

SUMMARY ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT (ESIA)

Project Name : **Small Towns Rural Water Supply and Sanitation Project**
Country : **Kenya**
Project Number : **P-KE- E00-007**

Department : **Water and Sanitation (OWAS)**
Date : **31 August 2009**

I. Introduction

Kenya experiences moderate droughts and floods every three to four years period and major droughts every about ten years. The pattern of droughts and floods is driven by weather patterns affecting coastal settlements, urban areas, river valleys, and most part of Western Kenya including the shores of Lake Victoria as well as the droughts affecting most parts of the country. About 80% of the country is arid and semi-arid land. Water continues to be scarce in the country and the current developed potential is estimated at 15% of available safe water resources. Demand for water and sanitation has been increasing rapidly because of increases in population and growing needs for irrigated agriculture, urban and rural populations, industries, livestock, and hydropower.

Degradation of water resources and poor sanitation in the country are linked to financial and technological resource constraints. The decline in water resources and poor sanitary services have serious consequences for water allocations, enforcement of the Water Act, management of water resources and improving the quality of the water and sanitation. The water sources in the country are severely degraded as a result of: excessive abstraction of surface waters (rivers, lakes, wetlands) and groundwater; soil erosion and resultant turbidity and siltation, high nutrient levels, causing eutrophication (oxygen depletion) of lakes and pans; and, toxic chemicals, including agricultural pesticides and heavy metals.

II. Project Description and Justification

The overall aim of the project is to contribute to the provision of improved water supply and sanitation in small towns, including the surrounding areas, and provide water storage for irrigation and domestic uses. The present infrastructure is inadequate and built in 1950s, in towns such as Bondo, Siaya, Maua, Othaya, Mukurwe-ini and Kitui. The water supply coverage in the towns varies from below 20% to around 50%. The sanitation situation is in similar state none of the towns has an acceptable sanitation action plan, program and system.

The proposed wastewater ponds for Bondo, Siaya and Othaya are covering an area of six ha, 4 ha and 4 ha respectively. In Yatta, water storage with a capacity of 31.5 million cubic meters and embankment volume of 1.3 million cubic meters in an impounded area of 470 ha will be developed. The areas proposed are rich in biodiversity with indigenous species that will require attention. Biodiversity offset initiative will regenerate displaced vegetation and local community will be engaged to enhance the offsets. In addition, local population estimated at 50 families will be resettled and a compensation scheme will be developed.

The infrastructure of the existing Masinga-Kitui water supply including transmission and distribution network is old. The water supply was constructed some ten years ago through a loan of KES. 800 Million. The gravity main line from Katheka to Kitui was not rehabilitated and currently accounts for a large percentage of Unaccounted-for-Water (UFW). The pipeline has relentless and frequent burst and especially section between Katheka – Kwa-Ngindu and the Katheka - Kwavonza. The reticulation system in Kitui town is also in a very poor condition.

In the Kenyan National Water Sector Strategy (2007 – 2015), the country aims to improve access to safe water and sanitation with the goal of attaining 75% access to safe and reliable water for urban areas and 70% for rural areas and reduce unaccounted for water to below 30%. The Government of Kenya's Vision 2030 acknowledges the fact that water is scarce in the country. The Government underscores the central role water plays in the performance of key economic sectors and the livelihoods of Kenyans. It further highlights the consequences of under-investment in: (a) water supply and sanitation services (WSS) as a fundamental need for productive livelihoods and (b) irrigation and hydropower developments on food and energy security. Under the economic and social pillars of the Vision, improved access to safe water and sanitation in both rural and urban areas, and increasing the area under irrigation have been given prominence with the rehabilitation and expansion of water supply and sanitation services in urban centers and construction of water storage dams identified as some of the flagship projects.

The Bank Group and other development partners committed to fully adopt and support the 2008 Kenya Joint Assistance Strategy (KJAS) realigned to Vision 2030. The Bank's Country Strategy Paper (CSP) 2008-2012 is in alignment with the Medium Term Plan (MTP), and focuses broadly on economic growth and employment creation as a basis for poverty reduction and building on lessons learnt from the post-election crisis of 2008. The Bank Group intervention is necessary to promote economic growth with linkages to addressing income disparities among households and regions in the country and supporting good governance and institutional strengthening essential to policy sustainability and infrastructure development.

The project addresses improved water supply and sanitation, in small towns as well as water storage that underpins the Kenyan economic and social developments. The project also fits within the broad thrust of the Bank's current 2008 – 2012 CSP which is underpinned by two pillars, with Pillar I focusing on the improvement of infrastructure services for competitiveness and enhanced regional integration and (ii) Pillar II, which addresses employment creation and poverty reduction. The current CSP is aligned with the MTP, and has a strong feature on the contributory role of water supply and sanitation, in infrastructural development. In addition, the CSP

(Deliverables and Targets) identifies the proposed investment being earmarked for funding under Kenya's ADF XI allocation.

III. Scope and Objectives of the ESIA

The project will comprise of three components: (i) institutional development support; (ii) water supply and waste water infrastructure; and, (iii) water storage. Detailed description of the components is provided in the table below. The objectives of the ESIA include identifying, assessing and analyzing impacts of the project and providing a plan to mitigate the negative impacts.

	Component Name	Component Description
1	Institutional Development Support	Gender sensitive baseline surveys (8) of project towns; Business and Strategic Business Plans (8) including Gender; Develop/Upgrade MIS and M&E systems (8); Hygiene education and Gender mainstreaming (district forums) Programs (8); Operation and Maintenance (8) (including Unaccounted For Water plans, Training, Studies, Equipment, Logistics); Sanitation and Wastewater management plans (8); Annual financial and annual technical audit (8); Support to Regulator, Reforms Secretariat, and Gender Focal point; Feasibility Studies (2), Detailed design and tender documents preparation of Thwake and Koru Dams (2)
2	Water Supply and Waste Water Infrastructure	Bondo, Siaya, Othaya, Mukurwe-ini, Maua, Kitui, Matuu and Kithimani: water supply system rehabilitation and extension works, wastewater and sanitation infrastructure works (consultant services for detailed design and supervision; implementation of: river intakes (8), boreholes (4); raw water and rising mains (127km), water treatment plant (73,800m ³ /day total of 9 plants), reservoirs (24,510 m ³ total of 9 reservoirs), distribution network (100 km), waste water ponds (8), exhauster (8), school and public toilets (100))
3	Water Storage	Detailed design, tender documents preparation and implementation supervision; recruitment of Panel of Experts; construction of Yatta dam and rehabilitation of Yatta canal (embankment works, spillways, intake, water treatment works, channel rehabilitation, water supply and irrigation infrastructure, and compensation); Water Resources Management Authority (WARMA) support; support for the two water users associations in the area (organizational capacity; operation and maintenance of irrigation infrastructure; agricultural extension support services); enhance the role of by-laws and water user associations for multi purpose use.

IV. Policy, Legal and Administrative Framework

The EIA regulations are applied in accordance with the provisions of the Environmental Management and Coordination Act (EMCA) of 1999. Kenya passed the EMCA in 1999. The main function of the EMCA is to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and implemented by the National Environmental Management Authority (NEMA). The proposed project shall be conducted under the guidance of Government of Kenya laws including policies, regulation, legal and institutional framework including;

Policy Framework

- National Environmental Action Plan (NEAP)
- Environmental and Development Policy (Session Paper No.6 1999)
- The World Commission on Environmental and Development (The Brundtland Commission Of 1987)
- Structure plans and local physical development plans (LPDP)
- The national poverty eradication plan (NPEP)
- The poverty reduction strategy paper (PRSP)

Legal Framework

- Environmental management and coordination act number 8 of 1999
- Factory act cap 514
- Public health act cap 242
- Malaria Prevention Act Cap 246
- Physical Planning Act, 1999
- Land Act
- Building code 2000
- Water act (2002)
- The penal code (cap 63)
- The local government act (cap 265)

Institutional Framework

- District physical planning officer
- Town and County Council by-laws and regulation
- National Environment Management Authority (NEMA)

Other relevant laws that govern protection of the environment and executed by different arms of the law include;

- The Agriculture Act, and the Agriculture (Basic Land Usage) Rules, 1986
- The Factories and Other Places of Work Act, -as revised 1990
- The Forestry Act-as revised 1992
- The Food, Drugs and Chemical Substances Act –as revised 1992
- The Government Lands Act
- The Wildlife Conservation and Management Act .Cap 376, Laws of Kenya and Amendment Act No. 16 of 1989 (KWS)
- The Tourist Industry Licensing Act (TILA), Cap 381, Laws of Kenya
- The Hotels and Restaurant Act (HRA), Cap 494, Laws of Kenya

In addition, the relevant AfDB policies, guidelines, procedures and safeguards below supplement the National Environmental Legislation:

- African Development Bank (2000). *The African Development Bank Group Policy on Good Governance*.
- African Development Bank (2001). *Environmental and Social Assessment Procedures for African Development Bank's Public Sector Operations*.
- African Development Bank (2001). *Gender Policy*.
- African Development Bank (2001). *Handbook on Stakeholder Consultation and Participation in ADB Operations*.

V. Description of the Project Environment Baseline Conditions

The project consists of different sites in Bondo, Siaya, Othaya, Mukurwe-ini, Maua, Masinga-Kitui and Yatta. In each one of the sites there will be construction, operation, and implementation works that will require effective mitigation measures. The site specific and associated impacts are summarized in the table below.

Project Sites	Components	Issues	Potential Impacts	Mitigation Measures
Bondo	Water supply and sanitation infrastructure	Public health	Increase in poor air quality, vector diseases, water quality	Public health education, awareness campaigns,
Siaya	Water supply and sanitation infrastructure	Water quality	Reduced water quality from soil erosion	planting vegetation along the river banks
Othaya	Water supply and sanitation infrastructure	site location, Odour/smell	Reduce likely occurrence of alien species	Stabilization lagoons
Maua	Water supply and sanitation infrastructure	Smell Dust/erosion	Poor air quality Pollution Respiratory	Reinforcement of by-laws and
Masinga-Kitui	Water Supply and Sanitation Infrastructure	Disposal of old pipes	Land contamination	Recycling, minimize waste and reclaim wasted land.
Yatta	Water Storage Works <ul style="list-style-type: none"> • Intake • Treatment works • Pumping Units • Rising Main • Distribution system with storage/balancing tanks 	Climate Change	Direct creation of a micro-climate change in the area influence recharge of reservoirs and downstream hydrological conditions	Engineering and project technical design to integrate new techniques that will cover resiliency or adaptation climate change strategies, to ensure natural flow of the river

VI. Public Participation

The consultations and investigations examined the projects' details and their potential impacts on the immediate surroundings with due regard to the public opinions. The consultations related to the physical, ecological, socio-cultural, socio-economic health

and safety conditions at the current projects' sites and the proposed projects on their environs during and after constructions.

Stakeholders Views and Opinions

Stakeholders for the Yatta project component were consulted due to likely significant environmental impacts. The consultations were in two different meetings on 26th to 27th November 2008 by the engineering team and a further detailed consultation by a team of environmental experts on 18th to 23rd December 2008. The aim of consultations was to solicit views about the project in the area and specifically about the likely impacts resulting from the development. A series of about 10 interviews were held with District Officers, Community Organizations and local family members affected by the project. During the consultations, the following documents were presented as guiding principles to effective environmental management. Kenya, the Environmental Management, and Coordination Act (EMCA) 1999 stipulate the procedure of carrying out an EIA and the types of projects for which an EIA is mandatory. EIA identifies both negative and positive impacts of proposed project and gives mitigation measures for the potential negative impacts.

- The EMCA is supported by its subsequent supplements the Environmental (Impact Assessment and Audit) Regulations 2003, Environmental Management and Coordination (Solid Waste Management) Regulations 2006, Environmental Management and Coordination (Water Quality) Regulations 2006 and Emissions Regulations 2007 and other pertinent International Environmental Regulations. According to the public meetings/consultations and interviews with key stakeholders the social acceptability of the proposed wastewater treatment plants and water storage capacity were highly acceptable by the participants. Perceived benefits included improved water quality and better sanitary services.

The public participation was conducted throughout the projects' areas and community members presented their concerns on the proposed projects. The participants at the projects' meetings all stated that they are eagerly waiting for the projects to start operating. However, they raised the following issues to be considered during implementation of the projects.

- Compensation: Issues of compensation were raised with almost all community members commenting that they would like to be compensated proportionately if the communal infrastructure impacts with the operations of their individual farms. They noted the proponent should also take into consideration destruction to existing crops, structures among other farm inputs;
- Supply of water to communities living along the main water pipelines: Majority of the community members felt left out of the projects as the existing pipelines pass through their areas and yet they do not have access to clean water. They suggested tanks or water points to be provided in their areas to store water for their use as this should reduce illegal connections and bursting of water lines.

- **Irrigation:** The community members requested that untreated water be availed for irrigation. They further stated that during dry seasons, dry areas receive very limited rainfall making food production to be very low; coupled with lack of sources of income the communities are normally left without food year round. They then suggested that the proponents should take into consideration the need of water for development of vegetable gardens. They noted the local authority is encouraging them to grow trees yet they are not allowed to irrigate the trees with the water supplied.
- **Private Storage Water Tanks:** The community lamented that they are not allowed to store water in storage tank and if found they also get disconnected. They stated this is a great challenge to them since water supply is not reliable in most areas. They added this makes it difficult for them to coordinate their activities, as they do not know when they shall receive water next.
- **Piping:** The community members stated that the standards of the water supply pipes currently being used are questionable due to the frequent bursts being experienced. They suggested appropriate piping be used though comments from the district office suggested that in majority of cases, community members intentionally do pipe burst in order to get water for livestock and domestic use.

VII. Project Alternatives

The area surrounding the towns is occupied by farming communities whose main economic activities revolve around subsistence farming and small-scale business activities. The main economic activities within the towns include small and medium provision stores and hotels. The project aims to expand its capacity and supply sufficient and reliable water to the above-mentioned trading and urban centers as they are strategically located in their respective divisions and they form the economic activity backbone in their areas. The project alternatives include expansion of the water supply by exploiting the following options;

The water supply schemes are based upon technical solutions retained on functional options relating to water sources, transmission, storage and distribution, as adopted on similar schemes recently implemented in Kenya.

The project will focus on rehabilitation and extension of the existing networks, with the aim of increasing the low coverage, reducing the existing high level of unaccounted for water (UFW), enhance the quality and quantity of supply and to improve revenue for the sustainability of the installed systems. Proposed interventions include operation and maintenance programs, leakage control involving procurement of equipment for leak detection, procurement of bulk meters for system flow measurements and procurement of household consumer meters.

Sanitation interventions will include wastewater action plans, waste stabilization ponds, provision of water and sanitation facilities to schools, health facilities and public places. Households will be target of intensive hygiene and sanitation promotion including community mobilization in the project areas, using the services of suitably qualified and experienced NGOs.

Bondo: studied: i) water pumped from river to the current site of the treatment plant, after treatment pumped to town; ii) from river by gravity from intake up-streams; iii) from lake pumped at a head of 250m over 14km. The first alternative was chosen based upon lower capital cost investment and operation and maintenance costs; studied: i) on-site sanitation and; ii) sewerage system by gravity with wastewater stabilization ponds. The first option was chosen for lower capital cost investment and operation and maintenance costs.

Siaya: studied: i) Sidindi Malanga source to meet the Siaya demand to cater for both Sidindi Malanga and Siaya town; ii) expansion of Abura dam supply to meet Siaya demand; iii) Abura dam plus new Wuoroye supply. The first alternative was chosen based upon lower capital cost investment and operation and maintenance costs; stabilization ponds. The first option was chosen for lower capital cost investment and operation and maintenance costs.

Othaya: The major part is rehabilitation of the five intakes and transmission lines, three treatment works and treated water gravity mains, and distribution system. The wastewater options are: i) on-site sanitation and; ii) sewerage system with wastewater stabilization ponds. The situation does not justify a sewerage system.

Mukurwe-ini: The major part is rehabilitation of the two intakes and transmission lines, treatment works and treated water gravity mains, and distribution system. The wastewater options are: i) on-site sanitation and; ii) sewerage system with wastewater stabilization ponds. The situation does not justify a sewerage system.

Maua: The existing intake will be rehabilitated to contribute 2,200 m³/day of the total demand. The balance could be abstracted from i) intake from Ura River or ii) intake at Makena water fall. The analysis shows that the second option is the most economic one. The wastewater options are: i) on-site sanitation and; ii) sewerage system by gravity with wastewater stabilization ponds. The situation does not justify a sewerage system.

Kitui: The two options are i) main source from Masinga Reservoir combined with boreholes and ii) main source from Masinga Reservoir combined with proposed reservoir across Athi River. The least cost option is to enlarge source works at Masinga, combined with rehabilitated boreholes, additional water from the Umaa Dam and the balance from Athi catchment. The options are: i) on-site sanitation and; ii) sewerage system with wastewater stabilization ponds. The situation does not justify a sewerage system.

Yatta: Several dam sites were analyzed the proposed dam site was identified as the most optimal. The canal is an existing structure which needs lining and some re-alignment.

VII. Potential Impacts

The consultants evaluated the potential negative and positive impacts that will be associated with the water supply and the water borne sanitation projects. The impacts have been categorized into three distinct phases namely; construction/project implementation, operation and decommissioning phases. The construction impacts

will be related to activities carried out during project construction phase. The operational phase impacts will be associated with the activities carried out by the community members and maintenance team from the division office or the water service providers while decommissioning will be associated with the project obsolete phase.

The impacts of the water supply projects during their life cycle (construction, operation, and decommissioning) can be categorized into impacts on the biophysical environment; health and safety impacts; and socio-economic impacts. An overview of anticipated impacts during the project phases are outlined below.

Negative Environmental Impacts of Construction Activities

- Increased demand of land and displacement of 50 families
- Physical Environmental Destruction due to extraction and use of building Materials
- Dust Emissions
- Exhaust Emissions
- Noise and Vibration
- Risks of Accidents and Injuries to Workers
- Interference with wildlife habits
- Clearance of Vegetation
- Increased Soil Erosion
- Solid Waste Generation
- Increased Demand for Sanitation
- Increased energy consumption
- Landslide and rock falling
- Increased water abstraction

Positive Environmental Impacts of Construction Activities

- Provision of Market for Supply of Development Materials and other secondary markets
- Increased Business Opportunities

Negative Environmental Impacts of Operational Activities

- Over abstraction of water from the dams
- Water Use Conflicts among community members
- Solid Waste Generation
- Increased Storm Water Flow
- Accidents and injuries
- Increased Demand for Sanitation
- Interference with Water Quality
- Diversion/vandalism of water and effluent, conveying pipes
- Disturbance of Private Properties

Positive Environmental Impacts of Operational Activities

- Development of industries and increased visitation to the area
- Development of cash crop industry and agricultural industry including horticulture, diary farming
- Reduced Nutrient Loading to underground Water thus improvement of water quality
- Improved sanitation facilities and levels

Negative Environmental Impacts of Decommissioning Activities

- Landslides and rock falling
- Solid Waste
- Lack of water or inconveniences to community members
- Dust
- Noise and Vibration
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Positive Environmental Impacts of Decommissioning Activities

- Rehabilitation
- Employment Opportunities
- Reduced air pollutions

IX. Mitigation/Enhancement measures

Mitigation Measures for the Operation Phase Impacts

- Development of a Resettlement Action Plan (RAP) with compensations for the 50 families
- Efficient sourcing and use of Raw Materials
- Minimise vegetation disturbance
- Control storm water run-off and soil erosion
- Development of Waste Management Strategy
- Control dust evolution
- Control Exhaust Emission and other air pollutants
- Manage noise and vibration impacts within recommended limits
- Manage and mitigate against accidents and injuries to workers
- Avoid interference with wildlife habitats
- Control energy and water consumption
- Avoid project conflicts with community members by developing communication platforms
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Mitigation Measures for the operation Phase Impacts

- Develop appropriate sludge management measures
- Ensure effluent outfall to riverbed is strategically located
- Use sewage by products to reduce levels of pollution
- Meter water abstraction to ensure it is within the required capacity
- Mitigate against water conflicts among community members
- Develop Solid Waste Management Plan

- Provide sanitation to project maintenance workers and near communal water points
- Control hazards and risks exposed to workers and community members including odours and air pollution , mosquito breeding sites, invasive aquatic communities
- Develop disaster management plan for fire outbreak, failure of plant etc

X. Environmental and Social Management Plan and Monitoring Programme

In order to implement the Environmental and Social Management and Monitoring Plan (ESMMP) responsibilities have been assigned to various parties within the water and sanitation Programme framework. The recommended mitigation measures will be outlined in the detailed design drawings, and detailed in the Technical Specifications. These mitigation measures will form part of the contract documentation for the Kenya Small Towns Water and Sanitation works. For example, there is to be a component for grassing and tree planting of appropriate species as offsets for the biodiversity and improvement in catchment areas and water shed management.

Component	Potential Impacts	Mitigation Measures	Responsible Institutions
Destruction of Physical Environment	<ul style="list-style-type: none"> • Soil erosion and compaction • Increased dam sediments • Obstruction of natural water channels 	<ul style="list-style-type: none"> • Develop soil erosion management measures • Limit the circulation of heavy machinery to minimal areas • Locate access roads perpendicularly or diagonally to the slope rather than along steep slopes • At the end of drilling works, level off the soils and facilitate plant regeneration. • Plan work in sections to avoid opening up areas that are left undeveloped 	<ul style="list-style-type: none"> • Department of Water
Waste Management	<ul style="list-style-type: none"> • Increased waste deposits and blockage of sewage plant • Decreased oxygen levels in the aerobic ponds 	<ul style="list-style-type: none"> • Encourage separate treatment for industrial and domestic effluent • Conduct awareness on need of appropriate waste management practices including reduction, reuse, recycle, segregation ,pre-treatment among others • Avoid open dumping of solid waste on wind ward side of the sewage works • Construction of waste screens and sediment traps 	<ul style="list-style-type: none"> • Municipal Council

Increased Water Demand/Supply & Water Quality	<ul style="list-style-type: none"> • Reduced amount of river water flow downstream • Increased irrigation operations • Reduced water quality including contamination with heavy metals and nutrients • Diversion of sewage and water 	<ul style="list-style-type: none"> • Observe the Water Act 2007 and the 30% water rights for downstream users • Use of metering methods including v-notches and sluices • Construction of sediment traps • Keep natural water channels free from obstruction • Conduct water quality monitoring at river recharge points • Incorporate biological treatment methods in sewage ponds to improve water quality • Develop monitoring strategies and penalties for individuals diverting sewers and water from lines 	<ul style="list-style-type: none"> • Water Services Board
Destruction of Flora and Fauna & Wildlife-Human Conflict	<ul style="list-style-type: none"> • Avoid interference with animals drinking points • Loss of vegetation cover/Deforestation • Destruction of indigenous tree species in the forest • Perturbation of terrestrial, aquatic and avian wildlife • Increase in poaching due to non-resident workers 	<ul style="list-style-type: none"> • Avoid constructing at animals water drinking points • Avoid selecting sites sheltering or frequented by wildlife • Preserve migration corridors for wild and domestic animals. • All trees uprooted to pave way for weir and access construction should be replanted • Avoid interference with wildlife breeding sites • Control introduction of invasive plants and animals species in forest, sewage ponds and water bodies • Promote the development of community nurseries. • Environmental conservation 	<ul style="list-style-type: none"> • Ministry of Environment
Air/Noise	<ul style="list-style-type: none"> • Degradation of air quality and ambient noise due to excavations operations • Degradation of air quality by vehicles emissions and dust during mining operations • Interference with domestic and wildlife due to excessive and destructive noise • Evolution of odours and green house gases from sludge 	<ul style="list-style-type: none"> • Operate equipments with air pollution control systems • Insulate noisy machines when working near animal habitats • Maintain vehicles and machinery in good condition in order to minimize gas emissions and noise. • Ensure continuous maintenance of sewage treatment plant and develop appropriate sludge handling procedures • Avoid construction of sewage plant on the windward side to avoid spread of pathogens, odour 	<ul style="list-style-type: none"> • Ministry of Environment

Social and Economic Concerns	<ul style="list-style-type: none"> • Migration • Communicable diseases • Resources competition • Loss of cultural heritage • Destruction of private property including farm produce and other investments • Loss of land • Gender equity 	<ul style="list-style-type: none"> • Conduct continuous public awareness and encourage participation throughout the project span to discuss contentious issues including compensation of Project Affected Persons • Communicate on project progress to community members and alert on sections to be develop to reduce destruction and interference • Accord local community employment and business opportunity as a priority • Implement HIV/AIDS and other communicable diseases programmes in conjunction with line ministries • Establish labour camps at reasonable distance from villages. • Where possible offer women equal employment opportunities to men • Develop secondary uses of weir including fish farming to generate income 	<ul style="list-style-type: none"> • Ministry of Gender , Social and Cultural Services
Occupation and Public Health & Safety Concerns	<ul style="list-style-type: none"> • Injuries and accidents to workers • Communicable diseases • Suffocation • Poisoning • Floods • Disease Vectors • Cultivation along sewage treatment plant, sewer and water supply lines 	<ul style="list-style-type: none"> • Complying with work place legal requirements • Provision of Protective Professional Equipments • Employment of competent work force • Instituting Safety drills, disaster preparedness and management programmes • Develop appropriate structure of the weir that meet recommended standards • Control disease vectors using appropriate methods 	<ul style="list-style-type: none"> • Ministry of Health and Local Government

XI. Budget

According to the engineers designs and projects' costs estimates it have been deduced that the project's total cost will be UA 77.92 million depending on the project's option to be implemented. The proposed implementation cost of the ESMP during development phase is estimated at 1% of the total project's cost. The ESMP will be for a period of 12 months and some activities carried over a 4 year period of the Programme implementation lifespan; while the cost of implementing the proposed operation phase ESMP has been estimated at UA 0.8 million which shall be reviewed annually to meet the project's needs. The cost of implementing the decommissioning phase ESMP shall be evaluated after the completion of the project when exact extent and quantity of materials used is established.

XII. Monitoring Programme

The best way to ensure that the new Wastewater Ponds operate in a consistent and environmentally sound manner is to provide a rigorous monitoring Programme. A

testing Programme will be established to monitor the treatment performance and efficiencies within wastewater ponds.

An equipped wastewater quality testing facility should be part of the set-up at the wastewater stabilization ponds. Sampling stations should be established in receiving water body in the vicinity of the outfall, to monitor water quality in the receiving waters and to help assess the impact of the treated effluents on water quality. These data will be available, and occasionally tested in parallel in other approved NEMA water quality laboratories.

As part of the management and continuous assessment, relevant stakeholders (including Government agencies and local residents) have to be contacted and consulted regarding the working of the projects. The aim of the consultation will primarily be to gauge client satisfaction and identify any anticipated changes early enough.

According to NEMA Water Quality Regulations 2006 any effluent discharge should be monitored and a license of the same acquired. requires daily monitoring for ammonia, BOD, coliform bacteria, pH and suspended and settle-able solids.

Resettlement plan takes into consideration full compensation benefits to the families to be resettled in part of the project implementation. The plan is in accordance with the Government policy, guidelines, and procedures. All affected property and households will be assessed and rewarded. Awareness on eventualities, training on coping adapting to new environments of the families to be resettled will be undertaken in part of the institutional and capacity development of the Programme.

XIII. Conclusion

The proposed project will benefit the community if appropriately implemented. The environmental expert has noted that some adverse negative impacts are likely to occur if appropriate measures are not taken into consideration at an early stage. These issues include landslides, falling rocks from hilly faces, contamination of farms with human waste, land, and water conflict, flow of sewage into the environment among others.

The proponent needs to address these issues at an early stage with the help of community members and their representatives. Despite the negative impacts, the positive impacts of the project are highly rated and are expected to benefit all stakeholders and the country at large. The project proponents are advised to adhere to prudent implementation of the Environmental Management Plan.

XIV. References

Environmental Impact Assessment Study Report for the Masinga-Kitui Water Supply and Sanitation Project May 2009

Feasibility Study of Othaya and Mukurwe-ini Water Supply and Sewerage Project, Draft Feasibility Report, 10303K-PDR-C-001, April 2009

Feasibility Study for Athi River Basin and Water Resources Development, 29 June 2006, Samez Consultants, Nairobi, Kenya

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