



**Government of The Gambia  
Ministry of Environment, Climate Change and  
Natural Resources**

**THE GAMBIA'S LONG-TERM  
CLIMATE-NEUTRAL DEVELOPMENT STRATEGY 2050**



**2022**



**Bakau, Kanifing Municipality (2022)**

The Gambia's Long-Term Climate-Neutral Development Strategy 2050 was developed under the guidance of the Ministry of Environment, Climate Change and Natural Resources with support from the 2050 Pathways Platform.

© Copyright 2022. Ministry of Environment, Climate Change and Natural Resources, Government of the Republic of The Gambia.

Satellite Map of The Gambia on the cover page culled from: <https://gisgeography.com/gambia-map/>



Despite contributing less than 0.01% to global greenhouse gas emissions, The Gambia - particularly its historic capital city Banjul, is identified globally as being one of the countries most vulnerable to the effects of climate change. Indeed the Office of the United Nations High Commissioner for Human Rights officially recognized that “Climate change threatens the effective enjoyment of a range of human rights including those to life, water and sanitation, food, health, housing, self-determination, culture and development.”

The Gambia has demonstrated strong ambition and led the way in combatting climate change, by submitting a Second Nationally Determined (NDC2) in 2021 whose commitment was widely commended for being the only NDC that is 1.5oC compatible. In line with the country's commitment to the Paris Agreement which it signed on 25th April 2016, The Gambia has developed an ambitious plan for achieving net-zero greenhouse gas emissions by 2050 called **THE GAMBIA'S LONG-TERM CLIMATE-NEUTRAL DEVELOPMENT STRATEGY 2050**, or LTS for short.

The Gambia's LTS was developed by the Ministry of Environment, Climate Change and Natural Resources, in partnership with the Ministry of Finance and Economic Affairs, through an extensive consultative and inclusive process with a wide range of stakeholders including the General Public; Government Ministries including Ministry of Gender, Children and Social Welfare and Ministry of Youth and Sports; Local Government Authorities; Academia; Civil Society Organisations; Community-Based Organisations; Non-Governmental Organisations; the Private Sector and International Development Partners.

The LTS builds upon The Gambia's National Climate Change Policy, the NDC2 and the Gambia 2050 Climate Vision. It will complement the forthcoming Green Recovery-focused National Development Plan (2023 - 2027) and Long-Term Development Vision (Vision 2050), currently being formulated under the coordination of the Ministry of Finance and Economic Affairs. The LTS and its subsequent revised versions shall guide the Government of The Gambia in future climate commitments under the UNFCCC, including NDCs and National Communications.

All these plans and strategies are necessary tools, required to guide us to becoming a middle-income country. But the journey does not stop at the strategy and planning level – we must implement the LTS and other complementary plans and strategies in a SMART and holistic manner, not only as part of our commitment to national development, but as our solemn duty and obligation to bequeath a planet in a better state than it is today, for generations yet unborn.

.....  
**Honourable Mrs. Rohey John-Manjang**  
**Minister of Environment, Climate Change and Natural Resources**

## EXECUTIVE SUMMARY

The Gambia's Long-Term Climate-Neutral Development Strategy 2050 (LTS) focuses on the country's 5 key greenhouse gas emitting sectors - namely Energy; Agriculture; Waste Management; Transport and Land Use Land Use Change and Forestry (LULUCF). Building upon the ambitious Second Nationally Determined Contribution, the LTS looks at both mitigation and adaptation actions that would require funding, for the country to reach net-zero emissions by 2050, in line with its commitment under the Paris Agreement.

The Low Emission Analysis Platform (LEAP) Software was used to carry out the modelling exercises for the LTS. Two scenarios up to 2050 for the 5 sectors are analysed as follows:

1. Business as Usual (BAU) and
2. Net Zero

The BAU scenario shows how the country's greenhouse gas (GHG) emissions are likely to evolve if no climate change mitigation action is undertaken. The overall CO<sub>2</sub> equivalent of GHG emissions is estimated at 5,895 GgCO<sub>2</sub>e<sup>1</sup> in 2011, which increased steadily to 6,329 GgCO<sub>2</sub>e in 2020 representing a 7% increase in GHG emissions. A projection from the base year in 2020 to 2050 revealed an emission estimate of 15,894 GgCO<sub>2</sub>e, which will be emitted in the country by 2050, if no mitigation action is undertaken to address the problem.

With the mitigation actions identified in the LTS, about 56% of the energy needs of the country can be addressed by hydro-power. The remaining 44%, which is equivalent to 161 GWh can be provided by wind and solar power, which will lead to the country achieving a net zero GHG emission scenario in this sector by 2050.

The implementation of the planned mitigation actions will help in reducing GHG emissions in the transport sub-sector from 1,026 GgCO<sub>2</sub>e<sup>1</sup> in 2020 to 315 GgCO<sub>2</sub>e<sup>1</sup> in 2050. This shows that the implementation of the mitigation actions within the transport sub-sector will not lead to the achievement of a net-zero mitigation scenario by 2050. This calls for the need to implement more rigorous mitigation actions in the other sectors in order to achieve a net sink mitigation scenario, particularly the LULUCF sector which has the highest potential for negative emissions. Therefore it is possible for The Gambia to reach net-zero emissions by 2050.

The most up to date secondary data available was used for the modelling exercise, obtained mainly from The Gambia's Greenhouse Gas Inventory as presented during the sectoral workshops, and supplementary data gathered from FAOStat, Gambia Bureau of Statistics, and the Ministry of Petroleum and Energy.

---

<sup>1</sup>Gigagrams of carbon dioxide equivalent

The LTS is costed at USD4.0 billion at today's prices. Therefore it will require an average of USD138 million per annum in funding, between now and 2050 in order to achieve its target of net-zero emissions by mid-century. This figure may seem astronomical for a small country like The Gambia, however it is nothing compared to the price of inadequate action. The Gambia in recent years has experienced increased frequency and intensity of drought, flooding, coastal erosion, windstorms, high temperatures, and intense and erratic rainfalls. These extreme weather events, particularly drought, severely hinder the country's sustainable development and poverty eradication efforts, as The Gambia aims to become a food self-sufficient, middle-income county by 2050.

The Gambia has no choice, but to take a modest lead in reducing its greenhouse gas emissions to net-zero by 2050, in order to safeguard the lives and livelihoods of its citizens and also contribute its quota in global efforts to contain climate change.

## ACKNOWLEDGEMENTS

The elaboration of this document was spearheaded by the Ministry of Environment, Climate Change and Natural Resources (MECCNAR).

### Managerial Oversight

- o Alieu Njie, Permanent Secretary (MECCNAR)
- o Alpha A K Jallow, Director of Climate Change Secretariat, MECCNAR and UNFCCC Focal Point
- o Momodou Mbye Jabang, Former Permanent Secretary, MECCNAR

### National Coordination

- o Ebrima Jawara, Deputy Permanent Secretary (Finance & Administration), MECCNAR and LTS National Coordinator

### Technical Guidance

- o Bubacar Zaidi Jallow, Deputy Permanent Secretary (Technical), MECCNAR and Adaptation Fund Focal Point
- o Isatou F. Camara, Deputy Director, Ministry of Finance and Economic Affairs
- o Siddharth Pathak, Director of Partnerships, 2050 Pathways Platform
- o Micol Salmeri, Senior Associate, 2050 Pathways Platform
- o Marcela Jaramillo, Senior Associate, 2050 Pathways Platform
- o Elaine Harty, Senior Project Manager, Climate Change, International Institute for Environment and Development

### Consultants and Modelling Team

- o Sait Drammeh, Lead Consultant, Pakau Consultancy, Goods and Services
- o Dr. Demba Trawally Consultant, Pakau Consultancy, Goods and Services
- o Dr. Lamin Dibba Consultant, Consultant, Pakau Consultancy, Goods and Services

### Steering Committee

- o Ministry of Environment, Climate Change and Natural Resources (Chair)
- o Ministry of Finance and Economic Affairs (Co-Chair)
- o Office of the President
- o Ministry of Petroleum and Energy
- o Ministry of Fisheries and Water Resources
- o Ministry of Agriculture
- o Ministry of Lands and Regional Governments
- o Ministry of Women Affairs, Children, and Social Welfare

## Technical Working Group

- o Climate Change Secretariat, MECCNAR (Chair)
- o Directorate of Development Planning, Ministry of Finance and Economic Affairs (Co-Chair)
- o National Environment Agency
- o Department of Planning, Ministry of Agriculture
- o Department of Community Development
- o Department of Forestry
- o Department of Parks and Wildlife Management
- o Department of Water Resources
- o National Water and Electricity Company
- o Gambia Women`s Chamber of Commerce and Industry
- o Women`s Bureau
- o American International University West Africa
- o 2050 Pathways Platform
- o International Institute for Environment and Development
- o Central Project Coordination Unit, Ministry of Environment, Climate Change and Natural Resources
- o All Gambia Forestry Platform

## Stakeholder Participants

- o Unique Group
- o The Point Newspaper
- o The Standard Newspaper
- o The Voice Newspaper
- o The Gambia Daily Newspaper
- o Gambia Radio and Television Services
- o Brikama Area Council
- o Kanifing Municipal Council
- o Greener Africa
- o National Agricultural Research Institute
- o Ministry of Tourism and Culture
- o Ministry of Health
- o Islamic Development Bank
- o National Coordinating Organisation of Farmer Associations Gambia
- o Ministry of Lands and Regional Governments
- o Ministry of Higher Education, Research, Science and Technology
- o University of The Gambia
- o Ministry of Youth and Sports
- o Department of Livestock Services
- o National Roads Authority
- o Ministry of Transport, Works and Infrastructure
- o OMVG

- o ROOTS Project
- o Environment and Resilience Development Project
- o Foroyaa Newspaper
- o Kanifing Municipal Council
- o Brikama Area Council
- o The Association of Non-Governmental Organisations
- o Gambia Chamber of Commerce and Industry
- o World Food Programme
- o Food and Agriculture Organisation
- o QTV
- o Mansa Banko Newspaper
- o Greener Africa
- o United Nations Development Programme
- o United Nations Capital Development Fund



**Tanji Bird Reserve (2022)**



# TABLE OF CONTENTS

Acronyms	11
List of Tables and Figures	14
<b>1.0 Introduction</b>	15
1.1 Country profile: economy, climate, COVID-19	15
1.2 Greenhouse gas emissions	17
1.3 Purpose of the Long-Term Climate-Neutral Development Strategy (LTS)	18
<b>2.0 Framework on Climate Change Mitigation and Adaptation in The Gambia - A Dynamic Process</b>	22
<b>3.0 Pathways to 2050: Results of the Economic/emissions modeling analysis</b>	27
3.1 Business as Usual Scenario	28
3.2 Mitigation actions to achieving a net-zero scenario	37
<b>4.0 Climate Change Resilience and Adaptation</b>	48
<b>5.0 Strategic priorities, targets and measures</b>	54
5.1 De-carbonization to achieve carbon neutrality: mitigating greenhouse gas emissions	54
5.1.1 Energy (electricity generation)	54
5.1.2 Agriculture	55
5.1.3 Land use, land-use change, and forestry (LULUCF)	56
5.1.4 Transport	57
5.1.5 Waste management	57
5.2 Sector-specific measures and cost of actions and interventions	57
5.2.1 Financing investment (funding) roadmap for the implementation of the LTS	58
5.2.2 Roadmap to mobilize finances	58
5.2.3 Education, Awareness Raising, Research, Technology, Development	59
5.2.4 Advocacy, mobilization, communication and information, other socio-economic impacts	61
<b>6.0 Institutional Framework and Modalities for implementation of the Strategy</b>	63
6.1 Governance, Monitoring and Review	63
6.2 Innovative delivery mechanisms to operationalize the strategy	64
<b>7.0 Conclusions</b>	67
Appendix 1: Consultation list	69
Appendix 2: High-level costing of interventions, with timelines	75
<b>References</b>	80

## Acronyms

ADB	African Development Bank
AGFP	All Gambia Forestry Platform
AIUWA	American International University West Africa
ARC	African Risk Capacity
BAC	Brikama Area Council
BAU	Business as usual scenario
CIPRISSA	Continental Investment Plan for accelerating Rice Self-sufficiency in Africa
CN	Concept note
COVID-19	Coronavirus disease
CPCU	Central Project Coordination Unit
CT	Core Team
DCD	Department of Community Development
DLS	Department of Livestock Services
DOF	Department of Forestry
DPWM	Department of Parks and Wildlife Management
DRR	Disaster risk reduction
DWR	Department of Water Resources
EbA	Large-scale Ecosystem-based Adaptation Project
ECF	European Climate Foundation
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organisation
FNC	First National Communication
GBA	Greater Banjul Area
GBOS	Gambia Bureau of Statistics
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOTG	Government of The Gambia
GRTS	Gambia Radio and Television Services
GWCCI	Gambia Women `s Chamber of Commerce and Industry
ha	Hectare
HFO	Heavy Fuel Oil
I&FF	Investment and financial flows
ICT	information and communications technologies
IDB	Islamic Development Bank
IFAD	International Fund for Agricultural Development
IIED	International Institute for Environment and Development
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency

ISDR	International Strategy for Disaster Reduction
KMC	Kanifing Municipal Council
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LEAP	Low Emission Analyses Platform
LECRDS	Low Emission Climate-Resilient Development Strategy
LFO	Light Fuel Oil
LIFE-AR	LDC Initiative for Effective Adaptation and Resilience
LTS	Long Term Strategy
LTV	Long Term Vision
LULUCF	Land Use Land Use Change and Forestry
M&E	Monitoring and Evaluation
MOA	Ministry of Agriculture
MECCNAR	Ministry of Environment, Climate Change and Natural Resources
MOFEA	Ministry of Finance and Economic Affairs
MOFWR	Ministry of Fisheries and Water Resources
MOHERST	Ministry of Higher Education, Research, Science and Technology
MOLRG	Ministry of Lands and Regional Governments
MOPE	Ministry of Petroleum and Energy
MOTC	Ministry of Tourism and Culture
MOTWI	Ministry of Transport, Works and Infrastructure
MRV	Monitoring, Reporting and Verification
NACOFAG	National Coordinating Organisation of Farmer Associations Gambia
NAO	National Audit Office
NAP	National Adaptation Plan
NAP-Ag	National Adaptation Plan for Agriculture
NAPA	National Adaptation Programme of Action
NARI	National Agricultural Research Institute
NASS	National Agricultural Sample Survey
NAWEC	National Water and Electricity Company Ltd
NCCP	National Climate Change Policy
NCCS	National Climate Change Secretariat
NDC	Nationally Determined Contribution
NDP	National Development Plan
NEA	National Environment Agency
NEEAP	National Energy Efficiency Action Plan
NEMC	National Environment Management Council
NGO	Non-governmental Organisation
NRA	National Roads Authority
NSP	NAMA Support Project
NZ	Net Zero Scenario

OECD	Organisation for Economic Co-operation and Development
OMVG	Gambia River Basin Development Organization
OP	Office of the President
PAGE	Programme for Accelerated Growth and Employment
PPCR	Pilot Programme for Climate Resilience
R&D	Research and Development
RICAR	Rural Integrated Climate Adaptation and Resilience Building Project
ROOTS	Resilience of Organisations for Transformative Smallholder Agriculture Programme
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SME	Small and Medium Enterprise
SNC	Second National Communication
SPCR	Strategic Programme for Climate Resilience
SRI	System of Rice Intensification
UNCCD	United Nations Convention to Combat Desertification
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTG	University of The Gambia
WACA	West Africa Coastal Areas (WACA) Resilience Investment Project 2
WB	World Bank
WFP	World Food Programme



**Brufut, West Coast Region (2022)**

## List of Tables

TABLE 1: REGISTERED MOTOR VEHICLES AND MOTORCYCLES – 2005 -2015	30
TABLE 2: COST OF CLIMATE CHANGE MITIGATION ACTIONS	57
TABLE 3: BUDGET FOR THE BSC (HONS) CLIMATE CCES AT AIUWA	60

## List of Figures

FIGURE 1: NEXUS BETWEEN MITIGATION AND ADAPTATION IN THE VISION, LTS NDC2 AND THE CLIMATE CHANGE MITIGATION AND ADAPTATION FRAMEWORK	26
FIGURE 2: OVERALL GHG EMISSION	28
FIGURE 3: ENERGY SECTOR EMISSIONS	31
FIGURE 4: AGRICULTURE, FORESTRY AND OTHER LAND USE EMISSIONS	32
FIGURE 5:GHG EMISSIONS FROM LIVESTOCK SUBSECTOR	33
FIGURE 6: PERDCENTAGE METHANE EMISSION BY SUB-SECTOR - AGRICULTURE	34
FIGURE 7: GHG EMISSIONS FROM AGGREGATE SOURCES	35
FIGURE 8: GHG EMISSIONS FROM FIREWOOD AND CHARCOAL	36
FIGURE 9: EMISSIONS FROM WASTE	37
FIGURE 10: ENERGY SECTOR MITIGATION MEASURES	40
FIGURE 11: AFOLU SECTOR MITIGATION MEASURES	45
FIGURE 12: WASTE SECTOR MITIGATION MEASURES	47
FIGURE 13: CORE TECHNOLOGIES FOR RENEWABLE ENERGY PRODUCTION	55

## 1. INTRODUCTION

The Republic of The Gambia is the smallest country in Mainland Africa with a land mass of about 10,689 km<sup>2</sup>. The country is surrounded by the Republic of Senegal on all sides, except for its western border which faces the Atlantic Ocean. The Gambia has a population of 2.487 million (2021 estimate, World Bank), giving it a population density of about 233 people per km<sup>2</sup>.



Jabang, West Coast Region (2022)

### 1.1 Country profile: Economy, Climate, COVID-19

#### Economy

The Gambia's economy is undiversified and heavily dependent on imports, remittances and tourism. Its GDP in 2021 was estimated at USD2.078 billion (World Bank, 2022). The informal economy is a major part of the Gambia's total economy. According to the International Labor Organization, over 80% of adult Gambian women are employed in the informal sector, and over 75% of Gambian men (as of 2018).

The main sectors driving economic growth are services, agriculture and tourism. Agriculture accounts for about 17.8 percent of gross domestic product (GDP), ranking behind the services sector, which recorded 68.8

percent of GDP. In general, more than two-thirds of Gambians reside in rural areas and derive their livelihoods mainly from agriculture and related activities. Agriculture is an important source of income for households, behind wages and salaries and petty trading (World Bank, 2019). The agricultural sector is largely dependent on rainfall which makes the economy vulnerable to the vagaries of the climate.

Tourism is The Gambia's primary foreign-exchange earner. The tourist industry is one of the fastest growing sectors of the economy. However, most of the tourism infrastructure is located along the coast in the Western part of the country, with high risks of destruction in the event of sea-level rise. In the event of the predicted sea level rise the investments in the tourism and other sectors will be destroyed, causing huge material and financial losses.

Trade has also traditionally played an important role in the economy, especially the re-export trade. Banjul, the capital of Gambia is a regional entrepôt, where merchandise can be imported in transit and re-exported without paying import duties. As a result, The Gambia's re-exports constitute over 80 percent of the country's total exports. (Gambia Bureau of Statistics).



Tourist Market at Bakau (2022)



## Climate

The Gambia has a tropical Savannah climate, with two distinct seasons: a dry season (November to May) and a rainy season (June to October).

Average temperatures range from 18°C to 30°C during the dry season and 23°C to 33°C during the wet season. In La Niña years, temperatures tend to be cooler than average throughout the year. Average rainfall in a year varies from 1,000 mm in the South and Southeast to 700 mm in the most northern part of the country (World Bank, 2021).

Mean annual temperatures have increased by 1.0°C since 1960, an average rate of 0.21°C per decade. The rate of increase has been most rapid in the months of October, November and December, at 0.32°C per decade. Since the 1950s, routine observation indicates that minimum temperatures across the country have increased steadily at the rate of 0.4 to 0.67°C per decade (World Bank, 2021).

By the end of the 21st century the country would experience an increase in the numbers of “hot” days and nights and longer heat waves.

Linear trends indicate that wet season (July, August and September) rainfall in The Gambia has decreased significantly between 1960 and 2006, at an average rate of 8.8 mm per month per decade. The length of the rainy season has also been decreasing with increasing variability in inter-annual rainfall (World Bank, 2021).

This erratic rainfall pattern has some impacts on the farming system, by reducing the length of the growing period of the predominantly rain-fed crops and the additional mid-season dry spell can create drought conditions for farming purposes, even during normal rainfall conditions.

## COVID-19

The COVID-19 pandemic evidenced a marked slowdown of the Gambian economy, as found in the rest of the world. However, the impact has been cushioned by a marked increase in remittance volumes. Remittances are a vital source of income for many Gambian households. They have increased dramatically in 2020, potentially cushioning the harsh effects of the pandemic for many families. The Gambian tourism sector, the second largest sectoral earner of foreign exchange, is under severe pressure. Whilst international tourism declined to zero for most of 2020, arrival numbers have gradually started to recover in the last quarter of 2021. Measures taken by government in response to COVID-19 have been assisted by financing from international development partners and multilaterals. (African Economic Outlook, 2022). As at 21st September 2022, there were 12,415 infections and 372 coronavirus-related deaths reported in the country since the pandemic began (World Health Organisation, COVID-19 Dashboard).

### 1.2 Greenhouse Gas Emissions (GHG)

According to the Third National Communication of The Gambia submitted to the UNFCCC in July 2020:

- *Emissions of direct GHG, that is, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, add up to 3,332GgCO<sub>2</sub>, or 83% of the 2010 inventory total.*
- *CO<sub>2</sub> emissions (1,090 GgCO<sub>2</sub> eq) account for 26% of national emissions, and 32% of emissions excluding GHGs controlled under the Montreal Protocol. Energy and Agriculture, Forestry, and Other Land Use (AFOLU) source categories, including the transport and electricity sectors of the Gambian economy, as well as CO<sub>2</sub> fluxes from agricultural soils in particular, are the main sources of CO<sub>2</sub> emissions.*

- *CH<sub>4</sub> emissions (1,914GgCO<sub>2</sub> eq) in 2010 represent 47% of national emissions, and 57% of emissions excluding GHGs controlled under the Montreal Protocol. The AFOLU sector, accounting for (1,584GgCO<sub>2</sub> eq), or 83% of national emissions, is by far the single largest source of CH<sub>4</sub>.*
- *The 2010 GHGI of the Gambia puts N<sub>2</sub>O emissions (338GgCO<sub>2</sub> eq) representing 8% of national total emissions, which increases to 10% if GHGs controlled under the Montreal Protocol are excluded from the inventory total*
- *HFC emissions (705GgCO<sub>2</sub> eq) in 2010 represent 17% of the national total. HFCs are generated almost exclusively from substitutes for ozone depleting substances (ODSs) used in refrigeration, air conditioning (311GgCO<sub>2</sub> eq), and in aerosols (308GgCO<sub>2</sub> eq).*
- *SF<sub>6</sub> emissions (1.1GgCO<sub>2</sub> eq) in 2010 represent 0.03% the national total.*
- *Energy industries were responsible for 70% (1.2 Gg) of SO<sub>2</sub> emissions, whilst road transport accounted for 34% of NO<sub>2</sub> emissions (1.11Gg).*

### 1.3 Purpose of the Long-Term Climate-Neutral Development Strategy (LTS)

The Gambia is listed among the top 100 countries most vulnerable to climate change (IPCC, 2020), and is among the top ten countries most vulnerable to coastal erosion and sea-level rise in the world (Gomez, Adelagun, et al., 2020). The Gambia in recent years has experienced increased frequency and intensity of drought, flooding, coastal erosion, windstorms, high temperatures, and intense and erratic rainfalls. These extreme weather events, particularly drought, severely hinder the country's sustainable development and poverty eradication efforts.



**Flooded settlements at Kotu, Kanifing Municipality (2022)**

Thus, The Gambia intends to be among the most progressive nations in tackling climate change issues and in early 2021 published The Gambia 2050 Climate Vision (LTV). The LTV has set very specific targets and by 2050 The Gambia aims to be a climate-resilient, middle-income country through green economic growth supporting sustainable, low emissions development, contributing its fair share to global efforts to address climate change. The mission for the LTV is to endeavor to reach net-zero carbon emissions by 2050, with enhanced adaptive capacities and resilience.

The LTV has the following strategic areas of focus:

1. Climate resilient food and landscapes: Agriculture, food security, forestry and natural resources, including water, biodiversity and wildlife
2. Low emissions and resilient economy: Energy, transport, infrastructure, and the key economic sectors of tourism and financial services
3. Climate resilient people: Health, education, equitable social development, and human settlements
4. Managing our coasts in a changing environment: climate-aware Integrated Coastal Zone Management

The formulation of the LTV involved a wide consultative and participative process with stakeholders, including representatives of government institutions and agencies, development partners, local communities (including women and youth), NGOs and the private sector. The issues raised and the recommendations made during those stakeholder consultations were considered in preparing the LTV.

In 2021, The Gambia launched the process of formulating its Long-Term Climate-Neutral Development Strategy (LTS), in order to operationalize the implementation of the Vision.

The LTS would translate the strategic priorities of the Vision into more concrete actions, policies, programs, and initiatives. It focuses on The Gambia's key GHG emitting sectors: Energy, Agriculture, LULUCF, Transport and Waste Management.

The formulation of the LTS is also in fulfillment of The Gambia's obligation as called for in the Paris Agreement that **“All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.”**

The formulation process was led by the Ministry of Environment, Climate Change and Natural Resources (MECCNAR), in close partnership with the Ministry of Finance and Economic Affairs (MOFEA). The two Ministries worked closely with key stakeholders to ensure that the process was country-led, participatory and inclusive – involving most Government Ministries, Departments and Agencies (MDAs), the private sector, civil society, development partners, the media, and the citizenry. Information was gathered from publications, workshops and interviews.

## PICTORIAL OF THE VARIOUS WORKSHOPS





## 2.0 FRAMEWORK ON CLIMATE CHANGE MITIGATION AND ADAPTATION IN THE GAMBIA: A DYNAMIC PROCESS



Coconut trees planted at Banjul Beach to prevent erosion (2022)

There has been a steady evolution of the laws, policies and strategies governing the implementation of climate change in The Gambia, starting from the First National Communication (FNC) developed in 2003, to the formulation of the National Climate Change Policy 2016, and now the LTS.

The FNC highlighted the sectoral vulnerabilities that existed at the time, and gave a detailed greenhouse gas inventory for the first time in The Gambia's history.

Building on the work from the FNC, the National Adaptation Programme of Action (NAPA) was developed in 2007.

The Gambia's National Appropriate Mitigation Actions (NAMA) developed in 2008 is the first mitigation centric strategic document. The NAMA identifies possible implementation barriers which include access to finance, capacity building and technology enablers.

The Second National Communication (SNC) developed in 2012 is a follow up to the FNC, and it includes assessments on investment and financial flows (I&FF) needed to address climate change in the water, energy, forestry and agriculture sectors.

The Renewable Energy Act 2013, established the legal, economic and institutional basis to promote the use of renewable energy resources and for connected matters.

A key process for enhancing the country's adaptive capacity to climate change is the development of a National Adaptation Plan (NAP). The NAP process will allow the socioeconomic consequences of the adaptation measures identified to be assessed. This process was initiated in The Gambia in 2015, when a NAP roadmap was developed based on discussions with key stakeholders.

In 2015, The Gambia proposed an ambitious Nationally Determined Contribution (NDC) with a conditional target that would bend its emissions onto a downward trajectory. The unconditional target is also amongst the most ambitious, dubbed as '1.5°C Paris Agreement compatible'. The Gambia's target aimed to unconditionally reduce emissions by 2.7% by 2030, below business-as-usual (BAU) and, conditional on international financial support, aimed for a target of 45.4% reduction by 2030.

The NAP-Ag (National Adaptation Plan for Agriculture), was launched in 2016 in recognition of the importance of adaptation in agriculture and also in response to the challenges of integrating climate change considerations into planning processes across sectors.

Building on the NDC, the formulation of the National Climate Change Policy 2016 (NCCP) seeks to provide *'the framework for managing climate risks, building institutions and capacities, and identifying new opportunities for climate-resilient sustainable development in The Gambia'*. It outlines the approach to be followed to develop the implementation framework for the Policy, through the subsequent National Climate Change Response Strategy and Action Plan.

The Education Sector Policy 2016-2030 includes significant references to climate change, including encouraging higher education institutions to develop curricula contents that cater for sustainable development including issues of environment and climate change.

In 2015 The Gambia was among a second round of countries selected to prepare their Strategic Programme for Climate Resilience (SPCR) under the Pilot Programme for Climate Resilience (PPCR), which forms part of the Climate Investment Funds.

In 2017, the country developed its SPCR, with a USD300 million investment portfolio. It is a comprehensive transformational adaptation and mitigation investment plan, designed to reduce and manage the country's high vulnerability to climate variability and change. It serves as a guide to secure catalytic financing from international and national climate-financing sources, thereby making the SPCR a key building block in the country's quest for a successful transition to a low emissions climate-resilient development pathway. The SPCR will be a foundational component of the LTS (The Gambia's 2050 Climate Vision).

The Low Emission Climate-Resilient Development Strategy of The Gambia, 2018-2030 (LECRDS) has as its main goal to **move The Gambia towards a green development pathway**. By supporting the achievement of targets included in the NDC, it maps out proposed interventions to reduce or mitigate climate impacts, leading to a low-carbon economy up to 2030 (Department of Water Resources, The Gambia, 2017).



Vegetable Stall off Bertil Harding Highway (2022)

The Third National Communications (TNC) of The Gambia was published in 2020 under the UNFCCC. It provides a quantitative assessment of GHG gas emissions from the major economic sectors and activities of the country, and develops plausible climate change scenarios for assessment of the potential impacts of climate change on some key sectors of the national economy. The potential impacts of climate change on crop production, forestry, fisheries, and rangelands and livestock have been assessed in great detail. As was the case however with the SNC, detailed cost-benefit analyses of mitigation and adaptation measures are absent. (Government of The Gambia (GOTG), 2020. Third National Communication under the UNFCCC. Ministry of Climate Change environment and Natural Resources (MECCNAR), Banjul. 75p.)

In 2021, The Gambia ramped up its emission elimination target in a Second Nationally determined Contribution (NDC2), which improved on the first NDC. It has a single timeline target of 49.7% GHG reduction by 2030 covering the sectors of Agriculture, Forestry (Deforestation and Forest Degradation, afforestation) and Other Land Use (AFOLU), Livestock, Industrial Processes and Product Use (IPPU), Energy (Energy Industries, Transport), Waste (Solid Waste Disposal, Wastewater Treatment and Discharge). While the gases covered are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and hydrofluorocarbons (HFCs). The NDC2 has a costed implementation plan (road map) for the identified mitigation and adaptation actions up to the horizon of 2030, accompanied by a Monitoring Reporting and Verification (MRV) Tool, to track the implementations of the actions and facilitate the monitoring and reporting at national and international levels.





Mile 7 Bakau (2022)

Following the submission of The Gambia's NDC2, Climate Action Tracker carried out a global analysis of NDCs and stated that

***“Out of the 36 countries, plus the EU, which were analysed, The Gambia is the only country whose commitment is '1.5°C compatible'.***

Since then, The Gambia has received recognition from different international media houses including The Guardian, Bloomberg, Canada's National Observer, Washington Informer and Energy Live News.

In 2022, The Gambia stepped forward as a frontrunner country for the LDC Initiative for Effective Adaptation and Resilience (LIFE-AR), and committed itself to achieving the LDC Group's 2050 Vision to be on climate-resilient development pathways by 2030 and deliver net-zero emissions by 2050.

The Ministry of Finance and Economic Affairs is in the process of formulating a Green Recovery-focused National Development Plan (2023 - 2027) and a Long-Term Development Vision (Vision 2050). It is envisaged that key Elements of the LTS would be incorporated in both documents.

Mitigation and adaptation are the two strategies for addressing climate change. Mitigation is an intervention to reduce the emissions sources or enhance the sinks of greenhouse gases. Adaptation is an 'adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities' (IPCC 2001). Adaptation/resilience and mitigation measures are mutually reinforcing and deliver co-benefits for adaptation, resilience and mitigation.

**Mitigation needs adaptation and adaptation needs mitigation.**

An effective Gambian climate change response requires economic, social and environmental interventions that integrate mitigation and adaptation elements within a developmental framework. This is the meaning of climate-resilient development, in the Gambian context (See figure 1 below).

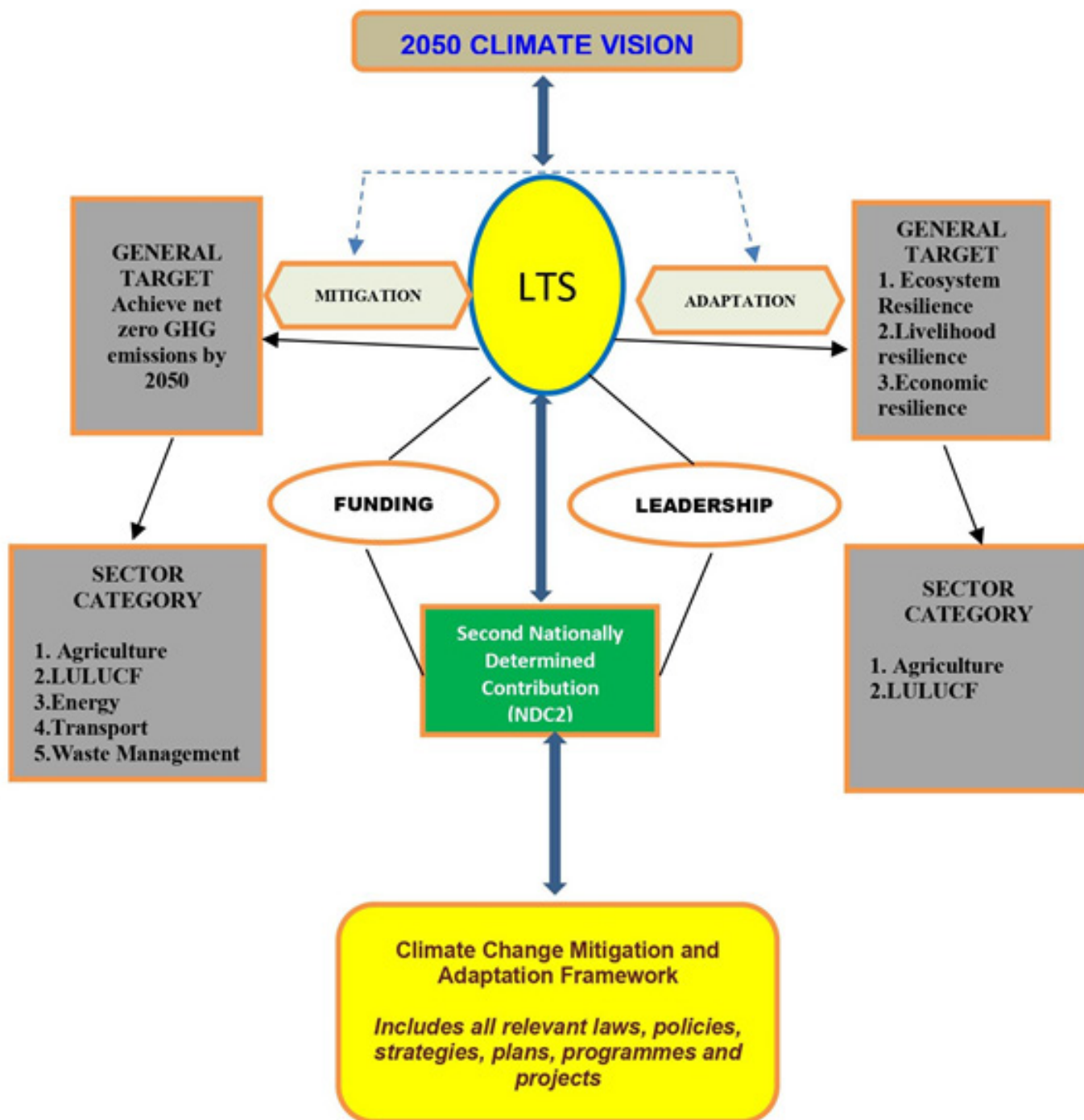


Figure 1: Nexus between mitigation and adaptation in the Vision, LTS, NDC2 and the Climate Change Mitigation and Adaptation Framework

### 3.0 PATHWAYS TO 2050: RESULTS OF THE ECONOMIC/EMISSIONS MODELING ANALYSIS

The Gambia's long-term strategy to significantly reduce its carbon emissions analyses two GHG emission pathway scenarios. These are: i) Business as Usual Scenario (BAU) and ii) Net Zero Scenario (NZ).

To develop these scenarios, historical data from 2011 to 2020 on GHG emission was gathered through stakeholder consultative workshops covering the energy, tourism, agriculture, forestry and waste management sectors. The workshop for the Energy, Agriculture and Forestry sectors was held on 22<sup>nd</sup> and 23<sup>rd</sup> of April 2022, whilst the workshop for the Tourism, Transport and Waste Management Sectors was held on 6<sup>th</sup> and 7<sup>th</sup> May 2022.

With the use of aggregate economic variables like population growth rate, Gross Domestic Product (GDP), per capita income and commodity prices, projections were made through the use of the Low Emission Analyses Platform (LEAP) modelling tool to identify emission pathways to 2050.

The LEAP modelling tool has the in-built capacity to conduct modelling on the energy sector. Activity data on electricity generation and transport were directly entered into LEAP to quantify GHG emissions for the energy sector, whereas the IPCC modelling tools were used to quantify the GHG emission for the non-energy sectors and the results transferred into LEAP to develop the GHG projections.



Bertil Harding Highway (2022)

### 3.1 Business as Usual Scenario

This scenario assesses the development of The Gambia's Green House Gas (GHG) emissions under current policies. It shows how the country's GHG emissions are likely to evolve if no climate change mitigation action is undertaken to curb the GHG emissions. The overall GHG emissions under this scenario is presented in Figure 2. The CO<sub>2</sub> below equivalent of GHG emissions is estimated at 5,895 GgCO<sub>2</sub>e in 2011, which increased steadily to 6,329 GgCO<sub>2</sub>e in 2020 representing a 7% increase in GHG emissions. A projection from the base year in 2020 to 2050 revealed an emission estimate of 15,894 GgCO<sub>2</sub>e, which will be emitted in the country if no mitigation action is undertaken to address the problem.

At the sectoral level, the highest amount of emission is recorded from the energy sector. This is followed by the AFOLU and the least is recorded from the waste sector. The emission from the energy sector is estimated at 1,377 GgCO<sub>2</sub>e in 2011 which increased to 1,888 GgCO<sub>2</sub>e in 2020. This represents a 37% increase in GHG emission. Projection of emission revealed a total estimate of 4,771 GgCO<sub>2</sub>e in 2050. The historical data shows an emission estimate of GgCO<sub>2</sub> 1,003 for the AFOLU sub-sector in 2011. This figure fluctuated up and down to 926 GgCO<sub>2</sub>e in 2020, showing a 7% decrease in total emissions. This figure is projected to increase to 2,338 GgCO<sub>2</sub>e in 2050.

The waste sub-sector emissions were estimated at 427 GgCO<sub>2</sub>e in 2020. This is projected to 1,027 GgCO<sub>2</sub>e in 2050. This figure is about 3 times lower than emissions from the energy sector and almost twice lower than that of the emission from the AFULO sector. This shows that the energy sector accounts for more than 50% of the GHG emissions.

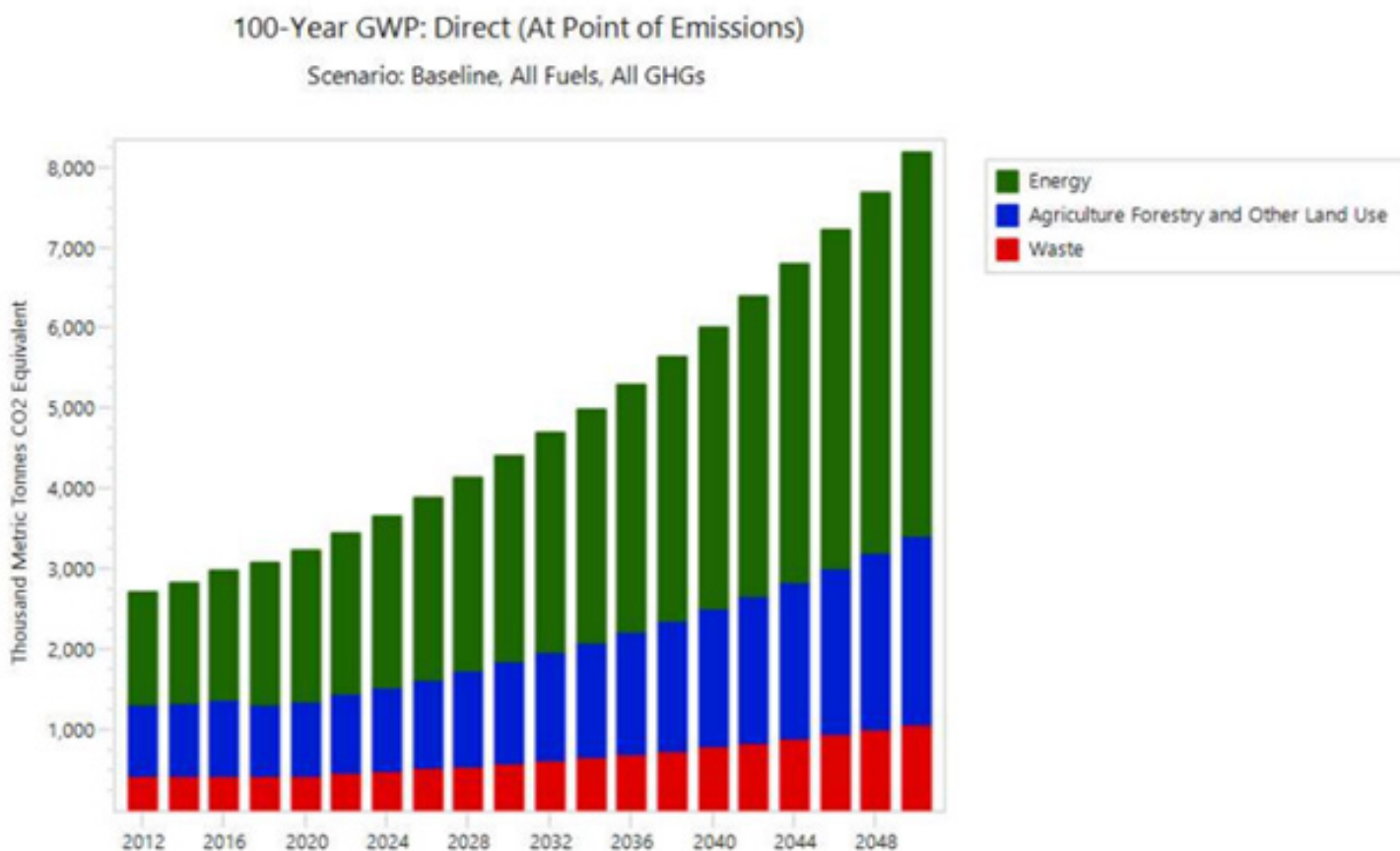


Figure 2: Overall GHG emission

Figure 3 below presents the GHG emission under the energy sector. This sector is sub-divided into two other sub-sectors: i) electricity generation and ii) transportation.

The National Water and Electricity Company (NAWEC) is the main institution on which the country depends almost entirely for electricity generation. NAWEC uses Light Fuel Oil (LFO) and Heavy Fuel Oil (HFO) to operate its generators and provide electricity to all sectors of the Gambian economy. In 2011, NAWEC produced 250 Gigawatt-hours of electricity, which increased to 386 Gigawatt-hour in 2020 (GBOS, 2020). In generating this energy, the modelling exercise shows that NAWEC has emitted 1,182 GgCO<sub>2</sub> equivalent, which is projected to increase to 3,744 GgCO<sub>2</sub>e in 2050.

The emissions from the transport sub-sector are also provided in Figure 3. The GHG emission estimates show that the transport sector is responsible for 1,026 GgCO<sub>2</sub>e of the GHG emissions under the energy sector. In 2020, this sub-sector emitted 345 GgCO<sub>2</sub>e which has been projected to increase to 1,026 GgCO<sub>2</sub>e in 2050. The rise in emissions could be attributed to the increased use of old cars and the poor quality of fuels used. There is currently no age limit on vehicles that are imported into country. This allows for very old secondhand vehicles to be imported into the country, which are more likely to emit greenhouse gases. Besides the fleet of old vehicles, there are no regulations on fuel standards, thus vehicles use low quality fuel which could also contribute to more greenhouse gas emissions.

In The Gambia, Informal Public Transport Services are characterized by individual ownership of vehicles. The vehicles are usually imported (second hand). As a result of the virtual absence of formal public transport services, the population has come to rely on locally modified vehicles called “*gele gele*” and mini-vans for public transport in order to reach their places of business, employment, recreation, education and health facilities etc. Most of the vehicle fleets of the informal operators are too old due to the prevalence of secondhand vehicles, which in turn is due to the fact that new vehicles are too expensive. (The Gambia National Transport Policy – 2018-2027)

Records from the Kingdom of the Netherlands reveal that the average age of vehicles exported to The Gambia is 18.8 years. (United Nations Environment Programme, 2020). The data currently available shows that about 93.82% of the motor vehicle fleet is made up of light vehicles (cars and mini-bus). See Table 1 below for the 2015 estimated vehicle fleet size.

**Table 1: Registered Motor Vehicles and Motor Cycles – 2005-2015**

Period	Mini-bus	Buses	Trucks	Tractors	Cars	Motor cycles	Total
2005	615	29	320	26	2,337	2,593	5,920
2006	729	41	187	44	3,100	1,000	5,101
2007	1,650	10	140	26	1,899	1,673	5,398
2008	243	55	213	10	4,832	2,726	8,079
2009	231	11	238	29	2,090	1,130	3,729
2010	436	34	210	15	3,256	2,941	6,892
2011	979	29	93	36	2,948	1,862	5,947
2012	1,065	18	219	15	2,257	2,235	5,809
2013	618	3	71	14	3,630	3,260	7,596
2014	1,194	24	348	59	5,438	11,767	18,830
2015	1,623	35	504	49	6,724	1,820	10,755
<b>Total</b>	<b>9,383</b>	<b>289</b>	<b>2,543</b>	<b>323</b>	<b>38,511</b>	<b>33,007</b>	<b>84,056</b>

Source: GBOS, 2017



Aerial view of Bertil Harding Highway (2022)

### 100-Year GWP: Direct (At Point of Emissions)

Scenario: Baseline, All Fuels, All GHGs

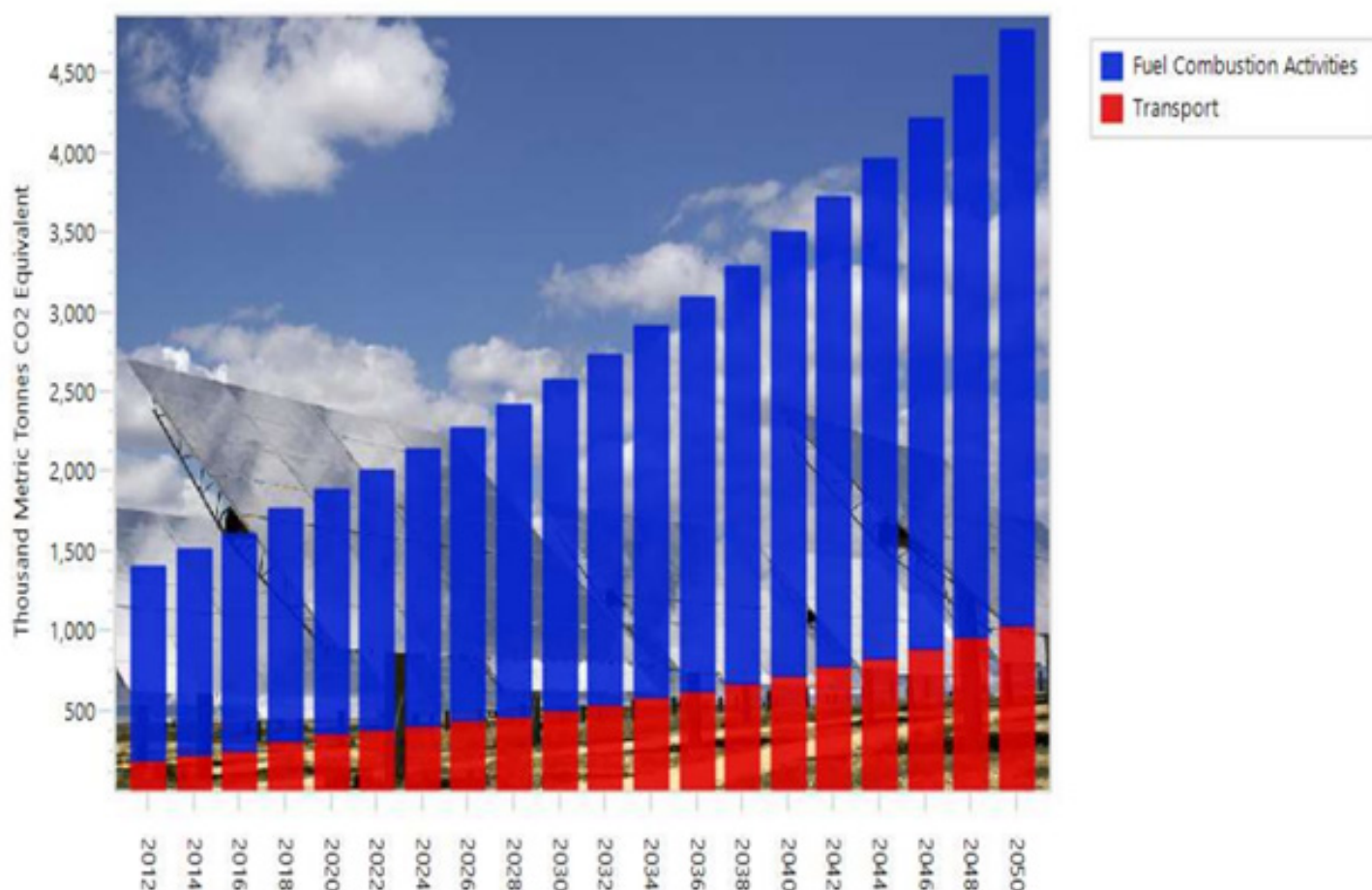


Figure 3: Energy sector emissions

The GHG emissions under the Agriculture, Forestry and Land Use (AFOLU) are highlighted in Figure 4 below. The emissions are recorded under livestock, aggregate sources, and forestry. GHG emissions from livestock stood at 434 GgCO<sub>2</sub>e in 2020, which is projected to increase to 1,085 GgCO<sub>2</sub>e in 2050. A similar trend is observed for the development of GHG emissions under aggregate sources and forestry. The emissions from aggregate sources is estimated at 270 GgCO<sub>2</sub>e in 2020 and projected to rise to 674 GgCO<sub>2</sub>e in 2050. The estimates for forestry were placed at 232 GgCO<sub>2</sub>e in 2020 and a projected value of 578 GgCO<sub>2</sub>e in 2050.

100-Year GWP: Direct (At Point of Emissions)

Scenario: Baseline, All Fuels, All GHGs

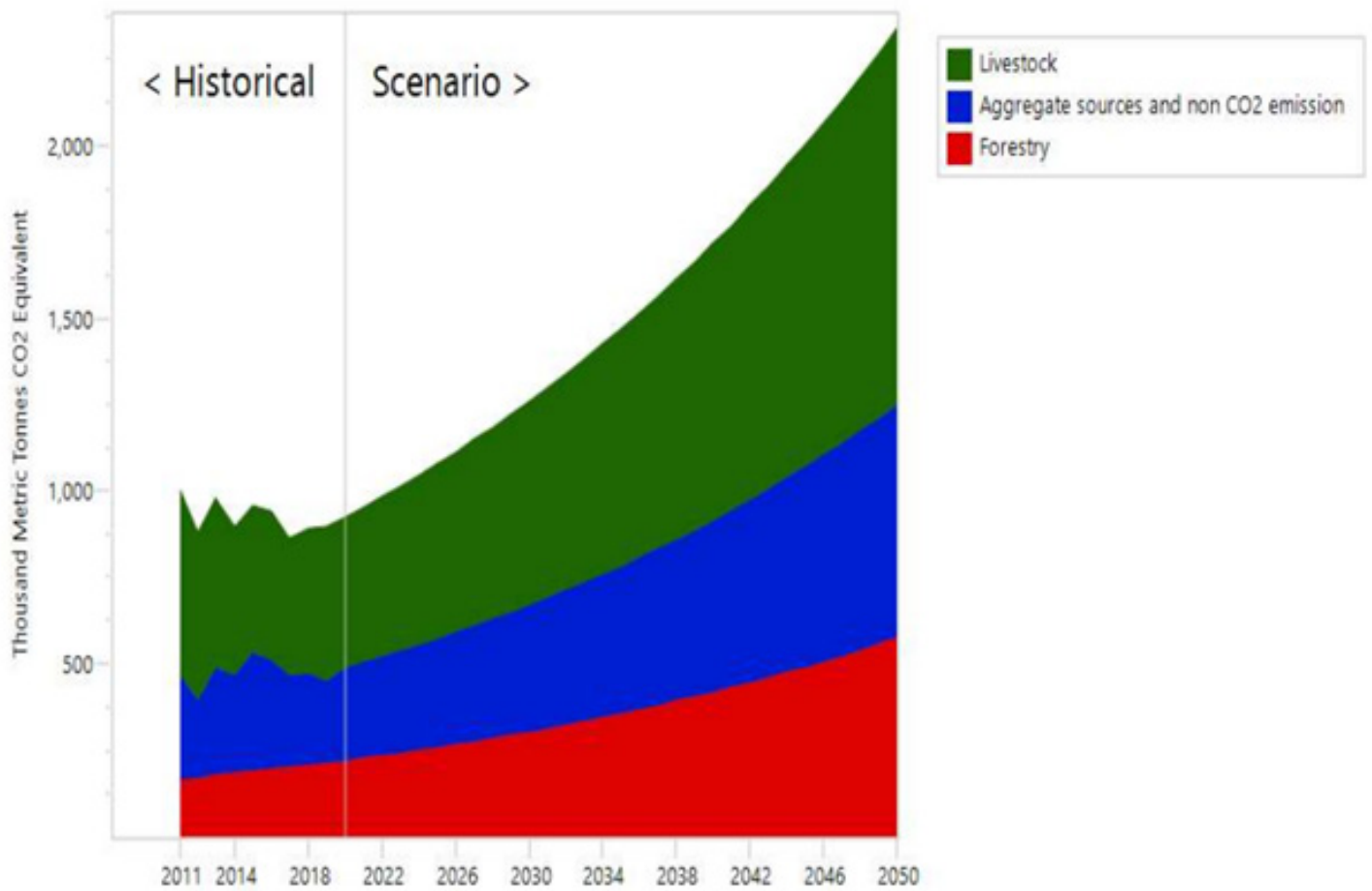


Figure 4: Agriculture, Forestry and Land Use Emissions

A breakdown of the emissions from the livestock sub-sectors are presented in Figure 5 below. The categories covered are enteric fermentation and manure management.





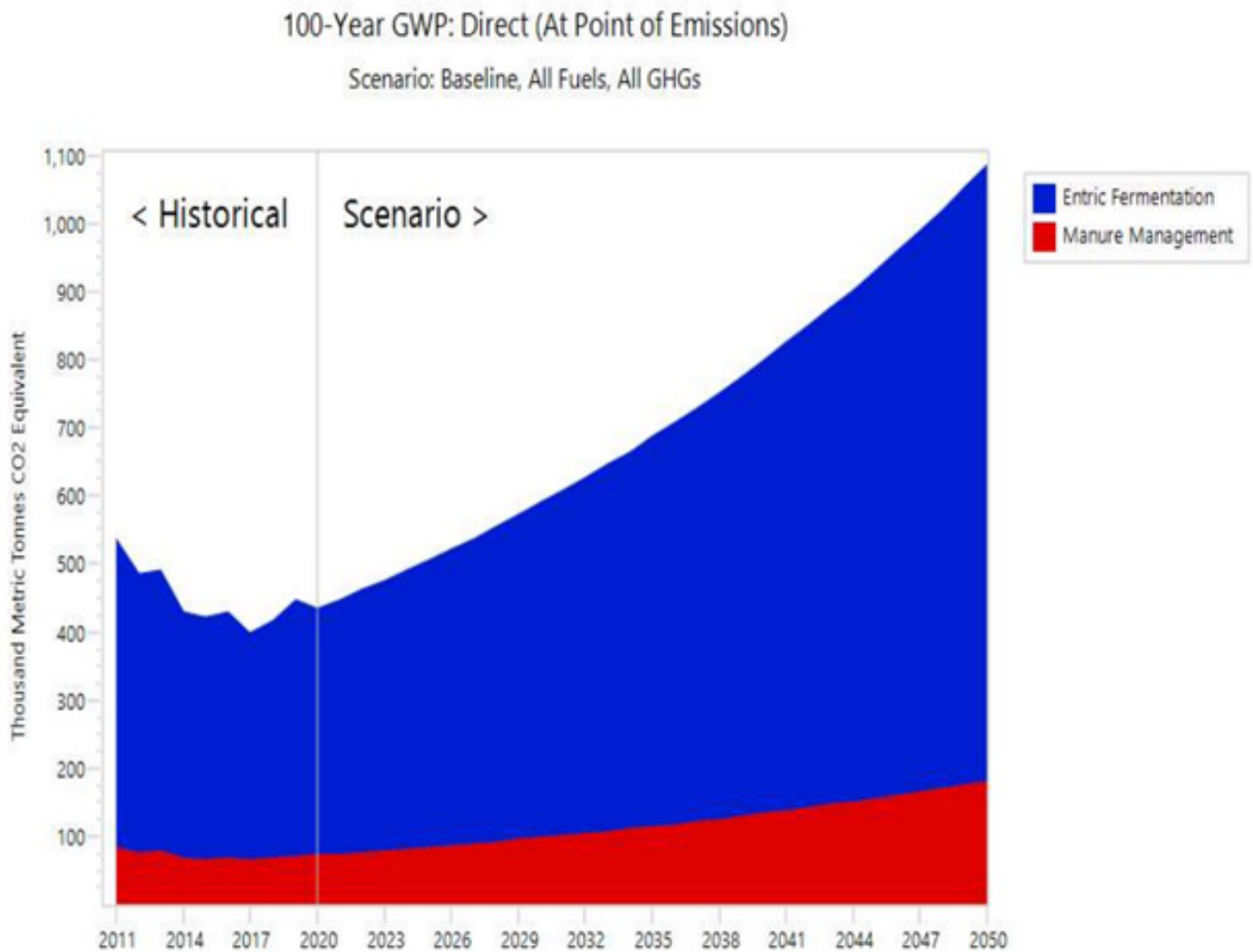


Figure 5: GHG emission from aggregate sources

The historical data places the emission from enteric fermentation at 452 GgCO<sub>2</sub>e in 2011, which increased to 362 GgCO<sub>2</sub>e in 2020. This shows a 20% decrease in emissions. However, considering the fact that livestock is acquired from neighboring Senegal to close the demand on a regular basis, future emissions are likely to increase. A projection of emissions show an estimate of 903 GgCO<sub>2</sub> in 2050. The estimates of emissions from manure management shows a similar trend. The emissions in 2020 stood at 73 GgCO<sub>2</sub>e, which is projected to be 182 GgCO<sub>2</sub>e in 2050.

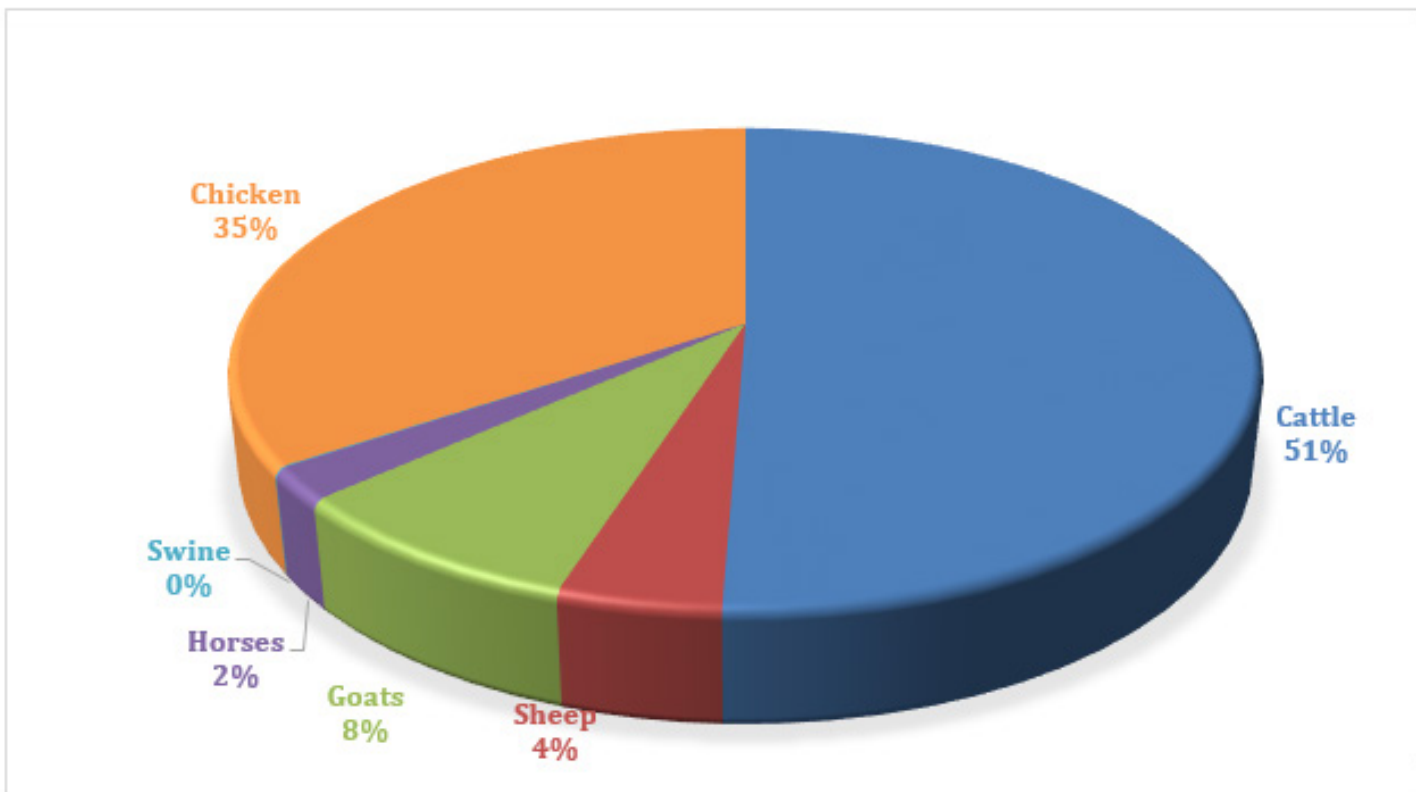


Goats and sheep for sale at a market in Banjul (2022)

Enteric fermentation is the main source of methane emissions in livestock. Within the livestock sub-sector, ruminant animals such as cattle, sheep, and goats are the primary source of methane emissions. See figure 6 below.

The goats form the largest share of ruminant animals accounting for 45%. This is followed by cattle at 34% and the least is registered by sheep at 21%.

Figure 6: Percentage Methane emission by sub-sector - Agriculture



Source: Baba, A. M. (23rd May 2022). Data and Modelling Output for The Gambia LTS [PowerPoint presentation]. LTS Sectoral Workshop, Kartong, WCR, The Gambia

Figure 7 below shows estimates of the GHG emitted from soils under the aggregate source, lime application and rice cultivation category. The highest GHG emission is estimated from flooded rice cultivation practices, which produce 126 GgCO<sub>2</sub>e in 2020 and are projected to increase to 308 GgCO<sub>2</sub>e in 2050. Rice is mainly produce by smallholder farmers in The Gambia. These farmers produce rice both in the uplands and lowlands. However, lowland rice production is more prominent. Rice production in the lowland rice ecologies is done under flooded conditions. During harvest rice fields are not properly drained. Most farmers use manual harvesting methods and throw rice straws into the stagnant waters which decay and cause methane emission into the atmosphere. The direct and indirect emissions of N<sub>2</sub>O account for a cumulative total 170 GgCO<sub>2</sub> in 2020, which is projected to increase to 363 GgCO<sub>2</sub>e in 2050.

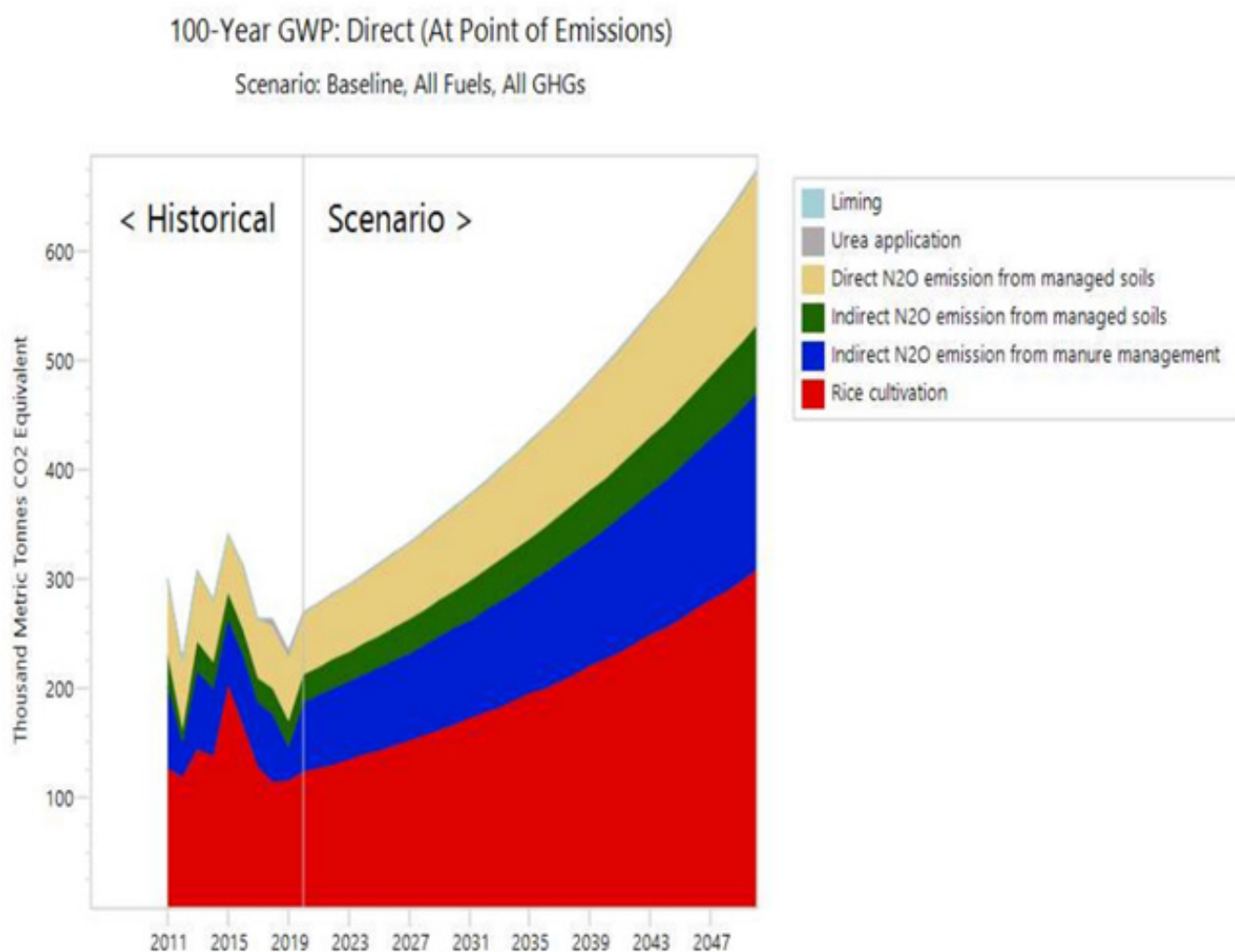


Figure 7: GHG emissions from aggregate sources

The GHG emissions from firewood and charcoal are presented in Figure 8. Charcoal is mainly used for cooking in urban and peri-urban areas, whilst firewood is the main source of energy for cooking in the rural areas. The emissions from firewood is estimated at 128 GgCO<sub>2e</sub> in 2011, which increased steadily to 172 GgCO<sub>2e</sub> in 2020. A projection of the emission revealed an estimate of 428 GgCO<sub>2e</sub> in 2050. On the other hand, the emissions from charcoal production stood at 38 GgCO<sub>2e</sub> in 2011, which increased to 50 GgCO<sub>2e</sub> in 2020 and later projected to 150 GgCO<sub>2e</sub> in 2050. This shows more than 60% of the emission in this sub-sector comes from firewood, which puts an intense pressure on the forest thus aggravating deforestation.

The increased dependence on charcoal and firewood is accelerating the depletion of the forest cover of the country. Since the forest is supposed to serve as the carbon sink of the country, the current rate of deforestation will cause our GHG emissions to increase.

100-Year GWP: Direct (At Point of Emissions)

Scenario: Baseline, All Fuels, All GHGs

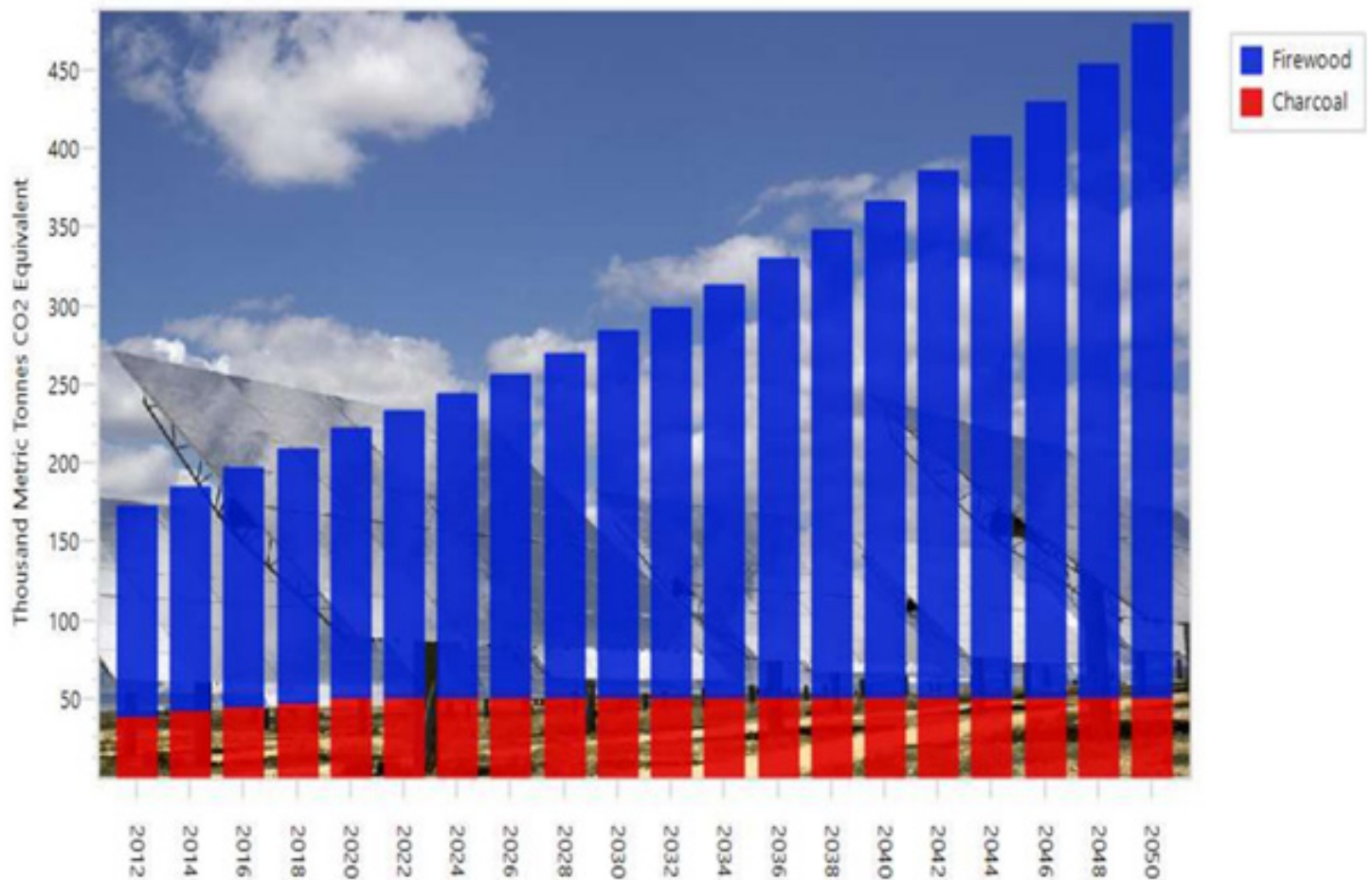


Figure 8: GHG emissions from firewood and charcoal

The bulk of emission from the waste sector is attributed to solid waste disposal (Figure 9). The emission from this activity was estimated at 426 GgCO<sub>2</sub>e in 2020 with a projected value of 1,065 in GgCO<sub>2</sub>e in 2050. Open burning of waste registered a lower amount of GHG emissions. In 2020 emissions from open burning of waste was estimated at 0.9 GgCO<sub>2</sub>e, which is projected to increase to 2.1 GgCO<sub>2</sub>e in 2050. These estimates show that the emissions from the waste sector come almost entirely from solid waste disposal, which produces substantial amount of methane.

100-Year GWP: Direct (At Point of Emissions)

Scenario: Baseline, All Fuels, All GHGs

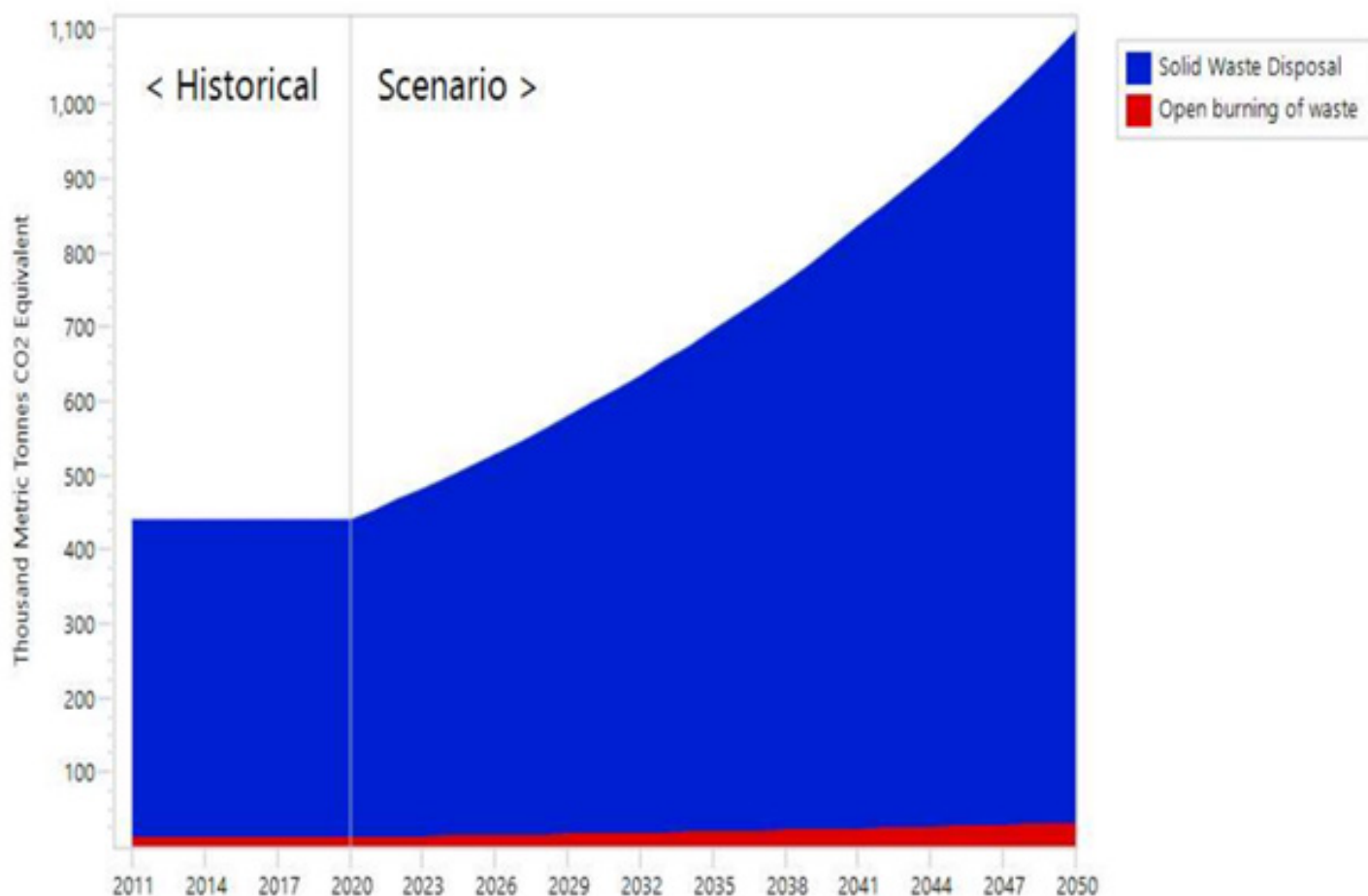


Figure 9: Emission from waste

### 3.2 Mitigation actions to achieving a net-zero scenario

The mitigation actions identified in this document are based on the desired GHG mitigation options identified in the LTV, which is built on existing efforts to implement the United Nations Framework Convention on Climate Change and Paris Agreement. The LTV identified several mitigation actions, which are categorized under three sub-subsectors that need to decarbonize to achieve a net-zero scenario by 2050. These sub-sectors are energy, AFOLU and Waste.



Aerial view of the Bakoteh Dumpsite – at 18 hectares, it is the largest solid waste site in The Gambia (2022).

## (A) Energy sector mitigation options

In an effort to curb Green House Gas emissions, The Gambia is determined to promote and encourage the use of renewable energy resources that would assist the country to achieving a net-zero emission GHG emission scenario by 2050.

To achieve this, the electricity strategy of The Gambia plans to achieve a 30% share of renewable energy by 2030 in the sector. The National Energy Policy 2015-2020 further sets out a plan to double the share of renewable energy resources every 10 years. If this plan is strictly adhered to, the country will be able to achieve a net zero emission target by 2050 within the electricity generation sub-sector. The following mitigation options are identified to achieve a net-zero scenario in the electricity generation sub-sector by 2050:

- MA1: Solar energy
- MA2: Wind energy
- MA3: Improved cook stoves
- MA4: Power saving devices and appliances
- MA5: Hydro Energy Power Plant (Sambangalou hydro-electricity Dam)
- MA6: Capacity Building programmes and public sensitization in renewable energy development
- MA7: Biomass

The electricity generation capacity of wind power is estimated at 197 MW whereas solar energy potential of The Gambia has been estimated to be 428 MW (IRENA 2018). There are plans to implement 13 solar projects with electricity generation capacity of 250 MW.



**Aerial view of the OMVG substation at Lower River Region (2021)**

In 2020, the demand for electricity was estimated at 1,488 kWh per household per annum in the urban areas whereas for rural households it was estimated at 792 kWh per annum. These figures were forecasted to increase to 1,572 kWh and 840 kWh in 2040 for urban and rural household per annum, respectively (Electricity roadmap 2020). The total number of households in the country is estimated at 280,659. About 177,686 of the households are in the urban areas whereas 102,973 reside in the rural areas (GBOS, 2015). Based on these figures, the total demand for electricity in the urban and rural areas was estimated in 2020 at 264.4 GWh and 81.6 GWh, respectively. This took the total demand for electricity in 2020 to 346 GWh, which is further estimated to reach 365.8 in 2040 (Electricity Roadmap 2020).



**Aerial view of Kotu Power Station, The Gambia's oldest and largest HFO power plant (2022)**

There is a discovery of natural gas off the coast of The Gambia and Senegal, which presents an opportunity for The Gambia to use natural gas to generate electricity. Although natural gas is a fossil fuel, its GHG emission is much lower than Heavy Fuel Oil (HFO), which is currently used by NAWEC to generate electricity. Additionally, there are plans to introduce three hydro-electricity power plants: 1) Sambangalou Hydropower Plant 2) Kaleta Hydropower Plant and 3) Souapiti Hydropower Plant. These hydroelectricity power plants have annual electricity generation capacity of more than 204 GWh. With these plans and targets in place, about 56% of the energy needs of the country can be addressed by hydro-power. The remaining 44%, which is equivalent to 161 GWh can be provided by wind and solar power and this will eventually assist the country to achieve a net zero GHG emission scenario by 2050.

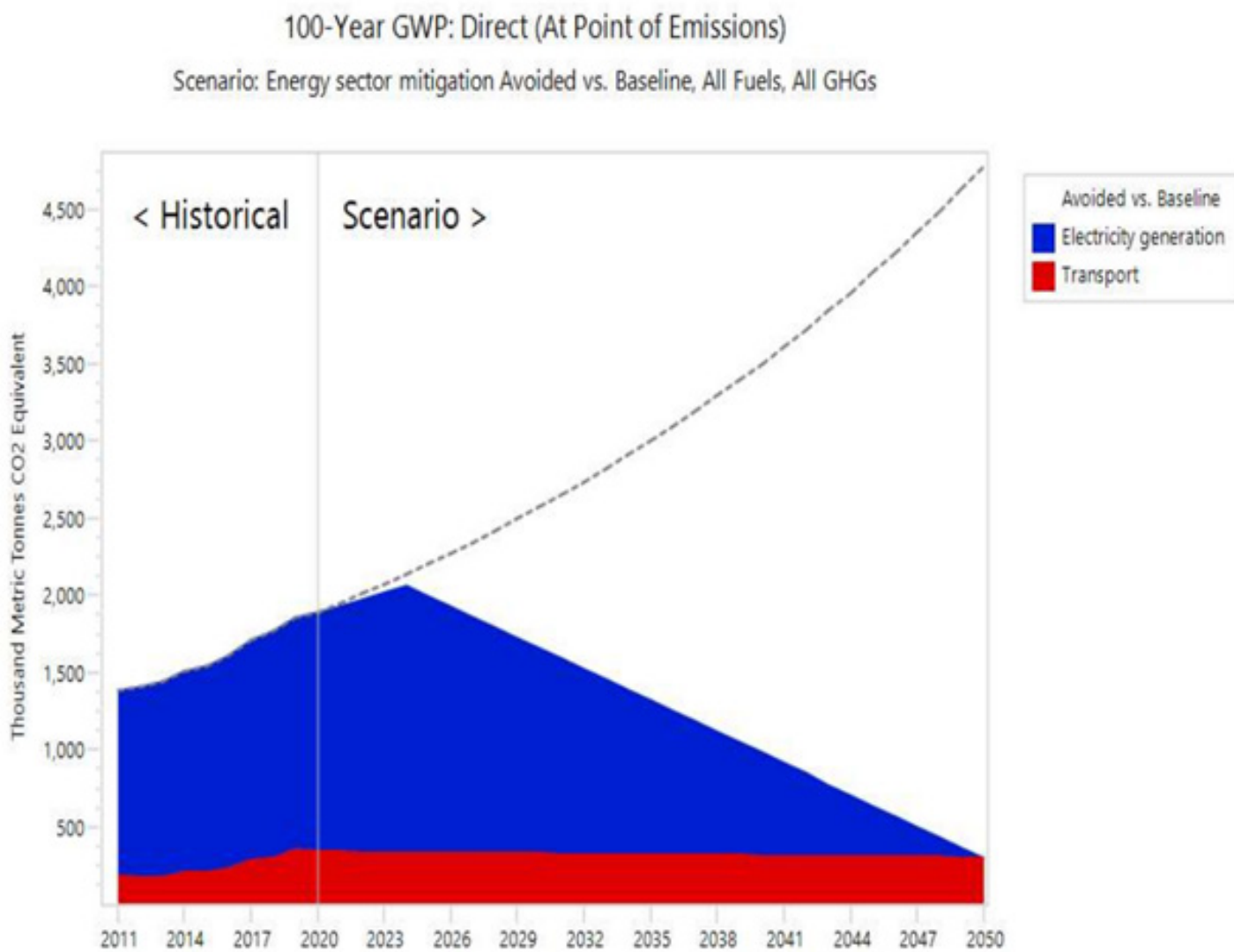


Figure 10: Energy sector mitigation measures

The Gambia has a total road network of 3,950km. Out of this figure, about 818.50 km is regarded as primary road, representing 20.9 percent of the total road network. The secondary road network is estimated at 359km. About 52 percent (187km) of these roads are situated in the urban areas. The untarred roads and rural feeder roads form the majority of road network within the country, comprising 65 percent (2,556 km) of the total road network. The total number of vehicles plying these roads from 2005 to 2016 is estimated at 84,056, (GBOS, 2016). This figure is further estimated to grow at an annual rate of 2.2 percent.

Due to rural-urban migration, more than 50 percent of The Gambia's population resides in the Greater Banjul Area (GBA). The high population of this area puts more pressure on the transport system. Traffic volumes on the busiest roads in GBA are in excess of 10,000 vehicles a day, whereas traffic in the rural areas are generally very low. The high traffic in GBA increases congestion and air pollution, thereby increasing GHG emissions in the area.





Traffic headed towards the Brusubi Roundabout (2022)

The government is committed to addressing the challenges emanating from increased demands for transport through efficiency improvements, including constructing alternative routes, flyovers and bypasses where deemed necessary, to ease traffic on the main link, and to invite private sector operators to participate in the development of the transport sub-sector. Overall, the infrastructure is in need of heavy investment and modernization that could offer opportunities to public private partnership ventures.

The transport sub-sector policy has set out plans to reduce GHG emission by widening the road networks, strengthening public transport and putting an age limit on vehicles that are imported into the country. The long term strategy is to reduce GHG emissions by introducing energy-efficient modes of transports, which have a GHG emission reduction target of 193.3 GgCO<sub>2</sub>e in 2030. The following GHG mitigation actions plans will go a long way in assisting the country to achieve a net-zero emission by 2050:

MA8: Vehicle Fuel Efficiency Standards

MA9: Vehicle emission Testing

MA10: Strengthening public transport system

MA11: Roads desiged with designated lanes for public transport, bicycles and pedestrians

MA12: Introduce in 2030 vehicle age limit

Currently, there is no regulation on fuel efficiency standards. The fuel sold by oil companies are of different quality and standards. This causes a lot of GHG emission from vehicles using low quality fuel. This calls for the need to introduce fuel efficiency standards to ensure all fuels sold in the country are of high quality. In addition, the introduction of vehicle emission testing will facilitate the setting up a GHG emission limit. This can be done

on vehicles operating within the country and used vehicles sent imported. At present, there is no age limit on vehicle importation. This increases the influx of vehicle that are not considered road worthy and those that are more likely to emit more greenhouse gases. Putting an age limit on vehicle importation will help the control the influx of old vehicles into the country. The proposed age limit is 3 years.



**Imported secondhand vehicles for sale on Kairaba Avenue (2022)**

There is a high level of traffic congestion in the Greater Banjul Area, which is due to narrow roads making it practically impossible for vehicles to move faster along the busy Tabokoto-Serrekunda highway and also along the Coastal Road leading from Brusubi roundabout to Kairaba traffic light along the Bertil Harding Highway. Traffic congestion is greatest along these highways, which slows down economic activity, increases GHG emissions and negatively impacts the GDP of the country. A remedial measure to this issue will be the widening of the roads to allow more vehicles to pass simultaneously, which will speed up travel time and reduce GHG emissions. Alternatively, the use of public transport, through the introduction of more buses, can be encouraged in order to reduce the number of private vehicles plying the roads during rush hours.

The implementation of the planned mitigation actions will help in reducing GHG emissions in the transport sub-sector from 1,026 GgCO<sub>2e</sub> to 315 GgCO<sub>2e</sub> in 2050. This shows that the implementation of the mitigation actions within the transport sub-sector will not lead to the achievement of a net-zero mitigation scenario by 2050. This calls for the need to implement more rigorous mitigation actions in the other sectors in order to achieve a net sink mitigation scenario.

## **(B) AFOLU Sector GHG Mitigation**

The LTV has set several GHG mitigation action plans for the AFOLU sector, which can assist the country in achieving a net-zero or net sink mitigation scenario by 2050. This will be achieved through the implementation of agro-ecology, promoting social protection for climate-induced impacts, forest protection, forest monitoring, afforestation, conservation agriculture, etc.. In addition, the vision strives to maintain 30% of the country's total land area under forest cover. With the implementation of these climate change mitigation actions, it is envisaged that there will be a reduction of 330 GgCO<sub>2e</sub> in 2030. The vision endeavours to promote environmentally friendly agricultural production and aims to achieve robust and sustainable land conversion processes. In a broader perspective, the following mitigation actions will be pursued to achieve a net sink GHG mitigation scenario within the AFOLU sector:

- MA13: Agro-ecological farming
- MA14: System of Rice Intensification
- MA15: Upland Rice Production
- MA16: Controlled timber harvesting
- MA17: Improved Manure Management
- MA18: Genetic improvement of livestock species
- MA19: Improved nitrogen-reduced animal feed
- MA20: Mangrove rehabilitation
- MA21: Afforestation and Reforestation

Enteric fermentation from ruminant livestock (cattle, sheep, goats, etc.) is one of the leading causes of GHG emissions from the livestock sub-sector. The situation is aggravated by the type of feed used by animals. Feedstuffs with more nitrogen are more likely to produce high rates of methane when consumed by animals. Therefore feeding the animals with reduced nitrogen feeds will reduce the methane emitted from their manure.



**Cattle grazing near the Salaji Forest Park (2022)**

The most prevalent livestock in the country is goat (378,231) followed by cattle (285,182) and least is sheep (176,984) (NASS, 2021). Most of these animals are concentrated in the Central River and Upper River Regions of the country. Animal husbandry is one of the main sources of income for farmers in the regions. The livestock owners in these regions mainly use free grazing during which animals are left on their own to fend for food or guided by a herdsman. Since animals are not confined to one place, there is limited choice as to the type of feed they consume. Most of them end up taking feeds with high concentration of nitrogen, which increases the likelihood of methane production through GHG emissions as a result of enteric fermentation.

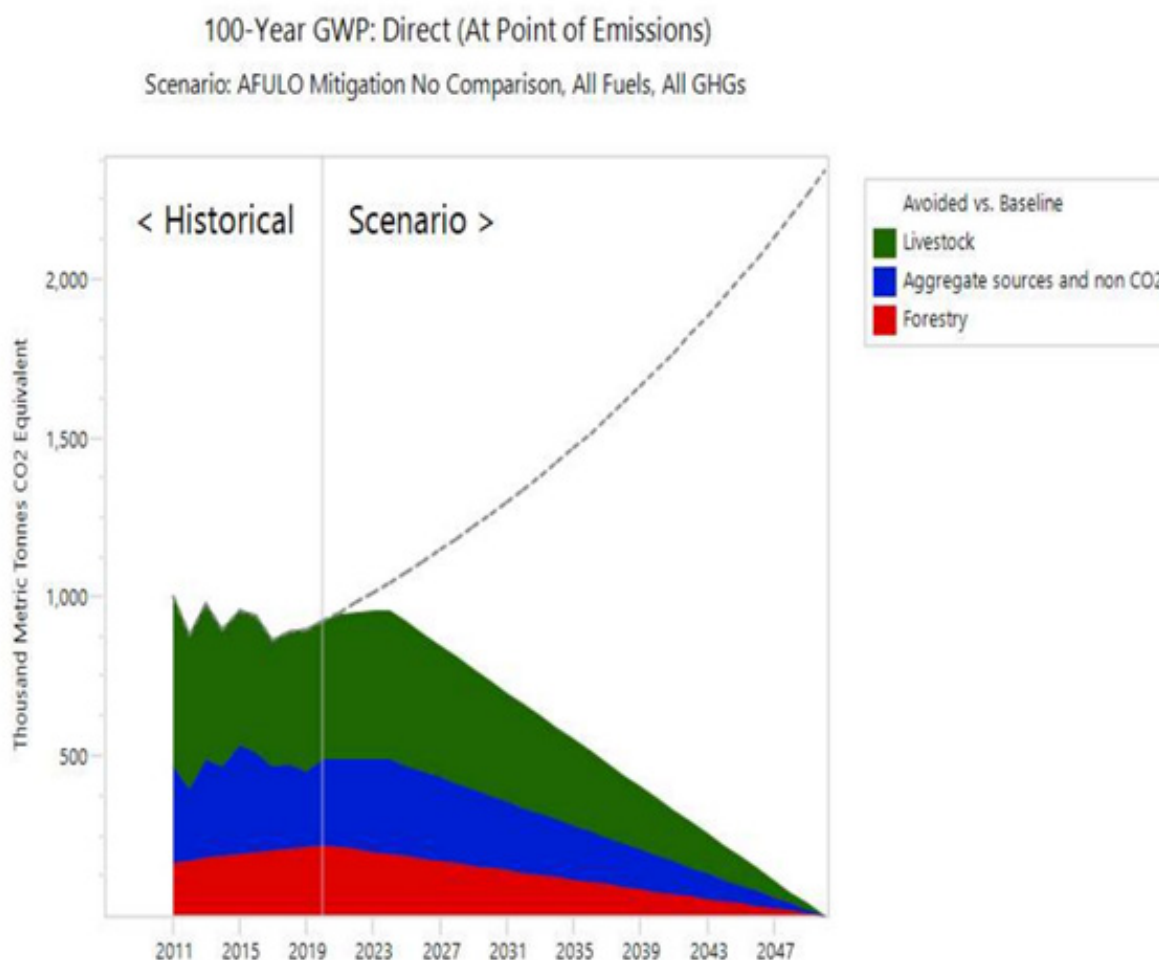
As a remedial measure, the GHG mitigation option on low nitrogen content, and feed additives and supplements will be pursued, by establishing range lands where feeds with low nitrogen content will be promoted and feed additives and supplements provided within the grazed land. This will help the animals to grow healthy, provide better income for livestock owners and significantly curb GHG emissions from enteric fermentation.

Crop production is another economic activity that significantly contributes to GHG emissions. To support crop growth, most of the farmers use chemical fertilizers, which contain high levels of nitrogen that is released into the atmosphere, thus increasing the level of GHG emissions. In 2019, a total land area of 100,810ha was put under coarse grain cultivation by smallholder farmers in the country. The amount of chemical fertilizers applied on this land was estimated at 1,410 tons, which translates to a fertilizer application rate of 14 kg per hectare as opposed to a recommended rate of 100kg per hectare for field crops (NASS 2019). This shows that with increased agro-ecological and improved manure management practices, farmers can be encouraged to reduce chemical fertilizer application to insignificant levels, which will help to significantly reduce GHG emissions from managed soils and urea application.



**Rice fields at Kuntaur, Central River Region (2020)**

Apart from coarse grain production, rice fields are another area where significant levels of methane are produced and emitted into the atmosphere. The demand for rice is estimated at 215,000 tons per annum. However, only 40,000 tons of this demand is met through local production (CIPRISSA, 2019). The huge gap is filled through rice importation. For this reason, the government set a rice self-sufficiency target by 2029 to close the gap between imports and local production. Efforts to increase local rice production are likely to increase methane emissions, since the rice hub of the country relies on flooded rice cultivation. As a mitigation measure, switching to a System of Rice Intensification (SRI), which discourages flooding of rice fields, would help in reducing methane emissions. In addition, promotion of upland rice production, which produces rice under minimum water requirement conditions, will further assist in reducing GHG emissions in rice fields.



**Figure 11: AFOLU sector mitigation measures**

The current land area under forest cover is estimated to be 271,200 which is approximately 24% of the total land area of the country (World Bank 2022). The LTV envisages that 30% of the country's total land area will be under forest cover by 2030. This means that 67,800 hectares (ha) should be put under forest cover through afforestation and reforestation efforts. With rigorous efforts to adhere to this trend, by 2050 about 203,400 ha will be put under forest cover.

There is high dependence of households on the forest. About 92% of households use the forest to provide fuel wood, charcoal and timber (GBOS 2017). The increased demand for farmland and settlements also puts a greater pressure on the forest cover. The reforestation and afforestation efforts, together with a ban on timber logging and control of bush fires will assist in achieving a net sink scenario by 2050, under the AFOLU sub-sector.



Fencing along the perimeter of Bijilo Forest Park (2022)

## (C) Waste Sector Mitigation

Waste management is becoming a growing concern in The Gambia. Most of the waste generated in the Greater Banjul Area is taken to Bakoteh dump site, which is located within one of the most populated areas in the country. There is continuous indiscriminate disposal of waste in the area, which is left to rot or burnt on regular basis creating environment pollution in the neighboring communities. The surrounding communities of the dump site are home to over 700,000 residents comprising 40% of the country's total population.

To mitigate the GHG produce from the waste sector, the following mitigation actions will be pursued:

MA22: Biogas from Organic Waste

MA23: Organic Waste Recovery

MA24: Waste recycling

MA25: Waste separation and collection



Illegal waste dumpsite at the edge of Salaji Forest Park, West Coast Region (2022)

These measures will ensure open indiscriminate dumping of waste is controlled. Through waste separation, recycling can be easily conducted. Separated organic waste can be turned into compost at household, ward and district levels. Though sensitization and training will be required. This will help to drastically reduce the amount of waste that is generated. When these mitigation actions are put in place and strictly followed, the country will be able to achieve a net zero scenario by 2050.

100-Year GWP: Direct (At Point of Emissions)

Scenario: Waste Emission Mitigation Avoided vs. Baseline, All Fuels, All GHGs

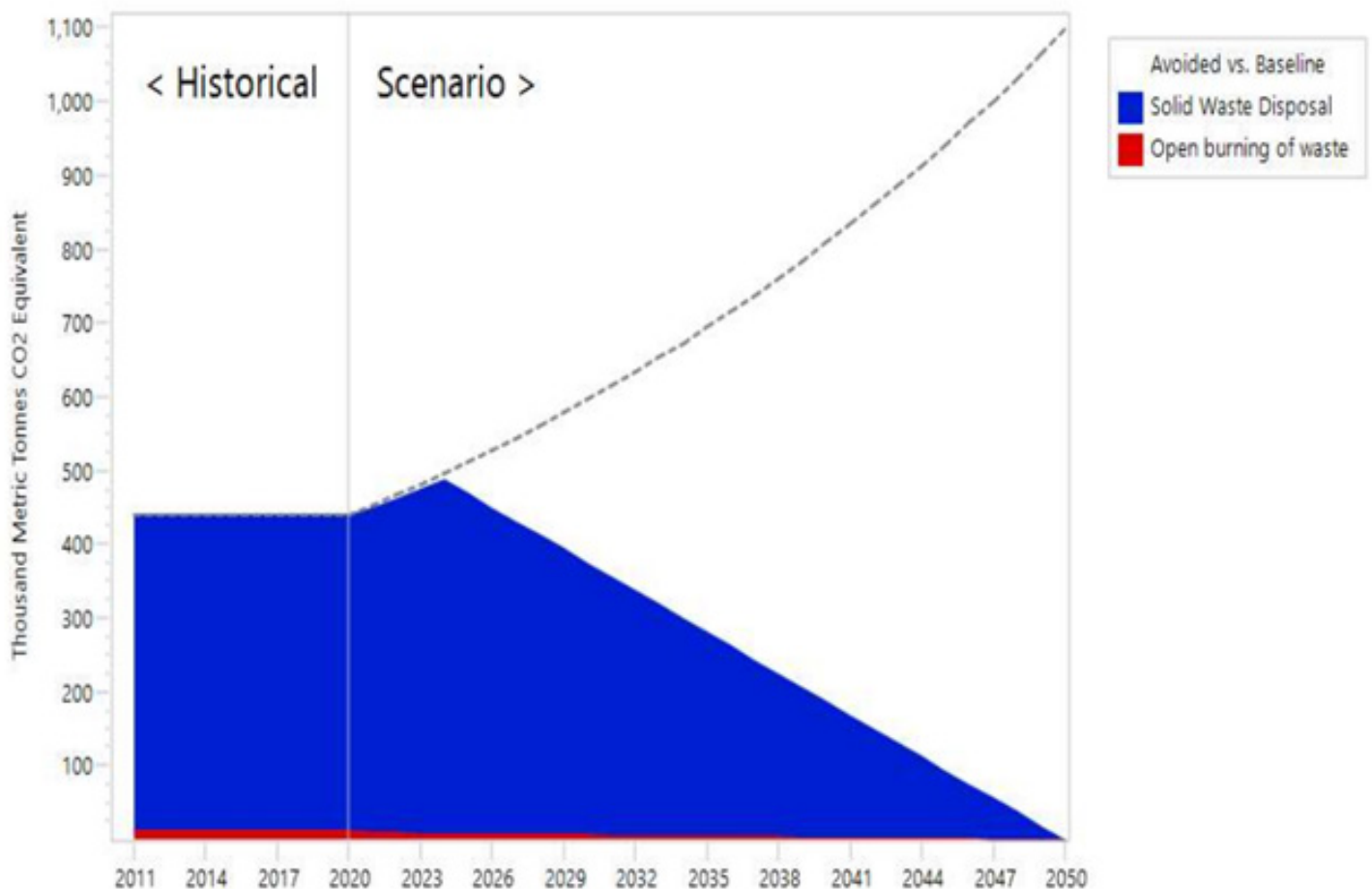


Figure 12: Waste sector mitigation measures

## 4.0 CLIMATE CHANGE RESILIENCE AND ADAPTATION



River Gambia, Central River Region (2021)

Agricultural activities are by their nature prone to numerous risks and uncertainties, be they abiotic (such as water, light, radiation, temperature, humidity or soil), biotic (including pests and diseases), or a result of prevailing cultural or economic conditions. Many of these risks have a climatic component and most of them will be affected by climate change, either in intensity, scope or frequency.

Climate resilient agriculture practices can help reduce hunger and poverty in the face of climate change. It is an approach that includes sustainably using existing natural resources through crop and livestock production systems to achieve long-term higher productivity and farm incomes under climate variability.

### **Strategies and technologies for climate change adaptation and resilience**

The two main types of adaptation are either autonomous or planned. Autonomous adaptation is the reaction of, for example, a farmer to changing precipitation patterns, in that she/he changes crops or uses different harvest and planting/sowing dates. Planned adaptation measures are conscious policy options or response strategies, often multisectoral in nature, aimed at altering the adaptive capacity of the agricultural system or facilitating specific adaptations. For example, deliberate crops selection and distribution strategies across different agroclimatic zones, substitution of new crops for old ones and resource substitution induced by scarcity.

Long-term adaptations are major structural changes to overcome adversity such as changes in land-use to maximize yield under new conditions; application of new technologies; new land management techniques; and water-use efficiency related techniques.

Climate change adaptation for agricultural cropping systems requires a higher resilience against both excess of water (due to high intensity rainfall) and lack of water (due to extended drought periods). A key element to respond to both problems is soil organic matter, which improves and stabilizes the soil structure so that the soils



can absorb higher amounts of water without causing surface run off, which could result in soil erosion

Conservation agriculture and organic agriculture that combine zero or low tillage and permanent soil cover are promising adaptation options for their ability to increase soil organic carbon, reduce mineral fertilizers use and reduce on-farm energy costs.

Trees and shrubs in farming systems (including agroforestry) can play a significant role in mitigating the impacts of extreme events and the resulting threats to food security. In addition to benefits such as the provision of wood and non-wood forest products, restoration of soil fertility, and the conservation of biological diversity, trees and forests improve the microclimate by buffering winds, regulating the water table, providing shade to crops and animals, and stabilizing coastal areas (e.g. through mangrove rehabilitation and afforestation). They thus contribute to sustainable agricultural production and food security.



Display of Non-forest products - Honey (2022)

Early warning and risk management systems are obvious and efficient contributors that can facilitate adaptation to climate variability and change in forecasting Crop yields.

Climate changes will also affect nomadic and transhumant livestock keepers. New routes and pastures will have to be found. The negative impact of ruminants on greenhouse gases emissions can be addressed through changes in animal husbandry including ruminant diets and animal stocking ratios to avoid nitrous oxides emission.

### **Energy sector (generation) Adaptation**

- Hydro energy power plant
- Renewable energy sources such as solar and wind household-based, institution-based and or community-based especially for remote communities;
- Use of efficient cooking stoves which are more fuel efficient and can use other forms of fuel such as briquettes;
- Introducing energy-efficient lighting and appliances,
- Energy-efficient buildings (energy efficiency and savings);
- Use of alternate energy operated motor vehicles, including cars and motorcycles
- Pursuing environmentally sustainable transport strategy;
- Solar water heating systems in the tourism sectors.



OMVG Transmission lines in West Coast Region (2021)

## Transport sector

- Vehicle fuel efficiency standards
- Use of electric vehicles
- Introduction of vehicles using low emission fuel
- Vehicle emission testing
- Strengthen vehicle emission testing
- Strengthen public transport system
- Designated lane for public transport, bicycles, and pedestrians
- Encourage Car sharing mechanism
- The application of vehicle age limit for importation (maximum 10 years) in 2030

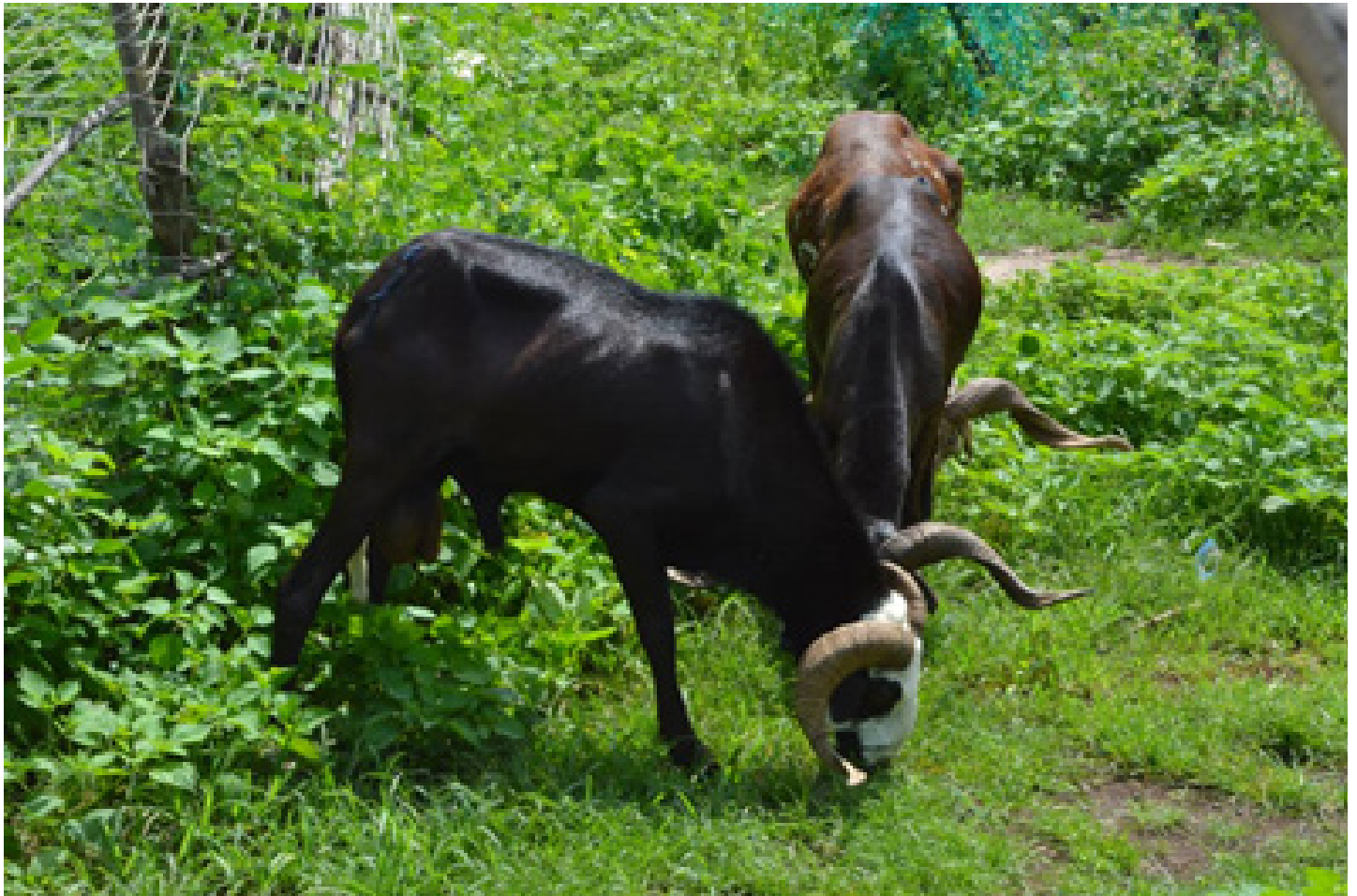


Senegambia Bridge (2020)

## AFOLU sector adaptation measures are divided into:

### 1. Agriculture sector

- Agro ecological farming
- Systems of rice intensification
- Upland rice production
- Implementing climate-smart agriculture (promote crop varieties with a higher heat/drought tolerance, short cycle varieties)
- Promoting cultivation of halophyte crops (control primary salinization)
- Using saline resistant varieties and grafting techniques in traditional crops
- Reducing food losses (Improved harvesting techniques; adequate storage to limit exposure to moisture, heat and pest infestation using metal silos; applying mobile processing units, solar dryers, graters and pressers and cold storage capacity.
- Exercise water management, soil amendments, organic matter management, different tillage, rotation, and cultivar selection.



## 2. Livestock subsector

### a. Enteric fermentation

- Improving production efficiency, quality of forages, processing feeds to improve digestibility, and adding grain-based concentrates to livestock diets
- Feed additives and supplements
- Reducing emissions from livestock manure through balanced feeding
- Lowering the nitrogen content of the animal feeds
- anaerobic digestion for methane production for use as a source of cleaner energy
- Herd management and breeding including basic disease prevention and providing shelter for the animals, as well as high-end genetics;
- Introduction of household-based, community-based and animal farm-based biogas facilities;

### b. Manure management

- More efficient use of manure as an energy or crop nutrient source.
- Simple storage and handling practices such as reducing storage time, covering the manure, avoiding straw/hay bedding can reduce emissions from stored manure

## 3. Land use, land-use change, and forestry (LULUCF)

- Forest inventory
- Controlled timber harvesting
- Changes of species and genetic management
- Reforestation, regeneration and afforestation techniques
- Controlled fires



Mangroves at Lower River Region (2021)

**Waste sector adaptation measures are:**

- Biogas from organic waste
- Organic waste recovery
- Integrated waste management
- Municipal waste separation and collection system
- Build facilities that will process solid waste generated into usable materials (recycling)
- Construct biogas facilities for utilization of waste into electricity and fertilizers
- Improve landfilling practices of residues
- Composting of separated waste materials.



Open burning of waste at Kotu (2022)

## 5.0 STRATEGIC PRIORITIES, TARGETS AND MEASURES

### 5.1 De-carbonization to achieve carbon neutrality: mitigating greenhouse gas emissions

#### Introduction

The concept of carbon neutrality has increased the awareness of a wide range of actors in light of the challenge of combating climate change, thus facilitating the empowerment of all the agents in this stage of the transition, a process essential for adapting to and dealing with this climate phenomenon.

A decarbonisation programme will set out the energy transition required to reduce energy consumption, improve energy efficiency and promote energy production from renewable sources, among other targets. Similarly, decarbonisation also encompasses a shift of model towards more sustainable, connected and safer mobility.

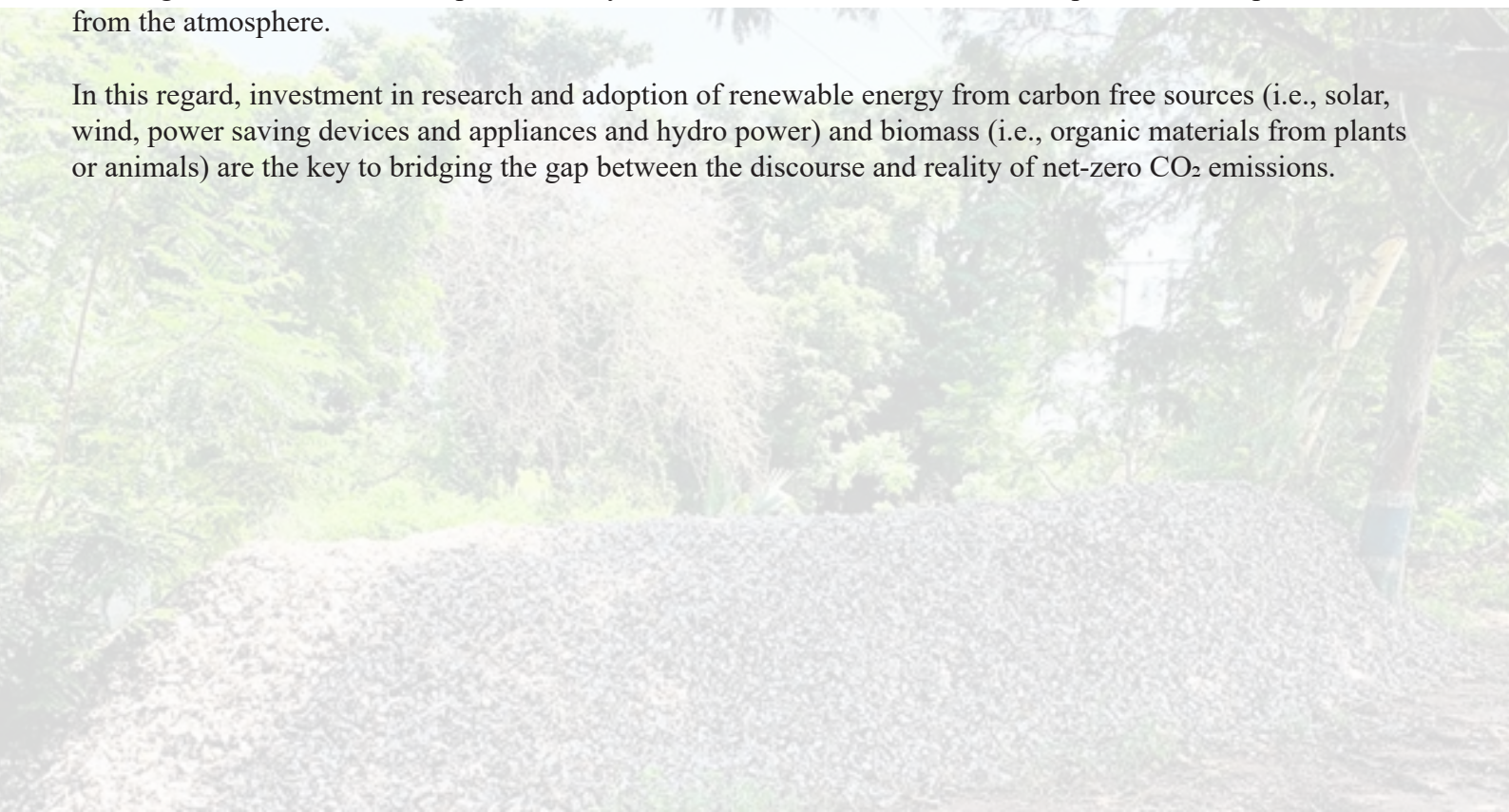
Although the other economic sectors account for some percentage of domestic GHG emissions and given that the mitigation actions often represent synergies with each other, the decarbonisation programme also aims to boost the circular economy as a new economic model for promoting savings on resources, chiefly materials, energy and water, and generating fewer emissions than the linear consumption models.

The main objectives in terms of the energy transition are the improvement of the electricity sector, the promotion of renewable energies and high-efficiency energy technologies and the encouragement of energy savings and energy efficiency. More specifically, the set of activities envisaged for each of these sectors are outlined below.

#### 5.1.1 Energy (electricity generation)

With the extensive use of fossil fuels, deforestation, and other forms of land-use change, anthropogenic activities have contributed to the ever-increasing concentrations of greenhouse gases (GHGs) in the atmosphere, causing global climate change. In response to the worsening global climate change, achieving carbon neutrality by 2050 is the most pressing task on the planet. To this end, it is of utmost importance and a significant challenge to reform the current production systems to reduce GHG emissions and promote the capture of CO<sub>2</sub> from the atmosphere.

In this regard, investment in research and adoption of renewable energy from carbon free sources (i.e., solar, wind, power saving devices and appliances and hydro power) and biomass (i.e., organic materials from plants or animals) are the key to bridging the gap between the discourse and reality of net-zero CO<sub>2</sub> emissions.



Among clean energies, renewables, such as solar energy, wind power, and hydro power energy, are regarded as some of the most important and efficient means to achieve carbon neutrality. Core technologies for renewable energy (figure 13), and the effects of these technologies on realizing carbon neutrality, are shown below.



Figure 13. Core technologies for renewable energy production

## 5.1.2 Agriculture

Strategies to reduce emissions in the agricultural sector include improved practices to enhance soils as a carbon sink; technologies and materials to reduce crop-related emissions and to reduce and capture livestock emissions; and shifts in consumption patterns toward less carbon-intensive foods.

Carbon storage can be enhanced through cultivation techniques that convert atmospheric CO<sub>2</sub> to carbon-based compounds in the soil, while also reducing erosion and the need for fertilizers and providing other benefits. These techniques include increasing the mass and quality of plant and animal inputs to soils; improving soil microbial diversity and abundance; and maintaining living plant cover on soils year-round. Breeding and choosing plants with long roots or other characteristics favoring sequestration can also enhance agricultural sinks.

N<sub>2</sub>O emissions can be reduced through improved management of nitrogen fertilizer use, such as better tailoring the quantity and timing of applications, improving fertilizer formulations, and applying fertilizer directly to roots. Fertilizer use can also be reduced through precision agriculture, which uses advanced technology such as sensors and data analysis to fine-tune the application of farm inputs to field conditions. Precision agriculture can also reduce fuel requirements by reducing the areas that receive agricultural inputs and the number of applications.

Enteric fermentation emissions from livestock can be reduced through feed management and by breeding livestock that already adapted to harsh living conditions through genetic modification. Such measures could include: (i) identifying and strengthening local breeds that have adapted to local climatic stress and feed sources and (ii) improving local genetics through cross-breeding with heat and disease tolerant breeds. A number of feed additives and supplements that could reduce enteric fermentation emissions could be developed and tested for their effectiveness and long-term impacts to animal health. Lowering the N content of animal feed is another adaptation practice that could be developed for the rural poor.

Improved manure collection systems could maximize biogas production and minimize emissions, and developing methods of manure collection from pasture-grazed animals could extend the use of this technology to pasture.

Consumer adoption of meat and dairy alternatives could lower emissions by reducing livestock production. Continued livestock production can play a role in lower-carbon agriculture by producing manure fertilizer and consuming crop by-products that are inedible for humans and would otherwise be farm waste.

### 5.1.3 Land use, land-use change, and forestry (LULUCF)

Opportunities to reduce emissions and enhance carbon storage in the LULUCF sector focus on maintaining or adding forests and slowing conversion to settlement or agriculture. Increased use of wood in construction, in place of materials like steel or cement with higher carbon footprints, can incentivize private forest owners to keep land forested, thereby maintaining and enhancing forests as a net GHG sink. While bushfire is not currently a large emission source, forestry management to reduce the risk of fires would reduce future carbon releases, especially given longer fire seasons caused by climate change. Existing forests can be managed for greater carbon sequestration through fertilization, irrigation, switching to fast-growing planting stock, increasing intervals between harvests, decreasing harvest intensity, and increasing forest density through afforestation and reforestation techniques.



Planting mangroves at Banjul Tanbi Wetland (2022)



## 5.1.4 Transport

Climate change cannot be stopped without decarbonising the transport sector. Transport emits around 23% of the energy-related CO<sub>2</sub> that feeds global warming.

Without immediate action, its share could reach 40% by 2030. Transport emissions have grown faster than those of any other sector over the past 50 years. Demand for transport will continue to grow massively in the coming decades. As a result, CO<sub>2</sub> emissions from transport activity will not fall, but could increase by 60% by 2050. And because transport relies on oil for 92% of its energy, it is particularly hard to decarbonise.

Over the long term, with policy interventions, it would be possible to reduce road transport GHG emissions in 2050 by 50-95% from 2010's level. To achieve the largest emission reduction potential of 95%, vehicle electrification, vehicle emission testing policy, vehicle fuel efficiency improvements, vehicle fuel efficiency standards, introduction of vehicles using low emission fuel, revive the river transport for goods and passengers are critical.

## 5.1.5 Waste management

Regarding the waste sector, emissions mostly arise from decomposition of organic matter in landfills, wastewater treatment processes and combustion of residual waste in energy from waste plants.

Mitigation options considered include reduced landfill methane generation, through waste prevention, recycling and banning biodegradable waste from landfill, organic waste recovery, increased landfill methane capture and oxidation, waste separation and collection, improvements at wastewater treatment and composting facilities.

## 5.2 Sector-specific measures and cost of actions and interventions

The cost estimates for the mitigation measures identified in this document are based on past costing of climate change mitigation actions in the country. According to an investment assessment conducted on climate financing, The Gambia will need USD4.00 billion by 2050 to address climate change mitigation and adaptation issues within the country. The emission estimates obtained from the modelling exercise for the different sectors were used as a basis to estimate the cost of mitigation actions in the LTS.

The overall cost estimates for the different sectors are presented in Table 2 below and the detailed costings for each sector and sub-sector can be found in Appendix 2. The cost estimates are presented to give a broader picture of the investment required for GHG mitigation actions in the different sectors or sub-sectors. A more detailed costing will be required during the actual programming for implementation of the mitigation actions.

**Table 2: Cost of climate change mitigation actions**

Sector	Cost – USD `000			
	Total	Short term	Medium term	Long term
Energy	2,474,000	865,000	605,000	1,004,000
Trasport	416,200	212,650	110,800	92,750
AFOLU	1,061,000	471,000	321,000	269,000
Waste	75,000	41,000	20,500	13,500
<b>Total</b>	<b>4,026,200</b>	<b>1,589,650</b>	<b>1,057,300</b>	<b>1,379,250</b>

The cost estimates are for today's prices and may be subject to revision during actual implementation of the LTS. The breakdown into short, medium and long-term may also be revised during implementation. The success of the LTS is conditional on the provision of international support.

## 5.2.1 Financing investment (funding) roadmap for the implementation of the LTS

The investment (funding) of the LTS will have to cover the mobilization of finances for the National Climate Change Fund, SPCR, NDC2, NAPs initiatives, MRV system and Capacity Building for climate change. The sources for funding will include national, regional, international (bi-lateral and multi-lateral) through the UNFCCC financial mechanisms, Multi-lateral Development Banks (MDBs), Development Partners, UN Agencies and Other Donors.

In general, direct funding for climate change interventions in the Gambia is project driven from donor partners. Most of it from the Least Developed Countries Fund (LDCF) through the GEF and recently from the Green Climate Fund (GCF). The other sources of funding include United Nations Development Programme (UNDP), Food and Agriculture Organisation (FAO), World Bank, African Development Bank (ADB), International Fund for Agricultural Development (IFAD) and French Development Agency (AFD).

From 2017 to date, estimated total climate funding received by The Gambia from various funding agencies and development partners is at least USD263 million, with USD46 million in the pipeline.

With regard to climate investment plan, the SPCR is currently the only blueprint document for the country developed under the PPCR, however a roadmap is yet to be developed apart from the Financial Instrument and Marketing Mechanism identified by the NCCP. The Financial instrument and marketing mechanism and the concept notes in the SPCR can form an important basis for a climate finance roadmap.

According to the NCCP, The Gambia relied heavily on external project-based funding to address climate change which results in an ad hoc approach to addressing climate change, rather than a sustained, systematic and integrated policy or programmatic approach. As it stands, sufficient long-term and predictable financial resources are required to implement the LTS as well as institutionalize cross sectoral planning and other cross cutting issues of climate change to address its impacts in the country.

## 5.2.2 Roadmap to mobilize finances

### 2022 to 2025-NCCF

The National Climate Change Fund was established as recommended in the National Climate Change Policy of 2016. The Ministry of Finance and Economic Affairs (MOFEA) will be the custodian of the fund, together with the Ministry of Environment, Climate Change & Natural Resources (MECCNAR), with both being joint signatories to the account. When fully operational, it is expected to fund climate change interventions in the country with accessibility to include local levels. Currently, there are no funds in the account. MECCNAR will be working with MOFEA to request GOTG to provide seed money to operationalize the account. GOTG will also work with development partners to organize a donor round table conference in order to mobilize funds.

### 2022 to 2030- SPCR

The SPCR has four concept notes with a total investment envelope of USD315,850,000. Each of the Concept Notes could be further developed into projects for implementation and increase climate finance into the country. Ministry of Environment, Climate Change & Natural Resources (MECCNAR) will coordinate with relevant sectors and collaborate with international and UN Agencies to transform the concept notes into project proposals for funding from the UNFCCC financial mechanisms and other bilateral and multi-lateral funding agencies.

### 2022 to 2030- NDC2

The current Second NDC of The Gambia has set the year 2030 to achieve its ambitious targets. It is accompanied with an initial 5-year work plan, estimated a little above that of the SPCR at USD400 million. Most of the NDC2 targets are conditional upon the receipt of international support, either through UNFCCC processes or through support from the bilateral and multi-lateral funding processes.

## Strategic priorities, targets and measures of the LTS 2022 – 2050

The various identified costs of the strategic priorities, targets and measures of the LTS are estimated in three phases; short-term, medium term and long-term (See table 1). Mobilizing and accessing funds for the implementation of these strategic priorities and measures will have to follow the methods use in mobilizing and accessing funds for the SPCR and the Funding of the NDC2.

### 2022 to 2030- NAPs initiatives

Although the SPCR's CNs will address certain aspects of adaptation, in the areas of building the enabling environment and resilience infrastructure, and research in climate change, it is largely inadequate to address the adaptation needs in the face of climate change. Through international donor grants and Government public funds, the country needs to mobilize more than triple it has already received to date, to address adaptation initiatives and building resilience to climate change.



Sea defences against beach erosion to protect a hotel in the Kotu Area (2022)

### 5.2.3 Education, Awareness Raising, Research, Technology, Development, State of climate mainstreaming in the educational system, R&D, and Innovation

Climate change is, to a certain extent, incorporated in the educational curriculum of some national academic institutions. However, climate is still not adequately incorporated in the overall national educational system. Currently, it is only the University of The Gambia (UTG) that has a postgraduate programme on climate change.

Capacity-building, institutional training and public sensitization are prerequisite requirements for empowerment of the citizenry in the combat to address climate change. Institutions and individuals must have strengthened

capacities in order to undertake climate change activities. By 2030 USD50 million will need to be mobilized for institutional strengthening, human resource capacities and sensitisation initiatives, and USD30 million thereafter.

During the development of the LTS, MECCNAR and MOFEA identified the American International University West Africa (AIUWA) as the Legacy partner that would spearhead the capacity building framework, and the strategy for transferring knowledge on the foundations of the LTS.

AIUWA will establish a College of Climate Change, Environment and Public Health in 2023, to initially offer a degree programme leading to **BACHELOR OF SCIENCE (Honours) IN CLIMATE CHANGE AND ENVIRONMENTAL SCIENCE (BSc (Hons) CCES)**.

The curriculum and course modules of the proposed course were validated at a workshop held on 26<sup>th</sup> and 27<sup>th</sup> May 2022, attended by various stakeholders including MECCNAR, Ministry of Higher Education Research Science and Technology. This curriculum is ready for use by any accredited institution of higher learning in The Gambia.

**The Budget from AIUWA for the BSc (Hons) CCES Programme is found in Table 3 below.**

Table 3: Budget for the BSc (Hons) CCES Programme at AIUWA

Activity	Cost per person per year	Cost per person for 3 years (Duration of Course)
BSc (Hons) in Climate Change and Environmental Science	USD3,100	USD9,300

For the degree programme to kickstart, funding would have to be sought for scholarships for an initial cohort of at least 20 students at a cost of USD186,000. Gradually, private students would enroll from The Gambia and beyond, as well as students sponsored by public and private institutions.

During the preparation of the LTS, the Islamic Development Bank (ISDB) was one of the stakeholders consulted for possible interventions in the capacity-building initiatives of the LTS. Their response was positive.

It is fundamental to mainstream climate change-related aspects into future national strategic planning documents related to education, R&D and innovation. This would assure the systematic and harmonized integration of climate-related aspects into the national educational, R&D and innovation ecosystem, as well as increase educational and research capacities and climate awareness.

The strategic integration of climate change at all levels of the educational system should include the provision of additional funding for climate-related research activities, to raise public awareness, and to establish centers of excellence.

A lot more has to be done to assure that the R&D community will be well positioned to support national authorities in the processes of informed decision making and evidence-based policy creation. Climate mainstreaming in the country may be significantly improved by enhanced institutional capacities and the establishment of sound mechanisms for inter-sectoral cooperation. Currently, the climate capacities of the MoHERST are limited, especially in terms of technical expertise for reporting towards international organisations, as well as for monitoring and reporting of policies, measures and projections.

When it comes to innovation in the field of climate change, many things need to be initiated and implemented in the next few years. The Fund for Innovation and Technology Development should be established and a Support Instrument of the Fund be launched in order to support innovative and improved technologies, know-how and technology processes, and to encourage different forms of collaboration among small and medium

enterprises (SMEs), business associations, clusters and/or chambers of commerce.

## Climate awareness in the country

The lack of financial and human capacities for the systematic support of climate awareness raising in the country limit the outreach of experts. Currently, most climate related awareness raising activities are supported by donor funded initiatives.

Awareness-raising should be a horizontal priority in all policies and measures used to promote climate action in The Gambia. Growing societal awareness and appreciation can drive enhancement of socio-cultural and/or environmental values in the context of climate change and build up momentum for overarching climate mitigation and adaptation action.

The awareness-raising process should be systematic and build society and policy-makers' knowledgebase, contributing to mainstreaming climate action and ensuring that policy options are optimized. Climate action's success ultimately depends on the engagement of all stakeholders. Intensive science policy dialogues and new approaches and tools to involve the public and business sector are essential to raise climate awareness and successfully implement climate action in the country.

## Measures for climate mainstreaming in the education, R&D, innovation, and awareness raising

It is recommended for the Government of The Gambia to:

- Regularly and systematically implement measures aimed at raising awareness on climate-change related issues;
- Ensure that climate-change-related issues are integrated into primary, secondary and tertiary curricula.

In addition to the above, both primary and secondary measures can be used for enhanced climate mainstreaming in the Education sector, R&D, innovation and awareness raising.

Primary set of measures to be implemented by the Government and relevant Ministries include:

- Mainstream climate change related aspects into a National Strategy for Education.
- Mainstream climate change related aspects into a National Strategy for Gender Equality.
- Develop an action plan for the introduction of climate-related education into the curricula of all education levels and in lifelong learning, teacher education and in-service training.
- Develop a national programme for climate awareness raising.
- Establish a coordination mechanism on climate change education among all relevant stakeholders.
- Allocate resources for the implementation of climate change education activities on all educational levels. Long-term Strategy on Climate Action and Action Plan
- Allocate resources for the implementation of climate change awareness raising activities in which a number of behavioral measures will be promoted, such as sustainable food production, vegan diet and lifestyle, environment and climate friendly consumer practices, primary waste selection, local waste composting, promotion of local and low carbon products, etc.

### 5.2.4 Advocacy, mobilization, communication and information, other socio-economic impacts

All communication activities make use of some form of media or channel of communication (e.g. mass

media, community media, and interpersonal communication [IPC]). While much of the communication effort on LTS is concerned with transmitting a series of messages to people affected by climate change, nearly all communication practitioners stress that to be effective, communication should be understood as a two-way process, with participation and dialogue as key elements.

A wide range of service providers based in communities and other government ministries and departments will need to be targeted, including the informal sector, which is often used by the poor and marginalized. Proper delivery and information systems to allow for the utilization of the LTS between different geographical areas will need the involvement of communication and information management experts as well as NGOs and CBOs.

Mobilizing resources, building partnerships, networking and community participation are all key strategies for social mobilization. Specific activities include group and community meetings, partnership sessions, school activities, traditional media, music, song and dance, road shows, community drama, soap operas, puppet shows, karaoke songs and contests. Other activities unique to a particular region may provide even better opportunities to engage and motivate individuals.



**Bijilo Forest Park (2022)**

## 6.0 INSTITUTIONAL FRAMEWORK AND MODALITIES FOR IMPLEMENTATION OF THE LTS

### 6.1 Governance, Monitoring and Review

#### Governance

The Gambia already has a robust governance structure clearly spelt out in the NCCP, which formed the basis for the governance structures in the elaboration process of the LTS, and which would serve as a lean and effective governance structure for the implementation of the LTS. Since the same structure would also oversee the implementation and revision of the NDCs, it would be prudent and cost-effective to have the 2 programmes overseen by the same governance structures.

As stated in the NCCP, an Inter-ministerial Climate Committee (IMCC), made up of the Permanent Secretaries and Directors of the line ministries represented in the NCCC, shall be formed to assist the NCCC in carrying out its functions. The Committee will be co-chaired by the Permanent Secretary MECCNAR, along with the Permanent Secretary MOFEA. The Steering Committee and Technical Working Group established as part of the governance structure for the elaboration of the LTS, were basically the IMCC split into two - one group formed of Permanent Secretaries (Steering Committee) and the other of Directors (TWG). To avoid duplication, and for continuity the TWG and Steering Committee membership as applicable, can be merged into a fully functioning IMCC, that would hit the ground running.

As also stated in the NCCP, the Climate Change Secretariat (CCS), housed at MECCNAR shall have the mandate of working with sectors and institutions on integrating climate change into the national and sub-national plans, and coordinating the implementation of the LTS. The CCS shall work closely with the Directorate of Planning at the Ministry of Finance and Economic Affairs. The CCS oversaw the overall coordination of the LTS elaboration process. The CCS shall chair a Core Team (CT) of local and international stakeholders that was created during the development of the LTV, and maintained for the elaboration of the LTS. This CT was able to meet at very short notice in order to brainstorm and tackle issues as they emerged during the development of both the LTV and LTS. It will be essential to maintain it during the elaboration of the LTS.

The National Audit Office (NAO), being the apex body in accordance with the 1997 Constitution of The Gambia responsible for auditing all public projects and programmes, shall carry out statutory and performance audits on the outcomes of the LTS and NDCs.

#### Monitoring

In line with the NCCP a robust and participatory monitoring framework will be developed to undertake regular monitoring and rigorous evaluation of the LTS. The purpose of this will be to monitor progress towards the delivery of its NZ emission target, and to identify the impact of its implemented actions.

The framework would be twofold - developing a monitoring and evaluation (M&E) plan and a Monitoring, Reporting and Verification system (MRV)<sup>2</sup>. It would be transparent, efficient and allow for civil society engagement, as well as international reporting.

---

<sup>2</sup>By 2027, Canada will grant 20 million Canadian dollars to four West African Countries - The Gambia, Ghana, Togo and Liberia – to support them in setting up functioning MRV systems.

Each sector would identify the performance indicators that will be formulated to track resilience and measure progress of implementation, over different time scales and at different administrative levels. Disaggregated indicators and outcomes will be tracked, including age- and gender-disaggregation, to ensure correct targeting and to guide responses towards assisting the poorest and most vulnerable people and groups. Data collected from different sources would have to be tailored for compatibility.

MRV is a new concept that would require training on its design and implementation. Once the MRV system is set up, existing data would be reviewed and data needs assessed.

Implementing institutions would be assessed and where gaps exist, have their capacities enhanced in MRV standards and procedures. Investment and capacity building will be required to improve the ability of stakeholders across all sectors to produce, collate, and assess new types of data.

Feedback from the monitoring framework would indicate where the LTS is falling short and therefore would need readjustment in order to meet its target of NZ emissions by 2050. The National Climate Change Council would have overall responsibility for overseeing the monitoring framework.

## Review

The LTS is a dynamic document that would have to be updated regularly if it is to remain fit for purpose in an increasingly changing global world. Some adjustments may be necessary, taking into account advances in technology, changes in national socio-economic circumstances and rate of progress of implementation of the LTS. The Gambia will review and update its LTS every five years. The review process will be all-inclusive involving all stakeholders – both public and private, local and international. The CCS will coordinate the review process in close collaboration with the Directorate of Development Planning at MOFEA.

## 6.2 Innovative delivery mechanisms to operationalize the LTS

In 2019, a creation of the Least Developed Countries Group called the LDC Initiative for Effective Adaptation and Resilience (LIFE-AR), was launched during COP 25 in Madrid, Spain. The Gambia was chosen as one of six beneficiary countries to pilot the programme.

At the time the LTS was being formulated, LIFE-AR was yet to be launched in The Gambia<sup>3</sup>. However, given the importance of the initiative in the implementation of the LTS, MECCNAR decided to organize a workshop on LIFE-AR on 17<sup>th</sup> August 2022. During the workshop, the background, objectives and purpose of LIFE-AR were presented to key stakeholder participants, after which interactive discussions were held, allowing for the collection of inputs for key strategies and design of a tailor-made LIFE-AR programme for The Gambia. When the LIFE-AR is fully launched in The Gambia, the delivery mechanisms in the LTS identified from the 17<sup>th</sup> August 2022 workshop would be reviewed and revised accordingly.

A total of 49 participants attended the workshop in person and 3 virtually, including officials from MECCNAR, Office of The President, Ministry of Finance and Economic Affairs, Brikama Area Council, Kanifing Municipal Council, Gambia Women's Chamber of Commerce, All Gambia Forestry Platform (AGFP), the National Coordinating Organisation of Farmer Associations Gambia (NACOFAG), American International University West Africa, United Nations Development Programme (UNDP) and the International Institute for Environment and Development (IIED).

<sup>3</sup>The concept was introduced to MECCNAR by a team from IIED; a Focal Point and Coordinator were appointed; Task Team to oversee the development process was established



## Overview of the Objectives and Purpose of LIFE-AR:

- To develop long-term climate adaptation interventions and investments that reach local levels
- Build resilience and address poverty in support of LDC Visions
- Develop a whole of society strategy with core delivery mechanisms – enabling coherent responses to the triple crises of climate change, nature degradation and poverty
- Multi-stakeholder approach including ministries of finance, planning, environment, local government and all relevant Government departments, as well as civil society, the private sector and academia, for a more effective response
- Reduce high transaction costs - designing core delivery mechanisms that aggregate climate action into large investment portfolios
- Delivering at least 70% of climate finance towards communities' priorities
- Design mechanisms that support systemic early action that reaches the most vulnerable households to climate disasters
- Strengthening LDC's institutions' climate capabilities, with agreed operating rules, highly transparent budgets and investment decisions, accountability mechanisms
- Holistic governance centered on gender and social inclusion

Workshop participants were divided into two groups and each group was tasked to address the following questions:

- 1) **What are the mechanisms that would enable the implementation of the LIFE-AR process as part of Gambia's LTS?**
- 2) **Are existing sectorial policies/strategies adequate to accommodate the LIFE-AR initiative, if not any suggestions?**

## OUTCOMES AND RECOMMENDATIONS FROM THE GROUP DISCUSSIONS

1. Establishment of a legal framework such as a Climate Change Act
2. Operationalize the Climate Change Fund
3. Government to provide the private sector with incentives and the certainty needed to commit investments in financing mitigation projects, including public-private partnerships
4. Climate finance governance to be more accountable, transparent with increased public and gender-equitable participation in decision-making.
5. Empower local government authorities to deliver more public services, whilst also opening opportunities for broader grassroots participation, including through informal institutions
6. Institutional Strengthening to include capacity building in carbon trading, which is an option for closing financing gaps, and environmental services.
7. Sensitization and popularization of the LIFE-AR concept
8. Float a green bond, administered by the Central Bank of The Gambia
9. Build fiduciary capacity to enable The Gambia have Direct access funding arrangements, empowering the country to manage financing without international intermediaries. Funding decisions, fund management, and oversight will all occur at the national level. This could lead to line ministries becoming accredited to receive, manage, and hold liability for international funds through direct access arrangements
10. Ensure every ministry has a climate change focal point and one alternative
11. The Gambia's Climate Change Policy has a target of 50% of financing to reach beneficiaries, which is lower than the 70% LIFE-AR target. The policy when reviewed or updated to revise the target upwards to 70%
12. Empower farmer organizations, CBOs, CSOs, NGOs and other bodies through participatory budgeting and rigorous monitoring and evaluation for delivery of public programmes
13. All ministries to have a climate change budget code created, in order to track climate-related expenditure for effective implementation, ensure domestic resources are directed towards climate change



**Group photo of participants at the LIFE-AR Workshop**

## 7.0 CONCLUSIONS

On 4<sup>th</sup> September 2022, members of the public were chosen at random and asked the following question:

### What can you say about Climate Change?

For greater transparency regarding the outcome of the public consultation process, comments and inputs received are summarized as follows:

- *People need to be sensitized, for them to understand that climate change is a real threat.*
- *Basically, climate change is caused by human beings. We are the sole cause of climate change. As we indiscriminately exploit our natural resources, so shall we see the consequences of our actions.*
- *Climate change should be looked at critically, with the authorities devising mechanisms to address it.*
- *We are suffering from the impacts of climate change continuously.*
- *My entire house was destroyed by windstorms last year, due to climate change.*
- *Trees act as windbreaks, protecting houses from heavy winds. If people settle and clear all the trees, when a heavy wind comes, their houses will be destroyed. Therefore, we should all engage in tree planting to serve as natural wind breaks. Planting trees will also reduce soil erosion, because their roots will bind the soil together, increasing its resistance to water flows.*
- *The unchecked felling of trees in the forests is contributing to climate change.*
- *The felling of trees and pace of building construction should be adequately addressed to mitigate the effects of climate change.*
- *Do not fell trees without replacing them.*
- *Everyone should be engaged in planting trees to combat climate change.*
- *Climate change causes erosion, which is making our beaches disappear.*
- *Strict measures should be put in place to prevent indiscriminate dumping of waste.*
- *Waste management should be taken seriously to avert climate change.*
- *We need to switch from fossil fuels to using more environmentally-friendly sources of energy like solar.*

The outcome of the vox pop has indicated that the average Gambian is to some extent aware of climate change. Their views, when taken into consideration with the output of the National Stakeholder Workshop that took place on 9<sup>th</sup> September 2022, identified the key priority areas for immediate intervention as follows:

- **General sensitization on climate change issues**
- **Promote the usage of renewable energy**
- **Promote use of manually-driven transport, e.g. carts and bicycles**
- **Build flyovers to reduce traffic congestion**
- **Encourage the use of public transport services in all its forms.**
- **Promote car sharing**
- **Reforestation**
- **Afforestation**
- **Establishment of standard landfills.**
- **Establishment of a legal framework such as a Climate Change Act**
- **Operationalize the Climate Change Fund**
- **Government to provide the private sector with incentives and the certainty needed to commit investments in financing mitigation projects, including public-private partnerships**
- **Sensitization and popularization of the LIFE-AR concept**

In a nutshell, two activities stand out – **Use of Renewable Energy and Growing Trees**. The Energy Sector is the greatest emitter of GHGs, whilst trees act as carbon sinks, neutralizing the GHGs emitted. The modelling

exercise using the available data has also shown that whilst it would be possible to drastically reduce the GHGs emitted from the energy sector, it would not reach zero. Hence the urgent need to aggressively grow trees. The recent ban in exporting timber imposed by the Government of The Gambia in July 2022, as well as the ban in the felling of certain hardwood tree species is a major step in curbing illegal logging, and proof of the political will to tackle the issue of deforestation.

Legislation for stiffer penalties to deter illegal logging, encroachment into forest lands and illegal dumping of waste particularly into forests should be speeded up, as the people have spoken - *Vox Populi, Vox Dei*.

Africa as a whole and The Gambia in particular, emit 5% and 0.01% of global greenhouse gases respectively. Going by the spirit of solidarity and as buttressed in Article 9, paragraph 9 of the Paris Agreement, developed nations which have contributed more to the accumulation of greenhouse gas emissions, should take a voluntary and leading role in financing The Gambia's LTS.



Stone Circles at Wassu, Central River Region (2021)

**APPENDIX 1: CONSULTATION LIST**

<b>NAME</b>	<b>ORGANISATION</b>
Abdoulie Jallow	Ministry of Finance and Economic Affairs (MOFEA)
Adama Tabally	MOFEA
Foday Sumareh	MOFEA
Abdou Karim Njie	MOFEA
Juldeh Ceesay	MOFEA
Fabakary Kanyi	MOFEA
Alagie Fadera	Directorate of Development Planning - MOFEA
Ambassador Habib T. B. Jarra	Office of the President
Ebrima G. Sankareh	Office of the President
Abdourahman Jallow	Office of the President
Faye Jassey	Office of the President
Prince Bubacarr Aminata Sankanu	Office of the President
Modou Lamin Darboe	Ministry of Petroleum and Energy (MOPE)
Oulaye Camara	MOPE
Dr. Adama Gassama Jallow	MOPE
Alieu Sonko	MOPE
Samba Bah	National Water and Electricity Company Ltd. (MOPE)
Kebba Cham	National Water and Electricity Company Ltd. (MOPE)
Muhammed Joof	National Water and Electricity Company Ltd. (MOPE)
Abdoulie Ceesay	Ministry of Higher Education, Research, Science and Technology (MOHERST)
Kemo Fatty	MOHERST
Kumba Jammeh	MOHERST
Lamin Conteh	Ministry of Basic and Secondary Education
Dr. Buba Manjang	Ministry of Health
Bakary Gassama	Ministry of Health
Dawda Fatty	Ministry of Lands and Regional Governments (MOLRG)
Omar Sarr	MOLRG
Fatou Gibba	Department of Community Development, MOLRG
Modou Cham	Department of Community Development, MOLRG
Musa Sanneh	Department of Community Development, MOLRG
Hassan Jallow	Ministry of Agriculture (MOA)
Musa M. Humma	MOA
Sariyang M. K. Jobarteh	Department of Agriculture - MOA
Francis Mendy	Department of Agriculture - MOA
Ebrima Cham	Department of Agriculture - MOA
Lamin Sillah	Department of Agriculture - MOA
Dr. Demba B. Jallow	National Agricultural Research Institute - MOA
Nuha Dunor	National Agricultural Research Institute - MOA
Bakary Jassey	National Agricultural Research Institute - MOA
Lamin Tamba	National Agricultural Research Institute - MOA
Lamin S. Jawla	Department of Livestock Services, MOA
Lamin S. Darboe	ROOTS Project, MOA

David Demba	ROOTS Project, MOA
Kawsu Drammeh	Ministry of Youth and Sports
Sainey Cham	Ministry of Gender, Children and Social Welfare
Bunja Ceesay	Ministry of Gender, Children and Social Welfare
Isatou Sallah	Ministry of Gender, Children and Social Welfare
Isatou Yarboe	Ministry of Tourism and Culture
Mamadi Dampha	Ministry of Tourism and Culture
Morro Sanyang	Ministry of Transport, Works and Infrastructure (MOT-WI)
Ousman Jammeh	MOTWI
Felicia Rosamond Mendy	National Roads Authority - MOTWI
Lamin Jadama	National Roads Authority - MOTWI
Modou Sanyang	National Roads Authority - MOTWI
Lamin Mai Touray	Department of Water Resources – Ministry of Fisheries and Water Resources (MOFWR)
Lamin Camara	Department of Water Resources – MOFWR
Lamin Makalo	Ministry of Environment, Climate Change and Natural Resources (MECCNAR)
Edrissa Jobe	MECCNAR
Momodou Wuri Jallow	MECCNAR
Momodou Kanyi	MECCNAR
Abibatou Jarju	MECCNAR
Fatou Mbye	MECCNAR
Fatou Secka	MECCNAR
Modou Lamin Bah	MECCNAR
Assan Sarr	MECCNAR
Momodou Habib Bah	MECCNAR
Ibrahim Colley	MECCNAR
Ndumbek Drammeh	MECCNAR
Fatou Jallow Bittaye	MECCNAR
Honourable Lamin Dibba	MECCNAR
Buba T. Touray	MECCNAR
Abubacar Sanyang	MECCNAR
Abdoulie Bayo	MECCNAR
Ousman Minteh	MECCNAR
Sheriff Colley	MECCNAR
Lamin C. Jallow	MECCNAR
Awa Jassey	MECCNAR
Sarjo Keita	MECCNAR
Lamin Colley	MECCNAR
Oumie Jallow	MECCNAR
Musa Jobarteh	MECCNAR
Fatou Joof	MECCNAR
Haddy Bojang	MECCNAR

Abubacar Kassama	MECCNAR
Jainaba Fatty	MECCNAR
Momodou Wuri Jallow	MECCNAR
Mathew Mendy	MECCNAR
Isatou Jawara	MECCNAR
Mengeh Jaiteh	MECCNAR
Basiru Camara	MECCNAR
Mariama Ndow Jarju	Environment and Resilience Development Project - MECCNAR
Sambou Kinteh	Climate Change Secretariat -MECCNAR
Abie Sanneh	Climate Change Secretariat -MECCNAR
Muhammed Jaiteh	Department of Forestry - MECCNAR
Modou Gaye	Department of Forestry - MECCNAR
Modou Colley	Department of Forestry - MECCNAR
Amadou Darboe	Dept of Parks and Wildlife Management (DPWM) - MECCNAR
Mariama Camara	DPWM - MECCNAR
Mawdo Jallow	DPWM - MECCNAR
Bai Lamin Sillah	OMVG
Omar Ceesay	National Environment Agency (NEA)
Lamin Komma	NEA
Alhagie Sarr	NEA
Njagga Touray	NEA
Dr. Dinesh Shukla	American International University West Africa (AIUWA)
Professor Dr. Makie Taal	AIUWA
Professor Dr. Yankuba Kassama	AIUWA
Mr. Olawale Fabiyi	AIUWA
Dr. Mohammed Baba Abdullahi	AIUWA
Associate Professor Rosa Ortega	AIUWA
Associate Professor Nwele James Obasi	AIUWA
Mr. Prabodh Shukla	AIUWA
Associate Professor Momodou Mousa Baro	AIUWA
Associate Professor Sankung Jobarteh	AIUWA
Mrs. Josephine Osileh	AIUWA
Miss Marie Kah	AIUWA
Mr. Kalifa Sanneh Darboe	AIUWA
Mr. Moses O. Durojaiye	AIUWA
Mr. Oladapo Fabunmi	AIUWA
Mr. Abdou Mbye	AIUWA
Mr. Ebom Emmanuel C.	AIUWA
Ms. Fatoumata Bojang	AIUWA

Ebrima Sonko	University of The Gambia
Lamin Dibba	Kanifing Municipal Council
Dodou Jallow	Kanifing Municipal Council
Bakary Jadama	Brikama Area Council
Modou Bah	Brikama Area Council
Vincent M Mendy	Unique Group
Amina Touray	Greener Africa
Pa Joof	Greener Africa
Musa F. Sowe	National Coordinating Organisation of Farmer Associations Gambia (NACOFAG)
A Sanneh	NACOFAG
Assan Jallow	NACOFAG
Seeku Janko	All Gambia Forestry Platform
Ebrima Camara	All Gambia Forestry Platform
Amie Touray	The Association of Non-Governmental Organisations
Modou Lamin Mbye	The Association of Non-Governmental Organisations
Beatrice Mboge	Gambia Women's Chamber of Commerce
Tida Sannoh	Gambia Women's Chamber of Commerce
Muhammed Jagne	Gambia Chamber of Commerce and Industry
Siddharth Pathak	2050 Pathways Platform
Camilla More	International Institute for Environment and Development (IIED)
Anna Schulz	IIED
Clara Gallagher	IIED
Ced Hesse	IIED
Dr. Daouda Ben Oumar Ndiaye	Islamic Development Bank
Omar Davis	Islamic Development Bank
Lamin Jammeh	United Nations Development Programme (UNDP)
Pa Lamin Dibba	UNDP
Heather Maseko-Msyale	UNDP
Buba Joof	United Nations Capital Development Fund
Dr. Mustapha Ceesay	Food and Agriculture Organisation
Adam McVie	World Food Programme
Peter Kimotho	World Food Programme
Siaka Malang	General Public
Fatoumatta Ceesay	General Public
Sara Camara	General Public
Ebrima Garba Cham	General Public
Momodou Lamin Kinteh	General Public
Mussa Njie	General Public
Mustapha Jarjue	Voice Newspaper
Adama Tine	The Point Newspaper
Cherno Omar Bobb	The Point Newspaper
Nelson Manneh	Foroyaa Newspaper



Alieu Bobb	Foroyaa Newspaper
Madiba Singhateh	Foroyaa Newspaper
Ndey Sowe	Mansa Banko
Awa Macalo	The Standard
Olimatou Coker	The Standard
Suma Jadama	Gambia Radio and Television Services (GRTS)
Alagie Mbye	GRTS
Baboucarr Ceesay	GRTS
Ebrima Jallow	GRTS
Sheh Joof	GRTS
Dawda Sowe	GRTS
Julian Mendy	GRTS
Ousman Manneh	GRTS
Sheh Joof	GRTS
Ebrima Jallow	QTV



Bijilo Forest Park (2022)

## APPENDIX 2: HIGH-LEVEL COSTING OF INTERVENTIONS, WITH TIMELINES

For the implementation of the LTS, “short-term” actions are to be implemented between 2022 and 2027, “medium-term” actions are to be implemented between 2028-2032, and “long-term” actions are to be implemented between 2033 and 2050. These costs are estimates, based on today’s prices and may need to be revised accordingly, during actual implementation of the LTS. The list of actions is based on the feedback from the consultation processes and is not exhaustive.

### ENERGY

Measure	Cost – USD `000			
	Total	Short term	Medium term	Long term
MA1 - Solar power 13 solar PV farms with storage capacity installed with capacity of 250 MW by 2050	1,400,000	200,000	400,000	800,000
MA2 – 100MW of Wind power by 2030	250,000	150,000	50,000	50,000
MA3 – Subsidies to encourage use of improved cook stoves	79,000	35,000	25,000	19,000
MA4 – Subsidies to encourage use of power saving devices and appliances	45,000	5,000	10,000	30,000
MA5: Hydro Energy Power Plant (Sambangalou hydro-electricity Dam) to supply 250MW by 2030	520,000	400,000	70,000	50,000
MA6 - Capacity Building programmes and public sensitization in renewable energy development	80,000	35,000	15,000	30,000
MA7 – Biomass facility to produce 10MW of power	100,000	40,000	35,000	25,000
<b>TOTAL</b>	<b>2,474,000</b>	<b>865,000</b>	<b>605,000</b>	<b>1,004,000</b>



## TRANSPORT

Measure	Cost – USD `000			
	Total	Short term	Medium term	Long term
MA8 - Vehicle Fuel Efficiency Standards improved by introducing eco-driving training centres and promotion of vehicles using low emission fuel and hybrid electric vehicles	2,000	1,000	500	500
MA9 – Roll out annual Vehicle Emission Testing by building and equipping 7 centres in every administrative region	2,000	1,500	250	250
MA10 - Strengthen public transport system by increasing fleet size of Government-owned buses, whilst maximizing comfort, speed and reliability	32,000	10,000	10,000	12,000
MA11 – Construct new roads and improve existing roads to have designated lanes for public transport, bicycles and pedestrians as well as flyovers to ease choke points	38,000	200,000	100,000	80,000
MA12 – Introduce age limit for imported vehicles to a maximum of 3 years	200	150	50	0
<b>TOTAL</b>	<b>416,200</b>	<b>212,650</b>	<b>110,800</b>	<b>92,750</b>



Donkey cart transporting bags of cement (2022)

## AFOLU

Measure	Cost – USD `000			
	Total	Short term	Medium term	Long term
MA13 – Promote agro-ecological farming by the provision of subsidized inputs to smallholder farmers and capacity-building in: Biofertilisers; Organic manures; Modern irrigation techniques; Integrated pest management	160,000	80,000	40,000	40,000
MA14 – Promote System of Rice Intensification, through mechanization and use of high yielding crops.	240,000	160,000	40,000	40,000
MA15 - Promote upland rice cultivation	120,000	40,000	40,000	40,000
MA16 – Control of timber harvesting to reduce emissions from logging, through capacity building of loggers in felling techniques and provision of skidding equipment.	12,000	5,000	4,000	3,000
MA17 – Improve manure management in livestock by using biodigesters and improved feed	9,000	1,000	3,000	5,000
MA18 – Genetic improvement of livestock species to reduce emissions from enteric fermentation	35,000	0	19,000	16,000
MA19 – Improved feed with reduced nitrogen content introduced at subsidized	15,000	5,000	5,000	5,000
MA20 – Mangrove rehabilitation and afforestation, including capacity building to improve survival rates of replanted mangroves	70,000	35,000	20,000	15,000
MA21 – Afforestation and reforestation of 67,800ha by 2030 and 203,400ha by 2050 mainly with hardwoods. The forests are to be fenced to prevent encroaching and illegal dumping of waste and prevent bush fires	400,000	150,000	150,000	100,000
<b>TOTAL</b>	<b>1,061,000</b>	<b>476,000</b>	<b>321,000</b>	<b>264,000</b>

## WASTE

Measure	Cost – USD `000			
	Total	Short term	Medium term	Long term
MA22 – Create 7 Biogas facilities producing 10MW of electricity by 2030	13,000	7,000	4,000	2,000
MA23 - Organic waste recovery by composting at household level, including a national awareness campaign to encourage composting of organic household waste.	55,000	30,000	15,000	10,000
MA24 – Encourage household waste recycling through a national awareness campaign	2,000	1,000	500	500
MA25 – Introduce waste separation at landfills	5,000	3,000	1,000	1,000
<b>TOTAL</b>	<b>75,000</b>	<b>41,000</b>	<b>20,500</b>	<b>13,500</b>





## REFERENCES

- 2050 Pathways Platform. (2017). 2050 Pathways: A Handbook.
- Baba, A. M. (23rd May 2022). Data and Modelling Output for The Gambia LTS [PowerPoint presentation]. LTS Sectoral Workshop, Kartong, WCR, The Gambia.
- Biodiversity And Wildlife Act 2003.
- Bouwer LM, Aerts JC. (2006). Financing climate change adaptation, Laurens, Bouwer, 2006, PubMed.
- Department of Water Resources. (2017). Low Emissions Climate Resilient Development Strategy of The Gambia (LECRDS) 2018 – 2030.
- Elliott, C., J. Worker, K. Levin, and K. Ross. 2019. “Good Governance for Long-Term Low-Emissions Development Strategies.” Working Paper. Washington, DC: World Resources Institute.
- First National Communication of The Republic of The Gambia to The United Nations Framework Convention on Climate Change.
- Gambia Bureau of Statistics. The 2020/21 Gambia SDGs Monitoring Survey.
- Gilruth, P.; Duguma, L.A.; Minang, P.A.; Bah, A.; Jaiteh, M.S.; Mwangi, S.; Ahmad, M. A Framework for Monitoring Ecosystems-Based Adaptation to Climate Change: Experience from The Gambia. Sustainability 2021, 13, 10959.
- Hans, F., Day, T., Röser, F., Emmrich, J. and Hagemann, M. (2020). Making Long-Term Low GHG Emissions Development Strategies a Reality - A guide to policy makers on how to develop an LTS for submission in 2020 and future revision cycles.
- <https://climateactiontracker.org/countries/gambia/>
- <https://climateknowledgeportal.worldbank.org/country/gambia/climate-data-projections-expert>
- <https://climateknowledgeportal.worldbank.org/country/gambia/climate-data-projections>
- <https://www.ifad.org/es/web/latest/-/story/community-gardens-pave-the-way-for-climate-resilient-agriculture-in-gambia>
- Intenational Institute for Envirinment and Development. (2014). Briefing Paper: Climate change financing in the Gambia.
- Lauer, H. (2015): Mainstreaming Climate Change Adaptation into Development Strategies in The Gambia. The Adaptation Paradigm between Resilience and Transformation. Occasional Papers of the section for Development Geography, No. 03, Bonn, Ferbruary, 2015.
- Locatelli, B. (2011). Climate Change and Forests in the Congo Basin: Synergies between Adaptation and Mitigation. Center for International Forestry Research.
- Ministries of Basic and Secondary Education and Higher Education Research Science and Technology. (2016). Gambia Education Sector Policy 2016 – 2030.
- Ministry of Petroleum and Energy. (2014). National Energy Policy (Strategies and Action Plan) 2014-2018.
- Ministry of Petroleum and Energy. (2021). Strategic Electricity Sub-sector Roadmap 2021 - 2040
- Ministry of Environment, Climate Change and Natural Resources, Scoping study on Monitoring Evaluation Reporting and Verification of Climate Change in The Gambia.
- Ministry of Environment, Climate Change and Natural Resources Strategic Plan 2018-2022.
- Ministry of Environment, Climate Change and Natural Reslources. (2017). Strategic Programme for Climate Resilience.
- Ministry of Finance and Economic Affairs. Final Evaluation Report of The Gambia's Vision 2020.
- Ministry of Finance and Economic Affairs. The 2018 Annual Progress Report of The Gambia National Development Plan (2018-2021).
- Ministry of Finance and Economic Affairs. (2021). The Gambia Turnaround Strategy.
- Ministry of Finance and Economic Affairs. (2020). The Gambia Voluntary National Review: A Report on the Progress of the SDGs.
- Ministry of Transport, Works and Infrastructre. (2017). The Gambia National Transport Policy 2018-2027.
- Njie, M. (2017). Climate change mitigation technologies in the Gambian energy, transport and waste



sectors.

- Organisation for Economic Co-operation and Development. (2022). Strengthening Climate Resilience; Guidance for Governments and Development Co-operation.
- Qi, J. & Terton, A. (2022). Addressing Climate Change Through Integrated Responses: Linking adaptation and mitigation. International Institute for Sustainable Development.
- Republic of The Gambia - Multi-Annual Indicative Programme 2021-2027
- Rural Integrated Climate Adaptation and Resilience Building Project (RICAR). Project Proposal.
- Schaeffer, M., U., Hutfilter, U. F., Brecha, R., Fyson, C., and Hare, B. (2019). Insights from the IPCC Special Report on 1.5°C for preparation of long-term strategies. Climate Analytics.
- Second Nationally Determined Contribution of The Gambia.
- The Gambia 2050 Climate Vision.
- The Gambia National Climate Change Policy 2016.
- The Gambia First Biennial Update Report Project.
- The Gambia National Development Plan: 2018-2021.
- The Gambia National Framework for Climate Services (NFCS-GAM) and Implementation Action plan: 2020-2024.
- The Gambia's Second National Communication under the United Nations Framework Convention on Climate Change.
- The Government of The Gambia Third National Communication.
- United Nations Climate Change Secretariat. (2017). Opportunities and options for integrating climate change adaptation with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction 2015–2030.
- United Nations Development Programme. (2012). An Assessment of Investments & Financial Flows in The Gambian Forestry Sector.
- United Nations Development Programme. Global Project: Capacity Development for Policy Makers to Address Climate Change
- United Nations Development Programme (2021). Circular GHG mitigation opportunities in The Gambia - A metabolic approach to defining a resource efficient and low-carbon future, UNDP, New York.
- United Nations Development Programme. Climate Change Country Profiles - The Gambia.
- UNDP and WRI. (2021). Quality Assurance Checklist For Long-Term Low Greenhouse Gas Emission Development Strategies.
- United Nations Environment Programme. (2020). USED VEHICLES AND THE ENVIRONMENT: A Global Overview of Used Light Duty Vehicles: Flow, Scale and Regulation.
- World Bank. 2022. The Gambia Economic Update: Coming Back Stronger. © World Bank.
- World Bank Country Reports for The Gambia: 2020-2022.



**Bijilo, West Coast Region (2022)**



