise its development objective. It is therefore important to take into account climate change resilience in developing and utilizing water resources for productive purposes in the project.

13.3.5 Climate Change Mitigation Measures

13.3.5.1 Investing in early warning systems

Access to information is an important risk management tool on various levels: government and other actors require data and information to adequately analyze the risk situation in the country and monitor important developments both for policy and strategy development purposes as well as for rapid reactions to, for example, an outbreak of a contagious crop or animal disease somewhere in the country. Private sector requires information to plan their investment and to develop products that are targeted to farmers, for example insurance companies need data on production, weather, and historical losses to develop their products. Finally, farmers need information on a broad range of topics (use of inputs, weather forecasts, control of pests and diseases, and market prices) in order to conduct their farm business in a more efficient manner.

Currently, a number of public and private sector entities have developed information systems for various parameters relevant for Agricultural Risk Management, for example, weather forecasts, market prices of inputs and goods for harvest, and better farming methods. The following table provides an overview of existing information systems.

Despite the broad range of service providers, timely and accurate information does not always reach the target audience. Most smallholder farmers still rely on radio and farmer to farmer information exchange. The figure below shows the source of information indicated by agricultural households for various topics during the last agricultural census. Recently, the use of mobile phones has increased rapidly and more and more information systems are using mobile phone technology to reach out to farmers.

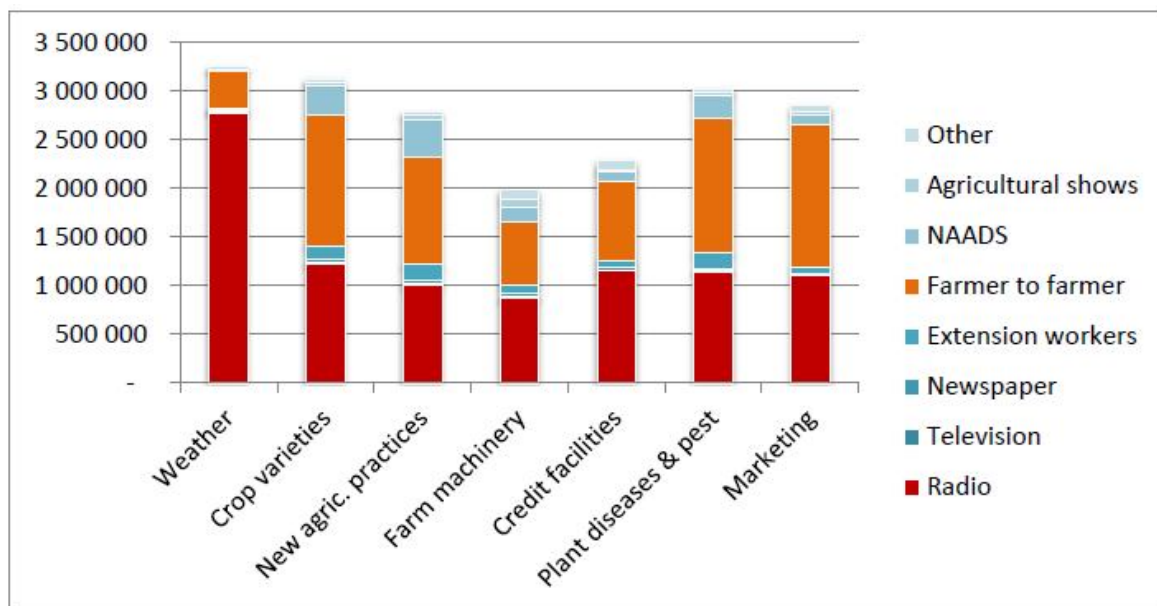


Figure 56: Farmers Access to information by source⁴⁰

⁴⁰ Agriculture Risk Assessment Study Uganda. October 2015 publication at: <https://www.researchgate.net/publication/301285723>

Apart from radio and mobile phone, farmers rely on the public sector to receive information. The agricultural extension system NAADS, the main source of agricultural information for smallholder farmers, is undergoing yet another transition. NAADS was the main provider of extension and advisory services to farmers in Uganda. This is complemented by the district and sub-county agricultural officers, the NARO regional centre staff, and the field officers of various NGOs involved in rural development. The first two former systems are under MAAIF and are being restructured to create a single spine system which is expected to increase farmers' access to information services.

The various early warning information systems are disjointed and not integrated which leaves farmers with numerous sources of information which can result in confusion. There is need to coordinate and harmonize approaches and bring efficiency, coherence and synergy to the diversity of early warning systems in Uganda and build a sustainable comprehensive system. Furthermore, the analysis and integration of data and information from multiple sources is most effective when it is coordinated under a single authority. To this effect, the OPM is currently implementing a plan to integrate the various EWS from ACTED (DEWS), MAAIF, FEWS NET, UNMA, IDSR, among others to create the National Early Warning System.

13.3.5.2 Investments in irrigation schemes

From 2000 to 2013, MAAIF managed to construct 711 water projects for production facilities in 54 districts. Out of the 711 facilities, 278 facilities are under the community management system and the rest are privately owned but under private public partnerships. This latter includes 71% availability of water facilities for production in the country. According to a sector report from MWE, in the financial year 2012/2013, the cubic volume storage of water for production had improved from 27.3 million cubic meters in December 2012 to 27.5 million cubic meters in December 2013 (East African Business Week, 2014).

Due to the recent history of large scale droughts in Uganda, water resources still remain a critical bottleneck. The irrigation potential for Uganda is estimated at 445,041 ha at an investment cost of USD 2.3 billion and an internal rate of return (IRR) of 46% (IFPRI, 2010). Besides small-scale irrigation, the Ministry has invested in a few larger projects. In 2013 the government invested approximately USD 25 million in the rehabilitation of three major irrigation schemes in the country; namely Mubuku Irrigation Scheme, Doho in Butalejja and Agolo in Lamwo Districts (East African Business Week, 2014).

13.3.5.3 Improved delivery of extension support services

In the short term for agriculture, some of the policies and measures that can be effective are a continuation of what is already ongoing as part of the Government's Agriculture Sector Strategic Plan (ASSP), providing extension services and conveying information on weather and market conditions to farmers in a timely manner. In addition, the programme emphasizes the role of diversification, post-harvest handling, and storage as important adaptation actions in the face of climate change. In some cases, specific climate smart agriculture programmes can be implemented to reverse the loss of yields in a cost-effective way, and Arabica coffee is an example.

13.3.5.4 Involving communities

Understanding of the social dimensions of climate change is crucial. Communities must be consulted and involved in order to build their resilience. Support community-based adaptation strategies through expanded extension services and improved systems for conveying timely climate information to rural populations for enhanced climate resilience of agricultural systems.

Diversification of livelihoods and income sources, especially in areas that face extreme events, is essential. Societies will also have to learn new skills and practices that may at times contradict traditional beliefs and practices. Information, education and communication raise awareness and will help dispel uninformed beliefs and superstitions about climate change. But crucially, communities have a vital role to play in

appraising what is being done as interventions in their areas and are well placed to inform such a process. Civil society and community organizations need to be empowered to monitor the implementation and localization of climate change intervention including in ECAAT-P. Women will be at the center of adaptation efforts because of their paramount importance in society as farmers and as caregivers, and they must be at the center of community involvement and empowerment.

13.3.5.5 Sustainable Management of Natural Resources

Natural Resource Management (especially wetlands, river, forests) has both a direct link to combating climate change and its effects, and positive benefits for livelihoods, food security and poverty. Ultimately, development can only be sustainable when government, CSO and the communities alike focus effort on sustainable management of natural resources. Intervention such as ECAAT-P need to put in place, measures for sustainable land management which should be operated under sustainable pathway.

13.3.5.6 Securing water

Finally, improved water storage is critical to address drought events and will become more so, over time. Such storage can be done in a relatively cost-effective manner. Sufficient safe water to meet the basic needs of the communities is not only critical for adaptation to climate change, but also a necessity for improving health and well-being and tackling poverty, just as sufficient water to keep ecosystems healthy is the basis for agriculture and production. This can be achieved through interventions such as rainwater harvesting which can be done at both household and institutional levels, protecting watersheds, catchment areas and water bodies from encroachment and over exploitation. Some of these interventions could be mainstreamed to ECAAT-P.

13.3.5.7 Planting of resistant varieties

Emphasis is placed on prevention, by promoting the development and planting of resistant cultivars, use of certified seeds, rapid seed multiplication, training of farmers, strengthening surveillance and emergency response capacities, promoting research–extension–farmer linkages and international cooperation. Such varieties are usual in breeding for tolerance to drought, pests and diseases.

13.3.5.8 Setting up of Farmers Field Schools-FFS

These will help smallholder farmers and extension agricultural staff to gain skills to cope with dynamics of climatic variability and disease occurrence and management of such issues in farming. Based on a learning-by-doing approach, the FFS would provide hands-on advice to the extensionists and the farmers themselves. Such institutions will provide support in the adoption and popularization of integrated, ecological and sustainable way.

13.3.5.9 Promote Community Based Adaptation (CBA)

From the above assessment of the vulnerability of the rural communities, it is recommended that promoting adaptation and building resilience takes a community-based approach. Community based adaptation refers to 'actions' that aim to reduce vulnerability to negative impacts of climate change at local levels in response to hazardous conditions. In some cases, responses are aimed to realize opportunities linked with climate change. Community based adaptation are 'actions' that place adaptation technologies and practices in the community – the setting, targets the community, uses the community as a key resource for adaptation, and builds the capacity of the community to be agents of change.

What is important to understand in the context of rural development and climate change adaptation is that resilience building is the strengthening of linkages and the building of positive and equitable modes of influence between local adaptation assets (financial, human, natural, physical, and political), adaptation

strategies/efforts, and societal structures (levels of government, community, and the private sector) and processes (laws, policies, culture and institutions).

In line with the above, the SPCR also recognizes that social support systems and strong neighbourhood systems are very important in minimizing vulnerability of individuals, households and communities and the SPCR plans to prioritize resilience Programs that invest in social networks and neighbourhood cohesion systems to facilitate collective efforts to cope with adverse effects of climate change and variability.

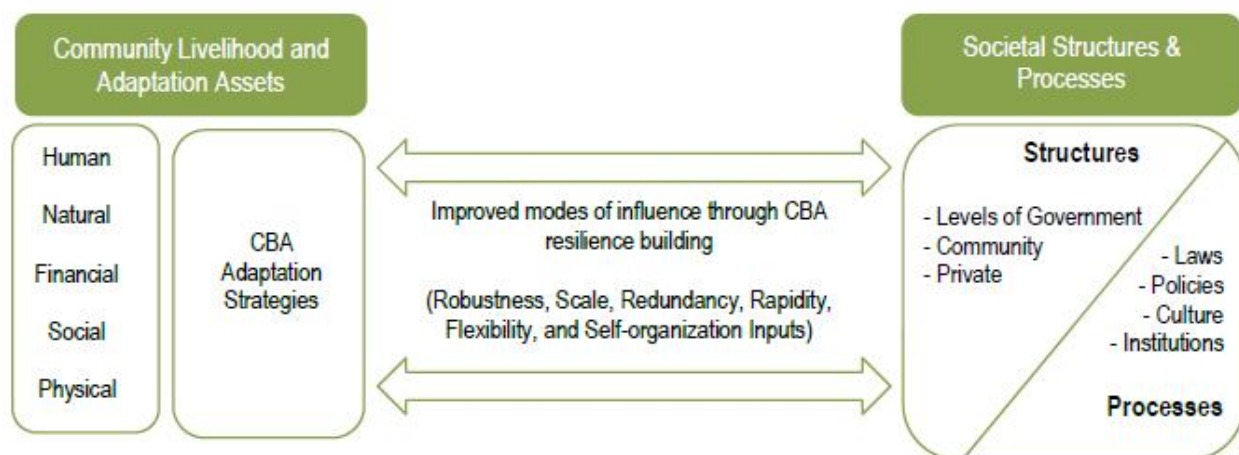


Figure 57: Conceptual framework for Community Based adaptation resilience building within a system, community, or society⁴¹.

13.3.6 Promote Ecosystems Based Adaptation

Many studies connect population pressures to natural resource depletion or degradation that will hinder adaptation to climate change. It is evident that rural communities are largely dependent on ecosystems such as forests and wetlands which are currently under threat of degradation. Poor soil health is often a limiting factor for crop production and increases the potential for soil runoff, erosion and drought like conditions. These problems are anticipated to become more severe with climate change. Therefore, an ecosystem-based adaptation approach needs to be integrated in the resilience building approach.

13.3.7 Target Vulnerable and Minority Groups

The effects of climate change are felt most acutely by those segments of the population that are already vulnerable due to their geography, gender, age, indigenous or minority status and disability. The findings indicate that different people within the community are impacted by climate change differently based on their roles and responsibilities within the family and their community, and the degree of access they have to resources. Women and men have different roles in household livelihoods, and they experience the impacts of climate change differently.

The Strategic Program for Climate Resilience (SPCR) in MoWE 2015 recognizes that in Uganda, the vulnerable social groups include women, children, conflict affected groups, people with disabilities, low-paid (formal and informal sector) workers, malnourished, ethnic minorities, agricultural workers, the elderly, pregnant women, and people living with HIV/AIDS. It notes that the vulnerability is mainly due to high poverty levels in specific areas of the country. The findings indicate that during and in the aftermath of a hazardous event, the adaptive capacity of women and men is also differentiated, because women, in many contexts, have less control over assets such as land, have limited employment and economic opportunities, lack voice in decision making, and do not enjoy the same personal or inherent rights as men. The scarcity of resources

⁴¹MoWE 2018: Report on *Building the Resilience of Rural Communities Through Improved conservation and protection of catchment areas and improving water supply, storage and utilization in Eastern and Northern Uganda areas.*

during times of climate stress also expose women to increased levels of abuse and violence. All these factors, and others, reduce women’s capacity to adapt to and overcome hazards both in the short and long term. Therefore, interventions need to be targeted at specific groups within the communities especially women and children.

13.4 Annex 4: Environmental and Social Screening Form

Please type or print clearly, completing this form in its entirety. You may provide additional information on a separate sheet of paper if necessary. Kindly note that the information you are to provide is required by Section 22 of the National Environment Act Cap 153.

Component under ECAAT-P	
Name of Subproject	
Project Objective	
Expected Commencement Date	
Proposed Main Project Activities	
Location (District, Parish, Village)	
Name of Evaluator	

BRIEF DESCRIPTION OF THE PROPOSED PROJECT

.....

EMPLOYEES AND LABORERS

Number of people to be employed: Employees and Laborer	During Construction	During Routine Operation
FULL-TIME		
PART-TIME		

DESCRIPTION OF PROCESS THAT COULD BE IMPLEMENTED

Briefly describe the type and nature or type of the project at the site.

.....

List the type and quantity of raw materials to be used in the project and highlight their sources

Material	Quantity	Source

POTENTIAL ENVIRONMENTAL IMPACTS

Please indicate environmental impacts that may occur as a result of the proposed project.

A. The Biological Environment

The Natural Environment

Describe the habitats and flora and fauna in the project area and in the entire area expected to be affected by the sub-project (e.g., downstream areas, access roads):

Will the project directly or indirectly affect?

Natural forest types?
swamps?

Wetlands (i.e., lakes, rivers, swamps, seasonally inundated areas)?

Natural critical habitats (parks, protected areas)?

Other habitats of threatened species that require protection under Ugandan laws and/or international agreements?

YES _____ NO _____

Are there according to background research/observations any threatened/ endemic species in the project area that could be affected by the project?

YES _____ NO _____

Will vegetation be cleared? If yes, please state the distance/length of affected area

YES _____ NO _____

Will there be any potential risk of habitat fragmentation due to the clearing activities?

YES _____ NO _____

Will the project lead to a change in access, leading to an increase in the risk of depleting biodiversity resources?

YES _____ NO _____

Provide an additional description for "yes" answers:

Protected Areas

Does the subproject area or do subproject activities?

Occur within or adjacent to any designated protected areas?

YES _____ NO _____

Affect any protected area downstream of the project?

YES _____ NO _____

Affect any ecological corridors used by migratory or nomadic species located between any protected areas or between important natural habitats (protected or not) (e.g., mammals or birds)?

YES _____ NO _____

Provide an additional description for "yes" answers:

Invasive Species

Is the sub-project likely to result in the dispersion of or increase in the population of invasive plants or animals (e.g., along distribution lines)?

YES _____ NO _____

Provide an additional description for a "yes" answer:

B. The Physical Environment

Geology/Soils

Will slope or soil stability be affected by the project? YES _____ NO _____

Will the subproject cause physical changes in the project area (e.g., changes to the topography)? YES _____
NO _____

Will local resources, such as rocks, wood, sand, gravel be used?

YES _____ NO _____

Could the subproject potentially cause an increase in soil salinity in or downstream the project area? YES _____
NO _____

Could the soil exposed due to the project potentially lead to an increase in lixiviation of metals, clay sediments, or organic materials? YES _____ NO _____

Landscape / Aesthetics

Is there a possibility that the sub-project will adversely affect the aesthetics of the landscape?

YES _____ NO _____

Pollution

Will the sub-project use or store dangerous substances (e.g., large quantities of hydrocarbons)? YES _____
NO _____

Will the subproject produce harmful substances? YES _____ NO _____

Will the subproject produce solid or liquid wastes? YES _____ NO _____

Will the subproject cause air pollution? YES _____ NO _____

Will the subproject generate noise? YES _____ NO _____

Will the subproject generate electromagnetic emissions? YES _____ NO _____

Will the subproject release pollutants into the environment? YES _____ NO _____

C. The Social Environment

Land Use, Resettlement, and/or Land Acquisition

Describe existing land uses on and around the sub-project area (e.g., community facilities, agriculture, tourism, private property, or hunting areas):

Are there any land use plans on or near the sub-project location, which will be negatively affected by subproject implementation? YES _____ NO _____

Are there any areas on or near the subproject location, which are densely populated which could be affected by the sub-project? YES _____ NO _____

Are there sensitive land uses near the project area (e.g., hospitals, schools)?

YES _____ NO _____

Will there be a loss of livelihoods among the population? YES _____ NO _____

Will the sub-project affect any resources that local people take from the natural environment? YES _____
NO _____

Will there be additional demands on local water supplies or other local resources?

YES _____ NO _____

Will the sub-project restrict people's access to land or natural resources?

YES _____ NO _____

Will the project require resettlement and/or compensation of any residents, including squatters?

YES _____ NO _____

Will the subproject result in construction workers or other people moving into or having access to the area (for a long-time period and in large numbers compared to permanent residents)?

YES _____ NO _____

Who is/are the present owner(s)/users of resources/infrastructures the subproject area?

Loss of Crops, Fruit Trees, and Household Infrastructure

Will the subproject result in the permanent or temporary loss of:

Crops?

Fruit trees / coconut palms?

Household infrastructure?

Any other assets/resources?

Occupational Health and Safety, Health, Welfare, Employment, and Gender

Is the sub-project likely to safeguard worker's health and safety and public safety (e.g., occupational health and safety issues)? YES _____ NO _____

How will the project minimize risk of HIV/Aids?

How will the sub-project minimize the risk of accidents? How will accidents be managed, when they do occur?

Is the project likely to provide local employment opportunities, including employment opportunities for women? YES _____ NO _____

Provide an additional description for "yes" answers:

Historical, Archaeological, or Cultural Heritage Sites

Based on available sources, consultation with local authorities, local knowledge and/or observations, could the sub-project alter:

Historical heritage site(s) or require excavation near the same? YES _____ NO _____

Archaeological heritage site(s) or require excavation near the same? YES _____ NO _____

Cultural heritage site(s) or require excavation near the same? YES _____ NO _____

Graves, or sacred locations (e.g., fetish trees or stones) or require excavations near the same?

YES _____ NO _____

N.B For all affirmative answers (YES) Provide description, possible alternatives reviewed and/or appropriate mitigating measures.

RECOMMENDATIONS

Environmental category: (tick where applicable)

	Category	Justification
	Does not require further environmental or social studies	
	Requires submission of only a Project Brief	
	Requires a full ESIA to be submitted on date	
	Requires an ESMP to be submitted on date	
	Requires a RAP to be submitted on date	
	Requires an Indigenous Peoples Plan (IPP)	
	Requires a Physical Cultural Resources Plan	

CERTIFICATION

We certify that we have thoroughly examined all the potential adverse effects of this subproject.

Reviewer:

Name:

Signature:

Date:

13.5 Annex 5: Detailed ESIA Process in Uganda

The ESIA guidelines (NEMA 1997) and the ESIA regulations (NEMA 1998) recognize the following stages in an ESIA process: Project Brief formulation; Screening; Environmental impacts study; and Decision making. In addition, public consultation is required throughout the ESIA process (Figure 54).

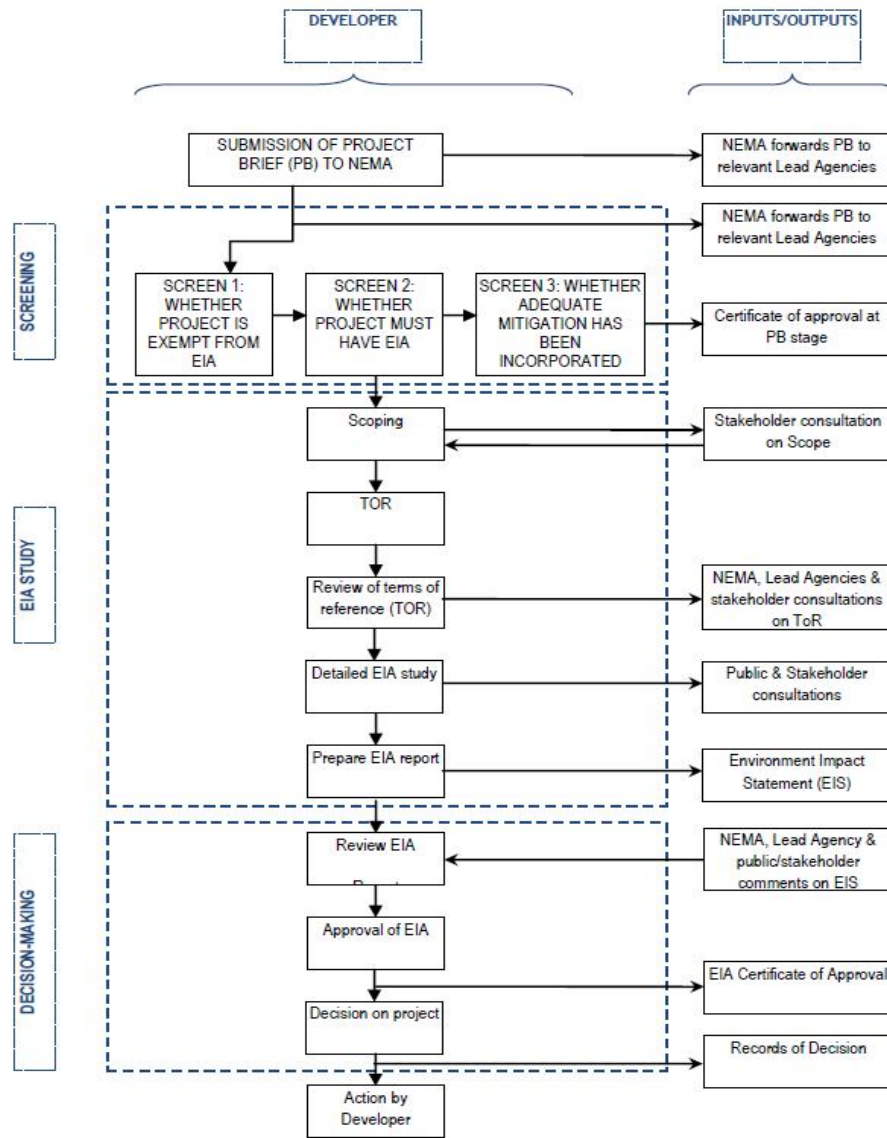


Figure 58: EIA Process in Uganda (Source: EIA Guidelines, 1997)

The EIA process in Uganda is described is initiated by the submission of a project brief – a document that contains the same sorts of information that are in the ESSF and a format for which is contained in the EIA guidelines. Once the information is judged to be complete, NEMA requests comments from the lead agency and then screens the project. The Executive Director has three options: (a) approve the proposed project, if the EIA is not mandatory and the project brief includes adequate mitigation measures, or (b) request the developer to prepare an Environmental and Social Impact Study (ESIS) if a decision cannot be made on the basis of the project brief. If MAAIF has ascertained that the project is on the mandatory ESIA list, NEMA state that the project brief stage is normally omitted, moving straight into the ESIA process. If the decision is for an ESIS, the proponent obtains NEMA approval of the proposed ESIA consultant, conducts a scoping exercise, and agrees with NEMA on the study terms of reference. The study is conducted and culminates in submission of an Environmental Impact Statement (ESIS) to NEMA for review and decision. Stakeholder consultation is mandatory at scoping, Terms of Reference preparation, during the environmental study, and

preparation of the draft Environmental and Social Impact Statement (ESIS). The content of an ESIS, as specified in the EIA regulations, covers the recognized elements of environmental and social assessment good practice, including consideration of technical and site alternatives and induced and cumulative impacts.

The EIA Regulations (First Schedule) list the issues to be considered in an EIA, including:

- a. Biodiversity
- b. Ecosystem maintenance
- c. Fragile ecosystems
- d. Social considerations including employment generation, social cohesion or disruption, immigration or emigration, local economy
- e. Effects on culture and objects of cultural value
- f. Visual impacts

Preparation of Project Brief

According to the National Environment Act, "project brief" means a summary statement of the likely environmental effects of a proposed development referred to in section 19 of the Act. Unlike the ESIA, a project brief does not require a scoping report and neither submission of terms of reference for approval by NEMA. According to Regulation 5 of the ESIA Regulations, 2006, a Project Brief is supposed to contain the following:

- a. the nature of the project in accordance with the categories identified in the Third Schedule of the Act;
- b. the projected area of land, air and water that may be affected;
- c. the activities that shall be undertaken during and after the development of the project;
- d. the design of the project;
- e. the materials that the project shall use, including both construction materials and inputs;
- f. the possible products and by-products, including waste generation of the project;
- g. the number of people that the project will employ and the economic and social benefits to the local community and the nation in general;
- h. the environmental effects of the materials, methods, products and by-products of the project, and how they will be eliminated or mitigated;
- i. Any other matter which may be required by the Authority.

If the Executive Director is satisfied that the project will have no significant impact on the environment, or that the Project Brief discloses sufficient mitigation measures to cope with the anticipated impacts he may approve project. The Executive Director of NEMA or his delegated official shall then issue a Certificate of Approval for the project. However, if the Executive Director finds that the project will have significant impacts on the environment and that, the Project Brief does not disclose sufficient mitigation measures to cope with the anticipated negative impacts, he shall require that, the developer undertakes an ESIA for the planned project.

Environmental Screening

The purpose of screening is to assist categorize the type of ESIA required for the project i.e. does it require a full ESIA, a Project Brief or no ESIA at all is required. This is important to enable the application of the appropriate ESIA level based on the project's anticipated levels of significant impacts as elaborated in the National Environment (EIA) Guidelines 1997.

Scoping and Preparation of ToRs

Scoping is the initial step in the ESIA process. Its purpose is to determine the scope of work to be undertaken in assessing the environmental impacts of the proposed project. It identifies the critical environmental impacts of the project for which in-depth studies are required, and elimination of the

insignificant ones. The scoping exercise should involve all the project stakeholders so that consensus is reached on what to include or exclude from the scope of work. It is also at this stage that project alternatives are identified and taken into consideration. The contents of the scoping report are the same as the project brief; however, more detail is likely to be needed. This may involve some preliminary data collection and fieldwork. The Developer takes the responsibility for scoping and prepares the scoping report after consultation with NEMA, Lead Agencies and other stakeholders. The developer with assistance from technical consultants will draw up the ToRs for the ESIS and submit a copy to NEMA that shall in turn be forwarded to Lead Agencies for comments, in this case including the District Environment Officer.

Preparation of the ESIS

In preparing an ESIS, relevant information is collected on issues of real significance and sensitivity. These are then analyzed, mitigation measures developed for the adverse impacts and compensatory measures recommended for unmitigated environmental impacts. Measures aimed at enhancing beneficial or positive impacts are also given. An ESIS documents the findings and is submitted to NEMA by the developer.

Review of ESIS and Decision on Project

The Developer is required to submit ten (10) copies of the ESIS to NEMA for review and approval. NEMA then forwards a copy to the Lead Agencies for comments. NEMA in consultation with the Lead Agencies shall review the contents of the ESIS, paying particular attention to the identified environmental impacts and their mitigation measures, as well as the level of consultation and involvement of the affected stakeholders in the ESIS process. In this review, the level to which the ToRs set out for the study is addressed shall be considered. In making a decision about the adequacy of the ESIS, NEMA shall take into account the comments and observations made by the Lead Agencies, other stakeholders and the general public. NEMA may grant permission for the project with or without conditions or refuse permission. If the project is approved, the Developer will be issued a Certificate of Approval.

Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) is intended to ensure efficient management of environmental and social issues in subprojects. The ESMP consists of:

- a. The relevant project activities,
- b. The potential negative environmental and social impacts,
- c. The proposed mitigating measures,
- d. The institutions responsible for implementing the mitigation measures,
- e. The institutions responsible for monitoring the implementation of the mitigation measures and the frequency of the afore-mentioned measures;
- f. Capacity building needs and
- g. The cost estimates for these activities.

In cases where the ECAAT-P is likely to have sub-projects which are small in nature without significant environmental impacts, an ESMP will be prepared and will outline specific actions to mitigate these impacts and conforming to the obligations stipulated in the screening exercises, and all legal instruments in force. At the time of the implementation of the sub-projects, the potential environmental and social impacts must be clearly identified and a management plan formulated, implemented and the plan's performance monitored during and after execution of sub-project activities. The impacts must be avoided or neutralized where possible or mitigated in conformity with Uganda's and the World Bank's prescriptions for sound environmental management.

Environmental Management and Monitoring Plan

Monitoring is the continuous and systematic collection of data in order to assess whether the environmental objectives of the project have been achieved. Good practice demands that procedures for

monitoring the environmental performance of proposed projects are incorporated in the ESIS. Monitoring provides information on the occurrence of impacts. It helps identify how well mitigation measures are working, and where better mitigation may be needed. The monitoring program should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental impacts are monitored is discussed below.

- a. Responsibilities in terms of the people, groups, or organizations that will carry out the monitoring activities be defined, as well as to whom they report amongst others. In some instances, there may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies;
- b. Implementation Schedule, covers the timing, frequency and duration of monitoring are specified in an implementation schedule, and linked to the overall sub project schedule;
- c. Cost Estimates and Source of resources for monitoring need to be specified in the monitoring plan;
- d. Monitoring methods need to be as simple as possible, consistent with collecting useful information, so that the sub project implementer can apply them.
- e. The data collected during monitoring is analyzed with the aim of:
- f. Assessing any changes in baseline conditions;
- g. Assessing whether recommended mitigation measures have been successfully implemented;
- h. Determining reasons for unsuccessful mitigation;
- i. Developing and recommending alternative mitigation measures or plans to replace unsatisfactory ones; and
- j. Identifying and explaining trends in environment improvement or degradation.

Public Consultation

The environmental impacts or effects of a project will often differ depending on the area in which it is located. Such impacts may directly or indirectly affect different categories of social groups, agencies, communities and individuals. These are collectively referred to as project stakeholders or the public. It is crucial that during the ESIA process, appropriate mechanisms for ensuring the fullest participation and involvement of the public are taken by the developer in order to minimize social and environmental impacts and enhance stakeholder acceptance. An effective consultation process should generally ensure that:

- a. The public has a clear understanding of the proposed project; and
- b. Feedback mechanisms are clearly laid out and known by parties involved.

Different stages of the ESIA process require different levels of public consultation and involvement. The key stages are:

- a. Public consultation before the commissioning of the ESIS;
- b. Public consultation during the ESIS; and
- c. Public consultation during ESIS review.

Consultation can be before, during the ESIA study or during its review as outlined below:

Consultation before the ESIA

On submission of the project brief to NEMA, it might be decided that views of the public on the project are sought. NEMA is obliged to publish the developer's notification and other relevant documents in a public notice within 4 weeks from the date of submission of the project brief and/or notice of intent to develop. It is important therefore, that a plan for stakeholder involvement is prepared before the ESIS begins. Such a plan should consider:

- a. The stakeholders to be involved;
- b. Matching of stakeholders with approaches and techniques of involvement;
- c. Traditional authority structures and political decision-making processes;

- d. approaches and techniques for stakeholder involvement;
- e. Mechanisms to collect, synthesize, analyze and, most importantly, present the results;
- f. To the ESIS team and key decision-makers;
- g. Measures to ensure timely and adequate feedback to the stakeholders; and
- h. Budgetary/time opportunities and constraints.

Public consultation during the ESIS

During the ESIS, the study team should endeavor to consult the public on environmental concerns and any other issues pertaining to the project. Though consultations are very critical at the scoping stage, ideally, it should be an on-going activity throughout the study. During the ESIS review, the public is given additional opportunity for ensuring that their views and concerns have been adequately addressed in the ESIS. Any earlier omissions or oversight about the project effects can be raised at this stage. To achieve this objective, the ESIS and related documents become public after submission to NEMA. An official review appointment will be announced, where the reviewing authority has to answer questions and remarks from the public. These questions have to be handed in writing prior to the meeting.

13.6 Annex 6: NARO Guidelines for Handling and Management of Chemical Spills in the Laboratories (LABSOPS 3/2014)

Purpose

This document outlines procedures for the management of chemical spills that may occur in the laboratories. It is meant to ensure that chemical spills are cleaned up immediately and appropriately, to minimize the effects of such chemicals on health, ensure safety from exposure to such spills and to reduce their impact on the environment.

Scope

These guidelines apply to all workers and others who use, transport and store chemicals in the Bioscience laboratories at NaCRRRI.

Definitions

Safety Data Sheets (SDS) provide workers with information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. Personal Protective Equipment (PPE) are devices worn by the worker or laboratory attendant to protect against hazard in the laboratory.

General

A worker handling a hazardous chemical should be aware of the correct procedures in the event of a spill. This information can be sourced through a SDS and if necessary explicitly detailed in a documented safe work procedure. Controls, such as double containment, bunding, drip trays or raised edges around work areas, must be in place to minimize the effects of a chemical spill. Spill management and response strategies should be included during laboratory emergency planning with personnel trained in the procedures. A quick response by laboratory personnel to a chemical spill is likely to limit the consequences, whether it is a minor or major spill. All laboratory workers must wear appropriate PPE when attending to a chemical spill. The PPE can be lab coats, gloves, safety glasses, goggles, face shields or respirators as appropriate to the risk.

Defining Major or Minor Spill

Spills will be either minor or major, depending on the volume, location and hazard of the substance spilt (Figure 55). will be used to categorize spills into major or minor.

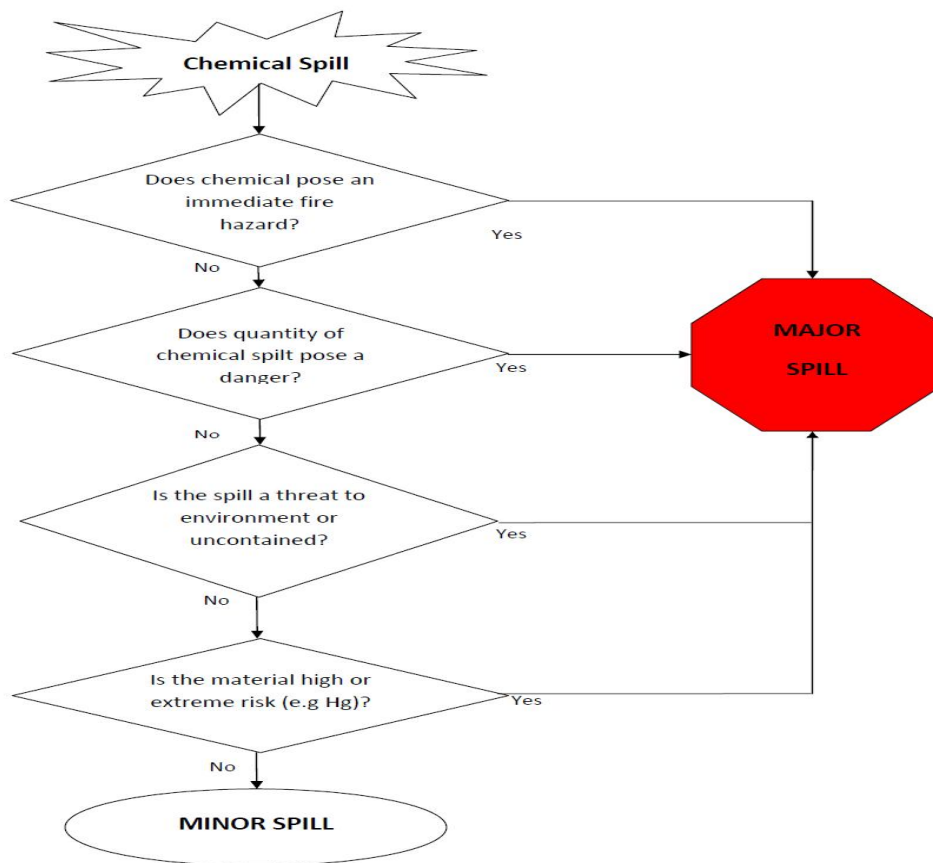


Figure 59: Decision criterion for categorizing spills into either major or minor (Source: NaCRRRI).

Minor Spill Responses

- Ensure you are wearing correct PPE to respond to the spill: Chemically resistant safety gloves, goggles, enclosed footwear, cotton laboratory coat, respirator with filters appropriate for the spilled chemical. - Always check the SDS for specific PPE requirements
- Immediately notify others in the area of the spill. Corridors and pathways have a lot of traffic so it is important to alert passers-by of the spill and ensure the area is kept free of traffic.
- Identify the chemical/s and hazards involved (SDS, label) and use the information on the physical and chemical properties of the material to judge response.
- If there is chemical exposure to a worker, respond as quickly as possible to administer appropriate first aid.
- Approach with care - many harmful chemicals lack colors or offensive odors. Avoid breathing vapors from the spill. Never assume the chemical is harmless.
- Control the source.
- Contain the spill with a barrier or use appropriate absorbent material from the spill kit.
- Clean up promptly and thoroughly and neutralize any acids / alkalis.
 - Decontaminate the affected area, equipment and clothing and dispose of any contaminated material appropriately.
 - Review area when decontamination is complete. Check walkways, floors, stairs, and equipment for contamination or damage.

Major Spill Responses

- Protect yourself.** Don't touch harmful substances. Be aware that fumes may pose a risk.
- Evacuate the laboratory.** If possible, as you leave, close doors to prevent further contamination and turn off any ignition sources.
- Isolate and control access to the spill area.** Do not allow non-essential personnel to enter the spill area.

- d. **Raise the alarm.** Contact the Laboratory Manager, supervisor or nearest scientist. If necessary, Emergency support services can be contacted.
- e. **Apply first Aid.** If necessary source the SDS for the chemical and treat contaminated individuals as per the SDS. If required, summon a UOW First Aid Officer, or ambulance. Isolate affected persons and keep on site.
- f. **Decontaminate.** In conjunction with expert assistance, minimize the spread of contamination and commence clean up procedures.
- g. **Review.** Once the clean-up is complete, review the area.

Generic Chemical Spill Response

Substance	Recommended Action
Organic Chemicals	<ol style="list-style-type: none"> a. Use an absorbent such as vermiculite b. Place spent vermiculite in a sealed labelled container for waste disposal by a licensed contractor c. Flammable solvents can be cleaned up with absorbent rags and then placed in fully open headed drums that are sealed, suitably labelled.
Oxidizing acids	<p>WARNING. DO NOT USE PAPER TOWELS</p> <p>The safety data sheet must always be consulted when dealing with these types of spills. In particular the hazards of the chemical (including acute and chronic health effects), reactivity information, safety precautions for handling and specific information for dealing with spills.</p>
Acids	<ol style="list-style-type: none"> a. For small spillages of acids use dry sand or carbonate to contain spill. b. The area should be flushed with water but not to the extent that the spillage is spread unnecessarily. c. Neutralize an acid with sodium bicarbonate by sprinkling generously over spill. d. Laboratory Spill Kits should contain soda ash (sodium bicarbonate) to sprinkle liberally over the spill. If necessary wear a P1 mask to avoid breathing soda ash dust.
Alkalis	<ol style="list-style-type: none"> a. Contain the alkali spill using dry sand or neutralizer. b. Neutralize with boric or citric acid before clean-up. c. Residual alkali should be washed with water ensuring no contact. d. Laboratory Spill Kits should contain boric acid to sprinkle liberally over the spill. If necessary wear a P1 mask to avoid breathing soda ash dust.

13.7 Annex 07: Chance Finds Procedure

Purpose

This document presents the Chance Finds Procedure focusing on aspects that may trigger exposure of physical cultural resources (PCRs) in the ECAAT-P project especially, during rehabilitation of laboratories and possible excavations works in the Project. Its purpose is to provide information on known cultural heritage sites within the project area and to define the response procedure in the event that a Chance Find is made. This Chance Finds Procedure has been produced in conformance with the *World Bank's OP 4.10 Physical Cultural Resources*, which states that when the proposed location of a project is in an area where tangible cultural heritage is likely to be found, a chance find procedure is to be included in the Environmental Assessment Report.

In the event of ground work being undertaken this procedure shall be implemented. Ground works will be monitored by at least one member of the Contractor staff that has received cultural heritage training.

Definition

"Chance finds refers to the discovery of previously unknown cultural heritage resources, particularly archaeological resources that are encountered during project construction or operation".

Scope

This Chance Finds Procedure outlines the process to be carried out upon coming across a Chance Find during the construction phase of the Project. This procedure is applicable mainly to ground-breaking construction activities carried out by Contractor and Sub-contractors.

Background

There are no known sites of cultural heritage of archaeological importance in the areas of the ECAAT-P Project more so, where this Policy is likely to be triggered. There are also no proclaimed or potential sites for proclamation in the study area, according to the Monuments and Relics Commission list of proclaimed monuments and relics. However, its could occur that, during the implementation of ECAAT-P Project supported activities through for instance, mechanization, some accidental encounters of PCRs materials could occur.

Responsible Parties

Employer HSE Manager

He/she or his appointed person responsible for the works:

Shall review and approve this procedure;

Shall review permits and their validity;

Collation of Chance Find reports for inclusion into the monthly reporting to the Lenders; and

Key contact to the Cultural Heritage Specialist.

Contractor HSE Manager

Shall manage all on-site ground-breaking activities in compliance with this procedure;

Shall work to ensure there is no impact on known cultural heritage sites within the construction areas;

Shall implement this procedure;

Shall audit activities onsite and ensure compliance;

Shall ensure that all permits are obtained and in place prior to outset of work;

Shall implement the monitoring programme and report on progress and submit as part of the monthly reporting to the Employer;

Shall monitor Subcontractors to ensure the requirements and responsibilities set out in this procedure are met;

Shall undertake consultation with relevant key stakeholder;
Shall implement and update cultural heritage reference materials such as educational posters in the workers accommodation and temporary construction facilities;
Shall ensure all on-site personnel are properly trained for their job functions and responsibilities;
Key contact to the Employer HSE Manager who would then consult with a Cultural Heritage Specialist; and
Include Chance Finds reports from the Project Cultural Heritage Specialist in the monthly site progress reports.

Subcontractors

Shall work to ensure there is no impact on known cultural heritage sites within the construction areas;
Shall implement this procedure; and
Shall report to the Contractor with regards to Chance Finds.

Cultural Heritage Specialist

A qualified Cultural Heritage Specialist (or an expert with trainings in archaeological aspects) shall be retained by the Contractor for the duration of the construction works to provide oversight of this Chance Finds Procedure and remain on-call on an as-needed-basis. Their responsibilities include, in the case of a Chance Find:

Shall undertake consultation with relevant key stakeholders;
Will provide and follow the procedures for the documentation and assessment of Chance Finds to determine if additional investigations are required;
Will follow the protocols for consultation with the national regulatory bodies to design and implement additional investigations (if required);
Shall undertake record keeping and chain of custody for movable finds;
Shall follow expert verification procedures;
Shall produce Chance Find reports for issue to the Employer Site HSE Manager; and
Shall provide initial Chance Find training through Toolbox Talks to the Contractors and Subcontractors.

Chance Finds Procedure

Precondition

A qualified Cultural Heritage Specialist shall be retained to provide oversight of this Chance Finds Procedure and remain on-call on an as-needed-basis and shall only conduct field monitoring if the Project either encroaches on areas of known archaeological sensitivity or encounters Chance Finds.

The Cultural Heritage Specialist must be specifically notified of the construction programme and when ground disturbing works are planned within or near specific areas of concern.

A Chance Find can be reported by any construction employee. As a result, it is necessary to provide cultural heritage training to all Project construction staff and Sub-contractors. Training can be undertaken by a Tool Box Talk, guided by the qualified Cultural Heritage Specialist.

Overall, any Chance Find shall not be disturbed further until an assessment by the Cultural Heritage Specialist is made and actions consistent with the requirements of this Chance Finds Procedure are implemented.

Steps to be taken upon identification and/or exposure

During construction or through accidental exposure, a cultural heritage site or items of archaeological interest may be identified. As soon as this occurs, the Contractor or Subcontractor shall undertake the following procedure to avoid any further damage:

The person or group (identifier) who identified or exposed the cultural heritage site or item archaeological interest must cease all activity in the immediate vicinity of the site.

The identifier must immediately inform his/her supervisor of the discovery.

The supervisor must ensure that the site is secured and control access. For this, install temporary site protection measures (warning tape and stakes, avoidance signs).

The supervisor must then inform the relevant Employer personnel responsible for at least the following:

HSE Manager and Community Liaison Officer.

Establish a localized no-go area needed to protect the Chance Find.

The appointed Cultural Heritage Specialist must be requested to perform an assessment in order to determine whether the Chance Find is cultural heritage and if so, whether it is an isolate or part of a larger site or feature.

Subject to the direction of the Cultural Heritage Specialist, based on the conditions of AfDB OS 1, artefacts are to be left in place.

OS 1 requires that no tangible cultural heritage shall be removed unless specific conditions are met (see Section 3).

If materials are collected they will be placed in bags and labelled by the Cultural Heritage Specialist and transported to the nearest cultural heritage/archaeology research authority/center. Project personnel are not permitted to take or keep artefacts as personal possessions.

The Cultural Heritage Specialist will document the Chance Find through photography, notes, GPS coordinates, and maps (collect spatial data) as appropriate.

If the Chance Find proves to be an isolated find or not cultural heritage, the Cultural Heritage Specialist will authorize the removal of site protection measures and activity in the vicinity of the site can resume.

If the Cultural Heritage Specialist confirms that that Chance Find is a cultural heritage site they will inform the relevant cultural heritage/archaeology body and initiate discussions about treatment.

Prepare and retain archaeological monitoring records including all initial reports whether they are later confirmed or not. The record will include coordinates of all observations to be retained within the Project's GIS system (ArcGIS) or equivalent.

Develop and implement treatment plans for confirmed finds using the services of qualified cultural heritage experts. The Cultural Heritage Specialist will coordinate this.

If a Chance Find is a verified cultural heritage site, prepare a final Chance Finds report once treatment has been completed.

While investigation is ongoing, co-ordinate with on-site personnel keeping them informed as to status and schedule of investigations and informing them when the construction may resume.

If mitigation is required, then rescue excavations will be undertaken by the Cultural Heritage Specialist, except in the case that the chance find is of international importance. Archaeologists with the appropriate expertise in these areas (e.g. hominid remains) addressing more specific finds will be appointed.

Monitoring

During construction, where relevant the protection of cultural/archaeological sites identified by the local community will be monitored to ensure their protection. Any chance finds will also be recorded and monitored; and audit undertaken to ensure that the procedure set out in the chance finds procedure was followed.

Training Framework

During the Project induction meeting, the Contractor and Subcontractors will be made aware of the presence of the on-call Cultural Heritage Specialist. Here, cultural heritage training will also be undertaken.

The objective of cultural heritage training is for the Contractor and Subcontractors to manage potential impacts to known and unknown cultural heritage sites by facilitating the identification and reporting of

potential Chance Finds encountered during construction works. This can be carried out through a Toolbox Talk.

The Contractor HSE Manager is responsible for providing training through a Toolbox Talk for all construction staff. The Toolbox Talk shall address:

Defining Chance Finds;

Identifying Chance Finds in the field;

Explanation as to why protection measures need to be put in place (avoid environmental harm and avoid prosecution/ legal penalties);

The steps to be taken upon identification and/or expose;

Do's and don't's; and

Roles and responsibilities of construction Contractors and Subcontractors in the process and the roles and responsibilities of the Cultural Heritage Specialist.

NB: It is important that, the provisions in this Annex are read together with Annex 6 which addresses Code of Conduct of Workers. The Code of Practice provides guidance to contractors who will undertake works in the laboratories rehabilitation associated with this project. Construction work is work carried out in terms of alteration, conversion, fitting-out, renovation, repairs/maintenance of some aspects in the laboratories facilities to improve their functionalities for improved delivery of ECAAT-P Project interventions and agricultural research at large, the construction workers must always:

- a. take reasonable care for their own health and safety***
- b. take reasonable care that their acts or omissions do not adversely affect the health and safety of other persons, and***
- c. comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace.***

General

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental and Social Management Plan for the works he is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved ESMP after written instruction by the Supervising Engineer (SE) to fulfill his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.
2. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an EMP. In general, these measures shall include but not be limited to:
 - a. Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity dust producing activities.
 - b. Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.
 - c. Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.
 - d. Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.
 - e. Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.
 - f. Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.

- g. Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.
 - h. Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.
 - i. Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.
 - j. Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long-distance transportation.
 - k. Ensure public safety and meet traffic safety requirements for the operation of work to avoid accidents.
3. The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.
 4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.
 5. Besides the regular inspection of sites by the SE for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Worksite/Campsite Waste Management

6. All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be banded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed of at designated disposal sites in line with applicable government waste management regulations.
7. All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.
8. Used oil from maintenance shall be collected and disposed of appropriately at designated sites or be re-used or sold for re-use locally.
9. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.
10. Construction waste shall not be left in stockpiles along the road but removed and reused or disposed of on a daily basis.
11. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.

Material Excavation and Deposit

12. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

13. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.
14. New extraction sites:
 - a. Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.
 - b. Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
 - c. Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
 - d. Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.
 - e. Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
 - f. Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.
15. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.
16. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.
17. The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable EMP, in areas approved by local authorities and/or the SE.
18. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

Rehabilitation and Soil Erosion Prevention

19. To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
20. Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
21. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
22. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
23. Locate stockpiles where they will not be disturbed by future construction activities.
24. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
25. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
26. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
27. Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use and allow natural regeneration of vegetation.
28. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.

29. Minimize erosion by wind and water both during and after the process of reinstatement.
30. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
31. Revegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

Water Resources Management

32. The Contractor shall at all costs avoid conflicting with water demands of local communities.
33. Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
34. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.
35. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities downstream and maintains the ecological balance of the river system.
36. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.
37. Wash water from washing out of equipment shall not be discharged into water courses or road drains.
38. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

Traffic Management

39. Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.
40. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.
41. Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.

Blasting

42. Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the SE.
43. Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times.
44. Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

Disposal of Unusable Elements

45. Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
46. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.
47. AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.
48. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

Health and Safety

49. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.
50. Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
51. Construction vehicles shall not exceed maximum speed limit of 40km per hour.

Repair of Private Property

52. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.
53. In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

Contractor's Health, Safety and Environment Management Plan (HSE-MP)

54. Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works. The Contractor's EHS-MP will serve two main purposes:
 - a. For the Contractor, for internal purposes, to ensure that all measures are in place for adequate HSE management, and as an operational manual for his staff.
 - b. For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the HSE aspects of the project, and as a basis for monitoring of the Contractor's HSE performance.
55. The Contractor's EHS-MP shall provide at least:
 - a. a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP;
 - b. a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
 - c. a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
 - d. the internal organizational, management and reporting mechanisms put in place for such.
56. The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

HSE Reporting

57. The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor HSE report is given below. It is expected that the Contractor's reports will include information on:
 - a. HSE management actions/measures taken, including approvals sought from local or national authorities;
 - b. Problems encountered in relation to HSE aspects (incidents, including delays, cost consequences, etc. as a result thereof);
 - c. Lack of compliance with contract requirements on the part of the Contractor;
 - d. Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and

- e. Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings.

58. It is advisable that reporting of significant HSE incidents be done “as soon as practicable”. Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keep his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports. Example formats for an incident notification and detailed report are given below. Details of HSE performance will be reported to the Client through the SE’s reports to the Client.

Training of Contractor’s Personnel

59. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHS-MP, and are able to fulfill their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:

- a. HSE in general (working procedures);
- b. emergency procedures; and
- c. social and cultural aspects (awareness raising on social issues).

HIV/AIDS

The contractors should have an HIV/AIDS policy and a framework (responsible staff, action plan, etc) to implement it during project execution.

Cost of Compliance

60. It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item “Compliance with Environmental Management Conditions” in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable HSE impact.

Example Format:HSE Report

Contract:

Period of reporting:

HSE management actions/measures:

Summarize HSE management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), HSE training, specific design and work measures taken, etc.

HSE incidents:

Report on any problems encountered in relation to HSE aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.

HSE compliance:

Report on compliance with Contract HSE conditions, including any cases of non-compliance.

Concerns and observations:

Report on any observations, concerns raised and/or decisions taken with regard to HSE management during site meetings and visits.

Signature (Name, Title Date):

Contractor Representative

Example Format: HSE Incident Notification
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Provide within 24 hrs to the Supervising Engineer

Originators Reference No:

Date of Incident:

Time:

Location of incident:

Employing Company:

Type of Incident:

Description of Incident:

Where, when, what, how, who, operation in progress at the time (only factual)

Immediate Action:

Immediate remedial action and actions taken to prevent reoccurrence or escalation

13.8 Annex 09: Code of Practice for Construction Workers

Introduction

This code of practice provides guidance to contractors who will undertake construction of healthcare facilities associated with this project. Construction work is work carried out in connection with construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure.

Construction workers must always:

- a. take reasonable care for their own health and safety
- b. take reasonable care that their acts or omissions do not adversely affect the health and safety of other persons, and
- c. comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace.

Managing Risks with Construction work

The first step in the risk management process is to identify the hazards associated with construction work.

Examples of hazards include:

- a. collapse of trenches
- b. falling objects, for example tools, debris and equipment
- c. hazardous manual tasks
- d. structural collapse
- e. the construction workplace itself, including its location, layout, condition and accessibility
- f. the handling, use, storage, and transport or disposal of hazardous chemicals
- g. the interface with other works or trade activities
- h. the physical working environment, for example the potential for electric shock, immersion or engulfment, fire or explosion, slips, trips and falls, people being struck by moving plant, exposure to noise, heat, cold, vibration, radiation (including solar UV radiation), static electricity or a contaminated atmosphere, and the presence of a confined space.
- i. the presence of asbestos and asbestos-containing materials
- j. the use of ladders, incorrectly erected equipment, unguarded holes, penetrations and voids, unguarded excavations, trenches, shafts and lift wells, unstable structures such as incomplete scaffolding or mobile platforms, fragile and brittle surfaces such as cement sheet roofs, fibre glass roofs, skylights and unprotected formwork decks
- k. welding fumes, gases and arcs

Safe work method statements(SWMS)

All persons who are involved in high risk construction work must develop and implement arrangements to ensure the work is carried out. This necessitates a SWMS, which is a written document that details high risk construction work activities to be undertaken, hazards or risks arising from those activities and measures to control the risks. All workers who will be involved in high risk construction work must be provided with information and instruction so they:

- a. know what to do if the work is not being conducted in accordance with the SWMS.
- b. understand and implement the risk controls in a SWMS
- c. understand the hazards and risks arising from the work

This information and instruction may be provided during general construction induction training, workplace-specific training or during a toolbox talk by the principal contractor, contractor or subcontractor.

Occupational Health Safety (OHS) Management Plans for Construction projects

An OHS management plan is a written plan that sets out the arrangements for managing some site

health and safety matters. The intention of an OHS management plan is to ensure the required processes are in place to manage the risks associated with a complex construction project, as there are usually many contractors and subcontractors involved and circumstances can change quickly from day to day. An OHS management plan must be in writing and must be prepared by the principal contractor before a project commences. It should be easily understood by workers (including contractors and subcontractors). It may not be necessary to communicate the entire OHS management plan to all workers; however, they must be made aware of the parts that are applicable to the work they are carrying out.

The OHS Management Plan must contain:

- a. arrangements for consultation, cooperation and coordination
- b. arrangements for managing incidents
- c. arrangements to collect and assess, monitor and review SWMS.
- d. names of persons at the workplace whose positions or roles involve specific health and safety responsibilities, for example site supervisors, project managers, first aid officers.
- e. site-specific health and safety rules and how people will be informed of the rules

While a OHS management plan is required for every construction project, a principal contractor may prepare a generic OHS management plan that applies to several construction projects, if the arrangements to manage work health and safety are the same for each construction project. However, the principal contractor must review and revise the plan to ensure it addresses the risks of the actual workplace.

INFORMATION, TRAINING, INSTRUCTION AND SUPERVISION

All contractors and subcontractors must provide relevant information, training, instruction and supervision to protect all persons from risks to their health and safety arising from construction work carried out.

A range of activities can assist in ensuring people have the necessary knowledge and skills to complete the work safely, including general construction induction training and other training that may be specific to the workplace or the task the person is performing. Information that might be provided includes workplace health and safety arrangements and procedures, such as for emergency evacuations. Information can be provided in various forms, including written formats or verbally, for example during workplace-specific training, pre-start meetings or toolbox talks.

General construction induction training provides basic knowledge of construction work, the work health and safety laws that apply, common hazards likely to be encountered in construction work, and how the associated risks can be controlled. Any person who is to carry out construction work must successfully complete general construction induction training, for example project managers and engineers, foreman, supervisors, surveyors, and laborers.

GENERAL WORKPLACE MANAGEMENT ARRANGEMENTS

The principal contractor must put in place arrangements for ensuring compliance with the following duties:

- a. providing a safe working environment
- b. Zero tolerance to Child Labor
- c. providing and maintaining adequate and accessible facilities
- d. providing first aid
- e. preparing, maintaining and implementing emergency plans
- f. providing workers with PPE, if PPE is to be used to minimize a risk to health and safety
- g. managing risks associated with airborne contaminants
- h. managing risks associated with hazardous atmospheres including ignition sources

- i. storage of flammable and combustible substances
- j. managing risks associated with falls, and
- k. managing risks associated with falling objects.

The principal contractors may put in place arrangements for ensuring compliance with the above requirements through contractual arrangements, but they cannot rely only on these arrangements to ensure compliance. The principal contractor may also coordinate with other subcontractors, and check compliance whenever the principal contractor attends the construction site.

Part II: Code of Conduct for Contractors

Each employee including trainee or volunteer of a **Contractor** who have interaction with the project must sign this "Code of Conduct."

In this Code, "Contractor" shall mean and apply to the contractor, its employees, sub-contractor, officers, agents, representative or those contracted through the Contractor to perform services authorized by the contract. The contractor agrees to adhere to this Code of Conduct when providing services to this project. The Code of Conduct is in addition to all other contract requirements, policies, rules and regulations governing delivery of services. The purpose of the code is to protect vulnerable people from abuse, neglect, maltreatment and exploitation. It clarifies expectation of conduct of the parties and their employees, which includes administrative staff, care staff, support services staff and any others when interacting with the project.

Contractor, its agents or representatives authorized through it shall not abuse, sexually abuse or sexually exploit, neglect, exploit or maltreat any fellow employees or people from general public/ community. Additionally, no person shall cause physical injury to any other person.

The Contractor shall not by acting, failing to act, encouragement to engage in, or failure to deter from will cause any person to be subject to physical or mental abuse, sexual abuse or sexual exploitation, neglect, exploitation, or maltreatment. The Contractor shall not engage any person as an observer or participant in sexual acts.

Contractor understands and acknowledges that failure to comply with this Code of Conduct may result in corrective action, probation, suspension, and/or termination of contract. Equally important to realize is that this Code also protects any person under the age of 18 years and any person 18 years of age or older who is physically or mentally **handicapped or impaired** due of mental illness, mental deficiency, physical illness or disability, or other temporary or permanent cause, to the extent that he is unable to care for his own personal safety.

Abuse shall include the following, but is not limited to:

- a. Harm or threatened harm, meaning damage or threatened damage to physical or emotional health and welfare of any person.
- b. Unlawful confinement.
- c. Deprivation of life-sustaining treatment.
- d. Physical injury including, but not limited to, any contusion of the skin, laceration, malnutrition, burn, fracture of any bone, subdural hematoma, injury to any internal organ, any injury causing bleeding, or any physical condition which imperils a person's health or welfare.
- e. Any type of physical hitting or corporal punishment inflicted in any manner upon the body.

Sexual misdemeanor will include, but not be limited to:

- a. Engaging in exploitive or manipulative sexual intercourse with any person. There will be zero tolerance to sexual misdemeanor including rape, defilement of minors/ sexual child abuse, sexual harassment and elopement.
- b. Taking indecent liberties with a person or causing an individual to take indecent liberties with a person, with the intent to arouse or gratify sexual desire of any person.
- c. Employing, using, persuading, inducing, enticing, or coercing a person to pose in the nude.
- d. Employing, using, persuading, inducing, enticing or coercing a person to engage in any sexual or simulated sexual conduct for the purpose of photographing, filming, recording, or displaying in any way the sexual or simulated sexual conduct. This includes displaying, distributing, possessing for the purpose of distribution, or selling material depicting nudity, or engaging in sexual or simulated sexual conduct.
- e. Use of profanities and obscene language in communities or when instructing others.

Neglect may include but is not limited to:

- a. Denial of sufficient nutrition to any person.
- b. Denial of sufficient sleep to any person.
- c. Denial of sufficient protective gear to any person.
- d. Failure to provide adequate supervision; leading to drug use in workplaces, accidents and impairment of employees.
- e. Failure to arrange for medical care and/or medical treatment for any person in an emergency.
- f. Failure to drive courteously at all times, leading to accidents.
- g. Failure to avoid damage public property.
- h. Neglecting public and employee complaints.

Drug abuse may include but is not limited to:

- a. Smoke in public or smoking in undesignated areas
- b. Consumption of alcohol while on duty/at work
- c. Use and trading in narcotics

Illegal trade activities without necessary licenses:

- a. Trade in protected fauna or flora species
- b. Trade in ivory or similar regulated wildlife products including game meat
- c. Trade in processed, semi-processed minerals and their ores

Financial exploitation will include, but is not limited to:

Utilizing labor of without paying for it, or at a non-commensurate financial rate/ wage.

Mistreatment will include, but is not limited to:

- a. Physical exercises, such as running laps or performing pushups,
- b. Unauthorized chemical, mechanical or physical restraints except,
- c. Assignment of unduly physically strenuous or harsh work.
- d. Failure to behave in a polite and courteous manner to the general public
- e. Requiring or forcing the individual to take an uncomfortable position, such as squatting or bending, or forcing people to repeat physical movements when used solely as a means of punishment.
- f. Group punishments for misbehavior of individuals except in accordance with the written policy.
- g. Verbal abuse: engaging in language whose intent or result is demeaning
- h. Denial of any essential service solely for disciplinary purposes
- i. Denial of visiting or communication privileges with family or significant others
- j. Requiring the individual to remain silent for long periods of time solely for the purpose of punishment.

Contractor agrees to document and report abuse, sexual abuse and sexual exploitation, neglect, maltreatment and exploitation as outlined in this Code and cooperate fully in any resulting investigation. Contractor shall prominently display a poster, notifying contractor employees of their responsibilities and to report violations and giving appropriate phone numbers.

Contractor/ Employee/ Volunteer/ subcontractor	
Signed:	Date (dd/mm/yyyy):
Name:	

13.9 Annex 10: Summary of consultative meetings during the study

Date of Meeting		17 th January 2018
Place of Meeting		Collin Hotel Mukono
Meeting proceedings recorded by		Ms. Muheki Mariam
Subject of the meeting		Consultative Meeting with NARO Institutions, ATAAS Project Staff, NAADS, OWC, DATIP and ZARDIs; Abi, Kachwekano, Ngetta, Mbarara, Bulindi, Mukono, Nabuin, Buginyanya and Rwebitaba during the ATAAS End of Quarter 2 (Oct-Dec 2017) and Review of Quarter 3 (Jan-Mar 2018) Workshop in Mukono on 17 th January, 2018 at Colline Hotel, Mukono.
Item	Summary of the Proceedings	
1	Introduction	
	<p>The Team Leader explained the purpose of the assignment which preparation of environmental and social safeguards tools for ECAATP Project is. The following safeguards tools are being prepared under the ECAATP project: ESMF, Pest Management Plan, Vulnerable and Marginalized People Framework, Resettlement Policy Framework (RPF), Gender Policy Framework and GHG and Climate Risk Analysis. By and large, ECAATP is preliminarily placed as a Category B type.</p>	
2	Issues Discussed	
	<p>Overview on safeguards in ECAATP Project</p> <p>Catherine B. Asekenye (Senior Social Development Specialist, World Bank) informed the workshop that, environmental and social safeguards are key if the project financing is to proceed before any requirements are considered and therefore, NARO and its stakeholders ought to support the consultants with information required so that the instruments should be ready before appraisal which is a week from the date of the workshop. She added, the spirit behind the safeguards is to ensure social sustainability and that all form of harm, marginalisation or unequal benefits from project activities are averted. Safeguards enhance equitable sharing of benefits among targeted communities while guaranteeing sustainability.</p> <p>In her remarks she emphasized a couple things to be taken into consideration in the ECAAT-P:</p> <ol style="list-style-type: none"> Some aspects during research may seem obvious but will need special attention. For instance, use of farmer's land for experiments, how much do project teams disclose to the farmer and are there any written documents or agreements on the use of their land?", is land fully restored after use? Are proceeds from the experimental farms shared with the land owners? she asked. The land given by the family, who is/will have been temporarily denied opportunity for farming? Are there any loss implications for some member of the households who had access to use of the land? How will benefits on such land be distributed? Issues of marginalized and vulnerable groups need special attention in the reports. This being a national project participation of the all population groups is key. Issues of intellectual property rights especially for farmers whose lands are used for field experiments, how do farmers or their communities benefit since they are not academicians? Catherine added that, restoration of the land after use for research is key and should be done to the satisfaction of both the farmers and their households. Given the role of women and girls in agriculture, a gender assessment is essential to 	

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Meeting proceedings recorded by	Ms. Muheki Mariam
Subject of the meeting	Consultative Meeting with NARO Institutions, ATAAS Project Staff, NAADS, OWC, DATIP and ZARDIs; Abi, Kachwekano, Ngetta, Mbarara, Bulindi, Mukono, Nabuin, Buginyanya and Rwebitaba during the ATAAS End of Quarter 2 (Oct-Dec 2017) and Review of Quarter 3 (Jan-Mar 2018) Workshop in Mukono on 17 th January, 2018 at Colline Hotel, Mukono.
Item	Summary of the Proceedings
	<p>enhance project focus under each value chain and related activities.</p> <p>g. There should be explicit strategy for exit by the researchers and such a process should be agreeable and acceptable to both parties.</p> <p>Overview of the project safeguards issues in ECAAT-P by the Consultant Team Leader He informed the Workshop that, the safeguards documents were being prepared at framework levels because details of the project are still being worked and, in the end, if there will be activities that will require further or additional environmental assessments, appropriate levels of such studies will be done. Based on envisaged limited works and other aspects in ECAAT-P such as in the rehabilitation of existing and operational laboratories, industrialization/value, and water use efficiency interventions, all these have been assessed to generate small scale and localized impacts whose mitigation measure will readily be formulated hence, the tentative placement of the ECAAT-P as a category B type.</p> <p>Some of the concerns raised by the consultants regarding safeguards in ECAAT-P Based on consultations so far, the team put the following observations to the workshop and asked for clarification that should be integrated into the safeguards documents for the project. These were:</p> <ol style="list-style-type: none"> a. On the vulnerable and marginalized groups, meetings in Kachekwano areas and with the Batwa indicated that, they are engaged in cultivation of crops as such, ECAAT-P should work out modalities for their involvement in the project since it is a national project. b. Researchers when using farmers lands need to improve on how they gain access, the way they use and how they should leave it. Farmers need explicit and exhaustive discussions with the scientists on the land for experiments and clearly improve on their exit procedures and need to restore and remove all fencings on the land and honor whatever obligations could be in the MoU for such undertakings. c. Concern of on the delivery of research outcome (new varieties, breeds) which are accessed through the private sector who are mainly profit minded sometimes, farmers are unable to buy the new varieties and they continue to plant vulnerable and low yielding varieties (see Annex); d. He added that follow-up or extension support is lacking. It is important that extension workers operate according to their outlined roles otherwise it is difficult to know where an extension worker stops. Many livestock and poultry extension players are in turn selling drugs and administering services at a fee. e. Diseases and pests are increasingly getting prevalent and this could be attributed to the warmer temperatures hence, the need for use of agrochemicals to control such pests. However, the regulation of agro-pesticides needs for to be done because Agricultural Chemicals Boards is not effectively discharging its roles as mandated by Plant Protection Act

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Place of Meeting	Collin Hotel Mukono
Meeting proceedings recorded by	Ms. Muheki Mariam
Subject of the meeting	Consultative Meeting with NARO Institutions, ATAAS Project Staff, NAADS, OWC, DATIP and ZARDIs; Abi, Kachwekano, Ngetta, Mbarara, Bulindi, Mukono, Nabuin, Buginyanya and Rwebitaba during the ATAAS End of Quarter 2 (Oct-Dec 2017) and Review of Quarter 3 (Jan-Mar 2018) Workshop in Mukono on 17 th January, 2018 at Colline Hotel, Mukono.
Item	Summary of the Proceedings
	<p>2007. In comparison to human and animal drugs, National Drug Authority (NDA) has advanced in regulating the trade in human and veterinary drugs unlike the ACB effort. Under the ECAAT-P how can some interventions be worked out?</p> <p>f. Issues sustainable management of crop residues/crop waste needs to be tackled especially on rice as compared to maize bran which is readily taken for poultry. The Lead Rice Researchers replied there are plants to produce oil out of rice husks and soon that problem will be no more though it needs resources which could be availed through ECAAT-P if possible.</p> <p>g. The farmers need to be part of intellectual properties that arise from research in their fields and such could in form of supporting the communities by improving a village school as part of projects rather than cite them in a scientific publications or academic thesis to which they have no access and, benefit.</p> <p>h. It is time to institutionalize environmental and social safeguards in NARO in view of of the Organizations activities and increasing challenges of climate as such, it has to have within its establishment, a fully-fledged Unit dedicated to safeguards building on a staff already in place.</p> <p>Workshop Discussions and summary by Deputy Director General NARO: After deliberations, the Deputy Director General summarized key issues as follows:</p> <p>a. On institutionalization of Environmental and Social safeguards, he asked the consultants to propose a modality which builds on already existing scenario in place i.e. NARO has dedicated a Senior Gender Scientist to head all safeguards aspects in its establishment. How best can this be developed he challenged?</p> <p>b. On intellectual property, he clarified that the country has an intellectual property law, and at NARO level there is intellectual property policy which should guide implementation of the ECAAT-P project. However, based on the study, the consultants should come up with what could be done to take the Organization forward in its compliance with such obligations.</p> <p>c. Regarding entry and exit to farmers lands during and after research, the safeguards team should internalize existing MoU framework and propose feasible ways of improving it bearing in mind dynamics surrounding aspects in the country. On the delivery of research outcomes, he said, measures are underway to ensure farmers are well informed of every results and products arising from research.</p> <p>d. On vulnerable and marginalized groups participation in ECAAT-P he noted, the commodity crops are in place and their involvement could begin with supporting them take up such crops in their cultivation and they could be supported through the ZARDIs in their vicinity.</p> <p>e. The likely risks of using agrochemicals to the scientist, community and the environment as a whole should be established. Utilization of crop byproducts especially the Rice waste is a good observation and should be furthered in study to identify the possible useful products</p>

Date of Meeting	17 th January 2018
Place of Meeting	Collin Hotel Mukono
Meeting proceedings recorded by	Ms. Muheki Mariam
Subject of the meeting	Consultative Meeting with NARO Institutions, ATAAS Project Staff, NAADS, OWC, DATIP and ZARDIs; Abi, Kachwekano, Ngetta, Mbarara, Bulindi, Mukono, Nabuin, Buginyanya and Rwebitaba during the ATAAS End of Quarter 2 (Oct-Dec 2017) and Review of Quarter 3 (Jan-Mar 2018) Workshop in Mukono on 17 th January, 2018 at Colline Hotel, Mukono.
Item	Summary of the Proceedings
	<p>which can be generated from such waste.</p> <p>Clarifications by the Team Leader</p> <p>The team leader then explained that the assignment will yield framework safeguards documents since for now exact locations and details of the projects are not yet know. He added that the pesticides regulations in the country is weak, and urged the concerned institutions need to borrow a leaf from NDA which is managing drug shops. He concluded by saying that we need to safeguard these issues least they will be bottle necks in the implementation of the project.</p> <p>The chairman in conclusion asked the participants especially NARO to own the presented concerns for the smooth running of the project and remove the barriers that affect participation of all groups in the project. He also asked the consultants not to work independently but rather as a team and called upon the all institutions to be organized if they want to achieve more.</p>

Date of the Meeting	9 th Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with Kibanga-Busika farmer group at Busika, Kiwewesi's home 12:15-1:20pm
Item	Summary of proceedings
	Introduction
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer
	Issues discussed
I.	<p>What environmental features do you have in the community and how do your activities affect these ecosystems?</p> <p>We have forests, grasslands and wetlands however a good portion of the forest cover is being cut to put up farms and wetlands have been reclaimed for agriculture. But there still remains a good portion of the forest cover and wetlands.</p>
II.	<p>Which crops do commonly grow and what agronomical practices do u follow?</p> <p>We commonly grow Cassava, Sweet potatoes, maize, tomatoes, beans, and matooke. All the work is done using hoes, there is no mechanization.</p>

Date of the Meeting		9 th Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with Kibanga-Busika farmer group at Busika, Kiwewesi's home 12:15-1:20pm	
Item	Summary of proceedings	
	<p>What are the common pests and diseases that affect your crops? The maize in our areas is terrorized by the army worm whose solution is spraying in the evenings and morning using pesticides like rocket. Our cassava is highly affected by Cassava Brown Streak Disease which has led to total loss at times and Cassava Mosaic Disease is there but we can still get some produce. We don't know how to control these diseases. Tomatoes and beans are affected by Blight especially in the hot conditions but we don't have any measures in place to combat these diseases. The other agrochemicals we use are herbicides to help control weeds like Weedmaster, 24D, Secaset, weed grow and weed round</p>	
III.	<p>What is your relationship with NaCRRI and what have you gained or lost in your association? There is no tangible benefit we harness from the institute though on rare occasions they have used land belonging to some of our farmers for field trails but even after such interactions, there is always no follow up after. We request the institute to help mobilize us into functional farmer groups and help with quality seed, training on standard agronomical practices and help us secure market for our produce to overcome this rampant buyer exploitation. In case the institute wants to use our land, we also ask the institute to make formal written agreements with us clearly stating period and size of land required and agree on a charge, what in detail will be done on the land and ways of remuneration to the farmer.</p>	
IV.	<p>How are women and youth involved in your agricultural production? Our women dominantly do planting and wedding of the fields after the men have opened the land. But there is almost similar involvement between the men and women. The youth have taken a back seat in agricultural production but there are a few involved.</p>	
V.	<p>In your opinion what do you want done to help improve your agricultural production? The research institute should guide us in formulation of groups and supply us with quality seed but also help us get good market to overcome the exploitation by many traders. We also need an authentic source of agrochemicals either by the institute of private sector but which are accredited by the institute. The research institute being close to us we most of the times have our crops suffer from various diseases which don't affect the same crops in areas distant to the institute, so we ask for some control measures from the institute to reduce disease spread or help us in fighting the disease. Then about using our land for research purposes, we ask that this should be done with clear written agreements and give us all the information about the experiment such that we know and take any necessary precaution. If the experiments are disease related, we request that barriers to deter infection of our gardens are put in place and in case the diseases are transmitted, we ask that the institute greatly intervenes to help fight it.</p>	

Date of the Meeting		11 th Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting Rubanda farmer group at Ikumba subcounty 8:15-10:20am	
Item	Summary of proceedings	
	Introduction	
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer	

Date of the Meeting		11 th Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting Rubanda farmer group at Ikumba subcounty 8:15-10:20am	
Item	Summary of proceedings	
	Issues discussed	
I.	<p>Which crops do you grow and what challenges do you face? Irish potatoes, beans, peas, sorghum, sweet potatoes and maize are the main crops we grow here. Looking at our terrain, we use manual labour, hoes as we dig along terraces and contour lines. The challenges with these crops is mainly pest and disease, Irish rot and blight, bean early blight, sweet potato weevil, and the army worm for maize. Sorghum is proving unprofitable since it takes a long time and is very tasking yet the Mulamba business its former greatest consumer has reduced, it also attacked by a pest that covers its inflorescence and it can't grow, famers have forsaken it. Another challenge we have faces like in tea, we obtained seedling, planted harvested and supplied to government but all our money for both our sold seedling and harvest has not been paid. Farmers also cultivate in wetlands since the soils on the hills is consistently lost due to erosion and slide. To our disease, we spray using agrochemicals.</p>	
II.	<p>What is the involvement of women and youth in agriculture? Women do 98% of the work from land opening, planting, weeding, and harvesting while the men do majorly supervisory work and little monetary facilitation. These women normally work with their children where the youth come in.</p>	
III.	<p>How has the NARO zonal institute supported you in your farming? Their contribution is negligible, their seed is limited to a few, the seed sent through the sub county never reaches us and most of the support is from NGOs and some mild extension services from government.</p>	
IV.	<p>How would you love the institute to help you? We need trainings on best practices to increase our productivity, we need high yielding quality and disease resistant seed, we also need other farm inputs from them or they recommend us to reliable suppliers. We have no guidance from the institute on dairy farming and poultry, our cows suffer from east coast fever and we have very low milk return for our local cows, it is 2-3ltrs per day and for the exotic it is 3-5ltr which is not sustainable.</p>	
V.	<p>What is the involvement of marginalized communities, women or youth in agriculture? We don't have any deliberate programs for marginalized communities like the Batwa in the region, the Batwa's involvement in agriculture is offering of manual labour to other farmers. Women are the backbone of agriculture in the region, they do all the donkey work with the children and youth. Men come in to oversee with little or no hands on in-put.</p>	

Date of the Meeting		9 th Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with JIMMY LAMO, Rice breeder at NaCRRI @ 10:48-11:50am	

Item	Summary of proceedings
	Introduction
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer
	Issues discussed
I.	What are your agronomical practices? The process starts with site selection, evaluating the top soil for stones or any qualities that don't favor maize and rice growth. To generate seed for multiplication it is advised to rotate crops seasonally to ensure maximum yield. Land opening is commonly done by hoes and there is little advancement in mechanized land opening for rice but for maize it is outspread.
II.	What guides your research agenda? Based on the demands of the people in society and the demands that increase in technology imparts on us, all combined by our mandate we carry out research to meet subsistence and commercial needs of farmers.
III.	What role is mechanization playing in rice and maize growing? Multiple tools, equipment and machinery have been developed to ease production and processing of maize and rice. Oxen and tractors play a role in land opening. Combined planters and harvester have been used for maize, threshers for rice are in place.
IV.	What pests and diseases affect maize and rice and how do you manage them. Maize is affected by maize rust, grey leaf spot, necrosis disease and the pests like the army worm are controlled by spraying, agrochemicals like rocket are used effectively early morning or evening with no effect on maize, but in cases of over doze they affect plant growth. Rice on the other hand, use of agrochemicals is highly discouraged because of the huge expenses associated in growing and weeding, the farmer should not have burdened with spraying costs. Scientists are laboring to generate resistant varieties to combat disease.
V.	What is your involvement of women and youth in rice and maize growing? Rice being a labor-intensive crop, through EAAP, women in their farmer groups were given threshers and other simple equipment's to ease their work. Women and youth manage their plots better than men and their yield is normally 8.5 tonnes per acre as compared to 6 tonnes for men managed fields. There is a challenge of children missing school to chase birds and other pests from rice fields which scientist are seeking to address by developing repellents to these birds from the field instead of any ecosystem damaging practices.
VI.	How do you involve other stakeholders in your research? Farmers (subsistent and commercial), government, seed companies MAAIF, and processing companies are involving in seed selection, trail and evaluation to ensure the seeds released are in line with the demands of society.
I.	Which crops do you do research on and what are your local agronomical practices? We chiefly do our research on; Irish potatoes, upland rice, climbing beans, wheat, tea, cassava and maize. This we do in collaboration with research institutes of NaCRRI, NARL, Buginyanya and Rwebitaba ZARDI's. we also do some extensive work on livestock but chiefly on goats which when expanded to cows and poultry locally adopted to the temperate conditions, it can help improve dairy production in the region. Our agronomical practices are designed to fit our mountainous terrain, the opening up of the land, weeding and harvesting are all done using a hoe, we occasionally use fertilizers but some organic input are put on our farms like cow dung and goat refuse.
II.	What guides your research agenda? In line with our mandate, we carry out research as prompted by the farmer's demands and the identified community challenges. We also purpose to accomplish the research objectives are prescribed in the various projects we undertake.

Date of the Meeting	9 th Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with JIMMY LAMO, Rice breeder at NaCRRI @ 10:48-11:50am

Item	Summary of proceedings
III.	<p>What is your involvement with private sector?</p> <p>We are highly involved with the private sector Uganda Industrial Research Institute has partnered with us and some farmers to produce quality crisps. Huntex brewers have also worked with a few farmers to grow sorghum for making alcohol. IFDC- International Fertilizer Development Center has helped in seed multiplication and training farmers on best soil management practices. National Sweet Potato Seed Agency has also helped to streamline the potato seed system in the region.</p>
IV.	<p>What pests and diseases do you face and how do you manage them?</p> <p>Our beans and sweet potatoes suffer from late blight and sweet potato bacteria wilt is also a challenge. We normally spray with agrochemicals like Macozeb or Redome but eventhen some suppliers sell out fake drugs, the challenge also arises to these pests developing resistance to the chemicals. Our cold conditions are also an added advantage because they don't favour multiplication of some pathogens and this lowers our disease prevalence.</p> <p>We also follow different spraying regimes for different varieties, different dosage for varying contact sessions like for the fungus and other microbes.</p>
V.	<p>What is the involvement of marginalized communities, women or youth in agriculture?</p> <p>We don't have any deliberate programs for marginalized communities like the Batwa in the region, the Batwa's involvement in agriculture is offering of manual labour to other farmers. Women are the backbone of agriculture in the region, they do all the donkey work with the children and youth. Men come in to oversee with little or no hands on in-put.</p>
VI.	<p>How do you manage wastes that emerge from this research institute?</p> <p>There are no standard procedures for waste management but the wastes generated from the livestock lab like animal carcasses, are always buried, the wastes from the tissue culture lab are also some times buried and other occurrences incinerated. There is no sorting of wastes prior disposal but all the waste is either buried or incinerated.</p>
VII.	<p>How do you involve your community?</p> <p>We normally deal with already organized farmer groups, in case we want our trail hosted, we contact the leaders of a farmer group who then select a famer with land and grant us access to the land, we train other famers using the trail demonstration and at the end the farmer takes the produce. We also work with the existing NGOs, CBOs, and government extension workers to get to farmers, the District production and Agricultural officers are key in linking us to the famers.</p>
VIII.	<p>What capacity do you need ECAAT-P to instil at your institute to maximize your research output?</p> <p>We have 295 acres of land at kachekano, 10 at Bugongi, 300 at Nyabwishenya, 300 at kalengele, 100 in Kihihi and 4 at Nyamiko. This is sufficient land to do research and test our outputs in varying environmental conditions.</p> <p>We need a soil lab that is fully furnished to reduce our trips and delay in research outputs arising from our dependence on NARL. We need an entomology and pathology lab with sufficient microscopes, freezers and all other necessary equipment. Our tissue culture lab needs more technical staff and more equipment like fume hoods and a growth room. We also need screen houses. Dairy research and poultry is ignored here yet these conditions can favour diary production, if investment is done in these areas we will greatly meet the challenges in this area. We need a sustainable system for supplying lab consumables at a regular basis.</p> <p>We also need investment in soil management system to reduce the prevailing soil erosion, landslides and soil loss which greatly strain our production.</p>

Date of the Meeting	9 th Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with JIMMY LAMO, Rice breeder at NaCRRI @ 10:48-11:50am

Item	Summary of proceedings
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Date of the Meeting	9 th Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with scientists @ NaCRRI at 3:00-5:30pm

Item	Summary of proceedings
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	Introduction
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	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer
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	Issues discussed
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	<p>What are the common challenges affecting cassava as a key ECAAT-P commodity? The challenges associated with cassava range from productivity challenges (biotic and abiotic) and processing challenges. In productivity disease is the main problem CBSD and CMD with whitefly as a pest and vector. The change in environmental conditions have increase diseases prevalence, reduced yield per unit area, climate change has created ambient conditions for survival of some pathogens, shifted productivity zones and reduced soil fertility. Processing of cassava is associated with challenges of waste management, inefficient technologies and food safety issues due to absence or poor implementation of quality standards.</p> <p>We also have postharvest including product instability over time, challenges of aflatoxin and lack of quality standards. In the consumption of foods, there are no regulating standards for food and this floods the population with a lot of substandard food. There is slow technology uptake and challenges in the cassava multiplication chain, this is worsened by poor extension services to improve the farmer's practical knowledge ad practice in line with the new technologies.</p> <p>There is a slow utilization pattern of the products of our research especially on the private sector in the direction of value addition and the absence of a regulating law makes the available services inadequate.</p> <p>Amidst all these challenges, the scientists highlight the successes cassava growing has seen in the last 160years, the increase in growing acreage from 5000 to 800,000 spreading from central to east and northern Uganda doubling the productivity per unit area. More seed is available for cultivation and quality varieties for growing that are tolerant to the diseases. Success in starch production and utilization of cassava wastes to produce bioplastics and fuels like bioethanol. In value addition, cassava is gaining ground in the confectionary products, it also been taken up as the recipe ingredient for beer.</p>
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	<p>The method of cassava propagation was and still is the same since time began, are there any scientific innovations that are geared toward an alternative propagation method? Evolutionary, Cassava cannot reproduce by its seed. Unlike other crops, Cassava produces a "false seed" which can't reproduce. Considering the current acreage of cassava in Uganda for 160 years, science has improved the varieties planted, the acreage and stabilized production.</p>
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Date of the Meeting	9 th Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT-P Environmental Social Safeguard Framework Design consultation meeting with JIMMY LAMO, Rice breeder at NaCRRI @ 10:48-11:50am

Item	Summary of proceedings
III.	<p>How do you engage with other stakeholders? The access to farmers is normally done through NARO's zonal institutes which deal with both farmer groups and individuals. There is also good collaboration between the district production officers where extension services are done. There are documented agreements between the researchers and farmers on our various engagements. Farmers organized in SACCOs and farmer groups make coordination easy in terms of access and obtaining feedback.</p>
IV.	<p>What efforts have you made in line with mechanization? There are large scale cassava planters that are being used by commercial farmers especially in Northern Uganda. There are also fuel economic weeders for both maize and cassava that consume a litre per acre to ease farmers work on the farm. There is great room for improvement.</p>
V.	<p>What challenges do you face with agrochemicals? They are costly and there are many counterfeits and "gangsters" on the market, it is therefore important to use what is recommended by Ministry of Agriculture</p>
VI.	<p>What is your procedure in mainstreaming gender and vulnerable groups? Farmer groups that encompass women and youth are purposely selected. For obvious reasons, trials carried out on woman's field will empower all women in the community. The research institute is determined to produce Vitamin A enriched varieties for the nutritionally challenged vulnerable group.</p>
VII.	<p>What capacity which when availed can make your research more productive? Install all the necessary world class equipment in the seven sections nutrition bioanalytical lab to make it fully functional. The conservation unit needs better equipment for storage of germ plasm, isolation of viruses from samples and world class conservation facilities. We look forward to rehabilitating an entomology lab to improve on disease research. The institute also needs technology driven green houses, where the ambient conditions can be modified to suit particular experiments. We also look forward to establishing a technology demonstration hub where all the research prototypes and designs are displayed in a classic way to educate, entice investors and easily share our technologies for easy take up by both public and private sector. A rehabilitation of guest house and recreation facilities including tennis, gym along with the already existing golf course will make the scientists more effective and productive.</p>
VIII.	<p>What wastes do you generate and how do you manage them to mitigate environmental impacts? Our lab currently deals with non-invasive material, no GMOs as yet and the material dealt with is safe. The waste from the lab is majorly biomass which is always incinerated and the chemical in solution are drained into a special septic tank with three sections for pre-treatment, dilution and storage until it is extracted for final disposal. The expired chemicals are laid off through the NARO standard procedure where specialists pick these chemicals and dispose them properly.</p>

Date of Meeting		9 th January 2018
Place of Meeting		Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by		Muheki Mariam
Subject of the meeting		Meeting with Mrs. Jemima Barisiyoy, Community Councilor and Farmer group Head
Item	Summary of the Proceedings	
1	Introduction	
	The Team Leader started by explaining the assignment, the significance of the consultation meeting and the role of farmers towards ECAAT-P project.	
2	Issues Discussed	
	<p>Are you involved in NACRRRI activities, if yes how? Yes, I am a farmer and I get seed varieties for maize, beans, rice and cassava from NACRRRI, Namulonge and my garden is used as a demonstration farm. For the other crops and animal breeds, I acquire from other suppliers.</p>	
	<p>What crop varieties would you prefer and why? Maize Long 5 and 7H, Rice Nerica 4, Cassava Nam 13 and Beans Nambale short. These varieties yield high and faster and more importantly they are pest and disease resistant. Jemima pointed out that Cassava Nam13 in particular has really proved to be better than the rest since it can be eaten in eight months and is not easily attacked by brown streak, its stems inhibit weed growth and the root tuber itself is delicious.</p>	
	<p>What are some of the challenges you face while dealing with NACCCRI varieties and how do you think these challenges can be addressed?</p> <ol style="list-style-type: none"> 1. The biggest challenge is inadequate information; the local farmers do not easily access information on how best to plant and look after the varieties they get from NACRRRI and NACRRRI inspections are not regular. NACRRRI does not sensitize farmers about their developments and products 2. Need for ready market for the cassava stems is yet another challenge since they fetch more money than the root-tuber (food) itself. 3. The farmer groups in place are not well organized and therefore dedicated individual farmers usually miss out on the best NACCCRI varieties since they can't be given on individual basis. 4. Land for farming is increasingly diminishing to development activities; most has so far been converted to housing estates. 5. Weather change patterns; the drought experienced is getting worse and this is largely due to farmers encroaching on swamps and deforestation. 6. The pesticides are highly priced and there are many counterfeits on the market. <p>Some of the above challenges can be addressed by NACRRRI through;</p> <ol style="list-style-type: none"> 1) Providing high yielding and disease resistant varieties 2) Interacting more with the farmers and have more demonstration farms 3) Regular farming trainings or educative programs <p>For the increased drought affecting crop reduction, Jemima advised that it can be managed by availing and adoption of solar based irrigation schemes.</p>	
	<p>What are the common pests and diseases that affect your crop production and which agrochemicals do you use?</p> <ul style="list-style-type: none"> § Beans- Aphids § Maize- Armyworm § Rice- yellowish spots on middle leaf § Have been using Rocket pesticide for both Maize and beans 	
	<p>What are the sources of water in this area Boreholes and well springs and all are within reach (less than a kilometer)</p>	

Date of Meeting	9 th January 2018
Place of Meeting	Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by	Muheki Mariam
Subject of the meeting	Meeting with Mrs. Jemima Barisiyoy, Community Councilor and Farmer group Head
Item	Summary of the Proceedings
	<p>What are the common challenges faced by women in this community</p> <ul style="list-style-type: none"> § Poor mobilization in farmer groups § Inadequate capital to advance farming

Date of Meeting	9 th January 2018
Place of Meeting	Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by	Muheki Mariam
Subject of the meeting	Consultation Meeting with Women's group
Item	Summary of the Proceedings
1	Introduction
	The Team Leader started by explaining the assignment, the significance of the consultation meeting and the role of farmers towards ECAAT-P project.
2	Issues discussed
	<p>Are you involved in NACRRI activities? Yes, majorly farming. We obtain from them Cassava, Maize and Bean seed varieties.</p> <p>Of the varieties you get, which ones do you prefer and why? Cassava and Maize because they are trusted to be good in regard to yields and resistance.</p> <p>Any challenges you have encountered while dealing with NACRRI Varieties?</p> <ul style="list-style-type: none"> a) Pests especially insects highly attack maize and beans hence one has to spray the crops else no harvest will be realized. b) The cassava variety we are currently growing sprouts well and has excellent stems but the root tuber is usually spoilt. This is a big challenge since we don't know yet which pesticides can prevent it. c) Rice growing has to be done on a large piece of land with a high-water table yet most of the existing land is now converted to housing construction development projects. d) Change in weather patterns for example since 2016 the drought period is increasing e) The yields keep reducing drastically to unacceptable levels after the third planting f) Rarely administer agrochemicals due to affordability reasons <p>The above- challenges can be addressed as follows;</p> <ul style="list-style-type: none"> a) The crops should be regularly sprayed with recommended pesticides from Ministry of Agriculture Animal Industry and Fisheries to boost their immunity hence increased production b) NACRRI should table which pesticides should be administered to cassava to prevent the root tuber from attack c) NACRRI in addition should come up with varieties that are highly resistant to both pests and diseases but also to drought or change in weather patterns as the case of yellow maize given in 2016 could withstand insects and drought, the yields were very good compared to all the other varieties at that time. d) The varieties provided should be durable able to yield up to the fifth planting at least. e) At the national level, the government should liaise with cooperatives and create adequate

Date of Meeting		9 th January 2018
Place of Meeting		Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by		Muheki Mariam
Subject of the meeting		Consultation Meeting with Women's group
Item	Summary of the Proceedings	
	market even outside Uganda. f) As farmers, we have to implement best farming practices such as mulching, manuring and crop rotation and after harvesting the plant residues should be left to rot in the garden to improve on the humus content.	
	What are the common diseases and pests affecting your crops and which agrochemicals do you usually apply? § Maize and Beans are affected by the army worm and are usually sprayed with Rocket. § For Cassava the root gets damaged and the agrochemicals to use are not known yet § "Super grow" is used on agricultural fields to rejuvenate their fertility.	
	What are some of the challenges you face while administering agrochemicals? § Have to dress appropriately in overalls, nose masks and gum boots. § Most of the pesticides have a bad odor Other than crop and animal production, what are your alternative sources of livelihood? § Vocational activities § Baking § Retail shops and trading	
	§ Savings groups (SACCOs) What are the sources of water in your community? § Boreholes at least not more than one km from the farthest homestead § Water tank (rain water harvesting) § Swamps for irrigation and watering animals	
	What environmental challenges does your community face? § Excessive deforestation attributed to the increased demand for charcoal, firewood and timber § Swamp encroachment and reclamation for cultivation of especially vegetables and rice	
	What are the common challenges you face as women in this community? § lack of support from our husbands § Inadequate capital to advance in agriculture production especially the need for more land and agrochemicals.	

Date of Meeting		9 th January 2018
Place of Meeting		Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by		Muheki Mariam
Subject of the meeting		Consultation Meeting with the Men
Item	Summary of the Proceedings	
1	Introduction	
	The Team Leader started by explaining the assignment, the significance of the consultation meeting and the role of farmers towards ECAAT-P project.	
2	Issues discussed	
	How are you involved in NaCRRI activities?	

Date of Meeting	9 th January 2018
Place of Meeting	Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by	Muheki Mariam
Subject of the meeting	Consultation Meeting with the Men
Item	Summary of the Proceedings
	We acquire seeds for planting such as Cassava, Maize and Beans.
	Of the seed varieties you are given, which ones do you prefer and why? Maize and Cassava because they have proven high yield, take a shorter period to mature therefore can bring in money more quickly.
	What are some of the challenges you face while dealing in NaCRRI varieties and how do you think these challenges can be overcome? <ul style="list-style-type: none"> a) Change in weather patterns has retarded yields greatly. And this variability makes it hard to determine the best planting season. b) Plant diseases in the previous season tend to affect the crops in the next season c) Insects spoil maize at its youngest stage d) Market for the harvested produce is low; the produce is sold off cheaply to avoid storage expenses. For example, a kilo of maize costs between Shs. 500 and 600 and the farmer cannot afford to store produce until when prices are higher. e) The Agrochemicals are costly f) Limited land for farming since most of the land has been converted into housing estate development. <p>These challenges can be addressed if;</p> <ul style="list-style-type: none"> a) Government can create a broader market for agricultural produce b) The prices of agrochemicals are subsidized and only the genuine one is allowed in the market c) More training programs are undertaken. NACRRI training personnel rarely train and at times the farmers are stuck hence therefore the training programs should be drafted and undertaken periodically. d) Permanent good quality varieties should be introduced compared to those that lose out after the third planting e) NACRRI should establish more demonstration farms and train more farmers who in turn train other farmers
	What are the common diseases and pests that affect your crop varieties and which agrochemicals do you administer to prevent them? <ul style="list-style-type: none"> § Maize is affected by army worm and Maize cob rust disease. § Beans are affected by aphids § Cassava is disturbed by the brown streak disease
	Agrochemicals used include; <ul style="list-style-type: none"> § Rocket for both maize § Rocket and weed master for beans § No agrochemicals are used for the case of Cassava
	Where do you purchase these agrochemicals? From shops in Gayaza town
	Do you experience any challenges while administering these agrochemicals? Other than failing to purchase the rightful PPE, there are no other challenges.
	How do you dispose off the waste agrochemicals and their packaging material? There's no procedure, they are thrown in the same gardens after use.
	What agricultural tools and equipment do you use on your farms? Majorly it's the hoe, since the land is limited and in small portions.

Date of Meeting		9 th January 2018
Place of Meeting		Jemima Barisiyoy's home in (Nalumuli Village, Kikoko Parish, Busukuma Sub-County, Wakiso District)
Meeting proceedings recorded by		Muheki Mariam
Subject of the meeting		Consultation Meeting with the Men
Item	Summary of the Proceedings	
	What are your alternative sources of livelihood? § Brick Laying § Transport business especially Boda Boda § Building	
	What environmental challenges does this community face? § Prolonged drought leading to water scarcity § Deforestation	
	What are the causes of these environmental problems? § Change in land use § Increased demand for firewood and charcoal § Rapid population growth	

Date of the Meeting		31 st Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Director BugiZARDI at 10:30-11:20am
Item	Summary of proceedings	
	Introduction	
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer	
	Issues discussed	
VI.	Which crops do you do research on and what are your local agronomical practices? We chiefly do our research on; Irish potatoes, beans, wheat, barley, cabbage, onions and maize. Our agronomical practices are designed to fit our mountainous terrain, the opening up of the land, weeding and harvesting are all done using a hoe, we occasionally use fertilizers but some organic input are put on our farms.	
VII.	What sets your research agenda? We normally start with our mandate as an institute and then we are inspired by the needs our community, we also look at the manifesto and through these we set priorities and also influenced by the source of funds.	
VIII.	How do you involve the different stakeholders of your institute? We normally have a five-year review meeting and the households are organized into farmer groups a= which we invite to share their perceptions on what they need done and how. We have had a few dealings with the private sector and little commercialization efforts in barley for seed production. Through district agricultural research support team, we work with the district to set research agenda and get other stakeholders in the area to air out their views.	

Date of the Meeting		31 st Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Director BugiZARDI at 10:30-11:20am
Item	Summary of proceedings	
IX.	<p>Is their use of agrochemicals in your research? We dominantly use fertilizers, pesticides and fungicides, the institute has protective gear but the farmers have no access. These chemicals are obtained from shops, government and other organizations for use at the farm. The use of these chemicals is rare with the farmers and dominantly at the institute, after use the packing material is burnt or just thrown away.</p>	
X.	<p>What efforts is the institution putting place to combat climate change? We are trying to breed for tolerant varieties that can with stand the prevailing climatic conditions. We have devised water conservation technologies and soil conservation techniques. We have porotypes for micro irrigation in collaborations with farmers and traders. We also involved in land scaping to improve soil conservation. The potential sites for irrigation are Manafa, Bulambuli and Bududa. The institute has about 95 hectares of land in Buginyanya, 47 hectares in Bulegeni with a few contentions with district town council and local clan threats and 86 hectares in Ikukuwe of which 5 acres have been taken in these wrangles.</p>	
XI.	<p>How do you manage wastes that emerge from this research institute? There are no standard procedures for waste management but the wastes generated from the livestock lab like animal carcasses, are always buried, the wastes from the tissue culture lab are also some times buried and other occasion incinerated. There is no sorting of wastes prior disposal but all the waste is either buried or incinerated.</p>	

Date of the Meeting		1 st Feb 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kween District Officials from 9:30-12:45pm
Item	Summary of proceedings	
	Introduction	
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came to the Chief Administration Officer who gladly welcomed us and the deliberations were ushered in by a prayer	
	Issues discussed	
I.	<p>Which crops are commonly produced in your district? We chiefly produce; Irish potatoes, beans, wheat, barley, cabbage, onions, rice and maize.</p>	

Date of the Meeting		1 st Feb 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kween District Officials from 9:30-12:45pm
Item	Summary of proceedings	
II.	<p>Have you experienced climate change and are there any district-based mitigation measures in place? The lost forest cover in the upland areas of the district has increased the rate of soil erosion and landslides in the upland which has silted and sedimented the low lands and increased the flood prevalence. The sedimentation has made the low land soils more arable and the floods have facilitated rice growing which was unheard of in the district. The change in climate also no longer favors maize growing in the district and we have resorted to mainly Irish.</p> <p>The efforts in place by the district include, water and soil conservation through revegetation of the uplands and tree planting, digging terraces and covering them with grass and educating the masses on how to improve our local climate. We have had a few irrigation systems but there is need for more support in this regard.</p>	
III.	<p>How is the district planning on protecting some of its sensitive ecosystems? The district borders Mt Elgon national park which Uganda Wildlife Authority after gazettement, is heavily guarded. There has been a sizable loss of the forest cover around to create room for resettling the Benet. Our area has a rough geographical terrain and there is an increase in the drying of some rivers due to the hot conditions and high withdrawal of the water for irrigation. People also tend to settle near arable soils which are close to the rivers, forests and wetlands, so the need to shield these ecosystems is key.</p>	
IV.	<p>What pests and diseases affect your crops? Bacteria wilt for our bananas and Irish, early and late blight for potatoes and beans, potato moth and aphids also attack our Irish, the army worm and necrosis is greatly affecting the maize, yellowing and burrowing worms are affecting the cabbage. In fighting these we do crop rotation to kill the pests in the garden by changing crop, we do seed selection to work with clean seed and reduce disease prevalence, we also encourage conducive storage to limit disease, at times we also go as far as Kabale to secure quality disease free seed for Irish. We also spray our crops to kill these pests and vectors.</p>	
V.	<p>Is their use of agrochemicals in your district for farming? We dominantly use fertilizers, pesticides and fungicides, the institute has protective gear but the farmers have no access. These chemicals are obtained from shops, government and other organizations for use at the farm. The use of these chemicals is rare with the farmers and dominantly at the institute, after use the packing material is burnt or just thrown away. There are several fake dealers with fake drugs and these have caused the pests to build resistance and yet farmers' resources are wasted.</p>	
VI.	<p>Other issues There is need for disaster profiling of the district and guide the installation of mitigation measures, the shift from maize to other short-term crops has reduced our productivity as a district and we need support to revitalize this. We have stores in place that are in poor shape but these can help extend the shelf life of our crops and secure a good market.</p>	

Date of the Meeting		1 st Feb 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Benet community farmer groups; Benet Lobby Group and Benet Peoples group

Item	Summary of proceedings
	Introduction
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer
	Issues discussed
XII.	Who are the Benet? These are people whose name means those who have been in existence since time memorial and they have survived by directly depending on nature harvesting honey, through bee keeping, rearing donkey's cows and goats.
XIII.	Which crops do you commonly grow in this community? We chiefly do our research on; Irish potatoes, beans, wheat, barley, cabbage, onions and maize.
XIV.	Has climate change affected you in anyway? We have small rivers which are drying up yet they were sources of water and the need for water for both crop growth and domestic use. We have tried to plant trees to help improve our climate. Droughts are more severe and highly destructive. In our upland areas have a high rate of runoff and erosions which causes floods in the low lands but we have put up terraces and contours and growing grass on them to conserve the soil and slow down water to reduce the flooding.
XV.	What pests and diseases affect your crops? Bacteria wilt for our bananas and Irish, early and late blight for potatoes and beans, potato moth and aphids also attack our Irish, the army worm and necrosis is greatly affecting the maize, yellowing and burrowing worms are affecting the cabbage. In fighting these we do crop rotation to kill the pests in the garden by changing crop, we do seed selection to work with clean seed and reduce disease prevalence, we also encourage conducive storage to limit disease, at times we also go as far as Kabale to secure quality disease free seed for Irish. We also spray our crops to kill these pests and vectors.
XVI.	How do you obtain, use and dispose agrochemicals in your farming endeavors? Mangocep, Ridomine and taala master are used to fight the potato blight and the aphids. The pesticides we used are toughco, rocket, bulldog and thunder to kill most of the pests. There is mild use of fertilizers in our farming but our soils are still fertile. We obtain most of these chemicals from Kenya and Kapchorwa but we administer them without any protective gear and this has had immediate effects like nasal congestion and skin irritation and there are some long-term effects like cancers.
XVII.	How do you deal with sensitive ecosystems? We are at the border of a tropical rain forest which is highly guarded after it was gazetted but there is no clear boundary between community and the forest. We do cattle keeping close to the forest and get milk, blood among others it is also used for dowry and a sign of real manhood. We have no hopes of mechanization because of our terrain but if availed with oxen, our operations will be greatly improved.

Date of the Meeting		1 st Feb 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kween District Officials from 9:30-12:45pm	
Item	Summary of proceedings	
	Introduction	
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came to the Chief Administration Officer who gladly welcomed us and the deliberations were ushered in by a prayer	

Date of the Meeting		1 st Feb 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting		ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kween District Officials from 9:30-12:45pm
Item	Summary of proceedings	
	Issues discussed	
XVIII.	Which crops are commonly produced in your district? We chiefly produce; Irish potatoes, beans, wheat, barley, cabbage, onions, rice and maize.	
XIX.	Have you experienced climate change and are there any district based mitigation measures in place? The lost forest cover in the upland areas of the district has increased the rate of soil erosion and landslides in the upland which has silted and sedimented the low lands and increased the flood prevalence. The sedimentation has made the low land soils more arable and the floods have facilitated rice growing which was unheard of in the district. The change in climate also no longer favors maize growing in the district and we have resorted to mainly Irish. The efforts in place by the district include, water and soil conservation through revegetation of the uplands and tree planting, digging terraces and covering them with grass and educating the masses on how to improve our local climate. We have had a few irrigation systems but there is need for more support in this regard.	
XX.	How is the district planning on protecting some of its sensitive ecosystems? The district borders Mt Elgon national park which Uganda Wildlife Authority after gazetting, is heavily guarded. There has been a sizeable loss of the forest cover around to create room for resettling the Benet. Our area has a rough geographical terrain and there is an increase in the drying of some rivers due to the hot conditions and high withdrawal of the water for irrigation. People also tend to settle near arable soils which are close to the rivers, forests and wetlands, so the need to shield these ecosystems is key.	
XXI.	What pests and diseases affect your crops? Bacteria wilt for our bananas and Irish, early and late blight for potatoes and beans, potato moth and aphids also attack our Irish, The army worm and necrosis is greatly affecting the maize, yellowing and burrowing worms are affecting the cabbage. In fighting these we do crop rotation to kill the pests in the garden by changing crop, we do seed selection to work with clean seed and reduce disease prevalence, we also encourage conducive storage to limit disease, at times we also go as far as Kabale to secure quality disease free seed for Irish. We also spray our crops to kill these pests and vectors.	
XXII.	Is their use of agrochemicals in your district for farming? We dominantly use fertilizers, pesticides and fungicides, the institute has protective gear but the farmers have no access. These chemicals are obtained from shops, government and other organizations for use at the farm. The use of these chemicals is rare with the farmers and dominantly at the institute, after use the packing material is burnt or just thrown away. There are several fake dealers with fake drugs and these have caused the pests to build resistance and yet farmers resources are wasted.	
XXIII.	Other issues There is need for disaster profiling of the district and guide the installation of mitigation measures, the shift from maize to other short term crops has reduced our productivity as a district and we need support to revitalize this. We have stores in place that are in poor shape but these can help extend the shelf life of our crops and secure good market.	

Date of the Meeting		31 st Jan 2018
Meeting Proceedings Recorded by		Michael Ahimbisibwe
Subject of the Meeting	ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kapchorwa community from 3:00-4:30pm	
Item	Summary of proceedings	
	Introduction	
	The Team Leader started by explaining the purpose of the visit and introduced the team with whom he came and the deliberations were ushered in by a prayer	
	Issues discussed	
I.	<p>Which crops do you grow and what are your communal agronomical practices? We chiefly do our research on; Irish potatoes, beans, wheat, barley, cabbage, onions and maize. Our agronomical practices are designed to fit our mountainous terrain, the opening up of the land, weeding and harvesting are all done using a hoe, we occasionally use fertilizers but some organic input are put on our farms.</p>	
II.	<p>What sensitive ecosystems existing in this territory? We are surrounded by Mt Elgon national park which is a tropical rain forest and the outskirts of the forest were degazzated to house the bennet who were forcefully evited out of the forest. Their livelihood still depends on the forest but it is illegal to graze, farm or even stay in the forest, a good work is being done by Uganda wildlife Authority to restrain exploitation of the forest.</p>	
III.	<p>Do you know anything about climate change and have you experienced it in this community? Our average temperature has increased and our crops have not thrived in these hot conditions, the dry and wet seasons no longer come in due time. We have resorted to irrigation on small scale to support our crops. To modify our local climate, we have also started a tree planting initiative and help conserve the soil. The irrigation we operate is under gravitation flow from the rivers in the mountain and the communities need for water increases daily and yet the demand cannot be met. If the irrigation is to be diversified, it would greatly improve production but if land is to be secured a simple compensation is enough motivation to support the project. And any efforts to secure our little land for project work we request to have formal agreements.</p>	
IV.	<p>What pests and diseases are affecting your crops? The armyworm has greatly frozen maize growing in our land, early and late blight for Irish and beans and banana bacteria wilt has also derailed Matooke in this area and we have no solution to it.</p>	
V.	<p>Is there any application of agrochemicals in your farming? We use fungicides like Rodomite and master, pesticides like rocket and some acaricides. Some of these pesticides have been ineffective in killing the pests like the army worm. We never use any protective gear and there have been come health issues arising but we cannot with certainty trace them back to the agrochemicals.</p>	
VI.	<p>Do u have any cases of child labor? The children are in school all the time and when they come for holiday they participate in all domestic chores and simple farming activities but this cannot be termed as child labor it is just children working together with their parents to help raise their fees and meet domestic food needs.</p>	

Date of the Meeting	31 st Jan 2018
Meeting Proceedings Recorded by	Michael Ahimbisibwe
Subject of the Meeting	ECAAT Environmental Social Safeguard Framework Design consultation meeting with Kapchorwa community from 3:00-4:30pm

Item	Summary of proceedings
VII.	<p>What capacity do need ECAAT to instill at your institute to maximize your research output?</p> <p>We have 295 acres of land at Kachekano, 10 at Bugongi, 300 at Nyabwishenya, 300 at kalengele, 100 in Kihihi and 4 at Nyamiko. This is sufficient land to do research and test our outputs in varying environmental conditions.</p> <p>We need a soil lab that is fully furnished to reduce our trips and delay in research outputs arising from our dependence on NARL. We need an entomology and pathology lab with sufficient microscopes, freezers and all other necessary equipment's. Our tissue culture lab needs more technical staff and more equipment's like fume hoods and a growth room. We also need screen houses. Dairy research and poultry is ignored here yet these conditions can favor diary production, if investment is done in these areas we will greatly meet the challenges in this area. We need a sustainable system for supplying lab consumables at a regular basis. We also need investment in soil management system to reduce the prevailing soil erosion, landslides and soil loss which greatly strain our production.</p>

13.10 Annex 11: ATTENDANCE LISTS DURING CONSULTATIVE MEETINGS



ECAAT ENVIRONMENTAL SOCIAL SAFEGAUD FARMER GROUP CONSULTATION
REGISTRATION FORM

09/01/2018

NO	NAME	ORGANISATION	DESIGNATION	SIGNATURE
01	BARISIYOY Jemimah	farmer	Community leader	Jemimah
02	Mary Kaboya	"	Farmer	Kaboya
03	lene Twimugisha	"	"	lene
04	BATUUSA JUSTINE	"	"	BatUSA
05	Nakalemwa SPICISZA	"	"	Nakalemwa
06	Senkindu John	"	"	John
07	TUMNESIGYE HERBERT	"	Farmer	Herbert
08	Iumba Michael	"	Farmer	Iumba
09	KASOZI Robert	"	"	Robert
10	NAGAWA Florence			Florence

0772555392
0762368730
0773077327
0781325522
0780813459
078649687
0780157241
0782094017
0772450894



ECAAT ENVIRONMENTAL SOCIAL SAFEGUARD FARMER GROUP CONSULTATION
REGISTRATION FORM

09/01/2018

NO	NAME	ORGANISATION	DESIGNATION	SIGNATURE
	Lamo Jimmy	NARO	Rice Breeder	
	Mama Francis	NACRRRI	Assistant	
	Luzee Willy	NARO	Cassava	
	Kabagamba Joseph	"	Cassava	
	Zimbe Habibu	"	"	
	Namabwa Aisha	"	"	Natouu
	Nabawaruka J	NARO	"	Nabawaruka
	Namwanga Robina	NARO	Cassava	
	Nasirani Muhamadu	NARO	"	
	Kiwewa Renema	"	"	Renema
	Kiwewa MOSRS	NARO	Cassava	
	Namuyanga Feliciah	NARO	Cassava	

Screenshots

ATTENDANCE LIST
ATAAS END OF QTR 2 (OCT-DEC) 2017 REVIEW AND QTR 3 (JAN-MARCH) 2018 PLANNING WORKSHOP
15TH TO 20TH JANUARY, 2018 - COLLINE HOTEL, MUKONO

DAY THREE

NO.	NAME	DESIGNATION	ORGANISATION / INSTITUTE
	CHARLES BAMUHANGA	SPO	Nasim ZARDI
	Muhumwa John Bosco	Nbo	MBAZAROTI
	Godwin Kwekwa	SHRO	NAROSEC
	OCIRGAN AUBERTAS	SECURITY PERSONNEL	NAROSEC
	Pascal Musoh	SPO/PL - CURU	NAROSEC / NaCORI
	Yefa Ahlami	DCO	NAROSEC
	ORONG YUVENTINO	AG. DIRECTOR	NAROSEC / NGETTA ZARDI
	MAS PETER M RWEGO	OWC liaison offr	NAROSEC
	Olivera Ssal	security officer	NAROSEC
	Muganga Laurence	PL	NaCORI

DAY THREE

NO.	NAME	DESIGNATION	ORGANISATION / INSTITUTE
	Ima Begma	DDGe	Abesee
	Fredrick Kabi	SRO - NALIRRI	Abesee
	Sadik KRIFIN	DOR	Abesee
	Klanne Nkalubo	RO/PL	NALIRRI
	Patrice Z. Nakaterigi	SFO	NATWSE
	Oban Jabo mu	PO - Naczi	Naczi
	Luzina R. Francis	SAO	NATWSE
	W.W. Wagoni	DOR	Naczi
	Anastasia Mabel	RW	MURD
	Florence Kijimba	SRO	NABL
	Nasse Kasozi	R/O	Abesee

13.11 Annex 12: Photo Records of Consultative Meetings



Figure 60: : Workshop to explain the project to the Safeguards Consultants at JBN Office premises, Kampala.



Figure 61: Section of Busika meetings on ECAAT-P



Figure 62: Meeting farmers in the outskirts of Kachekwano ZARDI in Kabale



Figure 63: Meeting with female farmers who are collaborating with NaCRRRI Researchers



Figure 64: A group of men who are participating with research scientists



Figure 65: Consultative meeting with Cassava NCoL Scientists



Figure 66: The ECAAT-P Safeguards Preparation Team Leader addressing the Consultative Meeting with NARO stakeholders in Mukono



Figure 67: A cross-section NARO Stakeholders Meeting in Mukono



Figure 68: Peeling cassava by Oribcing women's group in Abako, Alebtong district.



Figure 69: Bags of rice husks in an agro-processing facility in Iganga.



Figure 70: Cassava processing for home consumption in Kampala affluent settings, an important food even in urban areas.



Figure 71: A cross-section of Benet met during the ESMF Preparation study



Figure 72: Discussions with Kapchorwa District Officials during ESMF study



Figure 73: Meeting with Kween leaders



Figure 74: Consultations in Bulindi ZARDI