MINISTRY OF ENVIRONMENT, WATER AND NATURAL RESOURCES
STATE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
LOW EMISSION CAPACITY BUILDING PROJECT

WASTE SECTOR NAMA PROPOSAL SUBMITTED TO THE NAMA FACILITY

Project title : Emission Reduction through Sustainable Solid Waste Management in Kenya

Contents

General Information on the NAMA Support Project

	Country of implementation	Kenya
	Project start	[2013]
	Project termination	[2019]
	Overall Project volume (EUR)	
	Please indicate the required contribution of funding from the NAMA Facility for the overall project including all components (indicative basis)	2013 380,000.00 2014 1,380,0000 2015 3,771,000.00 2016 7,049,000.00 2017 1,100,000.00 2018 450,000.00 2019 370,000.00 **Total 14,500,000.00**
	Thematic focus	Waste/ wastewater treatment
	Project type	- Type C: Financial cooperation project with technical assistance component before and during implementation
1.2 Submitter		
	Type of institution	National Ministry
	Non-profit status[1]	Yes
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1.4 Delivery Organisation(s) (for outlines submitted by national governments only)	State Department of Environment and Natural Resources (through the National Climate Change Secretariat): Overall project coordination and policy oversight National Environment Trust Fund National Environment Management Authority(NEMA): Nakuru County Government Machakos County Government	

1 Project Description / Project Ambition

1.1 Project Summary

Increased population in Kenya's urban centres has strained the capabilities of the county governments to manage the solid waste generated; with only about 40% being collected and disposed at designated open dumpsites. Moreover, these dumpsites are a major source of greenhouse gas (GHG) emissions[1].

Under this proposal, Kenya's National Government, in partnership with the county governments of Machakos and Nakuru, seeks support from the International NAMA Facility to pilot the development of sustainable solid waste management mechanisms in the two counties. The mechanisms entail an integrated composting facility and a sanitary landfill in both counties. The compositing unit will produce organic fertiliser for use in farming in place of inorganic fertilizers, contributing towards the avoidance of GHG emission from the agricultural sector. Both facilities will generate energy from methane gas captured, providing an alternative source of energy.

This NAMA will also facilitate policy formulation, awareness creation and capacity development in the sector. The NAMA is in line with Vision 2030 and the Kenya Constitution (2010), and will be part of the implementation of the National Climate Change Action Plan (NCCAP). Finally, the NAMA provides an example of good practice and a learning platform for other counties.The total budget request is Euros 14,500,000.

1.2 Potential for transformational change

Solid waste management (SWM) in Kenya is a sector requiring high attention. The introduction of sanitary landfill and large-scale composting will completely transform solid waste management practices in Kenya. The success of the project will encourage other counties to adopt sustainable waste management approaches. Currently there exists neither sanitary landfills nor properly designed dumpsites in any of the counties in Kenya. Effective solid waste management policies coupled with a sensitised society on solid waste disposal are an integral part of sustainable solid waste management. Machakos and Nakuru are among the fastest growing urban centres in Africa, making them ideal sites for demonstration of best practice in SWM to other counties.

The SWM initiative is aligned to the broader national agenda/priorities and will contribute towards:

- The delivery of a clean and healthy environment, prescribed in the Kenya Constitution 2010;
- The attainment of the solid waste management initiative; and the clean, secure and sustainable environment envisioned in Vision 2030; and
- The implementation of a low-carbon climate resilient development pathway proposed in the National Climate Change Action Plan (2013-2017).

On the social front, the project will create at least 5,000 jobs, providing employment for the urban poor. In addition, the proposed project will improve air and general environmental quality, increase the aesthetic appeal of the cities involved, reduce GHG emissions, improve public health, change public perception on solid waste and protect the integrity of ground water. In addition, an added benefit of the project is the provision of alternative energy to replace woodfuel as the primary source of energy for cooking and heating for majority of the urban poor. This will reduce forest depletion, and enhance the forest carbon sink. The project is thus a 'double-edged sword' for mitigation as it contributes towards avoiding emissions from the waste sector, and in addition enhances the carbon sink.

The energy generated from this project will contribute towards bridging the gap between the national energy demand and supply. This could provide a major source of revenue to sustain the initiative. In addition, the facility will be used to generate organic fertilizer for use by local farmers, reducing the need for inorganic fertilizers, which are major sources of greenhouse gas emission in the agriculture sector. This could provide a third transformation dimension in GHG emissions reduction in the country. The sale of the compost fertilizer could also become another source of income to sustain the initiative. The organic fertilizer is crucial in supporting sustainable agriculture and enhancing food security.

Under sound management, sanitary landfills will change the negative perceptions that citizens have on waste disposal based on the existing unsanitary dumpsites that are unsightly, noxious and health hazard. The sanitary landfills will also transform the current dumpsites that attract vandals and are associated with high rates of crime.
Lastly, the initiative presents an opportunity to mainstream the National Climate Change Action Plan and the Waste Management Regulations at the county level.

1.3 Co-benefits

1.3.1 Socioeconomic

- Providing alternative sources of livelihood to approximately 22,150 households; especially women and youth that currently derive livelihood from waste at dumpsites.
- Use of compost will reduce the economic burden associated with the purchase of inorganic fertilizers for more than 600,000 local farmers, and translate into increased agricultural productivity and food security.
- Provision of alternative and clean source of energy, especially for the urban poor the peri-urban communities.
- Involvement of local communities in the project will create awareness on the importance to sustainable solid waste management.
- Proper management of waste will lead to a cleaner and healthier environment and translate into public health benefits.
- Contributes towards the delivery of the Kenya Constitution requirement of a clean and healthy environment and a 10% forest cover; Kenya's Vision 2030; and the Millennium Development Goals.

1.3.2 Ecological Benefits

- Avoidance of GHG emissions from dumpsites
- Conservation of forest GHG sinks
- Use of the compost will enhance proper nutrient recycling and provide an alternative to inorganic fertilizers that are major sources of GHG emissions in the agriculture sector – hence contributing to avoidance of emissions in this sector.
- Reduced chances of contamination of ground and surface water
- Controlled management of solid waste will reduce the probability of bioaccumulation of toxins
- Reduced air and environmental pollution
- Enhancement of ecological balance
- Contributes towards the enhancement of the forest cover and related biodiversity.
- Ensures a clean and healthy environment.

1.4 Financial ambition

The government of Kenya will provide matching co-financing of 10% of the total budget in addition to in-kind support. The Counties of Nakuru and Machakos will provide the land and

staff for the proposed project. Such initiatives, if replicated in other counties, will attract significant allocations from the national and county governments. There is also the potential for development partners to collaborate with the national government in the funding of the initiative. This could also be encouraged by previous and currently ongoing mitigation projects in the country such as EU, Australia and German funded Low Emission Capacity Building (LECB) project. The successful implementation of the project will serve to encourage public-private partnerships in solid waste management countrywide due to the potential economic benefits.

The proposed project can qualify for carbon trading and attract private sector investment. The National Climate Change Action Plan (NCCAP) was developed with support from the DFID, the Climate and Development Knowledge Network (CDKN), among others. These development partners have maintained a close working relationship with the Ministry of Environment, Water and Natural Resources; and are therefore potential partners in the NCCAP implementation. This initiative indeed will contribute towards the implementation of the NCCAP in the waste sector.

1.5 Mitigation potential

The proposed project employs some of the market-tested technologies with the ability to reduce the emission of GHGs, and thus providing effective mitigation of GHG emissions from the waste sector. The technologies include landfill methane destruction, and improved solid waste management practices. Significant GHG emission will be further avoided through controlled composting, tapping the produced biogas and reduced dependency on woodfuel, which will also contribute towards forest conservation and hence enhance the forest carbon sink. Estimations based on the daily solid waste generation in Nairobi indicate a potential daily methane production of 856,548kg/day. This is equivalent to 17,988 million tons of Carbon dioxide equivalent per day. The setting up of a sanitary landfill would therefore significantly reduce GHG emissions. The compost will provide an alternative to inorganic fertilizers that are major sources of GHG emissions in the agriculture sector – hence contributing to avoidance of emissions in this sector.

The successful implementation of this project will encourage other counties to adopt similar solid waste management practices. This has the potential to further reduce GHG emissions from waste sector countywide.

2 Project Concept

2.1 Starting Situation

There is evidence of increased solid waste in Kenya as a result of the rapidly increasing human population, increased economic status and income, changing consumption patterns, urbanisation and industrialization. Emissions from the waste sector were estimate at 0.8 million tonnes of carbon dioxide equivalent (MtCO2e) in 2010. These emissions are expected to grow to 2.0 MtCO2e in 2030. Methane emissions from unmanaged shallow disposal sites are the primary source of emissions (constituting 75%) in the sector.

The country has developed a National Climate Change Response Strategy (NCCRS) and a National Climate Change Action Plan (NCCAP) 2013-2017.In the NCCAP, Low Carbon Climate Resilient Development Pathway (LCCRDP) is a key component, which is in line with Vision 2030 and the Constitution of Kenya 2010. In recognition of the close link between climate change and development, the LCCRDP has for the first time been integrated in the Medium Term Plan (MTP) 2013-2017 for the implementation of Vision 2030. Kenya's decision to pursue a LCCRDP is also informed by the country's commitment to curb climate change and a desire to contribute to the global GHG emissions reduction. Kenya is a signatory to several International Conventions that include; the United National Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Bali Action Plan, among others.

2.2 Integration into national or sector strategies

In line with Vision 2030 and in consideration of the current challenges in the waste sector, Kenya has developed a number of specific strategies and projects focused on industrial and municipal waste management. Landfill methane capture is a priority low carbon option for waste management and alternative energy generation. Other potential low carbon options for energy include anaerobic composting, which requires separation of waste, but is not currently the practice.

For landfill methane capture and electricity generation to be a viable low carbon option, the percentage of municipal solid wastes (MSW) that reaches landfills should be increased. Currently, it is estimated that in approximately 60% of the waste generate is not collected and thus it does no reached the designated dumpsite. Of the 40% that reaches the designated dumpsites only 18% reaches disposal sites with a depth greater than 5 metres. The NCCAP recommends an increase in this figure to 50% for the sector to realise the desired abatement potential of 1.1 MtCO2e per year in 2030.

This proposed NAMA initiative seeks to support this goal, through the establishment of pilot projects in the waste sector. This initiative will demonstrate biogas capture and composting as well as the development of a sanitary land fill with methane capture for electricity generation as co-benefits.

2.3 Barriers for mitigation investments

Key barriers to implementation of waste mitigation actions in Kenya include;

- Proliferation of unmanaged and illegal dump sites in informal settlements,
- Lack of capacity for waste management by the county governments under the new devolved governance system,
- Varied waste management practices across the counties,
- Lack of low carbon technologies familiarity and awareness,
- Lack of proper waste handling equipment and infrastructure,
- A general negative public perception towards solid waste management,
- Waste is not often viewed as a marketable commodity and a key resource,

	Financial -Component	**Technical-Component**
2.4 Scope of the NAMA Support Project and Target Group	To provide financial support for: ▪ Social awareness campaigns in the pilot areas. ▪ Training of stakeholders to strengthen existing policies and regulations that deal with SWM. ▪ Training of local technical personnel on best practices and technology in SWM, monitoring and evaluation and local personnel to address start-up problems with a view of finding lasting solutions and to transfer of knowledge learned. ▪ Infrastructure development of sanitary landfills and composting facilities, electricity generation, including installation of monitoring and control equipment to check on GHG emissions and air pollution, survey works and civil-works.	▪ Backstop NEMA/MEWNR staff with skills and knowledge for strengthening existing SWM policy and regulatory framework. The project will include social awareness creation in the pilot areas. Core to the awareness campaigns will be the potential socio-economic benefits likely to accrue upon use of sanitary landfills and composting of organic waste, among other attendant co-benefits. ▪ Transfer of expertise on infrastructure development related to sanitary landfills, composting technology and biogas digesters/alternate energy generation. ▪ Capacity build the county personnel responsible for the administration and management of the proposed SWM initiatives. ▪ For sustainability, the project's scope will include monitoring and evaluation for an initial period of three years.
2.5 Overarching objective (Outcome)	**Potential for transformational change** The initiative has the potential to:	▪ Contribute to: – Global efforts to mitigate climate change through GHG emission

	▪ Transform the waste sector towards a less carbon intensive development path through avoiding GHG emissions from the dumpsites. ▪ Provide alternative/clean energy to the urban poor and the peri-urban communities. This will reduce reliance on fuel wood, hence enhance the carbon sink; ▪ Reduce emissions in the agriculture sector by providing an alternative to inorganic fertilizers. ▪ Showcase potential investment opportunities in the waste sector and attract private sector investment. ▪ Improved livelihood and quality of life, and access to clean energy. **Co-benefits** ▪ Provision of clean energy – contribute towards meeting the shortfall in the national/county energy supply; ▪ Job-creation and alternative livelihoods; ▪ Income from the sale of the generated energy and compost fertilizer; ▪ Contribute to food security through provision of 'affordable' fertilizer. **Financial ambition** ▪ Demonstration of potential investment opportunities in waste management is likely to attract additional funding sources that include the private sector investment; and ▪ Reduce existing barriers to investments. **Mitigation potential** ▪ Reduce/avoid GHG emissions in waste sector; ▪ Provide an alternative to fuel wood and reduce forest destruction, enhancing the GHG sink; ▪ Provide compost as an alternative to inorganic fertilizers that are major sources of GHG in the agriculture	reduction – National development plans and priorities – Clean and healthy environment ▪ Behavioural change towards waste management ▪ Implementing effective solid waste management systems in the country ▪ Increase local technical and technological capacity to address solid waste management ▪ Increased capacity to mobilize financial resources across sectors ▪ Mainstreaming financial resources for solid waste management across all counties ▪ Efficient and sustainable waste management in the country ▪ Enhanced forest carbon sinks

	sector.	
2.6 Specific objectives (Outputs)	▪ Reduce GHG emissions in the waste sector; ▪ Convert waste management into a resource that will generate revenue; ▪ Economic empowerment through job creation and alternative sources of livelihood; ▪ Poverty alleviation; ▪ Put in place a robust financial management system in the waste sector; ▪ Provide (compost as) an alternative to chemical/inorganic fertilizers and hence contribute to avoided emissions in the agriculture sector; ▪ Increased income	▪ Strengthening of the 3 R's (Reuse, Reduce and Recycle) ▪ Providing material conservation and conversion ▪ Plough back waste products in form of compost as an alternative to inorganic fertilizers that are major sources of GHG emissions in the agriculture sector ▪ Clean energy to support livelihoods and reduce reliance on biomass ▪ Reduced GHG emissions ▪ Improved health hence reduced medical expenditure ▪ Compliance to UNFCCC and other international agreements
2.7 Planned activities	**Contractual obligations** ▪ Expression of interest for contractual obligations public/private partnership in implementing the project. This includes service provision and products/material supply (The county of Nakuru has already advertised invitations for the expression of interest). ▪ Tendering process and awarding of contracts ▪ Supply of material, equipment and vehicles **Construction and Implementation phase** ▪ Feasibility study ▪ Acquisition and preparation of land ▪ ESIA study and report ▪ Licensing and permits ▪ Survey and civil works ▪ Architectural plans and project implementation ▪ Construction of transfer stations (transient storage) ▪ Service lines and utilities provision	**Awareness:** To raise awareness on: ▪ The need for and benefits of sustainable solid waste management among public health, environment and economy, ▪ The need for political will to ensure that tackling solid waste is a high national priority that also contributes towards the implementation of the National Constitution (2010) and the National Climate Change Action Plan (2013-2017); and the attainment of Vision 2030, , ▪ Investment opportunities in the waste management sector so as to attract private sector investment; ▪ Potential extra income from the sale of the products/ services. **Capacity building to:** ▪ The county personnel on good practice in waste management; ▪ Technological/technical aspects of the initiative; ▪ Requisite policy and legal frameworks at national and county levels,

	▪ Commissioning of the project ▪ Training and Induction ▪ Project implementation ▪ Monitoring and evaluation	▪ Implementing Agencies' financial officers on funds management and reporting in line with the NAMA facility requirements ▪ Management of income from the scale of the generated energy, and compost as an alternative to inorganic fertilizer. **Policy and Regulatory Frameworks** ▪ Review and strengthen the existing national relevant policies and regulatory frameworks ▪ Development and implementation of integrated waste management strategy and action plans for counties

2.8 Expected Long-term Results (Impacts)

Potential for transformational change: As urban populations grow, production of MSW will also increase. The primary responsibility for the practical implementation of MSW management falls with County Governments. Due to financial and technical capacity constraints in county governments, MSW management remain inefficient and ineffective; thus, the need for major policy and structural reforms, including capacity enhancenment in the sector. This NAMA has the potential for far-reaching reforms that will transform MSW management in Kenya.

Co-benefits: Include improved management of landfills, air and environmental quality, water quality and security around landfills, potential source of electricity, significant reduction GHG from avoided emissions from fossil fuel, job creation and improvement of livelihoods for women and youth dealing with recyclable waste products, increased agricultural production and food security through use of affordable compost fertiliser as an alternative to inorganic fertilizers.

Financial ambition: The NAMA Support Project has the potential to trigger additional private sector investment and reduce existing barriers to investments through public-private partnerships. The initiatives as peer learning platforms will serve to demonstrate to other counties the development benefits and business opportunities in MSW management leading to technology transfer.

Mitigation potential: Landfill methane capture, apriority low carbon option in the waste sector for Kenya, has an abatement potential of 1.1 MtCO2e per year by 2030.The project will also provide an alternative to wood fuel and reduce forest depletion, and hence enhance the GHG sink. Lastly, the project will provide compost fertiliser as an alternative to inorganic fertilizers that are major sources of GHG, hence reducing emissions in the agriculture sector.

2.9 Monitoring and Evaluation

2.9.1 Financial Component (FC Component)

The project will use a results-based management approach, encapsulating the logic model, the performance measurement framework, and risk analysis. This will involve realistically defining the expected results; clear identification of stakeholders in line with their needs; identification of appropriate indicators to monitor progress towards realisation of desired results and resources utilisation; and identification of a logical framework to manage risk.

A joint implementation committee will report on the results achieved and the corresponding resource utilisation on quarterly basis. The committee will draw representation from the national and county governments.

Strict financial management standards will be observed in line with Government of Kenya financial management guidelines and requirements, including both internal and external audits; and the M&E guidelines for NAMA Support Projects to be published by the NAMA Facility Board.

2.9.2 Technical Component

In addition to the model described the FC component, which also applies for the TC component, the proposed NAMA initiative will provide an opportunity to adopt the National Performance and Benefit Measurement (MRV+) system recommended in the National Climate Change Action Plan (NCCAP). The MRV+ system is designed to measure, report and verify not only the GHG emissions, but also the socio-economic benefits that will accrue, and the synergies between mitigation and adaptation. The MRV+ will also contribute towards harnessing knowledge generated, lessons learning and best practices to inform decision-making.

2.10 Project Integration

This project will contribute to the implementation of the NCCAP (2013-2017), whose development was financed by the United Kingdom (DFID) and other development partners. The NCCAP sets the framework for a low carbon climate resilient development pathway for Kenya, recognising the high GHG abatement potential in solid waste management. The proposed NAMA has been developed in the frame of the Low Emission Capacity Building (LECB) project being implemented by the Ministry of Environment, Water and Natural Resources (MEWNR).Through stakeholder engagement, LECB project prioritised solid waste sector as a key sector for NAMA development in Kenya. The LECB project is funded by EU and the governments of Germany and Australia. The project aims to strengthen Kenya's human, institutional and systemic capacities to develop a GHG national inventory system and Nationally Appropriate Mitigation Actions (NAMAs), with associated monitoring, reporting and verification (MRV) systems defined. Finally and perhaps of most significance, the project will contribute to the implementation of the Kenya Constitution 2010 and Vision 2030 in the delivery of a clean and healthy environment through sustainable solid waste management.
This NAMA will compliment another NAMA project in the geothermal energy sub-sector that is supported by the Government of Germany under the Mitigation Momentum Programme. The NAMA will also go a long way in the mainstreaming climate change component in development planning with respect to waste management. The NAMA is indeed in line with development partners' focus of contributing to sustainable development and emission reduction.

3 Expected Budget and Financing Structure

	FC-Component	TC-Component
NAMA Facility funding volume	10,765, 000.00	3,735,000.00
Funds provided by submitter (national government or delivery organisation) and other implementing partners[1]	1,076,500.00	373,500.00
Third party contributions (e.g. third party grants/concessional loans)[2]		
Total	11,841,500.00	4,108,500.00

NAMA Facility funding volume (cf. 1.1) (indicative basis)

	FC-Component	TC-Component
2013	300,000.00	80,000.00
2014	1,200,000.00	180,000.00
2015	1,900,000.00	1,871.000.00
2016	6,399,000.00	650,000.00
2017	600,000.00	500,000.00
2018	200,000.00	250,000.00
2019	166,000.00	204,000.00
Total	10,765,00.00	**3,735,00.00**

4 Other

Generation of solid waste in Kenya has been on the rise mainly due to the rapidly increasing human population coupled with rapid economic development, changing consumption patterns, changing income, urbanisation and industrialisation resulting to increased generation of waste. These increases have caused a rapid increase in GHG emissions from the waste sector. Low emission development strategies are an important starting point for NAMAs and are significant in demonstrating the alignment of NAMAs with national priorities and goals. For Kenya, the NCCAP recommends a low carbon-climate-resilient development pathway as the basis to comprehensively address climate change without losing the link with national development goals, objectives and priorities. The low carbon-climate-resisilient development pathway has been mainstreamed in the Medium Term Plan (MTP) 2013-2017 for the implementation of Vision 2030, enabling every sector to pick the sector priorities for implementation.

This will ensure the allocation of funds from the exchequer for the implementation of these sector priorities.

[1] In principle, the submitter's own funding is funding provided by the submitter to co-finance the total expenditures of the project that are eligible for support.
[2] Please indicate the sources and type of any allocations provided by third parties and the status of contractual agreements. Third party contributions refer to both public and private sources (e.g. contributions from other donors).

NAMAs present an institutional platform for developing country governments to attract financial, technological and capacity development support in organizing large-scale mitigation programmes. The proposed NAMA support project will thus serve to promote Kenya's domestic waste sector mitigation and low carbon development goals.

Due to the magnitude of the planned activities (as stipulated in the project proposal) implementation of the project without support from the NAMA Facility will take a long time to achieve.

The NAMA Support Project will play a pivotal role in demonstrating potential opportunites for public-private partnership funding and reduce existing barriers to investments through these partnerships. The project will also spur technology transfer and raise revenue from sale of energy and compost fertiliser, as part of measures to ensure sustainability. The initiative is also aligned to the Solid Waste Management Initiative in Kenya's Vision 2030, giving it leverage in terms of financial support from the exchequer and the county governments. The establishment of peer learning projects will serve to demonstrate to other counties the development benefits and business opportunities in sustainable MSW management.

Kenya is at a very crucial and strategic position following the launch of the NCCAP for the implementation of the National Climate Change Response Strategy (2010). The NCCAP summarises an analysis of mitigation and adaptation options and the recommends interventions that support low-carbon climate-resilient development. It also recommends the enactment of an enabling policy and regulatory framework, sets out next steps for knowledge management and capacity development, technology requirements, financial mechanism and national performance and benefits measurement system. The outlined NAMA support project will therefore be in tandem with Kenya's NCCAP.

The country also recently developed National Waste Management Regulations, 2006 (Legal Notice No.121) in line with the Rio Earth Summit 1992 and Agenda 21, which amongst others advocated for, minimization of wastes, maximization of environmentally sound waste re-use and recycling, promotion of environmentally sound waste disposal and treatment, and the extension of waste service coverage. The proposed NAMA is therefore in line with the said National Waste Management Regulations, 2006 (Legal Notice No.121).

Lastly, the NAMA project is in line with Kenya's vision 2030 and the Consititution of Kenya 2010 that gurantees the right to a clean and healthy environment.