THE GAMBIA

CLIMATE PROMISE

UNDP

A SAFE AND SUSTAINABLE FUTURE THROUGH BOLD CLIMATE ACTION

# The Gambia Climate Promise
# The NDC Update Report

June 2021

Supported by:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
based on a decision of the German Bundestag
Federal Ministry for Economic Cooperation and Development
Sverige
Sida
aecid
Spanish Agency for International Development Cooperation
MINISTERO DELL'AMBIENTE E DELLA TUTELA DEL TERRITORIO E DEL MARE
+ UNDP's Core Donors

## ACKNOWLEGEMENTS

**Contact person**
Alpha A.K. Jallow (UNFCCC Focal Point, Department of Water Resources, Ministry of Climate Change & Natural Resources).

**Authors**
Sandra Greiner (Climate Focus)
Federico De Lorenzo (Climate Focus)
Tobias Hunzai (Climate Focus)
Manfred Stockmayer (Energy Changes)

**Contributors and reviewers**
Katim Seringe Touray (national consultant)

Jelmer Hoogzaad (Shifting Paradigms)

Bubacar Jallow, Alpha A.K. Jallow (Ministry of Environment, Climate Change & Natural Resources)

Alexandra Soezer, Almamy Camara, Fatoumatta Sanyang (UNDP)

Josefine Axelsson, Simon Benmarraze, Paula Nardone (IRENA)

Kate Strachan, Takunda Mambo (ICLEI Africa – Local Governments for Sustainability)

Amadou Gaye, Momodou NJie (3A's Solutions)

John Kasiita Ssemulema (NDC Partnership)

Gabrielle Swaby (International Institute for Environment and Development – IIED)

**Editor**
Leah Brumer

**Design and layout**
Kimberly Koserowski

**Produced by**
Climate Focus, The Netherlands
Energy Changes, Austria

This publication should be cited as: United Nations Development Programme (2021). The Gambia Climate Promise, The NDC Update Report, UNDP, New York.


## UNDP CLIMATE PROMISE

UNDP is the leading United Nations organization fighting to end the injustice of poverty, inequality, and climate change. Working with our broad network of experts and partners in 170 countries, we help nations to build integrated, lasting solutions for people and planet. Learn more at undp.org or follow at @UNDP.


## DONOR AND PARTNER ACKNOWLEDGEMENT

This product was developed under UNDP's Climate Promise, with generous funding from the governments of Germany, Sweden, Spain, Italy, the European Union, and UNDP's other ore contributors.

# CONTENTS

# LIST OF TABLES AND FIGURES

## TABLES



## FIGURES

# ABBREVIATIONS

| | |
|---|---|
| **AFOLU** | Agriculture, Forestry and Other Land Use |
| **BAU** | Business as usual |
| **CAT** | Climate Action Tracker |
| **CBA** | Cost-benefit analysis |
| **CCGT** | Combined cycle gas turbine |
| **CDM** | Clean Development Mechanism |
| **CMA** | Conference of the Parties serving as the meeting of the Parties to the Paris Agreement |
| **CPP** | Climate Promise Project |
| **CSA** | Climate-smart agriculture |
| **CVF** | Climate Vulnerable Forum |
| **DWR** | Department of Water Resources |
| **EbA** | Ecosystem-based adaptation |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **GBA** | Greater Banjul Area |
| **GBoS** | Gambia Bureau of Statistics |
| **GCCF** | Gambian Climate Change Fund |
| **GCF** | Green Climate Fund |
| **GDP** | Gross domestic product |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse gas |
| **GNAIP II** | Second Generation National Agricultural Investment Plan – Food and Nutrition Security |
| **GoTG** | Government of The Gambia |
| **HFC** | Hydrofluorocarbon |
| **HFO** | Heavy fuel oil |
| **ICLEI** | International Council for Local Environmental Initiatives |
| **ICZM** | Integrated Coastal Zone Management |
| **IMCC** | Inter-Ministerial Climate Committee |
| **IMF** | International Monetary Fund |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **IPPU** | Industrial Processes and Product Use |
| **IRENA** | International Renewable Energy Agency |
| **ITMO** | Internationally Transferred Mitigation Outcome |
| **LDC** | Least Developed Country |
| **LECRDS** | Low Emissions Climate Resilient Development Strategy |
| **LFO** | Light fuel oil |
| **LULUCF** | Land Use, Land-Use Change and Forestry |
| **MECCNAR** | Ministry of Environment, Climate Change and Natural Resources |
| **MoFEA** | Ministry of Finance and Economic Affairs |
| **MRV** | Measurement, reporting and verification |
| **NAMA** | Nationally Appropriate Mitigation Action |
| **NAP** | National Adaptation Plan |
| **NAPA** | National Adaptation Programme of Action |
| **NAP-Ag** | Integrating Agriculture in National Adaptation Plans |
| **NCC** | National Climate Committee |
| **NCCC** | National Climate Change Council |
| **NCCP** | National Climate Change Policy |
| **NDC** | Nationally Determined Contribution |
| **NDC1** | The Gambia's First Nationally Determined Contribution |
| **NDC2** | The Gambia's Second Nationally Determined Contribution |
| **NDP** | National Development Plan |
| **NEEAP** | National Energy Efficiency Action Plan |
| **NEMA** | National Environmental Management Act |
| **NGO** | Non-governmental organization |
| **NMHS** | National Meteorological and Hydrological Service |
| **OVMG** | Gambia River Basin Development Organization |
| **PAGE** | Programme for Accelerated Growth and Employment |
| **PURA** | The Gambia Public Regulatory Authority |
| **R&SO** | Research and systematic observations |
| **SDG** | Sustainable Development Goal |
| **SHS** | Solar home systems |
| **SPCR** | Strategic Programme for Climate Resilience |
| **T&D** | Transmission and Distribution |
| **TNA** | Technology Needs Assessment |

| | |
|---|---|
| **TNC** | Third National Communication of The Gambia under the UNFCCC |
| **UN** | United Nations |
| **UNDP** | United Nations Development Programme |
| **UNEP** | United Nations Environment Programme |
| **UNFCCC** | United Nations Framework Convention on Climate Change |

# 1. INTRODUCTION

This **NDC Update Report** develops and combines the groundwork carried out to update The Gambia's second Nationally Determined Contribution (NDC2). The NDC2 builds on the first NDC (NDC1), which was submitted initially as the Intended Nationally Determined Contribution (INDC) prior to the Conference of the Parties 21 in Paris and resubmitted as the first NDC, as part of The Gambia's ratification of the Paris Agreement on 11 July 2016.

This report and the corresponding NDC2 were developed through the exemplary cooperation and coordination of The Gambia with international partners. The UNDP Climate Promise Project (CPP) provided support to coordinate the NDC2, including the NDC Update Report and an underlying metabolic analysis, the forthcoming 'Circular economy opportunities in The Gambia – A metabolic approach to define a resource efficient and low-carbon future.' The International Renewable Energy Agency (IRENA) conducted a cost-effectiveness analysis of renewable energy mitigation options for the power sector. With the support of 3A's Solutions, the International Council for Local Environmental Initiatives (ICLEI) Africa conducted a mitigation abatement cost-benefit analysis (CBA) for all remaining and prioritized sectors. The NDC Partnership provided coordination support to the implementation process.

## ENHANCING AMBITION IN THE NDC2

The Gambia's first NDC has received the positive distinction of being considered '1.5°C Paris Agreement-compatible' by the Climate Action Tracker (CAT). The nation is one of the few developing countries with a conditional target that sets emissions on a downward trajectory. In developing the NDC2, the Government of The Gambia (GoTG) is committed to retaining and, where possible, enhancing its strong ambition, while strengthening the integration of the identified mitigation measures into national planning processes. The recently validated **2050 Climate Vision of The Gambia** underscores the high level of commitment to decarbonization: it establishes the political aspiration for The Gambia to achieve net zero emissions by 2050, guiding the NDC2.

The NDC2 represents an **advance** relative to the NDC1 in the following respects.

First, sectoral coverage has been extended to include all greenhouse (GHG) emissions in The Gambia. The NDC2 covers the entire Agriculture, Forestry and Other Land Use (AFOLU) sector, in line with the 2006 Intergovernmental Panel on Climate Change (IPPC) guidelines, while the NDC1 addressed only agricultural emissions. The waste sector now includes emissions for both solid waste and wastewater, while the NDC1 did not include wastewater emissions.

Second, an additional 13 mitigation measures have been included. The NDC1 identified 10 mitigation options. The NDC2 revises and strengthens those mitigation measures and includes additional ones identified through the metabolic analysis and IRENA's work on the power sector. An additional eight mitigation measures were identified through the metabolic analysis, while IRENA defined eight for the power sector through the cost-effectiveness analysis of renewable energy mitigation options (five of which from the NDC1 were strengthened) and ICLEI added another two new options. All of these are included in the NDC2.

Third, the NDC2 relies on an enhanced and more robust database to estimate baseline emissions. The NDC1 relied on two scenarios: a low baseline scenario and a high baseline scenario, resulting in a significant difference (87percent) in estimated 2030 emissions. The NDC2 updates the sectoral data and assumptions were refined to derive a single, 'best guess' scenario. In addition, the 2010 emission level serving as the starting point for the projections had not been fully determined when the NDC1 was being drafted because The Gambia's National GHG Inventory Report had not yet been completed. The NDC2 places the baseline projections on a more solid footing by using the emissions in the official inventory

report, as published in The Gambia's Third National Communication (TNC) (2020). This generated the following change: while the NDC1 projected a 2030 business-as-usual (BAU) scenario level of 3,858 $GgCO_2e$, the NDC2 revises that projection to 6,617 $GgCO_2e$. The NDC1 mitigation scenario projects a reduction of around 1,800 $GgCO_2e$. The mitigation measures proposed in the NDC2 project GHG emissions of 3,327 $GgCO_2e$ in 2030, a reduction of 49.7 percent (3,290 $GgCO_2e$ in absolute figures) against BAU.

Fourth, the adaptation section was strengthened, providing more details on The Gambia's climate vulnerability, envisaged adaptation action and finance needs.

Nevertheless, developing the NDC2 was also a challenging undertaking. The most recent available inventory data dates back to 2010, which complicates the projections of baseline emissions. With the 2010 starting point emissions corrected, The Gambia's overall emissions increased substantially, from 1,758 $GgCO_2e$ and 3,711 $GgCO_2e$ in 2010 (NDC 1 low and high scenarios) to 4,033 $GgCO_2e$ (NDC2). This has repercussions for the subsequent projections, generating higher baseline emissions in 2030. Another challenge involved the limited integration of the mitigation measures identified in the NDC1 into the country's actual development plans. The COVID-19 pandemic also posed a significant challenge as it hindered data collection and reduced the number and quality of consultations with stakeholders. On the positive side, however, considerable progress was made in the electricity sector, with new investments in renewable energy in preparation (primarily in solar PV and hydropower).

## UNDERLYING CONSIDERATIONS FOR DEVELOPMENT OF THE NDC2 UPDATE REPORT

Development of the NDC2 update report was guided by the following considerations:

- The report lays out the structure **foreseen for the NDC2** in line with the latest guidance from the climate negotiations and related processes. This report provides for the disclosure of underlying considerations, data and processes of the NDC2 to support international stocktake and information transparency.
- Successive NDCs represent an advance relative to previous ones and reflect a country's highest possible ambition. The Gambia's NDC2 **strives to enhance the country's ambition** where possible, in line with the goal of holding the global average temperature increase to well below 2°C, while applying the latest United Nations Framework Convention on Climate Change (UNFCCC) guidance on NDC features.
- A detailed review of national circumstances was undertaken to update the NDC in line with developments in the country and to inform the **inclusion of new opportunities** aimed at strengthening the country's approach to fighting climate change. The report reflects the country's **evolving climate policy framework** and **institutional arrangements** for NDC implementation. An update of **NDC financing requirements** provides details on the sectoral investments required to implement proposed NDC mitigation and adaptation options.
- A **consultation** was held with representatives from relevant sectors for implementation of the NDC2, including with the public and private sectors, non-governmental organizations (NGOs) and academia, to assess and advise on development of the report.
- The update report may be used as a **basis for subsequent NDC updates** by taking a transparent approach to presenting considerations that have led to underlying decisions regarding the NDC2.

# 2. INFORMATION TO FACILITATE CLARITY, TRANSPARENCY AND UNDERSTANDING

**1. Quantifiable information on the reference point (including, as appropriate, a base year)**

| | | |
|---|---|---|
| *(a)* | *Reference year(s), base year(s), reference period(s) or other starting point(s)* | Base year for emission projections: 2010<br>Reference year for BAU emission target: 2030 |
| *(b)* | *Quantifiable information on the reference indicators, their values in the reference year(s), base year(s), reference period(s) or other starting point(s), and, as applicable, in the target year* | The 2030 projected emission level is 6,617 Gg$CO_2$e. |
| *(c)* | *For strategies, plans and actions referred to in Article 4, paragraph 6, of the Paris Agreement, or polices and measures as components of nationally determined contributions where paragraph 1(b) above is not applicable, Parties to provide other relevant information* | Not applicable |
| *(d)* | *Target relative to the reference indicator, expressed numerically, for example in percentage or amount of reduction* | The GHG emissions reduction from baseline level (BAU) in 2030 is 49.7percent. |
| *(e)* | *Information on sources of data used in quantifying the reference point(s)* | The Gambia's TNC, which is based on the country's 2010 National GHG Inventory Report, was used to quantify the baseline level. |
| *(f)* | *Information on the circumstances under which the Party may update the values of the reference indicators* | The BAU scenario was updated based on final National GHG Inventory data available for 2010 and other data sets, helping to improve understanding of the most likely development under the BAU scenario.<br>The Gambia plans to update the country's GHG inventory. The Ministry of Environment, Climate Change and Natural Resources (MECCNAR) has signed Memoranda of Understanding with sectoral ministries to coordinate information gathering for the inventory. A measurement, reporting and verification (MRV) tool for emissions from the forestry, energy and agriculture sectors is under development and will serve to update the inventory. The reference indicators may change as a result of the update. |

**2. Time frames and/or periods for implementation**

| | | |
|---|---|---|
| *(a)* | *Time frame and/or period for implementation, including start and end date, consistent with any further relevant decision adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA)* | 1 January 2021 - 31 December 2030. |
| *(b)* | *Whether it is a single-year or multi-year target, as applicable* | Single-year target. |

| | | |
|---|---|---|
| **3.** | **Scope and coverage** | |
| *(a)* | *General description of the target* | The mitigation measures described in the NDC2 will allow the country to reduce its GHG emissions by 49.7 percent compared to the expected 2030 baseline. In absolute figures, the mitigation measures will reduce The Gambia's GHG emissions by 3,290 $GgCO_2e$. |
| *(b)* | *Sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with IPCC guidelines* | **Sectors/categories:**<br>● Agriculture, Forestry and Other Land Use (AFOLU): Agriculture, Livestock, Deforestation and Forest Degradation, Afforestation.<br>● Industrial Processes and Product Use (IPPU).<br>● Energy: Energy Industries, Transport.<br>● Waste: Solid Waste Disposal, Wastewater Treatment and Discharge.<br>**Gases:** Carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs). |
| *(c)* | *How the Party has taken into consideration paragraph 31(c) and (d) of decision 1/CP.21* | Compared to the NDC1, coverage of the NDC2 has been extended. While the NDC1 did not cover all AFOLU emissions, the NDC2 covers the entire sector. The waste sector now includes emissions for both solid waste and wastewater, while wastewater emissions were not included in the NDC1. |
| *(d)* | *Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures and initiatives of Parties' adaptation actions and/or economic diversification plans* | The Strategic Programme for Climate Resilience (SPCR) outlines several activities aimed at enhancing climate change resilience in The Gambia. These include:<br>● Developing a climate-resilient integrated waste management system (under pillar 3: Developing climate- resilient infrastructure, services and energy systems), which could potentially include establishing facilities to generate energy from waste;<br>● Developing a climate-resilient energy infrastructure (under pillar 3) through activities such as installing solar and wind mini-grids and solar-powered street lights, or implementing the National Energy Efficiency Action Plan (NEEAP), which would include developing energy efficiency measures, such as incentivizing the penetration of energy-saving bulbs like LEDs;<br>● Protecting and restoring forest and agricultural landscapes through afforestation and reforestation (under pillar 4: Developing integrated approaches to build rural climate resilience in The Gambia); and,<br>● Developing a National Programme for Biogas Production and Utilisation through on-farm anaerobic digestion of manure (under pillar 4).<br>Mitigation co-benefits can be expected from the implementation of these measures. |
| **4.** | **Planning process** | |
| *(a)* | *Information on the planning processes that the Party undertook to prepare its nationally determined contribution and, if available, on the Party's implementation plans, including, as appropriate:* | |

| | | |
|---|---|---|
| *(i)* | *Domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner* | The GoTG's climate change portfolio and policy issues are entrusted to MECCNAR, the institution responsible for coordinating NDC implementation in the country.<br><br>MECCNAR was in charge of the NDC revision process in The Gambia. International partners, including the UNDP Climate Promise, IRENA, ICLEI and the NDC Partnership, supported the process. The process produced two outputs: The Gambia's Second NDC (NDC2) and an NDC Update Report. The report elaborates on and combines the groundwork carried out for the NDC revision process, including a metabolic analysis and cost-effectiveness analysis of renewable energy technology options. It provides for the disclosure of underlying considerations, data and processes of the NDC2 in the interest of international stocktake and information transparency.<br><br>The mitigation measures included in the NDC2 were validated through consultation with stakeholder representatives from sectors relevant to NDC implementation, including from the public and private sectors, NGOs (such as Action Aid International The Gambia), academia, and stakeholder organisations (such as the National Women Farmers Association and the TRY Oyster Women's Association). The selection of stakeholder groups sought to ensure that consultations were gender responsive.<br><br>In conjunction with the NDC revision process, The Gambia began to develop a costed NDC implementation plan, with support from ICLEI. At the time of NDC2 publication, the plan was being finalized. |
| *(ii)* | *Contextual matters, including, inter alia, as appropriate:*<br><br>*a. National circumstances, such as geography, climate, economy, sustainable development and poverty eradication;*<br><br>*b. Best practices and experience related to the preparation of the nationally determined contribution;*<br><br>*c. Other contextual aspirations and priorities acknowledged when joining the Paris Agreement* | The Gambia is a least developed country (LDC) that, due to its geographic location and status of economic development, is highly vulnerable to the impacts of climate change. In particular, coastal erosion and saltwater intrusion due to rising sea levels, as well as reduced rainfalls and variations in rainy season patterns, threaten livelihoods. The country depends largely on rainfed smallholder agriculture for food security - the main pillar of the economy - which leaves The Gambia highly vulnerable to drought and changes in annual rainfall patterns. Temperature change and saltwater intrusion also threaten the country's mangroves, making the country susceptible to flooding. Extensive information on The Gambia's national circumstances is available in the country's TNC under the UNFCCC (Chapter 2). |
| *(b)* | *Specific information applicable to Parties, including regional economic integration organizations and their member States, that have reached an agreement to act jointly under Article 4, paragraph 2, of the Paris Agreement, including the Parties that agreed to act jointly and the terms of the agreement, in accordance with Article 4, paragraphs 16–18, of the Paris Agreement* | *Not applicable* |

| | | |
|---|---|---|
| *(c)* | *How the Party's preparation of its nationally determined contribution has been informed by the outcomes of the global stocktake, in accordance with Article 4, paragraph 9, of the Paris Agreement* | Although the first global stocktake has not yet been conducted, the NDC Synthesis Report published by the UNFCCC Secretariat in February 2021 provides a preliminary indication as to whether updated NDC targets are in line with the Paris Agreement's objectives. The report states that aggregated estimated emission reductions "fall far short of what is required" to keep global warming to 1.5°C or below 2°C.<br><br>Although The Gambia's contribution to climate change has always been marginal (less than 0.01 percent of global GHG emissions in 2010, according to the Climate Analysis Indicators Tools (CAIT) database), the country adopted an ambitious NDC1. The CAT found it to be compatible with the 1.5°C target. The NDC2 further enhances the NDC1 targets by increasing sectoral coverage and including additional mitigation measures. As such, The Gambia sets an example by increasing the ambition of an NDC that was already consistent with the most ambitious goals of the Paris Agreement. |
| *(d)* | *Each Party with a nationally determined contribution under Article 4 of the Paris Agreement that consists of adaptation action and/or economic diversification plans resulting in mitigation co-benefits consistent with Article 4, paragraph 7, of the Paris Agreement to submit information on:* | |
| *(i)* | *How the economic and social consequences of response measures have been considered in developing the nationally determined contribution* | The National Adaptation Plan (NAP) process will allow the socioeconomic consequences of the adaptation measures identified to be assessed. |
| *(ii)* | *Specific projects, measures and activities to be implemented to contribute to mitigation co-benefits, including information on adaptation plans that also yield mitigation co-benefits, which may cover, but are not limited to, key sectors, such as energy, resources, water resources, coastal resources, human settlements and urban planning, agriculture and forestry; and economic diversification actions, which may cover, but are not limited to, sectors such as manufacturing and industry, energy and mining, transport and communication, construction, tourism, real estate, agriculture and fisheries* | See 3(b) above. |
| **5.** | **Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals** | |
| *(a)* | *Assumptions and methodological approaches used for accounting for anthropogenic greenhouse gas emissions and removals corresponding to the Party's nationally determined contribution, consistent with decision 1/CP.21, paragraph 31, and accounting guidance adopted by the CMA* | The Gambia intends to report a GHG inventory in accordance with Decision 18/CMA.1 and report on progress towards its NDC by 31 December 2021.<br><br>The Gambia will use the accounting guidance in Decision 4/CMA.1 for relevant accounting information.<br><br>For IPCC methodologies and metrics, see 5 (d).<br><br>Final accounting towards the target will depend on The Gambia's participation in voluntary cooperation under Article 6 of the Paris Agreement. Any transfers or uses of internationally transferred mitigation outcomes (ITMOs) will be accounted for and corresponding adjustments will be made consistent with the Article 6 and Article 13 guidance. |

| | | |
|---|---|---|
| *(b)* | *Assumptions and methodological approaches used for accounting for the implementation of policies and measures or strategies in the nationally determined contribution* | *Not applicable* |
| *(c)* | *If applicable, information on how the Party will take into account existing methods and guidance under the Convention to account for anthropogenic emissions and removals, in accordance with Article 4, paragraph 14, of the Paris Agreement, as appropriate* | Please refer to 5(a) above.<br>The IPCC 2006 Guidelines were used to calculate emissions in the GHG Inventory of The Gambia's TNC. |
| *(d)* | *IPCC methodologies and metrics used for estimating anthropogenic greenhouse gas emissions and removals* | See 5(c) above. |
| *(e)* | *Sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, as appropriate, including, as applicable:* | |
| *(i)* | *Approach to addressing emissions and subsequent removals from natural disturbances on managed lands* | *Not applicable* |
| *(ii)* | *Approach used to account for emissions and removals from harvested wood products* | *Not applicable* |
| *(iii)* | *Approach used to address the effects of age-class structure in forests* | *Not applicable* |
| *(f)* | *Other assumptions and methodological approaches used for understanding the nationally determined contribution and, if applicable, estimating corresponding emissions and removals, including:* | |
| *(i)* | *How the reference indicators, baseline(s) and/or reference level(s), including, where applicable, sector-, category- or activity-specific reference levels, are constructed, including, for example, key parameters, assumptions, definitions, methodologies, data sources and models used* | The 2010 National GHG Inventory Report was used as the basis for baseline development and to determine emission levels in the base year. Sectoral baselines were derived using top-down methods, based on historic data, intensities and expected growth rates. Expected future developments of individual parameters are derived using statistical methods (e.g., linear extrapolation of past trends), data from external sources (e.g., Food and Agriculture Organization of the United Nations (FAO)) or are based on targets stated in various strategies and plans (e.g., Second Generation National Agricultural Investment Plan – Food and Nutrition Security (GNAIP II) or The Gambia's National Transport Policy). The NDC Update Report presents the assumptions made for the development of each sectoral baseline, as well as data sources used to calculate GDP and population growth scenarios. |
| *(ii)* | *For Parties with nationally determined contributions that contain non-greenhouse-gas components, information on assumptions and methodological approaches used in relation to those components, as applicable* | *Not applicable* |
| *(iii)* | *For climate forcers included in nationally determined contributions not covered by IPCC guidelines, information on how the climate forcers are estimated* | *Not applicable* |

| | | |
|---|---|---|
| *(iv)* | *Further technical information, as necessary* | *Not applicable* |
| *(g)* | *The intention to use voluntary cooperation under Article 6 of the Paris Agreement, if applicable* | The Gambia intends to use voluntary cooperation under the framework provided by Article 6 of the Paris Agreement. The country does not plan to achieve any of its commitments by acquiring ITMOs. Instead, it would be a host country for mitigation activities aiming to protect the planet by meeting standards that deliver real, permanent, additional and verified mitigation outcomes that contribute to sustainable development, while avoiding the double counting of emission reductions. |
| **6.** | **How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances** | |
| *(a)* | *How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances* | The Gambia's contribution to global climate change has always been marginal. According to the CAIT database, its GHG emissions in 2010 represented less than 0.01 percent of global emissions.<br><br>At first sight, it would seem unfair to ask a country like The Gambia to contribute to global emission reduction efforts. This would suggest that resources to be allocated to poverty reduction and development priorities would be shifted to climate action, in keeping with the Paris Agreement's implementation requirements. The Gambia has always taken a progressive position and shown commendable leadership in the climate change negotiations, as the current level of global mitigation ambition is quite low and likely to pose tremendous challenges for countries like The Gambia. Agriculture, energy and water resources - sectors vital to The Gambia's economy - will suffer greatly if global and deep cuts do not occur in the near future. For this reason, The Gambia exercised leadership by joining the 2011 call for a universal mobilization of efforts to tackle climate change so that global actions can protect the future of the most vulnerable countries. With its NDC1, The Gambia wanted to take a moral position and call on all responsible and capable countries to take actions proportional to their responsibilities and capabilities, both for themselves and for the entire global community. The NDC2 reaffirms and, even, strengthens this commitment.<br><br>The Gambia is an LDC. Under the Lima Call for Action, LDCs are not required to set quantified or quantifiable targets. However, The Gambia's NDC2 includes quantified and quantifiable commitments that exceed The Gambia's fair share. |
| *(b)* | *Fairness considerations, including reflecting on equity* | Fairness considerations were addressed in 4(c) and 6(a). |
| *(c)* | *How the Party has addressed Article 4, paragraph 3, of the Paris Agreement* | The Gambia's NDC2 represents an advance relative to the NDC1 in the following respects:<br><br>● The NDC1 did not include forestry and wastewater emissions. The NDC2 increases sectoral coverage to all of the country's GHG emissions by including the two aforementioned categories; |

| | | |
|---|---|---|
| | | • 13 additional mitigation measures are included in the NDC2;<br>• The NDC2 relies on an enhanced and more robust database to estimate baseline emissions.<br>The Gambia's NDC reflects the country's highest possible ambition, taking into account "common but differentiated responsibilities and respective capabilities, in the light of different national circumstances". Considerations to support this statement are provided in 4(c) and 6(a). |
| *(d)* | *How the Party has addressed Article 4, paragraph 4, of the Paris Agreement* | The Gambia is a developing country.<br>As explained in 6(c), the NDC2 enhances its mitigation efforts compared to the NDC1.<br>Moreover, the NDC1 included an economy-wide reduction target, which the NDC2 retains.<br>As such, The Gambia's NDC stands out as very ambitious. |
| *(e)* | *How the Party has addressed Article 4, paragraph 6, of the Paris Agreement* | *Not applicable (The Gambia chose to submit a quantifiable target as its NDC instead of communicating strategies, actions and plans)* |
| **7.** | **How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2** | |
| *(a)* | *How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2* | As noted in 4(c), The Gambia's NDC1, whose mitigation ambition has been further enhanced in the NDC2, was deemed to be compatible with the 1.5°C goal of the Paris Agreement by the CAT. As such, this NDC will contribute substantially to achieving the ultimate objective of stabilizing GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and within a time frame sufficient to allow ecosystems to adapt naturally to climate change. This will ensure that food production is not threatened and will enable economic development to proceed in a sustainable manner. |
| *(b)* | *How the nationally determined contribution contributes towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement* | As noted in 4(c), this NDC is consistent with the goal of limiting the temperature increase to 1.5 °C above the pre-industrial level. The Gambia's GHG emissions peaked in 2015 (excluding IPPU) and trend downward in the mitigation scenario.<br>The Gambia is developing a 2050 Climate Vision that will establish the country's goal to reach net-zero carbon emissions by 2050, thus contributing to the goal of achieving a balance between anthropogenic emissions by source and removals by sinks in the second half of this century. |

# 3. NDC METHODOLOGICAL APPROACH

## 3.1 BASELINE DEVELOPMENT

### 3.1.1 PRINCIPLES

The main principles of the NDC1 and the related Technical Report (Climate Analytics, 2015) were also used to update the NDC2. They are:

- Most baselines are derived using top-down methods, based on historic data, intensities and expected growth rates.
- Expected future developments for individual parameters are derived using statistical methods (e.g., linear extrapolation of past trends), data from external sources (e.g., FAO) or are based on targets stated in various strategies and plans (e.g., GNAIP II (GoTG, 2018) or The Gambia's National Transport Policy).

The calculations for the NDC1 and those for the NDC2 differ in two key ways:

- A wide variety of baseline scenarios and sub-scenarios for the various sectors were developed for the NDC1. As a result, two scenarios were presented: a high baseline scenario and low baseline one. While the low baseline scenario projected emissions of 3,858 $GgCO_2e$ in 2030 (total emissions excluding land use, land-use change and forestry (LULUCF)), emissions under the high baseline scenario were 7,218 $GgCO_2e$ (an increase of 87 percent). The NDC1 argued that "the range shown aims to represent the maximum range of different uncertainties in data and assumptions." However, this massive difference diminishes the meaning of providing different scenarios. For the NDC2, only one baseline scenario was developed. It is a 'best guess' scenario using the approaches mentioned above and the data and assumptions described in the baseline section for each of the sectors (see section 5).
- The NDC1 calculations used different starting points for 2010 emissions. While the high baseline scenario was based primarily on the results of the draft GHG inventory (only draft results were available when the NDC1 was prepared), the low baseline scenario used other estimates to determine the 2010 emissions level. Consequently, the base year emissions level used to develop the baseline scenario (2010) was 1,758 $GgCO_2e$ for the low scenario and 3,711 $GgCO_2e$ for the high. The final version of the National GHG Inventory Report presented a value of 4,033 $GgCO_2e$. The NDC2 uses only values from the Report (GoTG, 2015) as a basis for baseline development.

The following table summarizes the values used in the two NDC1 baseline scenarios, the National GHG Inventory Report and the NDC2 for the base year 2010.

**Table 1: Comparison of 2010 baseline emission levels by sector (in $GgCO_2$)**

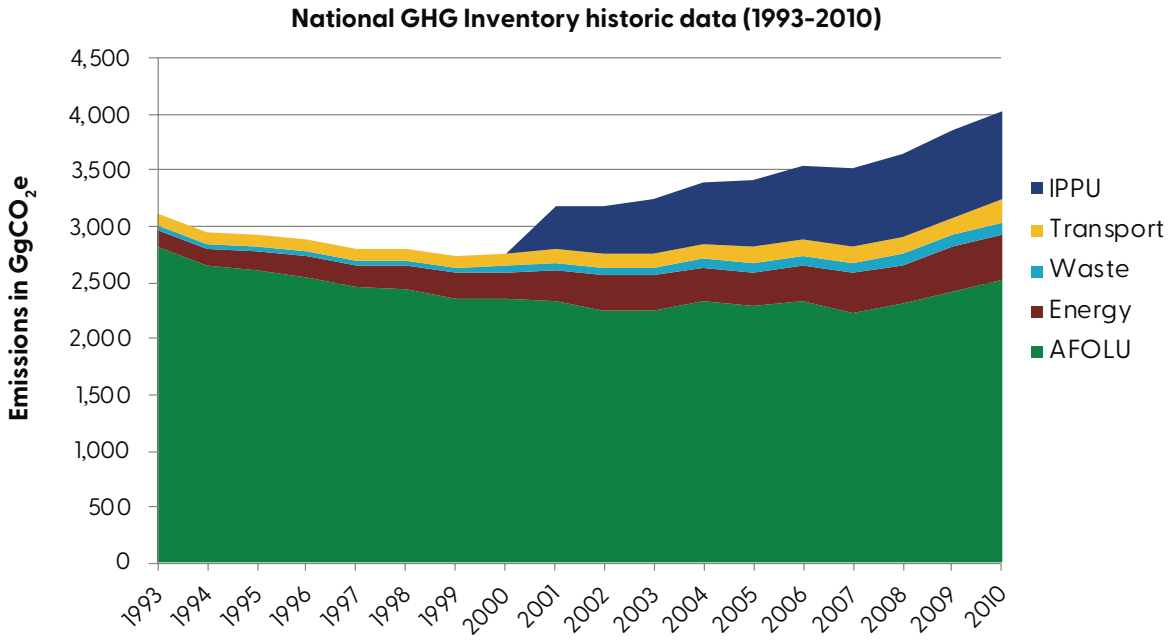
| | NDC1 | | National GHG Inventory | NDC2 |
|---|---|---|---|---|
| | Low scenario | High Scenario | | |
| Agriculture | 1,331 | 1,331 | 1,331 | 1,331 |
| Forestry | -360 | 1,183 | 1,183 | 1,183 |
| Energy | 417 | 417 | 417 | 417 |
| Waste | 99 | 116 | 107 | 107 |
| Transport | 203 | 203 | 203 | 203 |
| IPPU | 69 | 462 | 793 | 793 |
| **Total** | **1,758** | **3,711** | **4,033** | **4,033** |
| **Total w/o forestry** | **2,118** | **2,528** | **2,850** | **2,850** |

## 3.1.2 INVENTORY EMISSIONS

When the NDC1 was being drafted, The Gambia's TNC and the related 2010 National GHG Inventory Report were still being developed and official data were not yet available when the NDC1 was submitted. Consequently, the NDC1 calculations were based on draft data from the inventory reports prepared for the individual sectors, except the waste sector, for which no draft report was available at the time of finalization.

In the case of the NDC2, the final National GHG Inventory Report for 2010 is available and the values for the different sectors are taken as starting points for baseline development. The following graph provides an overview of changes in GHG emissions over the period 1993-2010, based on data from the National GHG Inventory.

**Figure 1: National GHG Inventory historic data (1993-2010)**




GHG emissions from biomass combustion for energy production are not included in the calculations. In 2010, these emissions stood at 2,287 $GgCO_2e$.

## 3.1.3 GDP GROWTH SCENARIOS

The World Bank's World Development Indicators were used for historic GDP data[1] To reflect real economic development, constant US dollar values for 2010 were used for historic data up to 2019.

For GDP growth data between 2020 and 2030, data from the IMF document, Requests for Disbursement under Rapid Credit Facility and Modification of Performance Criteria under the Extended Credit Facility Arrangement, were used[2]. Annual growth rates are estimated at between 2.5 percent and 6.9 percent, with a constant growth rate of 5 percent from 2025 onwards.

## 3.1.4 POPULATION GROWTH SCENARIOS

For population growth, data from the UN World Population Prospects was used, which provides historic population data and projections for future growth until 2100[3]. The country's 2013 census showed a total population of 1,857,181[4]. while the UN World Population Prospects provided a total of 1,793,199. Despite this difference (1.4 percent), the UN data was used as it also includes projections over the period under consideration (until 2030). World Bank data was used to determine urban and rural population[5].

1 The World Bank, 2021. World Bank Open Data: The Gambia.
2 International Monetary Fund (IMF), 2020. The Gambia: Requests for disbursement under the rapid credit facility and modification of performance criteria under the extended credit facility arrangement – debt sustainability analysis.
3 United Nations (UN), 2019. World Population Prospects.
4 Gambia Bureau of Statistics (GBOS), 2013 Population and Housing Census, The Gender Report.
5 The World Bank, 2021, op. cit.

## 3.2 REVISION OF NDC1 MITIGATION OPTIONS

ICLEI contracted with 3A's Solutions, a Gambian company, to conduct a cost-benefit analysis (CBA) of priority mitigation actions in The Gambia's NDC (document forthcoming). This analysis is based on the mitigation measures presented in the NDC1, which were corroborated and augmented in intensive consultations with national stakeholders and NDC partners. It generated a set of components proposed for implementation in the six sectors under consideration. Table 2 lists the components included in the NDC2 and the NDC Update Report.

**Table 2: Revised mitigation options from NDC1**

| Sector | Project | Objectives | Component | IPCC Source Category |
|---|---|---|---|---|
| **Agriculture** | GHG reduction from different rice ecologies in the Gambia | Reduce methane emissions: 1) by replacing lowland rice varieties with upland rice cultivars, and 2) through enhanced water and fertiliser management<br>Promote alternatives to pumped irrigation technology using fossil fuel | Component 1: Upland system - Nerica upland rice | 3C7. Rice cultivation |
| | | | Component 2: Lowland system - System of rice intensification | 3C7. Rice cultivation<br>3Da. Direct soil emissions (inorganic, organic fertilizer) |
| | | | Component 3: Lowland system - Tidal irrigation | 3C7. Rice cultivation |
| **LULUCF** | Re-greening degraded landscapes (including protected forests) | Restore degraded landscape and reduce incidence and intensity of bushfires (Natural Climate Solutions) | Component 1: Planting and management | 3B. Forest and grassland conversion |
| | | | Component 2: Fire prevention and control | |
| **Energy (Non-Power)** | Upscaling deployment of fuel-efficient biomass combustion stoves | Reduce consumption of forest energy products, and extraction rates through technological innovation | Component 1: Residential applications | 1A4a. Residential |
| | | | Component 2: Commercial and industrial applications | 1A4b. Commercial/ Industrial |
| **Transport** | Downsizing the Gambia's transport sector carbon footprint | Reduce fuel consumption through efficiency standards, and decongestion of major traffic arteries | Component 1: Implementation of vehicle fuel efficiency standards | 1A3. Transport |
| | | | Component 2: Strengthening public transport systems | |
| | | | Component 3: Increasing use of blended fuel in road transport | |

| Sector | Project | Objectives | Component | IPCC Source Category |
|---|---|---|---|---|
| **Waste** | Integrated waste management | Reduce methane emitted from open waste disposal through material recovery, waste treatment, and controlled disposal | Component 1: Solid waste management | 4A. Solid waste disposal<br>4B. Biological treatment of waste |
| | | | Component 2: Wastewater management (noting that insufficient data was available to do a financial assessment of this component) | 4D. Wastewater treatment and discharge |
| | | | Component 3: Small-scale, decentralised waste treatment | 4B. Biological treatment of waste |
| **IPPU** | Substituting HFCs in production and manufacturing processes | Increase uptake of climate-friendly products in industrial production processes | Component 1: GHG abatement in the food industry | 2F1. Refrigerants and air-conditioning |
| | | | Component 2: GHG abatement in the chemical industry | 2F2. Foam-blowing agents |

Details for each component are provided in section 5 and the relevant subsections describing the mitigation measures.

## 3.3 METABOLIC ANALYSIS

A metabolic analysis was conducted for The Gambia as part of the CPP. It identified circular mitigation options that could contribute to achieving the targets defined in both the NDC2 and The Gambia's Climate Vision. The circular economy approach provides an opportunity for The Gambia to combine economic development and job creation with reduced GHG emissions, improved climate resilience, and reduced reliance on imports of raw materials and goods. It can help to safeguard and restore the quality of the country's natural assets, notably the soils, forest stock and fishing grounds on which large segments of The Gambia's population rely. In a circular future, the country can continue to give priority to sourcing materials from regenerative, rather than depletive, sources and avoid waste. Twenty mitigation options were identified in the metabolic analysis. They were presented in a draft report and discussed with stakeholders in a workshop on 24 November 2020. The list of options included a description of the measures, the GHG emission reduction potential (covering both domestic and international emissions), estimated cost of implementing the measures, and the impact on job creation. The purpose of this workshop was to receive feedback on the mitigation options, underlying assumptions and mitigation potential identified. The final metabolic analysis is covered in a separate report, Circular economy opportunities in The Gambia – A metabolic approach to define a resource efficient and low-carbon future.

The next step involved selecting priority measures from the 20 options to be included in the NDC2. The criteria applied for the selection were as follows:

- annual GHG mitigation potential of more than 50,000 tons; and,
- job potential quantified as 'very high' or 'high.'

Based on these criteria, 10 options were selected for inclusion in the NDC2. This selection was validated in a stakeholder workshop held on 23 February 2021.

Table 3 lists all 20 options and highlights (in yellow) the 10 selected for inclusion in the NDC2.

**Table 3: Mitigation options selected from the metabolic analysis**

| | | | Domestic | International | | | | |
|---|---|---|---|---|---|---|---|---|
| Agriculture | MA1 | Climate Smart Agriculture | 205,000 | 51,000 | Medium | - | $51,199,738 | Very high |
| | MA2 | Improve livestock productivity | 196,000 | 1,000 | Medium | 8,678 | $215,357 | Very high |
| LULUCF | MA5 | Improved cookstoves | 153,000 | 0 | Medium | - | $- | Medium |
| | MA3 | Multistrata agroforestry | 42,000 | 64,000 | Medium | - | $33,719,034 | High |
| | MA4 | Firewood from agroforestry | 27,000 | 28,000 | Low | - | $8,641,939 | High |
| | | Ecotourism | - | - | Low | n/a | n//a | High |
| IPPU | MA9 | Local construction materials | - | 110,000 | Low | - | n/a | High |
| | MA10 | Substituting HFC | 705,000 | 0 | High | n/a | n/a | Low |
| | | Circular procurement | 10,000 | 10,000 | Medium | Not available | n/a | Medium |
| | | Circular energy transition | - | 6,000 | High | - | $- | Low |
| | | Strengthening informal sector manufacturing | - | - | Low | n/a | n/a | High |
| | | ICT as a service | - | 10,000 | High | - | $7,629,134 | High |
| Energy | | Passive building design | n/a | n/a | Low | - | $- | Low |
| | | Align the tax regime | 9,000 | 3,000 | Low | - | $11,097,133 | High |
| Waste Management | MA6 | Biogas from waste management | 50,000 | 0 | High | n/a | n/a | Medium |
| | MA7 | Organic waste recovery | 77,000 | 0 | Low | 63,842 | | Medium |
| | | Artisan plastics recycling | - | - | Low | 12 | $- | Low |
| | | Avoiding pollution from fish meal | n/a | n/a | Medium | n/a | $- | High |
| Multi-sector | MA8 | Reducing food losses | 66,000 | 9,000 | High | 58,624 | $3,534,403 | Medium |
| | | Extended Producer Responsibility | - | 29,000 | High | 18,068 | n/a | Low |

While all 10 options were considered for inclusion in the NDC2 and the NDC Update Report, the two measures below were not considered in the final version for the following reasons:

- MA5 – Improved cookstoves: this overlaps with the mitigation option covered by ICLEI
- MA9 – Local construction materials: this mitigation option generates only international GHG emission reductions and therefore is not considered in the NDC2.

Details for each measure can be found in section 5 and the relevant subsections describing the mitigation measures.

## 3.4 MITIGATION SCENARIOS

The mitigation scenario represents the path that The Gambia must follow until 2030 in order to achieve the Paris Agreement goal of limiting global temperature rise to 1.5°C. It includes mitigation measures in all sectors covered by the NDC2, which include:

- AFOLU (LULUCF and Agriculture)
- Energy

- Waste
- Transport
- IPPU

While the measures selected for the NDC2 have a 2030 horizon, they constitute important steps in the process of achieving the net-zero carbon emissions target by 2050, as defined in Gambia's 2050 Climate Vision.

The measures included in the NDC2 were thus developed as follows:

- Twenty-two mitigation measures were discussed and analysed in the process of preparing the NDC1. They covered all sectors except IPPU. Of the 22, 12 were included in the final version of the NDC1. As part of the NDC2 development process, ICLEI reviewed the measures included in the NDC1 and information was updated, where necessary. Based on the discussions with national stakeholders, further detailed components were identified for inclusion in the NDC2.
- A metabolic analysis was carried out as part of the CPP. It identified circular mitigation options for The Gambia. The analysis generated a list of 20 mitigation options, 10 of which were selected for inclusion in the NDC2 at a 23 February 2021 stakeholder workshop. (For details, see section 3.3.)
- IRENA analysed the cost-effectiveness of renewable energy mitigation options for the electricity sector, carried out under the Climate Action Enhancement Package of the NDC Partnership. A technical costing study was conducted using the marginal abatement cost curves methodology to determine the optimal combination of mitigation options for the electricity sector, with a focus on renewable energy technologies.

Details of all mitigation options included in NDC2 can be found in section 5.

Each mitigation measure included in the NDC2 and the NDC Update Report carries an identification number. The numbers are assigned as follows:

- ID 1-6: mitigation measures resulting from ICLEI's work
- ID MA1-MA10: mitigation measures based on the metabolic analysis
- ID E1-E8: mitigation measures based on the cost-effectiveness analysis of renewable energy technology options from IRENA's work.

Table 4 lists all mitigation measures included in the NDC2.

**Table 4: Mitigation measures included in NDC2**

| Sector | ID | Mitigation measure | Information source |
|---|---|---|---|
| Agriculture | 1 | GHG reduction from different rice ecologies in The Gambia | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| | MA1 | Improving agricultural resilience by implementing climate-smart agriculture (CSA) | Metabolic analysis |
| | MA2 | Improving livestock productivity | Metabolic analysis |
| | MA8 | Reducing food losses | Metabolic analysis |
| LULUCF | 2 | Re-greening degraded landscapes (including protected forests) | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| | 3 | Upscaling deployment of fuel-efficient biomass combustion stoves | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| | MA3 | Multistrata agroforestry | Metabolic analysis |
| | MA4 | Firewood from agroforestry | Metabolic analysis |

| Sector | ID | Mitigation measure | Information source |
|---|---|---|---|
| Energy | E1 | 89 MW of utility-scale solar PV capacity | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E2 | 3.6 MW of utility-scale wind capacity | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E3 | Reducing transmission and distribution losses to 17 percent | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E4 | Full replacement of diesel mini-grids with solar PV and battery storage systems | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E5 | Solar home systems (SHS) to supply off-grid consumption | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E6 | Substitution of incandescent light bulbs | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E7 | Solar water heating facilities to supply 10 percent of demand by 2030 | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| | E8 | 6 MW of solar PV rooftop systems by 2024 | Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia |
| Transport | 4 | Downsizing The Gambia's transport sector carbon footprint | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| Waste | 5 | Integrated waste management | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| | MA7 | Organic waste recovery | Metabolic analysis |
| | MA6 | Biogas from waste management and landfills | Metabolic analysis |
| IPPU | 6 | Substituting HFCs in production and manufacturing processes | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |
| | MA10 | Substituting HFCs | Metabolic analysis |

# 4. THE GAMBIA'S GHG PROFILE

The latest GHG inventory data submitted to the UNFCCC covers the year 2010. A draft of the 2010 National GHG Inventory was available when the NDC1 was developed. As explained in section 3.1.2, the GHG Inventory's preliminary figures were used for most sectors, while different figures were used for the waste and IPPU sectors.

The calculations for the NDC2 are based on the final results of the 2010 GHG Inventory. Assumptions were made to reflect the most likely baseline scenario development in each sector covered by the NDC in order to estimate the changes between 2010 and 2020. The calculations use the same Scenario Excel Sheet as the NDC1 calculations; it provides detailed calculations for all sectors. All assumptions in the model were reviewed and revised where more accurate or more reliable data were available. In all other cases, the assumptions from the NDC1 calculation were maintained. The details on the revisions can be found in the baseline section for each sector in section 5.

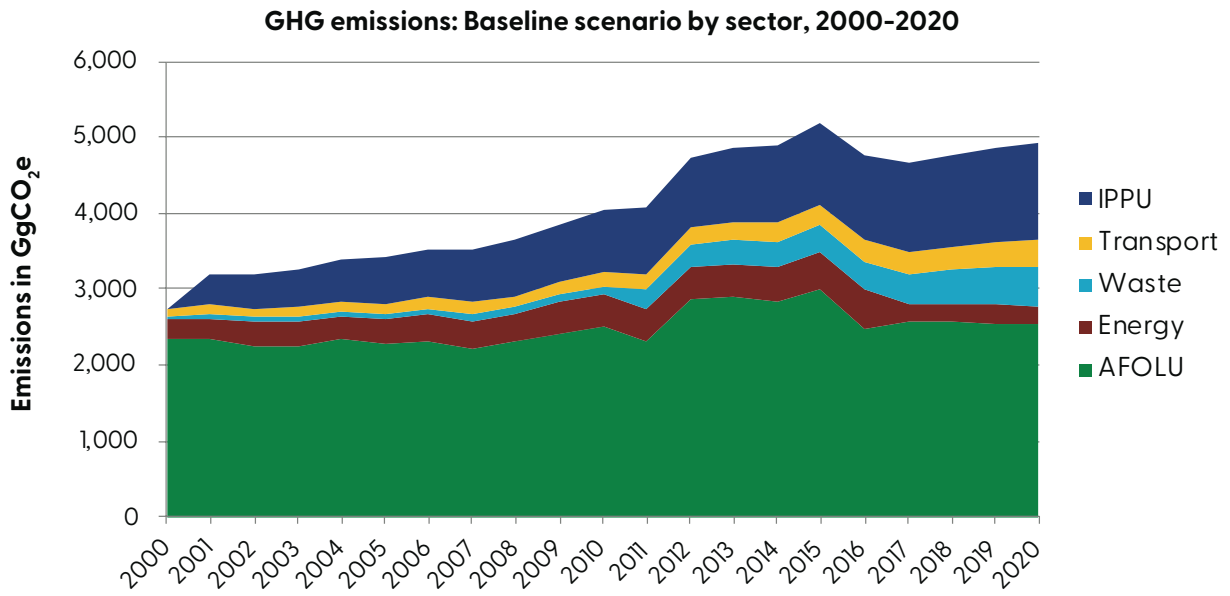
The following approaches were used to determine baseline development between 2010 and 2020.

- For a limited number of specific baseline components, actual data for the period 2010 to 2018 or 2019 were available. This includes, for example, emissions from agriculture (2011-2018) or rice production (2011-2018).
- For some parameters, data were available for specific years, such as number of cattle (available for 2011 and 2016). In such cases, data were interpolated linearly to calculate values for the missing years.
- For the majority of parameters, extrapolation of historic data was used to determine values for the period up to 2020. As a rule of thumb, data for the five most recent years were used as a basis for the extrapolation.
- Where available, growth rates of parameters from policy documents were applied, such as the growth rate of rice production from the GNAIP II.

The description of approaches used to determine the baseline development between 2010 and 2020 shows that reliable, up-to-date information and data are lacking. The latest GHG inventory data is from 2010 and, thus, outdated. Actual data were available for only for a small number of baseline components. In most cases, extrapolation of historic developments was the most appropriate way to determine baseline development.

Between 2000 and 2010, emissions rose from 2,752 $GgCO_2e$ to 4,033 $GgCO_2e$ (an increase of 46.5 percent). In 2020, baseline emissions reached 5,131 $GgCO_2e$, for an increase of 27.7 percent over the previous 10 years. The graph below shows the development of baseline emissions between 2000 and 2020 by sector.

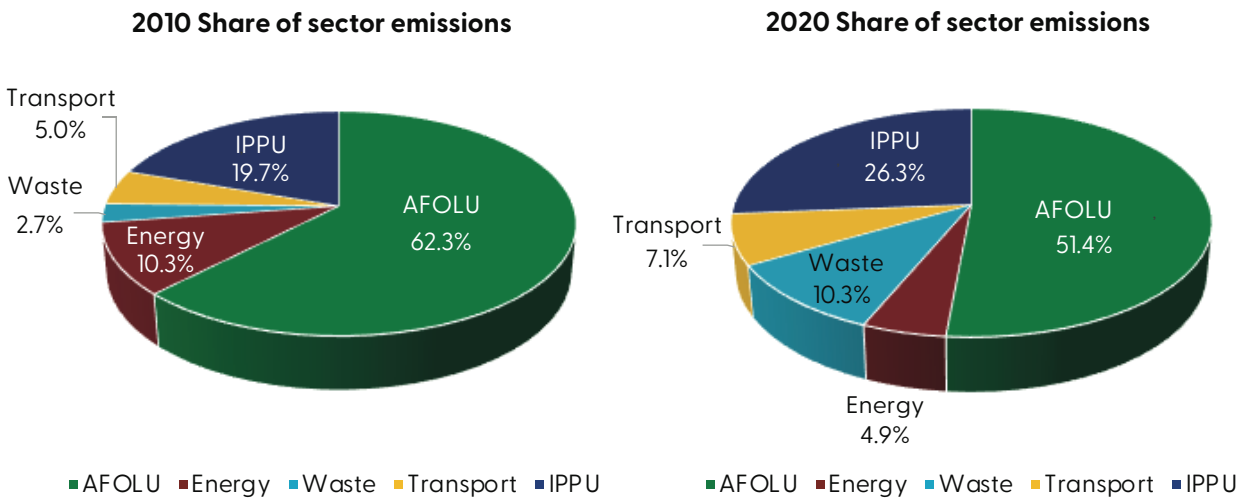
**Figure 2: GHG emissions: Baseline scenario by sector, 2000-2020**




This timeline of baseline emissions shows that development was erratic in the period 2010-2016. This was caused primarily by variations in the AFOLU sector related to rice cultivation (agriculture) and land use change (LULUCF), as reported in GNAIP II.

The two graphs below show the share of emissions by sector in 2010 and 2020. Share of emissions from the waste sector increased from 2.7 percent in 2010 to 9.8 percent in 2020. This is primarily because wastewater emissions were included starting only in 2011, as data on wastewater management was not available when the 2010 National GHG Inventory Report was prepared. Absolute emissions in the AFOLU sector were more or less constant between 2010 and 2020. However, due to the sharp increase in IPPU emissions, the AFOLU share fell to around 50 percent in 2020, while the share of IPPU emissions increased to around 25 percent. Transport emissions almost doubled over the 10 years, leading to an increase in the share of total emissions.

**Figure 3: Share of GHG emissions by sector, 2010 and 2020**



# 5. SECTOR BASELINES AND MITIGATION OPTIONS

This section provides detailed information on the baseline and mitigation measures for each of the following sectors:

- Agriculture
- LULUCF
- Energy
- Transport
- Waste management
- IPPU

The analysis discusses the agriculture and LULUCF sectors separately to allow the required level of detail. When discussing total GHG emissions (in both the baseline and mitigation scenarios), agriculture and LULUCF are subsumed under AFOLU.

## 5.1 AGRICULTURE

### 5.1.1 BASELINE

Historic activity data in the agriculture sector are abundant, compared to most other sectors. However, the data across national sources are not consistent and single sources present unexplained variation patterns over time. Therefore, FAO datasets for historic data up to 2018 were used, as they are the most consistent and complete. Data was retrieved directly from the FAO statistics page[6].

The GNAIP II is not consistent with regard to data on cattle. One section confirmed an annual growth rate of 3.4 percent per annum, while another section reported a national herd of 392,287 in 2011 and 292,837 in 2016. In the NDC2 calculation, the 2016 figure of 292,837 was taken as the basis for an annual increase of 0.5 percent per annum (no modification of assumption from first NDC).

Rice production has been updated based on figures presented in GNAIP II. It fell from around 70,000 tonnes (t) in 2013 and 2015 to 26,413t in 2018. The cropped area for rice production was relatively stable in the period 2011-2017, with 68,900 hectares (ha) cropped in 2017.

Projections between 2019 and 2030 differ significantly from the assumptions made in the NDC1. In that document, the high scenario assumed a 10 percent annual increase in land used for rice production, while the low scenario assumed an annual increase of 3 percent. The NDC1 assumed that by 2030, land used for rice production would total 440,000 ha in the high scenario and 126,000 ha in the low. The GNAIP II projects that 72,000 ha will be used for rice production by 2021, the end of the National Development Plan (NDP) period. Figures between 2017 and 2021 were interpolated.

The GNAIP II clearly states that the focus of mitigation interventions will be to increase the productivity of rice production, while keeping the area used for rice cropping constant. However, this is already a mitigation option and the NDC1 baseline of 3 percent annual increase is maintained.

6 Food and Agriculture Organization of the United Nations (FAO), 2021. FAOSTAT.

The area used to produce coarse grain has fallen sharply in recent years. From a 2012 high of 176,198 ha, the area planted in coarse grain totaled 37,400 in 2017. The GNAIP II sets a target of 170,000 ha in 2026 but assumes no further growth in area after that year.

The following table summarizes the main assumptions for the agriculture baseline scenario.

**Table 5: Agriculture baseline scenario assumptions**

| Indicator | Source | Comments | Value |
|---|---|---|---|
| Growth rate for cattle | GNAIP (2010) | Actual figures for 2016, constant growth assumed from 2016 onward. | 0.5% |
| Area used for rice cultivation | GNAIP II (2018) | Figure planned for 2021, constant between 2021 and 2030. | 72,000 ha |
| Growth rate for rice production | GNAIP II (2018) | No growth in area used for rice cultivation under GNAIP II; however, baseline increase is assumed. | 3% |
| Area used for coarse grain | GNAIP II (2018) | Figure planned for 2026. Linear growth between 2017 and 2026, constant figure between 2026 and 2030. | 170,000 ha |
| Emissions from non-rice agriculture in 2018 | FAO (2020) | Value based on FAO data. | 792.39 Gg $CO_2$e |
| Emissions growth rate for non-rice agriculture | FAO (2020) | Average of historic growth rates between 2012 and 2018. | 2.3% |
| Share of enteric fermentation emissions from cattle | FAO (2010), GoTG (2013) | Extrapolated from historic data. | 80% |
| Emissions from rice in 2018 | FAO (2020) | Value reported by FAO for 2018. | 364.94 Gg $CO_2$e |

## 5.1.2 MITIGATION MEASURES

The following mitigation measures are included in the NDC2 for the agriculture sector:

- 1 – GHG reduction from different rice ecologies in The Gambia
- MA1 – Improving agricultural resilience by implementing CSA
- MA2 – Improving livestock productivity
- MA8 – Reducing food losses

Details on each of the mitigation measures are provided in the following tables.

**Table 6: Mitigation options for the agriculture sector**

| Mitigation option no. and name | 1 – GHG reduction from different rice ecologies in The Gambia |
|---|---|
| Sector | Agriculture |
| Description of activity | Component 1: Upland system - Nerica upland rice<br>Component 2: Lowland system - System of rice intensification (SRI)<br>Component 3: Lowland system - Tidal irrigation |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |

| | |
|---|---|
| Mitigation potential (in $GgCO_2e$) and timeline | 449 $GgCO_2e$ in 2030 |
| Underlying assumptions | For Component 1, assumptions from NDC1 were kept constant. Only the implementation schedule was modified: from 2018-2022 in NDC1 to 2022-2026 in NDC2.<br>For Component 2, under NDC1, it was assumed that SRI can replace conventional production in up to 1/3 of the area for rice production. For NDC2, GNAIP II projects that SRI will total 3,000 ha out of 72,000 ha in 2026 (4.17%). It is assumed that implementation of Component 2 will begin in 2022.<br>For Component 3, the CBA calculated an increase of GHG emissions due to methane emissions of 18 $GgCO_2e$ for 2030. It was assumed that that component will be implemented at the same time that Component 2 is implemented. |
| Information source | NDC1; Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

| **Mitigation option no. and name** | **MA1 – Improving agricultural resilience by implementing climate-smart agriculture** |
|---|---|
| Sector | Agriculture |
| Description of activity | CSA proposes a combination of measures that reduce GHG emissions, while also improving the resilience of agricultural production to climate change impact. It does so typically through a combination of measures involving soil and nutrient management, water harvest and use, biodiversity management, pest and disease control, and the use of quality seeds and planting materials of well-adapted crops and varieties. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 205 $GgCO_2e$ in 2030 |
| Underlying assumptions | The estimate of soil organic carbon sequestration across The Gambia is conservatively based on the estimated 0.8 tonne $CO_2e$/ha sequestration impact of reduced tillage practices only. This value has been applied to the latest data on areas where cereals and groundnuts are harvested. |
| Information source | Metabolic Analysis Report; Haddaway, N.R., Hedlund, K., Jackson, L.E. et al. *How does tillage intensity affect soil organic carbon? A systematic review.* Environ Evid 6, 30 (2017). https://doi.org/10.1186/s13750-017-0108-9 |

| **Mitigation option no. and name** | **MA2 – Improving livestock productivity** |
|---|---|
| Sector | Agriculture |
| Description of activity | Some of the mitigation options are already practiced in The Gambia, including free roam grazing and combined forestry with cattle grazing. Still, livestock make up 11% of national GHG emissions. Additional productivity improvements offer mitigation potential. The World Bank and FAO have identified measures that may still be relevant to the Gambian context, ranging from improved forage quality to grazing management and improved animal health. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 408 $GgCO_2e$ in 2030 |

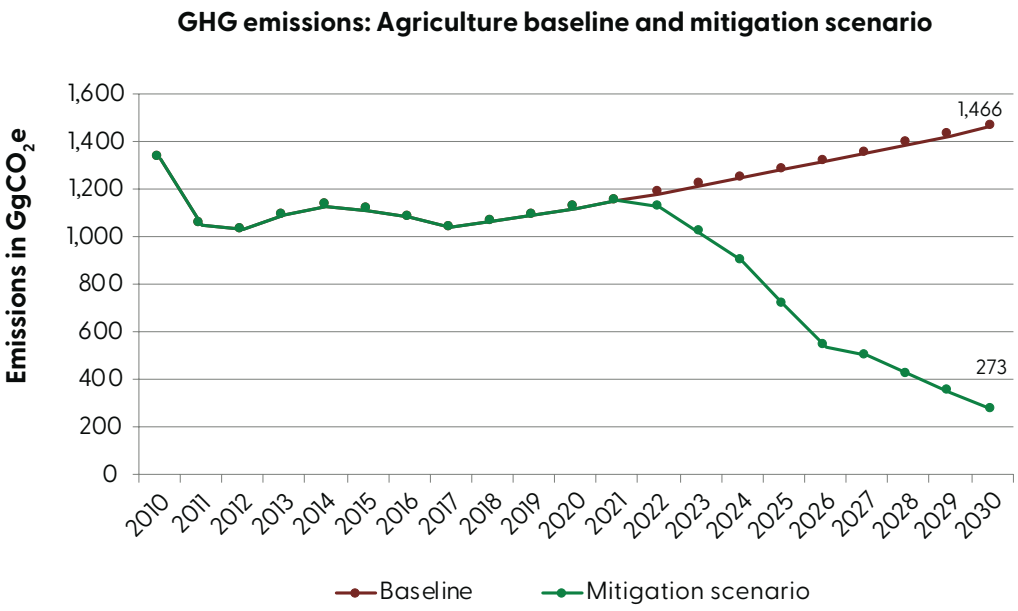
| | |
|---|---|
| Underlying assumptions | According to the FAO, the carbon intensity of small ruminant meat production in West Africa is an estimated 55% higher than the global average. The emissions reduction potential for The Gambia has been determined based on an average 27% to 41% emission reduction potential (34%), extrapolated to the entire livestock sector. |
| Information source | Metabolic Analysis Report; Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013. *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities*. Food and Agriculture Organization of the United Nations (FAO), Rome, page 76. |

| **Mitigation option no. and name** | **MA8 – Reducing food losses** |
|---|---|
| Sector | Agriculture and waste |
| Description of activity | Reduction of food losses involves activities including:<br>Improved harvesting techniques;<br>Adequate storage to limit exposure to moisture, heat and pest infestation using hermetic bags or metal silos;<br>Applying mobile processing units, solar dryers, graters and pressers, where applicable;<br>Contractual and aggregation points that help bring the product to market and warehouse receipt systems to reduce losses during storage; and,<br>Improved transport conditions and cold storage capacity. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 131 $GgCO_2e$ in 2030 |
| Underlying assumptions | For the emission reductions, the assumption is that this reduces import-related food waste (only retail and consumer stage) and domestic production (through the entire value chain) and thus affects both territorial and international GHG emissions. Reduced food waste also reduces landfill gas methane. An estimated 31% of all organic waste disposed of in landfills and dumpsites is food waste. The first-order decay models that are the basis of the estimated 116,000 $tCO_2e$ of landfill gas in the Third National Communication were not available. Therefore, a 20% reduction in landfill gas emissions has been assumed. This is below the 31%, taking into account the legacy emissions from historic disposal of organic material. |
| Information source | Metabolic Analysis (UNDP, 2021) |

### 5.1.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions in the baseline section, GHG emissions in the agriculture sector are expected to rise from 1,124 $GgCO_2e$ in 2020 to 1,466 $GgCO_2e$ in 2030 (a 30.4 percent increase). Based on the mitigation measures defined in section 5.1.2, GHG emissions in 2030 will be 273 $GgCO_2e$. This is a 75.7percent decrease compared to the 2020 level and 81.3 percent compared to the expected baseline level in 2030.

**Figure 4: GHG emissions: Agriculture baseline and mitigation scenario**




## 5.2 LAND USE, LAND-USE CHANGE AND FORESTRY (LULUCF)

### 5.2.1 BASELINE

The NDC1 Technical Paper defines high and low baseline scenarios for the forestry sector. The low scenario used FAO data, which is based on 1982 and 1990 forest assessments. The high baseline used national assessments from 1982 and 2010. The differences between these two sources are due to the definition of forest, as opposed to other wooded land, and the long period between forest assessments requiring estimations of forest cover. Since the historic development of the forest area is thus estimated rather than measured, a decision was taken in the NDC1 Technical Paper to report high and low historic emissions.

While the NDC1 used the low baseline scenario, the TNC reported figures for 2010 based on the high historic emissions scenario. The difference in 2010 is considerable, with 1.183 $GgCO_2e$ reported in the TNC, while the NDC1 used -360 $GgCO_2e$ as a basis for it baseline scenario. This was corrected in the NDC2, with the historic figures of the TNC taken as the starting point for baseline setting (1.183 $GgCO_2e$ in 2010) and the approach for the high baseline scenario applied for baseline setting between 2011 and 2030.

To project forest area for the period 2011-2030, the following approach was used: the average growth rate of forest area reported in the FAO Global Forest Resource Assessment 2020 (FAO, 2020) serves as the basis for calculating the NDC2 baseline scenario.

The FAO Global Forest Resource Assessment 2020 and the country report for The Gambia provide figures for forest area for the period 2010-2020[7]. Between 2010 and 2020, total forest area declined from 300,000 ha to 242,670 ha, an average annual decline of 1.9 percent. In the same period, the area of other wooded land declined from 123,000 ha in 2010 to 99,500 ha in 2020 (-19.1 percent). Accordingly, non-forested land increased from 589,000 ha in 2010 to 669,830 ha in 2020.

The average annual decline is now taken as the basis for calculating forest area for the period 2011-2030. The starting point is the forest area reported for 2010 in the high forest scenario of the NDC1 (420,240 ha) and related GHG emissions of 1.183 $GgCO_2e$. This approach must be used because there is no updated information on forest area development between 2010 and 2020.

7 Food and Agriculture Organization of the United Nations (FAO), 2020. Global Forest Resources Assessment 2020. Report: Gambia.

The FAO 2020 Forest Resource Assessment does not include information on fuelwood extracted from forests; therefore, the most recent data is from the 2010 National Forest Assessment. Based on 2005-2010 data, an annual growth rate of 2.95 percent was calculated and used for baseline calculations in the NDC1. Taking into account the forest cover decrease observed over the last 10 years and the extrapolated trend of a further annual decline of 1.91 percent, fuelwood extracted from forests seems unlikely to increase. Reflecting the lack of up-to-date information, the growth rate of fuelwood extracted is assumed to be zero percent for the period 2021-2030.

The NDC1 calculations use FAO data that directly report carbon stored above and below ground for the historic baseline. Later FAO data reports carbon stored per hectare of forest, rather than in overall biomass. This was used to estimate baseline emissions after 2011. Due to the lack of updated data since 2011, baseline figures are now extrapolated from the 2011 level, using the annual 1.91 percent decline in forest area.

The following table summarizes the main assumptions used for the LULUCF baseline scenario.

**Table 7: Assumptions for the LULUCF baseline scenario**

| Indicator | Source | Comments | Value |
|---|---|---|---|
| Average growth rate of forest area, 2011-2030 | FAO Global Forest Resource Assessment 2020 (FAO 2020) | Average of 2010-2020 taken as basis for calculation of baseline emissions 2010-2030. | -1.91% |
| Growth rate of fuelwood extracted | Own assumptions | Based on decline of forest area, zero development is likely. | 0% |

## 5.2.2 MITIGATION MEASURES

The following mitigation measures for the LULUCF sector are included in NDC2:

- 2 – Re-greening degraded landscapes (including protected forests)
- 3 – Upscaling deployment of fuel-efficient biomass combustion stoves
- MA3 – Multistrata agroforestry
- MA4 – Firewood from agroforestry

The tables below provide details on each mitigation measure.

**Table 8: Mitigation options for the land use, land-use change and forestry sector**

| Mitigation option no. and name | 2 – Re-greening degraded landscapes (including protected forests) |
|---|---|
| Sector | LULUCF |
| Description of activity | Component 1: Planting and management (afforestation)<br>Component 2: Fire prevention and control |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 373 $GgCO_2e$ in 2030 |
| Underlying assumptions | For Component 1, the same assumptions were used as in the NDC1 calculations. That high mitigation scenario assumed afforestation primarily in protected rural areas, using fast-growing species, with carbon sequestration rates as observed in plantations.<br>For Component 2, the mitigation potential related to forest fires caused by forest management-related activities, particularly hunting and harvesting, is carried over from NDC1 without modification. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

| Mitigation option no. and name | 3 – Increasing the deployment of fuel-efficient biomass combustion stoves |
|---|---|
| Sector | LULUCF |
| Description of activity | Component 1: Residential applications<br>Component 2: Commercial and industrial applications |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 218 $GgCO_2e$ in 2030 |
| Underlying assumptions | Component 1 restores the NDC1 assumptions that 200,000 cookstoves for domestic use will be produced and installed by 2030. Implementation is gradual, assuming an increase of 5 percent per annum.<br>Component 2 covers the installation of fuel-saving and less polluting stoves in lower basic and secondary schools that provide school meals, as well as the installation of FTT (FAO Thiaroye Technology) stoves/kilns in Banjul and Community Fishing Centres across the country. GHG emission reductions under Component 2 were calculated as 20.8 percent of GHG emission reductions achieved under Component 1. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

| Mitigation option no. and name | MA3 – Multistrata agroforestry |
|---|---|
| Sector | LULUCF |
| Description of activity | Several initiatives are aimed at combining agricultural and forestry activities to improve food security. This circular mitigation strategy aims to strengthen these initiatives to increase tree cover in The Gambia, both in urban and rural areas. Trees help retain water and improve drought resilience, provide food to the rural population in case of shortages, and provide shade in cities. |
| Included in NDC1 | NO |
| Conditional/unconditional | Unconditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 169 $GgCO_2e$ in 2030 |
| Underlying assumptions | The annual sequestration impact of multistrata agroforestry is 4.45 tCO2e/ha, while it is likely to be lower for tree planting in urban areas. The area suitable for forestry activities includes at least the UN Environment-targeted area of 13,000 ha of forest land. However, since an estimated 95,000 ha have recently been deforested, the actual potential is likely to be higher. To be conservative, it is estimated that 40 percent of the recently deforested area can be reforested by 2030. |
| Information source | Metabolic Analysis Report (UNDP, 2021); https://www.drawdown.org/solutions/multistrata-agroforestry |

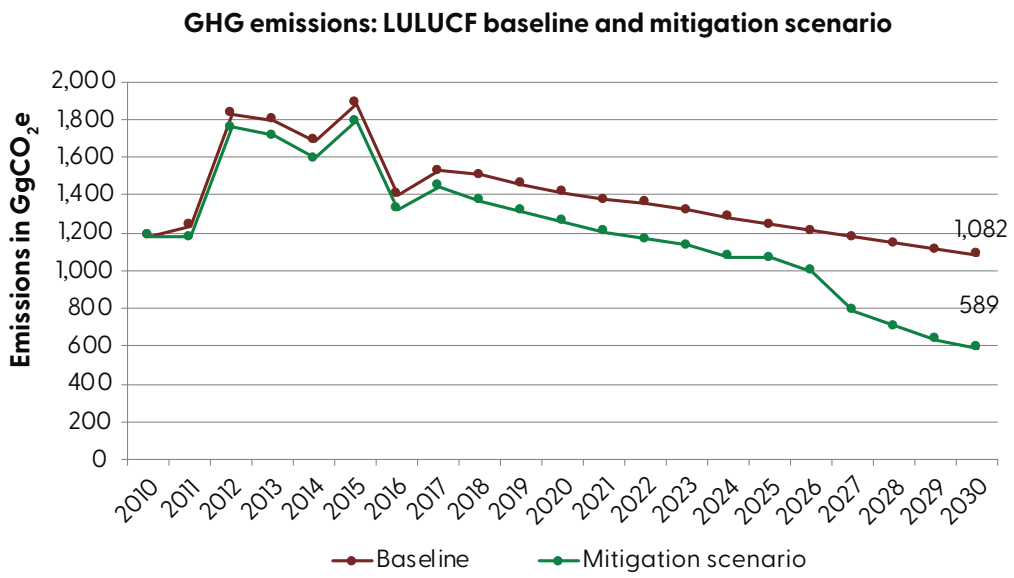
| Mitigation option no. and name | MA4 – Firewood from agroforestry |
|---|---|
| Sector | LULUCF |
| Description of activity | The 95,000 ha under community-based multistrata agroforestry in MA3 can produce around 262,000 tons of wood/year, assuming an agroforestry yield of 2.8 ton/ha/year. In the short run, it can be used to replace firewood from non-renewable sources. In the long run, when biogas and improved cookstoves further reduce firewood demand, the wood from agroforestry operations can be used for timber and as a substitute for carbon-intensive construction materials. |

| | |
|---|---|
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 169 $GgCO_2e$ in 2030 |
| Underlying assumptions | The 95,000 ha can produce around 262,000 tons of wood. The metabolic analysis estimated that around 88% of the wood can be used as firewood; the remainder would be used as construction material. The analysis also estimated that the share of non-renewable biomass is 6.6%, for a potential of 28.3 $GgCO_2e$. |
| Information source | Metabolic Analysis Report (UNDP, 2021); https://www.sciencedirect.com/science/article/pii/S1877343513001966 |

### 5.2.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions in the baseline section, GHG emissions in the LULUCF sector are expected to decrease from 1,415 $GgCO_2e$ in 2020 to 1,082 $GgCO_2e$ in 2030 (a decrease of 23.5 percent). Based on the mitigation measures defined in section 5.2.2, GHG emissions in 2030 will be 589 $GgCO_2e$. This is a 58.4 percent decrease compared to the 2020 level and a 45.6 percent compared to the expected baseline level in 2030.

**Figure 5: GHG emissions: LULUCF baseline and mitigation scenario**




## 5.3 ENERGY

### 5.3.1 BASELINE

The baseline emissions for the electricity sector between 2017 and 2030 were estimated by updating the methodology used in the NDC1, and included projections of electricity demand, supply and dispatch strategy.

The total population was estimated using the medium fertility scenario from the UN World Population Prospects (2019 Revision). The rural-urban population ratio was calculated using World Bank data (World Development Indicators) for the period 2010-2019. The linear trend for this time period was then extrapolated to 2030.

To estimate the number of consumers, national electrification targets of 100 percent access to electricity for urban populations by 2025 and for rural populations by 2030 were used. Linear interpolation was used to calculate the urban and rural access rates, respectively, between 2018-2025 and 2018-2030. The

access rate for each year's urban and rural population was then multiplied by the estimated population for that year to determine the percentage of rural and urban population with access to electricity from 2017 to 2030.

The proportion of the population connected to the main grid, mini-grid, and off-grid was then calculated. The Regional Off-Grid Electrification Programme (ROGEP) analysis (World Bank and ECREEE, 2019) used mini-grid and off-grid scenarios to estimate the share of the population served by electricity via the main grid, mini-grid, and off-grid. The 'least-cost' universal access option used in this analysis assumes that the entire population will be interconnected, gradually, to a single grid by interconnecting the mini-grids.

As a result, the percentage of the total population connected to diesel mini-grids in 2023 (1.8 percent) is assumed to fall to zero in 2030, as the on-grid population reaches 100 percent by 2030[8]. As the share of the population connected to the main grid increases to 100 percent in 2030, the proportion served by off-grid services decreases from 18.6 percent in 2023 to zero percent in 2030. If production data and the number of connections for the mini-grids were available, the scenario could be refined[9]. After estimating the share of the population connected to the main grid, mini-grid and off-grid for the period in question, the total population was multiplied by the share of the population connected to each service type (i.e., on-grid, mini-grid and off-grid). All mini-grid and off-grid users were assumed to reside in rural areas.

The average electricity consumption per household and the average household size had to be estimated to estimate the electricity demand. The average consumption for urban and rural populations connected to the main grid and mini-grids was derived from The Gambia electricity roadmap update (ECA et al., 2021), which was revised to account for the effects of COVID-19. It includes a low case, base case and high case for average consumption. After several iterations, the base case scenario was used, which brought overall demand closer to the ECA et al. scenario (461 GWh/year vs. 418 GWh/year for ECA et al., and 371 to 443 GWh/year for the 2015 INDC scenario). The 2018 annual report of The Gambia Public Regulatory Authority (PURA) shows energy demand of 1,005 GWh in 2018 (this cannot be replicated given the number of consumers and productive uses). For the urban population, average monthly consumption per household in 2020, 2025, and 2030 was 124, 161, and 175 kWh/month/household, respectively.

For the rural population, average monthly consumption per household in 2020, 2025, and 2030 was 66, 79 and 86 kWh/month/household, respectively. The average consumption estimated for the rural population connected to an off-grid system was the access Tier 2 from the ESMAP technical report, Beyond Connections: Energy Access Redefined, or 6 kWh per month per household for 2020, 2025, and 2030 (Bhatia and Angelou, 2015). The rural and urban population household sizes were estimated at 8.4 and 5.9 persons per household, respectively (The Gambia Integrated Household Survey, 2015/2016, GBoS).

The PURA 2018 Annual Report includes several connections per customer category for 2017 and 2018. On-grid or off-grid applications were assigned to the categories. Commercial (NGOs and schools), large (industries and banks), and central government customers were assumed to be connected to the main grid, while local government authorities, provincial services and agriculture were assumed to be connected via mini-grids. The energy intensity factors for productive uses were calculated using the ESMAP Multi-tier Framework, which defines rural areas as Tier 3 and urban areas as Tiers 4 and 5. The annual productive use increase was assumed to be 5 percent.

To account for both transmission and distribution (T&D) losses, losses on the main grid were estimated at 22 percent in the baseline scenario, consistent with the World Bank's Gambia Electricity Restoration and Modernization Project (World Bank, 2018). The losses on mini-grids were estimated to be constant at 10 percent over the period.

8 According to the PURA Annual Report 2018, The Gambia has several diesel mini-grids with installed capacity of approximately 3.38 MW and operating capacity of 1.5 to 2 MW diesel generation (Public Utilities Regulatory Authority, 2018). The mini-grids' short-term demand (2017-2023) had to be estimated. Following several iterations, a level of 1.8 percent of the population currently connected to mini-grids seemed to be realistic. In the baseline scenario, the load factor of the mini-grids is 30 to 48 percent after the productive uses are added.

9 The ROGEP is ambitious and deviates from linear growth in electricity access rates between 2018 and 2030 by 3 percent over the period 2023–2026. The gap closes between 2027 and 2030. ROGEP implies a gap of 7 to 8 percent from a linear baseline in 2022–2023. This calls for a possible review of the ROGEP, with less ambitious electrification levels in 2023 (77.6 percent vs 81.4 percent from ROGEP).

The table below presents the main assumptions for the electricity baseline scenario.

**Table 9: Assumptions for the electricity baseline scenario**

| Indicator | Source | Comments | Value |
|---|---|---|---|
| Access to electricity | ECA et al. (2021) | - | 100% access to electricity for urban populations by 2025 and 100% access to electricity for rural populations by 2030. |
| Average monthly consumption per urban household in 2020, 2025, and 2030 | ECA et al. (2021) | - | 124 kWh/month/household in 2020; 161 kWh/month/household in 2025; 175 kWh/month/household in 2030. |
| Average monthly consumption per rural household in 2020, 2025, and 2030 | ECA et al. (2021) | - | 66 kWh/month/household in 2020; 79 kWh/month/household in 2025; 86 kWh/month/household in 2030. |
| Annual productive use increase | PURA Annual Report & Financials 2018 (PURA 2019) | - | 5% per year. |
| T&D losses estimated as constant | Main grid: World Bank's Gambia Electricity Restoration and Modernization Project (World Bank, 2018)<br>Mini-grids: IRENA (2021) | - | 22% main grid, 10% mini-grids. |

## 5.3.2 MITIGATION MEASURES

The following mitigation measures for the electricity sector are included in the NDC2:

- E1 – 89 MW of utility-scale solar PV capacity
- E2 – 3.6 MW of utility-scale wind capacity
- E3 – Reduction of transmission and distribution losses to 17 percent
- E4 – Full replacement of diesel mini-grids with solar PV and battery storage systems
- E5 – SHS to supply off-grid consumption
- E6 – Substitution of incandescent light bulbs
- E7 – Solar water heating facilities to supply 10 percent of demand by 2030
- E8 – 6 MW of solar PV rooftop systems by 2024.

Details on each of the mitigation measures are provided in the tables below.

**Table 10: Mitigation options for the energy sector**

| Mitigation option no. and name | E1 – 89 MW of utility-scale solar PV capacity |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options takes into account a target of 89 MW of solar PV by 2030. |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |

| | |
|---|---|
| Status of implementation | On-going.<br>The Jambur (20 MW) project has been committed and is expected to come online in 2022; the feasibility study for the 150 MW WB project (of which 50 MW is considered) is ongoing and will be implemented in phases (potential 80 MW by 2023 and a second phase of 70 MW by 2025); the feasibility study for the UNDP-funded solar PV project of 10 MW outlined in the Nationally Appropriate Mitigation Action has been completed and the tender document was launched recently. |
| Mitigation potential (in $GgCO_2e$) and timeline | 97 $GgCO_2e$ in 2030 |
| Underlying assumptions | The dispatch strategy is merit-based, which means that solar and wind capacity are dispatched first because they have zero marginal costs. Imports and domestic electricity production from fossil fuels meet remaining demand. The Gambia River Basin Development Organization (OVMG) project's hydropower is prioritized, with a capacity contract of 5,000 hours per year. Following that, imported combined cycle gas turbine (CCGT) is deducted from demand, up to a maximum of 50%. For domestic capacity, CCGT with a maximum load factor of 90% (adjustable) is dispatched first, followed by heavy fuel oil (HFO) to meet the remaining demand.<br>The capacity factors assumed for the various technologies are as follows: 1,650 hours/year for solar PV (18.8% capacity factor); 1,752 hours/year for wind (20% capacity factor); 5,000 hours/year for hydropower (57% capacity factor); and 7,884 hours/year for CCGT (90% capacity factor).The emission factors for the various technologies are as follows: 0 tCO2e/MWh for renewable energy technologies; 0.8 tCO2e/MWh for light fuel oil (LFO, diesel); 0.6609 tCO2e/MWh for HFO; and 0.5 tCO2e/MWh for CCGT. |
| Information source | IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia. Based on data from the following sources: The Global Solar Atlas provided the capacity factor for solar PV (also equal to the capacity factor used in The Gambia electricity road map update Generation least cost development plan (ECA et al., 2021). The emission factor for LFO (diesel) was sourced from UNFCCC (CDM: Standardized Baselines - Emission factors for The Gambia's central grid and regional mini-grids), for HFO from the standardized baseline project and World Bank guidelines, and for CCGT from the EPA database and CDM Beijing Caoqiao Natural Gas CCGT Project. |

| **Mitigation option no. and name** | **E2 – 3.6 MW of utility-scale wind capacity** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options takes into account a target of 3.6 MW on-grid wind capacity by 2030. |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Status of implementation | Not implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | 4.2 $GgCO_2e$ in 2030 |

| | |
|---|---|
| Underlying assumptions | The dispatch strategy is merit-based, which means that solar and wind capacity are dispatched first because they have zero marginal costs. Imports and domestic electricity production from fossil fuels meet the remaining demand. The OVMG project's hydropower is prioritized, with a capacity contract of 5,000 hours per year. Following that, imported CCGT is deducted from demand, up to a maximum of 50% of demand. For domestic capacity, CCGT with a maximum load factor of 90% (adjustable) is dispatched first, followed by HFO to meet the remaining demand. The capacity factors assumed for the various technologies are as follows: 1,650 hours/year for solar PV (i.e. 18.8% capacity factor), 1,752 hours/year for wind (i.e. 20% capacity factor), 5,000 hours/year for hydropower (i.e. 57% capacity factor), and 7,884 hours/year for CCGT (i.e. 90% capacity factor).<br><br>The emission factors for the various technologies are as follows: 0 tCO2e/MWh for renewable energy technologies; 0.8 tCO2e/MWh for LFO (diesel); 0.6609 tCO2e/MWh for HFO; and 0.5 tCO2e/MWh for CCGT. |
| Information source | IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in The Gambia, International Renewable Energy Agency, Abu Dhabi. Based on data from ECA et al., 2021 where grid-connected wind capacity is considered a candidate project. The emission factor for LFO (diesel) was obtained from the UNFCCC (Clean Development Mechanism: Standardized Baselines, Emission factors for central grid and mini-grids of The Gambia); the HFO emission factor was obtained from the standardized baseline project and World Bank guidelines; and the CCGT emission factor was obtained from the EPA database and the CDM Beijing Caoqiao Natural Gas CCGT Project. |

| **Mitigation option no. and name** | **E3 – Reduction of transmission and distribution losses to 17percent** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options considers a target of 17 percent reduction in T&D losses by 2030. |
| Included in NDC1 | Partially; transmission losses were included, but not distribution losses |
| Conditional/unconditional | Conditional |
| Status of implementation | Not fully implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | 35 $GgCO_2e$ in 2030 |
| Underlying assumptions | The proposed target for on-grid T&D losses by 2030 is 17%. In its scenario, *Improvements in electricity distribution*, the 2015 NEEAP sets a target of 10% T&D losses by 2030. However, the 2018 World Bank report on the Gambia Electricity Restoration and Modernization Project notes that a 15%target would be challenging to meet. T&D losses are estimated to be 18% in the low case and 20% in the high case by 2030 in *The Gambia's electricity road map update Generation least cost development plan* (ECA et al., 2021). The proposed 2030 target of 17% has been presented to and validated by national stakeholders. |
| Information source | *IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi*. Based on data from NEEAP, 2015; The Gambia Electricity Restoration and Modernization, Project Appraisal Document 2530, 2018, and *The Gambia electricity road map update Generation least cost development plan*, (ECA et al., 2021). The *NAMA Design Document for Rural Electrification with Renewable Energy in The Gambia* (UNDP, 2015) is used to calculate the mini-grid T&D losses. |

| Mitigation Option no. and name | E4 – Full replacement of diesel mini-grids with solar PV and battery storage systems |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options considers replacing HFO mini-grids entirely with solar PV and battery systems by 2030, thus offsetting HFO mini-grids. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Status of implementation | Not implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | Zero $GgCO_2e$ in 2030, as it is assumed that all mini-grids will be grid-connected by 2030. Maximum contribution for the period 2021-2030 is 11 $GgCO_2e$ in 2023. |
| Underlying assumptions | Mini-grid electricity consumption had to be estimated to calculate the GHG emissions savings from the hybridization of mini-grids. Total population was estimated using the medium fertility scenario from the UN World Population Prospects (2019 Revision). The proportion of rural and urban population was calculated using World Bank data (World Development Indicators) for the period 2010-2019. This period's linear trend was then extrapolated to 2030. The national electrification targets of 100%access to electricity for urban populations by 2025 and 100% access for rural populations by 2030 were incorporated through linear interpolations for the urban and rural access rates, respectively, between 2018-2025 and 2018-2030. The access rate for each year's urban and rural population was then multiplied by the corresponding estimated population to calculate the rural and urban population with access to electricity from 2017 to 2030.<br><br>The share of the population connected to electricity via mini-grids was then estimated using the ROGEP analysis's mini-grid and off-grid scenarios (World Bank and ECREEE, 2019). The lowest-cost universal access option used in this analysis assumes a gradual interconnection of the entire population to a single grid by connecting the mini-grids. As a result, the model assumes a shift from 1.8% of the total population connected to HFO mini-grids in 2023 to 0%in 2030, as the on-grid population reaches 100% by 2030. As the mini-grids are connected and HFO is decommissioned, the mitigation model allocates the solar portion of the mini-grid to the on-grid mix. According to the 2018 PURA Annual Report, several HFO mini-grids with installed capacity of approximately 3.38 MW and an operating capacity of 1.5 to 2 MW HFO generation were included in the model. Several iterations were used to estimate the short-term demand for mini grids (2017-2023) and an assumption of 1.8% of the population currently connected to mini grids seemed reasonable.<br><br>The number of people connected to mini-grids was then calculated by multiplying the total population by the proportion of the population connected to mini-grids. All mini-grid users were assumed to be from rural areas.<br><br>The average electricity consumption per household and the average household size had to be estimated to estimate electricity demand. The average consumption for rural populations connected to mini-grids was derived from The Gambia electricity roadmap update, which was revised to account for the effects of COVID-19 and provides a low, base and high case for average consumption. Following several iterations, the high-case scenario was used, bringing overall demand closer to the ECA scenario (461 GWh/year vs. 418 GWh/year for ECA and 371 to 443 GWh/year for the INDC, 2015). The 2018 PURA Annual Report includes several connections per customer category for 2017 and 2018. On-grid or off-grid applications were assigned to the categories. Commercial (NGOs and schools), large (industries and banks), and central government customers were assumed |

| | |
|---|---|
| | to be connected to the main grid, while local government authorities, provincial services and agriculture were assumed to be connected via mini-grids. The energy intensity factors for productive uses were calculated using the ESMAP Multi-Tier Framework, which defines rural areas as Tier 3 and urban areas as Tiers 4 and 5. The annual productive use increase was assumed to be 5%.<br><br>T&D losses on the mini-grids were estimated to be constant at 10percent for the baseline scenario. After estimating total mini-grid consumption, the mini-grids' load factor in the baseline scenario ranges from 30 to 48%. |
| Information source | IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi. Based on data from the ROGEP analysis (World Bank and ECREEE, 2019), 2018 PURA Annual Report, Beyond Connections: Energy Access Redefined (ESMAP, World Bank, 2015), The Gambia electricity road map update Generation least cost development plan (ECA et al., 2021), and the NAMA Design Document for Rural Electrification with Renewable Energy in The Gambia. |

| **Mitigation option no. and name** | **E5 – SHS to supply off-grid consumption** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options assumes that SHS will meet all off-grid electricity demand. |
| Included in NDC1 | NO |
| Conditional/unconditional | Unconditional |
| Status of implementation | Not implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | 0.08 $GgCO_2e$ in 2030 |
| Underlying assumptions | This mitigation measure assumes that SHS will meet all off-grid demand. These systems replace kerosene lamps and allow for faster access. According to a scenario used in the ROGEP analysis (World Bank and ECREEE, 2019), the electricity access rate could reach 100% as early as 2023, with SHS serving 18.6% of the population in 2023. As more people connect to the main grid, the proportion of the population equipped with such systems would decrease from 18.6% in 2023 to 0% in 2030.<br><br>SHS demand is estimated at 4,195 MWh, which could represent 50,000 to 100,000 systems of 1-2kW users per day for 4 hours. The emission factor for the current reference solution (kerosene lamps) is 0.5 tCO2e/MWh. |
| Information source | *IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi*. Based on data from the ROGEP analysis (World Bank and ECREEE, 2019). |

| **Mitigation option no. and name** | **E6 – Substitution of incandescent light bulbs** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options assumes that incandescent lights will be replaced completely by 2030. |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Status of implementation | Not implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | 0.18 $GgCO_2e$ in 2030 |

| | |
|---|---|
| Underlying assumptions | This mitigation measure assumes that incandescent lights will be completely decommissioned by 2030. A 75% LED/25% compact fluorescent light (CFL) mix has been validated with national stakeholders. The share of efficient lighting is interpolated linearly from 5% in 2017 to 100% in 2030. The number of lamps is determined by the number of connected users/households. Assumptions for both urban and rural populations include three lightbulbs per household. The number of people per household is estimated to be six in urban areas and 8.4 in rural areas (2015/2016 Gambia Integrated Household Survey). Lighting hours in urban areas are estimated to be four hours per day, while lighting hours in rural areas are estimated to be three hours per day (according to the level of access in each category, as defined by Beyond Connections: Energy Access Redefined) (ESMAP, World Bank, 2015). On-grid lighting hours increase with population, from 2.2 million in 2020 to 5.4 million in 2030, while mini-grid lighting hours vary from 17,453 in 2020 to 3,397 in 2030. The average power consumption of incandescent bulbs is estimated to be 60 W, CFL bulbs to be 12 W (based on CDM PDDs for India), and of LED bulbs to be 9 W (based on incandescent lamps with 60W equivalent). |
| Information source | IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi. Based on data from Gambia Integrated Household Survey 2015/2016 (GBoS) and Beyond Connections Energy Access Redefined (ESMAP, World Bank, 2015). |

| **Mitigation option no. and name** | **E7 – Solar water heating facilities to supply 10 percent of demand by 2030** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options assumes that solar water heating will meet 10 percent of total demand by 2030. |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Status of implementation | Not implemented |
| Mitigation potential (in $GgCO_2e$) and timeline | 43.3 $GgCO_2e$ in 2030 |
| Underlying assumptions | Solar water heating is estimated to account for 10% of total hot water demand, with 50% of solar water heating implemented by 2030. Linear interpolation raises the share of solar water heating to this level between 2020 and 2030. |
| Information source | IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi. Based on data from INDC model. |

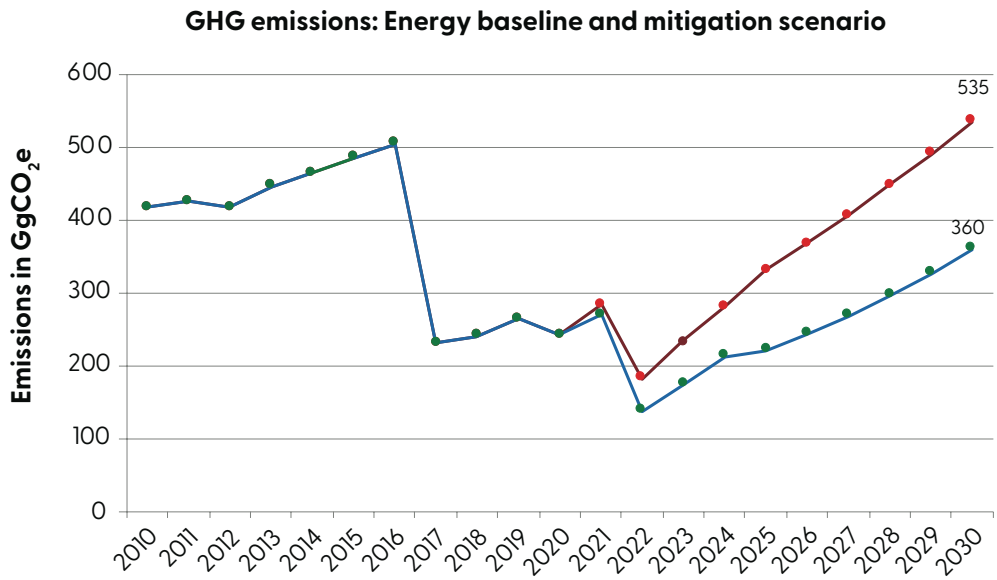
| **Mitigation option no. and name** | **E8 – 6 MW of solar PV rooftop systems by 2024** |
|---|---|
| Sector | Power/Electricity |
| Description of activity | IRENA's cost-effectiveness analysis of renewable energy technology options considers a target of 6 MW of grid-connected solar PV rooftop application deployment, which will be phased in until year-end 2023. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Status of implementation | Ongoing |
| Mitigation potential (in $GgCO_2e$) and timeline | 6.54 $GgCO_2e$ in 2030 |

| | |
|---|---|
| Underlying assumptions | IRENA's analysis assumes that 6 MW of rooftop solar PV will be deployed gradually between 2020 and 2024. Deployment was interpolated linearly between these years and a capacity factor of 1,650 h/year (18.8%) was used. |
| Information source | *IRENA (2021, forthcoming), Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia, International Renewable Energy Agency, Abu Dhabi*. Based on data from the project, Gambia Renewable Energy, which is supported by the European Investment Bank, World Bank, and European Union. |

### 5.3.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions for the baseline electricity emissions, GHG emissions in the electricity sector are expected to increase from 241 $GgCO_2e$ in 2020 to 535 $GgCO_2e$ in 2030 (122.0percent). Based on the mitigation measures defined in section 5.3.2, GHG emissions in 2030 will be 360 $GgCO_2e$. This is a 49.4 percent increase compared to the 2020 level and a decrease of 32.7 percent compared to the expected baseline level in 2030.

**Figure 6: GHG emissions: Energy baseline and mitigation scenario**




## 5.4 TRANSPORT

### 5.4.1 BASELINE

Limited data on the transport sector is available for The Gambia. The analysis is based primarily on the data sets and information provided for the preparation of the NDC1, which includes the Draft National GHG Inventory Report for the energy sector (The Republic of The Gambia, 2014c). That report includes historic emissions from 2001 to 2010, as well as vehicle registration data for the same period. The approach from the NDC1 (applying a top-down method to derive baseline emissions for the transport sector) has not changed. The historic motorization rate was calculated based on the vehicle registration data and projected into the future by extrapolating the trend from the period 2001-2010.

The original scenario Excel sheet contained a significant error in the number of vehicles, adding a subtotal when calculating the total number of vehicles. As a result, the number of vehicles was overestimated by almost 80 percent. This error was corrected in the new version of the sheet. Correcting this error also led to correcting the motorization growth rate, which was based on historic data. In the NDC1, that rate was assumed to be 3.8 percent in 2015, increasing to 5.6 percent in 2030. After the correction, growth rates were calculated at 2.1 percent in 2015, increasing gradually to 3.0 percent in 2030.

This figure is now consistent with the growth rate reported in The Gambia National Transport Policy (2018-2027)[10]. It calculates an annual average growth rate of 2.23 percent based on a study conducted in 2013. Therefore, the extrapolated growth rates (2.1 percent in 2015, increasing gradually to 3 percent in 2030) will be applied for the baseline calculation.

Historic GHG emissions for the sector divided by the number of vehicles registered provides the emission intensity of vehicles. This value represents an average across the fleet. The calculations in the NDC1 showed autonomous efficiency improvements as older vehicles are replaced with newer, more efficient models. However, the technical paper also showed that some efficiency improvements are offset by the use of larger vehicles with stronger engines. The NDC1 assumed an annual autonomous efficiency improvement of 0.5 percent until 2017, increasing to 1.5 percent annually starting in 2018. These assumptions seem to be unrealistic and were modified to zero percent up to 2020 and 1 percent annually starting in 2021.

The following table summarizes the main assumptions for the transport baseline scenario.

**Table 11: Assumptions for the transport baseline scenario**

| Indicator | Source | Comments | Value |
|---|---|---|---|
| Motorization growth rate | Historic data from Draft Inventory Report for the energy sector | Values consistent with annual average growth rate reported in the Gambia National Transport Policy (2018-2027) (GoTG 2017b) | 2.1% for 2015, 3%for 2030 |
| Autonomous efficiency improvement | Own assumptions | Downward revision of assumptions from NDC1 | 0%up to 2020, 1% 2021-2030 |

## 5.4.2 MITIGATION MEASURES

The following mitigation measure is included in the NDC2 for the transport sector.

- 4 – Downsizing The Gambia's transport sector carbon footprint

The table below provides details on this mitigation measure.

**Table 12: Mitigation options for the transport sector**

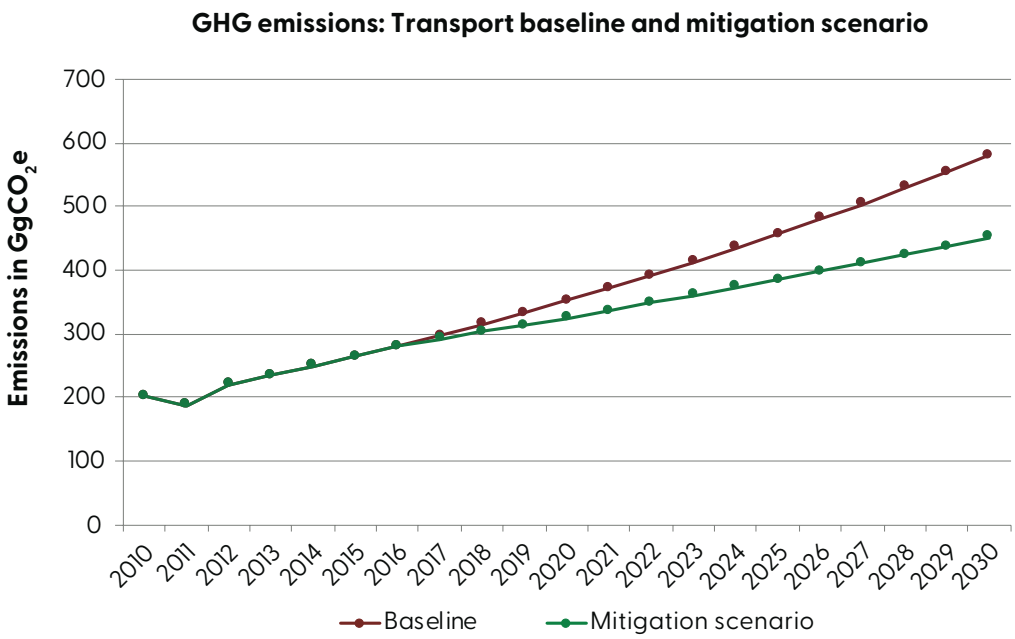
| Mitigation option no. and name | 4 – Downsizing The Gambia's transport sector carbon footprint |
|---|---|
| Sector | Transport |
| Description of activity | Component 1: Implementing vehicle fuel efficiency standards<br>Component 2: Strengthening public transport systems<br>Component 3: Increasing the use of blended fuel in road transport |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 129 $GgCO_2e$ in 2030 |
| Underlying assumptions | Component 1 is based on implementation of vehicle fuel efficiency standards in The Gambia. The GHG emissions calculations are based primarily on NDC1 assumptions, with marginal updates. The GHG mitigation effect is calculated as the average between the low/high baseline and low/high mitigation scenarios.<br>Data was insufficient to quantify Component 2 (public transport).<br>Biofuels (Component 3) are included as an option, but are not currently a priority. Thus, potential GHG emission reductions were not quantified. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

10 Government of The Gambia (GoTG), 2017b. The Gambia National Transport Policy (2018-2027).

### 5.4.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions in the baseline section, GHG emissions in the transport sector are expected to increase from 352 $GgCO_2e$ in 2020 to 580 $GgCO_2e$ in 2030 (64.8 percent). Based on the mitigation measures defined in section 5.4.2, GHG emissions in 2030 will be 451 $GgCO_2e$. This is a 28.1 percent increase compared to the 2020 level and a 22.2 percent decrease compared to the expected baseline level in 2030.

**Figure 7: GHG emissions: Transport baseline and mitigation scenario**




## 5.5 WASTE MANAGEMENT

### 5.5.1 BASELINE

Baseline emissions in the waste sector consider two sub-sectors, solid waste and waste water, which require different methodological approaches. The approaches used in the NDC1 were fully consistent with the calculations under the National GHG Inventory and are as follows:

- Solid waste: GHG emissions from solid waste result primarily from the significant amounts of methane ($CH_4$) released by bacteria that consume the organic matter present in solid waste when it degrades anaerobically in disposal sites. The IPCC methodology for estimating $CH_4$ emissions from solid waste disposal sites (SWDS) is based on a first-order decay method, which assumes that the degradable organic component in waste decays slowly over several decades. The calculations estimating solid waste-related emissions in The Gambia are based on own estimations of waste generated and disposed, given the lack of data for the required time frame. Data points from two publications were used to estimate solid waste generation since 1950 and projected to 2030. These data were used to calculate estimates of waste generated based on population and on GDP. Further detailed assumptions can be found in the NDC1 Technical Report.

- Wastewater: GHG emissions from wastewater also come from anaerobic degradation of organic matter present in the wastewater that releases $CH_4$. Additional emissions result from the release of nitrous oxide ($N_2O$), which is associated with the degradation of nitrogen components in wastewater (e.g., urea, nitrate and protein). Methane baseline emissions for the wastewater sub-sector were estimated following the 2006 IPCC guidelines, under three scenarios based on population projections (medium, low and high fertility) using data from the UN Population Prospects (2012). Further detailed assumptions can be found in the NDC1 Technical Report.

Several scenarios were developed in the NDC1 scenario Excel sheet and then used in the NDC1 high and low baseline scenarios. For the high scenario, the baseline was a combination of the waste baseline based on high GDP growth and the wastewater baseline-based high population growth, generating a 2010 baseline figure of 115.6 $GgCO_2e$. For the low scenario, the baseline was a combination of the waste baseline based on low GDP growth and the wastewater baseline-based low population growth, generating a 2010 baseline figure of 99.1 $GgCO_2e$.

Both 2010 figures are reflected in the National GHG Inventory Report and an average of 107.4 $GgCO_2e$ was calculated. This figure is consistent with the 2010 National GHG Inventory Report and will now be applied to the NDC2 baseline calculations.

Due to the lack of data, wastewater emissions were not included in the 2010 National GHG Inventory Report or in the NDC1 (although calculations were made in the scenario Excel sheet for NDC1 for the period 2011-2030). Wastewater emissions are now included in the NDC2.

An extensive list of assumptions made for the calculation can be found both in the National GHG Inventory Report and the NDC1 Technical Report. No changes to these assumptions were made for the NDC2.

### 5.5.2 MITIGATION MEASURES

For the sector waste management, the following mitigation measures are included in NDC2:

- 5 – Integrated waste management
- MA6 – Biogas from waste management and landfills
- MA7 – Organic waste recovery

Details on each of the mitigation measures are provided in the following tables.

**Table 13: Mitigation options for the waste management sector**

| Mitigation option no. and name | 5 – Integrated waste management |
|---|---|
| Sector | Waste |
| Description of activity | Component 1: Solid waste management<br>Component 2: Wastewater management<br>Component 3: Small-scale, decentralized waste treatment |
| Included in NDC1 | YES |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 497 $GgCO_2e$ in 2030 |
| Underlying assumptions | The same approach used in the NDC1 was used to calculate the GHG mitigation effect of Component 1; it involves calculating the average of the high and low mitigation scenarios.<br>Component 2 was included in the NDC2, but not quantified. For Component 3, the GHG emission reduction estimate is smaller than 1 $GgCO_2e$; therefore, it is not considered. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

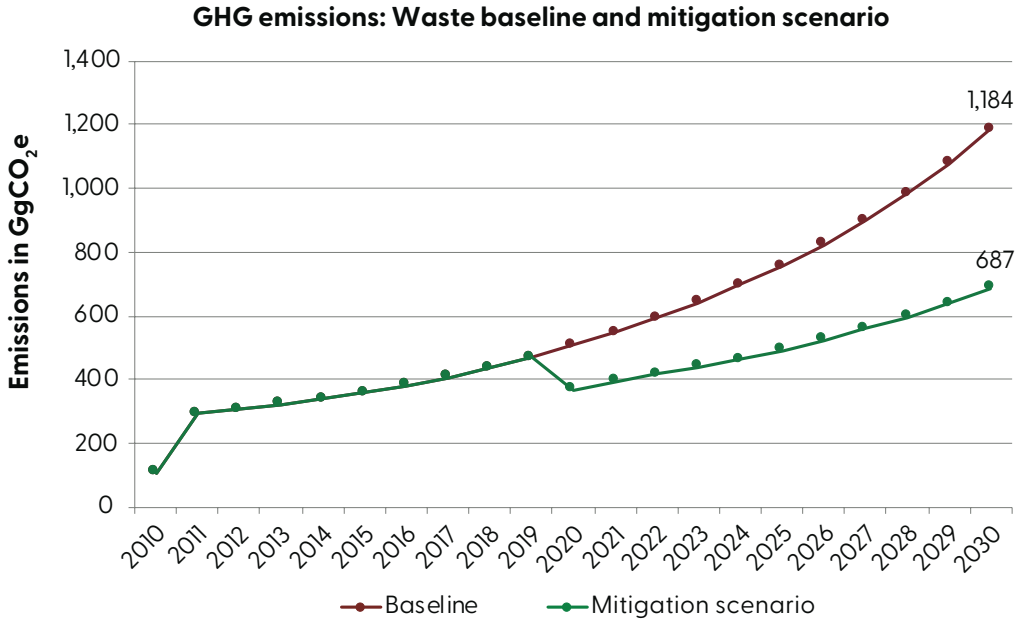
| Mitigation option no. and name | MA6 – Biogas from waste management and landfills |
|---|---|
| Sector | Waste |
| Description of activity | Under this strategy, the sewage system is improved and equipped with wastewater treatment facilities that capture and use the biogas. Existing landfills are covered and the landfill gas methane is also captured. These activities also aim to avoid pollution of ground and surface waters and contribute to meeting the objectives of existing rural water supply and sanitation initiatives in The Gambia. If the sludge from the wastewater facility is clean, it can be used as an organic fertilizer, thereby replacing the use of synthetic fertilizers. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 0 $GgCO_2e$ in 2030 |
| Underlying assumptions | GHG emission reductions are covered under Mitigation Option 5 – Integrated Waste Management; therefore, they are not included. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC; Metabolic Analysis Report (UNDP, 2021) |

| Mitigation option no. and name | MA7 – Organic waste recovery |
|---|---|
| Sector | Waste |
| Description of activity | An estimated 53% of municipal solid waste in The Gambia is organic waste. Most solid waste is dumped in informal dumpsites or burned. Only an estimated 3% is composted.<br><br>This strategy aims to reduce the volume of organic waste that is dumped or burned, while producing a soil enhancer. Agricultural soils in The Gambia have relatively low fertility. In addition, new processing capacity, like fishmeal factories, increase the industrial organic waste flow. However, before seeking to optimize the use of compost, food loss in the food value chains should be minimized (see MA8). |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 0 $GgCO_2e$ in 2030 (covered under 5 – Integrated Waste Management) |
| Underlying assumptions | GHG emission reductions are covered under Mitigation Option 5 – Integrated Waste Management; therefore, they are not included. |
| Information source | Metabolic Analysis Report (UNDP, 2021) |

### 5.5.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions in the baseline section, GHG emissions from the waste sector are expected to increase from 506 $GgCO_2e$ in 2020 to 1,184 $GgCO_2e$ in 2030 (134.0 percent). Based on the mitigation measures defined in section 5.5.2, GHG emissions in 2030 will be 687 $GgCO_2e$. This is a 35.8 percent increase compared to the 2020 level and a 42.0 percent decrease compared to the expected baseline level in 2030.

**Figure 8: GHG emissions: Waste baseline and mitigation scenario**




## 5.6 INDUSTRIAL PROCESSES AND PRODUCT USE

### 5.6,.1 BASELINE

The NDC1 technical report made clear that IPPU is not a focus sector for the analysis because activity data for the sector is very difficult to collect and many assumptions are required to estimate emissions. Nevertheless, IPPU emissions were included in the NDC1 to enable an assessment on the national level.

Gambian inventory data were used for the high baseline scenario to estimate IPPU sector emissions, while estimates based on US EPA data were used to estimate the low baseline scenario. Differences were considerable, with IPPU emissions of 1,322 $GgCO_2e$ in 2030 in the high baseline scenario and 161 $GgCO_2e$ in the low baseline scenario.

The 2010 figure for the high baseline scenario was based on the Draft Inventory Report, estimated at 462.16 $GgCO_2e$. The Final Inventory Report, which was published after the NDC1 was submitted, included a figure of 704.979 $GgCO_2e$ for 2010. This figure, together with the 2001-2009 time series, are now taken as a basis for the NDC1 baseline. The calculations made in the NDC1 based on the US EPA figures are ignored, as the NDC must be based on data reported to UNFCCC.

NDC1 calculations included $CO_2$, $CH_4$, sulphur hexafluoride (SF6) and HFC. $N_2O$ was missing, but was included in the revised calculations. Historic figures for the period 2001-2010 were updated with final figures from the GHG Inventory Report. The baseline for the period 2011-2030 is now a linear trend extrapolation of the historic figures for 2001-2010. Annual increases range from 5.6 percent in 2012 to 2.8 percent in 2030.

The following table summarizes the main assumptions for the IPPU baseline scenario.

**Table 14: Assumptions for the IPPU baseline scenario**

| Indicator | Source | Comments | Value |
|---|---|---|---|
| 2010 emissions level | National GHG Inventory Report (GoTG 2015) | 2010 emission level was replaced with figures from the National GHG Inventory, while the NDC1 used US EPA data. | 704.98 $GgCO_2e$ |
| IPPU baseline emissions | National GHG Inventory Report (GoTG 2015) | A linear trend of 2001-2010 data is used to determine 2011-2030 levels. | Increase between 5.6% and 2.8% |

## 5.6.2 MITIGATION MEASURES

The following mitigation measures for the IPPU sector are included in the NDC2:

- 6 – Substituting HFCs in production and manufacturing processes
- MA10 – Substituting HFCs

The tables below provide details on each mitigation measure.

**Table 15: Mitigation options for the IPPU sector**

| Mitigation Option no. and name | 6 – Substituting HFCs in production and manufacturing processes |
|---|---|
| Sector | IPPU |
| Description of activity | Component 1: GHG abatement in the food industry<br>Component 2: GHG abatement in the chemical industry |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 0 $GgCO_2e$ in 2030 (covered under MA10 – Substituting HFC) |
| Underlying assumptions | The calculations for measures covered under Component 1 generated a potential of 38 $GgCO_2e$; the potential for Component 2 totalled 20 $GgCO_2e$. The mitigation potential is subsumed under mitigation option MA10 - Substituting HFCs. |
| Information source | Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC |

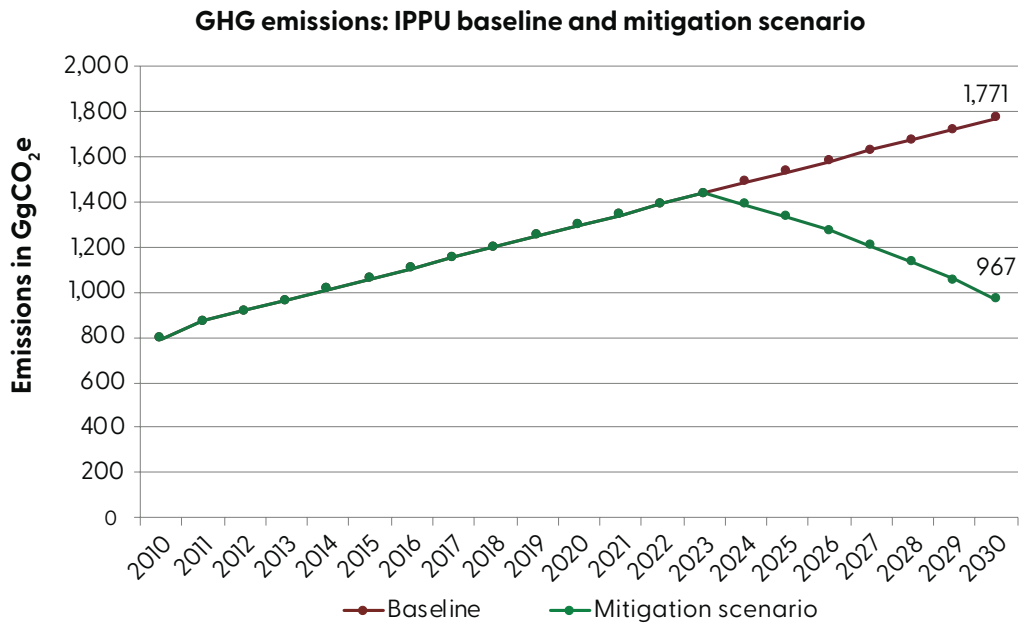
| Mitigation option no. and name | MA10 – Substituting HFCs |
|---|---|
| Sector | IPPU |
| Description of activity | HFCs were introduced in The Gambia as a substitute for CFCs, which are ozone-depleting substances regulated under the Montreal Protocol. HFCs are used in refrigeration, air conditioning (311,000 tCO2e) and in aerosols (308,000 tCO2e) and as fire retardants (8,000 tCO2e).<br>The United Nations Industrial Development Organization supports The Gambia in its efforts to reduce HFC emissions. The agency's activities aim at end the use of HFCs and substitute them with hydrocarbons. It does this by:<br>• redesigning products to phase out both ozone-depleting substances and GHG;<br>• extending the lifespan of existing appliances and training technicians to handle these substances and repair products that use them;<br>• supporting companies to convert to service-oriented business models, in which value is retained, products and resources are reused, and supplies are circular; and,<br>• supporting governments in monitoring the import and consumption of ozone-depleting substances and GHG and providing policy advice. |
| Included in NDC1 | NO |
| Conditional/unconditional | Conditional |
| Mitigation potential (in $GgCO_2e$) and timeline | 804 $GgCO_2e$ by 2030 |

| | |
|---|---|
| Underlying assumptions | The Metabolic Analysis suggested a reduction of 705 $GgCO_2e$ by 2030 (based on the 2010 GHG Inventory Data), without taking into account further increases in the baseline. Based on the historic figures for 2001-2010, the baseline for the period 2011-2030 was determined by a linear trend extrapolation, arriving at 1,608 $GgCO_2e$ in 2030. It was assumed that a 50% reduction of that baseline figure would be feasible, with measures starting in 2024, with emissions decreasing by 7.1% annually. |
| Information source | Metabolic Analysis Report (UNDP, 2021) |

### 5.6.3 EMISSION REDUCTION POTENTIAL

Based on the assumptions in the baseline section, GHG emissions in the IPPU sector are expected to increase from 1,297 $GgCO_2e$ in 2020 to 1,771 $GgCO_2e$ in 2030 (36.5 percent). Based on the mitigation measures defined in section 5.6.2, GHG emissions in 2030 will be 967 $GgCO_2e$. This is a 25.4 percent decrease compared to the 2020 level and a 45.4 percent decrease compared to the expected baseline level in 2030.

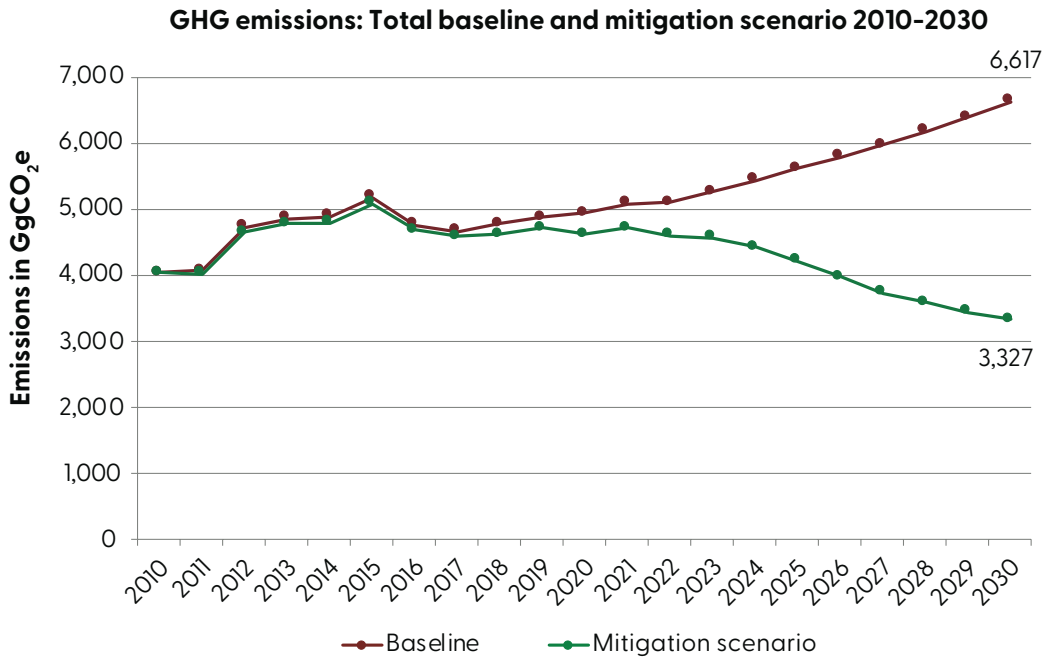
**Figure 9: GHG emissions: IPPU baseline and mitigation scenario**




## 5.7 SUMMARY OF BASELINE AND MITIGATION SCENARIO

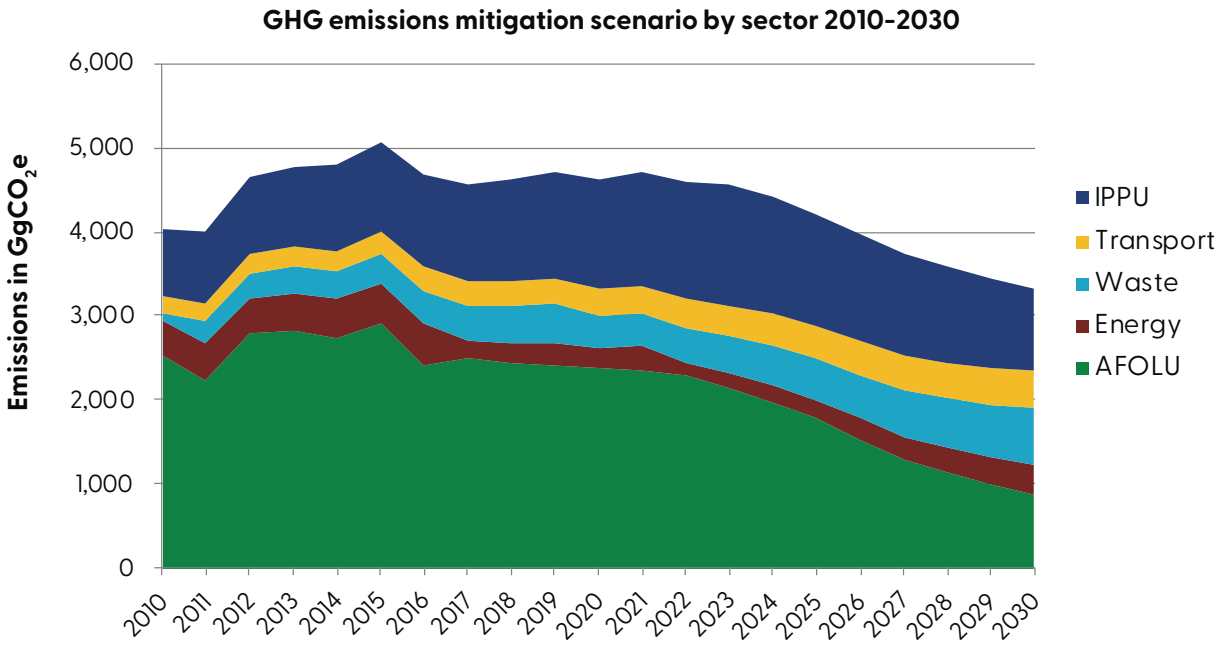
Based on the assumptions in the baseline sections of the various sectors, GHG emissions in The Gambia are expected to increase from 4,935 $GgCO_2e$ in 2020 to 6,617 $GgCO_2e$ in 2030 (34.1 percent). Based on the mitigation measures chosen for inclusion in the NDC2, GHG emissions in 2030 will be 3,327 $GgCO_2e$. This is a 49.7 percent reduction compared to the expected baseline level in 2030. In absolute figures, the mitigation measures will reduce the Gambia's GHG emissions by 3,290 $GgCO_2e$.

**Figure 10: GHG emissions: Total baseline and mitigation scenario 2010-2030**




The change by sector shows that AFOLU and IPPU are the sources of the most significant contributions towards the mitigation target. Reductions below the 2020 level can be achieved in these sectors. In all others (energy, waste and transport), baseline assumptions project a constant increase of GHG emissions until 2030 and mitigation measures selected can only cushion that increase. The measures are not sufficient to reverse the trend and reduce GHG emissions in these sectors.

**Figure 11: GHG emissions mitigation scenario by sector 2010-2030**



# 6. ADAPTATION OPPORTUNITIES

## 6.1 CLIMATE CHANGE VULNERABILITY

Although The Gambia does not contribute significantly to global warming, the country is highly vulnerable to climate change. As such, climate change adaptation is a top priority.

The Gambia is a member of the Climate Vulnerable Forum (CVF), a group of countries that are highly vulnerable to the adverse impacts of climate change. The Forum seeks to foster South-South cooperation on climate change among its members[11]. The Gambia is also part of the Vulnerable Twenty (V20) Group of Ministers of Finance of the CVF, whose mission is to promote alternative economic and financial visions to shape the global debate on climate change and climate policymaking[12].

Climate change is expected to impact The Gambia in a variety of ways, as the projections presented in the country's TNC show. Annual mean temperatures are projected to increase, relative to the year 2000, between 1.7° and 2.1 °C in 2050, and between 3.1° and 3.9°C in 2100[13]. Moreover, sea level is expected to rise between 19 cm and 43 cm by 2050[14]. Projections for annual rainfall patterns are less certain.

Climate change impacts are expected to put considerable pressure on the country's natural and societal systems. Decreasing rainfall is project to intensify salinization and acidification of lowland soils in The Gambia, affecting marginally productive soils or soils most exposed to climate stressors[15]. Scientific research also warns that Gambian forests, including coastal mangroves, may undergo noticeable changes as a result of increasing temperature and atmospheric $CO_2$ concentrations, modified rainfall patterns, and sea level rise by 2050[16]. Under a lower rainfall scenario, massive mangrove mortality in lower estuary areas is very likely[17].

Climate change will exert a considerable impact on vulnerable economic sectors and industries. With respect to agriculture, several studies indicate that climate change negatively influences yields of major crops grown in The Gambia, such as millet, sorghum, maize, and groundnuts[18]. This is particularly concerning for a country where the majority of the population relies on agriculture for its subsistence. Productive forest is also projected to shrink significantly in size, between 30 and 46.7 percent of land area, by 2030 and to decrease further, between 20 and 42.7 percent, by 2050, creating uncertainty for the wood processing industry[19]. The tourism sector is highly vulnerable to climate change impacts such as sea level rise, which will decrease the attractiveness of the shoreline and degrade amenities[20]. Construction and real estate could also be significantly impacted, as they are exposed to the risks and costs of climate-induced damage to infrastructure[21]. Finally, decades of fishing pressure, coupled with climate impacts, are highly likely to force changes in marine species diversity, geographical distribution and inter-species relationships[22]. This could impact the fisheries sector.

11 Climate Vulnerable Forum, 2021. About.
12 V20 Group of Ministers of Finance, 2015. Design document.
13 Ministry of Environment, Climate Change and Natural Resources (MECCNAR), 2020. Third National Communication of The Gambia under the UNFCCC (TNC), p. 37.
14 Ibid., p. 38.
15 NEA, 2010, as cited in Ibid., p. 38.
16 MECCNAR, op. cit., p. 39.
17 Ibid., p. 39.
18 Ibid., p. 43.
19 Ibid., p. 43.
20 Ibid., p. 47.
21 Ibid., p. 47.
22 Ibid., p. 48.

Vulnerability to climate change in The Gambia is linked to the country's widespread poverty and limited adaptive capacity to deal with the effects of changes. Limited access to resources to make quick changes to lifestyles, especially with respect to food supplies, and low access to risk-spreading mechanisms, render many people very susceptible to the current variability and future climatic changes. Highly-vulnerable groups include women and youth[23].

## 6.2 PLANNED ACTIONS

### 6.2.1 THE NAP PROCESS

A key process for enhancing the country's adaptive capacity to climate change is the development of a NAP. This process was initiated in The Gambia in 2015 with funding from UNDP. A NAP roadmap was developed based on discussions with key stakeholders. The roadmap covers a two-year implementation period that aims to address capacity and capability gaps along the entire spectrum of policy planning, review, development and outreach[24].

The Climate Change Secretariat within the MECCNAR is seeking funding to advance the NAP process. A proposal to the Green Climate Fund (GCF) Readiness and Preparatory Support Programme was submitted recently. The NAP process will be launched when funding is secured.

The NAP process is intended to facilitate the transition from project-based adaptation planning and implementation to an integrated approach to adaptation across all vulnerable economic sectors in The Gambia. It will thus enable the country to address climate change adaptation more coherently and efficiently. The outcome of the NAP process will be a costed adaptation strategy for the country. In addition, the NAP process will provide the tools, mechanisms, systems and information with which to replicate the NAP process at regular intervals and to mainstream adaptation into existing and future policies, programmes and activities across levels and sectors.

The Gambia considers the NAP as among the most appropriate vehicles to address its adaptation needs in the post-2020 context. The country is using the NAP process under the UNFCCC to conduct a comprehensive assessment of national adaptation needs. All necessary steps are being taken to engage all national stakeholders and international partners in the formulation and implementation of a comprehensive, transformational adaptation investment plan to address the country's high vulnerability against climate change. The Gambia expects to harness the opportunities in the Paris Agreement that make adequate provisions to enable international climate finance support for effective adaptation in the most vulnerable countries[25].

In recent years, The Gambia also received support from the Integrating Agriculture in National Adaptation Plans (NAP-Ag) project, which was launched in 2016 in recognition of the importance of adaptation in agriculture and in response to the challenges of integrating climate change considerations in planning processes across sectors. The project, jointly implemented by the FAO, UNDP and national governments, operates in 11 countries with funding from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety through its International Climate Initiative. It supports partner countries in Africa, Asia and Latin America to identify and integrate climate change adaptation measures into relevant national planning and budgeting processes, with a focus on agricultural sectors[26].

23 "Women and youth face specific challenges with respect to current and future climate risks. Women have disproportionally high responsibilities for farming activities in rural areas; responsibilities for family health and welfare; problems of access to land and to credit; and additionally experience more subtle forms of discrimination related to the paternalistic cultural traditions. In addition, women are more likely to lack identity numbers, and thus experience difficulty in interventions such as crop index-based insurance, land acquisition and obtaining collateral necessary for investments. Youth face particular challenges relating to a lack of skills and/or a mismatch between skills developed through the education and training systems and those demanded by the job market, plus a lack of job opportunities. These issues, together with resource degradation, poor quality of services in rural areas, and a desire to be part of the modern urban world are driving a rapid rural-urban migration, as well as the irregular migration to Europe from both rural and urban areas." AGRER, 2017. Strategic Programme for Climate Resilience (SPCR). Volume I: Main Report, pp. vii-viii

24 Ibid., p. 75.

25 Department of Water Resources (DWR), 2017. Low Emissions Climate Resilient Development Strategy of the Gambia (LECRDS) 2018-2030, p. 49.

26 Jallow, B.Z., 2019. The Gambia's National Adaptation Plan (NAP) Process for the Agriculture and Natural Resources (ANR) Sector – Stocktaking Report, p. 11.

NAP-Ag activities in The Gambia were launched officially in March 2018, where the project supported the GoTG, through the Ministry of Agriculture and the Department of Water Resources (DWR), to:

- strengthen technical and institutional capacity on NAPs;
- develop integrated roadmaps for NAPs;
- improve evidence-based results for NAPs; and,
- promote advocacy and knowledge-sharing on NAPs[27].

NAP-Ag activities included capacity-building training to facilitate gender-responsive adaptation planning at sub-regional and community levels as an input to the NAP process[28].

### 6.2.2 SHORT- AND LONG-TERM OBJECTIVES TO TRANSITION TO A CLIMATE-RESILIENT DEVELOPMENT PATHWAY

The national short-and medium-/long-term adaptation objectives outlined in the NDC1 were restated in the Low Emissions Climate Resilient Development Strategy (LECRDS) a few years later[29]. The GoTG has thus confirmed the strategy, which will be included in the NDC2 with only minor updates to the referenced policy documents.

**Short-term objectives**

In the short term, the GoTG intends to adopt specific enabling conditions so that The Gambia can transition to a low-emissions, climate-resilient development pathway. These must include national regulations, policies, subsidies and incentives, as well as international market and legal infrastructure, trade and technical cooperation. This will be achieved through intensive and extensive education, awareness raising and development, and implementation of socioeconomic research as it relates to climate change. Currently, enabling conditions are heavily weighted towards, and encourage, the prevailing brown economy, which relies excessively on fossil fuels, resource depletion and environmental degradation.

**Medium- and long-term objectives**

In the medium and long term, the GoTG must continue to mainstream climate change into national development frameworks as achieved in the National Climate Policy, the National Development Plan (2018-2021) and some sectoral policies and strategies (such as the Second Generation National Agricultural Investment Plan (2019-2026)-Food and Nutrition Security – GNAIP II) by adjusting all national and sectorial policies to take climate change into consideration. Appropriate changes in the policies, including fiscal policy, can foster public investments to green key sectors (including agriculture, energy, water resources and waste management); encourage the use of new market-based instruments; green public procurement; improve implementation and enforcement of environmental rules and regulations; improve trade and aid flows; and foster greater international cooperation.

27 Ibid., p. 11.
28 NAP Global Network, 2020. Building Local Capacities to Integrate Gender and Adaptation in Planning in The Gambia.
29 DWR, 2017, op. cit., p. 50.

### 6.2.3 PLANNED AND ONGOING ADAPTATION ACTIVITIES

The first Gambian NDC lists a series of adaptation activities that the country planned to include in its LECRDS and that were reiterated in that Strategy with minor changes.

The LECRDS lists the following adaptation activities[30].

1. **Improve the Climate and Climate Change Resilient urban and peri-urban infrastructure of The Gambia** including (a) water supply infrastructure in the Greater Banjul Area (GBA); (b) addressing infrastructural deficiencies of Sanitation services in Kanifing Municipality and Brikama Area Council; (c) developing and applying infrastructure construction and management codes/guidelines under climate change; (d) strengthening climate robustness of public and commercial sector buildings in the GBA; and (e) improved road infrastructure and drainage systems;

2. **Adapting the Agriculture System to Climate Change in The Gambia**, aiming at strengthening diversified and sustainable livelihood strategies for reducing the impacts of climate variability and change in agriculture and livestock sectors of The Gambia.

   FAO is currently implementing a 43 million USD project (**Adapting Agriculture to Climate Change in The Gambia**) which pursues this goal. The project has five components: (i) strengthening of institutional and technical capacity for adaptation to climate change in agriculture sector; (ii) assessment of vulnerabilities and risks and dissemination of timely climate risk information to users at all levels; (iii) promoting integrated livelihood and income generation, sustainable production and management practices in agriculture and linking to value addition and marketing; (iv) enhancing resilience of rangelands by implementing improved management practices; and (v) Monitoring, Evaluation and Knowledge Management31;

3. The **mainstreaming of climate change in all national development frameworks** will be continued following the successful integration of climate change issues and risks in the Programme for Accelerated Growth and Employment (PAGE: 2012 - 2015) and the follow-up National Development Plan (2018-2021) (GoTG 2017a); the Forest Policy, the Fisheries Strategic Action Plan and the Agriculture and Natural Resources Policy. Development of the follow-up medium-term strategy has started and the following activities will be carried forward.

   i. **Mainstreaming of Climate Change into Education Curricula**: Education, training and public awareness constitute the first pillar of mainstreaming. The Government enjoyed several achievements in education and the country is on track to achieve the education MDG target for net enrolment in primary education and literacy rate among the population aged 15-24 years. However, the issue of knowledge and education on climate change remains a challenge. Therefore, the Government will continue prioritizing basic/primary education, while expanding access to secondary, higher and tertiary education with emphasis on climate change. Integration of climate change in all education curricula will support the achievement of sustainable development in The Gambia.

   ii. **Integration of Climate Change into Sectorial Policies**: Of particular importance is the integration of climate change into the public budgeting system under the Ministry of Finance and Economic Planning. Taking climate change fully into consideration in the national budgeting system allows climate proofing of all activities and programmes and thus determines allocation of funds to those activities and programmes that are less contaminative.

30 DWR, 2017, op. cit., pp. 49-52.
31 Food and Agriculture Organization of the United Nations (FAO)/Global Environment Facility (GEF) Project Document, n.d. Adapting Agriculture to Climate Change in The Gambia.

4. The **planning, development and implementation of an effective disaster preparedness and response strategy in support of climate change adaptation and loss and damage** is a critical activity to develop and implement;

5. **Build and strengthen national capacities to promote and facilitate medium and long-term climate change adaptation planning and implementation**. The proposed activity will support national systems to integrate climate and development and to plan effectively and allocate finance, as well as identify appropriate sources of finance and policy mechanisms. The activity will build and strengthen institutional and technical capacities and knowledge brokering for climate change adaptation planning and the integration of adaptation within, or aligned with, current development planning and budgeting processes;

6. **Climate-proofing of the infrastructure in the Growth Centres** (Kerewan, Faraffenni, Janjanbureh, Bansang, Basse, Mansa Konko, Soma, Brikama and peri-urban settlements in the West Coast Region) **in the Administrative Regions** (NBR, CRR, URR, LRR and WCR) **of the country** to be implemented in phases and divided into:

   i. Component 1: Water supply, Sanitation and Waste Management;

   ii. Component 2: Public works infrastructure (roads, bridges, communication, etc.) in Brikama and the GBA;

   iii. Component 3: Climate Resilience of Public and Commercial Buildings;

7. **Enhancing Resilience of coastal and estuarine/riverine economies and livelihoods of the districts in the coastal zone** by reducing their vulnerability to sea-level rise and associated impacts of climate change of Gambia's most important coastal economic development assets, notably the tourism infrastructures on the open and sheltered coasts and the lowland rice growing landscapes of the riverine districts in NBR, LRR, and WCR; and

8. **Climate Change Adaptation through large scale ecosystem restoration of the River Gambia Watershed**.

Activities 9 (**Development and Implementation of the National Climate Policy and Strategy of The Gambia**) and 10 (**Establishment of the Gambian Climate Change Fund (GCCF)**) mentioned in the first NDC were not included in the LECRDS list. The National Climate Change Policy (NCCP) was been developed in 2016, while the National Climate Change Council (NCCC) is working to establish the GCCF through MECCNAR.

Other existing sectoral adaptation programmes or projects, as well as new investments in the pipeline, are listed in the SPCR. They include:

1. The forthcoming Euro 5.3 million EU-funded GCCA+ programme, **Climate Resilient Coastal Zone Planning for The Gambia**: The GCCA+ programme will support the establishment of an Integrated Coastal Zone Management (ICZM) Secretariat coupled with assistance to create an ICZM Programme under the National Environmental Act (NEMA) (1994) and creation of a National Advisory Committee (NAC), as well as a range of steps to enhance institutional capacity at the decision-making level for ICZM[32];

2. The GCF-funded programme, **Large-scale Ecosystem-based Adaptation in The Gambia: developing a climate-resilient, natural resource-based economy** ($25.5 million): By implementing ecosystem-based adaptation (EbA), the project will "both protect the environment and facilitate the development

32 AGRER, 2017, op. cit., pp. 75-76.

of the sustainable, natural resource-based economy to the benefit of local communities. EbA will be integrated into planning at national, district and village levels. Agricultural landscapes and degraded ecosystems including forests, mangroves and savannahs will be restored using climate-resilient tree and shrub species across an area of at least 10,000 hectares. This will be complemented by the establishment of natural resource-based businesses managed by local communities"[33];

3. The **Nema-Chosso project** – Strengthening Climate Resilience of the National Agricultural Land and Water Management Development Project (CHOSSO) – National Agricultural Land and Water Management Development Project (Nema) ($70.7 million)[34]: One of the project's main objectives was to support climate change adaptation in The Gambia by increasing producers' capacities to use climate-resilient technologies for rice and vegetable production. To this effect, the Nema-Chosso project invested in promoting viable and sustainable options for climate adaptation and resilience in Gambia's agricultural sector, with focus on small-scale women and youth farmers[35].

   The project was phased out in 2020, but a new project - **Resilience of Organisations for Transformative Smallholder Agricultural Project (ROOTS)** ($80 million), is meant to replace it. ROOTS will capitalize on the gains of the Nema, build on the successes of and draw lessons from ongoing and past projects funded by the International Fund for Agricultural Development (IFAD)[36]. The project will support targeted investments in infrastructure and the technical and organizational capacities of farmers' organizations, particularly youth, women and other stakeholders along the rice and horticulture value chains[37].

4. Several energy sector instruments geared toward promoting low carbon development and reducing carbon emissions for sustainable social and economic development, including renewable energy and energy efficiency, including (i) **Renewable Energy Initiative for Africa**; (ii) **Feed-in Tariff**; (iii) **Renewable Energy Policy**; (iv) **Green Mini Grid (AFDB)**; the **ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) Strategic Investment Plan**; and the **Rural Electrification NAMA and PPP for Solar PV**[38].

Other adaptation projects that are being implemented in The Gambia include:

1. The Global Environment Facility-funded (GEF) project, **Community-based Sustainable Dryland Forest Management** ($15 million). The project aims at reducing forest degradation in the northern part of the country by implementing three components: (i) strengthening policy and institutional capacity for sustainable dryland forest management; (ii) community-based sustainable dryland forest management and rehabilitation; and (iii) project monitoring and evaluation and information dissemination[39];

2. The FAO-funded project **Agriculture for Economic Growth** (around $15 million). Its overall objective is to contribute to sustainable growth in the agricultural sector and reduce food insecurity and malnutrition to create an enabling environment for improved economic growth. The project plans to achieve this goal by investing in a market stimulation approach to provide the pull factor that drives commercialization of production[40].

33 Green Climate Fund (GCF), 2021. Project FP011: Large-scale Ecosystem-based Adaptation in The Gambia: developing a climate-resilient, natural resource-based economy.
34 International Fund for Agricultural Development (IFAD), 2016. The Gambia: Strengthening Climate Resilience of the National Agricultural Land and Water Management Development Project (CHOSSO) – National Agricultural Land and Water Management Development Project (NEMA).
35 National Agricultural Land and Water Management Development Project (Nema), 2018. Best Adaptation Practices: Nema-Chosso in The Gambia.
36 Jeffang, Kebba, 2020. IFAD to Release Record US$80 Million Financed Project for Gambia, Designed to Promote Value Chain.
37 International Fund for Agricultural Development (IFAD), 2019. Resilience of Organizations for Transformative Smallholder Agriculture Programme: Project Design Report, p. 2.
38 AGRER, 2017, op. cit., p. 76.
39 Food and Agriculture Organization of the United Nations (FAO)/Global Environment Facility (GEF) Project Document, n.d. Community-based Sustainable Dryland Forest Management.
40 Food and Agriculture Organization of the United Nations (FAO) Project Document, n.d. Agriculture for Economic Growth.

### 6.2.4 AN INTEGRATED ADAPTATION PROGRAMME: THE STRATEGIC PROGRAMME FOR CLIMATE RESILIENCE (2017)

As demonstrated by its commitment to the NAP Process, The Gambia intends to transition from project-based adaptation planning and implementation to an integrated approach to adaptation.

The SPCR provides the most comprehensive integrated adaptation framework developed up to date in The Gambia. When a costed adaptation strategy is developed through the NAP process, the NAP will become the new reference framework for adaptation planning and investment in the country. Until then, the adaptation programme outlined in the SPCR can be used to guide adaptation investment in The Gambia.

Earlier policy and programme documents have identified a number of brown development challenges that need to be addressed to move The Gambia along a green development pathway. These challenges exist mainly at the policy, capacity, technology and finance levels. The SPCR has addressed some of these challenges, but focused primarily on adaptation, "...given the overriding needs in The Gambia"[41], although it has, where possible, and in line with the policy directions set out in the NCCP, also considered some mitigation priorities within the framework of an integrated approach to adaptation and mitigation[42].

The SPCR has been designed to enable the implementation of the long-term vision to achieve a climate-resilient development trajectory, and a critical path to accomplish it. This includes consideration of vulnerable economic sectors and social groups (including women, youth, indigenous peoples, and local communities) and ecosystems[43]. The SPCR was developed through a participatory and inclusive process that involved stakeholder consultations in the GBA. Meetings were held with women, youth, indigenous peoples, NGOs and CBOs, as well as government and private sector[44].

The SPCR is based on four pillars:

- Pillar 1: **Developing an enabling environment for climate resilience in The Gambia**

The project development objective is to put in place an enhanced enabling environment for achieving low-emission, climate-resilient development in The Gambia by: reviewing and developing key policies, legislation, and institutions; mainstreaming climate resilience into national development planning and implementation; and initiating and/or developing coherent systems and strategies for climate finance, capacity development and research, climate services, and a national system for monitoring, evaluation and research of climate resilience[45].

- Pillar 2: **Climate-resilient land use mapping, planning and information systems**

The project development objective is to put in place the necessary steps to develop, implement and enforce a national Land Use Plan that recognizes the need for climate resilience and balances the cross-sectoral aspirations of all relevant stakeholders. The Land Use Plan would provide an environment to achieve rational, efficient, economical and equitable use of resources in The Gambia, considering future growth and development. It would specifically address the relocation of the government functions currently within Banjul, as well as provide a coherent vision and framework for addressing coastal resilience[46].

- Pillar 3: **Developing climate-resilient infrastructure, services and energy systems**

Pillar 3 of the SPCR consists of an integrated programme designed to enhance the climate resilience of the urban areas in The Gambia – namely the GBA and the growth centres – while also covering

41 AGRER, 2017, op. cit., p. 33.
42 DWR, 2017, op. cit., p. 12.
43 AGRER, 2017, op. cit., p. 67.
44 Ibid., p. 3.
45 Ibid., p. 78.
46 Ibid., p. 82.

infrastructural issues beyond the urban areas. Specific components include developing climate-resilient integrated waste management, addressing the associated need for climate-resilient roads and drainage systems, and actions to climate proof water supply and sanitation infrastructure, as well as energy infrastructure. Livelihoods opportunities associated with renewable energy, waste management and urban agriculture will be supported, particularly for women, youth and disadvantaged groups, including differently abled people. The important cross- cutting focus areas of gender, youth, health, tourism and disaster risk reduction are integrated into the project components where applicable[47].

- Pillar 4: **Developing integrated approaches to build rural climate resilience in The Gambia**

The project development objective is to develop systems and integrated approaches to promote climate resilience in the rural and peri-urban areas of The Gambia, through developing climate-resilient, small-scale agriculture and livestock, community-based approaches to forest and natural resource management, and promotion of resilient livestock, agro-forestry and fisheries value chains and markets[48].

Steps to address the low participation of women in decision making at both community and national levels will be integrated across the components of all four pillars[49].

**Institutional arrangements for SPCR implementation**

The SPCR is coordinated by MECCNAR in collaboration with the Ministry of Finance[50]. Oversight of the SPCR had not been decided when the plan was published but it was noted that "once the NCCC and the IMCCC [Inter-Ministerial Climate Committee] were initiated and the GCCF in operation, additional details on project-level oversight of the SPCR investment programmes would be developed"[51].

**Synergies with other programmes**

There are three overarching climate change-focused programmes with which the SPCR would have tight integration and synergies: the LECRDS; the NAP process; and the TNA[52].

- Low Emissions Climate Resilient Development Strategy (LECRDS)

An important initiative central to the work of the SPCR is the UNDP-funded process to develop a LECRDS for The Gambia. The LECRDS was finalized in 2017 and was intended to assist to move The Gambia from its brown development pathway to a green growth path, particularly with respect to the planned urban and rural electrification and transport sector modernization. The LECRDS would also assist The Gambia to achieve the objectives of the Nationally Determined Contributions submitted to the UNFCCC under the Paris Agreement. Given the overarching mandate for the SPCR, the SCPR recommended that the LECRDS form part of, and be synergistic with, the strategy and investment programmes that will be designed for the SPCR. To this end, the SPCR team collaborated with the LECRDS coordinator to refine the Terms of Reference for the LECRDS assignment, so that this was synergised with the SPCR. Thus, the LECRDS was meant to focus on the identified priority brown development aspects not covered in the SPCR investment programmes. The focused LECRDS roadmap that is developed would form part of the ongoing and integrated process to implement the SPCR in The Gambia[53].

47 Ibid., pp. 86-87.
48 Ibid., p. 90.
49 Ibid., p. 90.
50 Climate Investment Funds (CIF), 2021. Gambia.
51 AGRER, 2017, op. cit., p. 97.
52 Ibid., p. 74.
53 Ibid., p. 74.

- National Adaptation Plan (NAP) process

The NAP process was initiated in 2015 and the MECCNAR is currently seeking funding to develop the NAP[54]. Given that the SPCR has been designated by the GoTG as the overarching strategy for the implementation of the NCCP, the SPCR recommends that the NAP be further planned and implemented under the umbrella of the SPCR, and not as a parallel process. The SPCR also states that preliminary discussions had been held between the SPCR team and the NAP coordinator. Further details on the specific elements to be covered within the NAP, to feed into the SPCR implementation, will be agreed[55].

Once the NAP is developed, it will become the new reference framework for adaptation planning and investment in the country.

- Technology Needs Assessment (TNA)

Towards the end of 2015, The Gambia embarked on a project for a TNA for mitigation and adaptation. The SPCR already includes a number of relevant technology enhancement measures, such as support to renewable energy and entrepreneurial opportunities in that regard; it would need to further integrate key findings of the TNA, during detailed planning of the specific investment programmes[56]. The TNA report for adaptation was published in 2016[57].

54 See above section 'The NPA process'.
55 AGRER, 2017, op. cit., p. 75.
56 Ibid., p. 75.
57 Jallow, B.P., 2016. Technology Needs Assessment - Adaptation Report. Consultancy report for Department of Water Resources (DWR) and UNEP-DTU partnership.

# 7. INSTITUTIONAL ARRANGEMENT

## 7.1 THE POLICY ENVIRONMENT

The GoTG has legislative and policy instruments in place to address climate change that form the basis of the NDC and its implementation. Following The Gambia's first NDC, a host of new policy and strategic guidance documents have been developed. Current thinking and orientation at the highest levels of policymaking and decision-making is aligned with the Paris Agreement of 2015, which puts the economy on a 'green growth' pathway. This new paradigm is reflected in the 2050 Climate Vision, the NDP and the NCCP. Related SDGs are accorded the highest priority. Seizing on seismic changes in the national political landscape that took place in December 2016, the climate policy and management frameworks provide an opportunity for capacity building and investments.

The 2016 **NCCP** represents The Gambia's determined and systematic response to the interlinked climate threats to sustainable development, wellbeing and ecological integrity. Accordingly, the Policy defines the following long-term vision for The Gambia:

Achieve a climate-resilient society, through systems and strategies that mainstream climate change, disaster risk reduction, gender and environmental management, for sustainable social, political and economic development[58].

The NCCP emphasizes that an effective Gambian climate change response requires economic, social and environmental interventions that integrate mitigation and adaptation elements within a developmental framework. It therefore establishes the goal of achieving the mainstreaming of climate change into national planning, budgeting, decision-making, and program implementation through effective institutional mechanisms, coordinated financial resources and enhanced human resources capacity by 2025.

The **2050 Climate Vision of The Gambia** provides a roadmap for national efforts aimed at addressing climate change. This long-term vision will inform short- and medium-term actions with a view to providing guidance and stability. The Vision will also underpin the country's forthcoming Long-Term Strategy for Low Greenhouse Gas Emissions and Climate Resilient Development.

**The Gambia National Development Plan (2018-2021)** spells out the government's development priorities and entails the following:

1. restoring good governance, respect for human rights and the rule of law and empowering citizens through decentralization and local governance;
2. stabilizing the economy, stimulating growth, and transforming the economy;
3. modernizing the agriculture and fisheries sectors to foster sustained economic growth, food and nutritional security and poverty reduction;
4. investing in people through improved education and health services, and building a caring society;
5. building infrastructure and restoring energy services to power the economy;
6. promoting an inclusive and culture-centred tourism for sustainable growth;
7. reaping the demographic dividend through youth empowerment; and
8. making the private sector the engine of growth, transformation, and job creation[59].

58 Department of Water Resources (DWR), 2016. National Climate Change Policy of The Gambia: Final Draft, p. 15.
59 Government of The Gambia (GoTG), 2018a. National Development Plan (2018-2021).

The **NEMA** was enacted in 1994 and provides the legal framework for the control and management of the environment. It makes provisions for the overall management of the coastal zone and all other wetlands. The priorities identified for a sound environmental management can be summarized as: (i) improvement and strengthening the institutional framework for environmental management; (ii) mainstreaming environment issues in policy and planning processes;(iii) strengthening environmental regulatory framework and enforcing the regulatory codes, and environmental regulations fully; (iv) Ensuring the functioning of institutional and legal frameworks for sustainable management and protection of the coastal zone and its resources; (v) strengthening environmental advocacy and sensitisation for sustainable development; (vi) ensuring the participation of the private sector, CSO, Non-Governmental Organization, and youth and women's groups in sustainable natural resource consumption; (vii) supporting decentralisation and Local Government Reform for community based natural resource management and sustainable development planning; and (viii) improving environmental quality monitoring and enforcement and solid waste management.

**The SPCR, 2017** builds on the NCCP to devise the implementation plan of the long-term vision to achieve a climate-resilient development trajectory[60]. It defines five key climate resilience priorities, adding 'Infrastructure and waste management' to the four identified in the NCCP. It also includes a short-, medium-, and long-term cost estimate for financing the SPCR, useful to inform international donor countries and institutions.

**The LECRDS, 2017** supplements the NDC and the SPCR in developing a strategic approach for addressing climate change in a holistic and inclusive manner. It identifies several priority actions to support the transition of the country to a low-emission and climate-resilient economy, categorized into administrative and cross-cutting actions, GHG mitigation actions, and actions for climate-resilient development (adaptation).

**Energy sector instruments relevant to the preparation/implementation of this NDC**

There are a number of existing and planned policies and strategies in the energy sector of The Gambia geared toward promoting low carbon development and reducing carbon emissions for sustainable social and economic development. Climate change mitigation policies could discourage unsustainable use of fossil fuels while promoting renewable energy and energy efficiency in electricity generation, transmission and use. However, the success of energy policies depends on institutional capacity building, the removal of financial barriers, and the development of strong legal framework with sufficient regulatory stability. International and regional cooperation, collaboration and support are required. Below is an overview of the policies and measures for mitigating climate change in the energy sector:

(a) **National Energy Policy, Strategy and Action Plan** (2014 – 2018) popularized the use of renewable energy technologies, facilitated donor intervention in the provision of grants, interest-free loans and fiscal incentives for the acquisition of renewable energy devices, implemented renewable energy law recommendations for feed-in tariffs to attract investment in the RE power plants, and published feed-in tariffs to give confidence to investors.

(b) **National Energy Efficiency Action Plan** (NEEAP) of The Gambia (2015-2020/2030) provides scenarios for the contribution of energy efficiency in the electricity and cooking sectors. The analysis of the simulation results provided sectoral energy efficiency targets for 2020 and 2030. They have been adopted as The Gambia's goals for 2020 and 2030 to contribute to achieving the Energy Efficiency Plan's targets. The sectoral categories include efficient lighting, high performance distribution of electricity, energy efficiency standards and labelling, buildings and industry. The effective implementation of the energy efficiency targets and trajectories will depend on the appropriateness of the measures and activities it adopts to create an enabling environment for actors. Some of the key elements of such an enabling environment include a well-conceived policy regime; a vibrant

60 AGRER, 2017, op. cit.

institutional, legal and regulatory framework; mechanisms for incentive planning of rules and behaviour; responsive organizational arrangements; and a well-designed regime of inducements and deterrents for individual actions. Thus, measures and activities are proposed in (a) efficient lighting; (b) standards and labelling; (c) energy efficient building; (d) electricity distribution; (e) cooking initiatives; (f) energy efficiency in the industrial sector; (g) energy efficiency in the transport sector; (h) other sectors (agriculture fisheries, etc.); and (i) cross-cutting measures. The national authority for the follow-up of the National Energy Efficiency Action Plan is the Ministry of Energy. A monitoring system, including indicators for individual measures and instruments, will be developed with the support of ECREEE, in order to follow-up the implementation of the National Energy Efficiency Action Plan (NEEAP).

(c) **National Investment Program on Access to Energy in The Gambia** (2013 – 2020) aimed to increase access to energy services for rural, urban and peri-urban populations by 2020.

(d) **Renewable Energy Act**, 2013 is designed to promote the use of RES in order to achieve greater energy self-reliance which will thus reduce the nation's exposure to fossil fuels, harmful emissions and the demand burden in regards to the supply of electricity; establish a Renewable Energy Fund; encourage investment into the RE sector; and ensure appropriate training and certification of installers of RE equipment and provision of guarantees to clients.

(e) **Sustainable Energy for All (SE4ALL) Action Agenda and Investment Prospectus** (2015 – 2030) is the country's plan of action to achieve the set of SE4ALL goals by 2030. SE4ALL is a global initiative led by the Secretary-General of the United Nations to achieve universal energy access, improve energy efficiency, and increase the use of renewable energy. The Investment Prospectus is designed to operationalize the SE4ALL Action Agenda for The Gambia by identifying and developing a set of implementable programs and projects, including their investment requirements. The investment prospectus features a number of projects that promote renewable energy and energy efficiency. These projects, if implemented, will contribute to climate change mitigation efforts.

f) **National Renewable Energy Action Plan** (NREAP) (2015-2020/2030) sets targets for the deployment of renewable energy in the country by 2020 and by 2030[61].

g) **NAMA** for '**Rural Electrification with Renewable Energy in The Gambia**' (2015), whose objectives include: increasing the level of renewable energy (for electricity) and contributing to the national long-term target of increasing the share of renewable energy within the power generation sector; reducing GHG emissions in the power generation sector; increasing the rural population's access to sustainable electricity; encouraging an increase in rural community income generation and improving rural livelihoods; and increasing the level of private sector participation within the power sector[62].

h) **Energy Sector Road Map** (2017) outlines a vision to modernize the Gambian energy sector and move toward 24/7 energy access for all Gambians. A least cost power development plan (LCPDP) is central to the road map, in addition to a review of required investments in T&D, as well as institutional changes required to attract reasonably priced independent power producers to the sector[63].

i) A policy and regulatory framework for green mini-grids is under development[64].

**The National Disaster Management Policy** brought disaster management issues, including climate change and its impacts, into the limelight and has introduced adaptive mechanisms at the community level. The Policy advocates for efficient response mechanisms to disaster management and developing an institutional framework and building capacities at the national, regional and local levels to respond to

61 Ministry of Energy (MoE), 2015. National Renewable Energy Action Plan (NREAP) (2015-2020/2030).
62 United Nations Development Programme, 2015. Rural Electrification with Renewable Energy in The Gambia.
63 The World Bank, 2018. Project appraisal document for The Gambia electricity restoration and modernization project, p. 3.
64 African Development Bank (AfDB), 2020. Gambia - The Gambia green mini-grid country programme - Enabling Environment - SEFA Appraisal Report.

disasters in a timely fashion. The overall objective of the policy is to build safe and resilient communities by enhancing the use of and access to knowledge and information in disaster prevention and management at all levels of society. Climate change adaptation is fully integrated into the Policy.

**The Second Generation National Agricultural Investment Plan (2019-2026)-Food and Nutrition Security (GNAIP II)** constitutes the main investment framework for agricultural development in The Gambia in the medium term (2019-2026). GNAIP II was formulated through a participatory process with stakeholders from the public and private sectors, including farmers' organizations. The Plan "aims to increase food and nutrition security at household level including for vulnerable households through increased ANR productivity based on sustainable use and management of natural resources in support of national goals of poverty reduction and improved livelihood"[65]. GNAIP II is based on four strategic axes: improving production and productivity of agro-forestry-pastoral and fisheries products; structuring of the value chains; strengthening the resilience of vulnerable populations; and governance.

The **Women's Act** of 2010 addresses the legal provisions for the advancement of Gambian women, including enforcement of the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the African Charter on Human and Peoples' Right on the Rights of Women in Africa. The Act includes a special provision regarding the rights of women in rural communities, including access to agricultural credit and loans, marketing facilities, appropriate technology, and equal treatment in land and agrarian reform, as well as in land resettlement schemes (Section 33.2.e). In particular, as regards the environment – and, by extension, climate change – the Act enshrines the right of every woman to live in a healthy and sustainable environment (Section 51.1). It calls for greater participation by women in the planning, management and preservation of the environment and the sustainable use of natural resources at all levels, as well as for protecting and developing women's indigenous knowledge systems. The Gender and Women Empowerment Policy 2010-2020 calls for effective mainstreaming of gender perspectives in addressing emerging crises, such as climate change, disaster management, and the food and fuel crises[66].

## 7.2 INSTITUTIONAL FRAMEWORK FOR NDC IMPLEMENTATION

Since the formulation of the NCCP in 2016, The Gambia government's climate change portfolio and policy issues have been entrusted to the **MECCNAR**. Within the Ministry of Fisheries and Water Resources, the **DWR** retained leadership of technical issues related to climate variability and change and serves as the organizational 'home' of the UNFCCC Focal Point. The DWR's mission is to "regulate and manage the sustainable utilization of water resources, coordinate related policies and provide timely and accurate weather and climate data and information to safeguard population and promote food security through effective participation, monitoring and awareness creation for overall socio-economic development of The Gambia"[67].

Through the DWR, The Gambia established an ad hoc, although standing, **National Climate Committee (NCC)**, comprising a wide array of stakeholders representing public, private and voluntary sector interests. NCC members are subdivided into thematic working groups supporting convention-related activities, led by the DWR Director and/or his/her designated UNFCCC Focal Point. The **National Environment Agency** serves as secretary to the NCC.

The NCCC is the body charged with decision- and policymaking for climate change. Among other functions, the NCCC is responsible for implementing the NCCP, coordinating related policy processes, fostering and strengthening international cooperation on relevant transboundary issues, and overseeing the GCCF.

65 Government of the Gambia (GoTG), 2018b. Second Generation National Agricultural Investment Plan-Food and Nutrition Security (GNAIP II-FNS), p. 4.
66 AGRER, 2017, op. cit., p. 50.
67 Ministry of Fisheries and Water Resources (MoFWR), 2021. About Water Resources Department.

An institutionalized Climate Change Secretariat, housed within the MECCNAR, interfaces and works in close collaboration with: a national network of climate change focal points; a national stakeholder forum; subnational administrative authorities; and research clusters to catalyse knowledge integration and evidence-based decision-making; effective implementation of policies, programmes and projects; effective communication and information dissemination; and seamless coordination of policy processes and programme activities, under the supervision of a newly established **IMCC**. The **National Climate Change Stakeholder Forum**, comprising representatives from farmers' groups, women's associations, professional associations, faith groups, children's and youth groups, workers and trade unions, media outlets, business and industry and charitable organizations, will maintain exchanges with the Secretariat, particularly on matters relating to policy and scientific research agenda setting and social auditing.

The IMCC is co-chaired by the Permanent Secretaries from the MECCNAR and Ministry of Finance and Economic Affairs (MoFEA), the latter being the designated national authority for the GCF.

# 8. NDC IMPLEMENTATION REQUIREMENTS

## 8.1 CAPACITY BUILDING ASSESSMENT

**Introduction**

To implement its NDC, The Gambia will require support for and collaboration on capacity building and enhancement at the individual, institutional and systemic levels to implement.

The country's TNC (2020) defines capacity building needs as a reflection of gaps between required and current national capacity to implement the UNFCCC[68]. The main gaps identified in the TNC are organizational and individual competencies in conducting high-fidelity research and sectoral assessments, thereby undercutting the basis and effectiveness of mainstreaming climate change into sectoral policy instruments, programmes and activities at national and subnational levels[69].

**Capacity in the field of hydrology and meteorology/National Meteorological and Hydrological Service (NMHS)**

Since the publication of The Gambia's Second National Communication, there have been significant upgrades of atmospheric and terrestrial observation networks, which now boast telemetric systems collecting data on a broad range of parameters under challenging operational conditions. However, individual efforts and initiatives, knowledge, leadership, and coordination issues represent formidable hurdles to the emergence of a vigorous issue-centred research environment. The NMHS, officially known as the Department of Water Resources (DWR) is the principal undertaker of systematic observations that hold a potential to improving interested parties' understanding of the climate system and its interactions with the physical environment. A systemic weakness, at the moment, is the absence of active research projects making use of the datasets generated under the NMHS operational programmes. Nonetheless, subsets of data streams are continually integrated into information/knowledge products and services targeting the general public, planners and decision-makers[70].

**Research and data collection**

Organizations entrusted with research and systematic observations (R&SO) responsibilities require strengthening of end-to-end R&SO systems (i.e., additional/enhanced physical and virtual resources) for meaningful outcomes and contributions to regional/global exchange of information. Ideally, data collection platforms should be automated as far as possible to enable real time data transmission to central databases. Moreover, there is considerable merit setting up (near-) real time hydrological data exchange with other Gambia River Basin countries and launching a national flood forecasting system. Deployment of data buoys at strategic locations in The Gambia's coastal waters would indeed add value to marine and shipping forecasts and add impetus to the development of national capacity for operational oceanography[71].

**Mainstreaming climate change into education curricula**

Improving education is one of the strategic priorities of the NDP 2018-2022.[72]. The importance of mainstreaming climate change into all education curricula, already emphasised in the Gambian first NDC, has been further reiterated in the NCCP. While recognising that spreading knowledge and education is challenging, the NCCP affirms that the Government will continue prioritising basic/primary education,

68 Ministry of Environment, Climate Change and Natural Resources (MECCNAR), op. cit., p. 67.
69 MECCNAR, ibid.., p. 67.
70 MECCNAR, ibid.., p. 62.
71 MECCNAR, ibid. p. 67.
72 Government of the Gambia (GoTG), 2017a. The Gambia National Development Plan (2018-2021): An abridged version, p. 13.

while expanding access to secondary, higher and tertiary education with an emphasis on climate change[73]. Since the submission of the NDC1, a new Basic Education curriculum has been developed, which integrates environmental issues, including climate change. Training of trainers and teacher training have been initiated for the new curriculum. These promising steps shall be extended to bring about full integration of climate change into all education curricula in The Gambia[74]. However, some gaps still need to be addressed. The TNC reports that, while teaching of environmental and social studies at pre-tertiary level incorporates elements of climate change, a recent curriculum audit identified significant presentation and relevance issues including gaps in the current curriculum[75].

**Capacity to conduct climate change research in academic institutions, including training offered by foreign institutions**

More than ever, the importance of establishing a premier climate change research cluster to undertake high-level issues-based research contributing to full implementation of the UNFCCC and meeting the expectations of government, development and other major stakeholder groups, is in evidence. In an ideal situation, such a cluster hosted by the University of The Gambia (UTG) Climate Change graduate school should be open to all Gambian scientists with relevant competencies[76].

Since 2013, UTG has graduated two cohorts of Gambian and international students on climate change and education, under the West African Science Service Centre on Climate change and Adapted Land Use (WASCAL)[77] signature capacity-building programme. In addition, UTG is offering an MSc Programme in Physics that offers renewable energy as one of several possible specialisations. Scores of other Gambians have been trained in West and Central African countries[78]. Barbados, Kenya, South Africa, Tanzania, and United Kingdom in diverse specialisations (meteorology, hydrology, data science, ecology, public health, agriculture, science, technology, engineering and mathematics) at different competency and academic levels (technician to PhD), to partly offset the loss of talent related to historic deficiencies in recruitment polices, capacity development strategies and succession planning. In general, training abroad is facilitated by government/host country bursaries administered through the Ministry of Higher Education, Research, Science and Technology or government agencies[79].

**Formulation of a Long-term Climate Change Capacity Development Strategy**

The NCCP puts forward the plan for the formulation of a Long-term Climate Change Capacity Development Strategy, as part of the process to develop the National Climate Change Response Strategy and Action Plan. The Long-term Climate Change Capacity Development Strategy will spell out the role of education at different levels (primary, secondary, tertiary), and propose effective ways to build on and extend the current efforts to mainstream climate change into educational curricula, as well as to develop an institutionalised climate change training programme across the sectors[80].

## 8.2 TECHNOLOGY DEVELOPMENTS AND NEEDS

Technology transfer is seen to play a critical role in the global response to the challenge of climate change. Technology transfer is a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, NGOs and research/education institutions. The broad and inclusive term 'transfer' encompasses diffusion of technologies and technology cooperation across and within countries. It comprises the process of learning to understand, utilize and replicate the technology, including the capacity to choose and adapt to local conditions and integrate it with indigenous technologies[81].

73 Department of Water Resources (DWR), 2016, op. cit., p. 54.
74 Ibid., p. 54.
75 The curriculum audit was conducted by Oluwatobi (2018), as cited in MECCNAR, 2020. TNC, p. 60.
76 MECCNAR, 2020, op. cit., p. 64.
77 More information available at https://wascal.org/.
78 Cameroon, Ghana, Nigeria, Togo and Senegal.
79 MECCNAR, 2020, op. cit., p. 60.
80 DWR, 2016, op. cit., p. 25.
81 Metz, B., Davidson, O., Martens, J.W., Van Rooijen, S.N.M., and McGrory, L.V.W., 2001. Methodological and Technological Issues in Technology Transfer.

The Gambia used the support provided under the framework of the TNA project[82] to assess the country's needs in terms of technologies required for the implementation of climate change response strategies and activities. To date, two structured climate TNAs have been conducted. The first focused on adaptation technologies[83]. while the second focused on priority mitigation technologies in selected sectors[84].

The technologies identified in the two studies are summarized in Table 16 below. The Mitigation and Adaptation Technology Action Plan of The Gambia provides an estimate of the costs of activities aimed at removing barriers to the dissemination of each listed priority technology[85]. These costs were included in Table 16 in aggregate fashion. The Technology Action Plan offers more granularity on the costs of individual activities.

**Table 16: Technology needs of The Gambia**

| Category | Selected sector | Priority technologies | Estimate of costs (aggregate) (US$) |
|---|---|---|---|
| Adaptation | Agriculture | Conservation agriculture | 650,000 |
| | | Tidal irrigation | 1,150,000 |
| | | Aquaculture | 1,945,000 |
| | Coastal resources | Sustainable sand management | 980,000 |
| | | Breakwater systems | 4,210,000 |
| | | Groyne systems | 500,000 |
| | Water resources | Water conservation | 9,123,600 |
| | | Relocation of water points | - |
| | | Aquifer recharge | 2,630,000 |
| Mitigation | Electricity generation | Combined cycle diesel generator | - |
| | | Wind turbine | 3,250,000 |
| | Road transportation | Direct fuel injection | 5,310,000 |
| | | Turbocharger systems | - |
| | Waste management | Bioreactor landfill | 23,800,000 |
| | | Sanitary landfill | |

The Gambia would require international and south-south cooperation, collaboration and support for the development of its own technologies as well as for technology transfer and innovation to increase its mitigation and adaptive capacities.

## 8.3 FINANCE REQUIRED FOR MITIGATION

### 8.3.1 COSTS IDENTIFIED IN THE FIRST NDC

An economic assessment was conducted while the NDC1 was being developed. The national climate change reports (including the National Capacity Needs Self-Assessment for Global Environmental Management, NOTCOMs, National Adaptation Programme of Action and Nationally Appropriate Mitigation Actions) also contain some costs identified for implementing the activities identified in the NDC1.

82 The TNA project is implemented by the United Nations Environment Programme (UNEP) and the UNEP DTU Partnership on behalf of the Global Environment Facility (GEF).
83 Jallow, B.P., 2016, op. cit.
84 Njie, M., 2017. Climate change mitigation technologies in The Gambian energy, transport and waste sectors Consultancy report for Department of Water Resources (DWR) and UNEP-DTU partnership.
85 Badgie, L., Mendy, B.L., Dumbuya, M., Jarjusey, A., and Jallow, B.P., n.d. Technology Action Plan.

Based on the NDC1 economic assessment, investments in renewable technologies (wind and solar) are highly beneficial for The Gambia. The upfront cost of renewables is identified as a major challenge for the country due to inadequate financial resources. However, using a real discount rate of 10 percent per year, renewables emerge as the most profitable option, with an associated negative carbon price ranging between $-7 to -20/tCO2e, depending on the scenario (high or low demand). The economic analysis suggests that even higher shares of renewable electricity generation through solar PV and wind are feasible in The Gambia. Limitations likely arise from the finance available for high up-front costs. The analysis does not consider additional costs related to grid adjustments for this purpose and would need to be assessed for higher shares of renewables. Methane capture in landfills also provides substantial mitigation potential at low cost. The associated cost is in the range of $0.34-0.36/tCO2e.

### 8.3.2 COSTING ANALYSIS OF MITIGATION OPTIONS UNDER THE SECOND NDC

At the time the NDC Update Report was being drafted, a CBA and a costing study of the mitigation measures included in the NDC2 were under development. IRENA conducted a cost-effectiveness analysis that estimated the costs of the mitigation measures that fall under the power sector, while ICLEI is conducting a costing study and a CBA of the mitigation measures that fall under all other sectors covered by the NDC2. Once completed, these efforts will help to inform an estimate of the finance required to implement the NDC2 mitigation measures.

## 8.4 FINANCE REQUIRED FOR ADAPTATION

The Gambia's NDC1 does not include an assessment of the finance required to implement adaptation actions; the document identifies the NAP process as the most appropriate vehicle to address national adaptation needs. However, the NAP process has not been initiated to date. The NDC2 will therefore include a provisional communication of adaptation needs based on the costs outlined in the SPCR.

The SPCR includes a tentative financing plan with implementation costs[86]. These figures can be used to communicate adaptation needs provisionally in the NDC2. When a costed adaptation strategy is developed through the NAP process, it will become the new reference for guiding adaptation investment in the country.

**SPCR financing plan**

Table 17 outlines the tentative SPCR financing plan[87].

**Table 17: Short-, medium- and long-term cost estimate for financing the SPCR**

| Programme components/SPCR pillars | Total cost ($) | Short-term ($) (0-5 years) | Medium-term ($) (6-10 years) | Long-term ($) (11-25 years) |
|---|---|---|---|---|
| Pillar 1: Developing the enabling environment for climate resilience | **28,850,000** | 11,060,000 | 11,000,000 | 6,790,000 |
| Pillar 2: Climate-resilient land use mapping, planning and information systems | **45,000,000** | 40,000,000 | 2,500,000 | 2,500,000 |
| Pillar 3: Climate-resilient infrastructure, services and energy systems | **169,000,000** | 50,000,000 | 69,000,000 | 50,000,000 |
| Pillar 4: Developing integrated approaches to build rural climate resilience | **73,000,000** | 20,000,000 | 30,000,000 | 23,000,000 |
| **Total financing costs:** | **315,850,000** | **121,060,000** | **112,500,000** | **82,290,000** |

As indicated in the SPCR, all budgets are tentative and subject to revision during actual programming of activities. They may be offset, increased or reduced. The figures represent working budgets, not the

86 AGRER, 2017, op. cit., p. 93.
87 Ibid., p. 93.

final investment amounts. The breakdown into short-, medium- and long-term amounts is also subject to detailed programming and sequencing of investments[88].

Some of the strategic interventions identified in this strategy build on existing development interventions with funding from the government, as well as development partners such as the GCF, IFAD, UNEP, UNDP and others. To effectively address the identified strategic interventions, substantial amounts of additional funding will be required in the long term, given the significant existing adaptation deficits identified in the gap analysis made within the SPCR framework[89].

**Breakdown of costs of each SPCR pillar**

This section outlines the detailed financing needs of each of the four pillars of the SPCR[90].

**Table 18: Cost breakdown/SPCR Pillar 1**

**Pillar 1: Developing the enabling environment for climate resilience in The Gambia91**

| Sr. Nr. | Components | Cost in $ |
|---|---|---|
| 1 | Policy, legislative and institutional review and development | 35,000 |
| 2 | Enhanced mobilization of climate finance | 25,000 |
| 3 | Climate change research, capacity development and communication | 2,235,000 |
| 4 | Furthering climate services investments and systems | 10,000,000 |
| 5 | Developing the climate resilience monitoring, evaluation and reporting system | 16,555,000 |
| **TOTAL** | | **28,850,000** |

**Table 19: Cost breakdown/ SPCR pillar 2**

**Pillar 2: Climate-resilient land use mapping, planning and information systems92**

| Sr. Nr. | Components | Cost in $ |
|---|---|---|
| 1 | Data gathering to inform climate-resilient land use planning and training | 1,500,000 |
| 2 | Establish a central information management system based on GIS, GIS equipment and accessories and training, housed within a new purpose-built facility | 33,500,000 |
| 3 | Preparation and publication of national land use and cadastral maps at a range of appropriate scales based on the existing situation | 4,000,000 |
| 4 | Development and publication of a national land policy and overarching act to guide land ownership, planning, management, development, and governance | 1,500,000 |
| 5 | Cross-sectoral updating, development and publication of relevant policies and acts taking account of climate resilience, in addition to other national development objectives | 500,000 |
| 6 | Preparation and publication of a national land use plan, including definition and legal recognition of implementation, monitoring and enforcement procedures, and creation of capacity to enact | 2,500,000 |
| 7 | Ongoing review and updating of the policies, plans and maps to respond to future changes in social, economic and environmental conditions | 1,500,000 |
| **TOTAL** | | **45,000,000** |

**Table 20: Cost breakdown/SPCR Pillar 3**

88 Ibid.
89 Ibid., p. 94.
90 AGRER, 2017. SPCR: Volume II: Concept Notes and Regional Consultations.
91 Ibid., p. 16.
92 Ibid., p. 35.

| Pillar 3: Developing climate-resilient infrastructure, services and energy systems93 | | |
|---|---|---|
| Sr. Nr. | Components | Cost in $ |
| 1 | Climate-resilient integrated waste management | 30,000,000 |
| 2 | Climate-resilient water supply and sanitation | 105,000,000 |
| 3 | Climate-resilient roads and drainage infrastructure | 10,000,000 |
| 4 | Climate-resilient energy infrastructure | 19,000,000 |
| 5 | Support to urban agriculture | 5,000,000 |
| **TOTAL** | | **169,000,000** |

**Table 21: Cost breakdown/SPCR Pillar 4**

| Pillar 4: Developing integrated approaches to build rural climate resilience in The Gambia94 | | |
|---|---|---|
| Sr. Nr. | Components | Cost in $ |
| 1 | Enhancing the resilience of small-scale farming against future climate impacts | 10,000,000 |
| 2 | Reverting the "Sahelization" of ecosystems in The Gambia to support resilience of small-scale farming, livestock and wildlife sub-sectors | 20,000,000 |
| 3 | Supporting the planning, rehabilitation and management of buffering coastal ecosystem to build the resilience of fisheries and tourism development in The Gambia | 13,000,000 |
| 4 | Private sector involvement for promoting and strengthening the resilience of communities' livelihoods in The Gambia | 30,000,000 |
| **TOTAL** | | **73,000,000** |

## 8.5 CONDITIONALITY ASSESSMENT OF MITIGATION AND ADAPTATION ACTION

### 8.5.1 NATIONAL UNDERSTANDING OF CONDITIONALITY

Within the context of the Gambian NDC, activities that are funded domestically through the national budget fall within the 'unconditional' pledge. Conversely, activities that are meant to be funded through other sources on a project basis are identified as 'conditional' upon financial support and/or technology transfer.

### 8.5.2 CONDITIONALITY OF MITIGATION ACTION

**Conditionality of NDC1 mitigation measures**

The NDC1 included two unconditional and 10 conditional mitigation measures:

Two unconditional mitigation measures:

- Afforestation: afforestation of 1 million trees per year in urban and rural areas as well as mangrove forests
- Increasing renewable energy sources: Increase by 20 percent the share of renewable sources in the electricity mix (20 percent of 525MW); 30MW Wind & 75MW solar.

Nine conditional mitigation measures upon financial support and technology transfer:

93 Ibid., p. 52.
94 Ibid., p. 68.

- NERICA rice projects
- SRI rice projects
- Reduced transmission losses
- Energy efficiency: lighting
- Energy efficiency: appliances
- Domestic energy use: solar water heating
- Methane capture in landfills
- Waste separation, composting, recycling
- Improved cooking stoves.

One conditional mitigation measure upon technology transfer:

- Improving vehicle fuel efficiency.

**Conditionality of NDC2 mitigation measures**

Table 22 presents the unconditional mitigation measures included in the NDC2 and those that will be conditional on provision of donor financial support.

**Table 22: Conditionality of mitigation measures**

| ID | Mitigation measures | Unconditional | Conditional upon | |
|---|---|---|---|---|
| | | | Financial support | Technology transfer |
| 1 | GHG reduction from different rice ecologies in The Gambia | | ✓ | ✓ |
| MA1 | Improving agricultural resilience by implementing climate-smart agriculture | | ✓ | ✓ |
| MA2 | Improving livestock productivity | | ✓ | ✓ |
| MA8 | Reducing food losses | | ✓ | ✓ |
| 2 | Re-greening degraded landscapes (including protected forests) | | ✓ | ✓ |
| 3 | Upscaling deployment of fuel-efficient biomass combustion stoves | | ✓ | ✓ |
| MA3 | Multistrata agroforestry | ✓ | | |
| MA4 | Firewood from agroforestry | | ✓ | ✓ |
| E1 | 89 MW of utility-scale solar PV capacity | | ✓ | ✓ |
| E2 | 3.6 MW of utility-scale wind capacity | | ✓ | ✓ |
| E3 | Reduction of transmission and distribution losses to 17% | | ✓ | ✓ |
| E4 | Full replacement of diesel mini-grids with solar PV and battery storage systems | | ✓ | ✓ |
| E5 | SHS to supply off-grid consumption | ✓ | | |
| E6 | Substitution of incandescent light bulbs | | ✓ | ✓ |

| ID | Mitigation measures | Unconditional | Conditional upon | |
|---|---|---|---|---|
| | | | Financial support | Technology transfer |
| E7 | Solar water heating facilities to supply 10% of demand by 2030 | | ✓ | ✓ |
| E8 | 6 MW of solar PV rooftop systems by 2024 | | ✓ | ✓ |
| 4 | Downsizing The Gambia's transport sector carbon footprint | | ✓ | ✓ |
| 5 | Integrated waste management | | ✓ | ✓ |
| MA7 | Organic waste recovery | | ✓ | ✓ |
| MA6 | Biogas from waste management and landfills | | ✓ | ✓ |
| 6 | Substituting HFCs in production and manufacturing processes | | ✓ | ✓ |
| MA10 | Substituting HFC | | ✓ | ✓ |

### 8.5.3 CONDITIONALITY OF ADAPTATION ACTION

Implementation of the SPCR (costs outlined in section 8.4 above) will be fully conditional on the provision of international support in the form of finance, technology transfer and capacity building.

## 8.6 FINANCIAL INSTRUMENTS FOR NDC IMPLEMENTATION

The Gambia's need for climate financing, in addition to ordinary development financing, is based on the threat that climate change poses to both development and environmental sustainability. The adverse effects of climate change constitute a significant risk to people's lives and livelihoods, particularly the poor and the vulnerable; these effects could reverse any economic progress. Thus, adequate and sustainable financing needs to be mobilized for the country to move forward along a sustainable and resilient development path[95].

**National financing priorities**

Transitioning to a climate-resilient economy will also come at a cost beyond the reach of The Gambia, an LDC. However, the cost of doing nothing now will be astronomical in the long term. Additional efforts are needed to further incentivize and institutionalize sources of finance to address emerging climate risks and build longer-term resilience. All key economic sectors likely to be affected by climate change impacts in The Gambia require enhanced resources, as well as the capacity to use them effectively; in short, enhanced climate finance readiness. The sectors include agriculture, livestock, water resources, health, infrastructure, transport, human settlements, physical planning, coastal zone management, energy, tourism, environment, forestry, fisheries and biodiversity inclusive of wildlife[96].

The major mechanisms through which the necessary additional funds may be obtained are listed below.

**National budgets**

The mainstreaming and integration of climate change issues into the national development agenda means that national budget allocations are necessary to support the implementation of existing climate change policy priorities. These national budget allocations will be tracked using budget coding and used to leverage the finances originating from external sources to cover the additionality related to climate

95 AGRER, 2017, Volume I, op. cit., p. 94.
96 DWR, 2016, op. cit., p. 40.

change[97]. As proposed in the NCCP, the GoTG shall design and implement a climate change budget coding and scoring system to track, monitor and report on climate adaptation, resilience building and mitigation expenditures. The system will be harmonized with the Integrated Financial Management Information System (IFMIS), and will identify and, in real time, check budget codes relevant to these climate change expenditures to facilitate accounting of and reporting on resource allocation and spending. This will constitute a country-led system for measurement, reporting and verification (MRV) of climate finance at the national level. The MoFEA shall explore different options of coding, tracking and tagging climate change adaptation, resilience and mitigation resource allocations and expenditures based on priorities, functions, and thematic areas. Expenditure on climate change shall then be made publicly available in an annual publication of detailed budget estimates, as is done for all national public expenditure[98].

**International sources of climate finance**

Developing countries have insisted in various fora on the principle of "adequate, new and additional" international financial resources for sustainable development, including environmental activities, to which the concept of predictability should be added. The available sources of external funding for adaptation and mitigation are diverse and expected to increase, resulting from positive donor responses to recent political changes, and include, for instance: the EU Global Climate Change Alliance Programme; the World Bank's Carbon Funds and Facilities; the Least Developed Countries Fund (LDCF) of the UNFCCC/GEF; the United Nations' Reduced Emissions from Deforestation and Forest Degradation (UN-REDD) Programme; Climate Investment Funds (CIFs) of the World Bank; the Special Climate Change Fund (SCCF) of the UNFCCC/GEF; the Adaptation Fund (AF) of the Kyoto Protocol (with secretariat at GEF and World Bank acting as Trustee); the GCF; and the Scaling up Renewable Energy in Low Income Countries Programme (SREP). In addition to those, numerous bilateral development partners have either set up their own climate change bilateral funds and programmes, and/or are mainstreaming climate change support into their development cooperation programmes[99]. The Gambia intends to continue to use these international financial sources to access climate finance to support the implementation of its NDC and climate change in general.

**Subregional and national financial institutions and the GCF**

Subregional development banks, such as the African Development Bank (AfDB), and national development banks may serve as alternative climate change funding channels for long-term investment in The Gambia. These banks can play an increasingly important role in assisting the country make a successful transition to low-emission climate-resilient development pathways. However, The Gambia has not been able to engage national financial institutions in climate change to the extent required. Adoption of the GCF and the establishment of the Africa Climate Change Fund have offered new opportunities and initiatives to access financial support. The MoFEA has been accredited as the National Designated Authority (NDA) for the GCF, which has provided The Gambia a grant to implement a readiness support programme aimed at enhancing the capacities of the NDA on climate change-related matters and the development of a strategic country programme that includes an investment framework and priorities building on existing policies and plans[100].

**Private sector and foreign direct investment**

Private sector players (both domestic and international) can provide investment mainly in the energy and forestry sectors, as well as industry in manufacturing and transport. Private sector sources may be supplemented by public–private partnership (PPPs) funds and grants or soft loans from multilateral financial institutions (MFIs)[101].

97 AGRER, 2017, Volume I, op. cit., p. 94.
98 DWR, 2016, op. cit., p. 41.
99 AGRER, 2017, Volume I, op. cit., p. 94.
100 Jallow, 2019, op. cit., p. 48.
101 AGRER, 2017, Volume I, op. cit., p. 94.

**National Climate Change Fund**

The NCCP provides for the establishment of the GCCF, which will be funded with initial contributions from the national budget. It will be housed in the MoFEA and governed by the NCCC. The key objectives of the GCCF are to integrate national and international sources of funding; facilitate the use of national systems and institutions in channelling resources and planning and implementing climate change responses; and to fund nationally-owned and driven programmes that are consistent with Vision 2020 and other national development strategies. The NCCP further emphasizes that the GCCF will provide the means to attract and channel appropriately the resources needed for implementing national mitigation commitments, as well as addressing the country's adaptation needs[102]. The NCCC was inaugurated in May 2019 and has since started the process of establishing the GCCF.

**Adjustments to the climate finance architecture**

For long-term finance, The Gambia would like to reiterate the proposal to make adjustments in the climate finance architecture. In macroeconomic terms, priority should be given to financing programs that generate strong synergies with domestic efforts. Perhaps the most important are global financial efforts that facilitate free or low-cost access to technology: global financial technology funds that create knowledge that is made available as a public good; public sector purchase of relevant technology that is also made freely available; technical assistance in building technology capabilities; and human capital formation. A second area may be mechanisms that facilitate long-term domestic financing in The Gambia, thus overcoming its short-term bias; for example, using the capitalization of multilateral development banks (e.g., the AfDB) to expand considerably their bond issuance and lending in the domestic currencies of the developing countries, and to support activities that contribute to domestic financial development in these countries, particularly domestic development banks' capacity to extend the maturities of available domestic financing. An additional area that may become very attractive is the design of global disaster relief and disaster insurance facilities to manage climate disasters. Such facilities could include insurance premiums with a grant component that could vary according to the level of development of countries such as The Gambia.

## 8.7 INTERNATIONAL VOLUNTARY COOPERATION

Although The Gambia did not benefit from the international market mechanisms under the Kyoto Protocol, it intends to make use of voluntary cooperation under the framework provided by Article 6 of the Paris Agreement. The Gambia does not plan to achieve any of its commitment by acquiring internationally transferred mitigation outcomes (ITMOs). Instead, The Gambia would be a host country of mitigation projects aiming at securing the protection of the planet by meeting standards that deliver real, permanent, additional and verified mitigation outcomes that contribute to sustainable development while avoiding the double counting of emission reductions. Mitigation measures that are in need of additional resources to be implemented, such as those identified in the NDC as conditional upon international support, could be facilitated by international voluntary cooperation under Article 6.2 (cooperative approaches) or be registered under the Article 6.4 Mechanism. Furthermore, The Gambia welcomes international support through non-market approaches (NMAs) as recognised by Article 6.8.

No Article 6 pilot activities have been initiated in The Gambia at present. However, the GoTG is collaborating with development partners to implement large scale mitigation projects in the country that could potentially generate ITMOs in the future.

102 DWR, 2016, op. cit., p. 42.

# 9. LIST OF SOURCES


African Development Bank (AfDB), 2020. Gambia - The Gambia green mini-grid country programme - Enabling Environment - SEFA Appraisal Report.

AGRER, 2017. Strategic Programme for Climate Resilience (SPCR). Volume I: Main Report.

AGRER, 2017. Strategic Programme for Climate Resilience (SPCR). Volume II: Concept Notes and Regional Consultations.

Badgie, L., Mendy, B.L., Dumbuya, M., Jarjusey, A., and Jallow, B.P., n.d. Technology Action Plan.

Climate Analytics, 2015. Technical Report – Technical analysis to support the development of the intended national contribution of The Gambia.

Climate Investment Funds (CIF), 2021. Gambia.

Climate Vulnerable Forum (CVF), 2021. About.

Department of Water Resources (DWR), 2016. National Climate Change Policy of The Gambia: Final Draft.

Department of Water Resources (DWR), 2017. Low Emissions Climate Resilient Development Strategy of the Gambia (LECRDS) 2018-2030.

ECA, et al., 2021. The Gambia electricity road map update Generation least cost development plan (forthcoming).

Food and Agriculture Organization of the United Nations (FAO), 2010. The Gambia. National Forest Assessment 2008-2010.

Food and Agriculture Organization of the United Nations (FAO), 2020. Global Forest Resources Assessment 2020. Report: Gambia.

Food and Agriculture Organization of the United Nations (FAO), 2021. FAOSTAT.

Food and Agriculture Organization of the United Nations (FAO) Project Document, n.d. Agriculture for Economic Growth.

Food and Agriculture Organization of the United Nations (FAO)/Global Environment Facility (GEF) Project Document, n.d. Adapting Agriculture to Climate Change in The Gambia.

Food and Agriculture Organization of the United Nations (FAO)/Global Environment Facility (GEF) Project Document, n.d. Community-based Sustainable Dryland Forest Management.

Gambia Bureau of Statistics (GBOS), 2013. The Gender Report.

Green Climate Fund (GCF), 2021. Project FP011: Large-scale Ecosystem-based Adaptation in The Gambia: developing a climate-resilient, natural resource-based economy.

Government of the Gambia, 2013. The Gambia's Second National Communication under the United Nations Framework Convention on Climate Change.

Government of the Gambia (GoTG), 2015. Third National Greenhouse Gas Inventory Report (NIR).

Government of the Gambia (GoTG), 2017a. The Gambia National Development Plan (2018-2021): An abridged version.

Government of the Gambia (GoTG), 2017b. The Gambia National Transport Policy (2018-2027).

Government of The Gambia (GoTG), 2018a. National Development Plan (2018-2021): An abridged version.

Government of the Gambia (GoTG), 2018b. Second Generation National Agricultural Investment Plan-Food and Nutrition Security (GNAIP II-FNS).

Group of 20 Ministers of Finance of Vulnerable Countries (V20), 2015. Design document.

ICLEI, 2021 (forthcoming). Cost-Benefit Analysis of Priority Mitigation Actions in The Gambia's NDC

International Fund for Agricultural Development (IFAD), 2016. The Gambia: Strengthening Climate Resilience of the National Agricultural Land and Water Management Development Project (CHOSSO) – National Agricultural Land and Water Management Development Project (NEMA).

International Fund for Agricultural Development (IFAD), 2019. Resilience of Organizations for Transformative Smallholder Agriculture Programme: Project Design Report.

International Monetary Fund (IMF), 2020. The Gambia: Requests for disbursement under the rapid credit facility and modification of performance criteria under the extended credit facility arrangement – debt sustainability analysis.

IRENA, 2021 (forthcoming). Analysis of the cost-effectiveness of renewable energy technology options in the climate action planning processes in the Gambia.

Jallow, B.P., 2016. Technology Needs Assessment - Adaptation Report. Consultancy report for Department of Water Resources (DWR) and UNEP-DTU partnership.

Jallow, B.Z., 2019. The Gambia's National Adaptation Plan (NAP) Process for the Agriculture and Natural Resources (ANR) Sector – Stocktaking Report.

Jeffang, Kebba, 2020. IFAD to Release Record US$80 Million Financed Project for Gambia, Designed to Promote Value Chain.

Metz, B., Davidson, O., Martens, J.W., Van Rooijen, S.N.M., and McGrory, L.V.W., 2001. Methodological and Technological Issues in Technology Transfer.

Ministry of Energy (MoE), 2015. National Renewable Energy Action Plan (NREAP) (2015-2020/2030).

Ministry of Environment, Climate Change and Natural Resources (MECCNAR), 2020. Third National Communication of The Gambia under the UNFCCC.

Ministry of Fisheries and Water Resources (MoFWR), 2021. About Water Resources Department.

Ministry of Transport, Works and Infrastructure (MOTWI), 2018. The Gambia National Transport Policy (2018-2027).

NAP Global Network, 2020. Building Local Capacities to Integrate Gender and Adaptation in Planning in The Gambia.

National Agricultural Land and Water Management Development Project (Nema), 2018. Best Adaptation Practices: Nema-Chosso in The Gambia.

Njie, M., 2017. Climate change mitigation technologies in The Gambian energy, transport and waste sectors Consultancy report for Department of Water Resources (DWR) and UNEP-DTU partnership.

The Gambia Public Utility Regulatory Authority, 2019. Annual Report & Financials 2018.

The World Bank, 2018. Project appraisal document for The Gambia electricity restoration and modernization project.

The World Bank, 2021. World Bank Open Data: The Gambia, https://data.worldbank.org/.

United Nations (UN), 2019. World Population Prospects.

United Nations Development Programme (UNDP), 2015. Rural Electrification with Renewable Energy in The Gambia.

United Nations Development Programme (UNDP), 2021 (forthcoming). Circular economy opportunities in The Gambia – A metabolic approach to define a resource efficient and low-carbon future

**Climate Promise**

United Nations Development Programme (UNDP)
www.undp.org

@UNDPClimate

NDC PARTNERSHIP ACCELERATING CLIMATE AND DEVELOPMENT ACTION
IRENA International Renewable Energy Agency
UN environment United Nations Environment Programme
FAO FIAT PANIS
unicef for every child
ILO
UN WOMEN
UN HABITAT UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME
WORLD BANK GROUP