**NAMAs Proposal – NAMA Seeking Support for Preparation[[1]](#footnote-1)**

**1. Title of Mitigation Action**

Developing appropriate strategies and techniques to reduce methane emissions from livestock production in Uganda

**2. Description of the Mitigation Action**

The major goal of the livestock research NAMA is to develop appropriate strategies and techniques of reducing methane emissions associated with livestock production which, according to the FAO Statistics Yearbook 2013 is the major source of GHG emissions in Uganda’s agriculture sector.

Silvopastoral techniques (converting degraded extensive, i.e. open, treeless pastures into a richer and more productive environment, where trees and shrubs are planted interspersed among fodder crops such as grasses and leguminous herbs), are used to transform degraded lands with mono-cultures of one grass species into more complex agroforestry systems that may include forest fragments, live fences, riparian forests and trees dispersed in pastures. These techniques have been shown to enhance biodiversity and sequester appreciable amounts of carbon while reducing methane production of livestock under increased tree cover.

In Costa Rica, the techniques ranged from planting trees, to natural pastures, to highly intensive fodder shrub plantations. Sequestered carbon was paid for at a rate of $2 per ton of CO2–equivalent. Farmers had a very positive reaction to the initiative. Results showed a typical win-win situation: an annual sequestration of 1.5 Mt of CO2–equivalent was accompanied with increases of 22% in milk production, 38% in stocking rate and 60% in farm income. The methane emission per product kilogram decreased while biodiversity (measured by the number of bird species and water quality) increased.

Major activities;

1. Exploring appropriate feeding strategies that increase productivity while at the same time reduce methane emissions from enteric fermentations. Efforts will be centred around strategies that have shown promise elsewhere including feeding livestock on improve forages; feed supplements. This will involve screening tanniferous herbaceous forages and agroforestry tree species for methane reducing potentials; supplementation using agro-industrial by-products including oilcakes; and integrating these options strategically in ruminant feeding systems or incorporating grain with pastures.
2. Exploring with various feed additives, including plant extracts (condensed tannins, saponins, essential oils) and rumen modifiers (yeast, bacterial direct fed microbials, and enzymes).
3. Explore ways to improve feed efficiency through breeding and diet manipulation. Improving feed conversion efficiency (the amount of feed consumed per unit of production), helps to decrease the amount of methane produced since more efficient animals have been shown to produce less methane. This can achieved thought giving animals diets that are more highly digestible.
4. Exploring manure and pasture management on both small and larger farms
5. Public information and awareness of appropriate strategies and technologies for reducing methane emissions from livestock as well as potential levels of mitigation

Primary outcomes:

* More accurate knowledge of baseline of methane emissions from livestock in Uganda;
* Effectiveness of alternative ruminant feeding methods in reducing methane emissions;
* Levels of mitigation possible and production impacts from using a range of strategies;
* Appropriate strategies to reduce emissions from enteric fermentation, manure and pasture management in Uganda.

Sector – Agriculture

Technology – To be determined through the NAMA

Type of Action – Research

Greenhouse gases covered by the mitigation action - methane (CH4), nitrous oxide (N2O),

**3. National Implementing Agency**

Ministry of Agriculture, Animal Industry and Fisheries, National Agricultural Research Organization-NARO and Makerere University

**4. Expected Time Frame for the Preparation of the Mitigation Action**

12 months

**5. Estimated Full Costs of Preparation**

Pilot Assessments (50,000):

Field assessments for collecting information about livestock production systems in Uganda in relation to methane and nitrous oxide emissions.

Consultations with stakeholders ($27,000):

Three consultative meetings with stakeholders each lasting one day ($ 9,000 each, 30 participants each=$27,000). This will also involve establishing links with Zonal Agricultural Research and Development Institutes as well as the National Agricultural Advisory Services - NAADS. Cost includes hiring of venue, teas, lunch and a modest transport refund to those coming from out of town. Meetings expected in month 3, month 6 and month 12 to approve the final NAMA document. Participants to these meetings will include representatives from MAAIF, NARO, and other stakeholders including from the International Livestock Research Institute.

Work plans, including specific activities and elements ($10,000): Other cross-cutting activities include stakeholder mapping and role sharing. Two 2-day planning meetings ($ 5000, 12 participants each =$10,000). Cost includes hiring of venue, teas, lunch and a modest transport refund to those coming from out of town. Planning meeting will bring a core team of stakeholders to finalize NAMA document. Meetings expected to take place in month 5 and month 10.

**5. Support Required to Prepare the Mitigation Action**

***5.1 Financial Support***

A grant of $87,000 to prepare the full NAMA proposal.

***5.2 Capacity Building Support***

Two technical expert/consultants (One international and one local) to gather all required information and to write full upland rice NAMA proposal ($35000). Training is also required the appropriate methods used estimate CH4 from livestock in the field as well as from manure left on pasture.

**6. Outcomes of NAMAs**

This research NAMA will not directly result into reduction of methane or nitrous oxide emissions, but will provide information that will be used by the farmers to reduce emissions associated with livestock production in Uganda, that currently comprise more than 90% of emissions from agriculture.

**Co-benefits**

Environmental: Proper use of manure replenishes soil fertility, reduces leaching of nutrients and boosts agricultural output. Use of biogas reduces demand for other fuels particularly firewood and charcoal hence reducing rates of deforestation and tree loss. Grazing land and pasture management practices that increase soil carbon stocks can significantly mitigate CO2 emissions. Improved production efficiency in cattle will reduce natural resources requirements for livestock production hence reducing overall environmental impacts.

Socio-economic: Economic benefits associated with animals with low residual feed intake-RFI. Reduced methane emissions from enteric fermentation imply that more energy is available to the animal per unit of feed consumed, Improved production and productivity of livestock, Improved livelihoods, better incomes, employment opportunities.

Sustainable development: Research would better elaborate the benefits, especially ability to improve incomes for small farmers; manure well managed for better productivity of crops.

 **Table 1 Proposed Work Plan for Implementing NAMA**

|  |  |
| --- | --- |
|  | Timeline in years |
| Exploring appropriate feeding strategies that increase productivity while at the same time reduce methane emissions from enteric fermentations | 1 | 2 |
| Exploring with various feed additives |  |  |
| Explore ways to improve feed efficiency through breeding and diet manipulation |  |  |
| Explore manure management on small and larger farms |  |  |
| Public information and awareness of levels of mitigation possible and appropriate strategies and technologies |  |  |
| Conduct annual & biennial MRV reporting and monitoring and evaluation |  |  |

**Measuring, Reporting and Verification:**

The MRV framework for NAMAs aims to provide assurance to stakeholders that projects and programmes meet certain requirements; that their implementation is carefully monitored, and that progress is reported and the results verified. The key to MRV in agricultural NAAMS is keeping good records at the farm-level. This research NAMA will gather baseline data, and attempt to calculate the emission reductions of specific abatement actions. MRV is very difficult in the agriculture sector, and MRV systems are very costly. As such, international support is required to lay this groundwork. A framework developed in consultation with the stakeholders is presented in Table 2.

* The study can reach smallholder farmers in Uganda through cooperative societies

**7. Links to National Policies and Other NAMAs**

7.1 Relevant National Policies

The **Agricultural Sector Development and Investment Plan** seeks to increase incomes of farming households from livestock; to improve quality and increase the quantity of agricultural produce and products; and to promote and encourage highly adaptive and productive livestock breeds.

The draft **Climate Change Policy[[2]](#endnote-1) and strategy** [[3]](#endnote-2) specify agriculture as one of the major sectors for climate change mitigation in Uganda, with reduced GHG emissions through sustainable land management of rangelands and pastures and minimal GHG emissions from utilisation of agricultural products for livestock feed.

7.2 Links to Other Mitigation Actions

Not Applicable

**Table 2 Proposed MRV Framework for Developing Appropriate Strategies and Techniques to Reduce Methane Emissions from Livestock Production NAMA**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Indicators** | **Emissions factors/Activity data** | **Data Owners**  | **Information** | **Institution Responsible for collecting Information** | **Procedure** | **Reporting** | **Verification**  | **Leadership** |
| Tonnes of gases and co2 equivalent | Population size; Type of livestock; Emission Factor of the type of Feeds | UBOS, MAAIF | Develop databaseData collection, supervision, funding  | MAAIFLocal Government |  | MAAIF | QA by MAAIF | MAAIF |
|  |  |  | Legal drafting of billsPublicity/awarenessFundingCoordination of sectoral playersRegulation of the systemStandards developmentSupervision Research, experimentation/pilots/practicals, vetting on credibility of scientistsTeaching (academia)Funding, research, information disseminationInformation dissemination, coordination of farmingEnsure compliance | MAAIFMAAIFMAAIFUCDAUFFEUFEANFAResearch institutionsResearch institutionsNGOsFarmers Associations (UFEA/UFFE)CCU |  |
|  |
| **Resources, capacities, staff** | From private sector, MFPED, public service, development partners, civil society |

**8. Additional Information**

Feasibility studies and/or background documentation

1. MAAIF, 2010. National Livestock Census Report 2008. Ministry of Agriculture Animal Industry and Fisheries, Entebbe.
2. Ejobi, F., Kabasa, J.D., Olaya, J.,Ebong, C., Kabirizi, J., Isabirye, P. and Livingston, R.2007. *Methane emission from cattle population in Uganda. Journal of Animal and veterinary Advances* 6(3): 399-403.
3. Dairy Investment Opportunities in Uganda-Report, <http://www.snvworld.org/download/publications/report_on_dairy_investment_opportunities_in_uganda.pdf>
4. Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G.2013. *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities*. Food and Agriculture Organization of the United Nations (FAO), Rome.
* Methodological basis used for estimating, for example, costs, needs for support or outcomes including emission reductions

Reports of meetings and consultations with various groups.

* Dr. Donald Kugonza, Department of Agricultural Production, Makerere University
* Dr. Freb Kabi, Department of Agricultural Production, Makerere University
* Dr. Fidalis Mujibi: International Livestock Research Institute-ILRI, Nairobi:
* Dr. Cyprian Ebong Institut-des-Sciences-Agronomiques-du-Rwanda, ISAR
1. The information provided in this template is taken from the Draft Manual of the NAMA registry (Version of 21 November 2012) developed for the UNFCCC. The full manual can be accessed at: [http://unfccc.int/files/cooperation\_support/nama/application/pdf/registry\_ manual\_25\_oct.pdf](http://unfccc.int/files/cooperation_support/nama/application/pdf/registry_%20manual_25_oct.pdf). The information is also informed by the IISD NAMA practitioner’s guide and the UNDP/UNFCCC/UNEP NAMA guidebook. [↑](#footnote-ref-1)
2. Uganda National Climate Change Policy. FINAL VERSION FOR APPROVAL. 5th April 2013. Ministry of Water and Environment, Kampala. [↑](#endnote-ref-1)
3. [↑](#endnote-ref-2)