



**GOVERNMENT OF THE GAMBIA**



## **FULL AGRICULTURE NAMA PROJECT OF THE GAMBIA**

**Mitigating Greenhouse Gas Emissions and Concentrations in the  
Atmosphere through the Strengthening and Promotion of an  
Integrated Crop-Livestock System in The Gambia**

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### **Abbreviations**

ACF	African Carbon Forum
AfDB	African Development Bank
AGRHYMET	AGRiculture Hydrology and METeorological Centre in Niamey
AHPS	Animal Health and Production Services
ANR-WG	Agriculture and Natural Resource Working Group
CCI	Climate Change Initiative
CDM	Clean Development Mecanism
CERs	Certified Emission Reductions
CILSS	Committee Iner-State pour Lutte Contra le Secherres
COP	Conference Of Party
CPMS	Cooperative Produce Marketing Society
CRR	Central River Region
CSO	Civil Society Organizations
DCD	Department of Community Development
DOA	Department of Agriculture

DoFish	Department of Fisheries
DoYS	Department of Youths and Sports
DWR	Department of Water Resource
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organization (United Nations).
FFS	Farming Field Schools
GBoS	Gambia Bureau of Statistics
GCCI	Gambia Chamber of Commerce and Industry
GGC	Gambia Groundnut Corporation
GGC	Gambia Groundnut Corporation
GHE	Gambia Horticultural Enterprise
GHG	Greenhouse Gases
GIEPA	Gambia Imports Exports Promotion Agency
GLMA	Gambia Livestock Marketing Agency
IFAD	International Food and Agriculture Development
ITC	International Trypanotolerance Centre
ISFP	Global Initiative on Soaring Food Prices
LECRDS	Low Carbon Emissions Climate Resilient Development Strategy
MoA	Ministry of Agriculture
MoBSE	Ministry of Basic and Secondary Education
MoE	Ministry of Energy
MoFEN	Ministry of Forestry and the Environment
MoHSW	Ministry of Health and Social Welfare
MoLG&L	Ministry of Local Government and Lands
MoWCI	Ministry of Works, Construction and Infrastructure
MRV	Measurement, Reporting and Verification
NACCUG	National Association of Cooperative Credit Unions The Gambia
NAMAs	Nationally Appropriate Mitigation Actions
NaNA	National Nutrition Agency
NaNA	National Nutrition Agency
NARI	National Agriculture Research Institute
NCC	National Climate Committee
NEA	National Environment Agency
NGOs	Non Governmental Organizations
PMU	Project Management Unit
PSC	Project Steering Committee
RCU	Regional Coordination Unit
RMC	Regional Member Country
SWMS	Soil and Water Management Services
TAC	Technical Advisory Committee
TANGO	The Association of Non-Governmental Organizations
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations
URR	Upper River Region
UTG	University of The Gambia

VISACA Village Savings and Credit Association  
WB World Bank  
WFP World Food Programme

## EXECUTIVE SUMMARY

*In 2007, the Bali Action Plan (Dec. 1/CP.13) introduced Nationally Appropriate Mitigation Actions (NAMAs) as a central concept for a new international climate regime. However, the number and quality of NAMAs generated from Africa are low due to inadequate capacity. The African Development Bank (AfDB) stepped in to support Burkina Faso, Egypt, Gambia, Guinea, Guinea-Bissau, Mali, Niger, Sudan and Uganda to develop their NAMAs. The Gambia developed a National NAMA containing ten (10) NAMA project ideas and submitted the document to the UNFCCC at COP 17 in December 2011.*

*The AfDB followed-up with the support to develop this FULL NAMA for the Agricultural Sector of The Gambia entitled “**Mitigating Greenhouse Gas Emissions and Concentrations in the Atmosphere through the Strengthening and Promotion of an Integrated Crop-Livestock System in The Gambia**”. The main objective of this agriculture NAMA is to reduce greenhouse gas emissions through the promotion of an integrated crop-livestock system and promote sustainable development, poverty reduction and other co-benefits. Specific this NAMA will promote the restoration of degraded grazing lands and better utilization and management of re-established grazing lands; promote intensive animal husbandry; facilitate further crop diversification and cultivation in project sites; facilitate the displacement of fossil fuel (diesel/gasoline) powered pump irrigation by solar and wind powered irrigation systems, and expand of tidal irrigation; facilitate the acquisition and utilization of postharvest and food storage and processing technologies.*

*The government’s vision for the agriculture sector is to transform The Gambia into a major supplier of agricultural products to local and international markets between 2012 and 2015 by increasing food security and boosting the income-generating capacity and the nutritional status of farmers, especially women and youths; transforming the agricultural sector from a traditional subsistence economy to a modern market-oriented commercial sector; increasing and sustaining agricultural production and productivity; and enhancing beneficiaries’ productive capacity through supervision, coordination, regulation and advice.*

*The Agricultural NAMA is proposed for implementation in the Central and Upper River Regions of The Gambia. These two regions have freshwater flow for the greater part of the year with large potential for tidal and surface water irrigation using diesel/gasoline powered pumps. They also have the largest livestock population and also have the largest number of women farmers in The Gambia.*

*In 2000, 51% of the total emissions from agriculture were methane emissions from animal husbandry, rice cultivation, savannah burning and burning of crop residues, 38% of the emissions were carbon monoxide from burning of savannahs and burning of crop residues, 10% of the emissions were Nitrous Oxides from agricultural soils, burning of savannahs and burning of crop residues, and 1% of the total emissions from agriculture were nitrogen oxide emissions. Animal husbandry produced 64% of the total emissions from the agriculture sector. Cattle rearing alone produced 83% and rice cultivation produced 33% of the total methane emission from agriculture sector. Thus intensive animal husbandry and upland rice cultivation will contribute to lowering these emissions especially in CRR and URR where the country has the largest number of animal population and conducts the largest rice irrigation schemes of the country.*

*Averaged projected (1990 to 2030) emissions from the Agriculture Sector are about 0.94 MtCO<sub>2</sub>eq and, through the implementation of this NAMA project, it is proposed to reduce these emissions by about 33%. Crop diversification, particularly the expansion of the area of cultivation of NERICA and other upland crops will lead to reduction in flooded rice cultivation and thus reduce methane emissions. The planting of nitrogen fixing crops and the encouragement of spot and zero burning practices would significantly reduce GHG emissions. Through the use of post-harvest and food processing and preservation techniques and technologies, reductions in emissions are expected to come from the Land Use and Land Use Change and Forestry emissions category based on the area and carbon stock whose destruction is avoided. By promoting and utilizing improved food storage facilities and post-harvest technologies, expansion of farmlands through encroachment into forests and virgin lands will be reduced. Reductions in emissions are expected to come from the Forestry Category based on the area and carbon stock whose destruction is avoided.*

*In addition to reducing greenhouse emissions, the implementation of this NAMA includes ensuring sufficient human, technological and financial resources with support from developed countries. These provisions typically also provide specific opportunities that include tapping the 650 Billion cubic metres of untapped underground water resources; the availability and utilization of appropriate, cost-effective and climate change friendly irrigation technologies (tidal and drip) for all year round production of crops and livestock; the availability and application of improved sustainable natural resources (e.g., rangelands) management practices to achieve reduced natural resource degradation, improved food security, expanded sources of livelihood and incomes and reduced poverty particularly of communities that depend on these resources; and the availability and applications of appropriate land use and soil management practices to reduce land and soil degradation and depletion. Also co-benefits offered by the implementation of this agriculture NAMA include improved food and income security; trained and empowered communities and government services in natural resources management; enhanced ownership and sustainability; improved infrastructure and expanded irrigation schemes that produce less greenhouse gases; improved rangeland resource management and transhumance, and reduced incidences of bush fires and disease epidemics; reformed land tenure arrangements for more equitable distribution of plots and increased security of holdings.*

*The Bali Action Plan emphasized that nationally appropriate mitigation actions must be “measurable, reportable and verifiable” (MRV). A pragmatic approach to ensure that national actions are indeed measureable, reportable and verifiable, is to adopt standard procedural guidelines on basic elements of national climate management systems, such as establishing a climate policy, setting national goals, implementing related national actions and tracking progress over time. The Gambia is in the process of developing a Climate Change Policy and a Low Emissions Climate Resilient Development Strategy (LECRDS) that will take into consideration MRVable actions. In the Policy and Strategy, the MRV scheme to be developed will be applicable to this project and will complement existing requirements for Parties to compile quantitative, aggregate national greenhouse gas inventories and national communications.*

*To achieve the emission reductions, the opportunities and co-benefits of this Agriculture NAMA barriers to implementation that must be overcome include none or inadequate availability of finance, capacity building and technologies; inadequate institutional and policy frameworks at the national for in-country NAMA implementation; none involvement of the most important stakeholders (local communities, women, youths and local leaders) in the process from the start; and inadequate infrastructure, high labour cost, inadequate farmer knowledge base, limited access to microfinance, credit facilities and information. These barriers must be lifted through the construction of required infrastructure, adequate storage facilities and good transport and communication networks; mobilization of adequate financial and material resources; creation and institutionalization of enabling (capacity building and technology*

acquisition and transfer) environment, and credit and microfinance facilities; design and implementation of training programmes for farmers and other stakeholders on processing and storage techniques, technical knowledge and provision of technology and grazing and grassland restoration processes; and development of appropriate policy and strategies.

## TITLE OF THE AGRICULTURE NAMA

Mitigating Greenhouse Gas Emissions and Concentrations in the Atmosphere through the Strengthening and Promotion of an Integrated Crop-Livestock System in The Gambia

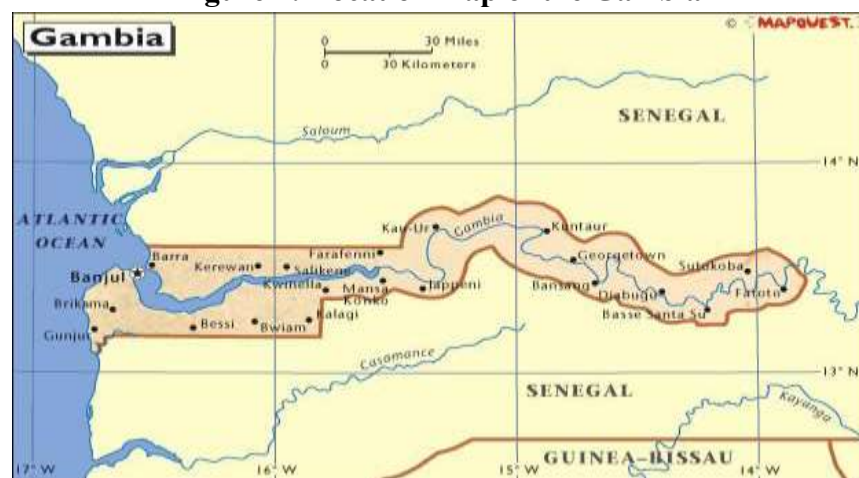
This NAMA Document has been prepared with the financial support from AfDB and FAO.

## 1: INTRODUCTION

### 1.1: Location:

The Gambia lies between latitudes 13 and 14 degrees North and longitudes 17 and 12 degrees West. It is the smallest country on the African continent with a total area of about 11,300 sq km of which 10,000 sq km is land and 1,300 sq km is water. The Gambia has a total land boundary of 740km, all of which is shared with the Republic of Senegal (Figure 1 below). On its marine seaboard, the country has an 80 km open coastline of which 11 km represents the mouth of the River Gambia. Maritime claims include a contiguous zone of 18 nautical miles and an exclusive economic zone (EEZ) of 200 nautical miles. The Gambia sits on the flood plain of the Gambia River flanked by savannah and low hills. The lowest point is at sea level and the highest point, unnamed, is 53 metres above sea level (DOS, 1980).

Figure 1: Location map of the Gambia



## **1.2: Climate**

The country has a Sudano-Sahelian climate, characterised by a long dry season (November to May the following year) and a short wet season (June to October). Average temperatures of The Gambia range from 18° to 30°C during the dry season and 23° to 33°C during the wet season. Mean annual temperature has noticeably increased since the 1940s. In effect, the lowest mean temperature of 25.8°C was recorded in 1947 whilst the highest mean temperature of 28.2°C was recorded in the year 2000. Mean annual rainfall varies from 900 mm in the south-west to about 500 mm in the north-east. Average relative humidity (RH) is about 68% in coastal areas and 41% in the hinterland, during the dry season, and generally above 77% throughout the country during the wet season. However, RH has also been decreasing since the 1940s, with annual average of over 75% in 1945 dropping to a little over 55% in 2002.

## **1.3: Population**

The Gambia has a population of 1,722,200 (2010 GBOS estimate) with an estimated natural growth rate of 2.93%. The relatively high population growth rate has been recognised as one of the constraints on development. The challenge lies in the fact that the population of the country would double every 16 years, carrying the possibility of undermining the country's goals of poverty reduction and slowing down economic growth. About 51% of the population is concentrated in the urban and peri-urban areas while 49% is living in the rural areas with 60% of total population under 25 years of age.

## **1.4: Economy**

Sectoral contributions to GDP show 26.8% from Agriculture, 14.5% from Industry and 58.7% from Services. Agriculture is the basis of Gambian economy, employing around 70% of the population and accounting for about 30% of the GDP. It is the principal source of livelihood for the rural population and for the majority of households below the poverty line. Weak performance in the sector (at only about 4% growth) is a primary cause of national poverty levels. With the economy heavily dependent on rain-fed agriculture, adverse climatic conditions have caused negative effects on agricultural production, eroding farmers' productivity and purchasing power. The agribusiness sub-sector remains undeveloped and market linkages with domestic, regional and international markets are under-exploited. Despite priorities to modernize and transform the sector from a subsistence-based to commercialized market-oriented sector, necessary conditions to realize these goals remain unmet. According to results of the Participatory Integrated Watershed Management Project (PIWAMP), the lowlands - where most of the investments in agricultural production take place - have undergone pronounced siltation and sedimentation which threatens their sustainability (PIWAMP, 2004). These effects combined with increasing periods of drought, increasing desertification largely caused by climate change, periodic floods and epidemics place the country at risk to disasters.



## **SECTION 2: GENERAL INFORMATION**

### **2.1: Rationale**

In 2007, the Bali Action Plan (Dec. 1/CP.13) introduced Nationally Appropriate Mitigation Actions (NAMAs) as a central concept for a new international climate regime (UNFCCC, 2008). Under the Cancun Agreements (Dec. 1/CP.16), the UNFCCC Conference of Parties (COP) agreed that developing country (Non-Annex I) Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to ‘business as usual’ emissions in 2020 (UNFCCC, 2010). Also in Dec. 1/CP.16, the COP decided that internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention. It is also expected that the support (capacity building, technology and finance) will be subjected to Measurement, Reporting and Verification (MRV) based internationally agreed rules and procedures.

Africa continues to severely lag behind other continents on the uptake of CDM projects, which could reduce GHG emissions and generate an alternate income stream from the sale of certified emission reductions (CERs) for project owners on the continent. Efforts have been made to revise this trend through the introduction of the Nairobi Framework on CDM which was initiated at COP 12 in Nairobi by UNDP, UNEP, World Bank, African Development Bank, and the UNFCCC Secretariat with the specific target of helping developing countries, especially those in sub-Saharan Africa, to improve their level of participation in the CDM.. Others initiatives have been put in place in order to improve the regional distribution of CDM project activities (e.g. the publication of recommendations on how to improve by the CDM Executive Board and the implementation of the CDM Programmes of Activity which is considered as a solution to assist African governments in overcoming some of the obstacles that are currently associated with the CDM). But these have attracted inadequate response. Africa is therefore, learning from this unfortunate experience by using the concept of NAMAs to correct the situation. NAMAs are already taking a prominent place in international politics for mitigating GHG emissions and thus encouraging African countries to better prepare and position themselves to take advantage of the opportunities offered under the NAMA mechanism.

However, the number and quality of NAMAs generated from Africa are low due to inadequate capacity. In their submission African countries expressed their need for financial, technological and capacity-building support for full participation in the NAMA mechanism.

The African Development Bank (AfDB) has responded to the African call for support by developing and implementing a project to build the capacity of Regional member Countries (RMCs) to produce viable NAMAs. Therefore, the Bank has put in place a Program for the

Development of NAMAs in Africa with the objective of providing assistance to Regional Member Countries (RMCs) to better understand NAMAs, to engage more effectively in the climate negotiations and to actively shape this important new climate instrument.

This program has two phases. During the first phase, The Bank organized several activities, including:

1. **Organization of Side events and workshops:**
  - a) during the 3<sup>rd</sup> Africa Carbon Forum (ACF) held in Marrakech, Morocco,
  - b) at the UNFCCC negotiations in Panama on October 2, 2011
  - c) during the COP 17 in Durban, December 2012
2. **Elaboration of a survey** which was conducted in January 2012 with the objective of collecting NAMA ideas from all RMCs. Opportunity was also given to those RMCs that did not have a chance to participate in the above mentioned workshops to communicate NAMAs they wish to develop or are currently developing
3. **Support to nine (9)**<sup>1</sup> RMCs in preparing NAMA ideas for submission to the UNFCCC.
4. **Elaboration of a guidebook** which intends to help RMCs to better understand the concept of NAMA and to provide support in undertaking processes to develop NAMAs

**In Phase II**, the Bank is commissioning tasks for supporting some of these countries to go further for the elaboration of their full NAMA proposals.

Gambia has been selected for this second phase for elaboration of a comprehensive NAMA proposal on agriculture.

To do so, two main activities have been held in Gambia: (i) a consultation workshops and (ii) sector consultation in order to collect necessary information for developing NAMA proposal (see Annex III for list of stakeholders).

As a Least Developed Country (LDC), the NAMA submitted by The Gambia is the **“Supported”** category<sup>2</sup> NAMA that will lead to a reduction of greenhouse gas emissions and contribute to sustainable development in the country. Successful implementation will depend on the availability of the capacity, technological and financial support identified and being requested in the document.

During the first phase, the submitted NAMA document contained ten mitigation actions (see Annex II), of which the following four are from the Agriculture Sector, including Livestock.

1. **Improving storage facilities and promoting the use of post-harvest technologies**
2. **Restoration of degraded grazing land through the multiplication and popularization of forage seed planting of multipurpose seed in grazing areas**

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<sup>1</sup>Burkina Faso, Egypt, Gambia, Guinea, Guinea-Bissau, Mali, Niger, Sudan and Uganda.

<sup>2</sup> Supported NAMAs are mitigation actions in developing countries, supported and enabled by technology, financing and capacity building from Annex I countries

3. **Promotion of an integrated crop-livestock system, including planting of nitrogen fixing crops and encouraging spot and zero burning practices**
4. **Promotion of cultivation of high-yielding rice**

Under Phase II, The Republic of The Gambia developed this Full Project entitled ***“Mitigating Greenhouse Gas Emissions and Concentrations in the Atmosphere through the Strengthening and Promotion of an Integrated Crop-Livestock System in The Gambia”***

The rationale for the Gambia Agriculture NAMA is to mitigate greenhouse gas emissions particularly the contribution from the agriculture sector, and to lower the cumulative build-up of greenhouse gases in the atmosphere. Therefore this document presents a request for financing, technology and capacity building support of a NAMA in the agriculture sector.

## **2.2: Objective**

The main objective of this agriculture NAMA is to reduce greenhouse gas emissions through the promotion of an integrated crop-livestock system and promote sustainable development, poverty reduction and other co-benefits. Specific objectives of this NAMA include:

The main objective of this agriculture NAMA is to reduce greenhouse gas emissions through the promotion of an integrated crop-livestock system to enhance promotion of sustainable development, poverty reduction and other co-benefits. Specific objectives include:

- a. Promotion and restoration of degraded grazing lands through the multiplication and popularization of forage seed planting of multi-purpose plants in grazing areas; better utilization and management of re-established grazing lands and protection from premature grazing; fire belt development and management; promotion and application of appropriate harvesting, storage, and preservation techniques; provision of animal watering facilities in degraded areas and sensitization of livestock keepers on improved feed conservation and preservation techniques.
- b. Promotion of intensive animal husbandry through the adoption of new approaches to livestock production such as improvement in genetics. Improvement of animal genetics would lead to less numbers of animals and a higher level of productivity. The targeted dual purpose Ndama cattle of the Gambia produces a maximum of 1.5 liters of milk a day; and an average of 250kgs live-weight at the age of 5 year. Benefits include poverty alleviation, food self-sufficiency and genetic improvement of indigenous breeds.
- c. Facilitation of further crop diversification and cultivation in Central and Upper River Region (CRR) and (URR) respectively. Some crops such as NERICA have been found to do very well in the upland soils of The Gambia that are sandy and have low nutrient content and poor water holding capacity. Because it grows in upland sandy soils very little greenhouse gases are emitted as opposed to deep water and flooded cultivation. Thus, the NAMA project will lead to reduction of emissions of greenhouse gases, particularly methane, and also increase food security.

- d. Facilitation of the displacement of fossil fuel (diesel/gasoline) powered pump irrigation by solar and wind powered irrigation systems, and expansion of tidal irrigation. Wind turbines produce no pollution and by using wind power it is possible to offset greenhouse gases that would have been generated by the national utility company or by private generators. Over its life, a small wind turbine can offset approximately 1.2 tons of air pollutants and 200 tons of greenhouse gases (carbon dioxide and other gases which cause climate change). Solar Photovoltaic Technology is used to provide electricity supplies of various forms and uses particularly from pumping and lifting water for irrigation. This will do very well for irrigation from surface water and ground water sources.
- e. Facilitation of the acquisition and utilization of postharvest and food storage and processing technologies to improve food availability and food security in the country. The increased availability of food will reduce clearing of virgin lands for cultivation of more food. The clearing of virgin lands, most of which are forest and rangelands leads to reduced sinks and increased emissions of greenhouse gases into the atmosphere. Thus, the ultimate outcome will be reduction in emissions of greenhouse gases from forest clearing for new farm lands, food security and poverty reduction.

### **2.3: Background on the Agriculture Sector**

The agriculture sector is characterized by subsistence-based rain-fed mixed-crop (mainly groundnuts, coarse grains, rice and cassava) farming, traditional livestock rearing, semi-commercial groundnut and horticultural production, small cotton and a large artisanal fisheries sub-sector. This type of farming system is carried out mainly by small-scale resource poor farmers who use labour-intensive traditional production practices on less than one-hectare average farm size plots (usually fragmented). The farming system, in general, results in low outputs and causes a gradual decline in soil fertility.

According to the Gambia National Agricultural Investment Plan (GNAIP) 2011 – 2015 (GoTG/GNAIP, 2010), Agricultural output is generated by around 69,100 farm households (500,000 people engaged in farming) cultivating 320,000 ha or about 57% of total arable land estimated at 558,000ha. Of the total cultivated area about 30% is devoted to the production of groundnuts for cash income, 144,000ha for coarse grains and about 72,000ha for rice cultivation under rain-fed conditions. Cotton is grown on land area averaging about 3,000 hectares annually, while cassava, potato and horticultural crops occupy between 1,500 to 2,000ha per year on average. An estimated 2,500ha is annually put to irrigate rice, mainly in the CRR, with an additional 800ha under horticulture. The estuary basin of The Gambia River is a tidal inlet with a saltwater intrusion ranging from 180 km in the rainy season to 250 km in the dry season. Agriculture is mostly rain-fed, and only about (6%) six percent of the irrigation potential has been used.

Livestock production is carried out nationwide by almost all rural households. Cattle totalling about 300,000 heads are the most valuable asset in the sub-sector, closely followed by small ruminants comprising sheep (160,000) and goats (230,000). Poultry meat is an important source of quality animal protein, especially because of the short production period. It is estimated that small-scale producers raise some 700,000 birds, representing 90% of the national poultry flock **(2009 NASS/MOA)**. Rangeland occupies 40% or 400,000 ha of the country's total area of which about 60% (or 240,000 ha) is used for pasture practicing transhumance. Rangeland resources are often characterized by poor drainage, rocky topography and low soil fertility.

Agriculture accounts for an average of about 27% of GDP of The Gambia and the livestock sector contributes 33% to agricultural GDP, groundnuts 23%, other crops 43%, fisheries 3% and forestry 2% **(2009 GBOS Estimate)**. Agriculture employs 75% of the labour force, meets about 50% of the national food requirements, provides an estimated two-thirds of households' income, and its share of the country's total exports is 70%, thus constituting a substantial part of The Gambia's foreign exchange earnings. In The Gambia, about 91% of the extremely poor and 72% of the poor work in agriculture and the groundnut farmers are the poorest of the poor. The agricultural sector is regarded as the prime sector for investments to raise income, improve food security and reduce poverty. The Gambia does enjoy comparative advantages for lowland rice, groundnuts, coarse grains, and cotton as well as for vegetable production.

Groundnut production accounts for 6.9% of GDP, while other crops account for 8.3%, livestock accounts for 5.3%, and fishing accounts for 1.8%. The fisheries sub-sector provides the cheapest form of protein and supplies about 40% of the total animal protein consumed in the country. Its current per capita consumption is estimated at 28 kg (compared to 20 kg in 1995). Groundnut exports contribute significantly to the national economy, accounting for 60% of domestic exports (GOTG/ISFP 2008) but exports began to collapse in 2004 to just USD 9.6 million compared to USD 49 million in 1975 as a result of failures in internal marketing arrangements. Promotion of groundnuts, the country's main agricultural export will remain an important part of the government's support to the agriculture sector. The specific initiatives will support the expansion of both large-scale commercial producers as well as smaller producers through farmers' cooperatives and associations.

It should be noted that Gambian women presently constitute half the population of the country and the majority of them are rural and are engaged in agricultural production. Consequently, we can note that about 75% of the agricultural labor force is provided by women and since agriculture contributes about 27% of GDP, we can conclude that the role of women at the macro-economic level is of great importance.

In Agriculture, women produce 40% of food consumed in the household. In groundnuts they produce 24% of crop, up from 23% in 1995. They own 36% of cattle, 52% sheep and 70% goats<sup>3</sup>.

On its current trajectory (GoTG/GNAIP, 2011), the overall objective of agriculture is to promote pro-poor growth and employment in the rural sector through private sector development. Specific policies and initiatives will be broadly based on a mixture of import substitution to ensure food security, and export promotion through private sector development. The government will promote domestic production of rice and other key food crops in order to reduce reliance on imports. At the same time, it will promote cash crops, such as cotton and vegetables, deemed to have potential to diversify agricultural exports.

A new agriculture and natural resources development policy aims to increase farm productivity, diversify farm household production and marketing mix, ensure farmers get a fair price for their produce and are paid in cash, maximize value addition to agricultural commodities. In order to meet these objectives, the authorities currently rely on multiple instruments:

- i. pan-territorial producer price support;
- ii. direct investment and operation of processing facilities;
- iii. direct supply of subsidized fertilizers; and
- iv. targeted support to enterprises through loan guarantees

The government's vision for the agriculture sector is to transform The Gambia into a major supplier of agricultural products to local and international markets between 2012 and 2015 by:

- i. Increasing food security and boosting the income-generating capacity and the nutritional status of farmers, especially women and youths;
- ii. Transforming the agricultural sector from a traditional subsistence economy to a modern market-oriented commercial sector;
- iii. Increasing and sustaining agricultural production and productivity; and
- iv. Enhancing beneficiaries' productive capacity through supervision, coordination, regulation and advice.

## **2.4: Scope of the Agriculture NAMA**

### **2.4.1: Geographical coverage:**

The Agricultural NAMA is proposed for implementation in the Central and Upper River Regions of The Gambia. The River Gambia and its banks in these two regions have freshwater flow for the greater part of the year with large potential for tidal and surface water irrigation using

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<sup>3</sup> Response to the questionnaire on implementation of the Beijing Platform for Action (1995) and the outcome of the Twenty-third Special Session of the General Assembly (2000)

diesel/gasoline powered pumps. The CRR and URR also have the largest number livestock population in The Gambia. The regions also have the largest number of women farmers.

#### **2.4.2: Technological**

Agricultural practices in The Gambia have been based on low technology input such as hoes and other crude implements. The potential for improved agricultural practices and improved technology transfer approaches (such as farmer field schools) is high. The abundant underground water resources (about 650 billion m<sup>3</sup>) available in the country could be more fully exploited if appropriate and cost-effective mix (tidal and pump) irrigation technology is used to ensure all year round production of crops and livestock. The current fossil fuel powered generators used for irrigation can be replaced by wind and solar powered generators to generate less greenhouse gases from the sector. The potential to train stakeholders, particularly civil society representatives on independent technology learning and creating capacities as a basis for generating sustainability in their farming systems is also high. It is important to use bottom-up Farming Field Schools (FFS) approaches for technology transfer.

#### **2.4.3: Capacity and Resources Requirement**

In recent years, the budget allocations for the Ministry of Agriculture (MoA) has been substantially small averaging about 2.7% of the total budget allocation for recurrent expenditures. However, these national allocations to the agricultural sector are reasonably close to that of neighbouring countries in West Africa where the average share is 3.5%. However, Government's commitment to reversing this trend and increase investment in agriculture progressively resulted in an increase to 4.5% in 2009 and 2010, and 6% for 2011 from the average of 2.5% in 2007 (GoTG/PAGE, 2011).

#### **2.4.4: Stakeholders**

Key policy level stakeholders are the Ministry of Agriculture with the mandate of agriculture and livestock, Ministry of Fisheries and Water Resources and the Ministry of Forestry and Environment responsible for policy issues of climate change. These will be supported by the Agriculture and Natural Resources Working Group, a policy level working group responsible for the supervision and monitoring of implementation of activities in the Agriculture (Agriculture and its 9 Service Units) and Natural Resources (Environment, Fisheries, Forestry, Water Resources and Wildlife) sectors.

At the technical level, the Department of Agriculture (DOA) and the Department of Water Resources (DWR) will be implementing and coordination stakeholders respectively. Other stakeholders include:

1. Government institutions such as the Ministry of Basic and Secondary Education (MOBSE), the Ministry of Local Government and Lands (MOLG&L), the Ministry of Health and Social Welfare (MoHSW), the National Nutrition Agency (NaNA), University of The Gambia (UTG), the inter-ministerial Food Security Working Group under the Vice President's

Office, the Department of Fisheries (DoFish), the Department of Youth and Sports (DoYS), the National Agricultural Research Institute (NARI), etc;

2. Quasi-government and private sector partners that include the Gambia Chamber of Commerce and Industry (GCCCI), the Gambia Investment Export Promotion Agency (GIEPA), the Gambia Horticulture Enterprise (GHE), the Gambia Groundnut Corporation (GGC), the Cooperative Produce Marketing Society (CPMS), the Gambia Livestock Marketing Agency (GLMA), the National Veterinary Council, the International Trypanotolerance Centre (ITC), the Farmers Platform and rural finance institutions (e.g. VISACAs and NACCUG);
3. NGOs such as TANGO, Concern Universal, Action Aid – The Gambia; Women’s Bureau and
4. Development partners such as IFAD, AfDB, FAO, EU, WB WFP, UNICEF, AGRHYMET/CILSS

## **SECTION 3: JUSTIFICATION**

### **3.1: Definition of Business-as-Usual (BAU) scenario**

In 2000, 51% of the total emissions from agriculture were methane emissions from animal husbandry, rice cultivation, savannah burning and burning of crop residues. Emissions of carbon monoxide from burning of savannahs and burning of crop residues constituted 38% of the emissions from agriculture. Nitrous Oxides emissions came mainly from agricultural soils, burning of savannahs and burning of crop residues and constitute 10% of the total emission from agriculture. About 0.5Gg or 1% of the total emissions from agriculture were nitrogen oxide emissions. Rice cultivation produced 6.40Gg CH<sub>4</sub> or 33% of the total methane emission from agriculture.

Substantial reduction in the productivity of natural pastures, due to climatic factors, call for the adoption of the new approaches to livestock production. In the 2000 National Inventory, animal husbandry produced 12.3Gg CH<sub>4</sub> or 64% of the total emissions from agriculture, 0.39Gg CH<sub>4</sub> or 2% came from crop residue burning and 0.25Gg CH<sub>4</sub> or 1% came from savannah burning. Also about 83% (10.2Gg CH<sub>4</sub>) of the total methane emissions from animal production (12.3Gg CH<sub>4</sub>) was produced by cattle rearing. The other animal categories (sheep, goats, donkeys, horses, mules, swine and poultry) combine produced the remaining 17% (2.1Gg CH<sub>4</sub>). Intensive animal husbandry will contribute to lowering these emissions especially in CRR and URR where the country has the largest number of animal population.

The Central and Upper River Regions are located in the freshwater zone of the River Gambia. In addition to tidal irrigation, pump irrigation using diesel/gasoline generators is extensively practiced during the dry season. During the rainy season deep water cultivation of rice is

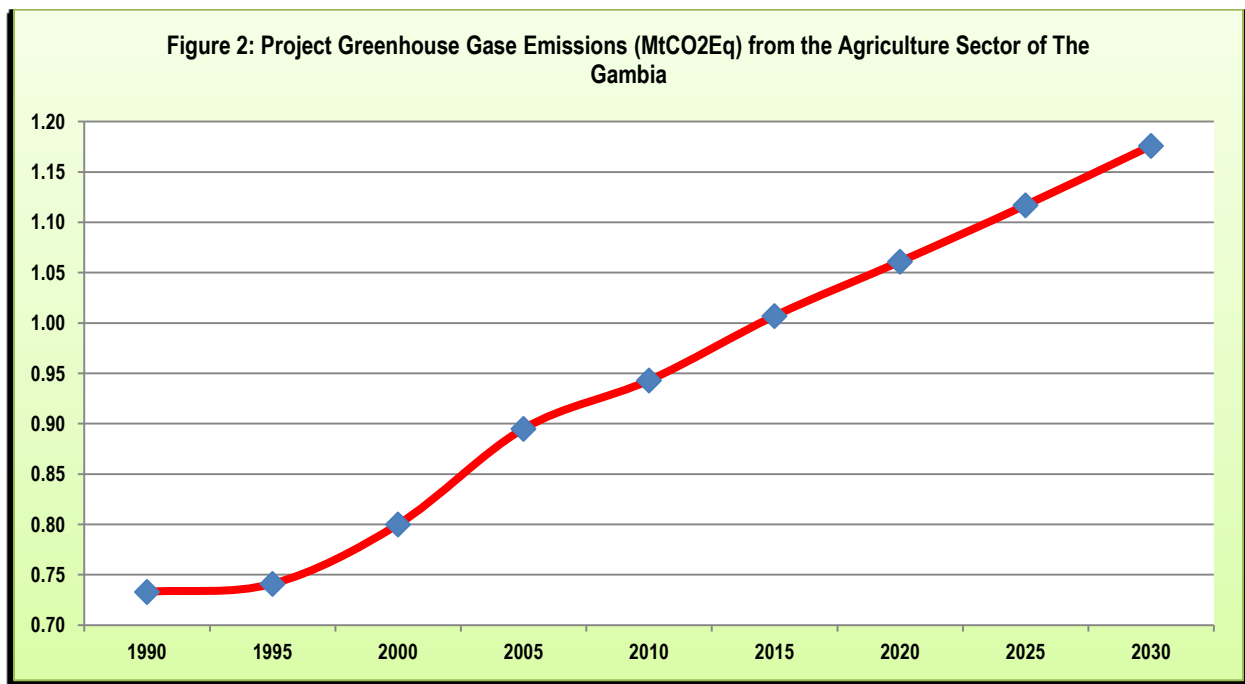


extensively practiced. These agricultural practices and technologies produce bulk of the emissions from agriculture. Through crop diversification and expanded irrigation using renewable energy generators, the current emissions can be drastically reduced.

### 3.2: Estimation of GHG reductions

Table 1 and Figure 2 below show the Business-as Usual projected greenhouse gas emissions from The Gambia as estimated by the US EPA for the period to 2030. Averaged projected emissions from the Agriculture Sector are about 0.94 MtCO<sub>2</sub>eq and it is proposed to reduce these emissions by about 33% through the implementation of this project. In this scenario, animal numbers per area would go down since productivity would have been enhanced which includes growth rates and milk output of the first generation of improved breeds. This would directly result to methane reduction. The target weight for improved breeds at aged five could go as high as 400kgs, as compared to 1.6 animals to attain a weight of 400kg. This by itself would reduce the amount of methane produced within a given population.

<b>Table 1: Projections of Greenhouse Gas Emissions (MtCO<sub>2</sub>eq) from The Gambia</b> (Source: US EPA (2011) excluding forestry)									
Country	1990	1995	2000	2005	2010	2015	2020	2025	2030
TOTAL (Excluding Forestry)	3.564	4.171	4.862	5.619	6.347	7.114	7.920	8.766	9.635
Energy	0.060	0.075	0.069	0.069	0.076	0.081	0.087	0.094	0.101
Agriculture	0.733	0.741	0.800	0.895	0.943	1.007	1.061	1.117	1.176
Industrial Processes	0.000	0.000	0.001	0.003	0.005	0.008	0.013	0.023	0.031
Waste	2.770	3.355	3.992	4.652	5.322	6.018	6.759	7.533	8.327



Crop diversification, particularly the expansion of the area of cultivation of NERICA and other upland crops will lead to reduction in flooded rice cultivation and thus reduce methane emissions. The planting of nitrogen fixing crops and the encouragement of spot and zero burning practices would significantly reduce GHG emissions. Through the use of post-harvest and food processing and preservation techniques and technologies, reductions in emissions are expected to come from the Land Use and Land Use Change and Forestry emissions category based on the area and carbon stock whose destruction is avoided. By promoting and utilizing improved food storage facilities and post-harvest technologies, expansion of farmlands through encroachment into forests and virgin lands will be reduced. Reductions in emissions are expected to come from the Forestry Category based on the area and carbon stock whose destruction is avoided.

### **3.3: Data availability/ Data requirements and collection**

The Gambia has good climate, agricultural and socio-economic data bases with historical records dating back to about 1890 for climate data and about 1974 for agriculture data. The main depositories of these data are the Gambia Bureau of Statistics (GBOS) for all data types, the Planning Services of the Ministry of Agriculture and the Climate Unit of the Department of Water Resources. Deterioration of the meteorological and hydrological data collection networks since the 1970s has meant that data on some elements such as solar radiation has serious gaps.

This is currently being addressed through the implementation of an Early Warning Project which is updating the data collection networks and expanding them to include other data that user stakeholders require.

### **3.4: Availability of MRV (Measuring, reporting, verification)**

#### **3.4.1: The Project MRV Framework**

The Bali Action Plan emphasized that nationally appropriate mitigation actions must be “measurable, reportable and verifiable” (MRV). A pragmatic approach to ensure that national actions are indeed measureable, reportable and verifiable, is to adopt standard procedural guidelines on basic elements of national climate management systems, such as establishing a climate policy, setting national goals, implementing related national actions and tracking progress over time. The Gambia is in the process of developing a Climate Change Policy and a Low Emissions Climate Resilient Development Strategy (LECRDS) that will take into consideration MRVable actions.

In the Policy and Strategy, the MRV scheme to be developed will be applicable to this NAMA project and will complement existing requirements for Parties to compile quantitative, aggregate national greenhouse gas inventories and national communications. The suggested approach provides assurance at the international level that national actions are indeed MRVable and are resulting in continual improvement in climate performance. Despite our limited resources and

national emissions, the strategies will be most suited to our national emissions profiles and development priorities, and adapting these over time.

The proposed MRV model will have the following characteristics:

- ☛ **Function of the MRV system:** To recognize national actions that are measurable, reportable and verifiable and to encourage continual improvement in climate performance. These functions are distinct from and complementary to the crucial functions of:
  - (i) National greenhouse gas inventories under the UNFCCC (i.e., to compile aggregate data on anthropogenic greenhouse gas emissions and to assess compliance with future quantified emission reduction and limitation obligations) and
  - (ii) Procedures to quantify emission reductions under carbon offset schemes.
- ☛ **Elements of the MRV system:** The approach requires that:
  - (i) the Gambia, like any other Party to the UNFCCC applies the standard guidelines for national climate management systems;
  - (ii) The Gambia, as in this NAMA Project, implements nationally appropriate mitigation actions in the context of climate management systems consistent with current and future COP guidelines,
  - (iii) Independent third parties accredited by the COP and appointed by each Party certify compliance of national climate management systems with the standard guidelines,
  - (iv) The COP acknowledges the certified actions in some form.
- ☛ **Applicability:** The NAMA Project is nationally owned through an extensive national consultation, validation and adoption process and is then posted in the NAMA Registry for access and recognition by all Parties;
- ☛ **Scope:** Through extensive consultations, the proper scope and scale has been determined based on existing policies and programmes, consistent with the UNFCCC, and nationally appropriate actions. The proposed MRV system for this NAMA project will be for supported NAMA.
- ☛ **Relationship to Registries, Schedules, National Communications and Mitigation Commitments:** The proposed MRV system will ensure that national actions are measureable, reportable and verifiable and that they are embedded in a climate management system that demonstrates continual improvement. This MRV approach is consistent with existing requirements, such as national communications.

### **3.4.2: Climate Management System Standard Guidelines**

This proposed nationally appropriate mitigation actions for the Agriculture sector is deemed to be MRVable, as it has been undertaken and developed in an open consultative process and fully adopted as a national document. As outlined above, and drawing on existing national and international management system standards, The Gambia is in the process of developing a Low Carbon Emissions Climate Resilient Development Strategy (LECRDS) and Climate Change

Policy and the implementation of this NAMA will take advantage of such national development frameworks. Through these development frameworks it is envisaged to raise sufficient resources to develop and implement a climate management system; appointing a climate management system team; communicating the importance of climate management; ensuring that climate performance targets are met; including climate considerations in long-term planning; and conducting management reviews. The proposed National Climate Change Policy and LECRDS would articulate a commitment to continual improvement in climate performance, under top management responsibility and will contain plans to develop and maintain a climate profile that documents GHG sources and sinks, evaluate past emissions trends and estimate future trends, as well as identify and prioritize opportunities for improving climate performance. They will establish performance benchmarks; define performance indicators to track progress towards objectives and targets; and define measurable climate objectives, targets and timetables for achievement.

The implementation of this NAMA includes ensuring sufficient human, technological and financial resources with support from developed countries. These provisions typically also provide specific opportunities for improving climate performance such as in the context of designing equipment, systems, processes and facilities; operating and maintaining significant GHG sources/sinks; and/or purchasing of goods, services and energy.

### **3.5: Opportunities offered by mitigating GHG emissions in agriculture sector**

The following opportunities arise from the implementation of this Agriculture NAMA and should be fully taken advantage of:

1. Untapped potential in underground water resources (about 650 Billion cubic metres), particularly in the deeper aquifer that is suitable for expanded crop production and animal watering leading to increased productivity and food security;
2. Availability and utilization of appropriate, cost-effective and climate change friendly irrigation technologies (tidal and drip) for all year round production of crops and livestock.
3. Availability and application of improved sustainable natural resources (e.g., rangelands) management practices to achieve reduced natural resource degradation, improved food security, expanded sources of livelihood and incomes and reduced poverty particularly of communities that depend on these resources; and
4. Availability and applications of appropriate land use and soil management practices to reduce land and soil degradation and depletion.

### **3.6: Potential co-benefits (development, technology transfer, etc.).**

In addition to reducing greenhouse emissions, co-benefits offered by the implementation of this agriculture NAMA include:

1. Availability of developed inland valleys with reduced soil erosion, lowland watershed management schemes and improved upland conservation management initiatives for the production of rice and horticultural crops in a drive towards food and income security;
2. Trained and empowered communities in natural resources management;
3. Improved watershed protection;
4. Improved infrastructure;
5. Enhanced ownership and sustainability.
6. Built and strengthened capacities of Government services in research and technology development, capacities of Extension Services, skills in a range of MOA Departments and Services and capacities of smallholders in improved farm management practices.
7. Emergence of and supported producer associations through technical and organizational strengthening including the provision of support to producer groups in farming practices, post-harvest processing, agribusiness development and market linkages, group organization, networking and information dissemination among many other activities.
8. Improved rangeland resource management and transhumance, and reduced incidences of bush fires and disease epidemics;
9. Availability of feed resources through animal feed gardening, production of forage crops and utilization and preservation of crop residues such as rice stalks and groundnut hay.
10. Strengthened national socio-economic development by providing sources of income, employment (particularly of youth and women), and increased foreign exchange earnings and investment opportunities;
11. Expanded irrigation schemes that produce less greenhouse gases, and the availability of improved agricultural practices and improved technology transfer approaches;
12. Reformed land tenure arrangements to provide more equitable distribution of plots and increased security of holdings;
13. Improved availability of information and data for informed decision making;
14. Increased intake of animal protein and improved health status; and
15. Employment created and incomes increased particularly for youths and women;

## **SECTION 4: ACTIVITIES, INDICATORS, OUTCOMES AND IMPLEMENTATION SCHEDULE**

### **4.1: Activities, Indicators and Outcomes**

As indicated in Section 2 above the main objective of this agriculture NAMA is to reduce national and sectoral greenhouse gas emissions from The Gambia, particularly in the Agriculture sector through the promotion of an integrated crop-livestock system that will translate most of the existing and projected non-greenhouse gas mitigation activities of the sector into mitigation activities and at the same time promote sustainable development, poverty reduction and other co-benefits.

Table 2 below summarizes the specific objectives of this NAMA and presents the activities and estimated costs of conducting the activities. Table 3 gives the expanded activities, outcomes and targets of verification (indicators).

<b>Table 2: Specific objectives, activities and estimated costs</b>		
<b>Specific Objectives</b>	<b>Activities</b>	<b>Cost (US Dollars)</b>
Greenhouse gas abatement through the promotion of the restoration, development and effective management of degraded grazing lands.	<ol style="list-style-type: none"> <li>1. Provide improved pasture seeds and multipurpose trees for the grazing lands;</li> <li>2. Multiply and popularize forage seed planting of multi-purpose plants in grazing areas;</li> <li>3. Assess the availability of, and rehabilitate/establish grazing lands;</li> <li>4. Identify and apply better management practices in re-established grazing lands;</li> <li>5. Provide protection from premature grazing;</li> <li>6. Monitor, develop and manage fire belts around grazing lands;</li> <li>7. Identify, apply and promote appropriate animal feed harvesting, storage, and preservation techniques;</li> <li>8. Rehabilitate and/or establish animal watering facilities in degraded areas;</li> <li>9. Conduct extensive sensitization of livestock producers on improved feed conservation and preservation techniques;</li> <li>10. Train farmers on management of rangelands and on the production and utilization of feed resources;</li> </ol>	3,000,000
Mitigation of GHG Emissions through the promotion of intensive animal husbandry.	<ol style="list-style-type: none"> <li>1. Promote and encourage the adoption of short cycle livestock species;</li> <li>2. Provide support to manage pests and diseases in livestock</li> <li>3. Identify, pilot and adopt new approaches to livestock (particularly indigenous ruminant breeds) production such as genetic improvement in livestock;</li> <li>4. Promote the construction of appropriate housing (compost penning) for livestock and enhance milk production.</li> <li>5. Promote and utilize feed conservation techniques;</li> <li>6. Establish rangeland management committees from existing structures to promote ownership;</li> <li>7. Promote sustainable poultry production and management;</li> <li>8. Conduct composting of poultry manure to reduce emissions of greenhouse gases;</li> <li>9. Provide and conduct training on the utilization of fire-fighting equipment</li> </ol>	2,500,000
Reduction of GHG emissions through Improved crop diversification, promotion of solar and wind	<ol style="list-style-type: none"> <li>1. Reclaim degraded lands for cultivation;</li> <li>2. Construct and manage dykes/spillways, contour bonds, weirs and aprons and concrete footings soil ripping and grading;</li> <li>3. Fortify and stabilize the dykes using cover crop planting (e.g. vetiver grass, shrubs, etc);</li> <li>4. Plough reclaimed sites;</li> <li>5. Cultivate high-yielding, stress tolerant, short cycle crop varieties;</li> </ol>	4,500 000

powered irrigation, and expansion of tidal irrigation;	<ol style="list-style-type: none"> <li>6. Adopt and utilize, where necessary, greenhouse gas emissions-friendly irrigation schemes such as renewable power sources;</li> <li>7. Utilize and promote animal traction and/or light power tillers in place of heavy machines for land preparation to avoid soil disturbances and carbon emissions;</li> <li>8. Develop and utilize integrated pest and disease management strategies;</li> <li>9. Build the capacity of various operators and actors through training and technology support for sustainability;</li> </ol>	
Reduction in GHG emissions by avoiding forest clearing, over exploitation and through promotion of postharvest, processing and preservation technologies;	<ol style="list-style-type: none"> <li>1. Construct and promote drying facilities (plastic or local materials);</li> <li>2. Construct and promote storage facilities (model granaries, raised platforms and hermetic stores) for cereals, and for horticulture and livestock products;</li> <li>3. Provide training on construction and use of infrastructure, packaging and labeling (including branding);</li> <li>4. Sensitize farmers on existing credit lines for the purchase of processing equipment (threshing, de-hulling, milling machines) and packaging;</li> <li>5. Training of beneficiaries on the production and utilization of biogas</li> </ol>	4, 000, 000
To Develop an institutional framework to guide the implementation process.	<ol style="list-style-type: none"> <li>1. Establish the Project Management Unit, the Project Steering Committee and the Technical Advisory Committee for effective management of the project;</li> <li>2. Conduct needs assessment for and strengthen relevant public (MoA and 9 Technical Services, NARI, UTG, DWR, NEA etc) private and civil society institutions' in relation to capacity building and development, including training;</li> <li>3. Conduct training and sensitization of the different stakeholders from the public and private sectors on relevant management and coordination skills</li> <li>4. Sensitize private sector partners on the benefits of greenhouse gas mitigation activities in the agriculture sector and those with high returns to investment;</li> <li>5. Identify the information requirements and set up an effective M&amp;E Framework;</li> <li>6. Conduct baseline surveys against which impacts can be assessed</li> <li>7. Evaluate impacts vis-à-vis baseline benchmarks</li> <li>8. Prepare regular progress and M&amp;E reports based on agreed schedule;</li> <li>9. Prepare and share knowledge management products and lessons learnt on best practices and innovative approaches;</li> <li>10. Establish a data base on agro-processing (processing technologies, various facilities, project documents) and market facilities</li> </ol>	1,000,000
<b>TOTAL</b>		<b>15,000,000</b>

**Table 3: Specific Objectives, Indicators, Activities and Outcomes**

Specific Objectives	INDICATORS	ACTIVITIES	OUTCOMES
<p>Greenhouse gas abatement through the promotion of the restoration, development and effective management of degraded grazing lands.</p>	<p>(a) 2 pasture fields established or rehabilitated in each district of the two regions                      (b) 2 pilot gardens for forage and pasture multiplication established in every district in CRR and URR;                      (c) 2 pilot grazing areas identified in every District in CRR and URR and fire belt established around each;                      (d) 2 animal watering points rehabilitated and/or established in every pilot grazing area identified in CRR and URR;                      (e) 1,500 livestock producers and farmers trained and sensitized in CRR and URR on production, storage, conservation and preservation of feed resources;                      (f) Quantity of greenhouse gas emissions reduced or avoid per gas per activity;</p>	<ol style="list-style-type: none"> <li>1. Provide improved pasture seeds and multi-purpose trees for the grazing lands;</li> <li>2. Assess the availability of, and rehabilitate/establish grazing lands;</li> <li>3. Multiply and popularize forage seed planting of multi-purpose plants in grazing areas;</li> <li>4. Identify and apply better management practices in re-established grazing lands;</li> <li>5. Provide protection from premature grazing;</li> <li>6. Monitor, develop and manage fire belts around grazing lands;</li> <li>7. Identify, apply and promote appropriate animal feed harvesting, storage, and preservation techniques;</li> <li>8. Rehabilitate and/or establish animal watering facilities in degraded areas;</li> <li>9. Conduct extensive sensitization of livestock producers on improved feed conservation and preservation techniques;</li> <li>10. Train farmers on management of rangelands and on the production and utilization of feed resources;</li> </ol>	<p>(i) Pasture seeds and multi-purpose trees available to farmers for re-established grazing lands;                      (ii) Increased access of livestock to feed and water                      (iii) Better management practices (avoidance of premature grazing, development of fire belts and animal feed management) applied;                      (iv) Livestock producers sensitized and trained on feed conservation and preservation of feed resources and on rangeland management;                      (v) Animals have better feed and are more productive;                      (vi) Grazing lands are improved to uptake and serve as sinks of greenhouse gases;                      (vii) Greenhouse gas emissions from animals are reduced due to better feed resources</p>
<p>Mitigation of GHG Emissions through the promotion of intensive animal husbandry.</p>	<p>(a) Number of grazing lands identified in CRR and URR;                      (b) Types and number of short cycle livestock species identified and used in the</p>	<ol style="list-style-type: none"> <li>1. Promote and encourage the adoption of short cycle livestock species;</li> <li>2. Provide support to manage pests and diseases in livestock</li> <li>3. Identify, pilot and adopt new approaches to livestock (particularly indigenous ruminant</li> </ol>	<p>(i) Availability of grazing lands determined;                      (i) Integrated pest and disease management strategies developed and utilized;                      (ii)</p>



	<p>project;</p> <p>(c) Number of livestock that underwent genetic improvement;</p> <p>(d) Number of birds used in the promotion of poultry per District or Region;</p> <p>(e) Quantity of poultry manure composted</p> <p>(f) Quantity of greenhouse gas emissions reduced or avoided per activity;</p> <p>(g) Number and type of fire-fighting equipment procured and supplied;</p> <p>(h) Number of stakeholders trained on the use of fire-fighting equipment;</p>	<p>breeds) production such as genetic improvement in livestock</p> <p>4. Promote the construction of appropriate housing (compost penning) for livestock and enhance milk production.</p> <p>5. Promote and utilize feed conservation techniques;</p> <p>6. Establish rangeland management committees from existing structures to promote ownership;</p> <p>7. Promote sustainable poultry production and management;</p> <p>8. Conduct composting of poultry manure to reduce emissions of greenhouse gases;</p> <p>9. Provide and conduct training on the utilization of fire-fighting equipment</p>	<p>(iii) Increased farmers' access to quality indigenous livestock;</p> <p>(iv) Increased feed utilization through feed conservation techniques</p> <p>(v) Rangeland management committees established from Village/District Development Committees</p> <p>(vi) Sustainable poultry production and management, including composting of manure promoted</p> <p>(vii) Communities and committees provide with and trained on the utilization of fire-fighting equipment</p>
<p>Reduction of GHG emissions through Improved crop diversification, promotion of solar and wind powered irrigation, and expansion of tidal irrigation;</p>	<p>(a) 3,500 ha of land reclaimed, developed and cultivated;</p> <p>(b) 30 Kms of dykes constructed and fortified</p> <p>(c) 1, 500 ha of land put under irrigation;</p> <p>(d) Number of wind and solar powered irrigation schemes established per Region;</p> <p>(e) 4 Model demonstration and training farms established in CRR and URR;</p> <p>(f) 1 Integrated pest and disease management Strategy developed per Region;</p> <p>(g) 1,500 operators and actors trained on identified</p>	<p>1. Reclaim degraded lands for cultivation;</p> <p>2. Construct and manage dykes/spillways, contour bonds, weirs and aprons and concrete footings soil ripping and grading;</p> <p>3. Fortify and stabilize the dykes using cover crop planting (e.g. vetiver grass, shrubs, etc);</p> <p>4. Plough reclaimed sites:</p> <p>5. Cultivate high-yielding, stress tolerant, short cycle crop varieties;</p> <p>6. Adopt and utilize, where necessary, greenhouse gas emissions-friendly irrigation schemes such as renewable power sources;</p> <p>7. Utilize and promote animal traction and/or light power tillers in place of heavy machines for land preparation to avoid soil disturbances and carbon emissions;</p> <p>8. Develop and utilize integrated pest and disease management strategies;</p>	<p>(ii) Degraded lands reclaimed, ploughed and cultivated;</p> <p>(iii) Appropriate structures constructed and fortified using cover crop planting</p> <p>(iv) High yielding and short cycle crop varieties are cultivated;</p> <p>(v) Greenhouse gas friendly and renewable energy powered irrigation schemes adopted and utilized;</p> <p>(vi) Use of animal traction and light machines for land preparation utilized and promoted;</p> <p>(vii) Integrated pest and disease management</p>

	technologies;	9. Build the capacity of various operators and actors through training and technology support for sustainability;	strategies developed and utilized; (viii) Capacity of operators and actors built through training and technology support;
Reduction in GHG emissions by avoiding forest clearing, over exploitation and through promotion of postharvest, processing and preservation technologies;	(a) 1 drying facility constructed in every District in CRR and URR; (b) 1 storage facility constructed in every District in CRR and URR; (c) 5 Farmers per District in CRR and URR have access to credit facilities for processing equipment; (d) Number of processing equipment (threshing, dehulling, milling, packaging etc) procured and utilized; (e) 2 farmer groups in every District of CRR and URR developed and strengthened;	1. Construct and promote drying facilities (plastic or local materials); 2. Construct and promote storage facilities (model granaries, raised platforms and hermetic stores) for cereals, and for horticulture and livestock products; 3. Provide training on construction and use of infrastructure, packaging and labeling (including branding); 4. Sensitize farmers on existing credit lines for the purchase of processing equipment (threshing, de-hulling, milling machines) and packaging; 6. Training of beneficiaries on the production and utilization of biogas	(i) Drying and storage facilities constructed for cereal, horticulture and livestock products; (ii) Capacity of farmers built through training and sensitization on construction and use infrastructure, packaging, labeling and branding; (iii) Farmers have access to credit lines and purchased processing equipment
To Develop an institutional framework to guide the implementation process.	(a) Number of Reports (meeting, progress, workshops, etc) generated and distributed by the PMU; (b) Needs assessment reports (c) Report on capacity building (training and sensitization) of various stakeholders; (d) Number and category of	1. Establish the Project Management Unit, the Project Steering Committee and the Technical Advisory Committee for effective management of the project; 2. Conduct needs assessment for and strengthen relevant public (MoA and 9 Technical Services, NARI, UTG, DWR, NEA etc) private and civil society institutions' in relation to capacity building and development, including training;	(i) Appropriate institutional framework and structures (PMU, PSC, TAC) for project management set-up and operational; (ii) Capacity needs of stakeholders assessed; (iii) Required training and sensitization to build capacities (management and

	<p>private sector partners trained on benefits of investing in greenhouse gas mitigation actions;</p> <p>(e) A well developed and operational monitoring and evaluation framework of the project;</p> <p>(f) Monitoring, reporting and verification (MRV) frameworks for project activities and support provided;</p> <p>(g) A operation data base on agro-processing and market facilities;</p>	<ol style="list-style-type: none"> <li>3. Conduct training and sensitization of the different stakeholders from the public and private sectors on relevant management and coordination skills</li> <li>4. Sensitize private sector partners on the benefits of greenhouse gas mitigation activities in the agriculture sector and those with high returns to investment;</li> <li>5. Identify the information requirements and set up an effective M&amp;E Framework;</li> <li>6. Conduct baseline surveys against which impacts can be assessed</li> <li>7. Evaluate impacts vis-à-vis baseline benchmarks</li> <li>8. Prepare regular progress and M&amp;E reports based on agreed schedule;</li> <li>9. Prepare and share knowledge management products and lessons learnt on best practices and innovative approaches;</li> <li>10. Establish a data base on agro-processing (processing technologies, various facilities, project documents) and market facilities</li> </ol>	<p>coordination skills) of stakeholders conducted;</p> <p>(iv) Private sector sensitized on benefits of investments in greenhouse gas mitigation activities;</p> <p>(v) An effective Monitoring and Evaluation Framework is developed and operational;</p> <p>(vi) A data base on agro-processing and access to market facilities is established;</p> <p>(vii) Reports project status and progress reports are prepared and shared regularly</p>
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## **4.2: Barriers and their removal**

This Agriculture NAMA is designed to enhance efforts to reduce emissions of greenhouse gases from the agriculture sector, effectively meet the policy goals expressed in the PAGE, the ANR Policy and the GNIAP and its investment plan, and promote sustainable national development. During the stakeholder workshop and consultations on the full development of this NAMA, participants identified the following barriers to implementing the actions and evaluated how difficult or easy it will be to overcome these barriers during implementation.

- a. Lack of clarity and pledges in the future funding of the NAMAs from developed countries;
- b. None or inadequate availability of the enablers (finance, capacity building and technologies) identified and needed for the implementation of the NAMA;
- c. Delay in the operationalization of the Green Climate Fund, the proposed “new market-based mechanisms” and the finalization of the rules and procedures related to the monitoring, reporting and verification of actions and support provided for the implementation of the NAMAs;
- d. Inadequate institutional and policy frameworks at the national for in-country NAMA implementation;
- e. None involvement of the most important stakeholders (local communities, women, youths and local leaders) in the process from the start; and
- f. Inadequate infrastructure, high labour cost, inadequate farmer knowledge base, limited access to microfinance, credit facilities and information;

These barriers must be lifted through:

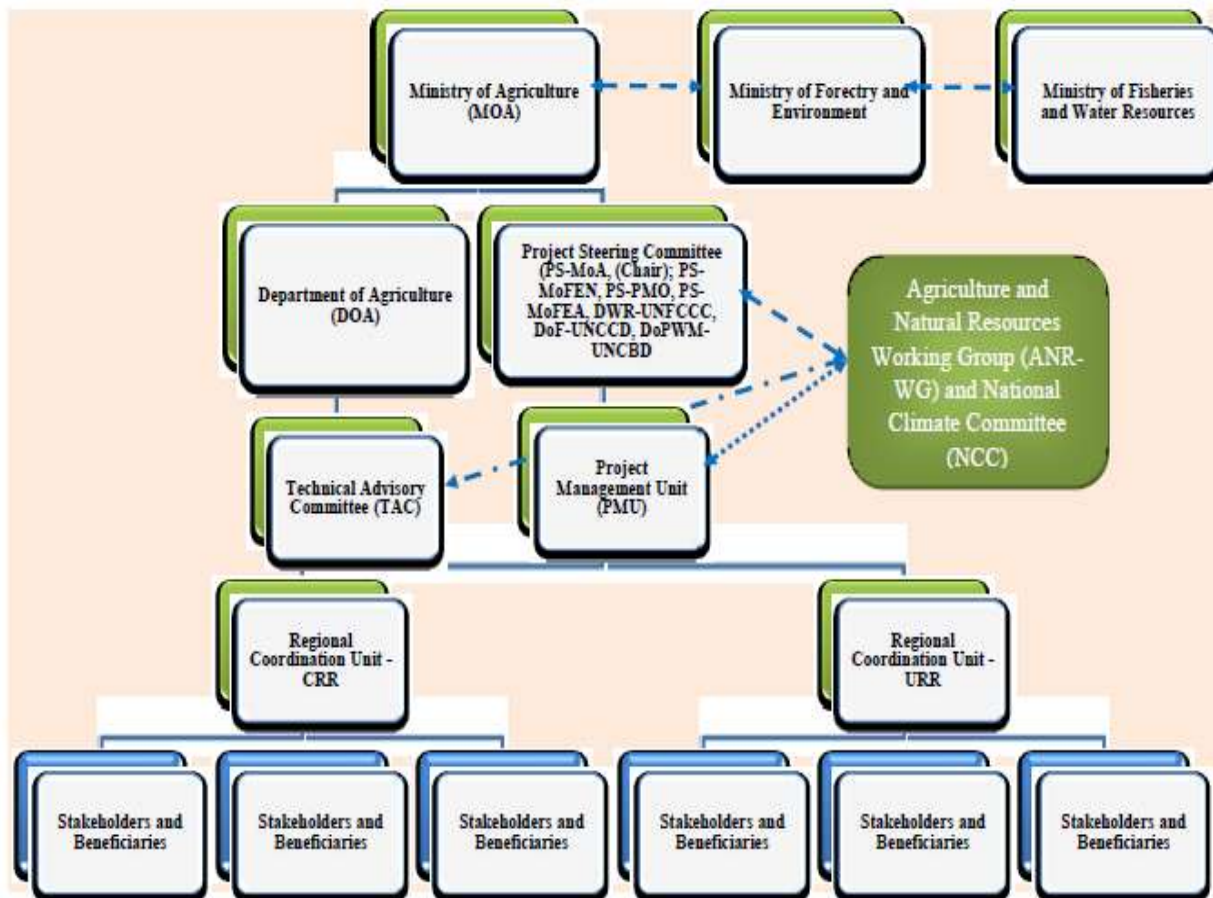
1. The construction of required infrastructure, adequate storage facilities and good transport and communication networks;
2. Resource mobilization from development partners for provision of funds and adequate finance;
3. Creation and institutionalization of enabling (capacity building and technology acquisition and transfer) environment, and credit and microfinance facilities;
4. Design and implementation of training programmes for farmers and other stakeholders on processing and storage techniques, technical knowledge and provision of technology and grazing and grassland restoration processes;
5. Development of appropriate policy and strategies;
6. Provision of support for small scale schemes; and
7. Strengthening of the Gambia livestock multipliers association

## **SECTION 5: IMPLEMENTATION**

### **5.1: Implementation Strategy and Institutional Framework**

This NAMA project will be implemented through inclusiveness at its highest. Figure 3 shows the proposed organigram for the management of the project. The Ministry of Agriculture (MoA) will

be the Government Executing Agency and the Department of Agriculture (DoA) will be the National Implementing Agency. A **Project Steering Committee (PSC)** will be established, chaired by the Permanent Secretary responsible of technical issues and projects and will be composed of the Permanent Secretary, Ministry of Forestry and the Environment; the Permanent Secretary, Personnel Management Office; the Permanent Secretary, Ministry of Finance and Economic Affairs; the Director General, Department of Agriculture; the Director, Department of Water Resources and UNFCCC Focal Point; the Director, Department of Forestry and UNCCD Focal Point; the Director, Department of Parks and Wildlife Management and UNCBD Focal Point; the Executive Director, National Environment Agency; the Executive Director, Women’s Bureau and the Executive Director, The Association of NGOs (TANGO) and the **National Project Coordinator (NPC)**. The NPC will serve as Secretary to the PSC. The PSC will work very closely and support the **Agriculture and Natural Resources (ANR) Working Group**, a policy level working group responsible for the supervision and monitoring of implementation of activities in the Agriculture (Agriculture and its 9 Service Units) and Natural Resources (Environment, Fisheries, Forestry, Water Resources and Wildlife) sectors.



**Figure 3: Organigram of the Management of the NAMA Project.**

At the technical level, a **Technical Advisory Committee (TAC)** will be constituted, chaired by the Department of Agriculture (DOA) and will be appropriately constituted from the **National**

**Climate Committee (NCC)** at project inception. The TAC will be responsible for the technical implementation of the project. For ease of reporting, the NPC will also serve as Secretary to the TAC. The TAC will report to the PSC and to the National Climate Committee (NCC) through the NPC. The Director of the Department of Water Resources (DWR) and UNFCCC Focal Point will work closely with DOA in the coordination and implementation of the project.

**A Project Management Unit (PMU)** will be established under the DOA and **Regional Coordination Units (RCUs)** will be established, one each in CRR and URR. Staff of the PMU and the RCUs will be recruited by the PSC with the full involvement of the Director General of DOA and the Regional Directors in CRR and URR. Table 4 below shows the institutions that will be responsible for the implementation of specific objectives of the project.

<b>Specific Objective</b>	<b>Responsible Institutions</b>
1. Greenhouse gas abatement through the promotion of the restoration, development and effective management of degraded grazing lands.	DOA, AHPS, DWR, DCD, NGO's, MOLGL, NEA, NARI
2. Mitigation of GHG Emissions through the promotion of intensive animal husbandry.	DOA, AHPS, DCD, NGO's, ITC, NARI
3. Reduction of GHG emissions through Improved crop diversification, promotion of solar and wind powered irrigation, and expansion of tidal irrigation;	DOA, DWR, MOE, SWMS, NARI
4. Reduction in GHG emissions by avoiding forest clearing, over exploitation and through promotion of postharvest, processing and preservation technologies;	DOA, DOF, AHPS, DCD, MOWCI, NEA
5. To develop an institutional framework to guide the implementation process.	DOA, DWR, NEA, MOFEN, ANR-WG, DCD, AHPS
Other stakeholders include but not limited to MOBSE, NaNA, MOH&SW, UTG, Food Security WG, NARI, GCCI, GIEPA, GHE, GGC, GLMA, National Veterinary Council, ITC, VISACA's, NACCUG, TANGO, Concern Universal, Action Aid, IFAD, AfDB, FAO, EU, WB, WFP, UNICEF, AGRHYMET/CILSS.	

## 5.2: Implementation Schedule and Plan

Table 5 shows the implementation schedule and plan which will be elaborated during the inception and set-up of the project. Implementation will be for seven (7) years.

<b>Project Phase</b>	<b>Implementation timeframe</b>	<b>Main Activity</b>	<b>Sub activity</b>
Phase 1	First half of Year 1	Project Set up	Recruitment of Project Staff
			Acquisition of project office space
			Procurement of equipment
			Development of Work plans
Phase 2	Years 1 – 7	Project inception and implementation	Project Implementation
			Midterm review after 2 ½ years
Phase 3	Last Half of Year 7	Project Completion	Project Ends
			Final Evaluation of project

### 5.3: Risk and Uncertainties

Table 6 shows the risks and uncertainties that may affect the implementation of the project and proposed actions to lift them. For successful implementation of the project all or the greater number of these risks and uncertainties should be lifted through the recommended actions.

<b>Table 6: Risks and Uncertainties related to project implementation and strategies to lift them</b>	
<b>Risks and Uncertainties</b>	<b>Strategies to remove risks and uncertainties</b>
1) Inadequate compliance with and implementation of the decentralization policies of The Gambia;	Ensure most of the management of the project is conducted at the administrative region for empowerment and devolution of responsibility to the administrative regions and grass root level communities
2) Inadequate technical and managerial capacity in the regions to effectively implement programme activities at the District, Regional and project management levels;	Ensure capacity building at regional and district levels particularly of agricultural service providers and the leadership of farmers associations; strengthening of the Gambia livestock multipliers Association
3) Adverse climatic variability and longer-term changes such as poor rainfall, which will affect groundwater recharge and availability of water for irrigation;	Promote irrigation practices and planning among beneficiaries and strengthen the early warning systems. Awareness raising and promote climate resilience activities
4) Limitations in establishing active linkages with viable market outlets - minimizing agribusiness development and expansion	Actively undertake market analyses for domestic and regional outlets, promote smallholder trade fairs and create and facilitate expedited access to microfinance and credit facilities
5) Political interference, mismanagement of project assets and deviations in use of funds	Recruit proven, experienced Project Management; establish regular debriefing, monitoring and systematic reporting between PMU and Steering Committee; develop clear implementation procedures and regulations
6) Fragmented donor coordination in Agriculture sector	Ensure periodic round table consultations and provide update to donors to ensure support for the GNAIP
7) Poor infrastructure, inadequate technology and technical knowledge on operation and maintenance of infrastructure and technologies and high labour cost;	Construct adequate infrastructure relevant to project implementation such as storage and processing facilities. Train farmers and other relevant stakeholders on storage, processing and preservation techniques and management of technologies
8) Inadequate access to information and skills	Enabling environment and Provide training programmes
9) Inadequate finance, non-availability of microfinance, inadequate access to credit facilities	Creation of microfinance facilities and reduce interest rates for farmers and livestock breeders
10) Absence of and/or bias on enabling policy on land tenure; ambiguity on land tenure ship and ownership	Review the Land Policy to enable clear land tenureship and to facilitate access to land by women and the landless
11) Inadequate draught animals and equipment;	Encourage and provide draught animals and other land preparation equipment
12) Inadequate provision of capacity building, technology and finance;	Develop Resource Mobilization Strategy and conduct aggressive and extensive resource mobilization from Government, private sector and development partners
13) Limited greenhouse gas emissions reduction levels from some of the project activities;	

## **SECTION 6: REQUIRED ENABLING SUPPORT**

The Durban outcome invited developed countries, entity or entities entrusted with the financial mechanism, including the GEF and GCF, multilateral, bilateral and other public donors, private and NGOs to submit information on financial, technological and capacity building support including:

- Whether support is for preparation and/or implementation of NAMA;
- Source of support and executing entity;
- Amount and type of support available: financial (grant or facilitated loan); technological or Capacity Building;
- Status of delivery; and
- Types of actions that may be supported and the process.

### **6.1: Enabling Capacity Building:**

This Agriculture NAMA requires technical and institutional capacity building for implementation. Specifically, it will be required to build the capacity of the Technical Team on analysis of the incremental costs of investments required to support implementation, over the period 2013-2030. The Team will also benefit from analysis to project national and sectoral greenhouse gas emission for the same period.

### **6.2: Enabling Finance**

Section 8 below gives an indicative cost of implementing the Gambia Agriculture NAMA. However, financing the implementation is crucial and critical prerequisite of the NAMA.

### **6.3: Enabling Technologies**

Implementation of the various activities identified under this NAMA will involve the acquisition and installation of technologies.

These will include Solar Photovoltaic Technology that is used to provide electricity supplies of various forms and uses in remote areas, where there is no main grid or it is difficult or impossible to use any other source of power supply. The systems are mounted on galvanized steel structures or trailers engineered to withstand harsh environments and high wind loads. The PV systems will be useful as alternatives to fossil fuel powered generators for lifting water from the River Gambia and from water points (wells and boreholes) for irrigation of crops. A lot of greenhouse gas emissions will be saved and due to reduced operation and maintenance cost, the system will be cheaper for the farmers in the long term.

Wind energy is found to be cheaper than any other new electric generation except natural gas which emits one pound of greenhouse gases for every kilowatt-hour of electricity it generates. Wind power is now the world's fastest growing energy source and has also become one of the most rapidly expanding industries. Experience shows that switching from fossil fuel to wind generators is feasible in CRR and URR. Wind has been used in these areas for pumping water



from water points such as wells. The economics of a wind system are very sensitive to the average wind speed in the area, and to a lesser extent, the cost of purchasing electricity. Wind turbines produce no pollution and by using wind power, greenhouse gases will be offset that would have been generated by fossil powered generators.

Postharvest technologies are used to cool, clean, sort and pack crop products. Various methods of high-speed cooling, and sophisticated refrigerated and atmosphere-controlled environments, are employed to prolong freshness, particularly in large-scale operations.

Food processing is the set of methods and techniques used to transform raw ingredients into food or to transform food into other forms for consumption by humans or animals either in the home or by the food processing industry. Food processing typically takes clean, harvested crops or slaughtered and butchered animal products and uses these to produce attractive, marketable and often long shelf-life food products. Similar processes are used to produce animal feed. Food processing technology includes a processing line used to produce fruit and vegetable chips from variety of fresh fruits and vegetables by low-temperature vacuum frying. The Fruit Juice Extractor is one food processing technology suitable for extracting juice from grape, tomato, fruits and vegetables.

Food preservation is the process of treating and handling food to stop or greatly slow down spoilage (loss of quality, edibility or nutritive value) caused or accelerated by micro-organisms. Some preservation methods, such as drying, allow food to be stored without any special containment for long periods. Common methods of applying these processes include drying, freezing, vacuum-packing and canning. Drying, using a Process Dryer, is the normal means of preservation for fish, meat and cereal grains such as maize, rice, millet and groundnuts.

Post harvest and food processing and preservation technologies are meant to reduce spoilage and thus lead to increased food availability. Consequently, less land will be needed for agricultural production that would otherwise be kept as forest and greenhouse gas sinks.

#### **6.4: MRV (Measuring, Reporting and Verification) of Support**

To measure, report and verify the support (capacity, technology and finance) provided by developed to developing country such as The Gambia requires setting up a mechanism, including guidelines, for the measurement, reporting and verification of the support. The objective of these guidelines is to address the need for accurate accounting of the provision of funds from developed country parties to developing country parties in order to assess compliance with finance obligations for mitigation, adaptation, technology transfer and capacity building with a view to ensure robustness and transparency of the Financial Mechanism of the Convention;

The Framework for the measurement, reporting and verification (MRV) of climate change, particularly for mitigation, shall comprise the following:

- a. Measurement shall address those funds exclusively aimed at enabling and supporting enhanced action on mitigation, technology development and transfer, report drafting, and capacity-building for non-Annex I parties, from public, private, bilateral, multilateral and alternative sources. With regards to funds provided for multiple purposes, only the share provided solely for mitigation under NAMAs shall be counted towards NAMA finance. Mobilization of funds through leverage and/or official development aid shall be considered supplementary and will not be counted as a part of NAMA finance. Mobilization of funds in developed countries for administrative purposes indirectly related to the provision of climate change funds towards developing countries will not be considered climate finance.
- b. Reporting includes the establishment of a Financial Support Registry, universally accessible in character, in order to ensure inclusiveness and transparency to all Parties. The origin, intermediaries and characteristics of funds, including funds from private, public, bilateral, multilateral and alternative sources, technology transfer and capacity building, shall be reported by parties to the COP through Annex I national communications, additional information submitted from developed and developing countries, including through their national communications, annual reports of operating entities of the financial mechanism, and others. Reporting of NAMA-related support must follow a common, internationally-agreed format, approved by the COP in order to allow for comparability, assessment and analysis by the Green Climate Fund Board and by all non-Annex I and Annex I parties. The format must include information on funded actions, amount effectively disbursed against obligations under the Convention, amount of new and additional funds, sector, financial channels, time frame and instruments (including grants, concessional loans, capital and others).
- c. Verification of the source and character of funds shall allow for traceability on the part of non-Annex I parties. Developing country parties that receive funding shall be able to certify the funds received and report on the effective use of funds.

## **SECTION 7: MONITORING AND EVALUATION FRAMEWORK**

Monitoring and Evaluation is a general term that is used to describe the process of assessment mechanisms that facilitate the measurement of the impact of the activities of a development project, programme or policy on the target group and assess whether the indicators are actually met. Monitoring is the regular collection, analysis and dissemination of information and data on the progress of the activities and programmes implemented while evaluation and impact assessment work at a deeper level. Evaluation and impact assessment are two slightly different processes. Evaluation establishes whether the positive outcomes planned by the project have been achieved but impact assessment looks at the positive and negative impact of the project. Monitoring and evaluation are necessary as mid-term, annual and end-of-project completion reports provide scanty information. Information generated from monitoring and evaluation regarding problems encountered and solutions developed are useful to generate lessons learnt for continuation of the project and for other similar projects and programmes under consideration and preparation. Monitoring and evaluation mechanisms can be applied at various levels. They

can be used to monitor projects at field level, programmes both at field and at institutional levels, and policies at institutional and governmental level.

### **7.1: Activities and outcomes subject to M&E**

Each of the NAMAs has identified and presented a very brief implementation plan and information on monitoring and evaluation. The implementation plan identified the Lead institution for the implementation of the NAMA, the executing agency and partners. Partners to be involved in the national and international monitoring and evaluation of project activities have also been identified. Detailed work plans with appropriate costing, schedule of deliverables, achievement indicators and roles and responsibilities of partners will be developed.

### **7.2: Key indicators**

The scope of the Monitoring and Evaluation (M&E) Framework includes monitoring of implementation (resources, activities and indicators), results (outputs, outcomes/effects and impacts) and context and/or risks to allow appropriate measures to be taken to limit negative effects on performance. In order for indicators to be effective, the objectives, outcomes and outputs of the activity, project, or programme against which results are measured must be clear, explicit, feasible, verifiable and realistically timed. Indicators must be closely related to objectives. Four groups of indicators are proposed for use in the measurement of the success of the project. These are:

- i. **Coverage:** the extent to which the project and its activities reach vulnerable stakeholders (individuals, households, businesses, civil society, government agencies, policymakers)
- ii. **Impact:** the extent to which the project activities reduce greenhouse gas emissions, enhance mitigation capacity and promote sustainable development (poverty reduction, food and nutrition security, capacity development and enhancement, etc);
- iii. **Sustainability:** the ability of stakeholders to continue the project activities beyond project lifetimes; and
- iv. **Replicability:** the extent to which projects generate and disseminate results and lessons of value in other national, regional and international activities, projects and programmes.

The monitoring is based on objectively verifiable indicators (OVIs) that include:

- i. Actual quantity of greenhouse gas emissions per gas per activity;
- ii. Amount of land and infrastructure reclaimed, developed and cultivated by the targeted beneficiaries;
- iii. Type of irrigation technologies acquired and installed;
- iv. Amount of land put under irrigation;
- v. Percentage increase in productivity of rice and other short cycle crops;
- vi. Number of small scale farmers and producers accessing credit to purchase postharvest processing equipment;
- vii. Percentage of households with improved levels of food and nutritional security;
- viii. Percentage of households with increased income;
- ix. Percentage increase in marketed agricultural products;

### **7.3: Responsible entity**

The M&E Framework and Plan are project based. The Department of Agriculture will implement this Project. The Ministry of Agriculture will serve as the Executing Agency. The UNFCCC Focal Point will closely collaborate with these institutions. A Project Steering Committee (PSC) shall be constituted and chaired by the Ministry of Agriculture. The Project Steering Committee (PSC) shall have the overall oversight and coordination role and shall review annual work-plans and budgets, progress and quality of project implementation and results on quarterly basis. A Technical Advisory Committee shall be established and shall work under the PSC and will be responsible for ensuring the comprehensiveness, efficiency and effectiveness of the overall project. A Project Management Unit will be set up at the Ministry of Agriculture and will be responsible for coordinating the implementation of project activities. The PMU will be headed by a National Project Coordinator and will be assisted by some support staff.

### **7.4: Reporting Schedule**

The National Project Coordinator will submit quarterly progress and financial reports to the National Climate Committee and the Project Steering Committee. The UNFCCC Focal Point will report to the ANR Working Group on a quarterly basis and/or as and when requested. The National Project Coordinator will submit to the Donor, bi-annual and annual reports as agreed. Financial Audit will be organized based on the agreed terms with the Donor.

## **SECTION 8: ECONOMIC VIABILITY**

### **8.1: Assessment of the costs and benefits**

The cost of implementation of this Agricultural NAMA of The Gambia is estimated at US\$ 15 million. The costs and benefits of this project have been assessed through extensive stakeholder consultations especially with experts from the Agriculture sector. Throughout the process of development of the project proposal, relevance, effectiveness and efficiency were key in the decisions as the project must meet environmental integrity through GHG emission reduction; equally meet the needs of the intended beneficiaries; be consistent with Gambia's sustainable development policies and programmes and that input resources are utilized effectively. Resultant impacts must be higher than cost of input resources and that the long-term and ripple effects brought by the implementation of a project far outweigh the negative effects and the environment for the continuation and replication of the achievements of the project after its completion are assured. In the design and implementation of the project, capacity building and technology acquisition, diffusion and knowledge transfer were considered in the broader picture of actions.

### **8.2: Proposal for financing arrangements.**

This full and final NAMA project for the Agriculture sector of The Gambia will be uploaded on to the NAMA Registry of the UNFCCC website. Interested donors (bilateral and multilateral)

will pick the project document for financing which may involve further formatting and development to the satisfaction of both the proponent (The Gambia) and the financier (Donor). Both donor and proponent shall strictly adhere to the UNFCCC COP decisions, procedures and guidelines for supporting and implementation of “Supported NAMAs” from a Least Developed Country.

## **9: REFERENCES**

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AfDB, THE GAMBIA: COUNTRY GENDER PROFILE, Quality Assurance and Results Department -Gender and Social Development Monitoring Division, October 2011

DOS, 1980; Department of Surveys Report

GoTG/GNAIP, 2011: Gambia National Agricultural Investment Plan, 2012 – 2015;

UNFCCC (2008) *Decision 1/CP.13 Bali Action Plan*, FCCC/CP/2007/6/Add.1\*, March 2008, available at <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3>

UNFCCC (2009) *Non-paper 51: Nationally appropriate mitigation actions by developing country Parties*, Contact group on enhanced action on mitigation and its associated means of implementation, November 2009, [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf)

UNGA, 2000: The outcome of the Twenty-third Special Session of the UN General Assembly

US EPA, 2011: Global Anthropogenic Non-CO2 Greenhouse Gas Emissions: 1990 – 2030, Appendices to the Report, EPA 430-D-11-003

## Annex I: NAMA information that can be submitted to the UNFCCC

<b>A. General Information</b>	
A1: Party	Government of The Gambia (GoTG)
A2: Title of the Mitigation Action	Mitigating Greenhouse Gas Emissions and Concentrations in the Atmosphere through the Strengthening and Promotion of an Integrated Crop-Livestock System in The Gambia
A3: Sector	Agriculture
A4: Technologies	Solar photovoltaic and wind power irrigation technologies; Postharvest technologies, Food storage, processing and preservation technologies
A5: Type of actions	National / sectoral project
A6: Description of the Mitigation actions	The Gambia Agriculture NAMA is to mitigate greenhouse gas emissions from The Gambia, particularly the contribution of the agriculture sector, and lower the cumulative build-up of greenhouse gases in the atmosphere
<b>B. National implementing entity &amp; stakeholders</b>	
B1: Nama coordinators (Name, address, phone and email)	<ul style="list-style-type: none"> <li>Mr. Abdoulie Danso, Deputy Permanent Secretary, Ministry of Agriculture, The Quadrangle, Banjul, The Gambia: Phone +220-990-2233; e-mail:</li> <li>Pa Ousman Jarju, Director and UNFCCC Focal Point, Department of Water Resources, 7 Marina Parade, Banjul, The Gambia: Phone: +220-422-7631; +220-982-9004; e-mail: pajarju@yahoo.co.uk</li> </ul>
B2: Relevant stakeholders	<ul style="list-style-type: none"> <li>The Ministry of Agriculture</li> <li>The Ministry of Fisheries and Water Resources</li> <li>The Ministry of Environment and Parks and Wildlife</li> <li>The University of The Gambia</li> <li>Women's Bureau</li> <li>The Association of Non-Governmental Organizations (TANGO)</li> </ul>
<b>C. Expected timeframe for implementation</b>	
C1: Expected start year	2014
C2: Number of years for completion	7 years
<b>D. Cost of the preparation of the Nama</b>	
D1: Used currency	USD
D2: Cost of preparation of the NAMA	USD 50,000
D3: Estimated full cost of implementation	USD 15 Million
D4: Estimated incremental cost of implementation	To be detailed during the preparation phase
<b>E. Support required</b>	
E1: Amount of financial support	USD 15 Million + co-financing
E2: Type of financial support	Grant + co-financing
E3: Amount of technology support	To be determined at the onset of implementation
E4: Type of technology support	Procurement of solar photovoltaic and wind power irrigation technologies; postharvest technologies, food storage, processing and preservation technologies
E5: Amount of required capacity building	USD5.9 Million

<p>E6: Type of capacity building support</p>	<ul style="list-style-type: none"> <li>• Provision of improved pasture seeds and multipurpose trees for the grazing lands;</li> <li>• Multiplication and popularization of forage seed planting of multi-purpose plants in grazing areas;</li> <li>• Promotion of appropriate animal feed harvesting, storage, and preservation techniques;</li> <li>• Rehabilitation and/or establishment of animal watering facilities in degraded areas;</li> <li>• Extensive sensitization of livestock producers on improved feed conservation and preservation techniques;</li> <li>• Training of farmers on management of rangelands and on the production and utilization of feed resources;</li> <li>• Promotion of the adoption of short cycle livestock species;</li> <li>• Provision of support to manage pests and diseases in livestock</li> <li>• Piloting new approaches to livestock (particularly indigenous ruminant breeds) production such as genetic improvement in livestock</li> <li>• Promotion of the construction of appropriate housing (compost penning) for livestock and enhance milk production.</li> <li>• Promote and utilize feed conservation techniques;</li> <li>• Establishment of rangeland management committees from existing structures to promote ownership;</li> <li>• Promotion of sustainable poultry production and management;</li> <li>• Training on composting of poultry manure to reduce emissions of greenhouse gases;</li> <li>• Training on the utilization of fire-fighting equipment</li> <li>• Construction and manage dykes/spillways, contour bonds, weirs and aprons and concrete footings soil ripping and grading;</li> <li>• Training on the utilization of greenhouse gas emissions-friendly irrigation schemes;</li> <li>• Promotion of animal traction and/or light power tillers;</li> <li>• Training on utilization of integrated pest and disease management strategies;</li> <li>• Training of various operators on technology support for sustainability;</li> <li>• Promotion of the drying facilities (plastic or local materials);</li> <li>• Promotion of storage facilities (model granaries, raised platforms and hermetic stores) for cereals, and for horticulture and livestock products;</li> <li>• Training on construction and use of infrastructure, packaging and labeling (including branding);</li> <li>• Sensitization of farmers on existing credit lines for the purchase of processing equipment (threshing, de-hulling, milling machines) and packaging;</li> <li>• Training of beneficiaries on the production and utilization of biogas</li> <li>• Establishment of the Project Management Unit, the Project Steering Committee and the Technical Advisory Committee for effective management of the project;</li> <li>• Training and sensitization of the different stakeholders from the public and private sectors on relevant management and coordination skills</li> </ul>
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	<ul style="list-style-type: none"> <li>• Sensitization of the private sector partners on the benefits of greenhouse gas mitigation activities in the agriculture sector and those with high returns to investment;</li> <li>• Establishment and operation of a data base on agro-processing (processing technologies, various facilities, project documents) and market facilities</li> </ul>
<b>G. Estimated emissions reductions</b>	
G1: Average emission	0.94 MtCO <sub>2</sub> eq
G2: Estimated emission reduction	A reduction of about 33% through the implementation of this project
<b>H. Other relevant information</b>	
H1: Indicators for implementation	<ul style="list-style-type: none"> <li>• Actual quantity of greenhouse gas emissions per gas per activity;</li> <li>• Amount of land and infrastructure reclaimed, developed and cultivated by the targeted beneficiaries;</li> <li>• Type of irrigation technologies acquired and installed;</li> <li>• Amount of land put under irrigation;</li> <li>• Percentage increase in productivity of rice and other short cycle crops;</li> <li>• Number of small scale farmers and producers accessing credit to purchase postharvest processing equipment;</li> <li>• Percentage of households with improved levels of food and nutritional security;</li> <li>• Percentage of households with increased income;</li> <li>• Percentage increase in marketed agricultural products</li> </ul>
H2: Benefits for local sustainable development	Job creation; food security; increase of income; improve the agricultural GDP; reduce poverty; decreased pollution and GHG emission; etc.

## ANNEX II:

### Final Agreed List of NAMAs for The Gambia:

1. *Develop a Low Carbon Development Strategy (LCDS) of The Gambia;*
2. *Increase energy production from renewable sources (Solar & wind)*
3. *Promote the use of energy-efficient cooking stoves*
4. *Reduce energy consumption by reducing transmission and distribution system losses to 15% by 2030*
5. *Improve storage facilities and promote the use of post-harvest technologies*
6. *Restore degraded grazing land through the multiplication and popularization of forage seed planting of multipurpose seed in grazing areas*
7. *Promote and integrated crop-livestock system by planting nitrogen fixing crops and encourage spot and zero burning practices*
8. *Promote the cultivation of high-yielding rice*
9. *Restore and rehabilitate degraded forest lands, protect and conserve wetlands, and develop greenbelts around human settlements, national forests, wildlife parks and protected areas through afforestation and reforestation activities.*
10. *Integrated Management of urban and peri-urban solid and liquid Waste*



### Annex III: List of persons and institutions involved in this process

#### Participants in the Workshop on the development of Nationally Appropriate Mitigation Actions (NAMA) proposal in Agricultural Sector of The Gambia Paradise Suites Hotel, January 8 & 9, 2013

No	Name	Institution	PHONE	EMAIL ADDRESSES
1	Bakary E Kujabi	Ministry of Works	9829591	<a href="mailto:bkanteh7@yahoo.com">bkanteh7@yahoo.com</a>
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3	Lamin Saine	Animal Health Prod. Service	7364327	<a href="mailto:lgsaine60@yahoo.com">lgsaine60@yahoo.com</a>
4	Baboucarr Mbye	Stay Green Foundation/NBR	9946991	
5	Ebrerre Gomez	Gambia Radio Service	6331756	
6	Abdou Sonko	Gambia Radio Service	3174209	
7	Bubacarr Jallow	Min. Forestry & Environment	3653113	
8	Hudul E.N Colley	NDMA	9361683	<a href="mailto:hudulcolley@yahoo.com">hudulcolley@yahoo.com</a>
9	Amie Jallow Jatta	FAO	9927798	
10	Abdoulie Danso*	Ministry of Agriculture	9902233	<a href="mailto:adanso57@yahoo.com">adanso57@yahoo.com</a>
11	Joko Kutubo E Sanyang	NARI	9957429	<a href="mailto:mansanyang@yahoo.com">mansanyang@yahoo.com</a>
12	Pa Ousman Jarju	DWR	9829004	<a href="mailto:pajarju@yahoo.co.uk">pajarju@yahoo.co.uk</a>
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14	Etheine Sylva	Gambia Television Service (GRTS)	3553458	
15	Momodou Kanyi	Min of Fisheries & Water Resources	7731020	<a href="mailto:Kanyimomodou@yahoo.com">Kanyimomodou@yahoo.com</a>
16	Kebba Camara	Gambia Television Service (GRTS)	3655654	
17	Saikou Jarju	Gambia Television Service (GRTS)	7018413	
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