ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED DEVELOPMENT OF GRAIN STORAGE FACILITIES ON PLOTS NO. 176 & 178 BLOCK "KK" AT IBADAKULI VILLAGE, IBADAKULI WARD, SHINYANGA MUNICIPALITY IN SHINYANGA REGION

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31st October 2017

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31st October 2017

ENVIRONMENTAL EXPERTS STUDY TEAM

Name	Position	Signature
Eng. Edgar Mwasha	Environmental Expert and ESIA Team leader	
Eng. Samwel Zakayo	Environmental Engineer	
Eng. Hellen Laizer	Environmental Engineer/Socio-Technical Expert	

EXECUTIVE SUMMARY

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INRODUCTION

Government of The United Republic of Tanzania has received a Polish credit (tie-up soft loan) toward the cost of the Storage Capacity Expansion Project (SCEP). This project is being implemented by the National Food Reserve Agency (NFRA) which was established by the Executive Agencies Act No. 30 of 1997 and came into effect on the 1st day of July, 2008. The overall purpose of NFRA is to meet food emergency in the country for post disaster needs and improve the efficiency of grain storage management.

The NFRA operates in all regions in Tanzania Mainland which are strategically located in surplus and deficit areas. Three of these operate in Southern part of the country (Songea, Sumbawanga and Makambako) and others are in Central part (Dodoma) Eastern part (Kipawa Dar es Salaam) Northern Part (Arusha) and Western/Lake part (Shinyanga) of Tanzania. Each zonal office is serving at least one region, hence the number of regions served by the zonal offices differ in both number and size e.g. population and grains production factors. The Agency is in process of re-organizing its zonal offices so as to increase its efficiency in performing its functions. Shinyanga zone which serves eight regions will be divided into two zones of Shinyanga and Kigoma. Shinyanga zone will serve Mwanza, Simiyu, Mara and Shinyanga itself while Kigoma zone will serve Tabora, Kagera, Geita and Kigoma itself. The main role of the Agency of which is their mission as well is to guarantee national food security by procuring, reserving and re-cycling strategic food stock in an efficient and cost effective manner and respond timely to food shortages in the country. In total NFRA owns 33 storage warehouses with a total storage capacity of 246,000 metric tons. The NFRA target is to gradually increase food stock levels to 700,000 MT by year 2018. The current storage capacity of NFRA is 241,000 MT, which is only 34% of the estimated optimal food requirement of 700,000 MT. Therefore there is a critical need to undertaking a modest expansion to achieving an optimal storage capacity. The existing capacity is not adequate to enable NFRA realize its targets both in the medium and long term. In order to have adequate storage facilities in Tanzania, NFRA intends to construct the improved

silo storage system to store grain through the construction of modern grain storage silos at eight selected strategic sites which include Songea, Makambako, Mbozi, Sumbawanga, Mpanda, Shinyanga, Dodoma and Babati.

The proposed development will be constructed on Plot No. 176&178 Block "KK" at Ibadakuli Village, Ibadakuli Ward in Shinyanga Municipality. The land documents are in the final stages at the Municipal levels and will be attached in the upcoming submissions once the process is complete. Total area owned was found to be 8.7 Ha, whereas area earmarked for silo is 0.6Ha (6,000 m^2) and the remaining area will be occupied by other components here mentioned. The major components that will be constructed at the site are eight (6) silos of capacity 3,350 MT and two (2) warehouse buildings, two being of capacity 10,000MT and one being of 2,250 MT that was renovated from milling house to small warehouse, all on a legally acquired site with total area of 8.7 Ha. Other important components that will be included are administration block, a house, WB office, weigh bridge, chemical and miscellaneous store, canteen, washrooms, laboratory building, generators and transformer house, water tank.

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The Legislation in Tanzania requires project developers to carry out an Environmental and Social Impact Assessment (ESIA) prior to implementation. NFRA has commissioned Eco Services (T) Limited to carry out the ESIA of the proposed project. The current environmental legislation in Tanzania requires all development projects to pass through a mandatory Environmental Impact Assessment. Along this legal obligation, the Terms of Reference (ToR) for this assignment requires undertaking an Environmental Impact Assessment and Social Impact Assessment studies. The Environmental Impact Assessment and Audit Regulations of 2005 guide the ESIA process and administration in Tanzania. The Regulations give mandate to the National Management Council (NEMC) to oversee the ESIA process, which culminates with the award of an Environmental Certificate (EC) by the Minister Responsible for Environment. The EC is among the prerequisite approvals required before the project comes to the ground for implementation.

The initial stage of the ESIA study is the scoping exercise, with an intention of identifying key issue to focus on during the detailed ESIA through stakeholders and stakeholder's

consultation. The results of the scoping exercise are essentially the basis for drafting of the ToR before their finalization. The scoping exercise was conducted in January 2017.

This study report therefore provides relevant information and environmental considerations on the project proponent's intention to seek approval from National Environmental Management Authority (NEMC) for the implementation of the proposed project.

PROJECT DESCRIPTION

The proposed site is located on an industrial area in Ibadakuli Village, Ibadakuli Ward in Shinyanga Municipality, Shinyanga Region. The designated GPS co-ordinates for the project site are Latitude 03°64'55.5''S and Longitude 033°47'28.03"E.

The plot is mainly bordered by a Jambo Industry on North separated by a wall fance, on the South is bordered by farm separated by a walk road of about 20m, Shinyanga to Mwanza Highway on the Eastern side about 30m from the site and A farm on the Western side about 5m. The site is located 5km from the Shinyanga Municipality.

STAKEHOLDERS PARTICIPATION AND COMMUNICATION

The consultations were performed by the consultants who involved residents close to the project location and various officials in Shinyanga Municipal Council.

Main issues that came out of the consultation include:

- Environmental conservation
- Waste management
- Congestion of incoming and outgoing traffic along the main road
- Location of the Emergency Assembly points
- Security
- Noise from standby power generator
- Community development

The concerns of each stakeholder have been adequately addressed in this EMP report. The stakeholders consulted are listed below:

- Developer
- Shinyanga Municipal Council
    - Regional Commissioner
    - Town Planner
    - Land Officer
    - Environmental Engineer
    - MEMO
- Fire and Rescue Force
- TANESCO

- TANROADS
- OSHA
- SHUWASA
- Ibadakuli Ward
    - WEO
- Ibadakuli Village
    - VEO
- Project area neighbours

PREDICTED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The impacts are predicted from implementation/construction, operation to decommissioning phase on the following issues: land degradation and contamination; air quality; noise; oil wastes; water resources; solid and liquid waste management; drainage, terrestrial ecology, visual and landscape; traffic; public/motorist comfort; occupation. Most of these key issues were identified during the scoping exercise and are taken onboard during preparation of ESIA. Positive and negative impacts are outlined below:

Anticipated Positive Impacts

The proposed project will have positive impacts to the society and the environment in general. Some of benefits include the following:

- It will encourage people to invest more in agriculture and increase the production in food crops thus increasing the food security at house hold and national level;
- It will optimize use of the land use; hence increasing its utility;
- It will ensure better monitoring, and improved governance and management of food stocks;
- The project will also provide employment opportunities during both construction and operation phases;
- It will ensure the country constant supply of food at all times throughout the year against food scarcity;
- Many secondary businesses are also likely to spring up during the construction phase especially those providing foods and beverages to the construction workers; and
- It will increase competition to both peasants and large scale farming for the provision of food crops to the national stock, which might encourage price regulation (lower).

Negative Impacts associated with the Project Phases

The following are summarized negatives impacts resulted from the project phases whose mitigation measures are well described in Chapter 6;

- Loss of natural vegetation;
- Noise and vibration;
- Air quality deterioration including dust pollution;
- Soil and water contamination;
- Blocked access routes;
- Soil erosion;
- Vehicular traffic;
- Safety hazard and public health;
- Risk of flooding and inundation;
- Damage to the Existing Infrastructure;
- Damage due to Waste Disposal;
- Vehicular emissions;
- Soil disturbance and modification of landscape;
- Disruption of traffic flow;
- Increased surface water run-off;
- Noise from standby generator, compressor; and
- Sanitary waste generation.

PROJECT ALTERNATIVES

No Action Alternative

The no project alternative entails retaining the current status quo (No construction of the grain depot). Adopting this option would mean avoiding most of the negative effects associated with the presence of the facility and missing all the positive benefits such as benefits to communities resulting from employment during and after construction, availability of enough storage facility for grains to ensure food security, and expansion of the local market for the farm products to NFRA particularly grains

Site Alternative

The option of using another site (away from Ibadakuli area) apart from that of the proposed one was also considered. However the feasibility study done by the proponent pointed the strengths of the proposed site as follows:

- The plot is located on a favourable piece of land in terms of size;
- The location is a good due to the road network and easy access; and
- Availability of electricity mains supply and water.

COST BENEFIT ANALYSIS

Several benefits are associated with the proposed development both at local and national level in terms of multiplier effects associated with linkages with local and national economy. The proposed project will generate employment opportunities in Ibadakuli during construction and operation phases, which may be filled by local people with relevant skills. Notwithstanding that at the moment salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve their quality of life and perhaps improve their lifestyles. However, employment opportunities and the salaries provided will extend beyond the workers and benefits as many people as possible, including several dependants. The project will have expanded the facility enough to store food for the benefit of the country and its people in times of food crisis.

ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN

A management plan to see to it that all the mitigation measures recommended by the EIA study have been implemented. This plan is termed as Environmental and Social Impact Management Plan (ESMP). The associated environmental and social management plan is TSHS 65,100,000. The estimated annual costs for carrying out the proposed environmental monitoring programme amounts to TSHS 28,500,000.

PROJECT COMPLETION AND DECOMMISSIONING PHASE

On completion of the project life on the site, everything should be left in order. To achieve this, the following should be accomplished.

- Landscaping of open areas should be done. Such areas should be sealed from pits and other depressions and vegetation introduced.
- All waste materials should be cleared and removed from the site. There should be no such materials as wood, glass, stones, scrap metals etc. However, these should be disposed appropriately.
- General rehabilitation of any excavated areas; quality vegetation should be introduced to add aesthetic value to the site. This should be regularly watered.
- The structures should be cleared and rubbed of any dust particles
- All construction equipment and plants should be removed and the old ones sold to the respective scrap materials handlers.
- Workers should be pre-warned just before decommissioning and suitably compensated and recommended: to assist in seeking opportunities elsewhere.

EXPERTS PARTICIPATED IN THE STUDY

Name of Staff	Firm/Organization	Area of Expertise	Position Assigned
Eng. Edgar Mwasha	Eco Services (T) Limited	EIA Expert and Team Leader	Lead Environmental Expert
Eng. Samwel Zakayo	Eco Services (T) Limited	EIA Expert and Environmental Engineering	Environmental Expert
Prof Valerian Silayo	Sokoine University of Agriculture (SUA)	Agricultural Engineering and Natural Resources Management	Agricultural Expert
Mr. Ignatius Ngamesha	Eco Services (T) Limited	Sociology	Sociologist
Eng. Robert Mshana	Eco Services (T) Limited	Civil Engineering	Civil Engineer
Dr. George Sangu	UDSM	Botany/Ecology	Ecologist
Eng. Hellen Laizer	Eco Services (T) Limited	Environmental Engineer	Environmental consultant

CONCLUSION

The assessment of impacts was based on the review of the project activities and issues identified during the EIA scoping phase and through stakeholders' consultation. The assessment acknowledges that any development will have effects on the biophysical and socio-economic environment. The impact assessment did not identify any issue of major significance that could not be mitigated such that the proposed project was not acceptable from the environmental and social perspective. All potential negative impacts identified through EIA could be mitigated to reduce severity and significance to acceptable levels or use of management controls. The associated negative impacts, to a large extent have been minimized through best management practices, safety and contingencies procedures and practices. Implementing proposed mitigation measures would increase environmental soundness of the project. It is, therefore, concluded that, implementation of the proposed grain storage facility will entail no deterrent impacts provided that recommended mitigation measures are adequately and timely put in place. NFRA is committed in implementing all the recommendations given in this EIS and further carrying out the environmental auditing and monitoring schedules. Although there are some limited negative environmental implications of the project, the project will have high socio-economic benefits to the local community in Ibadakuli, Shinyanga Municipality and the country as a whole.

ACKNOWLEDGEMENTS

NFRA would like to convey heartfelt thanks and appreciation to Eco Services (T) Ltd led by Eng Edgar Mwasha for leading the EIA team during assessment of the envisaged activities. He also helped in practical arrangements during consultation of stakeholders in Babati Town Council. However, Eng Samwel Zakayo for compilation of the issues raised by all stakeholders from national level to local authority in the project area and designating impacts mitigation and management plan. Mr. Eliyuko Kajiru and Eng. Hellen Laizer whose contribution during stakeholders' consultation was invaluable. The proponent is as well thankful to Prof. Valerian Silayo (Agricultural Expert), Mr. Ignatius Ngamesha (Sociologist), Eng. Robert Mshana (Civil Engineer) and Dr. George Sangu (Ecologist) for their professional inputs to achievable objectives of this study. Last but not least to all public servants from village, ward, municipal to ministerial levels for their great cooperation towards making this study a success, their comments and opinions are invaluable and actually have contributed to improve the EIS. Thank you very much all of you.

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
APF	Agency Performance Framework
BATNEEC	Best Available Technology Not Entailing Excess Cost
SHUWASA	Shinyanga Water and Sewerage Authority
CAADP	Comprehensive Africa Agriculture Development Programme
CCTV	Closed-Circuit Television
CEO	Chief Executive Officer
CRB	Contractors Registration Board
CSA	Climate Smart Agriculture
DoE	Division of Environment
EC	Environmental Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental management Plan
ERB	Engineers Registration Board
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FY	Financial Year
GDP	Gross Domestic Product
GoT	Government of Tanzania
HIV	Human Immune Deficiency Virus
kVA	Kilo Volts Amps
LGA	Local Government Authority
MAFC	Ministry of Agriculture, Food and Corporatives
MDGS	Millennium Development Goals
MEMO	Municipal Environmental Management Officer
MT	Metric Tonnes
NEMC	National Environment Management Council
NEP	National Environmental Policy
NFRA	National Food Reserve Agency
NGO	Non Governmental Organisations
NHC	National Housing Corporation
O&M	Operation and Maintenance
OSHA	Occupation Safety and Health Act
PK	Pyrelastic Kimberlite
PMO	Prime Minister's Office
QS	Quantity Surveyor
SCEP	Storage Capacity Expansion Project
SDGS	Sustainable Development Goals
TAC	Technical Advisory Committee
TAFSIP	Tanzania Agriculture and Food Security Investment Plan
TANDREC	Tanzania National Disaster and Relief Committee

TANESCO	Tanzania Electricity Supply Company
TANROADS	Tanzania Roads Agency
TDV	Tanzania Development Vision
ToR	Terms of Reference
TPRI	Tropical Pesticides Research Institute
TRA	Tanzania Revenue Authority
UNDP	United National Development Programme
URT	United Republic of Tanzania
VAT	Value Added Tax
VEO	Village Executive Officer
WEO	Ward Executive Officer

CHAPTER 1

1.0 INTRODUCTION

1.1 Background and Justification

Government of The United Republic of Tanzania has received a Polish credit (tie-up soft loan) toward the cost of the Storage Capacity Expansion Project (SCEP). This project is being implemented by the National Food Reserve Agency (NFRA) which was established by the Executive Agencies Act No. 30 of 1997 and came into effect on the 1st day of July, 2008. The overall purpose of NFRA is to meet food emergency in the country for post disaster needs and improve the efficiency of grain storage management.

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1.2 Rationale of the EIA Study

The purpose of this EIA study was to foresee the environmental, social and economic effects of the proposed grain storage facilities before the project come into the actual implementation. The study therefore has addressed the social, economic, and environmental issues associated with the project and provided relevant mitigation plan to prevent or minimize adverse impacts.

The study has determined the environmental consequences of the proposed project. In undertaking the EIA study, the consultant collected data on physical, biological and socio-cultural environment of the area. The information was used to predict the

potential impacts of the proposed activities as well as to develop appropriate mitigation measures and to plan programs to monitor any changes that may result after constructing and use of the facilities.

1.3 Nature of the project

The EIA study addresses all environmental and social aspects of the proposed grain storage facilities project as contained in the Terms of Reference (ToR) attached in Appendix II. As already stated above, this EIA study has been conducted in accordance with the National Environmental Impact Assessment and Audit regulations (2005), formulated after the Environmental Management Act No. 20 of 2004. This Act specifically requires mandatory carrying out of EIA for development projects implemented in Tanzania. Under these Regulations, major urban projects (like grain storage facilities) fall under category I projects, which require a full EIA study (First schedule list). The proposed grain storage facilities falls under this category and therefore it qualifies for a full EIA study. The requirements for full EIA study were observed in drawing up the Terms of Reference for this study during the scoping stage.

1.4 Scope of Work

This study entailed the following:-

- To provide a brief description of the relevant parts of the project including project location, design, components and activities;
- To review of policies, legislation, standards and regulations governing Environment at International, Regional and Local levels;
- To assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the project area;
- To make consultation with Government agencies, local communities and the private sector operating in near the project area;
- To assess and quantify the potential environmental impacts resulting from the road development, especially within the zone of influence of the project;
- Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives; and
- To develop an Environmental and social Management Plan (ESMP) detailing actions and responsibilities for impacts mitigation and monitoring.

The ToR that was prepared by the consultant and Approved by NEMC formed the basis for the study, and for that matter, this report.

1.5 Methodology

1.5.1 Study Team

The EIA being a multidisciplinary field involved a team of experts, the key ones being EIA Expert (Team Leader), Environmental Engineer, Architect and a Sociologist.

1.5.2 Scoping

The initial stage of EIA study is scoping exercise, with a major intention of identifying key stakeholders and potential social and environmental impacts (positive and negative). The results of the scoping exercise reinforce the drafting of the Terms of Reference (ToR) before their finalization.
Scoping exercise identified key stakeholders for the project and main issues of concern. It was conducted mainly through consultation with key stakeholders, reviewing various reports, studies and literature relevant to environment and grain storage projects in Tanzania. The scoping exercise was conducted in January 2017.

1.5.3 Field studies

The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. Two visits to the project area were made; the first visit was during scoping stage and the second at the detailed interview stage. All visits were made in January 2017.

The EIA team used the fieldwork to conduct interview with stakeholders and also to collect information on the state of the environment. Information collected includes land use, human demography, cultural heritage, water supply, wastewater collection, traffic issues, and other indicators related to environmental and socio-economic trends of Shinyanga Region and Shinyanga municipality. Other information was appraised through key informants' interviews and experts' observations.

1.5.4 Public participation

Broad consultations were conducted involving different institutions including:

Institutions

- Shinyanga Municipal Council
    - Regional Commissioner
    - Town Planner
    - Land Officer
    - Environmental Engineer
    - MEMO

- Fire and Rescue Force
- TANESCO
- TANROADS
- OSHA
- SHUWASA
- MAFC
- TPRI

Individuals

- Developer
- Ibadakuli Ward
    - WEO
- Ibadakuli Village
    - VEO
- Neighbours

The concerns of each group have been addressed in this EIA report.

1.5.5 Project Impact Assessment

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed grain storage facilities in Shinyanga Municipality. The checklist method was used to identify the impacts and mitigation measures. Further, environmental impact matrix method was adopted in identifying impacts of major concerns. A key guiding assumption in this study is that the project will be designed, constructed and operated with due care for safety and environmental matters using current and practical engineering practices and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the EMP.

1.6 Report Structure

The report is divided into two parts, whereby Part I is the Executive Summary and Part II contains the main text which consists of 11 chapters. Chapter 1 describes the Introduction, which gives the background information about the project, scope of work, rationale of the study, and methodology used in carrying out the study. Chapter 2 gives the description of the project in terms of its location, objectives, project design and project activities that would be carried out during the proposed works. Chapter 3 describes relevant Policies, Legal and Institutional framework governing EIA requirements and environmental management in the country. Chapter 4 describes the baseline information on the biophysical and socio-economic environment. Chapter 5 presents the results of stakeholder's participation and communication and how they

have been responded. Chapter 6 presents identification and prediction of impacts, project alternatives and its mitigation measures. Chapter 7 outlines Environmental and Social Management Plan. Chapter 8 provides Environmental, Social impact mitigation and monitoring plans of the anticipated impacts. Chapter 9 presents summary of cost benefit analysis of the project. Chapter 10 provides description on decommissioning phase of the project. Lastly, Chapter 11 draws up conclusions and recommendations of the study.

CHAPTER 2

2.0 PROJECT DESCRIPTION

2.1 Location and Accessibility

The proposed site is located on an industrial area in Ibadakuli Village, Ibadakuli Ward in Shinyanga Municipality, Shinyanga Region. The designated GPS co-ordinates for the project site are Latitude 03°64'55.5''S and Longitude 033°47'28.03"E.

The plot is mainly bordered by a Jambo Industry on North separated by a wall fence, on the South is bordered by farm separated by a walk road of about 20m, Shinyanga to Mwanza Highway on the Eastern side about 30m from the site and A farm on the Western side about 5m. The site is located 5km from the Shinyanga Municipality as shown in the Google map in Figures 2.1-2.3 shows the location of the project site.

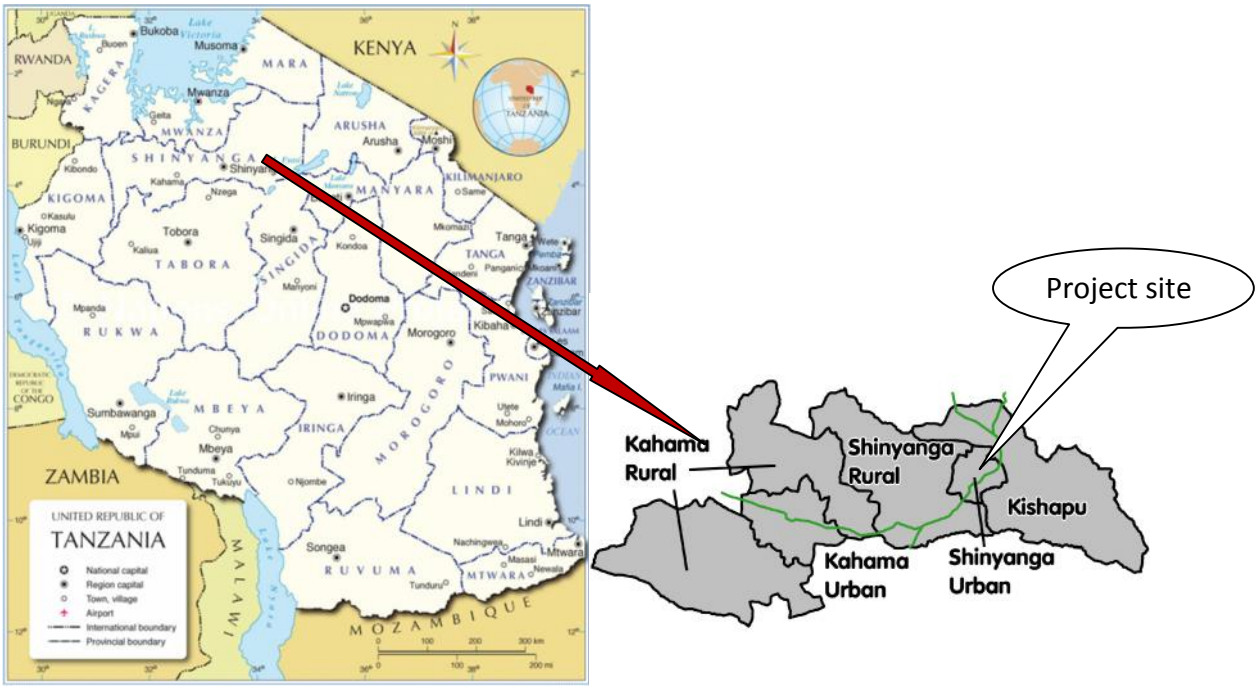

Figure 2.1: A map showing the Region and District of the proposed project (Source: Shinyanga-Region.svg, 2017)

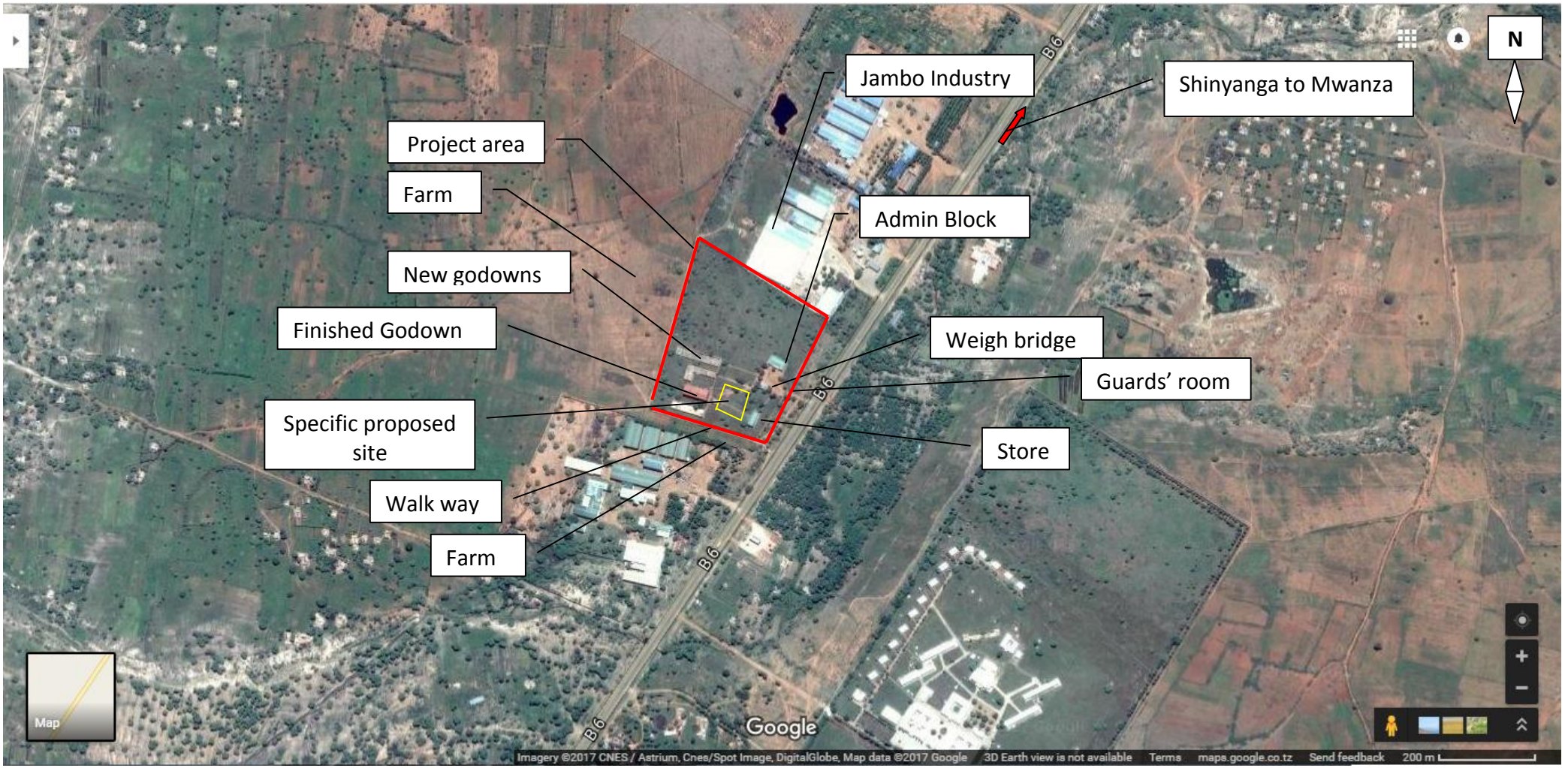

Figure 2.2: An Ariel map showing the location of the project site and adjacent developments
(Source: Google Earth, 2017

2.2 Project Activities

The proposed undertaking involves various phases from the planning phase all the way to the construction and operation phase. Each specific phase has its own activities which are adequately elaborated in following sections:

2.2.1 Mobilzation Phase

Construction materials such as bricks, gravel/stones, sand, cement, concrete will be locally sourced. Other materials include sheets, composite steel, galvanized steel ($275g/m^3$) products will be mobilized from Dar es Salaam. Most technical parts such as bins, Cleaning and drying unit, bulk Conveyance unit (Conveyors and elevators), Bulk storage unit (prefabricated grain storage and Bagging Bin), aeration system, and Instrumentation etc will be mobilized from Dar es Salaam and will only be imported when not locally available so as to meet with the standards and requirements of the facility. All materials will be sourced from the authorized areas/sources. Heavy construction equipment will be involved during construction i.e. bulldozers, heavy vehicles, compactors, concrete mixers will be sourced from registered contractors.

2.2.2 Pre- Construction Phase

The following are activities to be carried out during pre-construction stage:

2.2.2.1 Site Topography

The project area has a uniform terrain which is fairly flat with dominant gradient of less than 0.018 (1.8%) sloping southern part of the site, with no indication of storm water gullies. The area is covered by vegetation, with well established concrete block wall boundary.

2.2.2.2 Architectural, Engineering and Services Designs

Architectural designs are basically concepts that focus on the components or elements of a structure or system and unifies them into a coherent and functional whole, according to a particular approach in achieving the objective(s) under the given constraints or limitations. The designs of the proposed storage facility are approved and shown in this report.

2.2.2.3.Geotechnical Investigations and Results

A geotechnical site investigation is the process of collecting information and evaluating the conditions of the site for the purpose of designing and constructing the foundation for a structure, such as a building, plant or bridge.

Figure 2.3: Soil samples for laboratory testing
(Source: Geotechnical Report_NFRA Shinyanga, 2016)

Allowable Soil Pressure

The ground is generally characterized by a dense to very dense reddish silty SAND soil to about 3 m depth. From about 3 m depth to the end of boreholes, the ground gets very dense, from cemented SAND to weathered SANDSTONE ROCK. This suggests that for a foundation seated at a depth of 1.5 m (with proper compaction) an allowable bearing pressure of 180 kN/m can be used for the design the foundations. If the foundations are seated at 2.0 m or beyond, a safe bearing pressure of 200 kN/m can confidently be assumed. However, use of nominally reinforced concrete foundation base for the silos is recommended to bridge weak spots and support slab loads (per the structural design). For the warehouse, a mass strip foundation will be enough, given the highly bearing ground, underlain by a rock. Actual bearing capacity values will be determined once laboratory strength test results have been established.

Type of Foundation

The subsoil in the area has shown fairly uniform and homogeneous strength values for the layers from 1.5 m depth, which are underlain by cemented sands and lightly weathered rock. This calls for a lightly reinforced foundation or base. Thus, a NOMINALLY REINFORCED CONCRETE FOUNDATION/BASE is recommended. A 20 cm thick compacted layer of medium to coarse SAND is placed between the foundation structure/base and the native soil. This will serve as a drainage layer and prevent development of excess pore water pressure around the silo foundations and base. The

soil parameters required for structural design is provided in the Final Report which includes the results of laboratory tests. In addition to the soil parameters, such designs need the knowledge of the design load and the envisaged/available construction technics. It will therefore be left for the structural engineer to accomplish.

Depth of foundation

The recommended foundation should be seated at least 1.5 m below the ground surface in order to provide lateral support to the foundations, thus enhance the bearing stability of the foundations. This will have to be accompanied by a 20 cm layer of medium to coarse sand (drainage layer) and blinded with a 50 mm layer of lean concrete before casting the reinforced concrete base. This will increase protection to the reinforcement against *Geotechnical Investigations Final Report – NFRA Silos and Warehouse in Shinyanga* corrosion due to possible existence of or leaching of salts into the porous sandstone rock.

2.2.2.4 Environmental Impact Assessment

The environmental and social impact assessment (ESIA) process is an interdisciplinary and multi-step procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. Simply defined, the EIA process helps identify the possible environmental effects of a proposed activity and how those impacts can be mitigated. The purpose of the ESIA process is to inform decision-makers and the public of the environmental consequences of implementing a proposed project. This report is an environmental Impact Statement presenting the above considerations.

Figure 2.4: Basic Principals of EIA

2.2.2.5 Acquisition of various permits/ certificates (i.e EC, Building permit)

Acquisition of various permits is ongoing including the environmental certificate.

2.2.3 Construction Phase

Prior to construction of the grain storage facilities, site clearance will be done to pave way for construction process. Construction of site office and materials storage structures will be undertaken after site clearance.

Setting of the planned design will be done by the Contractor before piling foundation structures. The proposed facilities will be constructed in accordance to the approved architectural and engineering drawings. Installation of power, communication lines and building services will be done after the structure erected. Installation of interior facilities in offices will be done. At last landscaping of the surrounding environs will be done.

During the project construction the following activities are envisaged:

i. Contractor Mobilization;
ii. Equipment / Materials;
iii. General site clearance and access;
iv. Construction of borrow and disposal area;
v. Construction Camp Establishment;
vi. earth work and grading;
vii. Excavations;
viii. Foundations;
ix. Fabrication of Silos;
x. Construction of offices;
xi. Construction of drainages, septic tank systems ad soakage pits;
xii. Installation of Machinery; and
xiii. Utility requirements.

2.2.3 Operation Phase

The following can be among the major activities during the operation of the storage facilities;

2.2.3.1 Procuring of the food stock

The Agency uses different methods to procure its food stocks. The procurement cycle for food stocks starts in July and ends in December with a peak in October. Procurement of services and goods required for grain storage is done competitively through tendering processes. The procurement modalities for food stocks include tendering, use of agents, use of farmers groups and collection/buying centres. Provided the grain meets the minimum requirements, it will be purchased at a pre-determined price based on prevailing market price and unit cost of production. At present NFRA has about 60 permanent buying centres at the village level located in seven NFRA zones. In 2016/2017, the Agency is intending to increase the number of buying centres to 62 so as more farmers can have direct access to sell at buying centres. The plan is to have 50 permanent buying centres and 12 mobile buying centres.

Tendering

The NFRA procures through open public tender especially in areas with low production level. Successful bidders will be required to deliver the contracted quantities to the NFRA's designated warehouses. Currently, the majority of grains are acquired through direct purchase from farmers and traders at NFRA's collection centres. It should be noted that the availability and characteristics of suppliers in the grain market will have an influence on the procurement approach used, and on the competitiveness of the procurement prices. The use of tendering method reduces staff time spent on direct collection of grains, village collection centre renting costs, per diems costs, police escort costs and extra duty expenses and hiring of motor vehicles since the suppliers will be required to deliver the grains at the NFRA warehouses. It is believed that through competitive process, procurement of the grains can be much more efficient and cost effective.

Use of Agents

The NFRA appoints and enters into contracts with buying agents. The agents are required to deliver the grain at respective zonal storage facilities. The advantage of using agents is that the NFRA staff time is spared for strategic activities. The procurement agents will ensure that the farmers do not in any way get price lower than the procurement/support price if their produce conforms to specification.

The use of agents however will require a mechanism to assess their conducts and receiving feedback and complaints of the farmers during the procurement. The need to check against unnecessary rejection of food grains by the agent will be of paramount importance. Despite the need for a close follow up, the use of Agents appears to be the most suitable modality of grains procurement with the view to stimulate production rather than to curbing it. The use of agents will also eliminate intermediaries who will be buying grain from farmers at low prices for resale to the NFRA hence exploitation. The agents will be required to buy grains from the registered farmers at the respective villages, farmer groups and agricultural cooperatives.

Use of Farmer Groups

The NFRA enters with the farmer groups to procure grains from them. This initiative not only ensures the availability of grains to the Agency but also aims at promoting public procurement from smallholders at market competitive prices. However, for the NFRA to yield positive results on the procurement from farmer groups the purchase should go hand in hand with targeted support programmes such as access to credit, inputs and training. These facilities are yet to be practiced by the NFRA at the moment. Farmer groups usually face challenges associated with unpredictable rains that affect their production during a particular season. At a large extent farmer groups do not have access to irrigation schemes.

Collection/ Buying Centres

The NFRAs uses its own staff in procuring grain from its current 54 buying centres country wide. These centres are located at village level and their selection is determined by several factors including operational costs and the need to encourage private sector to fully participate in the grain market. Grain that meets the minimum requirements are procured at a pre-determined price based on prevailing price and unit cost of production.

The advantage of using buying centres is that the grains are to be purchased during the peak of harvest and when there is glut in the market, and released during period of emergencies for price stabilization and curbing food shortages. The surplus food stocks from farmers are being purchased at pre-determined prices and are made available to the public at the time of scarcity. The critic to the use of collection centres (cash purchase) modality is based on its inherent inability to mitigate issues surrounding the quality of the grain during the field due to divided attention and limited quality control personnel.

2.2.3.2 Stock storage, maintenance and quality control

Food grain purchased at buying centres is transported to the storage facilities, where it is inspected, cleaned, stored in silos or bagged in 90 kg bags, stacked, fumigated and stored. In order to the make the grain alive and maintain its properties. Fumigants and agrochemicals mostly used by the Agency are as indicated in Table 2.1 below. Inspection in the warehouses is done regularly to ensure that its condition remains within specification and that it is not subject to pest and rodent attack. Responsibility for frequent inspections and taking the necessary corrective actions rests with the quality control staff.

The use of Silos for storage purposes is of great importance as it will minimize the use pesticides by use of ozonation as the silos will be well tightened supporting no life for distructive macro and micro organisms. The other good thing of the silos is its monitoring is done electronically wherever the operator will be and whenever the affected area within the silos is detected, a dose is prepared and directed to that specific area without affecting the whole bulk and that will keep the storage free from pesticides applications.

Table 2.1: Fumigants and Agro-chemicals mostly used by NFRA

S/N	Purpose	Chemical Name	Trade Name
1	**Fumigation**	Aluminium Phosphide (Tablets)	Detia X.T
			Phostonix – T
		Aluminium Phosphide (Packets)	Detia Ex Packets
			Bulphos
2	**Spraying**	Pirimiphos Methyl 50	Acteric 50 EC
		ECDichlorovos 500 EC	Nuvan 500 EC
3	**Dusting**	Pirimiphos Methyl Dust 2%	Acteric Super Dust
			Bulphos Dust
4	**Rat Control**	Bromadialine	TCI Pellets
5	**Termite Control**	Chloropyriphos 45%	Dasban

(NFRA, 2017)

2.2.3.3 Food stock releases

Releases from the reserve are made to counteract food shortages determined from time to time by the Food Security Department of the Ministry of Agriculture Livestock and Fisheries in collaboration with the Local Government Authorities. This is done by carrying out vulnerability assessment studies which determine among others; target groups and recommends amounts of food releases in the form of food aid. Usually the releases are sanctioned by the Tanzania National Disaster and Relief Committee (TANDREC) under the chairmanship of the Prime Minister's Office (PMO). Distribution of the released food to the target groups is the responsibility of the Local Government Authorities. PMO has put in place guidelines to be used during distribution process at local levels. The Agency from time to time may release part of the food stock to the market for the purpose of stabilizing food supply, but this is only when demand is higher than supply.

2.2.4.4 Food stock recycling

To maintain the food reserve in good condition, it is necessary to periodically rotate the food stock which has not been required for relief programs and is still held in the reserves. The procedure is for NFRA to hold stock for not more than three years, after which it will be difficult for the said stock to be stored in good condition. Normally NFRA releases stocks that have been held for more than one year. The Agency targets to dispose at least 30% of the annual stock each year.

Other operational activities include;

- Operation of Machinery;
- Equipment;
- Repair and Maintenance; and
- Grain Transportation.

2.4.4.5 Procurement and Storage Challenges

The NFRA is required by Section 4.2 (iii) of the Executive Agency (National Food Reserve Agency) (Establishment) Order 2008 to maintain operational efficiency by using best and transparent internal procedures for procurement of goods and services. It is also required to achieve an effective and transparent procurement and stock control systems. Section 7.7 of Establishment Order GN.No.81 requires the CEO to obtain value for money in the procurement and delivery of goods and services. The CEO is required to implement a range of efficiency measures in accordance with the agreed programme and timetable set out in the strategic and business plans. The following are the main challenges faced by the NFRA:

Storage facilities:

NFRA has inadequate storage facilities to properly store grains it procures from farmers and traders. Table 2.2 below shows the current storage capacity against the projected stocks for the financial year 2013/14 by zone. It is obvious that if the procurement target is achieved the NFRA will be required to hire additional storage facilities or else keep some of its stock outside the warehouses. It is clearly shown in the table that distribution of storage facilities among zones is not optimal considering food stocks supply in respective zone and hence calls for the transfer of food stock from one zone to the other to mitigate storage gap.

Table 2.2: Current storage capacity vs. projected stock for the FY 2013/14 (MT)

Zone	Storage capacity	Projected stocks available	Projected Transfer In/(Out) to other zones	Total stored	Excess/ (shortage) Storage capacity
Arusha	**39,000**	**33,061**	**10,000**	**43,061**	**(4,061)**
Kipawa	52,000	25,298	18,500	43,798	8,202
Dodoma	39,000	32,311	10,000	42,311	(3.311)
Shinyanga	14,500	36,108	35,000	71,108	(56,606)
Makambako	34,000	69,786	14,500	84,286	(50,286)
Songea	24,000	64,233	-	64,233	(40,233)
Sumbawanga	38,500	102,546	-	14,546	23,954
Total	**241,000**	**363,341**	**88,000**	**363,341**	**(122,341)**

(Source: NFRA Investment Plan, 2014/15-2023/2024)

Excessive transport costs

In addition to incurring transport costs to move procured grains from collection centres to the respective zonal warehouses, the NFRA also incurs costs in stock movements between the zones. The transfers from one zone to another are attributed to the excess demand in some zones in one hand and shortages of storage capacity in zones with excess supplies in another hand. The Agency therefore needs to establish an optimal transportation model that will ensure that transport costs are at minimal level. Most of the transfers were made from other zones to Arusha (21%), Kipawa (16%), Shinyanga (15%) etc. On average the transfer costs amount to 7.3% of the grain procurement costs (NFRA Investment Plan, 2014/15-2023/2024).

Grains purchase framework/guidelines:

Apart from the existing procurement legal framework, NFRA does not have a documented grains purchase framework/guidelines that defines clearly:

- Minimum criteria/ standards of the grain (appearance etc.);
- Documentation;
- Grading;
- Coding of the attributed expenses;
- Monitoring and controls of the stores;
- Segregation of duties; and
- Location and quality of store facilities.

Grains mix

A good food reserve programme must be able to stimulate production rather than to curbing it. For food reserve to be effective, it must be operated in a transparent and predictable fashion, it was however, submitted by the districts that efforts to promote sorghum and other grains are affected by lack of reliable markets. NFRA grain base is significantly limited to maize. It is therefore a high time for the NFRA to expand its grains mix to suit and promote the local supply of other grains such as cassava, sorghum and finger millet.

Procurement targets

NFRA does not achieve its annual procurement targets. Table 2.3 below shows actual procurements against targets for the past three financial years. The trends show that the Agency's procurement performance declined from 91% in FY 2010/11 to 31% in FY 2012/13. This is attributed to delay in fund transfers from the central government and capacity gaps in the procurement and storage capacity at the Zonal Offices.

Table 2.3: Procurement Actual versus Target

ZONE	2010/2011			2011/12			2012/2013		
	TARGET	**ACTUAL**	**%**	**TARGET**	**ACTUAL**	**%**	**TARGET**	**ACTUAL**	**%**
Arusha	**20,000**	**16,767.2**	**84**	**15,000**	**1,251.6**	**8**	**15,000**	**316.1**	**2**
Dodoma	15,000	15,222.3	101	15,000	1,400.5	9	10,000	19.1	0
Kipawa	20,000	-	0	-	-	-	5,000	15,000.0	300
Makambako	45,000	39,070.1	87	30,000	18,572.7	62	50,000	13,183.9	26
Shinyanga	5,000	5,104.3	87	5,000	1,307.4	26	-	-	-
Songea	35,000	48,129.7	102	45,000	52,268.9	116	60,000	26,863.3	45
Sumbawanga	60,000	56,725.0	95	50,000	51,044.4	102	60,000	7,346.4	12
TOTAL	**200,000**	**181,019.0**	**91**	**160,000.0**	**125,845.8**	**79**	**200,000.0**	**62,728.9**	**31**

(Source: NFRA Investment Plan, 2014/15-2023/2024)

2.4.4.6 Recommendations on Procurement

Based on the situational analysis of the NFRA procurement process, the following is recommended to be undertaken to improve operations:

- Consider a more decentralized warehouse facility to ensure food availability within a short distance of the affected areas relative to food sources;
- Establish grains pricing mechanism that is transparent based on the accurate grains production costs data and market selling prices;
- Consider the possibilities of using mostly Agents and farmer groups and farmer organizations in procurement of grains;
- Establish an Agents Performance Framework (APF) that among other things will provide guidelines and standards to be followed by the contracted agents. NRFA should also ensure that the agents are properly trained on the procurement standards and guidelines. No Agent should be contracted unless he goes through the training on these standards and guidelines and demonstrate the general understanding of the same;
- Develop credit and finance schemes, emphasizing finance for small farmers groups including micro-credit. Farmers groups and farmer organisations should be trained on the quality futures of the grains they procure and store before they are purchased by the Agency;
- Implement the proposed storage expansion projects to meet current and future demand;
- Establish an efficient market information platform that will help farmers to make profitable decisions on when and where to market and on what to produce;
- Promote offer prices well in advance to the farmers in all procurement areas;

- Explore the possibility of using railway mode of transport where the service is available;
- Expand grains mix to include other nutritional food ingredients such as sorghum, cassava, rice, finger millet, bean, oil seeds etc.;
- Develop grains purchase guidelines to enable zonal offices procure high quality grains;
- Procurement section and zonal offices to be properly staffed with qualified and experienced procurement staff that matches the scope of work performed at that level; and
- Establish an optimal transportation model to be aligned with the annual grains procurement plans. This will also go in line with establishment of Operations and Logistics Department under the Directorate of Operations.

2.2.5 Refurbishment Phase

In order to ensure that the facilities are in good and safe operating condition at all times, there will be a maintenance unit in place with competent personnel and adequate tools and equipment to attend all maintenance duties. The facility's maintenance schedule and procedures will be in place to guide implementation of the maintenance process.

2.2.6 Demobilization Phase

Demobilization of temporary structures will be done for proper restoration of the site by:

1. Demolishing all structures;
2. Transportation of used timber, iron sheets, reinforcing iron rods, rubbles away from the site; and
3. Landscaping.

2.2.7 Decommissioning Phase

The decommissioning phase will involve, dismantling of complex silos, removal of intake unit, Bins, Cleaning and drying unit, bulk Conveyance unit (Conveyors and elevators), Bulk storage unit (prefabricated grain storage and Bagging Bin), aeration system, and Instrumentation and if necessary demolition of other structures in order to pave the way for other activities.

2.3 Project Design

The project is expected to be executed on a combination of two sites i.e. plots No. 176 and 178 with a total area of 8.7 Ha, whereas area earmarked for silos construction is 6,000 m^2 (0.6Ha). The proposed expansion will include construction of eight (6) silos of capacity 3,350 MT and two (2) warehouse buildings, two being of capacity 10,000MT and one being of 2,250 MT that was renovated from milling house to small warehouse.

Other supporting facilities such as administration blocks, installing weighbridge and other equipment will be constructed

The layout arrangements for silos complex and warehouse will be done accordingly. After fitting the facilities in the available area, the drainage system layout, internal roads (hardstand) pavements, administration building, washrooms, canteen, chemical store, miscellaneous stores as well as traffic plan will be included in the design.

The design of site layout for major facilities (silos and warehouse) based on operational flow and best approach of space optimization. The arrangement follows the logical flow of materials in the sequence of grain storage technology. Warehouses are arranged in the manner that cut and fill is minimized while maintaining East-West direction for maximum ventilation. Silos were arranged basing on the proper manoeuvring of vehicles both during offloading and loading of grains. Detail layout is found in drawing number NFRA/2015/D011 (see Appendix VI).

The Project implementation is expected to begin by June 2017 for duration of 12 months.

2.3.1 Project Components

The major components that will be constructed at the site are

- eight (6) silos of capacity 3,350 MT;
- three (3) warehouse buildings, two being of capacity 10,000MT and one being of 2,250 MT that was renovated from milling house to small warehouse;
- Administration block;
- WB office;
- Weigh bridge, that can measure up to 100 T ones at once;
- Chemical and miscellaneous store;
- Canteen;
- Washrooms;
- Laboratory building;
- Generators and transformer house;
- Water tank;
- Installation of CCTV cameras to enhance security; and
- Installation of communications systems (Data and Voice).

The specifications for the Silos and Warehouses are provided in Table 2.4.

Table 2.4: Specifications for the silos and warehouse to be constructed in Shinyanga

Item	Description	Specifications
SILOS DATA		
1	Silo Bin Capacity (MT)	6 x 3,350
2	Bin Diameter (m)	17.0
3	Bin Height (m)	18.8
4	Overall Height (m)	23.90
5	Materials	Galvanized Steel (275g/m^3)
6	Silos type	Flat bottom
7	Grain type	Maize
WAREHOUSE DATA		
8	Warehouse size (m)	Approx. 90m x 40m
9	Height of stake	5m
10	Wall Height	6m
11	Construction Material	Composite (steel & concrete)
12	Capacity	10,000 MT
13	Warehouse size (m)	Approx. 80m x 30m
14	Height of stake	5m
15	Wall Height	6m
16	Construction materials	Composite (steel & concrete)
17	Capacity	2,250MT

(Source: NFRA)

2.4 Construction Materials

Table 2.5 provides construction materials in terms of types and quantities. It is worthwhile to note that the quantities are estimates as actual quantities will be determined later.

Table 2.5: Type and Quantity of Materials to be used During Construction of the Facility

Material	Quantity	Source
Sand	180 m^3	Locally
Aggregates	100m^3	Locally
Stones	20 tons	Locally
Cement	500 bags	Locally
Cement blocks	700,000	Locally
Timber work	100pcs	Locally
Iron nails (different sizes)	50kg	Locally
Sheets	50pcs	Locally
composite steel	30tons	Dar es Salaam

Galvanized steel (275g/m^3)	40m^2	Dar es Salaam
Bins, cleaning and drying unit, Bulk conveyance unit, Bulk Storage unit, Aeration system and Instrumentation	-	Dar es Salaam
Paint(various colours)	200 litres	Locally
Water	100,000 litres	From SHUWASA
Iron bars	3tons	Locally
Iron sheets	200pcs	Locally
Electrical wires	-	From TANESCO
Water pipes (13mm)	50pcs	Locally
Pipe fittings and valves	-	Locally
Sewer pipes (100mm)	30pcs	Locally

2.4.1 Transportation of Materials

Construction materials will be transported by trucks from different sources according to nature of the materials and products required. The proponent will hire suppliers in accordance to company procurement procedures and the contractor who will be responsible for all construction activities that will be going on at the site. Transporting of these materials might have adverse social and environmental impacts including:

- Use of fossil fuels;
- CO_2 emissions;
- Increased road vehicle movements; and
- Nuisance to local residents.

Methods for mitigation of these impacts are discussed in chapter 8 and 9 in this report.

2.5 Waste Generation

This section provides information of solid and liquid waste generated in all project phases. The methodology used to estimate solid waste was based on established data from different studies in Tanzania that a solid waste generation rate used per person per day was 0.79kg/day/person. As for liquid wastes, scientific accepted figures internationally were adopted and 80% of water consumed per day per person is wastewater.

2.5.1 Mobilization wastes

In this phase, the major activities conducted include survey and geotechnical investigation and thus minimal solid wastes such as dust, grasses/cut tree branches and top soils are expected to be generated from site clearance. Grasses will be left at the site since can decomposed and top soil will be backfilled to the depression/holes drilled during investigation.

2.5.2 Construction wastes

Major wastes generation associated with the project construction are oily water, waste oils, oily rags, and other similar wastes from site workshops. And also cut trees, empty cement bags, cardboards, metal scraps.

Major wastes generation associated with the project construction and their treatment/ disposal methods are described in Table 2.6.

Table 2.6: Waste generation and treatment during construction phase

Activity	Waste Type	Quantity	Treatment/Disposal Method(s)
Site Clearance	Trees and Shrubs	No trees or shrubs were on site	N/A
	Soil	Not Significant	This organic soil is full of manure, will be stockpiled to be used during planting of vegetation
Excavation of Foundation	Spoil Soil	200 m^3	This soil shall be stock piled along the foundation trenches. The soils shall be used to reinstatement site at the end of the project
Actual Construction	Rubbles	50m^3	Will be stockpiled and used to fill cut sections
	Scrap metals	100Kg	Sell to recyclers
	Timber	80Kg	Sell to recyclers
	Cement bags	50Kg	Sell to recyclers
Actual operation	Pesticides empty containers and obsolete chemicals	<50kg	Will be disposed of by the Certified contractor

Domestic Wastes

The estimated amount of waste refuses to be generated for 50 workers at the site will be 40 Kg per day. A local solid waste transfer station shall be designated by the contractor to store domestic refuse before they are collected by the Municipal trucks to the existing disposal facility for all types of solid wastes located at Kizumbi Ward 15 km from the project site.

Liquid waste

Sanitation system to be used at the site is temporary septic tank-soak away combination located at the site.

Assuming that

- There will be an estimated 50 workers
- Water consumption =40l/capita/day
- 80% of the water consumed become wastewater
  Wastewater generation per day = 50x40x0.8

About 1.6 m^3 per day of liquid waste will be produced from the site during construction period

2.5.3 Operational Phase

Solid Wastes

The Solid wastes such as pesticides containers and utilities, maize husks, papers, tins, glass, bottles, food wastes are expected during operational phase. Estimated 55.3kg per day of domestic refuse will be generated at the site by workers. A solid waste collection point shall be designated by the Contractor to store domestic refuse before they are collected by the appointed contractor to the disposal facility.

Type and disposal method of solid waste generated during operation phase of the proposed facilities is provided in Table 2.7.

Table 2.7: Waste generation and disposal during operation phase

Waste	Disposal method
Glass	Sell to recyclers
Plant material (tree trimmings, grass cuttings, sweepings)	Composting will be used/burn at the site
Organic waste	Recycle, composting
Scrap materials (leather, fabric, metal etc)	Reused/Sell to Recyclers
Domestic waste (food remains, empty drinking bottles)	Disposal at designated dumpsite
Pesticides empty containers and obsolete chemicals (Aluminium cans/ packaging materials) and expired chemicals	Disposal through certified contractor

Amount of solid waste generated is estimated as below. Given that;

- Expected number of workers=70 persons

- Generation rate is 0.79kg/person .day
- Total waste generated per day= 70 persons*0.79kg/person. day
  =55.3 kg/person.day

Liquid Wastes

Assuming that;

- There will be about 70 workers
- Water consumption = 40l/capita/day
- 80% of the water consumed become wastewater
  Wastewater generation per day =70x40x0.8=2,240L/cap.day

About 0.224m^3 per day of liquid will be produced from the construction site during construction period. All this waste will be managed through improved pit latrines that will be installed on site. The septic tanks were observed at the site but not in use, they were previously used before the land was transferred to NFRA. These tanks will be modified to switch the current design.

2.7 Energy and Water Demand

2.7.1 Energy

Currently at the site, there are 2 Transformers of 1000kVA and 100 kVA capacities**,** a standby generator of capacity 500kVA with S/N SGC 12001, U 2278A Model Perkins. They are adequate sized to supply electricity and back up electricity to the proposed silos complex. The major areas where power will highly be needed is during the operation of the silos and to the office uses.

2.7.2 Water Consumption throughout Project Phases

During Mobilization Phase

Water consumption during mobilization is not expected although water will be available at the site.

During Construction Phase

Water consumption in this phase is expected to be significant. Total water for construction and curing concrete structures is estimated at 500m^3.

During Operation Phase

Water consumption during operation of the proposed facilities was estimated based on the number of workers who will be employed during the operation of all the existing

and proposed facilities at the site area. It is expected daily consumption of water at the proposed facility will be 2,800 litres per day considering about 70 people will be employed at the area. This water will be supplied from SHUWASA mains.

During Decommissioning

As in decommissioning, water consumption in this phase will be very minimal almost negligible.

CHAPTER 3

3.0 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Environmental Management Regulation in Tanzania

A clean and safe environment is the constitutional right of every Tanzanian citizen. Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. The NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The EIA certificate is issued by the minister responsible for environment. There are many policies and pieces of legislation on environmental management in Tanzania, the relevant ones to this project briefly discussed below.

3.2 National Policies

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address environmental management in various sectors. Among others, the objective of these policies is to regulate the development undertaken within respective sectors so that they are not undertaken at the expense of the environment. The national policies that address environmental management as far as this project is concerned and which form the corner stone of the present study include the following:

3.2.1 National Environmental Policy (NEP) of 1997

Tanzania currently aims to achieve sustainable development through the rational and sustainable use of natural resources and to incorporate measures that safeguard the environment in any development activities. The environmental policy document seeks to provide the framework for making the fundamental changes that are needed to bring consideration of the environment into the mainstream of the decision making processes in the country.

The National Environmental Policy, 1997 stresses that for a framework law to be effective, environmental standards and procedures have to be in place. For example, Chapter 4 of the policy (Instruments for Environmental; Policy), Section 61, states that "*As part of the (National Environmental Policy) strategy in the implementation of the National Environmental Guidelines, specific criteria for EIA conduct will be formulated".*

The National Environmental Policy as a national framework for environmental management emphasized that the transport sector shall focus on the following environmental objectives:

- Ensuring sustainability, security and the equitable use of resources for meeting the basic needs of the present and future generations without degrading the environment or risking health or safety;
- To prevent and control degradation of land, water, vegetation and air which constitute our life support system;
- To conserve and enhance our natural and man-made heritage, including the biological diversity of the unique ecosystem of Tanzania;
- To improve the condition and productivity of degraded areas including rural and urban settlement in order that all Tanzanians may live in safe, healthful, productive and aesthetically pleasing surroundings;
- To raise public awareness and understanding of the essential linkages between environment and development and to promote individual and community participation in the environmental action; and
- To promote international co-operation on the environment and expand our participation and contribution to relevant bilateral, sub-regional, regional, and global organizations and programs, including implementation of treaties.

On addressing the issues of poverty alleviation, the policy recognizes its impact to the environment. The policy focuses on the satisfaction of basic needs of citizens with due cognizance to protecting the environment. This project will ensure that the above policy objectives are met.

The NEP advocates the adoption of Environmental Impact Assessment (EIA) as a tool for screening development projects which are likely to cause adverse environmental impacts.

3.2.2 Construction Industry Policy (2003)

Among the major objectives of the policy, which supports a sustainable building development sector, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as buildings, road-works, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health. This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation.

3.2.3 National Land Policy (1995)

The National Land Policy states that, “the overall aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad - based social and economic development without upsetting or endangering the ecological balance of the environment”. This EIA partly responds to this requirement.

3.2.4 National Human Settlements Development Policy (2000)

Among the objectives of this policy that touch the investment sector are to improve the level of the provision of infrastructure and social services for the development of sustainable human settlements and to make serviced land available for shelter to all sections of the community. Such infrastructure and services constitute the backbone of urban/rural economic activities. The proposed facilities shall increase the office space in the area which is essential to increase productivity.

3.2.5 National Gender Policy (2002)

The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it puts emphasis on gender quality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society.

The project proponent has adopted the policy through the provision of equal opportunities to both men and women in construction of the facilities and related activities.

3.2.6 The National Population Policy (1992)

The main goal of the National Population Policy is to extend the horizon of the country's Development plans whose principal objective is to move Tanzanians away from poverty and extend their horizon of standard of living. The policy, therefore, gives our country guidelines for dealing with all population issues in an integrated manner, and its implementation will give a new dimension and direction to development plans by making population issues the basis for the preparation of these plans.

3.2.7 The National Health Policy (1990)

The health Policy is aimed at improving the health status of all people wherever they are, in urban and rural areas, by reducing morbidity and mortality and raising life expectancy. Good health, i.e. physical mental and social well being, is a major resource and economic development.

3.2.8 The National Agriculture Policy (2013)

This policy focuses on having the agricultural sector that is modernized, commercial, highly productive and profitable; that utilizes natural resources in an overall sustainable manner and acts as an effective basis for inter-sectoral linkages by the year 2025.

The general objective of the policy is to develop an efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad based economic growth and poverty alleviation.

The Policy however has the following specific objectives:

(a) Increase production, productivity and profitability from utilization of the factors of production (land, labour and capital);
(b) Enhance national food security through production of sufficient quantity and quality of food;
(c) Improve agricultural processing with a view to add value to agricultural products and create jobs;
(d) Enhance production of quality products in order to improve competitiveness of agricultural products in the markets;
(e) Increase foreign exchange earnings from exportation of agricultural products;
(f) Provide enabling environment to attract private sector investment to take advantage of existing comparative and competitive advantages;
(g) Strengthen agricultural support services (research, extension and training);
(h) Strengthen inter-sectoral coordination and linkages to increase efficiency and effectiveness;
(i) Protect and promote integrated and sustainable utilization of agricultural lands; and
(j) Promote implementation of cross cutting issues in agricultural undertakings.

The overall purpose of NFRA is to guarantee national food security for post disaster needs by procuring, reserving and re-cycling strategic food stock in an efficient and cost effective manner and respond timely to food shortages in the country and improve the efficiency of grain storage management.

3.3 Legal Framework

3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191

The Environmental Management Act (EMA) is a piece of legislation that forms an umbrella law on environmental management in Tanzania. Its enactment has repealed the National Environment Management Council Act. 19 of (1983) while providing for the continued existence of the National Environment Management Council (NEMC).

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international

instruments on the environment; to provide for implementation of the National Environmental Policy; to provide for establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that in matters pertaining to the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environment considerations into development policies, plans, programmes, strategies projects and undertake strategic environmental assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania.

Part VI of the EMA deals with Environmental Impact Assessments (EIA) and other Assessments and directs that an EIA is mandatory for all development projects. Section 81(2) states that "An Environmental Impact Assessment study shall be carried out prior to the commencement or financing of a project or undertaking", while Section 81(3) states "a permit or licence for the carrying out of any project or undertaking in accordance with any written law shall not entitle the proponent or developer to undertake or to cause to be undertaken a project or activity without an environmental impact assessment certificate issued under this Act".

Relevance to the project

The Act is relevant to the project because the project is in the mandatory list of those projects requiring EIA. The proponent strives to comply with this Act that is why the study is conducted to not only get the environmental certificate as required by EMA (2004) but also to show commitments on protecting the environment regarding the proposed project. In this case the project is required to abide by the legislation and existing national guidelines.

3.3.2 The Water Supply and Sanitation Act No. 12 of 2009

This is also a new legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by taking into account among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities.

Relevance to the project

The proponent will abide to the given provisions, he will make sure all sewages produced are well contained in the designed facilities and once full are properly disposed through contractors to the designated areas. All this is to ensure the environment becomes sustainable to all living beings at neighbourhood of the proposed project.

3.3.3 The Land Act no 4 of 1999

These laws declare all land in Tanzania to be "Public land" to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the "Right of Occupancy" of any landholder for the "public/national interest" should the need arise. The laws also declare the value attached to land.

The law as amended in 2004 recognizes the role of land in economic and urban development. The law provides for technical procedures for preparing land use plans, detailed schemes and urban development conditions in conformity with land use plan and schemes. The LGA has the power to impose conditions on the development of any area according to the land-use planning approved by the Minister. This project conforms to this law because it has followed all development conditions provided.

Relevance to the Project

The proponent will abide to the given provisions in the Act.

3.3.4 The Urban Planning Act No. 8 of 2007

Section 29 (1)-(3), 31, 32 and 33 of the Act provides directives to the land owner of what to be done before implementation of the project:

Section 29 (1)notwithstanding the provisions of any other written law to the contrary, no person shall develop any land within a planning area without planning consent and any conditions specified therein;
(2) notwithstanding the provisions of any other law to the contrary, the consent of the planning authority under this section shall be a condition precedent to the consideration by licensing authority of any application for the issue of a license for any other purpose involving development of land; and
(3)where in connection with an application for planning authority is of opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity shall have injurious impact on the environment, the applicant shall be required to submit together with the application of an environmental impact assessment report.

Section 31 (1) A person shall not subdivide any land use unless that person:-

(a) Obtains written approval from the Director and a copy of the written approval shall be forwarded by the Director to the Commissioner for Lands, together with a plan of the approved subdivision on which dimensions of all lots, widths of the streets and back lanes and such other particulars as the planning authority may consider necessary has been shown; and
(b) Deposits with the nearest planning authority a sum sufficient to cover the fees for the survey of all lots comprised in the permitted subdivision or of such lots as Director of Surveys and Mapping may consider desirable to be surveyed at the same time.

(2) the planning authority may, accept such security in lieu of the deposit for survey fees as he may consider sufficient guarantee for the payments of fees when required.

Section 32 (1) An application for planning consent to develop land or approval to subdivide land or to change use of land shall be made to the planning authority or the Director as the case may be, n the form and manner prescribed by the regulations made under this Act;

(2) in consideration an application, the planning authority or the Director may, subject to the regulations made to the regulations made under this Act, grant consent to develop or approval to subdivide land or to change the use of land, as the case may be, either unconditionally or subject to such conditions as may be necessary or may refuse the application;

(3) in dealing with any such application, the Director shall act in conformity with the provisions of the general planning scheme and any other approved scheme;

(4) Without prejudice to the provisions of subsections (2) and (3), conditions may be imposed on the grant of any consent to develop or approval to subdivide land or to change the use of land as the case may be given thereunder and those conditions may provide:

a. for the commencement or completion of any work before the expiration of a specified period;
b. for requiring deposits to be placed with such public or statutory authority as the planning authority may specify, to secure the compliance with the requirements of that public or statutory authority; and
c. for compliance with any guidelines or requirements issued by the conservation authority for the purposes of conservation or any other requirements related thereto.

Section 33 (1) subject to the provisions of subsection (2), every planning consent granted to carry out any building operations on application to develop land pursuant to subsection (1) of section 32, shall lapse if the development is not completed within three years from the date of the grant of consent or, in the case where an appeal has been brought against the conditions imposed by the planning authority, within three years from the date of determination of the appeal.

(2) the planning authority may, in its discretion, renew the consent for such period as it may consider necessary.

Relevance to the Project

Therefore the proposed grain storage facilities has been approved by relevant authorities Shinyanga Municipal Council and therefore it is in line with the objectives of this law.

3.3.5 The Occupation Health Safety (2003)

The law requires employers to provide a good working environment to workers in order to safeguard their health. The employers need to perform medical examinations to determine fitness before engaging employees. Employers must also ensure that the equipment used by employees is safe and shall also provide proper working gear as appropriate. This shall be adhered to during construction and operational phase of the proposed building.

Relevance to the Project

The project involves construction and operation of heavy and complex structures. In this regards the project proponent shall be required to abide by the relevant provisions given in the Act. This includes seeking approvals and license from the relevant authorities as specified in the Act. The proponent shall also be required to safeguard public health and safety of the workers.

3.3.6 Fire and Rescue Force Act (2007)

According to the Act, among others, the functions of the force are to: '(a) Extinguish fire (b) grade cities, municipalities, townships and villages into various fire and rescues services levels (c) conduct fire inspection and investigations for purposes of obtaining information relating to the causes of fire and loss inflicted by fire (d) Conduct studies on investigation of arson and accidental fire (e) Conduct training for fire department personnel, other officers and voluntary fire fighters (f) Prepare fire statistics and fire service information (g) Conduct fire tests on protection facilities, equipment and materials. In section 3(1) (g) it covers premises of facility used as a place for storage flammable liquids, gas or chemicals. The Act also obliges the owners and managers of the structures to set aside places with free means of escape, and install fire alarm and detection systems, or such other escape and rescue modalities in the event of fire.

Relevance to the Project

The proposed facilities will involve use of electricity and other power sources that may pose fire risks. To comply with the Act, measures such as installation of fire extinguishers and emergency preparedness and response strategy have been provided for the safety of the facility.

3.3.7 Employment and Labour Relations Act No. 6 0f 2004

The Act makes provisions for core labour rights; establishes basic employment standards, provides a framework for collective bargaining; and provides for the prevention and settlement of disputes and provides. The developer shall see to it that the Contractor adheres to employment standards as provided for by the law.

Relevance to the project

The project involves employment of both skilled and non-skilled labour during all project phases. In this regard, the project proponent shall be required to abide by the relevant provisions given in the Act.

3.3.8 Engineers Registration Act and its Amendments 1997 and 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB). Laws require any foreigner engineer to register with ERB before practicing in the country. Foreign engineers working with this project shall abide to the law requirement.

Relevance to the project

The proponent will abide to the Act by assigning the registered engineers to carry out the engineering activities and guidance to the completion of the project.

3.3.9 The Contractors Registration (Amendment) Act, 2008

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practise. It requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. This act amends the Contractors Registration Act, with a view to providing provisions for effective regulations of activities and maintenance of professional conduct and integrity of contractors and for related matters.

Section (3) of the Act instructs the contractor to take responsibilities of all the activities on site.

(a) any person who for a reward or, other valuable consideration undertakes to carry out and complete any construction works for another person, of any structure situated below, on or above the- ground or water bodies or other work connected therewith, where such person undertakes to do any such works;
    (i) himself supplies the material necessary for the work or is authorized to exercise control over the type, quality or the use of material supplied by any other person;
    (ii) himself supplies the labour necessary for the work or is authorized on behalf of the person for whom the work is undertaken or any other person, to employ or select for employment workmen to assist him in the execution of the work; **or**

(b) any person who for himself as a developer or investor, undertakes to carry and complete construction works of any structure for public or private use or other works connected therewith, where such person undertakes to do any such works;
    (i) himself supplies the labour necessary for the works or is authorized to exercise control over the type, quality or the use of material supplied by any other person; or
    (ii) himself authorized on behalf of the person for whom the work is undertaken or any other person, to employ or select for employment workmen to assist him in the execution of the work.

Relevance to the project

The Developer shall comply with the law requirement during the recruitment of contractors for project implementation; all the activities to be carried at the site will involve the contractor registered by the CRB Board.

3.3.10 The Architects and Quantity Surveyors Act (1997)

Similarly require architects and quantity surveyors (QS) to be registered with the Board before practising. Foreign architects and QS should abide with the law.

Relevance to the project

This Act has direct implications to the proponent and thus he has used the registered Architects and Quantity Surveyors when preparing the drawings of the project site.

3.3.11 The Local Government Laws (Miscellaneous Amendment), Act 2006

This act established the local governments and urban authorities with mandates to spearhead developments in districts and urban centres (for cities and municipalities) respectively. By this law, the authorities have mandates to formulate bylaws to enhance environmental management within their district/urban authorities. The proposed

building will be located at Ibadakuli Village, Ibadakuli Ward, Shinyaga Municipal Council in Shinyanga Region.

3.3.12 Public Health Act 2009

An Act provide for the promotion, preservation and maintenance of public health with the view to ensuring the provision of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Section 66 of the Act state that: (1) A building or premises shall not be erected without first submitting the plans, sections and specifications of the building site for scrutiny on compliance with public health requirements and approval from the Authority. (2) A building or premises or its part or any structure shall not be occupied until a certificate of occupancy has been granted. (3) The provisions of subsections (1) and (2) shall not apply to the dwelling houses in the rural areas or houses erected in urban which have been recognized as such under the Squatter Upgrading Programme.

Relevance to the project

These provisions have direct implication to NFRA. The proponent has the responsibility of ensuring that it complies with the requirements of the Act in all phases of the project i.e., construction, operation and decommissioning.

3.3.13 The Water Resources Management Act, 2009 (Act No. 11/ 2009)

The Act provides for legal and institutional framework and outline principles for sustainable management of water resources. It incorporates provisions preventing and control water pollution, and for participation of stakeholders and the general public in the implementation of the National Water Policy, 2002.

The Act echoes the provisions of the Environmental Management Act to declare every person living in Tanzania to have a stake and a duty to safeguard and protect the water resources and to inform the relevant authorities of any activity and phenomenon that may affect the quantity and quality of water resources (S.7). The Act adopts SEA and EIA as tools for controlling water works. Any proposed development in a water resource area or a watershed must carry out an EIA in accordance with the provisions of the Environmental Management Act.

The institutional framework for the management of water resources under the Act include the establishment of the office of the Director of Water Resources, the National Water Board, the Basin Water Boards, Catchment and sub-catchment Water Committees, and Water User Associations.

The Act incorporates conditions for protection of water resources, imposes restrictions on the use of water during drought and disasters, establishes water protected zones,

and ground water controlled areas. The Act incorporates provisions for control of water pollution; prescribe conditions for water use permits, ground water permits, discharge permits and regulation of water user rights.

Relevance to the project

The proponent will abide to this provision by attaining all relevant permits regarding his project. He will also play in making sure the water sources are well protected for the betterment of all users.

3.3.14 Tanzania Food, Drugs and Cosmetics Act, 2003

An Act to provide for the efficient and comprehensive regulation and control of food, drugs, medical devices, cosmetics, herbal drugs and poisons and to repeal the Food (Control of Quality) Act, 1978 the Pharmaceuticals and Poisons Act, 1978 and to provide for related matters.

Relevance to the Project

The proponent will adhere to the provided Act.

3.3.15 The Local Government (Urban Authorities) Act, No. 8 of 1982

An Act to make better provision for the establishment of urban authorities for the purposes of local government, to provide for the functions of those authorities and for other matters connected with or incidental to those authorities.

Section 55 (1) (a), (b) and (e) subject to this Act, it shall be the duty of every urban Duties of urban authority within its area of jurisdiction:-

(a) to establish and maintain offices and buildings for the purpose of transacting the business of the authority and for public meetings and assemblies;
(b) to take and require the taking of measures for the conservation of natural resources, the prevention of soil erosion and the prohibition and control of cultivation; and
(e) to provide for the inspection of all meat, fish, vegetables and all other foodstuffs of whatever kind or nature, and of liquids intended for human consumption, whether exposed for sale or not; and to seize and destroy all such foodstuffs or liquids as are unfit for human consumption (or to seize and otherwise deal with any foodstuffs or liquids intended for human consumption when and in such manner as may by by-laws be directed or allowed), and to supervise and control all bakeries.

Relevance to the Project

The proponent will adhere to the given provisions in the Act.

3.3.16 Grazing Land and Animal Feed Resources Act 2010

An Act to provide for the management and control of grazing-lands, animal feed resources and trade and to provide for other related matters.

Section 16 (1) The grazing-lands shall be demarcated or delineated in accordance with the provisions of the Village Land Act and the Land Use Planning Act.

(2)Without prejudice to the generality of section 32(1) of the Village Land Act, the Village Council shall grant-·the right of way for stock-driving for purposes of providing access to water, dipping, marketing facilities and other services which are not within the grazing-land.

17.-(1) The Village Council shall set aside part of the communal village land to be a strategic grazing-land in accordance with the provisions of the Land Use Planning Act;
(2) The grazing-lands referred to in subsection (1), shall be communally or privately owned by livestock keepers; and
(3) Subject to other written laws, the Village Council shall prohibit, restrict, limit or control entry into grazing land for purposes of cultivation, mining, establishment of wildlife protected areas or any other use other than livestock keeping.

Relevance to the Project

NFRA site is planned for industrial uses. In order to prohibit unauthorized movement of animals to the site, the proponent will be required to demarcate the area.

3.3.17 The Plant Protection Act, 1997

An Act to make provisions for consolidation of the Plant Protection Act, to prevent the introduction and spread of harmful organisms, to ensure sustainable plant and environmental protection, to control the importation and use of plant protection substances, to regulate export and imports of plants and plant products and ensure the fulfilment of international commitments, to entrust all plant protection regulatory functions to the Government, and for matters incidental thereto or connected therewith.

Relevance to the Project

NFRA is in line with the provisions given in the Act and is committed to protect the environment through the environmental management and monitoring plan provided in this report as well re-planting the site after construction phase.

3.3.18 Industrial and Consumer Chemicals Act No. 3 of 2003

This Act introduces measures for the control of production, importation, exportation, transportation, storage, handling and placing on the market of industrial or consumer chemicals or chemical products and provides for the carrying out of such control. Industrial and Consumer Chemicals (Management and Control) Act [No. 3 of 2003] [Regulation 2004]. The Industrial and Consumers Chemicals (Management and Control) Act No 3 of 2003 provides a legal framework or the management and control of industrial and consumer chemicals throughout the life cycle.

The law requires that all those persons who intends to produce, import, export, sale, deal in industrial and consumer chemicals must register with the Registrar of Industrial and Consumer chemicals so that their capacities to manage chemicals can be assessed. Those who qualify are registered and then required to meet certain conditions as might be stipulated in their certificates of registrations. The law also requires that facilities used in the production, storage disposal of chemicals and waste must be registered for the same reasons of ensuring that they are of sound designs and that are operated properly.

Relevance to the Project

NFRA will comply with all the provisions stated in the Act

3.4 Relevant Regulations, Guidelines, Plans and Programmes

3.4.1 The Tanzania 2025 Development Vision

The Tanzania Vision 2025 aims at achieving a high quality livelihood for its people attain good governance through the rule of law and develop a strong and competitive economy. Specific targets include:

1. A high quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically the Vision aims at: food self-sufficiency and security, universal primary education and extension of tertiary education, gender equality, universal access to primary health care, 75% reduction in infant and maternal mortality rates, universal access to safe water, increased life expectancy, absence of abject poverty, a well educated and learning society;
2. Good governance and the rule of law moral and cultural uprightness, adherence to the rule of law, elimination of corruption; and
3. A strong and competitive economy capable of producing sustainable growth and shared benefits a diversified and semi-industrialized economy, macro-economic stability, a growth rate of 8% per annum, adequate level of physical infrastructure, an active and competitive player in regional and global markets.

Modern residential building like this one is one of the most important agents to enable Tanzania achieve its Development Vision objectives (both social and economic), such as eradicating poverty. Construction of the hotel will contribute to the attainment of the 2025 Vision.

3.4.2 United National Sustainable Development Goals (SDGS)

In 2000, 189 countries of the world came together to face the future and what they saw was daunting, famines, drought, wars, plagues, poverty. The perennial problems of the world. Not just in some faraway place, but in their own cities and towns and villages. They knew things didn't have to be this way. They knew we had enough food to feed the world, but that it wasn't getting shared. They knew there were medicines for HIV and other diseases, but that they cost a lot. They knew that earthquakes and floods were inevitable, but that the high death tolls were not. They also knew that billions of people worldwide shared their hope for a better future. So leaders from these countries created a plan called the Millennium Development Goals (MDGs). This set of 8 goals imagined a future just 15 years of that would be rid of poverty and hunger. It was an ambitious plan.

The United Nations Development Programme (UNDP) has been one of the leading organizations working to achieve the MDGs. Present in more than 170 countries and territories, we funded projects that helped fulfill the Goals.
We championed the Goals so that people everywhere would know how to do their part. And we acted as "scorekeeper," helping countries track their progress. And the progress in those 15 years has been tremendous. Hunger has been cut in half. Extreme poverty is down nearly by half. More kids are going to school and fewer are dying. Now these countries want to build on the many successes of the past 15 years, and go further.

The new set of goals, the Sustainable Development Goals (SDGs), aims to end poverty and hunger by 2030. World leaders, recognizing the connection between people and planet, have set goals for the land, the oceans and the waterways. The world is also better connected now than it was in 2000, and is building a consensus about the future we want. That future is one where everybody has enough food, and can work, and where living on less than $1.25 a day is a thing of the past. UNDP is proud to continue as a leader in this global movement.

The Goal Number 2 out of 17 of SDGS "Zero Hunger" is meant to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. In the past 20 years, hunger has dropped by almost half. Many countries that used to suffer from famine and hunger can now meet the nutritional needs of their most vulnerable people. It's an incredible accomplishment. Now we can go further and end hunger and malnutrition once and for all. That means doing things such as promoting sustainable agriculture and supporting small farmers. It's a tall order.

But for the sake of the nearly 1 out of every 9 people on earth who go to bed hungry every night, we've got to try. Imagine a world where everyone has access to sufficient and nutritious food all year round. Together, we can make that a reality by 2030.

Relevance to the Project

The main role of the NFRA of which is their mission as well is to guarantee national food security by procuring, reserving and re-cycling strategic food stock in an efficient and cost effective manner and respond timely to food shortages in the country. Therefore, the proponent is in line with the SDGS.

3.4.3 Climate Smart Agriculture Programme (2015-2025)

Agriculture is a key sector of Tanzania's economy, as it provides livelihood to over 80 percent of the population, generates about 24.1 percent of GDP, contributes 30 percent of export earnings and employs 75 percent of the total labor force (URT, 2013). Crops, livestock, fisheries and forest resources are key subsectors contributing to agriculture GDP. The agriculture sector has direct impact on the attainment of the Millennium Development Goals (MDGs) and the emerging sustainable development goals (SDGs), including poverty reduction.

High dependence on rain-fed agriculture and poor soil health increases vulnerability of farming systems and predisposes rural households to food insecurity and poverty thus eroding their productive assets and weakening their coping strategies and resilience. The scaling up of climate-smart agriculture (CSA) practices presents an opportunity to reduce such losses, build resilience in the agriculture sector, improve productivity and farmer incomes, and contribute to climate change mitigation. The climate-smart agriculture (CSA) concept reflects an ambition to further integrate agricultural development and climate responsiveness. CSA aims to achieve food security and broader development goals under a changing climate and increasing food demand.

Relevance to the Project

Climate change in Tanzania is dynamic; it has been changing now and then. Improved food storage and distribution with the proposed grain storage facility will help improve the storage when the supply is higher than the demand and during the shortage of food, NFRA will supply the food with affordable prices to the people. NFRA is in line with this CSA programme.

3.4.4 Tanzania Agricultural and Food Security Investment Plan (TAFSIP), 2011-2012 to 2020-2021

TAFSIP is Tanzania's version to operationalize the CAADP framework formulated to assist achievement of TDV 2025. It is a 10 years road map for agricultural and rural development that identifies priority areas for public and private investments in the sector to promote agricultural growth, rural development, and food security and nutrition. It is a framework for the prioritization, planning, coordination, accountability, harmonization and alignment of investments that will drive Tanzania's agricultural development over the next decade. The objectives of CAADP are to:

i. achieve an average of annual sectoral growth of 6% and government allocation of budget at 10%;
ii. attain food security and nutrition;
iii. develop regional and sub-regional agricultural markets;
iv. integrate farmers and pastoralists into the market economy; and
v. achieve a more equitable distribution of wealth.

To achieve the CAADP objectives, the investment plan is expressed in terms of seven thematic programme areas each with its own strategic objective and major investment programmes. The thematic areas are:

i. Irrigation Development, Sustainable Water Resources and Land Use Management;
ii. Agricultural productivity and Rural Commercialization;
iii. Rural Infrastructure, Market Access and Trade;
iv. Private Sector Development;
v. Food Security and Nutrition;
vi. Disaster Management, Climate Change Adaptation and Mitigation; and
vii. Policy Reform and Institutional Support.

Relevance to the Project

The goal and development of TAFSIP have direct implications to NFRA because one of the NFRA mission is to guarantee national food security by procuring, reserving and re-cycling strategic food stock in an efficient and cost effective manner and respond timely to food shortages in the country. In total NFRA owns 33 storage warehouses with a total storage capacity of 246,000 metric tons. The NFRA target is to gradually increase food stock levels to 700,000 MT by year 2018.

3.4.5 Agricultural Sector Development Programme Phase II (ASDP II)

The Agriculture Sector Development Programme (ASDP) is one of the key instruments that the government uses to meet TDV 2025 and implement the ASDS. This programme had the following objectives:

i. to enable farmers to have better access to, and use of, agricultural knowledge, technologies, marketing systems and infrastructure, all of which contribute to higher productivity, profitability, and farm incomes;
ii. to promote private investment based on an improved regulatory and policy environment. The objectives will be achieved through a set of complementary interventions aimed at:
    a. improving the capacity of farmers, including food insecure and vulnerable groups, to more clearly articulate demand for agricultural services and to build partnerships with service providers;
    b. reforming and improving capacity of both public and private agricultural service providers to respond to demand and provide appropriate advice, services and technologies;
    c. improving the quality and quantity of public investment in physical infrastructure through more devolved technically-sound planning and appraisal; and
    d. improving market institutions, including strengthening the policy and regulatory frameworks and coordination capacity at national level.

Relevance to the Project

The proponent is line with ASDP II to make sure that, TDV 2025 is achieved through its main and specific objectives.

3.4.6 The Environmental Impact Assessment and Audit regulations, 2005

These regulations set procedures for conducting EIA and environmental audit in the country. The regulations also require registration of EIA experts. This EIA has been conducted following the above stated regulations. This regulation shall apply to all projects, undertakings and activities referred to in part VI and the Third schedule to the Act and, the First Schedule to these regulations

Relevance to the project

The project involves petroleum oil as well as transportation of petroleum products. In this regards the project proponent shall be required to abide by the relevant provisions given in the Act.

3.4.7 Registration of Environmental Experts Regulations, 2005 (GN No. 348)

Part I of the regulations, Regulation (2) states the application of the regulations.
This regulation shall apply to;

a) all individual environmental experts; and
b) firms of environmental experts, certified and registered under these Regulations

Part II of the regulations, Regulation 4 (1)-(3) gives the objectives of the regulations, which are as follows;

(1) (a) establish system for registration of environmental experts;
    (b) provide for system of nurturing competence, knowledge, observance of professional conduct, consistency in carrying out of environmental impact studies and environmental audits;
    (c) ensure that the conduct of environmental impact assessments or environmental audits is carried out in an independent, professional, objective and impartial manner, and
    (d) provide for a code of conduct, discipline and control of environmental experts.

(2) For the purpose of systematic nurturing of competence, promotion of knowledge, observance of professional conduct, consistency and integrity of environmental management practice in Tanzania, environmental experts certified and registered in accordance with the provisions of these Regulations may establish professional associations; and
(3) The Registrar of Environmental Experts shall keep and maintain a list of names of associations formed in pursuant to sub-regulation (2).

Part V of the regulations gives directions on the registering of the environmental experts stated from Regulations (22-31), also Part VI gives the code of practise and discipline of environmental experts as stated in Regulations (32-39)

Relevance to the project

The proponent has complied to this regulation by commissioning the professionals and fully registered environmental experts recognized by NEMC to undertake the EIA study of his proposed project as recommended by the Environmental Impact Assessment and Audit regulations, 2005.

3.4.8 Environmental Management (Air Quality Standards) Regulations G.N No. 237 of 2007

The object of these Regulations shall be to-

a) set baseline parameters on air quality and emissions based on a number of practical considerations and acceptable limits;
b) enforce minimum air quality standards prescribed by the National Environmental Standards Committee;
c) help developers such as industrialists to keep abreast with environmentally friendly technologies; and
d) ensure protection of human health and the environment from various sources of pollution.

Relevance to the project

The project proponent shall be required to abide by the relevant provisions given in these regulations.

3.4.9 Environmental Management (Soil Quality Management) G. N. No. 239 of *2007*

The object of these Regulations is to-

a) set limits for soil contaminants in agriculture and habitat;
b) enforce minimum soil quality standards prescribed by the National Environmental Standards Committee;
c) prescribe measured designed to maintain, restore and enhance the sustainable productivity of the soil;
d) prescribe minimum soil quality standards to maintain, restore and enhance the inherent productivity of the soil in the long term;
e) enforce minimum soil standards prescribed by the National Environmental Standards Committee for such purposes as agricultural practices;
f) ensure implementation of criteria and procedures prescribed by the National Environmental Standards Committee for the measurement and determination of soil quality;
g) prescribe measures and guidelines for soil management; and
h) ensure compliance with any such measures and guidelines for soil management that may be prescribed by the minister.

Relevance to the project

The project involves petroleum oil as well as transportation of petroleum products. In this regards the project proponent shall be required to properly handle all the oil spills during the operations or any other activities that will result to soil pollution.

3.4.10 Environmental Management (Control of Ozone Depleting Substances) Regulations G. N. 240 of 2007

These Regulations shall apply to-

a) all persons dealing or otherwise handling or using controlled substances or products that contain, is made with or is dependent on, or designed to contain chemical substances that have the potential to destroy ozone molecules in the stratosphere and includes the products listed in the First Schedule to these Regulations;
b) every importer and distributor of ozone depleting substances;
c) every importer of technology which uses ozone depleting substances;
d) every company and individual who services refrigerators, air conditioners including mobile and other ozone depleting substances technologies; and
e) every company or an individual using or servicing fire extinguishers.

Relevance to the project

The project proponent will abide to the given regulation to make sure ozone is protected from any ozone depleting substance.

3.4.11 Environmental Management (Water Quality Standards) Regulations of 2007

Part I of this regulation Section (3) provides the objectives the following objectives;

(a) protect human health and conservation of the environment;
(b) enforce minimum water quality standards prescribed by the National Environmental Standards Committee;
(c) enable the National Environmental Standards Committee to determine water usages for purposes of establishing environmental quality standards and values for each usage; and
(d) ensure all discharges of pollutants take account the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned.

However, Part III of this regulation gives the prohibitions and prescribed minimum water quality standards.

Relevance to the project

The proponent is will to protect the water source from any kind of pollution by having the well organized and designed structures to ensure all the operations are compliant to this regulations provided.

3.4.12 The Environmental Management (Hazardous Waste Control and Management) Regulations, 2009

These regulations shall apply to all categories of hazardous waste and to the storage and disposal of hazardous waste and their movement into and out of Mainland Tanzania.

Relevance to the project

NFRA will adhere to the given provisions in the Act.

3.4.13 The Environmental Management (Solid Waste Management) Regulations of 2009

The Environmental (Solid Waste Management) Regulations of 2009, provides principles for management and control of solid wastes including administration and institutional arrangement, licenses and permits. Regulation 5(1) states that, any person who owns

or controls a facility or premises which generates waste shall minimize the waste generated by adopting cleaner production principles such as improvement of production process through conserving raw materials and energy by:

a) Eliminating the use of toxic raw materials within such times as may be prescribed by the Minister; and
b) Reducing toxic emissions and wastes to a level prescribed in the applicable national environmental quality standards. Regulation 17 (a) prohibits certain solid wastes into receptacles. The regulation states that no person shall deposit hazardous substance including asbestos or asbestos containing material, explosives, fireworks, firearms, batteries, hot ashes, flammable liquid, highly flammable materials, infectious material, pressurized containers (other than a pressurized container commonly used for containing domestic products such as fly spray, hair spray and similar materials),or radio-active material.

Regulation 17 (b) prohibits any person to deposit certain solid wastes of corrosive, carcinogenic, flammable, persistent, toxic, explosive, or radioactive nature materials into receptacles. Regulation17 (c) prohibits any person to deposit any liquid, acid, paint, printer sink, oil, oil sludge, asphalt emulsion, viscous fluid or similar product into receptacles which if spilt in a public place may cause damage or injury or result in pollution of the environment. PART VI of the regulations is on plastic waste management. Under the duty to segregate solid waste, regulation 35-(1) requires any person to ensure that plastic materials are separated from non-plastic materials and deposited into receptacles prescribed by local government. Regulation 35-(2) states that duties to segregate waste apply to all stages of waste management including collection, transportation and final disposal.

Relevance to the project

The proponent will make sure all solid wastes produced at the area are well managed and will be hand in hand with the government to make the environment better for living.

3.4.14 International Agreements, Conventions and Treaties

Tanzania has ratified or acceded to a large number of international treaties and conventions. Among those the following are relevant to the project.

- ILO Convention: C148 Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (Ratified by Tanzania (United Republic of) on 30:05:1983) which protects Workers Against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration; and
- International Labour Organization (ILO) Convention: C138 Minimum Age Convention, 1973 (Ratified by Tanzania (United Republic of) on 16:12:1998) which prohibits child labour.

3.5 Institutional Framework for the Management of Environment

3.5.1 Overall Management Responsibility

The institutional arrangement for environmental management in Tanzania is well spelt out in the EMA (2004). There are seven (7) institutions mentioned by the act, of which the Minister Responsible for the Environment is the overall in-charge for administration of all matters relating to the environment.

Part III, section 13(1) of EMA (2004) states that the minister responsible for environment shall be in overall in charge of all matters relating to the environment and shall in that respect be responsible for articulation of policy guidelines necessary for the promotion, protection and sustainable management of environment in Tanzania.

The legal institutions for environmental management in the country include;

- National Environmental Advisory Committee;
- Minister responsible for Environment;
- Director of Environment;
- National Environment Management Council (NEMC);
- Sector Ministries;
- Regional Secretariat; and
- Local Government Authorities (City, Municipal, District, Township, Ward, Village, sub-village "Mtaa and Kitongoji").

3.5.2 National Environmental Advisory Committee

The National Advisory Environmental Committee is comprised of members with experience in various fields of environmental management in the public and private sector and in civil society. The committee advises the Minister on any matter related to environmental management. Other functions include:

- Examine any matter that may be referred to it by the Minister or any sector Ministry relating to the protection and management of the environment;
- Review and advise the Minister on any environmental plans, environmental impact assessment of major projects and activities for which an environmental impact review is necessary;
- Review the achievement by the NEMC of objectives, goals and targets set by the Council and advise the Minister accordingly;
- Review and advise the Minister on any environmental standards, guidelines and regulations;
- Receive and deliberate on the reports from Sector Ministries regarding the protection and management of the environment; and
- Perform other environmental advisory services to the Minister as may be necessary.

The National Environmental Advisory Committee shall advice the minister pertaining to the issuance of the Environmental Certificate upon the review of this EIA

3.5.3 Minister Responsible for Environment

The Minister is responsible for matters relating to environment, including giving policy guidelines necessary for the promotion, protection and sustainable management of the environment in Tanzania. The Minister approves an EIA and may also delegate the power of approval for an EIA to the DoE, Local Government Authorities or Sector Ministries. The Minister also:

- Prescribes (in the regulations) the qualifications of persons who may conduct an EIA;
- Reviews NEMC reports on the approval of an EIA;
- Issues an EIA certificate for projects subject to an EIA; and
- Suspends an EIA certificate in case of non-compliance.

Regarding to this project the minister shall review NEMC reports on the approval of this EIA before issuing the certificate.

3.5.4 Director of Environment

The Director of Environment heads the Office of the Director of Environment and is appointed by the President of the United Republic of Tanzania. The functions of the Director of Environment include:

- Coordination of various environmental management activities undertaken by other agencies;
- Promotion of the integration of environmental considerations into development policies, plans, programmes, strategies, projects;
- Undertaking strategic environmental risk assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of quality of human life in Tanzania;
- Advise the Government on legislative and other measures for the management of the environment or the implementation of the relevant international environmental agreements in the field of environment;
- Monitoring and assessing activities undertaken by relevant Sector Ministries and agencies;
- Preparation and issuing of reports on the state of the environment in Tanzania through relevant agencies; and
- Coordination of issues relating to articulation and implementation of environmental management aspects of other sector policies and the National Environment Policy.

3.5.5 National Environment Management Council (NEMC)

The NEMC's purpose and objective is to undertake enforcement, compliance, review and monitoring of EIA's and to facilitate public participation in environmental decision-making.
According to the Environmental Management Act (2004) the NEMC has the following responsibility pertaining to EIA in Tanzania:

- Registers experts and firms authorized to conduct EIA;
- Registers projects subject to EIA;
- Determines the scope of the EIA;
- Set-ups cross-sectoral TAC to advise on EIA reviews;
- Requests additional information to complete the EIA review;
- Assesses and comments on EIA, in collaboration with other stakeholders,
- Convenes public hearings to obtain comments on the proposed project;
- Recommends to the Minister to approve, reject, or approve with conditions specific EIS;
- Monitors the effects of activities on the environment;
- Controls the implementation of the Environmental Management Plan (EMP);
- Makes recommendations on whether to revoke EIA Certificates in case of non-compliance;
- Promotes public environmental awareness; and
- Conducts Environmental Audits.

Concerning this project NEMC is responsible to Register this EIA, Determines the scope of the EIA to be conducted, Set-ups cross-sectoral TAC to advise on EIA reviews, Recommends to the Minister to approve, reject, or approve with conditions specific EIS and Controls the implementation of the Environmental Management Plan (EMP) for this project.

3.5.6 Sector Ministries

The existing institutional and legal framework the Sector Ministries are required to establish Sector Environmental Sections headed by the Sector Environmental Coordinator.

The Sector Ministries' Environmental Sections;

- Ensure environmental compliance by the Sector Ministry;
- Ensure all environmental matters falling under the sector ministry are implemented and report of their implementation is submitted to the DoE;
- Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required;

- Ensure that environmental concerns are integrated into the ministry or departmental development planning and project implementation in a way which protects the environment;
- Evaluate existing and proposed policies and legislation and recommend measures to ensure that those policies and legislation take adequate account of effect on the environment;
- Prepare and coordinate the implementation of environmental action plans at national and local levels;
- Promote public awareness of environmental issues through educational programmes and dissemination of information;
- Refer to the NEMC any matter related to the environment;
- Undertake analysis of the environmental impact of sectoral legislation, regulation, policies, plans, strategies and programmes through strategic environmental assessment (SEA);
- Ensure that sectoral standards are environmentally sound;
- Oversee the preparation of and implementation of all EIA's required for investments in the sector;
- Ensure compliance with the various regulations, guidelines and procedures issued by the Minister responsible for the environment; and
- Work closely with the ministry responsible for local government to provide environmental advice and technical support to district level staff working in the sector.

3.5.7 Local Government Authorities

Under the Local Government Act of 1982 (Urban and District Authorities), Local Government Authorities include the City Councils, Municipal Councils, District Councils, Town Councils, Township, Kitongoji, Ward, Mtaa and Village.
The Environmental Management Committee of each jurisdiction:

- Initiates inquiries and investigations regarding any allegation related to the environment and implementation of or violation of provisions of the Environmental Management Act;
- Requests any person to provide information or explanation about any matter related to the environment;
- Resolves conflicts among individual persons, companies, agencies non-governmental organizations, government departments or institutions about their respective functions, duties, mandates, obligations or activities;
- Inspects and examines any premises, street, vehicle, aircraft or any other place or article which it believes, or has reasonable cause to believe, that pollutant or other articles or substances believed to be pollutant are kept or transported;
- Requires any person to remove such pollutants at their own cost without causing harm to health; and

- Initiates proceedings of civil or criminal nature against any person, company, agency, department or institution that fails or refuses to comply with any directive issued by any such Committee.

Under the Environmental Management Act (2004), the City, Municipal, District and Town Councils are headed by Environmental Inspectors who are responsible for environmental matters. The functions of the inspectors are to:

- Ensure enforcement of the Environmental Management Act in their respective areas;
- Advice the Environmental Management Committee on all environmental matters;
- Promote awareness in their areas on the protection of the environment and conservation of natural resources;
- Collect and manage information on the environment and the utilization of natural resources;
- Prepare periodic reports on the state of the local environment;
- Monitor the preparation, review and approval of EIA's for local investors;
- Review by-laws on environmental management and on sector specific activities related to the environment;
- Report to the DoE and the Director General of the NEMC on the implementation of the Environmental Management Act; and
- Perform other functions as may be assigned by the local government authority from time to time.

3.6 Institutional Framework for Management of the Proposed Building

The proposed grain storage facilities shall be operated by NFRA. The day to day activities of all the site premises shall be managed by NFRA and to be determined after the construction phase.

CHAPTER 4

4.0 BASELINE INFORMATION

4.1 Methodology

The baseline geology and soils were characterized primarily using existing information generated from geotechnical investigations performed by a separate company. Other information was obtained from literature review of reports such as District Socio Economic Profile and relevant publications. Additionally, field visits were done to established information like hydrology and topographical aspects of the site.

4.2 Geophysical Environment

4.2.1 Climate

Climate in Tanzania varies from tropical along the coasts to temperate in highlands. Shinyanga has a tropical climate. The summers are much rainier than the winters in Shinyanga. With Shinyanga region having a single modal rainfall type, the mean rainfall is 821mm per year. There is typically high rainfall from February to May.

Seasonal variation in temperature at is typically between 17°C and 32°C. The average temperature in Shinyanga is 24.5°C. The driest month is July, with 1 mm of rainfall. The greatest amount of precipitation occurs in March, with an average of 145 mm. The warmest month of the year is October, with an average temperature of 26.0 °C. The lowest average temperatures in the year occur in July, when it is around 22.3 °C.

4.2.2 Topography

The project area has a uniform terrain which is fairly flat with dominant gradient of less than 0.018 (1.8%) sloping southern part of the site, with no indication of storm water gullies. The area is covered by vegetation, with well established concrete block wall boundary.

4.2.3 Geological conditions

According to the existing literature and the geology of degree sheet no. 18, the Geology of Shinyanga area is generally constituted of Archaean (intrusive) rock formations, mainly mafic volcanic flows, overlain by a series of pyroclastic and ash tuffs and some felsic rocks as identified by the Geotechnical Report attached in Appendix VII . In some places around Mwadui kimberlite rocks dominate. The Kimberlites can also be subdivided into pyrclastic kimberlite (PK), re-sedmented volcaniclastic kimberlite deposits (RVPK), granite breccias, turbedite deposits and shales. The geology is characterised by lateral heterogeneity, in addition to the vertical changes, heterogeneous volcanic eruption. Clear distinction can be drawn between upper (re-

sedimented) and lower (pyroclastic) crater deposits. There is limited evidence of recent tremors and tectonic movements in Shinyanga area, mainly from distant epicentres in the East African Rift Valley (e.g. Kigoma, Dodoma, Manyara, Arusha, and recently, Bukoba). Design of structures in Shinyanga should consider and provide for that fact.

4.2.4 Air quality

The ambient air quality was assessed using a portable gas detector type GMI VISA model 66369BENX. The gas detector established the air composition characteristics by recording the proportions of oxygen (O_2) [%], carbon monoxide (CO) [mg/nm^3], hydrogen sulphide (H_2S) [mg/m^3], sulphur dioxide (SO_2) [mg/nm^3], and carbon dioxide (CO_2) [%]. Further, an EN certified ambient explosive gas detector was utilized for assessing the explosiveness due to the presence of petroleum volatile combustible gases namely, methane, propane, and volatile organic compounds (VOCs).

The assessment of air emissions at the site revealed that the emissions of carbon monoxide (CO) and nitrogen oxides (NO_x) were within acceptable values, below the threshold limit set in the Tanzania's Environmental Management (Air Quality Standards) Regulations (2007). The details presented in Table 4.1 shows that the average CO emissions were 96.83 [mg/m^3] and that of NO_x were 84.60 [mg/m^3] which are below Tanzania Standards.

Table 4.1: Air Emission data

Reading number	O_2 (%)	CO (mg/m^3)	Nox (mg/m^3)	Co_2 (%)	Amb. Temp. (°c)	Exh. Temp. (°c)	Excess air (%)	Eff. (%)
Point 1 (P1), at the gate entrance	20.5	96.00	87.00	2.10	20.10	114.00	589.40	71.30
Point 2 (P2), Office building	20.4	97.20	86.60	2.20	20.20	115.00	590.20	71.10
Point 3 (P3), old warehouse	20.5	97.10	84.50	2.40	20.00	114.00	587.20	71.40
Point 4 (P4), old canteen	20.7	97.00	80.30	2.31	20.30	113.00	588.40	71.30
Average	**20.5**	**96.83**	**84.60**	**2.25**	**20.15**	**114.00**	**588.80**	**71.28**
Allowable Limit (Tanzania Standard)*	20	250.00	600.00					

(Source: Site measurements, January 2017)

4.2.5 Dust

Dust levels from the pre-determined points within the project compound were determined using Hold Peak particulate monitor model HP-5800D. The equipment is capable to sample dust of PM2.5 and PM10. The Hold Peak measures particulate concentrations using laser scattering technique. The following are instrument specification:

- Measuring principle： Laser scattering
- The range of PM2.5 detection：0-999.9 μg/m3
- The resolution of PM2.5： 0.1 μg/m3
- The range of PM10 detection：0-999.9μg/m3
- The resolution of PM10： 0.1 μg/m3
- The minimum of particle diameter ：0.3 μm
- Relative Accuracy：±20% or ±15μg/m3 MAX

All four assessed points showed dust level to within the standards (Table 4.2).

Table 4.2: PM measured at the site

	P1	**P2**	**P3**	**P4**	**Average**	**Threshold (WHO)**
PM2.5(μg/m^3)	7.50	6.62	7.30	7.50	7.23	25
PM10(μg/m^3)	17.2	17.5	16.9	17.6	17.30	50

(Source: Field Work, December 2016)

4.2.6 Noise quality

Current noise levels are associated with traffic along Shinyanga to Mwanza Highway and neighbouring Jambo Industry. The other noise levels associated with the area are natural elements i.e. wind.

Noise level measurement was done using a NICETY digital sound level of model type SL821, Model ST-805 with measurement range of 30 to 130 dB(A). The following are technical specifications:

- Microphone: 1/2 polarization capacity microphone
- Range: A-weighting: 30dB ~ 130dB
- Measurement frequency range: 31.5Hz to 8kHz
- Calibration: 94dB
- Data recording; 10
- Display: LCD with 4 digits, 0.1dB resolution, sampling rate 1s
- Bar graph: Scale range 50dB, 1dB resolution

The average noise level measured at four different areas of the site (office, guard's office, storage area and new yard site) was found to be 43.24 dB which is within both National and WHO standards. Table 4.3 shows the measured noise values.

Table 4.3: Noise Levels Measured at the Project Site

Measured point	Reading 1	Reading 2	Reading 3	Average	Threshold Noise*
P1 (at the site entrance)	40.60	43.72	45.10	43.14	90
P2 (at the admin block)	42.53	40.52	43.69	42.25	
P3 (at the warehouse)	41.62	44.73	46.70	44.35	
MEAN				**43.24**	

Source: (Site measurements on 9th January, 2017 at 10:20-10: 40 a.m)

4.2.7 Hydrology

There are no rivers or streams in the area.

4.2.8 Physical Features

The project site has the following structures; Administration Block**,** Weigh Bridge and its office, Security Guard House, Store House and Store maintenance office, SHUWASA domestic point (DP), Block Fencing, Electricity wire**,** Four Godowns, One of the Godowns is full constructed while three of them are unfinished, North of the Store house there is about 50m^3 hole which was been used for oil tank, behind Administration Block there are toilet and septic tank, there are 2 Transformers of 1000kVA and 100 kVA capacities**,** a standby generator 500kVA with S/N SGC 12001, U 2278A Model Perkins as seen in Figure 3.8-3.10. The experts have observed six points for the construction of six Silos which will be enclosed in an area of 6,000 sqm. All the structures at the site will not be demolished rather will still be used by the proponent as part of the other components.

Figure 4.1: Observed administration block at the project site
(Source: Field work, January 2017)

Figure 4.2: Observed weighbridge and office at the project site
(Source: Field work, January 2017)

Figure 4.3: Observed godown at the project site
(Source: Field work, January 2017)

Figure 4.4: Observed physical features at the project site
(Source: Field work, January 2017)

Figure 4.5: Observed physical features at the project site
(Source: Field work, January 2017)

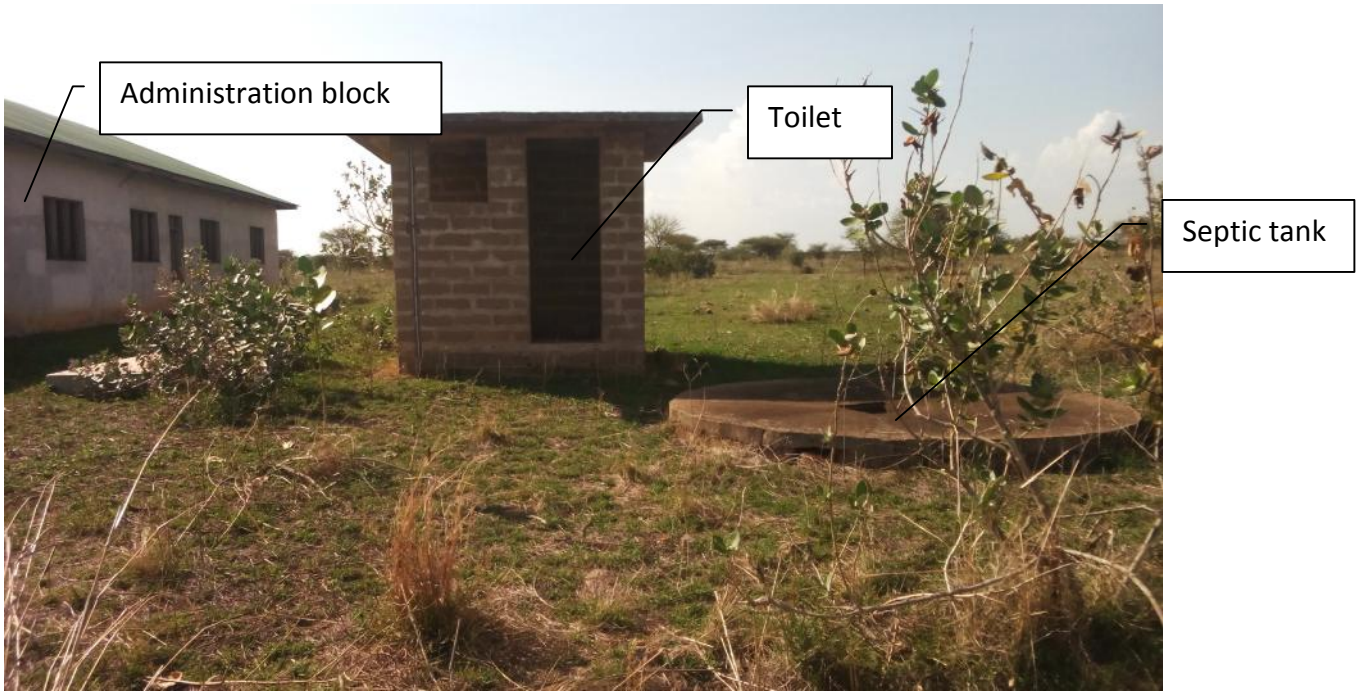

Figure 4.6: Observed physical features at the project site
(Source: Field work, January 2017)

Figure 4.7: Existing godowns at the project site
(Source: Field work, January 2017)

Figure 4.8: The New Transformer of 1000kVA at the project site
(Source: Field work, January 2017)

Figure 4.9: The Old Transformer of 100kVA at the project site
(Source: Field work, January 2017)

Figure 4.10: A standby generator of 500kVA at the project site
(Source: Field work, January 2017)

4.3 Biological features

Flora and Fauna

The characteristic vegetation of the region is of "bush" or thicket type, which is widespread throughout the area where the natural plant cover has been altered by biotic factors. Depressions and seasonally wet areas with impeded drainage support the growth of grasses and sometimes a mixture of grasses and woody plants. Where the natural vegetation has been altered by agricultural activities, regenerating bushes mixed with annual herbs and grasses form a type of induced vegetation. Most of the hill ranges, steep slopes and protected forest reserves are covered with large woody plants, which form good watershed protective covers.

The characteristic vegetation of the district is of bush or thicket type. This is formed whether the natural vegetation has been destroyed by agricultural activities, grazing or fire. Regeneration of bushes is mainly Acacia spp. mixed with short – lived annual grasses and herbs.

At the project site, besides birds, ants and small reptiles, the site is whole covered by grasses also a number of trees were observed at the site of the following species *Acia polyacantha* (28)*, Albizia spp* (8)*, Azadirirach indica* (1)*, Senna siamea* (2)*, acacia nilotia* (2)*, Leucaena diversifolia* (1) with their local names respectively as follows "migunga"-28, "muarobaini"-1, "mijohoro"-2, "mihale"-2 and "mlusina"-1. No wildlife of ecological importance was observed at the site (see Figure 4.11).

Figure 4.11: Plant species observed at the site at the project site
(Source: Field work, January 2017)

4.4 Socio Economic Environment

4.4.1 Administrative divisions

Shinyanga Region is located is in the North Western part of Tanzania at the South of Lake Victoria and this makes it part of lake Zone Regions. Despite its wealth, Shinyanga Region is one of the relatively least developed region in Tanzania. Approximately the region lies between latitude 30 15" and 40 30" South of the Equator and between longitudes 310 30" and 340 15" East of the Greenwich Meridian. The region has a total surface area of 18,555 square kilometres. Administratively the region is divided into 3 Districts namely Kahama, Kishapu and Shinyanga with 6 Local Government Authorities - Kahama Town Council, Shinyanga Municipal Council, Kishapu District Council, Shinyanga District Council, Msalala Council and Ushetu Council.

Shinyanga Municipal Council is one of the eight districts of the Shinyanga Region of Tanzania and includes the city of Shinyanga. It is bordered to the North by the Mwanza Region, to the south by the Shinyanga Rural District, to the East by the Kishapu District, and to the West by the Kahama District. The council has a total 17 administrative wards, Ibadakuli being one of wards where the proposed development is expected.

4.4.2 Population

The Region had a total population of 1,534,808 as per 2012 census. However, Shinyanga Municipal Council has a total population of 161,391 people. Ibadakuli ward is where the proposed project with a total population of 12,537 people of which 6,290 are males and 6,247 are females as shown in Tables 4.4-4.5. Ibadakuli Village where the proposed project will be implemented has a total population of 5912 people, 2957 are females and 2925 are males.

Table 4.4: Population of Shinyanga Region by Sex, Average Household Size and Sex Ratio

S/N	District/Council	Population (Number)			Average household size	Sex ratio
		Total	Male	Female		
		1,534,808	**750,841**	**783,967**	**5.9**	**96**
1	**Shinyanga Municipal Council**	**161,391**	**78,655**	**82,736**	**4.8**	**95**
2	Kishapu District Council	272,990	135,269	137,721	6.3	98
3	Shinyanga District Council	334,417	162,956	171,461	6.3	95
4	Kahama District Council	523,802	256,463	267,339	6.3	96

5	Kahama Town Council	242,208	117,498	124,710	4.9	94

(Source: National Population census, 2012)

Table 4.5: Population of Shinyanga Municipal Council

S/N	Ward	Population		
		Total	**Male**	**Female**
		161,391	**78,655**	**82,736**
1	Mwamalili	7,100	3,583	3,517
2	Kolandoto	11,301	5,462	5,839
3	Ngokolo	19,658	9,314	10,344
4	**Ibadakuli**	**12,537**	**6,290**	**6,247**
5	Shinyanga Mjini	5,402	2,632	2,770
6	Chamaguha	5,218	2,669	2,549
7	Ibinzamata	5,061	2,462	2,599
8	Kitangili	8,338	4,063	4,275
9	Kizumbi	11,264	5,619	5,645
10	Mwawaza	5,665	2,766	2,899
11	Ndala	9,432	4,555	4,877
12	Kambarage	13,796	6,649	7,147
13	Chibe	5,840	2,917	2,923
14	Lubaga	7,042	3,402	3,640
15	Ndembezi	14,837	7,111	7,726
16	Masekelo	8,787	4,252	4,535
17	Old Shinyanga	10,113	4,909	5,204

(Source: National Population census, 2012)

4.4.3 Ethnicity

The main indigenous ethnic groups are the Sukuma, Nyamwezi, Nyiramba, and Nyantuzu. Others, who form the minorities are the Taturu and the Sumbwa. The main occupations of People of Shinyanga are both agriculturalists and livestock keepers. The regional population is divided into urban and rural despite the fact that majority of its people are farmers.

4.4.4 Land Use

The land use of the project site is the industrial area. Therefore, the proposed site falls under the uses identified by the Town Planning office in Shinyanga Municipal Council. No impacts associated with this in line with the development associated with change in the land use. The project will also not result in the damage to the land but improve it. The application for change of present land use to the proposed petrol station has been submitted to the Municipal council.

4.4.5 Education

Shinyanga Region continues to improve pre-primary education, primary education, secondary education and adult education in the region by encouraging the citizens in:

(a)Enrolment of children to school and attendance management
(b)Improve the environment for learning and teaching and the construction of primary schools and secondary schools
(c)Strengthening and ensuring that the percentage of people who know how to read, write and count continues to rise.

Shinyanga region has 545 Pre-primary classrooms of which 521 are in Government Primary Schools while 24 are in Private Primary Schools, 570 primary schools out of which 546 are owned by the public and only 24 schools are owned by the private sector. Up-to July 2013 the region had a total of 132 Ordinary Level Secondary Schools, out of which 112 schools are owned by the Government and 20 by private sector and has currently a total of 7 Advanced Level Secondary schools out of which 3 are owned by the Government and the remaining 4 are owned by private Institutions. It also has has a total of 7 Institutes which are 1 Teachers Institute, 1 Technical Institute (VETA) and 3 Community Development Institute and 1 University College Centre of Moshi Cooperative University. Except of the Centre for the Open University of Tanzania, the region does not have a University. The Vocational Education Training Institute located in Shinyanga Municipality is the only Institute that provides various technical fields for both short and long courses. The courses provided include carpentry, welding, motor vehicle mechanics, gemstone cutting and polishing, electrical installation, computer, heavy plant operating and blasting and drilling. Number of pre-schools, primary schools and secondary schools owned by the government and individuals, organizations and institutions are as summarized in Table 4.6.

Ibadakuli Ward has 6 primary schools namely; Mwangala, Bugweto, Viwandani, Ibadakuli, Zogole and Bugwanduge primary schools. It also has 2 secondary schools Rajani and Uzogweto Secondary Schools. Ibadakuli and Viwandani primary schools, Rajani Secondary school are in Ibadakuli village where the proposed project will be developed.

Table 4.6: Number of schools in Shinyanga Region-2012

Council	Pre-primary		Primary		Secondary		Development institutions		VETA		Teachers College		Universities	
	G	**P**	**G**	**P**	**G**	**P**	**G**	**P**	**G**	**P**	**G**	**P**	**G**	**P**
Kahama (Msalala and Ushetu)	164	2	184	2	29	0	1	0	0	0	0	0	0	0
Kahama Town Council	67	14	72	14	14	11	1	0	0	0	0	0	0	0
Kishapu	114	2	114	2	26	2	0	0	0	0	0	0	0	0
Shinyanga (M)	48	6	48	6	17	6	1	0	1	0	1	0	1	0
Shinyanga (R)	128	0	128	0	26	1	0	0	0	0	0	0	0	0
Total	**521**	**24**	**546**	**24**	**112**	**20**	**3**	**0**	**1**	**0**	**1**	**0**	**1**	**0**

(Source: Regional Commissioner's office, 2012)

*G-Government
*P-Private

4.4.6 Health Services

Health situation in Shinyanga Region is characterised by high infant and maternal mortality rates. Prevalence of high rates of water borne and water caused disease is also a big problem. The causes of disease are amplified by inadequate health facilities, lack of essential equipment and hospital supplies. Shinyanga Region has a total of 187 health service delivery centres of which 5 are Hospitals, 18 Health Centres and 164 Dispensaries. The Regional average health service provision for every 10,000 people is 0.95 while the National average on the same is 1.52. In order to improve the situation the region continues to implement Primary Health Development Programme which emphases that each Village to have a Dispensary, Ward with a Health centre and each District to have a Hospital.

Ibadakuli Ward has one dispensary used by the village called Ibadakuli health Centre.

4.4.7 Existing Services

The site has necessary infrastructure at the vicinity; this covers electricity, water supply, telephone lines, and access roads. The power source to site shall be Tanzania Electricity Supply Company (TANESCO) through a three phase electricity mains supply. Figure 4.8-4.10 shows the existing 2 Transformers of 1000kVA and 100 kVA capacities**,** a standby generator 500kVA with S/N SGC 12001, U 2278A Model Perkins that will be usedto to supply electricity and back up electricity to the proposed silos complex.

4.4.8 Energy and Power Supply

Shinyanga region, like other rural regions in the country, she still uses traditional means of energy which are not environment friendly. The main source of energy used for cooking is firewood (94.3 percent of households) followed by charcoal (4.9 percent) and other sources accounted for 0.8 percent. These sources include gas, crop residues and cow dung. However, there were a small proportion of households using electricity (0.1 percent). These results indicate that more has to be done to improve alternative energies other than charcoal and firewood for protection of forests as well as environment sustainability.

4.4.9 Economic Activities

Agriculture

Despite of the recent mushrooming of activities within the mining industry, agriculture had continued to dominate the livelihood and economic performance of Shinyanga region. The sector contributes about 75 percent to the district economy and employs more than 90 percent of the working population. Farming is predominantly subsistence. Main cash crops are cotton and tobacco, while the main food crops include maize,

sorghum, paddy, sweet potatoes, millet and cassava. Besides farming, livestock keeping, cattle, goats and sheep rearing are major activities in Shinyanga. This means in terms of productive sectors, agriculture is the leading sector in the region.

Livestock

Livestock keeping is the second most important economic activity for the majority of Shinyanga residents. However, to a large extent, livestock keeping is traditional and involves mostly indigenous cattle. Other livestock kept are, goats, sheep, donkeys, pigs, poultry, camels and dogs. The livestock sub sector makes a big contribution to food security and poverty eradication at household level. Livestock population in Shinyanga region in 2012 was estimated to be 3,287,950. Cattles were the dominant livestock which accounted for 36.4 percent of the Regional total livestock population.

Trade and Industry

There are three categories of industries in Shinyanga region namely, large scale industries employing more than 50 workers; medium scale industries employing between 10 and 49 workers; and small scale industries employing 1 to 9 workers. The region is mainly dominated by agro processing industries especially ginneries (14) and oil processing industries (9) mainly from cotton seeds. Shinyanga region has 14 ginneries of which 8 are located within Shinyanga Municipality. These include the following: Jambo Ginneries and Oil Mills Ltd, Fresho Investment, Afrisian Ginneries, Gaki Investment, Aham Investments, Kisumwa Machinery, Bunda Oil Mills and SHIRECU (Ozogore Ginnery.

Grain mills and factories

Grain milling in Shinyanga is done in small and medium scale factories, and main grains grained include maize, cassava, millet, and sorghum, the small scale factories are located in the rural and urban areas while medium gaining mills are located in the urban areas. These factories have low capacity of production and parking.

Fishing

Fishing is not a prominent economic activity in Shinyanga region. Small scale fishing practiced in some parts of the region is merely for domestic consumption. However, fish breeding is practiced at two fish breeding stations covering an area of 8 hectares. Over 100,000 fingerlings mainly Tilapia species are produced annually for onward stocking into dam reservoirs and ponds for domestic fish farming. Fresh water fish are obtained from dam reservoirs, seasonal rivers and Lake Kitangiri. Nevertheless, fish is comparatively scarce in Shinyanga region compared with other lake zone regions.

Forestry

Land and forest resources are the main natural endowments of Tanzania. In Shinyanga the total forest reserve area in the region amounts to 1,172,578Ha and 500Ha Community Forest Management Reserve (CFMR). However it has been noticed that the country's forest area has been declining yearly. Shinyanga region being part of Tanzania also experiences the same problem. Causes of this decline in the region are mainly due to agricultural expansion, fuel wood utilization and tobacco curing in tobacco growing areas, over grazing, wildfire, over exploitation of wood resources for various purposes and other human activities.

Examples of types of trees found in the region include *Moringa spp, Eucalypus spp, Albizia spp, Acacia spp, Brachystegia spp, Termarindus india, Adansonia digitata, Afzelia spp, Grevillea spp, Gliricidia spp, Melia orborea, Pterocarpu spp, Senna spp and Vitex spp* and many other hardwood trees.

Bee keeping

Shinyanga is among the regions in Tanzania known for honey and bee-wax production. The forest cover available in some parts of the region has a great potential for bee keeping though the sector is still under developed due to lack of know-how and modern technology. This results the existing potential of this important economic activity not to be fully exploited. Kahama and Kishapu districts are a bit prominent in traditional bee keeping and are now adopting for modern bee – keeping. Tanzania's honey is ranked among the best in the world because it is purely organic of high quality. Honey and its by products are in high demand locally and in the export market such as Europe, Japan, USA and middle East.

Wildlife

Regarding the wildlife sector, the region is endowed with one game reserve which borders Moyowosi Game Reserve on western side in Kigoma region. This game reserve in Kahama District and Bukombe District in Geita Region (formerly in Shinyanga Region) is covering an area about 7,000 Km^2. The Game Reserve is endowed with wild animal such as *Hippo, Lions, Leopards, Sitatunga, Sable Zebra, Buffalo, Wilddogs, Bushbuck, Impala, Giraffe, Baboons, Greater Kudu, Topi, Roan Antelope* and *Elephants.* These wildlife areas already attract a fair number of tourists due to the fact that the area is not yet developed in terms of tourist accommodation and camping sites for tourist hunting. Kigosi Game Reserve is mostly suitable for trophy hunting.

However, on prior arrangement, photographic safaris, walking safaris and bird watching can be organized as well as accommodation (fly camps). The reserve can be accessed by chartered light air craft or scheduled flights to Shinyanga then by road approximately 2hrs drive. This reflects that there is investment potential yet to be tapped in this sub

sector Furthermore, Maswa, Moyowosi Kigosi and Kigosi game reserves also make the region a better destination for tourists. Wildlife animals such as hippo, lion, zebra, buffalo, elephant, wild dog, bushbuck, impala, giraffe and baboon can be seen in those game reserves and national park. Activities permitted in the national park include viewing and photographic safaris and research and training activities. In game reserves, game cropping, tourist hunting, photographic safaris and training activities are undertaken.

Mining

Shinyanga region play a significant role in mineral production in the country. However, the sector has yet to contribute significantly to the region's economy. The region attracted a large flow of Foreign Direct Investment, mainly in the mining of gold and diamonds. According to 'Taarifa ya Utendaji kazi ya Ofisi za Madini Kanda ya Kati Magharibi katika kipindi cha mwaka 2009', medium scale diamond mining company, El-Hillal Minerals Limited operates in Buganika in Mwadui area in Kishapu District. Large scale diamond mining company, Williamson Diamonds Limited operates in Mwadui area while large scale gold mining companies, Pangea Minerals Ltd and Kahama Mining Corporation Ltd are observed in Buzwagi and Bulyanhulu also in Kahama District.

Shinyanga region play a significant role in mineral production in the country. However, the sector has yet to contribute significantly to the region's economy. The region attracted a large flow of Foreign Direct Investment, mainly in the mining of gold and diamonds. According to 'Taarifa ya Utendaji kazi ya Ofisi za Madini Kanda ya Kati Magharibi katika kipindi cha mwaka 2009', medium scale diamond mining company, El-Hillal Minerals Limited operates in Buganika in Mwadui area in Kishapu District.

4.4.10 Infrastructures

Roads

Being at the North Western part of the country and makes part of lake zone, Shinyanga region has the privilege of having frontier to six regions. These regions include Geita, Simiyu, Singida, Tabora, Kigoma, and Mwanza. Landlocked countries of Republic of Congo, Burundi, Rwanda and even Uganda also depend to some extent on the efficiency of Shinyanga roads as well as Isaka dry land port.

As a result, the region has been privileged with a well developed transport network system connected to these regions. With the exception of Kahama to Tabora via Nzega road, all other roads connecting the region to neighboring regions are tarmac roads.

Table 4.7: Roads Networks by Type and Length

Council	Type and length in km						
	Trunk	**Region**	**District Council**	**Urban**	**Feeder**	**Total**	**Percent council share**
Shinyanga Rural	60	123	722.33	0	338.06	1,243.39	26.9
Kahama	92	189	238.4	346.6	1,269.3	2,135.3	46.1
Shinyanga Urban	40	13	58.95	277.4	166.67	556.02	12.0
Kishapu	96	192	260.7	20.4	124	693.1	15.0
Total	**288**	**517**	**1,280.38**	**644.4**	**1,898.03**	**4627.81**	**100**
% Share	**6.2**	**11.2**	**27.7**	**13.9**	**41.0**	**100.0**	

(Source: Shinyanga Regional Commissioner Office-2013)

Railway Transport

Shinyanga region is having opportunity whereby the central railway line from Dar es Salaam to Mwanza is passing through. Similar to road network, railway line connects Shinyanga with seven regions: Mwanza, Tabora, Singida, Dodoma, Morogoro, Pwani, Dar es Salaam and Kigoma. This line provides services in Shinyanga region through, Seke and Songwa stations in Kishapu district, Shinyanga station (Shinyanga Municipal Council), Usule and Lohumbo stations in Shinyanga Rural district and Isaka station in Kahama district.

Air Transport:

There is not yet much improvement in this sub sector for the last decade. So far there is only one airport which is located at Ibadakuli area in Shinyanga Municipal Council whereby a private airline namely, The Precision Airline uses regularly to embark and disembark passengers. In addition there are 2 airstrips located at Kahama districts which serve these areas for non-scheduled air traffic for medical, tourist and other services. The existing 1 airstrip is owned by the Kahama Mining Company Limited (KMCL) and Alliance Ginneries Ltd own a strip. It is obvious that, improvement of these facilities and introduction of regular local flights would enable the region to benefit greatly.

Telecommunication and Postal services

The invention of Information Communication Telecommunication, to a large extent has reduced the dependency of analog telecommunication services by Tanzania Telecommunication Company Limited.

Mobile Phone Services also is available to easy communication. To date, the use of internet facility and mobile phones are considered to be more efficient in the region. Other telecommunication providers Radio include 2 radio stations, internet operators, 4 different cellular phone service providers are TIGO, AIRTEL, VODACOM, HALOTEL and ZANTEL, 5 branches of post office and 7 sub-post offices.

4.4.11 Financial Institutions

Macro and Micro Financing:

Kahama Town consists of NMB, NBC, CRDB, EXIM, TPB banking services while Kishapu have none. Shinyanga Municipal council has four financial institutions i.e. Cooperative Rural development Bank, National Micro Finance Bank, National Bank of Commerce and Postal Bank.

The region attracts a large flow of Foreign Direct Investment, mainly in the mining of gold and diamonds in Kahama town, Kahama district, Kishapu and partly Shinyanga Rural.

Non financial institutions

Insurance firms

Insurance services are provided by Government and Private Institutions. National Insurance Corporation (NIC) and Zanzibar Insurance Corporation are Governmental Institutions providing insurance services to Shinyanga Municipality residents. Many Private insurance company and Blockers opened their offices specifically in centers of towns for the purpose of providing services to residents

Social security funds

The Government is providing security funds to the members through regional offices. The security Funds established in these areas are NSSF, LAPF, PSPF and NIHF. Various Religion organizations also provide social security bunds by mobilizing funds from their members

CHAPTER 5

5.0 STAKEHOLDERS CONSULTATION

5.1 Introduction

Public participation was considered as an important element of the proposed project. Section 89 of the Environmental Management Act (EMA, 2004) provides directives on public participation issues and its importance in the EIA. EIA and Audit Regulation 17 (URT, 2005) provides further details and procedures for public participation in the EIA process.

In this ESIA study various stakeholders participated. The consultations involved residents close to the project location and various officials in Shinyanga Municipal Council and Government agencies/ institutions. The concerns of each stakeholder have been adequately addressed in this ESIA report.

5.2 Issues Raised During Consultation

The main issues and concerns identified during scoping include the following:

- **Noise from construction equipment and machineries** – The project could cause noise nuisance from construction machineries. If construction is done during nights, the WEO office should be informed
- **Dust emissions**- dust from the construction must be controlled
- **Increased sewage**- more sewage is expected during the operation phase and hence overloading of the sewerage system
- **Increased solid wastes**-more solid wastes generation is expected during construction and operation period
- **Increased water use**-High use of amount water use is expected during construction and operation
- **Location of Emergency assembly point** – location of assembly points at the project site is important during the emergency to gather all the workers at the site for safety issues
- **Security**-This was also an issue raised by the neighbours to the project site, the safety of themselves and their properties.
- **Community development**- if by any chances their youths get employment opportunities during the project phases.
-

5.3 Stakeholders Identified

These were identified using simple methods such as scoping, networks, literature review and interviews. From one stakeholder, the team was connected to another and another stakeholder, in chain like or network process.

Process

Simple methods such as networks, literature review and interviews were used in the process of stakeholder identification. From one stakeholder, the team was connected to another and another stakeholder, in a chain like manner. The following is a short list of both institutional and individual stakeholders. Additional stakeholders will be identified during the full EIA process.

5.3.1 Institutions

- Shinyanga Municipal Council
    - Regional Commissioner
    - Town Planner
    - Land Officer
    - Environmental Engineer
    - MEMO

- Fire and Rescue Force
- TANESCO
- TANROADS
- OSHA
- SHUWASA
- MAFC
- TPRI

5.3.2 Individuals

- Developer
- Ibadakuli Ward
    - WEO
- Ibadakuli Village
    - VEO
- Neighbours
    - Jambo Industry

The method used to get the views of the stakeholders was through professional discussion (List and Signatures are shown in Appendix III).

Typically, the Agenda for these consultations included:

- Presenting the Project
- Obtaining their environmental and socio-economic concerns and perceptions regarding the proposed project.

Issues and comments raised by the stakeholders are summarized in Table 5.1.

5.4 Spatial, temporal and institutional boundaries of the project

There are three types of boundaries that were considered in this EIA study: institutional, temporal and spatial boundaries.

5.4.1 Institutional boundaries

These can be determined from political boundaries, Acts, regulations and institutional mandates. This development touches the interest of many institutions and is in relation to several policies, laws and plans in Tanzania and outside Tanzania. The list of these institutions is provided above.

5.4.2 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. Temporal boundaries also include site restoration and decommissioning.

5.4.3 Spatial boundary

Spatial boundaries are impacts that whether are likely to occur at local, regional, national or international level. The proposed project will have low range implications that could be felt only felt locally in Ibadakuli Ward.

In this study, the spatial categorization has been termed as core impact area, immediate area and area of influence. The core impact area is the centroid of the project i.e. the petrol station area. The core impact area is surrounded by an *immediate impact area*, an area that is outside but plays important role or bears relatively some of the impacts (positively or negatively). The immediate impact area in the case of the proposed project would include the surrounding plots.

The study then identified the potential impacts of the project, predicted them and evaluated their significance. Impact identification was done by simple checklist method while prediction entailed use of correlation *matrix*.

Table 5.1: Issues Response from the Stakeholders Consultations

S/N	Name	Position	Issue/Comments	Issue Response
1	Zainab R. Telak	**Regional Commissioner-** Shinyanga	i) Community notification should be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents ii) Sound construction equipment with noise sinks should be used iii) Good housekeeping should be maintained at all sites to reduce the fire risk iv) Topsoil should be stock piled and used for reclamation or re-vegetation practice at the site during landscaping	i) The proponent will notify the community and take necessary measure to reduce dust ii) The proponent will use iii) The proponent will maintain the good house keeping iv) The proponent will not disposed the top soil excavate instead will use it to reclaim the land after construction activities
2	Charles Maugira	**Administrative Officer-**Shinyanga Municipality	i) He has no objections with the project, he supports its implementation	i) Noted
3	Bundala Shija	**Ibadakuli-WEO**	i) Supporting community development projects ii) Employment opportunities to be given first to the people of Ibadakuli Ward. iii) Enhanced revenue collection as taxes and levies to government	i) The proponent will support ii) The proponent will consider iii) Noted

4	Helbert Robert	**Ibadakuli-VEO**	i) He was of the opinion that the project is good for the community of Ibadakuli since they expect the project to offer employment opportunities to local community members ii) There should be community outreach programs aimed at assisting community development projects iii) Creation of business opportunities to local groups and companies e.g. boost to local shops, food vendors and other service providers.	i) True ii) The proponent will assist iii) True
5	Emmanuel Mitinje.	**Town Planner** -Shinyanga Municipality	i) He was aware of the proposed Grain Storage (SILOS) project to be under taken on Plots No. 176&178, Block "KK" ii) No objections with its implementation	i) Noted ii) Noted
6	Elias Augustine	**Land Officer**-Shinyanga Municipality	i) She insisted on the land use of the area that is rules and regulations for the Silos Storage ii) No objections with the proposed project	i) Noted as the land use identified is for grain storage purposes ii) Noted
7	Charles Muchuruza	**Electrical Eng.**-Shinyanga Municipality	i) He emphasized on cleanliness of the environment during the construction and operation of the project phases ii) Safety and occupational health standards should be observed	i) The proponent will observe cleanliness of the environment at all phases ii) The proponent will observe
8	Mr Rwatus Kulwa	**TANROADS**	i) Machine operators in various sections with	i) The proponent will provide

		Engineer- Shinyanga MC	significant noise levels should be provided with noise protective gear ii) Construction equipments should be selected, operated and maintained to minimize noise iii) Trucks transporting construction materials should be covered if the load is dry and prone to dust emissions iv) Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and v) Controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic	ii) The proponent will work on minimizing noise pollution in the environment iii) The proponent will make sure all the trucks are covered when construction starts iv) Proper design at the proposed site will consider all v) The proponent will ensure safety at the area at all phases
9	Emmanuel Nyamwihura	**MEMO-** Shinyanga Municipality	i) He emphasized on the cleanliness of the environment and monitoring of the activities ii) To re-vegetate the area after construction activities iii) Proper design of the access roads, water and wastewater infrastructures	i) The proponent will consider the cleanliness of the environment ii) The proponent will employ the qualified engineer for the construction of such infrastructures
10	Eng. Raphael Njago and Eng. Mahacha	**Engineers TANESCO-** Shinyanga Municipality	i) They are satisfied with the area no objections but the proponent should seek their assistance during installation to be given the total requirements including the	i) The proponent will seek their assistance when implementation begins

			costs in order to accomplish the job.	
11	Hanafi A. Mkilindi	**A/Insp-Fire & Rescue Force-** Shinyanga Municipality	i) Fire hydrants should be installed at the area with the interval of 100m from each other to ensure good and enough water supply for emergency fire response ii) The area should have enough emergency water tanks or wells iii) After construction, all godowns should have Hose reels iv) The godown should have at least two emergence doors v) Septic tank behind the admin block should be covered vi) There are should be Fire Assembly Point with enough space at the project site	i) The proponent will install as advised ii) Enough water storage tanks will be installed iii) Hose reels will be installed iv) The proponent will consider that in the design v) The proponent will consider that when found unnecessary vi) The fire assembly point will be marked
12	Silvester Mahole	**SHUWASA MD**	i) All liquid wastes shall be directed Septic tank-Soak away pit within the premises ii) Regular checks and maintenance of fire fighting extinguishers and fire detectors iii) Good housekeeping shall be maintained at all sites to reduce the fire risks	i) Proper septic tanks will be constructed to accommodate all the wastewater from the site ii) The proponent will do regular maintenance of all the fire preventive measures iii) The proponent will maintain the good house keeping
13	Elimpaa Kiranga Oswald Ruboha Sospeter Mtemi	**MALF-**AgPS **MALF-**DLVP **MALF-**ADLM	i) Food security will improve and thus combat hunger in the country ii) Stabilization of grain market in terms of price(price regulation) iii) It will create market to the farmers	i) True ii) True iii) True, the market will grow

	Richard Kasuga Beatus Maleme B.A. Shaban Seuchi J. Mburi George Mandepo	**MALF**-HGCU **MALF**-ADCPS **MALF**-DPMU **MALF**-DAHRM **MALF**-HLU	iv) It will result into population increase v) It will create employment opportunities at all project phases vi) Transportation activities may result into noise, traffic for incoming and outgoing trucks	and the farmers will be assured with the market and thus work hard iv) It is true, unauthorized people will be strictly prohibited in the project site area v) True vi) The proponent has put in place the proper mitigation measures as discussed in EMP in Chapter 8
14	Salaam	**CEO-Jambo Industry** (Neighbour)	i) He has no objections on the proposed project	i) Noted
15	Samwel Mmari Solomon Mungure	P/Inspector-**TPRI** P/Inspector-**TPRI**	i) Storage facilities should not be close to residential areas; ii) Solid waste management should be properly done especially empty pesticides containers and expired pesticides; iii) Safety and health issues of the workers should be considered; iv) Good ventilation system should be done in the warehouse; v) Washrooms and toilets should be adequate	i) The site is located in an industrial area which is appropriate to the proposed project ii) All kind of wastes will be properly managed; iii) The proponent will consider; iv) The proponent has considered it the design; v) The proponent has

			for all workers at the site; vi) Storage of pesticides waiting to be used and expired pesticides should done in well confined stores well designed to meet the required standards; vii) Storage and handling of pesticides should be done by a well trained personnel; viii) Chemical stores should be allocated a bit far from the office buildings	considered it in the its designs; vi) The proponent will adhere to it; vii) The proponent will hire the skilled personnel to handle all issues of pesticides; and viii) Noted

CHAPTER 6

6.0 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

6.1 Introduction

This section outlines the process of impact identification and assessment of the impacts in each stage of the proposed project. The section also proposes mitigation measures that the proponent is committed to undertake so as to prevent or reduce the identified adverse impacts.

6.2 Impact Identification

Impact identification is a process designed to ensure that all potential significant impacts are identified and taken into account in project design and implementation. A number of 'tools' are available to assist in impact identification. The simplest, and most frequently used, are checklists of impacts, although matrices, network diagrams and map overlays are also commonly used. In this EIA study, a checklist and matrix methods were used. The checklists, which have been developed from previous experiences, provide lists of potential impacts associated with specific activities. They provide a quick method of identifying the impacts and in such help also practitioners to avoid overlooking some of potential of the impacts associated with a particular activity. The matrix provides a rather systematic way of evaluating the identified impacts.

6.2.1 Impacts associated with mobilization

The following issues were identified to be occurring during the mobilization phase of the project.

i. Loss of vegetations;
ii. Benefits to communities resulting from employment; and
iii. Air pollution from vehicular emissions.

6.2.2 Impacts associated with construction phase

i. Loss of vegetation;
ii. Disturbance of ecological species;
iii. Employment opportunities;
iv. Increased noise levels and vibration;
v. Air pollution;
vi. Increased dust and emissions from machines and vehicles;
vii. Increased solid waste generation;
viii. Sanitary waste generation;
ix. Occupational health and safety risks;
x. Over-exertion;

xi. Slips and falls;
xii. Work in heights;
xiii. Moving machinery; and
xiv. Population influx.

6.2.3 Impacts associated with Operation Phase

i. Benefits to communities and municipality at large resulting from employment and other economic activities linked to project;
ii. Traffic congestion;
iii. Health and safety risks due to fire hazards;
iv. Contamination of soil due to use of pesticides;
v. Increased pressure on the municipal services; and
vi. Waste management problems during operations.

6.2.4 Impacts associated with Demobilization Phase

The following key issues are associated with decommissioning phase:

i. Production of rubble and associated disposal problems;
ii. Noise and dust pollution;
iii. Loss of aesthetic; and
iv. Loss of employment.

6.3 Impact Evaluation

Identification of impacts was followed by prediction or estimation of the magnitude, extent and duration of the impact in comparison with the situation without that the project. The matrix method was used (Table 6.1). To be able to predict whether impacts are likely to occur as well as their scale, the initial reference or baseline data prior to the project was determined, and the future changes forecasted with or without the proposed project. The impact evaluation was based on experts' knowledge as well as checklists.

The significance of impacts was tested using the following criteria:

i. The magnitude and likelihood of the impact and its spatial and temporal extent;
ii. The likely degree of recovery of the affected environment;
iii. The value of the affected environment;
iv. The level of public concern;
v. Are extensive over space and time (magnitude);
vi. Are intensive in concentration or in proportion to assimilative capacity;
vii. Exceed environmental standards or thresholds;
viii. Do not comply with environmental policies, land use plans, sustainability strategy;

ix. Adversely and seriously affect ecologically sensitive areas; and
x. Adversely and seriously affect heritage resources, other land uses, communities and/or indigenous peoples, traditions and values.

The description of the nature of impact includes what is likely to be affected and in what specific way (see Table 6.1) that shows the cumulative and residual impacts due to the presence of the proposed project.

6.3.1 Direct Impact

This refers to an impact that appears immediately as a result of an activity from such a project. For example, the loss of forest habitat is a direct impact of logging.

6.3.2 Indirect Impact

An indirect impact is that which is related to the project but that arises from an activity of the project at a secondary level.

6.3.3 Spatial Extent

This refers to physical space and size with regards to the impact coverage. This gives insight as to whether or not the impact would occur on a scale described as follows:

Site: an impact could affect the whole or measurable portion of the site. Usually used when impact is limited to the immediate area of the proposed project;

Local: an impact affecting an extended area adjacent to the site, e.g. a neighbourhood or small town.

Regional*:* an impact affecting the area including the outlying areas of the city, the transport routes and the adjoining towns.

National*:* an impact far reaching to international boundaries.

6.3.4 Temporal Duration

The lifespan of the impact; this is measured in the context of the life-time of the proposed development.

Short term: the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase.

Medium term: the impact will last for the period of the construction phase; thereafter it will be entirely negated.

Long term: the impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent: the only class of impact which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

6.3.5 Intensity

This refers to the level of severity or magnitude of the impact and it could be:

Low: Impact will have insignificant influence on the receptor or environmental entity.

Moderate*:* impact could have an adverse shock on the environmental entity or receptor. The environmental constituent experiences considerable shock though it may continue with its function.

High*:* impact could have significant shock on the environmental media and may not be easy to mitigate or reverse.

6.3.6 Probability

This refers to the possibility or likelihood of an impact actually occurring. The impact may occur for any duration of time in the life cycle of the activity, and not at any given time. Thus, it's either:

Unlikely: the probability of the impact occurring is very low.

Possible*:* the impact could happen, and mitigation planning should be undertaken.

Probable*:* it is most likely that the impact will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity, or

Definite*:* the impact will take place regardless of prevention or mitigation.

6.3.7 Receptor Sensitivity

This refers to the level of tolerance to exposure, of a specific organism or an environmental media. It can be:

Low*:* Impact will have insignificant influence on the receptor or environmental entity.

***Moderate**:* impact could have an adverse shock on the environmental entity or receptor. The environmental constituent experiences considerable shock though it may continue with its function.

***High**:* impact could have significant shock on the environmental media and may not be easy to mitigate or reverse.

6.3.8 Frequency

This simply refers to how often a specific impact will occur; it can be tri-annual, once, daily or hourly.

6.3.9 Determination of Significance

Significance was is determined through a synthesis of impact characteristics or combination of effects. Significance is an indication of the importance of the impact in terms of physical extent, intensity and time scale, and therefore may give some insight on the level of mitigation required.

***Negligible**:* impact is insubstantial and does not require any mitigation action.

***Low**:* impact is of little importance, but may require limited mitigation.

***Moderate**:* impact is of importance and thus considered to have mitigation. Mitigation is required to reduce the negative impacts to acceptable levels or positive impacts maximized.

***High**:* impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable.

Table 6.1: Evaluation of Cumulative and Residual Impacts for the proposed grain storage facilities

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
IMPACTS ON LAND, NOISE, SOILS, AIR QUALITY AND WATER ENVIRONMENT									
Site Preparation Construction	Particulates and dust accumulation Noise of dredgers, vehicles	**DIRECT** (Irreversible) (on Soils & Air Quality)	Once	High	Site	Short term	Low	Definite	Moderate
		INDIRECT (Irreversible) (on Surface Water)			Site	Short term	Low	Probable	Negligible
		DIRECT(Irreversible) (on human receptors)			Site	Short term	Low	Definite	Moderate
	Change in soil texture due to earth works, trenching, compacting activities and steel works mountings	**DIRECT** (Reversible)	Once	Low	site	Short term	Low	Definite	Negligible
	Exposed soil is	**DIRECT** (Reversible)	annually	Low	Site	Short term	Moderat	Probable	Negligible

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
	prone to erosion by water or wind.						e		
	Soil aeration disrupted by concrete works.	**DIRECT** (Reversible)	Once	Low	Site	Long term	Low	Definite	Negligible
	Stockpiling of construction materials could lead to nutrients flow disruptions.	**DIRECT** (Reversible)	Once	Low	Site	Short term	Moderate	Probable	Negligible
	Deforestation (There is little vegetation cover at site)	**DIRECT** (Cutting trees) (Reversible)	Once	Low	Site	Long-term	Low	Definite	Moderate
	Disturbance to simple wildlife and loss of habitat.	**INDIRECT** (Reversible)	Once	Low	Site	Short term	Low	Possible	Negligible
	Earth works, steel works and concrete pad construction (mixing cement and laterite).	**INDIRECT** (Residual)	Once	Low	Site	Short term	low	Unlikely	Negligible
	Noise during	**DIRECT** (Reversible)	Daily for 30	Low	Site	Short term	Moderat	Definite	Low

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
	construction (machinery)		weeks				e		
	Visual impact. Disfigurement of the natural landscape and alteration of aesthetic view.	**DIRECT** (Residual)	Once	Low	Site	Permanent	Moderate	Definite	Low
	Create Jobs (150 jobs)-construction and tanks mountings	**DIRECT**	Once	Moderate	Local	Short term	Moderate	Definite	High
Operational	Mobile air pollution - Emissions from delivery trucks (diesel particulates, e.g. diesel, from exhaust fumes, N0x,C0x and S0x	**DIRECT (Irreversible)** (on Air Quality and Humans) **INDIRECT (Irreversible)** (On Soils and Vegetation) **INDIRECT**	Daily	Low Low	Local Site	Long term Long term	Moderate Moderate	Definite Probable	Moderate Low
	Noise (increase in vehicular	**DIRECT** (Reversible) (on human	Daily	Low	Local	Long term	Moderate	Probable	Moderate

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
	flow)	receptors)			Site	Long term	Moderate	Probable	Moderate
	Domestic Waste (sewerage and foodstuffs)	**DIRECT** (on soils and water)	Daily	Low	site	Long term	Moderate	Probable	Moderate
	Waste Oils from Engine and Parts Servicing	**DIRECT** (on H_20 Quality &Soils) **INDIRECT** (on Vegetation)	One off for Every 3 yrs	-	Local Site	Long term Long term	Moderate Moderate	Probable Probable	Low Low
	Increased vehicular traffic and road accidents	**DIRECT** (Reversible)	Daily	Low	Site	Long term	Moderate	Definite	moderate
	Pressure on utilities and infrastructures	**DIRECT** (Reversible)	Daily	High	Local	Long term	High	Possible	High
	Social security	**INDIRECT**	Daily	Moderate	Local	Long term	moderate	Possible	High
	Create Jobs (70 jobs) – technical	**DIRECT**	One off for 25 years	Moderate	Local	Long term	Moderate	Definite	Moderate

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
	Operations								
Decommissioning	-Dust from remnants, particulates, concrete debris from demolitions. -Alteration of scenic beauty, Habitat Destruction etc.	**DIRECT** (Residual) (on Air Quality & Soils)	Once	Low	Site	Short term	Low	Definite	Moderate
		INDIRECT (on Vegetation)		Low	Site	Short term	Low	Probable	Low
		DIRECT (Residual) (on Scenic Appearance)		Low	Site	Permanent	Low	Probable	Negligible
		INDIRECT/PERMANENT (Residual) (on habitat)	Once	Low	Site	Permanent	Low	Probable	Negligible
		INDIRECT (Reversible) (on water)		Moderate	Local	Short term	Low	Probable	Negligible
		INDIRECT (on people/workers)	Uncertain	Variable	Site	Short term	Moderate	Probable	Low
	Blasting noise	**DIRECT**	Once	Low	Site	Short term	Moderat	Possible	Low

PHASE	IMPACT DETAILS	TYPE OF IMPACT	FREQUENCY	RECEPTOR SENSITIVITY	SPATIAL EXTENT	TEMPORAL DURATION	INTENSITY	PROBABILITY	DETERMINATION OF SIGNIFICANCE
	during controlled demolitions of concrete pads.	(Reversible)					e		
	Jobs-local contractors (technical)	**DIRECT**	Once	Moderate	Local	Short term	Moderate	Possible	Low

The impacts were further rated at a scale of "–3" to "+3" through "0" in the following manner;

+3	High positive impacts
+2	Moderate positive impacts
+1	Minor positive impact
0	No impacts
-1	Minor negative impact
-2	Moderate negative impacts
-3	High negative impacts-

The team focused on significant positive and negative impacts that were rated -2, -3 and proposed mitigation measures.

Table 6.2: Impact Correlation Matrix for the proposed construction of grain storage facilities

S/N	Parameter/Activities		Mobilization and construction phase						Operation Phase						Demobilization Phase		
		Site clearance	Soil investigation	Transportation of	Trench excavations	Construction of the superstructure and	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Vehicle Parking	Water provision	Removal of temporary Structure	Landscaping	Termination of Temporary
1.	Job Creation	+1	+1	+1	+2	+3	+1	+3	+1	+1	+1	+2	0	+2	+1	+1	0
2.	Increased revenue to the owner, Municipality and Country as a whole	0	0	0	0	+2	0	+3	+1	+1	+1	+1	+2	+1	0	0	0
3	Influx of job mongers	-2	-1	-1	-2	-3	-1	-1	0	0	0	-1	0	0	-1	0	0
4	Increased noise levels and vibration		-2		-2	-2	-1	0	0	0	0	0	0	0	-2	-1	0
5	Increased solid waste generation	-2	-1	0	-2	-2	-1	-2		-2	0	-1	0	0	-2	-1	0
6	Dust and noise pollution	-1	0	-2	-1	-2	0	-1	0	0	-1	0	0	0	-1	-2	0
7	Population Influx	0	0	-1	-1	-2	-1	0	0	0	0	0	0	0	-1	-1	0
8	Occupational health and safety risk	-1	0	-1	-1	-2	0	-2	-1	-1	-1	-1	0	0	-1	0	0
9	Availability of affordable houses for rent	0	0	0	0	0	0	+3	+2	+2	+3	+2	+2	+2	0	0	0

S/N	Parameter/Activities		Mobilization and construction phase						Operation Phase							Demobilization Phase		
		Site clearance	Soil investigation	Transportation of	Trench excavations	Construction of the superstructure and	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Vehicle Parking	Water provision	Removal of temporary Structure	Landscaping	Termination of Temporary
10	Increased revenue to the owner, Municipality and Country as a whole	0	0	0	0	+2	0	+3	+1	+1	+1	+1	+2	+1	0	0	0
11	Increased pressure on social services and utilities	0	0	-2	-2	-2	0	-3	-3	-3	-3	-1	0	-3	0	0	0
12	Increased solid and liquid wastes	-2	-1	-2	-2	-2	-1	-2	+3	+3	0	-1	0	0	0	0	0
13	Health and safety risks due to fire hazards	0	0	0	0	-1	0	-2	0	0	0	-1	0	0	0	0	0
14	Loss of employment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3
15	Parking space	0	0	-2	0	-1	0	-2	0	0	0	0	-2	0	0	0	

6.4 Significant Impacts during Mobilization Phase

Positive Impacts

6.4.1 Employment Opportunities

The project is expected to employ few personnel during mobilization of materials. Works may include offloading of materials at site. Stimulation of local economy from food vendors is also expected.

Negative Impacts

6.4.2 Air pollution from vehicular emissions during transportation of construction material

Transportation of construction materials to the site may impact local air quality due to vehicular emissions.

6.4.3 Noise pollution from trucks during transportation of construction material

Transportation of construction materials to the site may cause noise nuisance due to movement of trucks and construction equipment.

6.4.4 Dust emissions

Transportation of construction materials to the site may cause dust emissions from trucks carrying sand and from project area roads.

6.4.5 Environmental hygiene of the local roads/streets

Movement of dumping truck may litter construction materials like sand, gravel etc. which may impact hygiene of the local area roads.

6.4.6 Traffic jams

Transportation of construction materials to the site may involve 3 trucks of $10m^3$ capacity. According to existing traffic jams in Dar es Salaam, it is expected that each truck will have 2 trips per day. This may not cause traffic jams in the project area roads.

6.5 Significant Impacts during Design Phase

Positive Impact

6.5.1 Compliance and income generation

Compliance of the designed facilities and specifications to the required standards as the drawing will be designed by professionals and though that Increase of income

through professional fees as the professionals will be paid to the design work they have accomplished that will include site visit of which per diem will be paid to them.

Negative Impact

6.5.2 Risk of flooding and inundation

In Shinyanga, drainage is a challenge for both storm water drainage systems. The area has steep slopes which will need special attention during design & construction.

6.5.3 Damage to the Existing Infrastructure

Establishment of construction camp, pile driving and other civil works for construction of silo, stock piling of construction material, increasing traffic during construction and operation will impact the existing social infrastructure in the vicinity, if those are not addressed properly during the design phase

6.5.4 Damage due to Waste Disposal

If proper and adequate drainage and sewerage system and proper waste collection method is not provided that will create overflow of existing system, odor issue, public nuisance and pollution of ground water and soil.

6.6 Significant Impacts during Construction Phase

Positive Impacts

6.6.1 Employment Opportunities

The proposed project development will benefit nearby communities in terms of employment and creating linkages with local economy by the supply of goods and services during construction. The local people either shall be employed directly by the contractor or indirectly by other businesses linked to it (i.e. selling of food to workers). About 50 people are expected to be employed during this phase.

Negative Impacts

6.6.2 Loss of natural vegetation

Few trees that are at the site will be cut off and the site will be cleared to pave way the construction activities.

6.6.3 Increased Noise Levels and Vibration

During construction activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Construction activities

normally generate a lot of noise ranges from 50 – 75Bba. Noises from vehicles during and after the construction phase may rather be significant. Most of the deterrent noises shall be confined during the construction period only, which is rather a shorter period compared with the lifetime of the proposed building.

6.6.4 Air Quality deterioration

Construction machinery and project vehicles will release exhaust emissions, containing carbon monoxide (CO), sulfur dioxide (SO2), oxides of nitrogen (NOX), and particulate matter (PM). These emissions can deteriorate the ambient air quality in the immediate vicinity of the project sites. Furthermore, construction activities such as excavation, leveling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions. These emissions pose health hazards for the nearby communities.

6.6.5 Soil and water contamination

Wastes particularly effluents from the works sites may contaminate the soil and water. The contractors' camps will generate domestic solid waste and waste water including sewage. The contractors' workshops will generate oily water, waste oils, oily rags, and other similar wastes. The stores and warehouse will generate solid waste such as empty cement bags, cardboards, metal scraps and wooden crates. Improper disposal of these waste streams can potentially contaminate the soils and water resources of the area.

6.6.6 Increased Solid Waste Generation

Site clearance and construction activities will generate a lot of rubble, spoil soils, excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. The waste generated need adequate haulage facilities and at the right time. Inadequate management of the waste shall create unsightly condition on site.

6.6.7 Sanitary Waste Generation

Construction activities may include the generation of sanitary wastewater discharges in varying quantities. It is estimated that about 1,600 litres per day of liquid waste will be produced from the site during construction period.

6.6.8 Occupational Health and Safety Risks

Construction of the building will expose the labourers and the general public to bronchial and other respiratory tract diseases. Also poor use (or not using at all) of the safety gears during construction phase will result into loss of lives or injuries during construction. The incidence rate of water borne diseases such as cholera and diarrhoea will increase if there will be no proper sanitation practices at the construction site.

Construction of steel silos may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools during assembling of the steel frames from height which can result in injury to the head, eyes, and extremities. Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a silo construction site may pose temporary hazards, such as physical contact, dust, emissions, and noise.

6.6.9 Social Conflicts

The presence of a large workforce, establishment of construction camps, Project-related traffic and construction activities may potentially cause conflicts with the nearby communities, privacy issues for the women and other similar problems.

6.6.10 Vehicular Traffic

The construction activities will cause an increase in the vehicular traffic on the local roads. Similarly, transportation of silo equipment and materials will also cause additional traffic on the access routes (roads). The number of trucks carrying construction materials including cement, reinforcing bars, sand and stone chips will be expected. This increased traffic can potentially cause traffic congestions on roads and also pose safety hazards for the nearby population particularly children.

6.6.11 Soil erosion

The construction activities which could potentially cause soil erosion include the following: Construction camp establishment, site clearance, excavation and construction of silo foundations.

6.6.12 Blocked access routes

The construction camps, construction activities and stock-piling of construction material can potentially block the access routes and roads inside and in the vicinity of the silo site.

6.6.13 Population Influx

More people especially youths will move to the construction site seeking for job opportunities when implementation of the project starts, this will cause influx of the people at the area.

6.7 Significant Impacts during Operation Phase

Positive Impacts

6.7.1 Benefits to Communities Resulting from Employment

The proposed silos complex will benefit nearby communities in terms of employment and creating linkages with local economy by the supply of goods and

services during operational phase. The local people either shall be employed directly (cleaners etc) or indirectly by other businesses linked to it.

6.7.2 Increased Revenue to the Municipality and Nation as a whole

The owner will be liable to paying a number of taxes including property tax, city levy, VAT etc. These benefits will in turn benefit the local and national economy.

Negative Impacts

6.7.3 Increased Pressure on Social Services and Utilities

The increase in the size and people has the potential to increase pressure on social services and utilities such as water, wastewater collection, electricity, roads etc. The demand may strains the existing service delivery system in one way or the other.

6.7.4 Safety Hazards and Public Health

The O&M activities may pose some safety hazards particularly to the O&M staff. These may include electrocution, fall, burns, cuts and other body injuries, asphyxiation, and exposure to phosphine gas. The fuel storage at the silo facilities may also pose safety hazards for the O&M staff as well as for surrounding population. Inappropriate waste disposal and air quality deterioration caused by the O&M activities, Unhygienic condition and unavailability of safe drinking water for the O&M staff will also expose them to health risks. O&M staffs are particularly exposed to the fumigants which may cause severe respiratory irritation. The hazards may involve the following;

- Loss of lives;
- Serious injuries; and
- Loss of properties.

6.7.5 Increased Wastes (Solid and Liquid Wastes)

Solid wastes mainly kitchen wastes and food wastes are inherent in office buildings. It is estimated that total of 55kg/day of solid waste will be generated in the building. Liquid wastes from the lavatories which are estimated at 2.24 m^3/day of liquid waste. This amount is significant whose inadequate management could create unsightly condition on the area.

6.7.6 Air quality Deterioration

Emergency diesel generator and vehicles transporting grains will release exhaust emissions, containing carbon monoxide (CO), sulfur dioxide (SO2), oxides of nitrogen (NOX), and particulate matter (PM). Emissions and leakage from the bag filters may also release PM. These emissions can deteriorate the ambient air quality in the immediate vicinity of the project sites. These emissions pose health hazards for the Operation and Management staff and nearby communities. In addition, phosphine

gas may be released from the aluminum phosphide, which would be used as a fumigant in the facility. Phospine gas is toxic and is denser than air and hence may collect in low lying areas. It can form explosive mixtures with air and also self-ignite. When phosphine burns it produces a dense white cloud of phosphorus pentoxide – a severe respiratory irritant. Primarily the O&M staff may be exposed to phosphine.

6.7.7 Soil and water contamination

Inappropriate waste disposal from the O&M activities as well as from offices and residential facilities may potentially contaminate soil and water thus negatively affecting nearby communities and biological resources of the area.

6.7.8 Noise and vibration

The O&M activities (running of motors, conveyor belts, bag filters, chilling plant, dryers, and others) at the silos and vehicular traffic will generate noise and vibration which are likely to affect the O&M staff and nearby communities.

6.7.9 Vehicular traffic

Transportation of food grain to and from silos will cause additional traffic on the access routes (roads ways). This increased traffic can potentially cause traffic congestions on roads and also pose safety hazards for the nearby population particularly children.

6.7.10 Electricity Consumption

Storage in silos is of power sensitive system, therefore, this design considered a standby power supply as an alternative during power blackouts.

6.7.11 Disposal of empty pesticide containers

Storage of grains in the silos and warehouses will involve minimal usage of pesticides to keep away rates and other destructive insects. If management of the chemicals wont be effective will cause pollution to the environment such as soil, air and underground water.

6.7.12 Aesthetic value

Site clearance, tree felling, presence of construction material/machinery, and construction activities may potentially affect the aesthetic value of the area. Also, presence of silos may potentially affect the aesthetic value of the area.

6.8 Boundaries of the Project

Project boundaries within which the ESIA to be undertaken is an important component and was determined during scoping exercise. There are three types of

boundaries that considered in this scoping and the ESIA in general: institutional, temporal and spatial boundaries.

6.8.1 Institutional Boundaries

Institutional boundaries refer to those institutions sectoral boundaries in which the project lies or interacts. These can be determined from political boundaries, Acts, regulations and institutional mandates. The proposed development is a civil works project. This development touches the interest of local and international institutions. All this has been detailed during the ESIA study.

6.8.2. Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. Consideration has been made to what will happen when the project ends, where there is need for site restoration and decommissioning.

6.8.3 Spatial Boundary

The proposed project will have wide ranging implications that could be felt locally, regionally and outside Tanzania. Most of the biophysical impacts are both local and regional (except for air pollution related impacts, which can be global) whereas socio-economic impacts are of local scale.

6.9 Project Alternatives

Consideration of project alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. In this EIA report, the following alternatives are considered and will be examined in detail during the EIA process.

6.9.1 No project Alternative

The no project alternative entails retaining the current status quo (No construction of the grain depot). Adopting this option would mean avoiding most of the negative effects associated with the presence of the facility and missing all the positive benefits such as benefits to communities resulting from employment during and after construction, availability of enough storage facility for grains to ensure food security, and expansion of the local market for the farm products to NFRA particularly grains.

6.9.2 Alternative Site

The option of using another site (away from Ibadakuli area) apart from that of the proposed one was also considered. However the feasibility study done by the proponent pointed the strengths of the proposed site as follows:

- The plot is located on a favourable piece of land in terms of size;

- The location is a good due to the road network and easy access to public transportation; and
- Availability of electricity mains supply.

6.8.3 Design Alternative

The design of site layout for major facilities (6 silos and 2 warehouses) based on operational flow and best approach of space optimization. The arrangement follows the logical flow of materials in the sequence of grain storage technology. Warehouses are arranged in the manner that cut and fill is minimized while maintaining East-West direction for maximum ventilation. Silos were arranged basing on the proper manoeuvring of vehicles both during offloading and loading of grains. Prime land is becoming a scarce commodity and therefore optimal use of land is encouraged.

6.9.4 Energy Alternative

The use of other alternative energy sources apart from power from the national grid and diesel generators were considered. It is generally acceptable that the supply of electricity from national grid is not reliable as it mostly originates from hydroelectric power generators, which depend on rainfall frequency, intensity and pattern. On the other hand, diesel generators, which are mainly used during power interruptions, emit a lot of greenhouse gases especially when they are run for a long time. Solar energy was considered and the design team shall explore the feasibility of using this alternative.

6.9.5 Water Alternative

The proponent will be using water from Babati Urban Water Supply Authority (BUWASA). However, in the designs underground water abstraction through a borehole drilling has been considered to supplement the supply during shortage of water supply from BUWASA. Rain water harvesting is also considered whose installation of the storage tanks (number and capacity) will be determined in the implementation of the project.

6.9.6 Construction Materials and Technology

Recently, three new storage technologies have been developed for grain storage. These are actellic super, super grain bags and metal silos. Actellic super is a cocktail of 1.6% Pirimiphos-methyl and 0.3% Permethrin. It has been promoted as a chemical effective against the LGB in combination with practices like immediate shelling and treating. The super grain bag, also known as the IRRI super bag, has been used in rice storage but is also said to be suitable for other cereal storage. The super bag fits as a liner inside existing storage bags. However, these technologies are geared towards small volume storage and also need warehouses.

To address this problem, a metal silo was developed as a valid option and proven effective in protecting stored grains from attack by storage insect pests to large quantities. A metal silo is a cylindrical structure, constructed from a galvanized iron sheet and hermetically sealed, killing any insect pests that may be present. The impact of metal silo technology in Africa, Asia and Latin America includes, improving food security, empowering farmers, enhancing income opportunities and job creation, and safeguarding the agro-ecosystems. The metal silo can be fabricated in different sizes, some of industrial manufacturers are able to produce metal silos large than 5,000 MT capacity. Silos storage facilities are more efficient and developed technology compared to warehouse storage facilities (Figure 6.1). However, due to large investment cost on silos, NFRA will continue constructing warehouse facilities to complement the existing facilities as well as supporting the few silos storage facilities planned.

Figure 6.1: Typical Storage Facilities to be constructed by NFRA at the site (Source: NFRA, 2017)

CHAPTER 7

7.0 IMPACTS MITIGATION MEASURES

This chapter entails measures or interventions that shall be implemented so as to minimize the potential impacts identified in the preceding chapter. Most of the mitigation measures put forward are basically good engineering practice that shall be adhered to during all the project phases.

7.1 Enhancement Measures for Positive Impacts during Construction Phase

7.1.1 Employment Opportunities

- The contractor shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;
- Employment should be on equal opportunities for both gender;
- Contractor shall provide on job training; and
- Local communities shall be encouraged to provide quality goods and services in the shops surrounding the project site especially during the operation phase

7.2 Mitigation Measures for Impacts during Construction Phase

7.2.1 Loss of natural vegetation

Re-vegetation will be required after the construction activities to compensate the cut trees and cleared vegetations at areas where no construction will be expected. The plantation of trees will most likely take place towards the end of the construction phase. Appropriate maintenance and monitoring will need to be carried out to ensure survival and growth of the planted trees. This will improve the good looking of the environment also trees will act as carbon sinking and thus improve air quality**.**

7.2.2 Increased Noise Levels and Vibration

- Planning activities e.g. job rotation to minimise exposure, workers will be moved in different section and those who work at the source and path of noise will be given few hours;
- Sound construction equipment, with noise sinks and ear plug, shall be used;
- Working hours for construction activities within/near the communities should be limited to between 8 am and 6 pm;
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear;
- Construction equipment shall be selected, operated and maintained to minimize noise;
- The workforce shall be educated on the issue of maintaining tranquility; and

- Vehicle speeds should be kept low, and horns should not be used while passing through or near the communities.

7.2.2 Air Quality deterioration

- The vehicular and equipment exhaust should comply with the national standard;
- Apply dust suppression techniques such as water sprinkling twice a week to open earth construction area to reduce dust emission;
- Cover the trucks transporting construction materials if the load is dry and prone to dust emissions;
- The construction area is already fenced by a wall; this will prevent the dust at the ground to be picked up by the wind;
- Cover the building by hessian net to prevent dust from reaching the neighbouring area; and
- Notify community around where appropriate work is likely to cause dust impact on the public and nearby residents.

7.2.3 Soil and water contamination

- No untreated waste effluents should be released to ground or water;
- Vehicles and equipment should not be repaired in the field. If unavoidable, impervious sheathing should be used to avoid soil and water contamination;
- For the domestic sewage from the construction camps and offices, appropriate treatment and disposal system, such as septic tanks and soaking pits should be constructed having adequate capacity;
- Waste oils should be collected in drums and sold to the recycling contractors;
- The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) should be sold to recycling contractors;
- The hazardous waste should be kept separate and handled according to the nature of the waste; and
- Domestic solid waste from the construction camps should be disposed in a manner that does not cause soil contamination.

7.2.4 Solid Waste Generation

- The contractor shall have adequate facilities for handling the construction waste (i.e. collection points and separation units for recyclable materials) before transported to dumpsite at Kizumbi. These recyclables include pieces of timber, iron rods, aluminum pieces, plastic materials and glass materials;
- Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping; and

- Demolition debris shall be sold to recyclers. Other building materials shall be reused or recycled.

7.2.5 Sanitary Waste Generation

Provide adequate temporary or portable sanitation facilities serving all workers at the construction site. Feasible option is to install 2 hole- pit latrine onsite.

7.2.6 Occupational Health and Safety Risks

Over-Exertion

- Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary;
- Planning work site layout to minimize the need for manual transfer of heavy loads;
- Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations; and
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks.

Slips and Falls

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths;
- Cleaning up excessive waste debris and liquid spills regularly;
- Locating electrical cords and ropes in common areas and marked corridors; and
- Use of slip retardant footwear.

Work in Heights

- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, or through an opening in a work surface; and
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds. The tie in point of the fall arresting system can also be able to support 5000 pounds.

Moving Machinery

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic; and
- Using inspected and well-maintained lifting devices appropriate for the load, such as cranes, and securing when lifting them to higher job-site elevations.

7.2.7 Social conflicts

Liaison with the communities should be maintained throughout the construction to the operation phase

7.2.8 Vehicular Traffic

- Project drivers should be trained on defensive driving practices;
- Speed limits should be enforced for the Project vehicles;
- Reduced speed near/through communities;
- Liaison should be maintained particularly with the communities near the camps and work sites; and
- Safety signage should be placed at the work sites.

7.2.9 Soil erosion

- Cut and fill at the proposed sites should be carefully designed, and ideally should balance each other. The surplus soil, if any, should be disposed at places approved by the Supervision Consultants ("Engineer"). Such sites should be selected after surveying the area and ensuring that soil deposition will not have any significant impacts, such as loss of productive land, blocked access, natural vegetation and disturbance to drainage;
- The fill material should not be obtained from any cultivation fields or orchards, unless the consent of the owner is obtained;
- Areas from where the fill material is obtained or surplus soil deposited, should be landscaped to minimize erosion and hazard for people and livestock;
- Construction camps should be located in a stable and flat area, requiring minimal devegetation and levelling;
- Embankments and excavated slopes should not be left untreated/unattended for long durations. Appropriate slope stabilization measures should be taken per the design (eg, stone pitching);
- Vehicular traffic on unpaved roads should be avoided as far as possible; and
- After the completion of the construction works, the construction sites, campsites and other work areas should be completely restored. No debris, surplus construction material or any garbage should be left behind.

7.2.10 Blocked access routes

- The construction facilities (work areas, camp sites, workshops, others) should be established after obtaining approval from the Supervision consultants and ensuring that no roads or routes are blocked; and
- In case of the blockage of the existing routes, alternate routes should be identified in consultation with affected communities.

7.2.11 Population Influx

- The contractor shall deploy locally available labour force; and
- Maintain good security in the area with signage like “No employment at the moment”, to keep away job seeker.

7.3 Enhancement Measures for Positive Impacts during Operation Phase

7.3.1 Employment and Other Economic Activities Linked to the Project

- The developer is committed to engage local people for maintenance and cleanliness of the building during operations. Priority will be given to women in the neighbourhood.

7.4 Mitigation Measures for Impacts during Operation Phase

7.4.1 Increased Pressure on social Services and Utilities

- Alternative measures like use of solar power. Use of energy savers bulbs shall be given high priority; and
- Potential use of ground water and rain water harvesting will be explored.

7.4.2 Health Hazards and Safety Risks

- The facility should prepare a site specific Health, Safety and Environment (HSE) Plan. The Plan should also include awareness raising and prevention measures for particularly for communicable diseases such as hepatitis B and C, and HIV/AIDS. The HSE Plan should be made an integral part of the Operational Manual of each facility. The Plan should particularly address procedures to handle aluminum phosphide and to prevent exposure to phosphine gas. Material safety data sheet (MSDS) should be followed to handle aluminum sulphide and other hazardous chemicals;
- PPE should be provided to the O&M staff. HSE trainings should be provided to the O&M staff on a regular basis;
- Availability of safe drinking water should be ensured at each facility;
- First aid boxes should be made available at each construction site. Emergency phone numbers (including hospitals, Fire Department, and Police) will be displayed at key locations within the facility;
- Fire fighting equipment should be made available at the facilities;

- The O&M staff should be provided safety including fire fighting training;
- All safety precautions should be taken to transport, handle and store hazardous substances, such as fuel;
- Waste management plan should be prepared and implemented in accordance with international best practice;
- Liaison with the community should be maintained;
- Good housekeeping shall be maintained at all sites to reduce the unnecessary risk; and
- Provision of fire escape route and fire detectors in the building.

7.4.3 Increased Solid Wastes

- The inert recyclable waste from the site (such as card board, drums, and broken/used parts) should be sold to recycling contractors;
- The hazardous waste should be kept separate and handled according to the nature of the waste;
- Domestic solid waste from the offices and residential areas should be disposed in designated areas that do not cause soil contamination; and
- The garbage collection room shall be emptied by the company and wastes will be transported at the authorised dumpsite at Kizumbi twice per week.

7.4.4 Increased Wastes (Grey and Black Soil)

Untreated waste effluents should not be released to the environment. For the domestic sewage from the offices and canteen, appropriate treatment and disposal system, such as septic tanks and soaking pits, should be constructed having adequate capacity

7.4.5 Air Quality Deterioration

- The bag filters should be maintained regularly, ensuring that there is no excessive leakage and release of PM. The emissions from these filters should comply with the national standards for air quality. Compliance with the standard for ambient air quality should be ensured;
- The steel silos should be connected with the duct at the dust collection point, which will be attached to a reverse jet bag filter and then to the fan which will vacuum the duct and extract the dust. These suction ducts will be suitably installed at the dump pit of the grain collection point, to the bucket elevator and chain conveyors also to collect dust during operation of silos;
- Standard operating procedures will be followed to handle and use aluminum phosphide, and to prevent exposure to phosphine gas; and
- The Operation and Management staff should be provided HSE trainings on regular basis; these trainings should address the issues related to phosphine gas.

7.4.6 Vehicular traffic

- Department should prepare a traffic management plan for each silo facility. This plan should be a part of the Operational Manual of each facility; and
- Liaison should be maintained with the relevant authorities (such as traffic police, TANROADS, SUMATRA) regarding the grains transportation particularly during emergencies.

7.4.7 Disposal of empty pesticides containers and obsolete

All empty pesticides containers will be temporarily storage in an enclosed designated area and disposed of by the certified contractor.

7.4.8 Aesthetic value

- Proper housekeeping should be regularly maintained at the facilities; and
- landscaping and tree plantation should be carried out at the site and camps where possible.

7.5 Mitigation Measures for Impacts during Decommissioning Phase

7.5.1 Dust Pollution

- Water sprinkling shall be applied to open earth to reduce dust emission;
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions;
- The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind; and
- Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.

7.5.2 Noise Pollution

- Sound construction equipment, with noise sinks shall be used;
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear; and
- Construction equipment shall be selected, operated and maintained to minimize noise.

7.5.3 Increased Solid Waste

- All materials which can be reused shall be reused; and
- Materials that cannot be reused shall be sent to the authorised dumpsite at Kizumbi.

CHAPTER 8

8.0 ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN

8.1 Impact Management Plan

Plans for the implementation of mitigation measures for the proposed project are provided in this chapter. The Plans indicate institutional responsibilities, time to take the action and estimated costs. The proposed costs are only indicative, should the proposed development proceed with the suggested changes, the developer will work out on actual costs and include them in the overall cost of the project. Based on the EMA, (URT 2004), NEMC is required to ensure compliance of all the agreed conditions for authorization. The measures are given in Table 8.1. The developer is committed to implement the mitigation measures suggested by the Environmental and Social Impact management Plan (ESMP).

8.2 Implementation of the Management Plan

The environmental and social mitigation measures incorporated in the detailed engineering design shall be handed over to the contractor during construction period. The Contractor shall take stock of the contents of the Environmental and Social Management Plan of the Project. The contractor shall implement the ESMP during the construction period under close supervision of the developer. During the Operation Phase, The developer will manage all the activities by proper implementation of the ESMP.

8.3 Environmental and Social Cost

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed. These costs are indicated in Table 8.1. The developer shall cover all the costs proposed in the ESMP.

Table 8.1: Environmental and Social Impact Management Plan for the Proposed Construction of Hotel Lodge

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Construction Phase				
Loss of natural vegetation	▪ Re-vegetation will be required after the construction activities to compensate the cut trees and cleared vegetations at areas where no construction will be expected ▪ The plantation of trees will most likely take place towards the end of the construction phase ▪ Appropriate maintenance and monitoring will need to be carried out to ensure survival and growth of the planted trees. This will improve the good looking of the environment also trees will act as carbon sinking and thus improve air quality	Contractor/ proponent	Operation phase	2,000,000
Increased noise levels and vibration	▪ Plan activities e.g. job rotation to minimise exposure, workers will be moved in different section and those who work at the source and path of noise will be given few hours. ▪ Employ sound construction equipment, with noise sinks and ear plug, shall be used ▪ Restrict vehicles carrying construction	Contractor/ proponent	Construction phase	2,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	materials during peak hours of the day. ▪ Provide noise protective gear to machine operators in various sections with significant noise levels. ▪ Select construction equipment, operated and maintained to minimize noise. ▪ Educate workforce on the issue of maintaining tranquility			
Air quality deterioration	▪ The vehicular and equipment exhaust should comply with the national standards. ▪ Apply dust suppression techniques such as water sprinkling twice a week to open earth construction area to reduce dust emission. ▪ Cover the trucks transporting construction materials if the load is dry and prone to dust emissions. ▪ The construction area is already fenced by a wall; this will prevent the dust at the ground to be picked up by the wind. ▪ Notify community around where appropriate work is likely to cause dust impact on the public and nearby residents.	Contractor/ proponent	Construction phase	2,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Soil and water contamination	▪ The contractors should prepare separate waste management plans for the site in accordance with international best practice. ▪ No untreated waste effluents should be released to ground or water ▪ Vehicles and equipment should not be repaired in the field. If unavoidable, impervious sheathing should be used to avoid soil and water contamination. ▪ For the domestic sewage from the construction camps and offices, appropriate treatment and disposal system, such as septic tanks and soaking pits should be constructed having adequate capacity ▪ Waste oils should be collected in drums and sold to the recycling contractors ▪ The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) should be sold to recycling contractors ▪ The hazardous waste should be kept separate and handled according to the nature of the waste	Contractor/ proponent	Construction phase	2,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Solid waste generation	▪ The contractor shall have adequate facilities for handling the construction waste (i.e collection points and separation units for hazardous and non hazardous materials) before transported to dumpsite at Kizumbi ▪ Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping. ▪ Demolition debris shall be sold to recyclers. Other building materials shall be reused or recycled.	Contractor/ Supervision firm/ proponent	Construction phase	3,000,000
Liquid waste generation	Provide adequate temporary or portable sanitation facilities serving all workers at the construction site. Feasible option is to install 2 hole- pit latrine onsite.	Contractor/ proponent	Construction phase	3,000,000
	Over-Exertion: ▪ Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary ▪ Planning work site layout to minimize the need for manual transfer of heavy loads	Contractor/proponent	Construction phase	1,5000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	▪ Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations ▪ Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks			
Occupational health and safety hazards	**Slips and Falls:** ▪ Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths ▪ Cleaning up excessive waste debris and liquid spills regularly ▪ Locating electrical cords and ropes in common areas and marked corridors ▪ Use of slip retardant footwear	Contractor/proponent	Construction phase	2,000,000
	Working in Heights: ▪ Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any	Contractor/proponent	Construction phase	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	height if the risk includes falling into operating machinery, into water or other liquid, or through an opening in a work surface ▪ Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds. The tie in point of the fall arresting system can also be able to support 5000 pounds			
	Moving Machinery: ▪ Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic ▪ Using inspected and well-maintained lifting devices appropriate for the load, such as cranes, and securing when lifting them to higher job-site elevations.	Contractor/proponent	Construction phase	1,5000,000
Social conflicts	Liaison with the communities should be maintained throughout the construction	Contractor/proponent	Construction phase	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Vehicular traffic	▪ Department should prepare a traffic management plan for each silo facility. This plan should be a part of the Operational Manual of each facility ▪ Liaison should be maintained with the relevant authorities (such as traffic police, TANROADS, SUMATRA) regarding the maize transportation particularly during emergencies.	Contractor/ proponent	Construction phase	1,000,000
Soil erosion	▪ Cut and fill at the proposed sites should be carefully designed, and ideally should balance each other. The surplus soil, if any, should be disposed at places approved by the Supervision Consultants ("Engineer"). Such sites should be selected after surveying the area and ensuring that soil deposition will not have any significant impacts, such as loss of productive land, blocked access, natural vegetation and disturbance to drainage ▪ The fill material should not be obtained from any cultivation fields or orchards, unless the consent of the owner is obtained	Contractor/ proponent	Construction phase	3,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	▪ Areas from where the fill material is obtained or surplus soil deposited, should be landscaped to minimize erosion and hazard for people and livestock ▪ Construction camps should be located in a stable and flat area, requiring minimal devegetation and leveling ▪ Embankments and excavated slopes should not be left untreated/unattended for long durations. Appropriate slope stabilization measures should be taken per the design (eg, stone pitching). ▪ Vehicular traffic on unpaved roads should be avoided as far as possible ▪ After the completion of the construction works, the construction sites, campsites and other work areas should be completely restored. No debris, surplus construction material or any garbage should be left behind			
Blocked access routes	▪ The construction facilities (work areas, camp sites, workshops, others) should be established after obtaining approval from the Supervision consultants and ensuring	Contractor/ proponent	Construction phase	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	that no roads or routes are blocked ▪ In case of the blockage of the existing routes, alternate routes should be identified in consultation with affected communities.			
Population influx	▪ The contractor shall deploy locally available labour ▪ Maintain good security in the area with signage like "No employment at the moment", to keep away job seeker	Contractor/ Supervision firm	Construction phase	1,000,000
Operation Phase				
Increased pressure on social services and utilities	▪ Alternative measures like use of solar power, drilling a borehole at site, water recycling shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority ▪ Consultation with the street, ward and municipal authorities to determine their capacity to service the silos complex/warehouses shall be made and modalities of service delivery shall be established	Designer/ Contractor/ Supervision firm/ Developer	Operation phase	6,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Health and safety risks	▪ Adequate number of portable fire extinguishers shall be placed at strategic locations (Stair cases). ▪ Regular checks and maintenance of fire fighting extinguishers and fire detectors ▪ Good housekeeping shall be maintained at all sites to reduce the fire risk. ▪ The design of the Buildings shall strictly adhere to the Fire Safety Standards ▪ Developer shall insure the building against fire hazards ▪ Workers health check-up should be done regularly and well monitored	Designer/ Contractor/ Supervision firm/ proponent	Operation phase	7,000,000
Increased solid wastes	▪ An air tight chute from the top floor to ground floor has been designed to receive and direct the waste to the garbage collection station at the ground floor; ▪ The garbage collection station shall be emptied at the authorised dumpsite at Kizumbi once per week; ▪ Empty pesticides containers and obsolete will be disposed of the certified contractor;	Proponent	Operation phase	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Increased liquid wastes (offices and canteen)	▪ All liquid wastes shall be directed Septic tank-Soak away pit within the hotel premises; and ▪ Installation of oil/water interceptor prior to municipal sewer.	Proponent	Operation phase	1,000,000
Air quality deterioration	▪ The vehicular and equipment exhaust should comply with the national standards; ▪ The bag filters should be maintained regularly, ensuring that there is no excessive leakage and release of PM. The emissions from these filters should comply with the national standards for air quality. Compliance with the standard for ambient air quality should be ensured; ▪ The steel silos should be connected with the duct at the dust collection point, which will be attached to a reverse jet bag filter and then to the fan which will vacuum the duct and extract the dust. These suction ducts will be suitably installed at the dump pit of the grain collection point, to the bucket elevator and chain conveyors also to collect dust during operation of silos;	Proponent	Operation phase	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	▪ The filtered dust will be collected and put in the gardens for decomposition; ▪ Standard operating procedures will be followed to handle and use aluminum phosphide, and to prevent exposure to phosphine gas; ▪ The Operation and Management staff should be provided HSE trainings on regular basis; these trainings should address the issues related to phosphine gas			
Vehicular traffic	▪ Department should prepare a traffic management plan for each silo facility. This plan should be a part of the Operational Manual of each facility ▪ Liaison should be maintained with the relevant authorities (such as traffic police, TANROADS, SUMATRA) regarding the maize transportation particularly during emergencies.	Proponent	Operation phase	1,000,000
Aesthetic value	▪ Proper housekeeping should be regularly maintained at the facilities ▪ landscaping and tree plantation should be carried out at the site and camps where possible	Proponent	Operation phase	2,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
Demobilization Phase				
Dust pollution	▪ Water sprinkling shall be applied to open earth to reduce dust emission. ▪ Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions. ▪ The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind. ▪ Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.	Contractor/Developer	Demobilization phase	2,000,000
Noise pollution	▪ Sound construction equipment, with noise sinks, shall be used ▪ Machine operators in various sections with significant noise levels shall be provided with noise protective gear. ▪ Construction equipment shall be selected, operated and maintained to minimize noise.	Contractor/Developer	Demobilization phase	2,000,000
Increased solid waste	▪ All materials which can be reused shall be reused ▪ Materials that cannot be reused shall be sent to a the authorised dumpsite at	Contractor/Developer	Demobilization phase	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of Mitigation	Relative Cost (TZS)/annum
	Kizumbi			
Total cost of mitigation measure (TZS)				**54,100,000**

CHAPTER 9

9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Monitoring refers to the systematic collection of data through a series of repetitive measurements over a long period of time to provide information on characteristics and functioning of environmental and social variables in specific areas over time. There are four types of monitoring that are also relevant to this EIA.

- **Baseline monitoring** – the measurement of environmental parameters during a pre-project period and operation period to determine the nature and ranges of natural variations and where possible establish the process of change.

- **Impact/effect monitoring***:* involves the measurement of parameters (performance indicators) during establishment, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project. This monitoring provides experience for future projects and lessons that can be used to improve methods and techniques.

- **Compliance monitoring**: takes the form of periodic sampling and continuous measurement of levels of compliance with standards and thresholds – e.g. for waste discharge, air pollution.

- **Mitigation monitoring** aims to determine the suitability and effectiveness of mitigation programs designed to diminish or compensate for adverse effects of the project.

To ensure that mitigation measures are properly done, monitoring is essential. Table 9.1 provides details of the attributes to be monitored, frequency, and institutional responsibility and estimated costs. These costs are only approximations and therefore indicative. Costs that are to be covered by the developer should be included in the project cost.

Table 9.1: Social and Environmental Monitoring Plan for Implementation of Mitigation Measures for the Proposed Hotel Lodge

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (TZS)
Pre construction Phase								
Air Quality	Dust (PM_{10})	Once	Project site	ppm	*Detector tubes*	0.01	Developer/ Environmental Consultant	300,000
Noise Baseline	Noise level	Once	Project site	dBA	*Noise Level Meter*	80	Developer/ Environmental Consultant	100,000
Construction Phase								
Air Quality	Dust (PM_{10})	Once in three months	Project site	ppm	*Detector tubes*	0.01		3,000,000
Noise pollution	Noise level	Once a week	Project site	dBA	*Noise Level Meter*	80		4,800,000
Employment opportunity	Percentage of local construction labourers	Three times a year	Project site	Number of local people employed in the project	Records, inquiries and observation	-	Contractor/ Supervising firm/ Upanga East ward leaders	1,000,000
Occupational safety and health risks	Number and type of safety equipment	Twice a year	Project site	Number of safety measures provided	Records, injuries and inspection	-	Contractor	2,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (TZS)
	such as mask, helmet gloves and ear plugs. Health and sanitation facilities in site.							
Waste Management **Solid**	Amount of solid wastes	Once a week	Project site	Kg for Solid waste, Litres for Liquid waste	Observations and Measurements	0	Contractor/ Supervising firm/ Developer	2,000,000
Liquid	▪ BOD_5,	Monthly (for all parameters)	Municipal sewer Influent (for all)	Mg/l	▪ EMDC1 1173: Part 3- Five day BOD Method	▪ 30mg/l	Developer	1,000,000
	▪ COD			Mg/l	▪ EMDC1 1173: Part 4- Dichromate Digestion method	▪ 60mg/l		1,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (TZS)
	▪ NO_3 ▪ pH range			Mg/l Range	▪ APHA Standard Methods: 4110 B. Ion Chromatography with Chemical Suspension of Eluant Conductivity Direct dipping pH meter	▪ 20mg/l		500,000 200,000
Operation stage								
Air Quality	Dust pollution (PM_{10})	Twice every month for the first two years	Project site	ppm	Detector tubes	0.01	Developer/ Environmental Consultant	3,600,000
Noise pollution	Noise level	Once in three months	Project site	dBA	Noise Level Meter	80	Developer/ Environmental Consultant	1,200,000
Safety risk due to fire	Awareness and Signage number of fire	Once in three months	Project site	Number of safety measures provided	Records, injuries and inspection	-	Developer/ OSHA	2,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (TZS)
	extinguishers							
Waste Management	Solid and Liquid waste	Everyday	Project site	Kg for Solid waste, Litres for Liquid waste	Observations and Measurements	-	Developer/ Shinyanga Municipal	1,000,000
Total monitoring costs								**22,700,000**

CHAPTER 10

10.0 COST BENEFIT ANALYSIS

10.1 Introduction

Cost Benefit Analysis (CBA) is a simple technique used to create non-critical financial decisions. It involves adding the benefits of a particular action then providing a comparison with the associated costs. The results of the analysis are expressed as payback period which is the duration needed for the benefits to repay the costs. CBA is an important tool in project management and it is applicable in situations like evaluating a new project, assessment of any change initiative and determining the feasibility of different purchases.

The overall purpose of NFRA is to meet food emergency in the country for post disaster needs and improve the efficiency of grain storage management. However, the role of the Agency of which is their mission as well is to guarantee national food security by procuring, reserving and re-cycling strategic food stock in an efficient and cost effective manner and respond timely to food shortages in the country..

10.2 Socio-Economic and Environmental Cost Benefit Analysis

Environmental cost benefit analysis is assessed in terms of the negative versus positive analysis. Furthermore, the analysis is considering whether the impacts can be mitigated and the costs of mitigating the impacts are reasonable. As it has been mentioned in Chapter 6 and 7, the benefits of the project, in terms of social benefit are substantial, the environmental impacts are mitigatable and the financial resources needed to mitigate the impacts are relatively small compared with the actual capital investment. The two main socio-economic and environmental costs can be easily mitigated. The technology has evolved for over 50 years. These facilities are safer now than most of other known hazards.

NFRA shall ensure that the operation of the storage facilities is done with maximum safety measures. Due to low level of the mentioned risks to happen, apparently, this project has more benefit to the environment, economy and the society as a whole.

10.2.1 Socio-Economic Benefits

It is expected that this development will contribute to the provision of both permanent and temporary employments for the neighbourhood. In addition, the investment will contribute to government revenue through property taxes and increased land rent. Improvement of the economy of the area and neighbourhood status as the proponent will participate in the community development activities as well create both direct and indirect employment e.g. security etc

10.2.2 Environmental Benefits

The proposed project will optimize and increase the land utility by developing through construction of the modern storage facilities. This development will have direct impact to the economy of the country through taxes and rents. However, after construction phase the area will be re-vegetated with other plant species and thus increasing the beauty of the area.

10.2.3 Socio-Economic and Environmental Costs

Fire Hazards

Operations of storage facilities may lead to fire risks due to electrical installation when improperly done.

Air Pollution

The pollution will be contributed by the mobilization, construction and decommissioning activities as well explained in Chapter 6.

Health and Safety Risks

The project may compromise the health of the workers during the implementation. The EMP should be adhered to, to make sure the health of the workers are protected.

Loss of Flora and Fauna

The project will involve removal of the existing trees, shrubs and grasses to pave way for the construction activities of the proposed project. This will also cause loss of some plants species and disturbances to other ecological species e.g birds, butterflies, reptiles like lizards, ants and other creatures that were dependant of the existing vegetations.

CHAPTER 11

11.0 DECOMMISSIONING

As decommissioning will take place in the unforeseen future, the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail change of use (functional changes) or demolition triggered by change of land use. The following are some of the impacts and Mitigation Measures to be expected.

On completion of the project life of 50 years i.e from 2017-2067 everything should be left in order to achieve this, the following should be accomplished.

- Landscaping of open areas should be done. Such areas should be sealed from pits and other depressions and vegetation introduced.
- All waste materials should be cleared and removed from the site. There should be no such materials as wood, glass, stones, scrap metals etc. However, these should be disposed appropriately.
- General rehabilitation of any excavated areas; quality vegetation should be introduced to add aesthetic value to the site. This should be regularly watered.
- The structures should be cleared and rubbed of any dust particles
- Workers should be pre-warned just before decommissioning and suitably compensated and recommended and if possible, assist in seeking opportunities elsewhere.

Information pertaining to the decommissioning of the project at the end of its life cycle and associated impacts, proposed measure to return the site as far as possible to its former state elaborately provided in Table 11.1. The total cost for decommissioning plan is estimated at TZS 16,700,000 which can be relatively higher depending on currency value at that particular time.

Table 11.1: Decommissioning Activities with respective Costs

Accessory	Activity	Estimated Cost (TZS)	Remark
Decommissioning Permit	Obtain permits from Shinyanga Municipality and NEMC	500,000	Prior to these activities, the permits should be obtained before demolishing
Demolishing Contractor	Tendering for proper registered demolishing Contractor	200,000	
Furniture	Remove all furniture	1,000,000	All furniture to be sold in accordance to company policy
Sanitary works, electrical installations& its accessories	Drain all pipe work and disconnect the manhole chambers of each tank	2,000,000	The vent remains connected
	Seal all disconnected pipe work in the manhole chamber		
	The vent pipe should be disconnected just above ground level		
Walls and concrete structures	Dismantle all walls and concrete works including pilings	10,000,000	Contractor
Landscape	Re-vegetate and reinstate the surrounding to retain the natural site appearance	3,000,000	
Total		**16,700,000**	

CHAPTER 12

12.0 SUMMARY AND CONCLUSION

This report has presented ESIA of the proposed expansion of grain storage facilities (6 silos and 2 warehouses) that will be constructed on Plots No. 176 & 178 Block "KK" within an area of 6,000 m^2 at Ibadakuli Village, Ibadakuli Ward, Shinyanga Municipality.

The assessment of impacts was based on the review of the project activities and issues identified during the EIA scoping phase and through stakeholders' consultation. The assessment acknowledges that any development will have effects on the biophysical and socio-economic environment. The impact assessment did not identify any issue of major significance that could not be mitigated such that the proposed project was not acceptable from the environmental and social perspective. All potential negative impacts identified through ESIA could be mitigated to reduce severity and significance to acceptable levels or use of management controls. The associated negative impacts, to a large extent have been minimized through best management practices, safety and contingencies procedures and practices. Implementing proposed mitigation measures would increase environmental soundness of the project. It is, therefore, concluded that, implementation of the proposed expansion of the storage facilities will entail no deterrent impacts provided that recommended mitigation measures are adequately and timely put in place. The Developer is committed in implementing all the recommendations given in this EIS and further carrying out the environmental auditing and monitoring schedules. Although there are some limited negative environmental implications of the project, the project will have high socio-economic benefits to the local community in Ibadakuli and the nation as a whole..

It is thus our opinion as consultants that the project to be allowed to go ahead provided that the outlined mitigation measures are adhered to. The key objective should be geared towards minimizing the occurrence of impacts that have the potential to degrade the general environment. This will be (effectively) overcome through close following and implementation of the recommended EMPs. The project proponent shall work closely with the environmental Experts including NEMC; the general public and the local council to enhance the facilitation of the issues of concern.

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APPENDICES

Appendix I: NEMC Letter Approving Terms of Reference

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL(NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Telephone: +255 22 2774889,
Direct line: +255 22 2774852
Mobile: 0713 608930
Fax: +255 22 2774901
Email: dg@nemc.or.tz
Website: www.nemc.or.tz

35 Regent Street,
P. O. Box 63154
11404 Dar es Salaam
TANZANIA

In reply please quote:

Ref: **NEMC/HQ/EIA/01/0678/Vol.1/4**

Date: 10/02/2017

Chief Executive Officer,
National Food Reserve Agency (NFRA),
P.O. Box 5384,
Dar es Salaam

Attn: Joseph P. Ogonga

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR THE PROPOSED GRAIN STORAGE FACILITIES EXPANSION ON PLOT NO. 176&178 BLOCK "KK" IBADAKULI INDUSTRIAL AREA, SHINYANGA MUNICIPALITY, SHINYANGA REGION

Kindly refer the heading above.

We acknowledge receipt your letter with **Ref. No. BA.52/112/01/36** of 31st **January, 2017**, attached with 5 copies of scoping reports and terms of reference of the above mentioned project for review.

Kindly be informed that the Council has reviewed the scoping report and terms of reference and found to be adequate to guide the EIA study. However, the following should also be taken into consideration to improve the ToRs.

i. Evidence of land ownership for the proposed project site and all other documents relevant to the proposed development;

ii. Detailed description of the nature and size, components/activities and historical commencement of the existing grain storage facilities;

iii. Detailed description of all project components/activities of the expected expansion of the storage facilities;

iv. Stakeholders' consultation should be exhaustive and records of meeting, communication and comments raised should be appended and addressed in the EIS. Names and signatures of all consulted stakeholders should be appended as well. Also, include stakeholder's issue response table showing how and where significant issues raised by stakeholders have been addressed in the EIS and

v. The contents and the structure of the EIA report should adhere to Regulations 18 and 19 respectively of the EIA and Audit Regulations, 2005.

Please, work on these comments and the improved ToRs should be appended in the EIA report to be submitted to NEMC for review.

Following receipt of the EA report, the Council will arrange for the site verification visit to the project site and review meeting that will follow thereafter.

You will be required to provide transport facility for site verification team and review costs amounting to **Tshs. 13,718,902.85** which excludes transport costs as elaborated on the attached sheet (**NEMC Invoice NO. 3890 of 09/02/2017**).

The funds can be paid by cheque or electronic money transfer to NEMC's Bank Account No. **0150005055800**, Bank Name: **CRDB Bank Limited**, Branch: **PPF Tower Branch**, Swift Code: **CORUTZXXX**. Please, submit copy of bank transfer note to the Council. We look forward to your cooperation on this matter.

Yours Sincerely,

R. Said
For: Director General

Cc: Eco Services (T) Limited, P.O. Box 36086, **Dar es Salaam**.

Appendix II: Approved Terms of Reference

TERMS OF REFERENCE FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF GRAIN STORAGE FACILITY EXPANSION ON PLOTS NO. 176 & 178 BLOCK "KK" AT IBADAKULI VILLAGE, IBADAKULI WARD, SHINYANGA MUNICIPALITY IN SHINYANGA REGION

1. INTRODUCTION

The detailed scope for undertaking Environmental and Social Impact Assessment is intended to guide the Consultant to address relevant environmental and social issues during the assessment process. Among others, the EIA and SIA shall be conducted in accordance with the requirements of the Environmental Management Act (2004). The Consultant shall do everything necessary to meet the objectives of the services and not less than the following task that should be undertaken during the Environmental and Social Impact Assessment. In the process of consultation (Scoping process) with relevant stakeholders like environmental authorities, the Consultant may further be required to finalize the ToR according to the agreement with these stakeholders.

2. SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information:-

- The profile of the proponent;
- Project justification
- Location of the project and reasons for rejecting the alternatives;
- Land ownership document and designated use of the proposed project
- General layout, size, and capacity;
- Area of influence of the road works
- Pre-construction activities
- Construction activities
- Schedule of project activities
- Staffing and support;
- Facilities and services
- Operation and maintenance activities
- Life span

Task 2: Description of the Environment

Assemble, evaluate, and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences.

Modify the lists below to show the critical information for this project category or which is relevant to it. Environmental characteristics of the study area shall be presented on a map to facilitate the understanding of the study area

(a) Physical environmental: This shall cover geology; topography; soils; climate and meteorology; physical structures at site, utilities and services available.

(b) Biological environment: All flora and fauna present at the project site (if any).

(c) Socio-cultural/economic environment; population, land use; planned development activities community structure; goods and services; recreation; public health; Gender issues and HIV/AIDS, Cultural/ historic properties and attitudes to the project.

Task 3: Legislative, Policies, Administration Framework

Describe the pertinent regulations and standards governing the following;

- Environmental quality,
- Health and safety,
- Protection of sensitive areas,
- Protection of endangered species,
- Siting and
- Land use control at international, national, regional and local levels.

The Consultant shall undertake a review of policies, legislation and administrative framework within which the environmental management of the proposed activities to be carried out.

Task 4: Assist in Interagency Coordination and Public Participation

- Assist in coordinating the ESIA with other government agencies, in obtaining the views of local NGOs and affected groups,
- Keeping records of meetings and other activities, communications, and comments and their disposition.
- Establish the views of the public with regards to the potential impacts of the proposed construction of the grain depot.
- Identify the different groups of stakeholders, and then use the most appropriate method to establish their views.

The Consultant shall undertake an open and transparent consultation process to ensure that the views of interested and affected parties are and approximately incorporated in the project design.

Task 5: Analysis of Alternatives to the Proposed Project

- Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives.
- The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures.
- Compare alternatives in terms of potential environmental and social impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements.
- When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated.
- To the extent possible, qualify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures.
- Include the alternative of not constructing the project to demonstrate environmental and social conditions without the project.

Various environmental and social criteria should be developed to select the best alternatives.

Task 6: Identification, Analysis and Assessment of Potential Impacts

- The Consultant shall identify, analyze and assess environmental and social impacts of the proposed grain storage depot.
- The Consultant shall distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts.
- Identify impacts that are unavoidable or irreversible.
- Describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.
- The significance of impacts of the proposed construction of the grain storage depot station shall be assessed, and the basis of this assessment shall be specified.
- The Consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.
- The Consultant shall use the most up to date data and methods of analyzing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

Task 7: Mitigation Measures

The Consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction and operation. The costs of implementing these measures shall wherever possible be estimated and presented.

Task 8: Environmental and Social Management Plan (EMP)

The Environmental Management Plan focuses on three genetic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring.

- The Consultant shall prepare an Environmental and social Management Plan, which will include proposed work programme, budget estimates, schedules, staffing and training requirements and other necessary support services to implement the mitigation measures.

- Institutional arrangements required for implementing this management plan shall be indicated.

- The cost of implementing the monitoring and evaluation including staffing, training and institutional arrangements must be specified. Where monitoring and evaluation will require inter-agency collaboration, this should be indicated.

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

Prepare detailed arrangements to monitor the implementations of mitigating measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs.

3. REPORTING

The ESIA reports should be concise and limited to significant environmental Issues. The Main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or un-interpreted data are not appropriate in the main text and should be presented in appendices or separate volume. Unpublished documents used in the ESIA may not be readily available and should also be assembled in appendices. Organized the ESIA may not be readily available and should also be assembled in appendices. In organizing the ESIA reports according to the outline

in the Environmental Impact Assessment and Audit Regulations, 2005 (Regulation 18 (1), (2) and (3)). The main report will contain separate Executive Summaries both in English and Swahili. All reports shall be submitted initially as draft versions, which shall be finalized to accommodate clients' comments.

4. STAFFING

The Consultant will engage Ecologist, Agricultural and Natural Resources Management Engineer, Civil Engineer, an Environmental Engineer, EIA Expert and a Socio-Technical Expert. The Consultant may wish to absorb other supporting staff to facilitate efficient expedition of the work.

Appendix III: List of Key Stakeholders Consulted

LIST OF STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) ON GRAIN STORAGE FACILITIES EXPANSION.

SITE NAME: SHINYANGA

S/N	NAME	ORGANISATION	TITLE	CONTACT NO.	SIGNATURE	DATE
1	ZAINAB R. TELACK		RC	0754298348	[signature]	16/01/2017
2	CHARLES MAUGIRA	ofisi ya DC shinyanga	Afisa Tawala	0767858030	[signature]	16.01.2017
3.	MARY SHANGALI	NFRA SHY	ZONAL MANAGER	0754 285969	[signature]	16/01/2017
4	Renatus Kulwa	TANROAD	T/ENG	0754613906	[signature]	16/01/2017
5.	CHARLES MACHURIA	SHY MC	E. Eng.	0767214813	[signature]	16/1/2017
6.	Hanifa Mkilindi	FIRE	Fire Marshal	0763425924	[signature]	16/01/2017
7	ELIAS AUGUSTINE	SHY MC	LAND OFFICER	0767449574	[signature]	16/01/17
8.	Eng Mahacha	Tanesco	Engineer	0713733266	[signature]	16/1/17
9.	EMMANUEL MITINJE	SHY MC	TOWN PLANNER	0754271966	[signature]	16/1/17

LIST OF STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) ON GRAIN STORAGE FACILITIES EXPANSION.

SITE NAME: .....

S/N	NAME	ORGANISATION	TITLE	CONTACT NO.	SIGNATURE	DATE
01	GASTO NZOASIO	NFRA	ASSISTANT TECHNICIAN	P.O BOX 82		16/01/2016
02	VIOLET J. KASUKU	NFRA	CIVIL TECHNICIAN	P.O BOX 802 0762 142490		16/01/2016
03	E. NYAMWITHURA	SHY MC MEMO	MEMO	0784858715		
04	SILVESTER MAHOLE	SHUNASA	MD	067-511208		17.1.2017
05	BUNDALA SHIJA	SHY MC	VEO	0758381286		17/1/2017
06	HELBERT-ROBERT	SHY MC	VEO	0765664200		17/1/2017
07.	Salaam.	Jambo.	CEO	0767112111		17.1.2017

LIST OF THE KEY STAKEHOLDERS CONSULTED FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF GRAIN STORAGE FACILITY EXPANSION ON IN BABATI AND MANYARA REGIONS

S/N	Date	Name	Organization and Address	Title	Telephone/Cell No	Signature
1.	25-5-2017	ELIMPAA KURANGA	MALF	AgPS	0754446233	
2	-11-	Vumilia Zikankus	NFRA	Ag. CEO	0744468044	
3	-11-	Joseph. P. Okoroya	NFRA TTO	Ag DBD	0713377172	
4	-11-	Oswald Ruboha	MALF	AD-M&E	0754882005	
5		Paulo Tarimo	MALF	DLVP	2800457	
6	-11-	Sospeter Mteni	MALF	AD-LM	0762-879041	
7	-11-	Richard Kasuga	MALF	HRCU	0769-239946	
8	-11-	Beatus Malema	MALF	RDCPS	0754608806	
9.	-11-	B.A. Shaban	MALF	DPMU	0713227288	
10.	-11-	Seushi J. Mbyri	-11-	DAHRM	0754745305	
11	-11-	George Mandepo	-11-	HLV	0754375058	

LIST OF THE KEY STAKEHOLDERS CONSULTED FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE PROPOSED DEVELOPMENT OF GRAIN STORAGE FACILITIES ON PLOTS NO. 794-803 BLOCK "YY" AT MALANGI VILLAGE, MAISAKA KATANI WARD IN BABATI TOWN COUNCIL IN MANYARA REGION AND ON PLOTS NO. 176 & 178 BLOCK 'KK' AT IBADAKULI VILLAGE, IBADAKULI WARD IN SHINYANGA MUNICIPALITY IN SHINYANGA REGION

S/N	Date	Name	Organization and Address	Title	Telephone/Cell No	Signature
1	29/09/17	SAMWEL MINARI	TPRI, BOX 1585 ARUSHA	P/INSPECTOR	0767407206	
2	29/09/17	SOLOMON MUNGURE	TPRI BOX 1585 ARU	—11—	0713749313	

Appendix IV: Written Comments from Stakeholders Consulted

"Tunayaangaza Maisha Yako" TANESCO "We light Up Your Life"

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O.Box 9024, Dar Es Salaam, Tanzania, Tel : +255 22 2451130/9 Fax: +255 22 2452026

Our Ref: SHY/RM/03

17.01.2017

ECO SERVICES LTD,
MIKOCHENI LIGHT INDUSTRIAL AREA,
S.L. P. 36086,
DAR ES SALAAM.

YAH: TATHIMINI YA ATHARI ZA MAZINGIRA KWA GRAIN STORAGE FACILITIES KATIKA KATA YA IBADAKULI MTAA WA VIWANDA MKOA WA SHINYANGA

Rejea kichwa cha habari hapo juu.

Jana tarehe 16/01/2017 tumefanya ukaguzi/tathimin ya pamoja tukiwa na wadau mbalimbali kama Tanroad, Manispaa, Misitu na Malia asili, Halmashauri na wadau wengine katika eneo ambalo mamlaka ya hifadhi ya chakula imenunua kwa ajili ya kuhifadhi chakula (nafaka).

Kwa upande wetu Shirika la umeme (Tanesco) mkoa wa Shinyanga tumejiridhisha kua eneo liko salama na miundombinu yetu imefika eneo husika. Ila kinachotakiwa ni usambazaji wa huduma ya umeme katika magara (4) pamoja na majengo yanayotarajiwa kutumika kama ofisi.

Usambazaji huu utafanyika mara baada ya mamlaka ya chakula kuainisha mahitaji yake kwetu na kupatiwa tathimini ya garama zinazohitajika na kuzilipa ili kukamilisha huduma hizo.

Wako katika huduma,

Mhandisi Raphael Njango
K/Meneja wa Tanesco Shinyanga

HALMASHAURI YA MANISPAA YA SHINYANGA

Simu. 028-2763213
028-27625
Fax: 028-2763750
E-mail: municipalshy@yahoo.com

Unapojibu Tafadhali Taja

Kumb. Na. SHY/MC/C.20/2VOL.III/162

Ofisi ya Mkurugenzi wa Manispaa
S.L.P. 28,
SHINYANGA

Tarehe: 17 Januari, 2017

M/S Eco Service Limited,
S.L.P. 36086,
DAR ES SALAAM.

YAH: TAARIFA KUHUSU GHALA TARAJIWA LA HIFADHI YA CHAKULA ENEO LA IBADAKULI

1.0 Timu ya wataalam imekwenda eneo linalotarajiwa kuwa Ghala la Hifadhi ya chakula Ibadakuli. Katika eneo la umeme, huduma hiyo ipo mpaka kwenye Transformer yenye ukubwa wa 100 KVA ambayo itabadilishwa na kuwekwa yenye ukubwa 1,000 KVA kwa ajili ya matumizi makubwa ya baadaye kama inavyokusudiwa.

2.0 Stand by generating set inaonekana ipo katika hali nzuri ila haijatumika kwa muda mrefu, hivyo inahitaji matengenezo makubwa kwa sababu ya Dampness. Ukubwa wake ni kama 500 KVA, Primer mover yake ni S/N SGC 12001 U 2278A. Aina ya Perkins.

3.0 Usambazaji wa mfumo wa umeme kwa ndani ya hifadhi ni vyema kazi hii ya kusambaza miundo mbinu ya umeme kwa kujenga L/T line ya nyaya Insulated PVC kwa kuzingatia step up structural degisn ili huduma ifike kwenye maeneo lengwa na kwa mpangilio kutokana na ughali wa underground cables.

4.0 Automatic change over switch cubicial kutokana vihenge vitakavyojengwa vina uhitaji wa umeme muda wote wa umeme pamoja na matumizi mengine, iwekwe Automatic change overswitch cubicial.

5.0 Taa za security zitumike za solar panels poles pindi vyanzo vyote vya umeme vinapokuwa na hitilafu au kutokuwepo umeme, taa hizo ziwake muda wote kwa ajili ya usalama wa eneo hilo kutokana na Jiografia yake.

Ninawasilisha,

Charles Muchuruza
AFISA UMEME

KNY.MKUPUGENZI WA MANISPAA
HALMASHAURI YA MANISPAA
SHINYANGA

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HOME AFFAIRS
FIRE AND RESCUE FORCE

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REGIONAL FIRE OFFICER,
FIRE AND RESCUE FORCE
P.O.BOX 300,
SHINYANGA

Ref. No. HAJ/393/03/VOLII/ 81

17TH JANUARY 2017

ECO SERVICES LIMITED,
MIKOCHENI LIGHT INDUSTRIAL AREA,
P.O.BOX 36086,
DAR ES SALAAM.

REF: **FIRE SAFETY ASSESMENT REPORT FOR PROPOSED CONSTRUCTION OF GRAIN STORAGE FACILITIES AT IBADAKULI SHINYANGA**

By refering the assessments carried out on **16th January 2017** on Grain Storage Facilities at Ibadakuli Indusrtial Area, Shinyanga Municipal in Shinyanga Region by ECO SERVICE LTD, here is the Fire Safety Observation and Remarks as one of the stakeholders.

OBSERVATIONS:

1. Administration Block
2. Weigh Bridge and Its Office. The weigh Bridge can measure up to 100 Tones at once.
3. Security Guard House.
4. Store House and Store maintenance office.
5. Four Godowns. One of the Godowns is full constructed while three of them are unfinished.
6. North of the Store house there is about **50M^3** hole which was been used for oil tank. The hole is uncovered.
7. Behind the Store house there is also a well of about **12M^3** which is uncovered.
8. Behind Administration Block there is uncovered septic tank.

9. The Transformer of 1000kV
10. The generator.
11. Also we have observed four points for the construction of Four Silos.
    - ❖ The Observed facilities are enclosed in an area of **60,000M²**

FIRE & RESCUE FORCE SAFETY COMMENTS (REMARKS)

1. Fire Hydrants should be installed within the area with the interval of 100m from each other. This is to ensure good and enough water supply for emergency fire response.
2. The area should have enough Emergence water tanks or wells.
3. After construction, all Godowns should have Hose Reels.
4. The hole and well around the Store house should be covered or demolished before storage started.
5. Septic tank behind Administration Block should be covered.
6. The Godowns should have at least two emergence doors.
7. There should have Fire Emergence Assembly Point located in area with enough space for all workers to gather in an emergency. The areas that are out of harm's way.

FOR REGIONAL FIRE OFFICER
SHINYANGA

A/INSP: H. A. Mkilindi
For: REGINAL FIRE OFFICER
FIRE AND RESCUE FORCE – SHINYANGA.

VITENDEA KAZI JESHI LA ZIMAMOTO NA UOKOAJI WILAYA YA SHINYANGA

Na.	VITENDEA KAZI	IDADI
1.	Wafanyakazi (Askari)	25
2.	Magari	01 (Ujazo wa maji Lita 7,000)
3.	Foam	Lita 400
4.	Hose	5

16/01/2017

HALMASHAURI YA MANISPAA
S.L.P. 28
SHINYANGA

TATHMINI YA ATHARI ZA MAZINGIRA ENEO LINALOJENGWA GHALA LA CHAKULA KATA YA IBADAKULI WA VIWANDANI

MAONI

1. Nashauri maeneo yatakayolazimika kuondolewa miti, baadae ipandwe miti mingine mahali patakapostahili ili kuhifadhi mazingira na kuleta mandhari nzuri
2. Eneo lipandwe maua
3. Kilionekana kichaguu ambacho kinaweza kuwa na madhara endapo mchwa utazagaa unaweza kuharibu majengo na vyakula vinavyohifadhiwa, hivyo mchwa udhibitiwe.
4. Miundombinu ya barabara maji safi na maji taka isanifiwe vizuri
5. Eneo kwa ujumla lilionekana ni zuri likisanifiwa vizuri

Emmanuel Nyamuhura
Afisa Mazingira wa Manispaa
SHINYANGA

ENVIRONMENT MANAGEMENT OFFICER
MUNICIPAL FOREST OFFICER
SHINYANGA

Aina ya miti iliyoonekana kwenye eneo la mradi

1. Acia polyacantha (migunga) - 28
2. Albizia spp. 8
3. Azadirach indica (mwarobaini - 1
4. Senna siamea (mjohoro) 2
5. Acacia nilotica (mihale) 2
6. Leucaena diversifolia (mlusina) 1

Afisa Mazingira wa Manispaa
SHINYANGA

Appendix V: Land Ownership Documents

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA KILIMO MIFUGO NA UVUVI
WAKALA WA TAIFA WA HIFADHI YA CHAKULA
Kizota Viwandani Area | S.L.P 1050 Dodoma | Simu: +255(0)26 2340012 | Fax:+255(0)26 2340014
Barua pepe: info@nfra.go.tz | Tovuti: www.nfra.go.tz
NFRA

Kumb. Na. CAB. 26/165/112/01/52 **27 Oktoba 2017**

Mkurugenzi Mkuu
National Environmental Management Council (NEMC)
35 Regent Street
S.L.P. 63154,
11404 DAR ES SALAAM

YAH: HATI MILIKI ZA MAENEO UTAKAPOTEKELEZWA MRADI

Tafadhali husika na kichwa cha habari hapo juu.

Ifuatayo ni hali halisi ya upatikanaji wa Hati Miliki za eneo utakapotekelezwa Mradi wa Kuongeza uwezo wa Hifadhi ya Akiba ya Chakula (Storage Capacity Expansion Project):

NA.	KANDA/ENEO	NAMBA YA KIWANJA	MAELEZO
1.	Sumbawanga	Plot No. 20 & 21, Block "EE", Mtaa wa NMC, Kata ya Mazwi, Manispaa ya Sumbawanga, Mkoa wa Rukwa	Manispaa wamekamilisha kuandaa *Deed Plan* pamoja na Hati Miliki. Tarehe 01 Novemba 2017 itawasilishwa kwa Kamishina Msaidizi wa Ardhi kanda ya Mbeya kwa ajili ya kusainiwa.
2.	Mpanda	Plot No. 16 & 17, Block "C" Mtaa wa Mpanda Hotel, Manispaa ya Mpanda, Mkoa wa	Manispaa wamekamilisha kuandaa *Deed Plan* pamoja na Hati Miliki. Tarehe 01 Novemba 2017 itawasilishwa kwa Kamishina Msaidizi wa

		Katavi	Ardhi kanda ya Mbeya kwa ajili ya kusainiwa.
3.	Mbozi	Plot No. 92, Block "J" Mtaa wa Ipanga, Kata ya Ichenjezya, Wilaya ya Mbozi, Mkoa wa Songwe	Hati Miliki Na. 41660-MBYLR; LO No. 537669 ipo kwa jina la NFRA.
4.	Songea	Plot No. 101, 102 & 106; Block "B" Mtaa wa Ruhuiko Shuleni, Kata ya Ruhuiko, Manispaa ya Songea, Mkoa wa Ruvuma.	Hati Miliki Na. 27169-MBYLR; LO No. 176125 na Hati Na. 23840-MBYLR; LO No. 176126 zipo kwa jina la NFRA. Plot Na. 106 mchakato wake bado upo ngazi ya Ardhi Manispaa ya Songea kwa ajili ya kuandaliwa Deed Plan.
5.	Shinyanga	Plot No. 176 & Plot No. 178 Mtaa wa Ibadakuli, Manispaa ya Shinyanga.	Manispaa wamekamilisha kuandaa *Valuation for Transfer,* Wakala umelipa gharama za kuhamisha umiliki na mchakato wa kuandaa Hati Miliki ili ipatikane kabla ya mwisho wa mwezi Novemba 2017.
6.	Babati	Plot No. 794 – 803 Block "YY" Maisara area, Wilaya ya Babati, Mkoa wa Manyara.	Hati Miliki Na. 52892; LO No. 618201 ipo kwa jina la NFRA.

F.M. Masele

KNY: KAIMU AFISA MTENDAJI MKUU

Appendix VI: Project Drawings

Appendix VII: Geotechnical Report

Appendix VIII: Safety Data Sheet for Handling and Use of Aluminium Phosphide