



MINISTRY OF LIVING CONDITIONS AND SUSTAINABLE
DEVELOPMENT



BENIN REPUBLIC



**DIRECTORATE-GENERAL FOR THE ENVIRONMENT AND
CLIMATE**

**READINESS PROJECT FOR BENIN'S INTENDED NATIONALLY
DETERMINED CONTRIBUTIONS
(PROJECT N° GFL/5070-2724-4F42-2201)**

**BENIN'S FIRST NATIONALLY DETERMINED
CONTRIBUTION UNDER PARIS AGREEMENT**

FINAL VERSION

LIST OF ACRONYMS

AIC	:	Climate-smart Agriculture
ANCB	:	Benin's National Association of Municipalities
UNFCCC	:	United Nations Framework Convention on Climate Change
NDC	:	Nationally Determined Contribution
CMEICB	:	Commission of Economic Modelling of Climate Impacts and Incorporation of Climate Change into the General State Budget
NCCC	:	National Climate Change Committee
COP ou CP	:	Conference of the Parties
INDC	:	Intended Nationally Determined Contributions
DGEC	:	Directorate-General for the Environment and Climate
GHG	:	Greenhouse Gas
IPCC	:	Intergovernmental Panel on Climate Change
GTEC	:	Environment and Climate Thematic Group
MCVDD	:	Ministry of Living Conditions and Sustainable Development
SDG	:	Sustainable Development Goals
NGO	:	Non-Governmental Organisation
GAP	:	Government's Action Programme
NAPA	:	National Adaptation Programme of Action with regard to climate change
GDP	:	Gross Domestic Product
LDC	:	Least Developed Countries
GWP	:	Global Warming Potential of greenhouse gas
TFP	:	Technical and Financial Partners
SBEE	:	Benin Electrical Power Company
TNC	:	Benin's Third National Communication on Climate Change
LULUCF	:	Land Use, Land-Use Change and Forestry

LIST OF CHEMICAL SYMBOLS

CO₂	:	Carbon dioxide
CH₄	:	Methane
N₂O	:	Nitrous oxide

LIST OF UNITS

t	:	ton
CO₂ eq	:	Carbon dioxide equivalent
MW	:	Megawatt
Mt	:	Megaton
Mt CO₂ eq	:	Megaton carbon dioxide equivalent
km²	:	Square kilometre

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EXECUTIVE SUMMARY

Pursuant to paragraph 13 of decision 1/CP.20 concerning the Lima Appeal of December 2014, which reiterated the invitation addressed to the Parties to announce their Intended Nationally Determined Contributions (INDC) prior to the twenty-first session of the Conference of Parties (COP21), Benin has submitted its INDC to the Secretary of the United Nations Framework Convention on Climate Change (UNFCCC) in September 2015. This document could stand for its first Nationally Determined Contribution (NDC) had it not chosen, while making the deposit of its instrument of ratification of Paris' Agreement, October 31st, 2016, the option to develop its NDC by updating its INDC, as provided by paragraph 22 of the decision 1/COP.21 adopting Paris' Agreement. Thus, this document which is the outcome of more detailed work which has benefited from wide participation from various stakeholders coming from public, private structures, as well as NGOs and local governments stands for Benin's first NDC.

1- NATIONAL CIRCUMSTANCES

Located in West Africa in the Gulf of Guinea, between latitudes 6°30' and 12°30' N and longitudes 1° and 3°40' E, Benin Republic covers an area of 114, 763 km². With an annual average rate of demographic growth equal to 3.5 %, its estimated population is up to 10,653,654 inhabitants for the year 2016. Two types of climate prevail over the country namely: the subequatorial climate in the southern region and the continental tropical climate in the northern region. From an economic standpoint, Benin is a Least Advanced Country (LDC) whose economy relies chiefly on agriculture. In spite of the efforts made in economic terms, the average rate of real growth (4.2 % from 2006 to 2015) is inferior to the 7 % growth rate, minimum required for a sustainable poverty reduction.

Awareness of climate change-related challenges has induced Benin's development and adoption of several policies, strategies and response programmes among which the national Agenda 21, the national strategy of sustainable development, the climate resilient and low-carbon development strategy, the national strategy for capacity-building, apprenticeship training and skills development to support a development that is environmentally friendly, low in gas emissions and climate resilient as well as the National Adaptation Programme of Action (NAPA). The political will of Benin's Government to address climate issues has gained a foothold in its Action Plan 2016-2021 (GAP) which is based on Agenda 2030 on sustainable development and the decisions of Paris Agreement. So, climate change is an area of concern for the Government of Benin who develops actions on the basis of clearly defined targets and guidelines with the help of governmental structures, local communities, the private sector and civil society organizations.

2- Mitigation

2.1. Current greenhouse gas emissions and projections in BAU case.

Benin's overall GHG emissions are up to 14.1 Mega ton of CO₂ Equivalent (Mt CO₂ eq), that is approximately 1.5 ton of CO₂ eq per capita in 2012, without Land Use, Land-Use Change and Forestry sector (LULUCF). These emissions are from the sectors of energy (47.4 %), agriculture (45.9%), waste (5.0 %) and industrial processes (1.6 %). Taking LULUCF into consideration, the record of GHG emissions (14.9 Mt CO₂ (e)) and absorptions (50.3 Mt CO₂) shows globally that Benin remains a GHG sink with a net absorptive capacity of 35.4 Mt CO₂ in 2012. However its capacity of carbon sequestration, even of absorption of CO₂, with regard to its green cover is declining (20.6% between 1995 and 2005 versus 32.0% in 2012).

As far as projection is concerned, in the BAU scenario context (without intervention), the tendency of global emissions (without LULUCF) reveals a growth rate of 172.8 % over 2012-2030 period evolving from 14.1 Mt CO₂ eq to 38.5 Mt CO₂ eq. The total aggregate cumulative GHG emissions for this scenario over 2021-2030 period is close to 306.1 Mt CO₂ eq. 66.3 % of it would come from the energy sector and 27.4 % from agriculture sector.

In the BAU scenario, Benin looks forward to reducing the overall cumulative greenhouse gas emissions (without forestry sector) by approximately 49.49 Mt CO₂ eq, that is a reduction of 16.17% over 2021 to 2030 period. The share of the national efforts is up to 3.63% and that of conditional contribution is 12.55%. In the BAU scenario the implementation of these measures would contribute to reduce the cumulative greenhouse gas emissions in the energy sector by 23.35 Mt CO₂ eq over 2021 to 2030 period, that is 11.51% including 9.53 % of conditional contribution and 1.98% of unconditional contribution. The efforts of reduction within the sector of agriculture would make it possible to avoid the cumulative GHG emissions reaching approximately 26.1 Mt CO₂ eq in the BAU scenario, that is a reduction of 31.1% over 2021 to 2030 period, including 25.3 % of conditional contribution and 5.8 % of unconditional contribution.

As far as LULUCF is concerned, the implementation of the measures could contribute to increase Benin's capacity of cumulative sequestration to a total value of 32 Mt CO₂ eq in case the business-as-usual scenario is maintained in this sector over 2021-2030 period including 76.6 % of conditional contribution and 23.4 % of unconditional contribution, through a cutback in deforestation (23.9 Mt CO₂ eq) and the creation of planted forests (8.1 Mt CO₂ eq).

2.2. Climate change mitigation targets and measures

Considering the existing strategies, plans and programmes, the key sectoral mitigation targets and measures as regards climate change are displayed in tables 3 to 5.

2.3. Strategies, programmes, implementation projects

The implementation of the sectoral mitigation activities (farming, energy and forestry) as regards the NDC will use the existing strategies, programmes and projects as well as future programs and projects.

3. ADAPTATION

Taking into consideration its status as a Least Developed Countries (LDC), its environmental context and its development goals, adaptation remains for Benin Republic the top priority as regards addressing climate change even though it adheres unconditionally to the global effort, directed towards mitigation strategy.

3.1. Benin's vulnerability to climate change

In terms of current vulnerability, major climatic risks which impact lives and livelihoods within the sectors of agriculture, water resources, shoreline and forestry are: drought, floods, late and heavy rains, strong winds, excessive heat and sea-level rise. The outcome of these climatic risks over the last three decades has generated numerous impacts, in this case the decrease in agricultural yields, disturbance in farming calendars, decreasing water levels in clean water supply dams, prolongation of the period of low water level, coastal erosion, etc.

As far as future vulnerability is concerned, the climatic risks to which natural and human systems could be exposed to fall under a scenario of persistence or escalation of the risks currently recorded and vary according to the sector in question. The potential impacts, according to climatic prospects by the years 2025, 2050 and 2100 range from coastal floods and intrusions of saltwater into rivers and watercourses to a drop in corn crops in some agro-ecological areas (ZAE5 in particular) with a shift in high-flow periods in Benin's Niger basin.

3.2. Climate change adaptive targets

Considering the existing strategies, plans and programs, the key sectoral targets as regards climate change adaptation are defined by the years 2020, 2025, 2030 and recorded in table 7.

3.3. Strategies, programs, implementation projects

The implementation of the sectoral adaptation activities (agriculture, water resources, shoreline and forestry) as regards the NDC will use the existing strategies, programs and projects as well as future programs and projects.

4. INSTITUTIONAL FRAMEWORK FOR THE IMPLEMENTATION OF THE NDC

Benin's NDC will be implemented under the authority of the Ministry responsible for the environment which plays the role of National Focal Point of the United Nations Framework Convention on Climate Change with the effective participation of all the stakeholders, namely the Technical and Financial Partners, governmental and non-governmental stakeholders with a consideration for gender and social inclusion (sector Ministries, local communities, private sector, civil society, etc). The involvement of stakeholders will be ensured through some institutions especially (i) the Steering Committee of the NDC which is the supreme authority in matters of decision and direction, (ii) the National Coordination of the NDC which is the backbone instance for all the actions and (iii) the sectoral implementation teams hailing from the ministries covered by the measures taken in the NDC. The responsibility of implementation of the identified projects and programs on the level of the various sectors covered by the NDC rests with the involved sector ministries. The necessary guidelines and terms will be given by the Ministry responsible for the environment to support if need be the sector ministries in the preparation of funding-seeking documents under the mechanisms established to support LDCs. The ministry responsible for the environment will also ensure the responsibility for the follow-up evaluation of the implementation of the NDC as well as that of institutional capacity-building in collaboration with the sector ministries.

5. MEANS OF IMPLEMENTATION

The activities envisaged under the implementation of Benin's NDC require financial and technological means as well as capacity building.

With regard to technological resources, emphasis will be laid on endogenous technologies and South-South and North-South transfer including the necessary know-how. The identified major needs in technology transfers relate to the sectors of agriculture/forestry, energy (table 10).

Capacity building will consist in developing technical skills and improving institutional capacities.

To carry out its ambitions of Greenhouse Gas (GHG) mitigation, Benin Republic will need an overall financial envelop that is on the order of 6,042.33 million US dollars including 2,135.24 million as contribution of Benin's Government and 3,907.09 million to mobilize from the Technical and Financial Partners (TFP) over the period starting from 2021 to 2030. The indicative cost of implementation of the adaptation programs and projects is

estimated at approximately 5,594.69 million US dollar including the national contribution (unconditional share) which is on the order of 1,441.15 million US dollar while the conditional share (international support) corresponds to 4,153.54 million US dollar.

On the whole, the financial resources to mobilize for the implementation of the mitigation and adaptation measures under Benin's first NDC globally amount to 11,637,02 million US dollar which is supposed to come from public funds, the private sector and international support.

6. CONSTRAINTS RELATED TO THE IMPLEMENTATION OF ADAPTIVE STRATEGIES AND POSSIBLE SOLUTIONS

The successful implementation of the NDC could be challenged by many constraints among which the following are worth mentioning: limited technical expertise, poor quality of data and information, effective and timely mobilization of national and foreign resources, the capacity of the involved governmental institutions to effectively manage large scales programs, the effectiveness of enforcement of the regulatory laws, the effective technology transfer as well as the outcome of the research-development assignments at national level.

I. NATIONAL CIRCUMSTANCES

Benin Republic is located in West Africa in the Gulf of Guinea, between latitudes 6°30' and 12°30' N and longitudes 1° and 3°40' E, Benin Republic covers an area of 114, 763 km². With an annual average rate of demographic growth equal to 3.5 %, its estimated population is up to 10, 882, 953 inhabitants for the year 2016 (INSAE, 2015).

Two types of climate prevail over the country namely: the subequatorial climate in the southern region and the continental tropical climate in the northern region. Over the year, the average rainfalls range from 700 mm in the north to 1,500 mm in the south whereas air temperatures remain within an average of 27.2 °C, with absolute surges which could exceed 45°C in the North (ASECNA, 2016).

Benin has a status of a Least Developed Country (LDC) whose economy chiefly relies on agriculture, trade and transportation with bordering countries. In spite of the efforts made in economic terms, the average rate of real growth (4.2 % from 2006 to 2015) is inferior to the 7 % growth rate, required minimum to eradicate poverty (GAP 2016-2021). This raises numerous challenges to overcome under various poverty reduction strategies (Ndoye *and al.*, 2016).

Exogenous factors among which climate change are likely to hamper the success of the implementation of the measures taken or planned to reduce poverty at national level. As a matter of fact, just like the other LDCs, Benin remains a country particularly vulnerable to climate change variability whose consequences are felt both at national and local levels. Over nearly two decades, the pluviometric patterns characterizing the climates of Benin witness fluctuations sometimes very significant in the middle or within the seasons. The main risks the country is confronted with are drought, floods and late and heavy rains. Additional to these major risks are the occurrence of climatic risks with a small geographical range, such as sea-level rise, yet significant impacts in economic and social terms.

Awareness of climate change-related challenges has induced Benin's development and adoption of several policies, strategies and response programmes among which the national Agenda 21, the national strategy of sustainable development, the climate resilient and low-carbon development strategy, the national strategy for capacity-building, apprenticeship training and skills development to support a development that is environmentally friendly, low in gas emissions and climate resilient as well as the National Adaptation Programme of Action (NAPA). In general those documents aim at (i) incorporating climate issues into Benin's strategic sectoral operational plans, so that they may be low-carboned and more climate- resilient for its sustainable development and (ii) providing Benin with a sustainable human resource base to address climate change. Other initiatives are under course especially the development of the national adaptation plan and the national policy as regards fighting against climate change.

The political will of Benin's Government to address climate issues is showcased in its Action Plan 2016-2021 (GAP). This programme is chiefly based on the Agenda 2030 on sustainable development and the decisions of Paris Agreement. It provides for actions and reforms to "enhance sustainably Benin's economic and social development" including the development and implementation of adaptation, mitigation and disaster management measures through the continuation of the implementation of NAPA, support for the development of renewable energies, initiatives of forest protection, afforestation and greening at communal level, fight against coastal erosion, a climate-smart agricultural strategy, the promotion of a rational and sustainable management of natural resources and forest, etc.

The emergency of climate issues requires a global response approach backed in particular by the Ministry of Living Conditions and Sustainable Development (MCVDD). The chief institutions involved in the fight against climate change within this ministry are the Directorate-General for the Environment and Climate (DGEC), the National Fund for the Environment and Climate (FNEC) and Benin's Agency for the Environment and Climate (ABEC). The DGEC's assignment is to design and ensure the implementation as well as the follow-up-evaluation of the policy and strategies of the Government as regards the management of the effects of climate changes and the promotion of environment-friendly economy. Climate issues are handled by the MCVDD in partnership with the other sector ministries, local governments, the private sector and civil society organizations with the support of Technical and Financial Partners. These institutions are involved individually or collectively through committees especially the National Committee on Climate Changes (NCCC), the Commission of Economic Modeling of the Impacts of Climate and the Incorporation of Climate Change into the General State Budget (CMEICB), the national system of GHG inventory, etc. The development of the system of Measurement, Reporting and Verification at national level is in the pipeline through the Project of Development of the First Updated Biennial Report.

II- MITIGATION

2.1. Current greenhouse gas emissions and projection in the BAU case

Data on greenhouse gas emissions (GHG) are based on the results available in June 2017 from the GHG inventory survey carried out under the project of development of the Third National Communication (TCN).

❖ Greenhouse gas emissions at national level

Benin's total GHG emissions amounts to approximately 14.1 Mega ton CO₂ Equivalent (Mt CO₂ eq), that is approximately 1.5 ton CO₂ eq per capita in 2012, without Land Use, Land-Use Change, Lands and Forestry (LULUCF). These emissions come from the sectors of energy (47.4 %), agriculture (45.9%), waste (5.0 %) and industrial processes (1.6 %).

Considering LULUCF, the balance of GHG emissions (14.9 Mt CO₂ eq) and absorptions (50.3 Mt CO₂) shows globally that Benin remains a GHG sink with a net absorptive capacity of 35.4 Mt CO₂ in 2012, this means that its GHG emissions are largely offset by the absorption of CO₂ on the level of its forest cover. Even though Benin remains a sink, its capacity of carbon sequestration is declining falling from (52.0) Mt CO₂ eq in 1995 down to (41.3) Mt CO₂ eq in 2005, that is a decrease of 20.6 %, and to (35.4) Mt CO₂ eq in 2012, that is a decrease of 32.0 %.

❖ Projection of greenhouse gas emissions in the BAU case

In the BAU case, the tendency of overall emissions (without LULUCF) reveals an increase rate of 172.8% over the period 2012-2030 rising from 14.1 Mt CO₂ eq to 38.5 Mt CO₂ eq (Figure 1). The total of aggregate cumulative GHG emissions without any intervention over the period 2021-2030 is close to 306.1 Mt CO₂ eq (without LULUCF). They would come up to 66.3% from the energy sector and 27.4% from the agriculture sector.



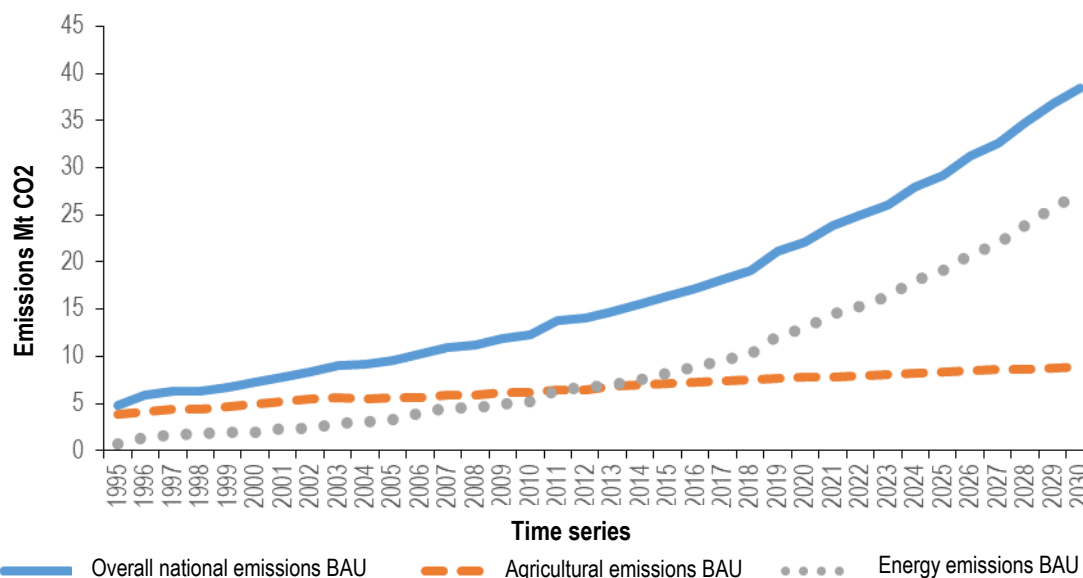


Figure 1: Tendency of overall emissions and emissions in agriculture and energy sectors (1995-2030) – BAU scenario.

❖ **Assumptions and methodological approaches used to forecast greenhouse gas emissions in the BAU case (Table 1).**

Table 1: Assumptions and methodological approaches used to forecast GHG emissions in the BAU case

Methodology for the counting of the emissions for the year 2012 (reference year)	The inventories of the GHG of year 2012 were carried out according to the revised 1996 version of the guideline of the Intergovernmental Panel on Climate Change (IPCC), IPCC's recommendations regarding good practices and uncertainty management for national inventories of GHG (GPG 2000) and IPCC's 2006 guidelines for the sectors of energy, agriculture, waste, and industrial processes.
Approach concerning the emissions related to LULUCF for the reference year.	IPCC's recommendations regarding good practices for Land Use, Land-Use Change and Forestry (LULUCF) (GPG 2003), IPCC's guidelines 1996 (GL 1996).
Methodology of emission projection in the BAU scenario (without any measure of emission reduction)	<p>Projection of the emissions by sector of activity without LULUCF (2013-2030):</p> <p>The methodology used for the projections of emissions since 2013 links the volume of GHG emissions of a country to three factors which are demographic data (Pop), data of the GDP per capita (GDP/Pop) and GHG emission per unit of GDP (GHG/GDP) according to the equation hereafter:</p> $\text{Volume of GHG} = \text{Pop} \times (\text{GDP/Pop}) \times (\text{GHG/GDP})$ <p>The basic data used are the following:</p> <ul style="list-style-type: none"> • Sectoral GHG inventories over the period from 1995 to 2012 (source TNC Project) • Population data and demographic projections: period from 1995 to 2030 • GDP data in FCFA at 2007 constant prices: in the period 2002-2012. <p>The results obtained have been adjusted over the period from 2019 to 2030 to take into account the emissions that would be generated by the implementation of the programme designed to enhance domestic capacity of thermal electricity generation estimated on the basis of the GPG 2000 and the GL 1996.</p> <p>Projection of aggregate emissions (2013 to 2030): aggregate emissions are assessed using the sum of the sectoral emissions without LULUCF.</p>

Potentials of global warming (PGW)	PGW values provided by IPCC in its fourth assessment report: 1 for CO ₂ , 25 for CH ₄ and 298 for N ₂ O.
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2.2. **Mitigation** measures under nationally determined contributions

Benin Republic is classified among the Least Developed Countries (LDC) and the low-lying coastal Countries. Bearing that in mind, Benin in its submission, presents a contribution to GHG mitigation based on the measures contained in the strategies, programs and projects for the **period 2017-2030**. This period includes the preparatory stage of implementation of the NDC (2017 to 2020) and the period of implementation of the NDC (2021 to 2030, the accounting period regarding GHG emission reduction efforts). To this end, numerous opportunities of mitigation of GHG emissions have been identified in the **sectors of agriculture, energy and LULUCF**.

❖ **Mitigation measures under nationally determined contributions**

The overall nationally determined contribution to mitigation is reported in table 2. The intended sectoral measures and their effect are reported in tables 3, 4 and 5 and are illustrated by figures 2, 3 and 4.

Table 2 : Overall nationally determined contribution

Period covered	2017-2030 (2017-2020: preparatory phase of implementation of the NDC; 2021-2030: implementation of the NDC and accounting regarding GHG emission reductions)
Reference year	2012
Type of contribution	Contribution based on the measures contained in strategies, programs and projects likely to contribute to GHG emissions reduction and also based on national resources (unconditional contribution) as well as on the support of the international community (conditional contribution). The unconditional contribution includes public funds and private investments.
Scope of coverage and range	
GHG considered in the contribution	Carbon dioxide (CO₂), Methane (CH₄), nitrous oxide (N₂ O)
Sectors/sources covered by the contribution	<ul style="list-style-type: none"> - Energy (sources: residential sector and energy industries) - Agriculture (farmlands, rice fields, burning of the agricultural residues, guided burning of savannas). - LULUCF (wooded grounds including natural and planted forests).
Geographical area	All the national territory.
Expected overall emission reduction (all targeted sectors put together) in the BAU scenario	<p>The measures envisaged in the sectors of Energy and Agriculture are likely to contribute to reduce the cumulative GHG emissions (without LULUCF) by approximately 49.49 Mt CO₂ eq in the BAU scenario, that is a reduction of 16.17 % over the period 2021-2030 (figure 2) including 12.55% of conditional contribution and 3.62% of unconditional contribution.</p> <p>The implementation of the measures envisaged in LULUCF would contribute to increase its cumulative sequestration capacity of 32 Mt CO₂ eq over the period 2021-2030 including 76.6% of conditional contribution, by limiting deforestation (23.9 Mt CO₂ eq) and creating planted forests (8.1 Mt CO₂ eq).</p> <p>Lowering the annual rate of deforestation would make it possible to reduce the cumulative emissions due to the sector of forestry by 110 Mt CO₂ eq over 2021-2030 period including 80% of conditional contribution and 20% of unconditional contribution.</p>

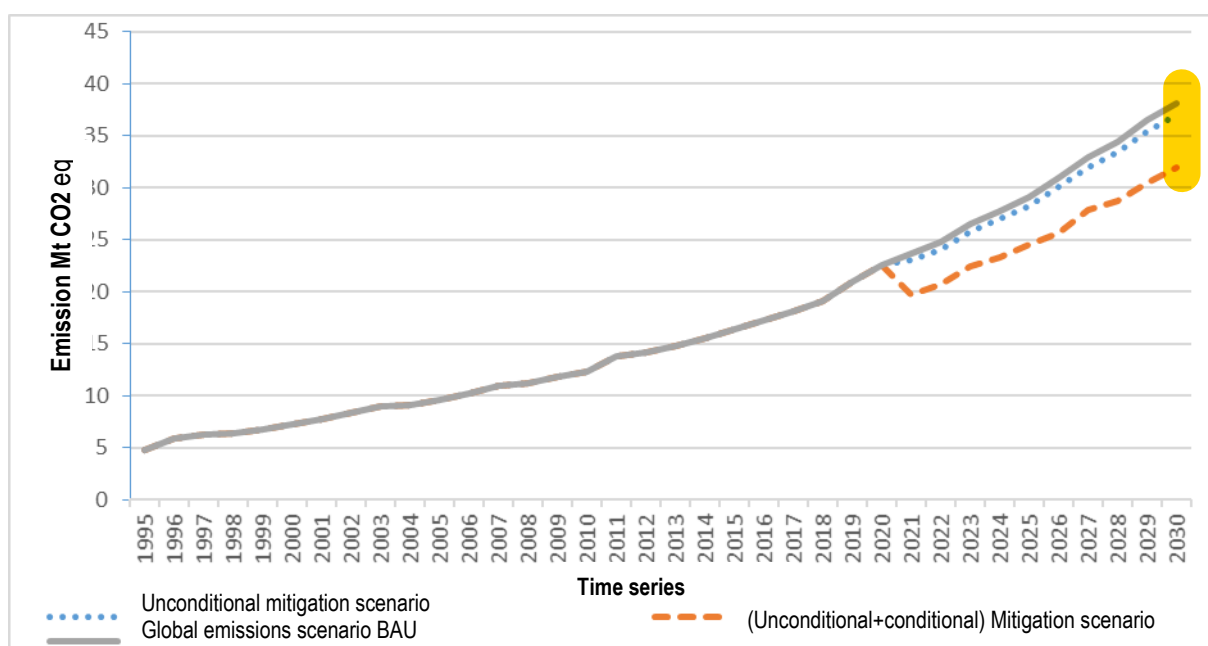


Figure 2: Overall GHG emissions estimate in the BAU scenario and in case of intervention

Table 3: Measures envisaged and emissions avoided in agriculture sector

Sub-sectoral targets	Measures envisaged	Unconditional contribution	Conditional contribution (additional)
Promoting improved farming techniques under crop production.	(1) Implementing improved farming techniques on a cultivated area of 500,000 ha/year.	250, 000 ha / year	250, 000 ha / year
Promoting soil fertility management techniques under crop production.	(2) Implementing soil fertility-maintaining techniques on a cultivated area of 500,000 ha/year.	100, 000 ha / year	400, 000 ha / year
Promoting irrigation schemes	(3) Developing 96,500 ha of farmlands and building 180 water retaining dams.	48,250 ha of developed farmlands and 90 water retaining dams built	An additional 48,250 ha of developed farmlands and 90 water retaining dams built
	(4) Developing and irrigating 52,000 ha of rice-growing area with water control	26,000 ha of developed and irrigated rice-growing area with water control.	An additional 26,000 ha of developed and irrigated rice-growing area with water control
Emission reduction in the agricultural sector.	<p>Expected avoided emissions (Figure 3): Efforts to improve the technical guidance targeting the limitation of methane fermentation and nitrous oxide emanations due to the nitrification/denitrification in farming systems would make it possible to avoid the cumulative emissions of these gases to a total value of about 26.14 Mt CO₂ eq in the BAU scenario, that is a reduction of 31.1 % by the year 2030 including 25.3% of conditional contribution and 5.8 % of unconditional contribution.</p> <p>The avoided cumulative emissions are distributed as follows: (1) Promotion of improved farming techniques 4.3 % including 2.1 % of conditional contribution; (2) Promotion of soil fertility management techniques 23.8 % including 19.1 % of conditional contribution;(3) Promotion of irrigation schemes 3.0 % including 1.5 % of conditional contribution.</p>		

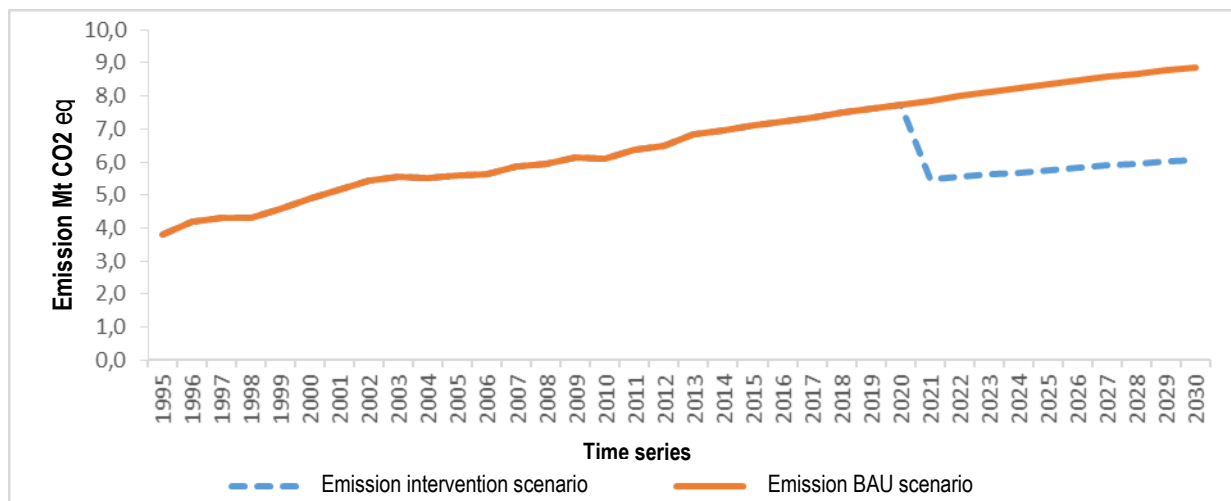


Figure 3: Estimate of GHG emissions in the BAU scenario and in case of intervention in the sector of **agriculture**.

Table 4: Measures envisaged and emissions avoided in the **energy** sector

Sub-sectoral targets	Measures envisaged	Unconditional contribution	Conditional contribution
Developing electric power generation using natural gas and sources of renewable energies	(1) Construction at Maria Gléta of thermal biofuel power plants (fuel, natural gas) (on the whole at least 500 MW by 2030)	X	
	(2) Construction in the port of Cotonou of a Liquefied Natural gas regasifying floating terminal (total capacity of the power plants to operate:500 MW)	X (60% of the investment)	X (40% of the investment)
	(3) Operating with natural gas the installed thermal generation capacity.	X (3% of the capacity with natural gas and 97% with fuel if the gasifying terminal project is not carried out.)	X (the overall capacity if the gasifying terminal project is carried out)
	(4) Developing renewable energies (construction of the hydroelectric power plants of Adjarala 147 MW; Dogo (bis) 128 MW; establishing PV solar farms with a total capacity of 95 MWc, structuring a biomass fuel investment 15 MW):	X (60% of the investment)	X (40% of the investment)
	(5) Construction of a third hydroelectric power plant (developing the site of Vossa, 60,2 MW)	X (60% of the investment)	X (40 % of the investment)
Increasing households' access to electric lighting in place of kerosene lighting	(6) Electrification of localities by connecting them to the network (on the whole 600 localities between 2021 and 2030).	X (Electrification of 300 localities)	X (Electrification of 300 additional localities)
	(7) Promoting the access of 424,000 kerosene-lighting using households to electric lighting in the localities which will be connected to the grids of Benin Electric Power Company (SBEE)	Procurement of 212,000 connection kits for households	Procurement of 212,000 additional connection kits for households
Enhancing actions for	(8) Pursuing actions for energy efficiency in all sectors: industries, tertiary sector, and	X	

Sub-sectoral targets	Measures envisaged	Unconditional contribution	Conditional contribution
an efficient use of electric power in all sectors.	households (standards setting, PV solar power stations on the roofs of public buildings, promoting the use of low power-consuming appliances, promoting street PV solar lighting etc.)		
Promoting low wood-energy consuming technologies	(9) Promoting the economic use of firewood-energy through the access of 140,000 new households to cleaner cookstoves.	46,000 households	94,000 households
	(10) Supporting the organization and development of the market of efficient cleaner cookstoves	X	
	(11) Enforcing regulations and measures for the promotion of a market of low power-consuming air-conditioners and refrigerators using hydrocarbon instead of CFC.	X	
Promoting partial substitution of firewood-energy consumption with butane gas	(12) Promoting the access of 275,000 new households to domestic gas-based cooking equipment: by subsidizing the cost of procurement of the small gas canister of 6 kg + gas burner in the order of 30 %.	90,000 households	185,000 households
	(13) Subsidizing the consumption of cooking gas in the order of 25 % of top-up fees	X	
Addressing current shortcomings as regards energy databases	(14) Conducting a survey on the penetration rates of cleaner cookstoves, gas cooking equipment and power consumption in households (nationwide)	X	
	(15) Conducting tests to check the performance of the various cleaner cookstoves distributed by various stakeholders	X	
	(16) Conducting a domestic survey to supplement the information available regarding vehicle fleet by collecting data on daily fuel consumptions for categories and various uses of vehicles.	X	
Emissions reduction for energy sector	Expected avoided emissions (Figure 4) The implementation of these measures will contribute to reduce the cumulative GHG emissions in this sector in the BAU scenario by 23,35 Mt CO₂ eq over 2021 to 2030 period , that is 11,51 % including 9,53% of conditional contribution and 1,98 % of unconditional contribution. The avoided cumulative emissions are distributed as follows: (i) power generation 7,80 % including 7,06 % of conditional contribution; (ii) promotion of electric lighting in households 3,62 % including 2,42 % of conditional contribution; (iii) saving in wood-energy by promoting cleaner cookstoves 0.084% including 0.056 % of conditional contribution; (iv) partial substitution of charcoal with butane gas 0,001%.		

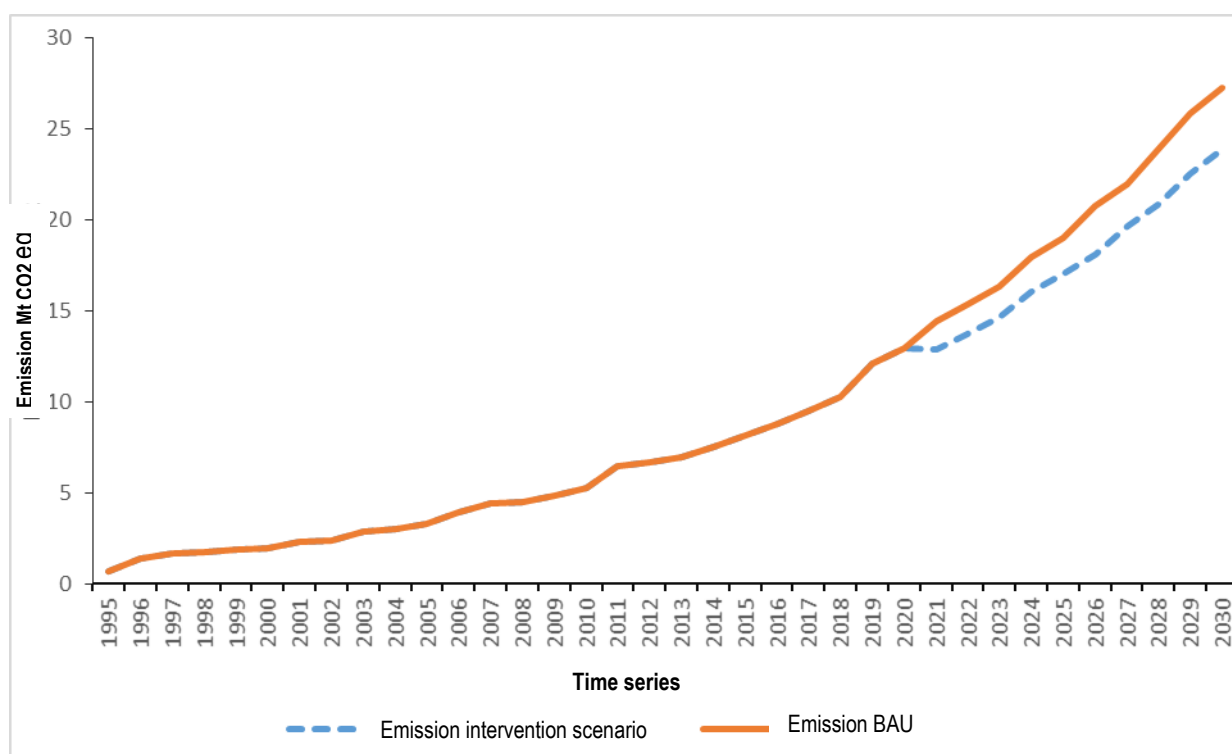


Figure 4: Estimate of GHG emissions in the BAU scenario and in case of intervention in the **energy** sector.

Table 5: Measures envisaged and emissions avoided in **LULUCF**

Sub-sectoral targets	Measures envisaged	Unconditional contribution	Conditional contribution
Increasing the capacity of carbon sequestration of the country's forest ecosystems through the implementation of sustainable natural forests development and the strengthening of efforts of reforestation/plantation	(1) Protecting and preserving existing natural and planted forests to reduce and keep deforestation rate down to 35,000 ha/year instead of 60,000 ha/year	Reducing deforestation rate by 5,000 ha/year.	Additional reduction of deforestation rate of 5,000 ha/year.
	(2) Implementing a reforestation plan aiming at developing 15, 000 ha of planted forests annually.	Developing 5,000 ha of planted forests per year	Developing an additional 10,000 ha of planted forests annually
Emission reduction/sink enhancement for LULUCF	<p>Emissions avoided/ projected removals in the BAU scenario</p> <p>(i) Limiting deforestation: the cumulative avoided emissions over 2021-2030 period are estimated at 110 Mt CO₂ eq, including 80,0% of conditional contribution;</p> <p>(ii) Carbon sequestration: 32 Mt CO₂ eq over 2021-2030 period, including 76,6% of conditional contribution, by limiting deforestation (23,9 Mt CO₂ eq) and developing planted forests (8,1 Mt CO₂ eq).</p> <p>Emissions avoided/removals are distributed as follows:</p> <p>✓ Unconditional targets related to LULUCF:</p> <ul style="list-style-type: none"> - reducing the cumulative emissions due to LULUCF by 22 Mt CO₂ eq over 2021-2030 period by lowering the annual rate of deforestation by 5,000 ha/year. - increasing the cumulative carbon sequestration of natural forests over 2021-2030 period by 7.5 Mt CO₂ in the BAU scenario by lowering the annual rate of deforestation by 5,000 ha/year (4.8 Mt CO₂) and developing 5,000 ha of planted forests annually (2.7 Mt CO₂). 		

	<p>✓ Conditional targets related to LULUCF::</p> <ul style="list-style-type: none"> - reducing the cumulative emissions due to LULUCF sector by 88 Mt CO₂ eq over 2021-2030 period by lowering the annual rate of deforestation by 20,000 ha/year. - increasing the sequestration of the natural forests over 2021-2030 period by 24.5 Mt CO₂ by lowering the annual rate of deforestation by 20,000 ha/year (19.1 Mt CO₂) and developing 10,000 ha planted forests annually (5,4 Mt CO₂).
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❖ **Methodological assumptions and approaches for developing mitigation scenarios**

The methodological assumptions and approaches for developing mitigation scenarios are presented in Table 6.

Table 6 : Methodological assumptions and approaches for developing mitigation scenarios

Methodology of emissions projection as regards "with measures" scenario in the sector of agriculture	Implementing improved farming techniques for crop production: lowering GHG emissions by 0.72 T CO ₂ eq / ha/year. Implementing soil fertility-maintaining techniques for crop production: lowering GHG emissions by 4 t CO ₂ / ha/year. Implementing irrigation schemes: lowering GHG missions by 1.01 t CO ₂ / ha/year. Developing and irrigating rice-growing areas with water control: lowering of CH ₄ emissions by 8.5 t CO ₂ eq / ha/year.
Methodology of emissions projection as regards "with measures" scenario in the sector of energy	The expected avoided emissions based on the measures envisaged have been determined using the activity data according to the technical guidelines provided by IPCC especially the GPG 2000 and guidelines GL 1996.
Methodology of emissions projection as regards "with measures" scenario in LULUCF	Annual rate of total deforestation as regards natural forests: 60, 000 ha; natural forests deforestation-related emissions: 120 t CO ₂ eq / year; capacity of sequestration of tropical natural forests 4 t C/ha/year; capacity of carbon sequestration of forest plantations 2 t C/ha/year; implementation of a plan of afforestation with the aim of developing 15, 000 ha of forest plantation annually; protection and preservation of natural forests which would make it possible to reduce and keep the rate of deforestation down to 35,000 ha/year.
GHG's global warming potentials (GWP)	Values of the GWP provided by IPCC in its fourth assessment report: 1 for CO ₂ , 25 for CH ₄ and 298 for N ₂ O.
Net contribution of market-based international mechanisms	No contribution from international funds.

III. AMBITION AND FAIRNESS

The target of reducing cumulative emissions over 2021 to 2030 period by 16,17 % based on the measures is fair in view of the weak contribution of Benin to global emissions, its low level of development and its socio-economic vulnerability. Benin Republic is one of the least developed countries of the world whose estimated GHG emissions are up to 1.5 t CO₂ eq per capita and are largely offset by the carbon sequestration of its forest cover. Its economic performances remain weak and unstable with a critical financial standing, characterised by a

relatively high level of indebtedness and an increase in the budget deficit. The average rate of real growth (4.2 % from 2006 to 2015) is lower than the 7 % growth rate, minimum required to eradicate poverty. The country depends on external support for its supply in commercial energies (oil products and power).

Benin's commitment is ambitious since its reduction targets are related to the key sectors for its economic development particularly the sectors of energy and agriculture whose emissions represent 93 % of the overall emissions of the country. Benin's aspiration to economic development and the growth of its population would induce a trend growth of its energy needs. Thus, GHG emissions due to the sectors of agriculture and energy should increase continuously. So the challenge will be the promotion of a low-carbon development.

IV. ADAPTATION

4.1. Benin's vulnerability to climate change

In terms of current vulnerability, the major climatic risks which affect lives and livelihoods with regard to the sectors of agriculture, water resources, coastline and forestry are drought, floods, late and heavy rains, strong winds, excessive heat and sea-level rise.

The occurrence of the above-mentioned climatic risks have generated over the last three decades numerous impacts, namely the decrease in agricultural productivity, the disturbance of agricultural calendars, the decline of drinking water supply dams' levels, the extension of the low waterflow period, the flooding of shorelines, etc.

As far as future vulnerability is concerned, the climatic risks to which could be exposed natural and human systems fall under a scenario of persistence or escalation of the risks currently observed and depend on the sector concerned. The potential impacts, according to climatic projections by 2025, 2050 and 2100 range from coastal floods and intrusions of salt-water into the watercourses and waterbeds to a decrease in corn yields in some agro-ecological zones (ZAE5 in particular) including a shifting of flood periods in Benin's Niger basin.

4.2. Adaptive targets for climate change

Using existing strategies, plans and programs, key sectoral adaptive targets for climate change are defined by the years 2020, 2025, 2030 and recorded in table 7.

Table 7 :Sectoral adaptive targets for climate change

Sectors	Key adaptive targets
	By years 2020/2030
All sectors	<ul style="list-style-type: none"> • Mastering vulnerability assessment tools and decision-support tools in order to integrate adaptation to climate change into the instruments of planning and management of national and regional institutions. • Building adaptive capacity to climate change in all socio-economic sectors (generation of employment, incomes, etc). • Mobilizing the required financial resources for financing climate change adaptation.

Sectors	Key adaptive targets
Agriculture	<p>❖ By 2020</p> <ul style="list-style-type: none"> • Ensuring diversification and promotion of high value-added agricultural value chains, as well as modernizing the resilient farm infrastructures in climate change context; • Promoting suitable systems of agricultural production resilient and adapted to climate change for food and nutritional security (climate-smart agriculture regarding Climate); • Defining new agricultural calendars adapted to a changing climate. <p>❖ By 2025</p> <p>Improving Benin's agricultural performance, to enable it to ensure durably food and nutritional sovereignty, to contribute to the economic and social development of the men and women of Benin and to hit the Sustainable Development Goals(SDGs) in particular the SDGs 1, 2, 12, and 13.</p>
Water resources	<p>❖ By 2020</p> <ul style="list-style-type: none"> • Ensuring universal access to safe drinking water to all Beninese citizens; • Reinforcing water availability in poor areas with the populations' adaptation to climate change in view; • Promoting water conservation in its various uses. <p>❖ By 2030</p> <ul style="list-style-type: none"> • Reducing the vulnerability of natural and human systems to water stresses, floods and degradation of water quality; • Enhancing knowledge regarding the climatic system and the tools for generation of climate and water-related information and forecasting of weather conditions; • Promoting control and good water management.
Forestry	<p>❖ By 2020</p> <ul style="list-style-type: none"> • Promoting intensive afforestation throughout the country using incentive measures; • Promoting sustainable management of public and community forests areas; • Adapting forest sector's legislative and regulatory framework to climate change context; • Updating the national forest inventory. <p>❖ By 2030</p> <ul style="list-style-type: none"> • Reducing communities' vulnerability to degradation of forest ecosystems. • Promoting agroforestry. • Developing mangrove ecosystems (distinctive forestlands of the coastline).
shoreline	<p>❖ By 2020</p> <ul style="list-style-type: none"> • Ensuring the protection of the shoreline against the risk of sea-level rise which can exacerbate the phenomenon of coastal erosion; • Cleaning up the banks of lakes and lagoons located in the vicinity of the shoreline <p>❖ By 2030</p> <ul style="list-style-type: none"> • Reducing the vulnerability of human settlements and resources located in the coastal area to sea-level rise; • Ensuring continuously the protection of marine and lagoonal ecosystems.

V. STRATEGIES, PROGRAMMES, PROJECTS AND INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION

5.1. Implementation of sectoral activities

Implementing the sectoral activities planned under the NDC will use existing as well as future strategies, programs, projects (tables 8, 9, 10 and 11). As a result, the relevant sectoral structures are committed to take them into account in designing future programs and projects.

It is noteworthy to remark that some mitigation projects indicated in table 8 provide co-benefits with adaptation and vice versa.

Table 8 :Strategies, programs and projects enabling the preparation and implementation of the NDC as regards mitigation in the sector of agriculture

Strategies, programmes and projects	Actions enabling the preparation and implementation of the NDC
(1) Gouvernement's Action Programme 2016-2021	
Support Programme for Rural Economic Growth	Developing 405 hectares of swampy areas for rice-growing and market-gardening
Support Project for Agricultural Infrastructures in Ouémé Valley (PAIA-VO)	Rehabilitating irrigation schemes (i) 1,000 ha of developed irrigated areas with perfect water control, (ii) 3,500 ha of swampy areas including up to 2,800 ha of plain development in flood zones and 700 ha of rice-growing swamps developed by the company, (iii) 300 ha of market-gardening for women.
Support Project for Food Production in Alibori, Borgou and les Collines (PAPVIRE-ABC)	<ul style="list-style-type: none"> Developing irrigation schemes: rehabilitating 7 agro-pastoral dams (600, 000 m3) and developing 1,927 ha of irrigated areas. Developing agricultural value chains and resilience (improving farm productivity and technological innovations, building stakeholders' capacity, developing agricultural value chains).
Support Project for Market-gardening (PADMAR) Development	Improving productivity and production (developing resilient market-gardening acreages on 2,100 ha; access to improved technologies and techniques).
Program of Improvement of Small Farmers' Agricultural Productivity (PAPAPE)	Increasing the productivity of small producers' systems of agricultural production in rain-fed and in irrigated areas (dissemination of technologies for integrated management of soil fertility, rehabilitation of soils state and fertility).
Project of Development of Irrigated Areas in Rural Areas (PDPIM)	Construction of water schemes: developing 1,000 ha of marshy land and 300 ha of small irrigated acreages, rehabilitation of 200 ha degraded arable lands, construction of four (04) water retaining units.
Water Scheme Project for the Lower Part of Mono River Valley (PAHV- MONO)	Developing a pilot acreage of 500 ha in the valley of the Mono River.
(2) Project "Supporting the transition towards an agriculture and food systems related to climate-smart agriculture" (AIC)	<ul style="list-style-type: none"> Intensifying sustainably productivity and increasing agricultural incomes; Lowering and/or eliminating GHG emissions; Creating an advancing political and financial environment, providing farmers with knowledge and access to resources and services for the transition towards systems of production that are sustainable, productive, resilient and economically viable.

(3) Strategic plan of development of the agricultural sector	
Improving the productivity and production of the crop products hailing from the priority agricultural value chains	Increasing by at least 50% by 2025 the current levels of agricultural productivity (improving access to professional knowledge and technological innovations for men and women; promoting the development of water schemes).
Building resilience as regards climate change and improving vulnerable people's food and nutritional security	<ul style="list-style-type: none"> • Agricultural innovations for resilience as regards climate change and its mitigation (promotion of climate-smart agriculture), dissemination and support for the implementation of systems of production limiting GHG emissions); • Sustainable soils and aquatic ecosystems management.
(4) Climate-resilient and low-carbon development strategy	
Building the resilience of communities and agricultural value chains	<ul style="list-style-type: none"> • Procurement of relevant irrigation systems; • Developing a national plan to make land ownership secure for farming
Building multi-purpose dams	<ul style="list-style-type: none"> • Building three multi-purpose dams on the main stream of the Ouémé River with plans for integrated and effective watershed management; • Developing farmland • Rehabilitating farmland •
(5) Project for building climate resilience for the vulnerable populations and ecosystems of the drainage basin of the Ouémé River through the AIC and the sustainable management of soils and water resources.	<ul style="list-style-type: none"> • Disseminating agricultural innovations regarding climate change and its mitigation (Promoting AIC) • Disseminating and supporting the implementation of the systems of production limiting GHG emissions • Promoting sustainable management of soils and aquatic ecosystems • Developing the drainage basin of the Ouémé River
(6) Comprehensive climate change adaptation programme through the development of agriculture, river transportation, tourism, in the valley of Niger River in Benin	Developing farming and pastoral systems (construction of five (05) multi-purpose dams with the development of 500 ha of irrigated acreage, rehabilitation of seven (07) irrigation schemes, development of 200 ha of swamps with partial water control, development of 500 ha in recession period, building four (04) spate irrigation for recession period acreages).
(7) Programme of enhancement of past and ongoing actions as regards improved farming techniques, soils fertility management techniques and irrigation scheme (2021-2030).(comprehensive programme development during the preparatory phase of the implementation of the NDC).	

Table 9 :Strategies, programs and projects enabling the preparation and implementation of the NDC as regards mitigation in the energy sector

Policies, strategies, programmes and projects	Actions enabling the preparation and implementation of the INDC
(1) GOUVERNMENT'S ACTION PROGRAMME (2016-2021)	
Project "Developing renewable energies and energy efficiency"	<ul style="list-style-type: none"> • Constructing the hydroelectric power station of Adjarala, 147 MW • Constructing the hydroelectric power station of Dogo - (a), 128 MW • Constructing the hydroelectric power station of Vossa 60,2 MW • Developing photovoltaic solar farms: total capacity 95 MW, 45 MW of which MCA project will be in charge of.

Policies, strategies, programmes and projects	Actions enabling the preparation and implementation of the INDC
	<ul style="list-style-type: none"> • Structuring the biomass-fuel investment: using agricultural waste (potential of 15 MW) • Developing photovoltaic street lighting • Promoting access of households from isolated areas to PV solar kits
Project "Controlling energy consumption"	<ul style="list-style-type: none"> • Setting binding standards of power consumption reduction • Installation on main public buildings of PV solar power stations with energy storage; replacing air-conditioning • Street lighting: substituting high power consumption lighting for low LED power consumption lighting; solar street light luminaries • Energy efficiency in households
Urban and rural electrification projects	<ul style="list-style-type: none"> • Project of construction of Kandi-Banikoara power transmission line • Project of reinforcement and extension of electricity grids • Urgent implementation of the project of electrification of 17 rural localities by connecting them with the conventional grids of SBEE (Benin National Power Company) • Project of reorganization and extension of SBEE's grids in Abomey-Calavi municipality and Atlantic Department
	<ul style="list-style-type: none"> • Action plan for the electrification of rural areas (projects in the pipeline: Electrification of 600 localities using photovoltaic solar system); Programme in the pipeline at Benin's Agency for Rural Electrification and Energy Management.
Benin's Programme regarding the Millenium Challenge Account (MCA II)	<ul style="list-style-type: none"> • Project for power generation (i) photovoltaic power generation activity using the support for the construction of four solar power stations, total capacity 45 MW; (ii) rehabilitation of the hydroelectric power station of Yeripao and its enhancement from 505 KW to 1 MW). • Power distribution project • Project for non-grid access to electricity
(2) Low-carbon and climate-resilient development strategy (support for energy transition)	
(3) Programme of development of productive capacities and enhancement of off-grid access to electricity (2021-2030)	
Projects of construction of other power stations	Constructing new power stations fuel/gas in order to increase the total installed capacity to 500 MW at least in 2030.
Project of construction of a third hydroelectric power station	Vossa power station (60.2 MW)
Projects of electrification of urban and rural areas	<ul style="list-style-type: none"> • Continuation of the projects of reinforcement and extension of SBEE's distribution networks in urban centres • Continuation of the projects of electrification of localities by connecting them to SBEE's power grid (600 localities between 2021 and 2030) • Continuation of off-grid electrification projects
Project of substitution of wood energy for butane gas and other sources of energy in Benin	<ul style="list-style-type: none"> • Promoting access of 275,000 new households to small gas cookers (6kg gas canister + gas burner).
(4) Programme of enhancement of actions as regards energy efficiency (2021-2030). (Programme development during the preparatory phase of implementation of the NDC)	
<ul style="list-style-type: none"> • Promoting access of households to economic charcoal-using hearths • Promoting partial substitution of charcoal consumption for butane gas. 	

Policies, strategies, programmes and projects	Actions enabling the preparation and implementation of the INDC
	<ul style="list-style-type: none"> • Supporting the organization and development of domestic markets for manufacturing and marketing efficient cookers (improved wood energy- using hearths; butane gas-using cookers). • Standards setting, implementing regulations, supporting the organization and development of a market of low-power consumption electric equipment (lamps, air-conditioners, refrigerators, freezers) and other electric equipment. • Introducing the obligation of considering power efficiency in public electric equipment orders and in the construction of public buildings (defining specific terms of references, taking interministerial decisions etc). • Generalizing the installation in public administration buildings of automatic shutoff devices as regards lighting and air-conditioning in the event of absence of the users of the offices. • Developing information and awareness-raising campaigns as regards the advantages related to power saving and the performance of power equipment in order to bring about behavioral changes. • Developing/enhancing actions promoting street lighting by LED or solar street light luminaries • Implementing support programs for the improvement of power efficiency in the industrial and tertiary sector.

Table 10: Strategies, programs and projects enabling the preparation and implementation of the NDC as regards mitigation in the sector of forestry

Policies, strategies, programmes and projects	Actions enabling the preparation and implementation of the NDC
(1) Gouvernement's Action Programme 2016-2021	
Programme of intensive afforestation of the national territory using incentive measures	<ul style="list-style-type: none"> • Developing the national strategy for intensive afforestation; • Achieving, forest maintenance and monitoring of 20,000 ha of plantations and/or enrichment in classified forests and afforestation areas; • Achieving, forest maintenance and monitoring of 800 ha of private communal plantations • Achieving, forest maintenance and monitoring of 700, 000 meters linear of street and roadside tree planting in urban and suburban areas • Developing 300 green areas in the cities • Developing and implementing simplified plans of forest plantations management; • Implementing a forest protection and monitoring system against grassfires and seasonal migration.
PAGEFCOM 2: Support Project for Communal Forests Management, phase 2	<ul style="list-style-type: none"> • Promoting non-food forest products; • Developing blue economy in forests; • Supporting economic forest alternatives; • Improving the forest cover.
Programme of Management of Forests and Coastal Areas, additional phase	<ul style="list-style-type: none"> • Financing income-generating alternative activities; • Protecting and monitoring old plantations; • Managing publicly-owned plantations.
Building the resilience of the energy sector to climate change impacts in Benin (NAPA Energy)	Ushering sustainable land and forest management practices in order to build the resilience of wood for energy growing areas.
(2) Promoting sustainable biomass	Adopting the best practices as regards land use, sustainable forest

electric power generation in Benin.	management (sustainable land and forest management by rehabilitating lands and forest plantations on 3,000 ha, and developing 2,000 ha of plantations to provide biomass, improving agricultural techniques on more than 9,000 ha by adopting the best land use practices).
(3) Integrated climate change adaptation programme through the development of agriculture, river transport, tourism, in the Niger valley in Benin	Sustainable management of agroforestry and pastoral resources (2,000 ha of improved fallow land and agroforestry, 4,000 ha of participative sylvopastoral plantations in classified forests)
(4) Low-carbon and climate change resilient development strategy (2016-2025): enhancing carbon sinks and reducing deforestation and forest degradation-related emissions	
Enhancing carbon sinks and reducing deforestation and forest degradation-related emissions	<ul style="list-style-type: none"> • Implementing large scale reforestation programmes • Developing the various components of REDD+ program • Developing and implementing forest ecosystems sustainable management plans
(5) National strategy for wildres management in Benin	
Improving the leadership of the controlled wildres management	<ul style="list-style-type: none"> • Implementing the forest policy (area related to wildres controlled management) • Developing adequate guidelines and plans for wildres controlled management • Regulating the use of fires in protected natural spaces, farming areas, grazing areas, forest areas, etc... defined in the Master Development Plans of Municipalities (SDAC) • Developing transborder and international partnerships of assistance as regards large fires management.
(6) Integrated strategies for promoting wood for energy generating privately-owned plantations in Benin	
Benin's spatial development agenda	
Ensuring a sustainable forest resources management	<ul style="list-style-type: none"> • Designing and implementing participative development plans; • Rehabilitating degraded woodlands; • Developing a maintenance and monitoring system for woodlands using modern tools; • Promoting the sustainable development of timber and wood for energy value chains • Perpetuating conservation and protection initiatives • Designing and implementing a programme for developing farming areas in connection with the safeguarding of natural areas
(7) Program for enhancing actions related to the protection and conservation of natural forests and plantations (2021-2030).(Full program development during the preparatory phase of the implementation of the NDC)	

Table 11 :Sectoral strategies enabling the implementation of adaptation-related targets

Sectors	Sectoral strategies enabling the implementation of the adaptation-related targets
All sectors	<ul style="list-style-type: none"> • National Implementation Strategy for United Nations Framework Convention on Climate Change (NIS) • Climate change National Adaptation Plan (NAPA) • National Development Plan (in the pipeline at the MPD) • Government's Action Plan (GAP) • Capacity-building strategy for human resources, apprenticeship training and skills development as regards climate change
Agriculture	<ul style="list-style-type: none"> • Strategic Development Plan for the Agricultural Sector (2017-2025) • National strategy for supplying effective and efficient weather services to the benefit of the stakeholders of the agricultural sector • Strategy for training farmers, stockbreeders and fishermen on climate change resilient technologies and the use of agro-meteorological information • Communication strategy for stakeholders'capacity-building for climate change adaptation as regards Benin's crop production and food security • National Plan for agricultural investments, food and nutritional security (2017-2021) • Strategic Development Plan for climate-smart agriculture (2018-2022)
Water resources	<ul style="list-style-type: none"> • National Action Plan for an Integrated Water Resources Management (PANGIRE) • National Strategy for Drinking Water Supply in rural areas in Benin • National strategy for Drinking Water Supply in urban areas in Benin • Master Plan for Water Management and Development in the Basin of the Ouémé River
Forestry	<ul style="list-style-type: none"> • National Program for a Sustainable Management of Natural Resources • Capacity-building strategy as regards wildres management for a better adaptation to climate change • Strategic plan for developing mangroves ecosystems • Strategic Plan for Developing Non-wood Forest Products

5.2. Institutional framework for implementing the NDC

The diagram of the selected institutional organization for implementing the NDC is summarized in figure 5.

Benin's contribution will be implemented under the leadership of the Ministry responsible for the environment which serves as National Focal Point for UNFCCC with the effective participation of governmental and non-governmental stakeholders as well as TFP. The implementation of the identified projects and programs on the level of the various sectors covered by the NDC is the responsibility of the concerned sector ministries. The necessary guidelines and facilitations will be provided by the Ministry responsible for the environment to support if necessary the sector ministries in preparing funding application packages under the mechanisms established to support Least Developed Countries. The ministry responsible for the environment will also assume responsibility for the monitoring evaluation of the implementation of the NDC as well as for the implementation of the institutional capacity-building in collaboration with the sector ministries.

The involvement of the stakeholders will be ensured through some institutional bodies in particular:

- A steering committee which is the supreme body as regards decision-making and guideline. It chiefly includes the Secretaries-General of the concerned sector Ministries, technical directors hailing from various ministries. The Minister responsible for the environment chairs the aforesaid committee and provides reporting.
- A National Coordination which is the backbone instance for all the retained actions. It is the interface between the implementing agencies. To carry out successfully its activities, it relies on some consultative bodies among which the KETF (TFPs'umbrella), the National Committee on Climate Change (NCCC), the platform for forecasting and addressing disasters, the Commission of Economic Modeling of Climate Impacts and Incorporation of Climate Change into the General State Budget (CMEICB), the National Association of Beninese Municipalities (ANCB). The national Coordination will also be assisted by the Expert Panel on mitigation and vulnerability/adaptation as well as some research institutions.
- Sectoral implementation teams. They hail from the ministries covered by the measures retained under the commitments contained in the NDC. They represent key links in the practical implementation. Sectoral coordinations are ensured by Programmes and Perspectives Managers assisted by the Directors of Administration and Finance. They include Technical Directors and programs and projects managers.

INSTITUTIONAL ARRANGEMENT FOR IMPLEMENTATION

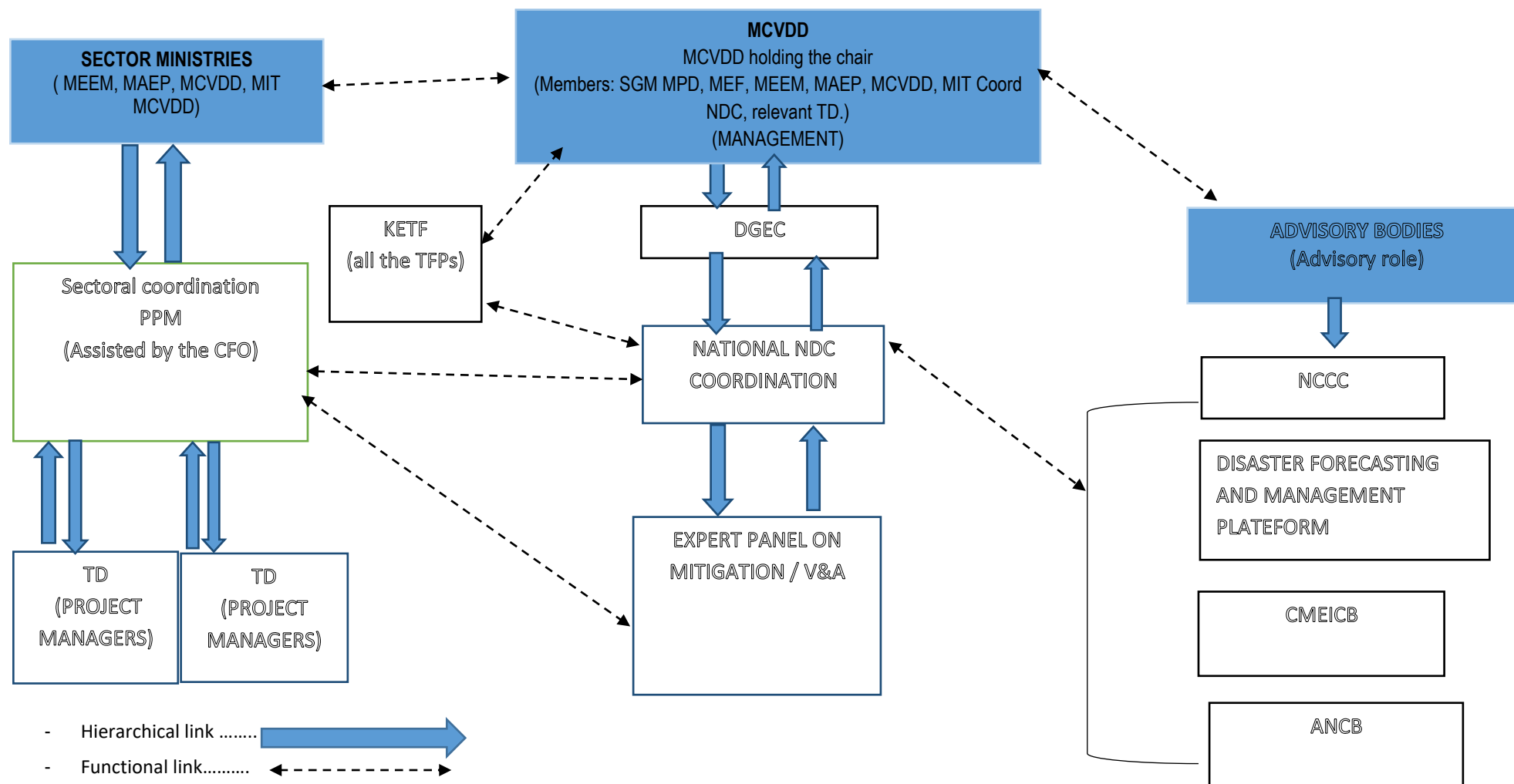


Figure 5 : Organisational chart of the institutional framework for implementing the NDC

VI. MEANS OF IMPLEMENTATION

The plan of implementation of the intended activities under Benin's NDC is presented in appendix 3. The implementation of these activities requires financial, technological as well as capacity-building means.

6.1. Needs for Technology Transfer

With regard to technological resources, stress will be laid on endogenous technologies and South-South and North-South transfer including the necessary know-how. The identified major needs for technology transfer relate to the sectors of agriculture/forestry and energy (table 12)

Table 12 : Needs for Technology Transfer

Energy Sector	Sector of agriculture/forestry
<ul style="list-style-type: none"> - energy efficient power generators - economic cookstove and efficient pressure cooker - butane gas and related equipment; - renewable energy-generating equipment - energy efficient household equipment (lamps, air-conditioners, electric household appliance) - low power consumption industrial equipment 	<ul style="list-style-type: none"> - Soil fertility maintenance technologies using herbaceous leguminous plants; - Agroforestry technologies using woody leguminous plants; - Integrated management technologies for soil fertility and conservation of soil moisture - Organic and botanical inputs production technologies; - Technologies based on crop residues burying, composting and use of manure; - Irrigation scheme technologies, pastoral development technologies and infrastructures for opening up remote areas; - Technologies of conservation and processing of agricultural products; - Technologies of densification of agricultural residues and waste into briquette - Short-cycled and less water-demanding crop varieties - Practising improved carbonization (Casamance grinding stone) - Sustainable forest management - Green manures technologies - Local fast-growing forest plants production technologies

6.2. Capacity-building

Capacity-building will consist in developing skills and improving institutional capacities (table 13).

Table 13 : Needs for capacity-building

Sectors/ priority areas	Needs for capacity-building
Climate observation and monitoring System	Developing a reliable climate observation and monitoring system encompassing the climatic system as a whole, in particular the land-ocean-atmosphere components.
	Strengthening air-pollution measuring stations.
	Developing capacities of monitoring and forecasting weather fluctuations and changes, and systems of early warning and evaluation of the socio-economic, environmental impacts, etc.

Sectors/ priority areas	Needs for capacity-building
Institutional framework	Strengthening current structures which operate in the field of protection of the atmosphere, lands and oceans.
	Creating or strengthening structures dealing with adaptation issues
	Creating or strengthening structures dealing with mitigation issues
	Developing nationwide climate plans and strengthening the consideration of climate change in development programs/strategies
	Incorporating Climate Change issues into agricultural development policies, plans and programs
	Training rural development stakeholders (executive officers, technicians, producers, local authorities) on issues regarding the relationship between climate and agriculture.
	Supporting the adoption of improved technologies for sustainable land management
	Using models in agro-climatology (building capacities in modeling agro-climatic risks, getting used to software such as DSSAT, SARRAH, etc).
	Desseminating local knowledge as regards risk or agro-climatic crises management.
	Monitoring-evaluation of agricultural and irrigation scheme development projects.
	Training professional staff and producers on the system of production of the major food crops including soil fertility and moisture conservation integrated management techniques
Energy	Promoting and improving access to renewable energies sources in order to safeguard forest resources and reduce the populations' vulnerability to Climate-related effects.
	Supporting the development of efficient cooking equipment markets (cleaner cookstoves, gas-fire cooking equipment).
	Training public and private stakeholders and users on renewable energies systems
	Capacity-building on energy-saving initiatives and measures in various sectors (households, industry, services).
	Adopting labels and standards for efficient lamps and electric household equipment.
Water resources	Building the skills of the decentralized services of the Directorate-General of Water to anticipate risks and address hydro-climatic hazards.
	Capacity-building as regards the consideration of Climate issues in water resources management policies.
	Training technical executives regarding water systems' vulnerability to Climate Change and the methodology of survey of water resources' vulnerability to Climate Change.
	Developing water resources integrated projects management in Climate Change conditions
	Hydro-Climatic modeling (hydrological functioning of watersheds, hydrogeologic functioning of aquifers, the process of saltwater intrusion into well fields in the coastal area).
Forestry/ Biodiversity	Setting up focal points responsible for Climate issues in their relationship to biodiversity.
	Considering Climate issues in the management of biological resources.
	Training stakeholders (decision makers, technicians, peasants, local authorities) regarding the development of integrated projects of conservation of biological resources in climate change settings as well as ex situ and in situ methodology of conservation.
	Desseminating local knowledge as regards the management of biological resources.
	Developing systems of information and warning as regards the harmful effects of Climate Change on biodiversity
	Exploiting traditional knowledge as regards the relationship between climate and biological diversity.

Sectors/ priority areas	Needs for capacity-building
	Developing and disseminating in local languages legislations and regulations concerning biodiversity management
	Exploiting traditional knowledge as regards biological diversity for enhancing carbon sequestration sinks
Human settlements	Introducing Climate Change issues in development plans, policies, strategies, programs and projects.
	Training and informing stakeholders (decision makers, health workers, populations, local authorities) on the harmful effects of Climate Change
	Protecting socio-economic systems against the degradation of coastal area and sea-level rise.
	Capacity-building, at various levels, to interpret and communicate relevant climatic information and advise local communities.
	Institutional and technical capacity-building as regards public administration, civil society organizations and communities, for accessing local risks and vulnerabilities, and formulating climate-sensitive development plans and policies.
	Promoting practical adaptation solutions to climate variability and future climate change-related risks.
	Promoting capacity-building and knowledge-sharing as regards climate change, through awareness-raising activities, risk management and the development of gender-sensitive policies.
Health	Training the stakeholders of the medical pyramid as regards climate change and their impacts on health.
	Developing an information and monitoring system on the impact of climate change on health

6.3. Funding

National resources (public funds and private investments) will be supplemented by the external financial support (bilateral or multilateral).

The estimated overall cost for the implementation of the plans, programs and projects registered under Benin's NDC totals 11,637.02 million US dollars including 3,576.39 million US dollars in unconditional option and 8,060.63 million US dollars in conditional option (appendices 1 and 2). The shares which relate to mitigation and adaptation measures are respectively 6,042.33 and 5,594.69 million US dollar. This estimate is based on the current experiments of the country in the implementation of climate change mitigation and adaptation projects.

In order to measure the progress achieved in the implementation of the aforesaid activities, systems of monitoring and evaluation will be set up including in particular Measurement, Reporting and Verification (MRV).

6.4 Conditions for success of the implementation of the NDC

The success of the implementation of the NDC will depend on the following conditions:

- The effective and timely mobilization of the national resources and the expected assistance from the international community. Difficulties of mobilization of sufficient resources could hamper the implementation of the projects.

- The capacity of the concerned public structures to effectively manage large- scale programmes. To prevent any difficulty which might arise from the lack of capacity of these structures, it will be necessary to make at the sectoral level a good diagnosis of the staffing needs for the timely implementation for the projects; and this within the framework of the development of the institutional capacity-building programme identified in the NDC .
- Effectiveness in the establishment of regulations and control of the domestic market of imported electric and electronic equipment and the success of energy efficiency promotion operations.
- Capacity of the agricultural sector to effectively promote the improved farming techniques on the planned areas.
- Effectiveness of technology transfer just like the outcome of the research- development activities at national level.

REFERENCES

DG-Eau, 2013 : Réalisation du Schéma Directeur Aménagement et de Gestion des Eaux du bassin de l'Ouémé.

DG Eau Cotonou 194p

FMI (2016) : Consultations de 2015 au titre de l'Article IV. Communiqué de presse Rapport des Services du FMI et Déclaration de l'Administrateur pour le Bénin. Rapport du FMI no [16/6]. <https://www.imf.org/external/french/pubs/ft/scr/2016/cr1606f.pdf>

NSAE (2015). RGPH4 : que retenir des effectifs de population en 2013, INSAE, Cotonou

MAEP, 2015 : Budget Programme Gestion 2016-2018, Cotonou.64p

MAEP, 2015 : Document de programmation pluriannuelle des dépenses 2016-2019. Cotonou, 40p.

MEGCCRPRNF, 2015 : Contributions Prévues Déterminées au niveau National. 27p

MEHU, 2011 : Deuxième Communication Nationale sur les changements climatiques

MSP, 2009 : Plan National de Développement Sanitaire (2009-2018)

Ndoye D., Fall E.H, Alofa J.P. (2016). Bénin. Perspectives économiques en Afrique. BAD, OCDE, PNUD. www.africaneconomicoutlook.org

Programme d'Actions du Gouvernement 2016-2021

Projet TCN (2016). Inventaire de gaz à effet de serre du secteur Energie. Groupe thématiques Energie. DGEC, MCVDD, Cotonou. 125p.

Projet TCN (2016). Inventaire de gaz à effet de serre du secteur UTCATF. Groupe thématiques UTCATF. DGEC, MCVDD, Cotonou. 87p.

Projet TCN (2016). Inventaire de gaz à effet de serre du secteur Agriculture. Groupe thématiques Agriculture. DGEC, MCVDD, Cotonou. 50p.

APPENDICES

Appendix 1: Summary of mitigation measures under the intended nationally determined contributions

Targets of the measure proposed	Quantified targets (by 2030)	Unconditional*	Cost in (million US \$)	Conditional *	Cost in (million US\$)	Total cost in (million US\$)
Sector of agriculture						
Promoting improved farming techniques within the framework of crop production.	Implementing improved farming techniques over an area of 5,000,000 ha.	50%	136.50	50%	136.50	273.00
Promoting soil fertility management techniques within the framework of crop production.	Implementing soil fertility maintenance techniques over an area of 5,000,000 ha	20%	185.56	80%	742.22	927.78
Promoting irrigation schemes.	Developing 96,500 ha of agricultural land and constructing 180 water reserves.	50%	263.18	50%	263.18	526.36
	Developing and irrigating 52,000 ha of rice-growing areas with water control.	50%	141.82	50%	141.82	283.64
Sector of energy						
Developing electric power generation using gas and renewable energy sources.	Developing a thermal value chain of electric power generation (construction in the port of Cotonou of a liquified natural gas regaseifing terminal + pipeline of connection to the gas pipeline)	60 %	138.00	40	92.00	230.00
	Developing renewable energies (construction of the hydroelectric power plants of Adjarala 147 MW;Dogo (a) 128 MW;establishing solar PV farms with a total capacity of 95 MW, structuring a biomass fuel value chain15 MW)	60%	441.00	40%	294.00	735.00
	Building a third hydroelectric power plant (developing the site of Vossa 60.2 MW)	60 %	209.06	40 %	139.37	348.43
Extending households' access to electric lighting as an alternative to kerosene lighting.	Continue implementing the projects for the electrification of localities (on the whole 600 localities by connecting them to SBEE's conventional grid).	50%	90.00	50%	90.00	180.00

Targets of the measure proposed	Quantified targets (by 2030)	Unconditional*	Cost in (million US \$)	Conditional *	Cost in (million US\$)	Total cost in (million US\$)
	SBEE procuring 424,000 connection kits for households	50%	53.00	50%	53.00	106.00
Enhancing measures for efficient power consumption in all sectors	Continue implementing the national programme of energy efficiency in all sectors: industries, tertiary sector, and households (setting standards, PV solar power plants on the roofs of administrative buildings, promoting the use of energy efficient electric equipment, promoting PV solar-based street lighting etc.)	33%	6.60	66.67	13.34	19.94
Promoting the access of households to butane gas cooking equipment (subsidy 30 %)	275, 000 new households	33%	2.09	67%	4.25	6.34
Facilitating access to gas refill (subsidy 25%)	All using households	100%	136.67	0%	0	136.67
Promoting the access of households to economic charcoal hearths	140, 000 cleaner cookstoves	33%	0.14	67%	0.29	0.43
Addressing current gaps on the level of energy databases	(15) Conducting a survey on the penetration rates of cleaner cookstoves, gas cooking equipment and households power consumption (nationwide)	100 %	0.35	0 %	0	0.35
	(16) Conducting tests to check the performance of the various cleaner cookstoves distributed by various stakeholders	100 %	0.05	0 %	0	0.05
	(17) Conducting a poll at the national level to supplement the information available on the vehicle fleet by collecting data on daily fuel	100 %	0.10	0 %	0	0.10

Targets of the measure proposed	Quantified targets (by 2030)	Unconditional*	Cost in (million US \$)	Conditional *	Cost in (million US\$)	Total cost in (million US\$)
	consumptions as regards the various categories and uses of vehicles.					
Forestry sector						
Promoting high efficiency carbonization oven	-	0%	0	100%	4.80	4.80
Promoting publicly-owned, communal and private plantations	Area of 150, 000 ha	10%	82.00	90%	740.00	822.00
Rationalizing the exploitation of forest resources	Over an area of 1, 330, 000 ha at least;	10%	52.00	90%	460.00	512.00
Securing the limits of the state-owned forest estate;	2, 664, 805 ha	40%	140.00	60%	210.00	350.00
Promoting alternative activities to forest resources exploitation	-	10%	40.00	90%	390.00	430.00
Institutional and regulatory framework						
Organizing the kick-off- workshop for the implementation of the NDC		100%	0.04	0%	0	0.04
Developing the institutional framework of coordination for the implementation of the NDC		PM				
Backing the involved sector ministries for the preparation of the scheduled programs in the plan of implementation of the NDC and the fundraising documents for the projects under the support mechanisms for LDCs		20%	0.08	80%	0.32	0.40
Developing and implementing an institutional and regulatory capacity-building programme in the Climate Change Management sub-sector		100%	9.00	0%	0	9.00

Targets of the measure proposed	Quantified targets (by 2030)	Unconditional*	Cost in (million US \$)	Conditional *	Cost in (million US\$)	Total cost in (million US\$)
Promoting scientific, technical and technological research as regards climate change adaptation and mitigation;		20%	8.00	80%	32.00	40.00
Promoting technology and know-how transfer as regards climate change adaptation and mitigation		0%	0.00	100%	100.00	100.00
TOTAL		35.34 %	2,135.24	64.66 %	3,907.09	6,042.33

Appendix 2: Summary of adaptive measures under Benin's nationally determined contributions

N°	Adaptive measures, status of implementation and sources	Targets	Options and costs				
			Unconditional		Conditional		Total cost (million US\$)
			Proportion (%)	Cost (million US\$)	Proportion (%)	Cost (million US\$)	
1	Integrated Climate Adaptation Program through the Development of Agriculture, River transportation, Tourism, in Benin's Niger valley (PIACC-DAT- in Benin's Niger valley) <i>Not yet implemented</i>	- Providing stakeholders and agricultural communities with opinions and alarms in case of occurrence of significant, announced weather and climatological happenings which are detrimental to production systems	8	10.20	92	117.26	127.46
	Project of adaptation of agricultural calendars to the new climate change context. <i>Project Of the Second National Communication not yet implemented</i>	- Promoting appropriate climate-smart agricultural production systems for food and nutritional security	10	0.51	90	4.60	5.11
	Support Project for Infrastructures in the Valley of Ouémé River (PAIA-VO) (2013-2020). <i>Pilot Phase under implementation (Project of the GAP 2017-2021)</i>	- Developing new agricultural calendars enabling the stakeholders of agricultural and pastoral economy to securely plan and carry out production operations	50	63.73	50	63.73	127.46
	Project of Development of Socio-economic Infrastructures and Food Security (PDISSA) (Developing 750 ha of irrigated areas in the basin of Niger River). <i>Under preparation</i>	- Contributing to food security and a strong and inclusive economic growth in Benin	5	1.70	95	32.38	34.08
2	National action plan for integrated water resources management (PANGIRE) (2011-2015). <i>Under updating process</i>	Increasing the availability of water during dry seasons for people's adaptation to climate change; Promoting integrated water	7	3.82	93	50.71	54.53

		resources management					
	Developing multi-purpose hydraulic infrastructures and sustainable water resources management (<i>Project of the GAP 2017-2021</i>)		25	53.89	75	161.68	215.57
	Developing the Middle and Lower valley of Ouémé River (<i>Project of the GAP 2017-2021</i>)		25	113.74	75	341.23	454.97
3	Reducing pregnant women and under five children's vulnerability to diseases related to climate risks in Benin <i>Measure identified under NAPA but not yet implemented</i>	Contributing to the reduction of morbidity and mortality linked to paludism and other diseases related to climate risks in Benin	5	0.10	95	1.86	1.96
4	Shoreline protection project as regards sea-level rise / coastal erosion <i>Measure identified under NAPA but not yet implemented according to NAPA approach</i>	- Addressing the sedimentary imbalance, the thinning down and retreat of the beach, - Rehabilitating the fragile ecosystems (mangrove) and promoting an improved salt-mining technology powered by solar energy and wind	15	0.33	85	1.88	2.21
5	LoCAL-Benin Initiative Projects in 6 municipalities in the North of Benin.(2014-2016). <i>It is necessary to extend the Initiative to all the 77 municipalities of the country.</i>	Contributing to bridge the gap for financing adaptation to climate change on the level of local communities while building their institutional and technical capacity to address climate risks and challenges in the process of local development.	8	61.34	92	705.46	766.80
6	Project for strenghtening Information on climate and early-warning system in Africa for a climate-resilient development and adaptation to climate change (SAP-Benin 2013-2017). <i>End-term, not yet scaled project</i>	Improving monitoring capacities, early-alarm systems and the availability of information as regards climate change in order to address climate shocks and plan adaptation to climate change in Benin	5	1.58	95	29.95	31.53

	Project for strenghtening the observation system for a better monitoring of the climate and its variability in Benin's Niger basin <i>not yet implemented</i>		5	0.39	95	7.45	7.84
7	Developing the banks of the lagoon of Cotonou (<i>Project of the GAP 2017-2021</i>)	Transforming the bordering flood-prone areas of the lagoon of Cotonou, a green lung for the city	25	71.79	75	215.37	287.16
	Cleaning-up and developing the banks of the lagoon of Porto-Novo (<i>Project of the GAP 2017-2021</i>)	Reducing the climate vulnerability of the people and ecosystems bordering the lagoon of Porto-Novo	25	4.57	75	13.70	18.27
	Rainwater Sanitation Project in Cotonou (<i>Project of the GAP 2017-2021</i>)	Addressing sustainably problems with flooding in Cotonou by providing sanitation facilities (primary rain water collectors)	30	313.27	70	730.96	1,044.23
	Shoreline protection program against coastal erosion (Cotonou-Siafato, Hilacondji- Bouche du roy , Grand-Popo-Ouidah) (<i>Project of the GAP 2017-2021</i>)	Protecting Benin's coast against the advance of the sea	60	205.97	40	137.32	343.29
8	Cities' climate change Adaptation Programme in Benin (<i>Project of the GAP 2017-2021</i>)	Promoting a rational and sustainable management of the environment, climate change and natural resources	50	24.48	50	24.48	48.96
	PAGEFCOM 2: Support Project for the Management of Communal Forests, phase 2 (<i>Project of the GAP 2017-2021</i>)	Promoting the early-warning system and economic alternatives to Forests overexploitation	50	12.86	50	12.86	25.72
	Sustainable development of Tourism in the W Regional Park (<i>Project of the GAP 2017-2021</i>)	Incorporating climate change into promotional programmes for tourism	30	5.84	70	13.61	19.45
	Integrated management programme for border areas (<i>Project of the GAP 2017-2021</i>)	Enhancing border communities' food, social and economic security in climate change context	60	10.73	40	7.15	17.88

	Risk and disaster prevention and management programme (<i>Project of the GAP 2017-2021</i>)	Adapting production and consumption patterns to environmental and climatic constraints in disaster risk areas	60	1.96	40	1.30	3.26
	Building the resilience of the energy sector to climate change impacts in Benin (<i>Project of the GAP 2017-2021</i>)	Reducing the impacts of climate change and weather variability on the energy sector in Benin	40	15.83	60	23.74	39.57
	Supporting research programmes for the generation of Climate-related Adaptation and Resilience technologies pertaining to Agricultural Value Chains: ARFACC (<i>Project of the GAP 2017-2021</i>)	Improving Benin's agricultural research-related contribution to food security and competitiveness of agricultural products by enhancing strategic research, research and development and by developing research results, in a climate change and weather variability context	60	4.57	40	3.04	7.61
9	Sustainable cities programme (<i>Project of the GAP 2017-2021</i>)	Implementing a Habitat and Housing System, an Urban and Territorial Planning System, an Environment and Resilience System.	25	445.10	75	1,335.30	1,780.40
	Designing a development and water management plan for Benin's Niger basin (<i>Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)	Implementing a reference framework for water management in Niger basin	8	0.06	92	0.74	0.80
	Mobilizing surface waters for climate change adaptation in the most vulnerable Municipalities located in the Centre and Northern departments (<i>NAPA-Benin and Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)	Developing surface waters	8	0.30	92	3.48	3.78
	Construction of ten (10) multi-purpose impoundments in the Niger	Improving the availability of water for users	10	4.65	90	41.82	46.47

	River Valley (<i>Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)						
	Rehabilitation and agricultural diversification of twenty agro-pastoral reserves in Benin (<i>Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)	Developing water engineering schemes in rural areas	10	0.98	90	8.81	9.79
	Rehabilitating and diversifying 5 small dams Gamagou, Gah Guessou, Sombi Kérékou, Wara and Zougou Pantrossi in Higher Alibori (<i>Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)	Providing support for the maintenance of water supply facilities in the most vulnerable localities	10	0.20	90	1.76	1.96
	Building protective flood dams (<i>Climate Investment Plan 2016-2024 of the Niger Basin Authority</i>)	Rehabilitating community-based proven adaptation measures as regards floods	10	6.66	90	59.91	66.57
			25.76	1,441.15	74.24	4,153.54	5,594.69

Appendix 3 : NDC plan of implementation

Activities	2017- 2020					2021- 2025					2026- 2030			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Phase 1 : Preparatory Phase of implementation of the NDC														
Establishing the institutional framework for the implementation of the NDC														
Organising the inception workshop for the implementation of the NDC														
Achieving the conceptual design and developing the monitoring/Verification/Evaluation system														
Providing support for the sector ministries involved in the preparation of the scheduled programs in the plan of implementation of the NDC and the applications for projects funding under support mechanisms for LDCs														
Phase 2 : Implementation phase														
Sectoral implementation of the mitigation component														
• SECTOR OF AGRICULTURE														
Government's Action Plan 2016-2021														
Project "Supporting the transition towards a climate-smart agriculture and climate-smart food systems"														
Subprogramme to build the resilience of communities and agricultural value chains														
Subprogramme for building multi-purpose dams														
Capacity-building programme as regards improved farming techniques, soil fertility management techniques, irrigation scheme (2021-2030).														
Preparatory phase														
Implementation Phase														
• SECTOR OF ENERGY														
Government's Action Plan 2016-2021														
Programme of production capacity-building and increase access to electrical power (2021-2030)														
Preparatory phase														
Implementation Phase														
Capacity-building programme to promote energy efficiency (2021-2030).														
Preparatory phase														
Implementation Phase														
• LULUCF SECTOR														
Government's Action Plan 2016-2021														
Sub-programme for enhancing carbon sinks and reducing emissions related to deforestation and forests degradation														

National Strategy for Wildres management in Benin: Program for improving the steering of controlled wildres management														
Programme for enhancing actions to protect and conserve natural and planted forests (2021-2030).(Programme development area during the preparatory phase of implementation of the NDC)														
Preparatory phase														
Implementation Phase														
Implementation of adaptation component														
• Strenghtening the system of climate-related risks prediction and early warning for food security in the vulnerable agro-ecological areas														
• Mobilizing surface water for climate adaptation (micro-dams)														
• Controlling climate-sensitive diseases														
• Protecting shoreline as regards sea-level rise / coastal erosion														
• Strenghtening local gouvernance as regards financing climate adaptation														
• Capacity-building as regards climate observation														
• Building the resilience of low-lying coastal cities														
• Incorporating climate change into sectoral development planning														
• Ensuring the sustainability and resilience of Benin's major cities														
• Incorporating climate adaptation into local strategies for the reduction of the vulnerability of natural and human systems in Benin's Niger basin														
• Agricultural Sector-related mitigation measures having a co-benefit with regard to adaptation														
• Energy Sector-related mitigation measures having a co-benefit with regard to adaptation														
• LULUCF-related mitigation measures having a co-benefit with regard to adaptation														
Implementing activities related to institutional and regulatory capacity-building														
Developing and implementing an institutional and regulatory capacity-building programme for Climate Change Management sub-sector;														
Encouraging scientific, technical and technological research as regards climate adaptation and mitigation;														
Encouraging technology and know-how transfer as regards climate adaptation and mitigation.														
Organizing the work to update the first NDC														