



MINISTRY OF THE ENVIRONMENT, SANITATION AND
SUSTAINABLE DEVELOPMENT

REVISED NATIONALLY DETERMINED CONTRIBUTION





REVISED NATIONALLY DETERMINED CONTRIBUTION



EXECUTIVE SUMMARY

Mali, concerned about its harmonious economic development in a context of climate change, has made a commitment to contribute to the collective effort to achieve the objectives of the Paris Agreement on climate change by 2015.

Mali's economy is essentially based on the exploitation of natural resources. Population growth (3.36%/year) and climatic constraints have led to overexploitation and degradation of these resources. Two-thirds of the country is arid and semi-arid dominated by desertification problems. Natural hazards have increased with the intensification of climate change: repeated droughts, floods, strong winds, bush fires, destabilization of rainfall patterns. Agriculture, which is the most affected, accounts for 45% of GNP and employs about 80% of the working population.

This situation is all the more serious as the climate scenarios for 2100 predict an average increase in temperatures of 3°C and a decrease in rainfall of 22% throughout the country.

At the macro-economic level, the country integrates climate changes into the planning processes, particularly in the implementation of the Strategic Framework for Economic Recovery and Sustainable Development (CREDO), which constitutes the country's unique reference framework for the all of the country's development policies, as well as in the National Policy for the Protection of the Environment and, since 2011, in the National Policy on Climate Change

In 2015, Mali submitted its first NDC, despite the fact that the country remains a low emitter of greenhouse gases. Despite a difficult economic context, a number of measures have been taken by the Government for its implementation. Based on the assessment of the first NDC, with the climate emergencies observed at the global level, Mali has embarked on a collective approach to raising its ambitions.

This increase in Mali's ambition has been achieved through the following actions:

the addition of waste as the 4th sector of its NDC;

increasing emission reduction ambitions for the land use change and forestry sector from 21% to 39% emission reduction

At the horizon 2030:

- ▶ sequestering 211864 KT CO₂ eq Kilo Tonnes CO₂ equivalent in 2030 under the baseline scenario and 296 483 KT Tonnes CO₂ equivalent under the mitigation scenario;
- , updating the baseline period with mitigation scenario GHG reduction levels compared to the baseline scenario of 31% for energy, 25% for agriculture, 39% for forests and 31% for waste;
- ▶ the inclusion of short-lived pollutants in emission reduction efforts.

The synthesis of emissions and sequestrations by 2030 gives a 40% reduction in these total emissions. In terms of adaptation, Mali's vision is to make the green and climate-resilient economy a priority.

The NDC's adaptation forecasts include:

- ▶ the continuation of the five major programmes, which include forestry, smart agriculture and renewable energy;

- ▶ projects in the forestry sector : management of silting up of watercourses, reforestation, planting of thousands of hectares of fruit trees;
- ▶ REDD+ programmes with the co-benefit of being equally effective under the heading of mitigation (development of the gum arabic sector and non-timber forest products);
- ▶ the development of research on adaptation to climate change;
- ▶ mobilizing local communities, vulnerable communities and women's groups to improve their resilience to climate change;
- ▶ a series of sectoral projects in the fields of agriculture, waste, civil society and capacity building

Financing is fundamental to the Paris Agreement. It ensures the implementation of policies and actions to achieve the objectives identified in the Nationally Determined Contributions.

In line with the obligations of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Climate Agreement, the country receives funding to combat CC from various sources, including funds under the Convention, support from Technical and Financial Partners, bilateral and multilateral development banks, the private sector, etc...

As part of the implementation of the actions of the new CON, the following strategy will be developed by Mali in three stages:

Axis 1: Project portfolio development : The mobilization of financial resources is strongly linked to the availability of projects or programs and their qualities. Projects will be prioritized in an investment plan or portfolio of projects.

Priority 2: Improve access to sources of financing by increasing the number of direct access entities and, above all, by creating an operational framework for consultation with international entities operating in Mali.

Axis 3: Improve internal mobilization through co-financing by the State through the special investment budget to facilitate the mobilization of resources at the international level.

The mobilization of resources for the implementation of the programs identified in the NDC is a condition for Mali to achieve its GHG reduction objectives and adapt its production systems, its ecological and social systems to climate change. It is in this context that Mali will embark on a low-carbon and climate-resilient economic development trajectory, further contributing to global efforts to stabilize greenhouse gases, as part of the common but differentiated responsibility.



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ACRONYMS

AEDD	Investigation Agency Environment and of the Sustainable development
AFOLU	Agriculture Forest and Allocation of Earths
AGCC	Global Alliance on Changes Climate
MA	Association of Municipalities of Mali
AMADER	Malian Agency for the Energy Developementies Domestic and Domestic Workers !EElectrification Rural
ANADEB	Agency National Biofuel Development
ANICT	National Investment Agency for Territorial Communities
BUR	Biennial Update Report
BDM SA	Bank of Development of the Email
CC	Climate Change
UNFCCC	Convention Frame some U-NationsNies on the Climate Change
COP	Conference of the Parties
CO	Malian Company for the Development of Textiles
CON	Determined Contribution to the National level
CREED	Strategic Framework for the Economic and the Sustainable development
CESC	Conseil Economique Social and Cultural
CNSC	National Committee on Climate Change of Mali
CNE	Counsel National from Environment
DNA	Direction National Railway
Agriculture ONE	Direction Nationale
Energy	
DNEF	Direction National of the Waters and Forests
DNACPN	Direction National of Sanitation and Control some Pollution and Nuisance
DNPD	Direction National from the Planning of the Development
EDM HIS	Energy of Mali
EE	Efficiency Energy
ENR	Renewable Energy
IMF	Fund Monetary International
GEDEFOR	Sustainable Forest Management
IPCC	Intergovernmental Panel on Nuclear PowerClimate Change
GIE	Economic Interest Grouping IWRM
Management Integrated Resources in	
Water GHG	Gas at Greenhouse Effect
INSAT	National Institute of the Statistics
HCC	High Council of Communities
GCF	Fund Green for the Climate
FCM	Fund Climate Mali
MEADD	Ministry of the Environment, Sanitation and Sustainable Development
CDM	Mechanism for one Development Propre
MRV	Measure reporting and verification
ODD	Objectives of Sustainable development

OVMS	Organization for the stake in value of the Senegal River
PANA	Plan of Shares National d'Adaptation
GDP	Product Raw Interior
PIRL	DraftInventory Resources Woody
PNA	Plan National d'Adaptation
GNP	Gross National Product
UNDP	Program United Nations for the Development
TFP	Technical Partners and Financial SEI
	Institute Environment Stockholm SHA
	Secretariat at !' Harmonization from !'
	Help
SIFOR	System Forestry Information
SIE	System Information Energy
SLPC	Pollutant climatic at Short lifespan
SRI	Automation system rice growing intensive
SNGIE	National System Management from InformationEnvironmental
TCN	Third Communication National
PDD-DIN	Program Development Sustainable Delta Inter of the Niger
PRAPS	Regional Support Project at the PasToralism at Sahel
IUCN	Union International from the Conservation from the Nature
WAEMU	Union Economic Monetary Ouest African

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FOREWORD



The Paris Climate Agreement offers a unique opportunity for Mali to transform its development trajectory towards low-carbon development. In view of the commitments made by Mali in 2015, we have deemed it necessary to increase our ambitions by revising our Nationally Determined Contribution (NDC).

The level of GHG reduction ambitions of the mitigation scenario compared to the baseline scenario in 2030 is :

- 31% for the energy sector ;
- 25% for the agricultural sector;
- 39% for the forestry and land-use change sector;
- 31% for the waste sector.

The summary of emissions and sequestration by 2030 gives a 40% reduction in these total emissions by 2030. We have made this commitment in a difficult socio-political context and especially in a worrying context of COVID-19, which demonstrates the firm will of the Government of the Republic of Mali to contribute effectively to the collective effort climate change. The vision of this revised NDC is fully aligned with the development vision of the Strategic Framework for Economic Recovery and Sustainable Development (CREDO).

Mali's revised CON covers four sectors (Energy, Agriculture, Forestry and Waste) and provides for the construction of photovoltaic power plants by 2030 to increase the share of renewable energies in the energy mix; promoting the use of organic manure for resilient agriculture; intensive reforestation and protected area protection programmes and finally to better manage the production and processing of waste in the perspective of the Sustainable Development Goals. The revised NDC also includes short-lived pollutants . This CON will be implemented in conjunction with the HCFC and HFC phase-out schedule under the Kigali Amendment signed and ratified by Mali.

Mali's revised NDC focused on gender because it is recognized that women are important agents of change and holders of important knowledge and skills related to mitigation, adaptation and reduction risks, which makes them essential agents in this area. In the implementation phase, it will be necessary to integrate gender indicators and adopt a gender-sensitive approach in the development of policies, programmes and projects contributing to the achievement of the objectives of the NDC.

Climate change is a global phenomenon with impacts on all aspects of human life. It is therefore important to consider global and local solutions to address the adverse effects that are becoming increasingly severe. This is why Mali aims to better equip local authorities to build the resilience of local communities so that the

the success of the territorialization of the NDC is a reality by 2030, hence the holding of the regional consultations to this end.

The successful implementation of the CON requires an inclusive approach, so the Ministry of Economy and Finance is a major player in this process. We have made a commitment to move towards climate-sensitive budgeting and capacity-building measures are already being taken in this direction.

Finally, it is urgent for the other ministries concerned to integrate the objectives of the revised CON into their planning process and to develop sectoral monitoring plans to enable us to monitor progress. This is the place to salute all the technical and financial partners who have supported Mali in the development of this CON, which will undoubtedly enable us to accelerate the energy and ecological transition towards low-carbon development that respects the environment. The European Commission is committed to the environment in order to achieve the ultimate goal of the Paris Climate Agreement.

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The Minister for the Environment, Sanitation I.,e

u Sustainable Development

INTRODUCTION

Type of Contribution :

Nature of commitments	Mitigation scenario based on GHG emission reductions compared to a baseline scenario reflecting normal business trends (Business-As Usual BAU scenario)
Scope	<ul style="list-style-type: none">• All GHG emissions and carbon sequestration on the national territory• Adaptation for the whole of the national territory for the sectors concerned by economic and social development
Gases considered	Carbon dioxide (CO2) Methane (CH4) Nitrous oxide (N2O). For short-lived pollutants : NOx, SO2 and NH3
Presentation of the programs	Kilo tonne (kt) for CO2 Kilo tonne of CO2 equivalent (k ^t eq CO2) for other gases 2015-2019 2020-2030 for baseline and mitigation scenarios
Reference period	GHG emission inventories were carried out according to the IPCC 2006 IPCC guidelines
Implementation period	Energy - Agriculture - Land Use Change and Forestry - Waste
Methodology for estimating emissions	
Sectors covered	

Ambition of Evili

Mali is a carbon sink and will remain so on the current basis beyond 2030. However, Mali considers that it must contribute to the maximum of its possibilities to the collective ambition to limit the increase in global temperature to below 2°C by the end of the century, and if possible 1.5°C per cent. Relationship to the industrial era in order to limit the negative impacts of climate change on agriculture and on the occurrence of natural risks and disasters (droughts, floods, bush fires).

The level of GHG reduction ambitions of the mitigation scenario compared to the baseline scenario in 2030 is:

- 31% for the energy sector ;
- 25% for the agricultural sector;
- 39% for forestry and land-use change;
- 31% for the waste sector.

The synthesis of emissions and sequences by 2030 gives a 40% reduction in these total emissions. The mitigation scenario involves ambitious actions favourable to the country's development and the improvement of production systems, in particular: accelerating the inclusion of renewable energies in the energy mix, improving the quality of energy and improving the quality of renewable energy. the performance of agricultural production processes, the reduction of deforestation and intensive reforestation.



CHAPTER 1

SITUATION OF MALI IN THE FACE OF CLIMATE CHANGE



1.1. INDICATEURS MACROECONOMIQUES

Population	20,9 millions
Croissance démographique	3,36 %
Taux d'urbanisation	41 %
Population rurale (2019)	59 %
Taux de croissance annuel du PIB (2020)	4,9 %
Taux national de pauvreté	42,7%
Taux national d'accès à l'électricité (2019)	50 %
Consommation d'énergie par habitant (2018)	0,3 tep/habitant
Consommation électrique annuelle (2018)	159 Kwh/habitant
Puissance totale installée en MW (2019)	772 MW
Estimation de la demande annuelle en électricité (2018)	2.025 GWH
Part des ENR dans la production nationale d'électricité (2019)	13 %
Part du Mali à l'émission mondiale des GES	0,06%

L'économie du Mali repose essentiellement sur l'exploitation des ressources naturelles. La croissance démographique et les contraintes climatiques ont entraîné une surexploitation et une dégradation de ces ressources.

Le Mali considère que le maintien de l'intégrité des milieux naturels est un acte écologique mais aussi un acte éminemment économique.

Les deux tiers du pays sont arides et semi arides dominés par les problèmes de désertification qui se sont accentués à partir de la deuxième moitié du 20ème siècle avec l'amplification des effets des changements climatiques.

Les risques naturels se sont accrus avec l'intensification des changements climatiques : sécheresses à répétition, inondations, vents forts, feux de brousse, perturbation du régime des pluies entraînant une incertitude sur les calendriers agricoles. L'agriculture qui est la plus touchée, représente 45% du PNB et occupe environ 80% de la population active, elle demeure très sensible aux changements climatiques.

1.2. ENGAGEMENTS DU MALI EN REGARD DES CHANGEMENTS CLIMATIQUES

Le Mali s'est engagé à lutter contre les changements climatiques en signant la convention cadre des Nations Unies sur les changements climatiques (28 décembre 1994) et le Protocole de Kyoto (27 janvier 1999).

Le Mali a ratifié la majorité des Accords Multilatéraux sur l'Environnement, notamment :

- la Convention de lutte contre la Désertification adoptée à Paris le 17 juin 1994 et ratifiée par le Mali le 31 octobre 1995.
- la Convention sur la Biodiversité adoptée le 22 mai 1992 et ;
- l'Accord de Paris sur le climat ratifié le 23 Septembre 2016.

The country developed its National Adaptation Programme of Action (NAPAA) to the adverse effects of climate change in 2007. It presented its first, second and third national communication to the convention and its first Biennial Report (BUR) which is currently being validated.

Mali also developed its National Climate Change Policy in 2011, along with a strategy and action plan.

At the macro-economic level, the country integrates the environmental dimension in general and climate change in particular into development planning processes, particularly in the implementation of the National Framework for Economic Recovery and Sustainable Development (CREDO), which constitutes the single reference framework for all the country's development policies for the period 2019-2023.

It has also developed a Strategic Framework for the Achievement of a Resilient and Green Mali that will enable the effective realization of a resilient and low-carbon economy while giving new impetus to its economic growth and poverty reduction objectives.

At the legislative level, Mali is in a process of drafting texts favorable to the fight against climate change and the preservation of the environment; for example, Lawl No. 2020-009 of May 11, 2020 exempting renewable energy equipment VAT and import taxes.

At the institutional level, the Ministry of the Environment, Sanitation and Sustainable Development is in charge of taking climate change into account. It has entrusted the Agency for the Environment and Sustainable Development (AEDD), created in 2010, with the mission of managing the various aspects of climate change.

Mali has also set up a National Climate Change Committee (CNCC) which is the body for consultation, guidance and mobilization of the country's active forces. This committee is consulted regularly to support the teams preparing the national contribution, in particular through its thematic groups.

1.3. OVERVIEW OF MALI'S GHG EMISSIONS PROFILE DURING THE YEAR 2016

Overall, the latest estimates show that Africa is responsible for about 4% of global GHG emissions and Mali about 0.06%. Even if emissions are set to increase as the country develops, Mali is still a carbon sink today (3rd TCN and Mali Biennial Report).

The emission profile of the four main gases calculated by the Mali Biennial Report (BUR) for the year 2016 is shown in Table 1 below.

Table 1: Emissions and Sequestration of the four main GHGs (year 2016) in Mali

Secteurs	Année 2016		
	Types de GES		
	CO2	CH4	R.J. 1t.
Energy	11202	1811	502

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Agriculture	75 469	49027	26 441
Forests and Land Use Change	-322,055	0	0
Rubbish	506	278	187
	-234,879	51115	27 230

NB: Positive values reflect emissions and negative values reflect GHG sequestration .

The analysis of Mali's GHG emissions inventory highlights the existence of significant mitigation potential, on the one hand through the reduction of emissions in the main emitting sectors, namely agriculture and the use of agricultural land and energy, and on the other hand by strengthening the capacity of forests to absorb GHGs .

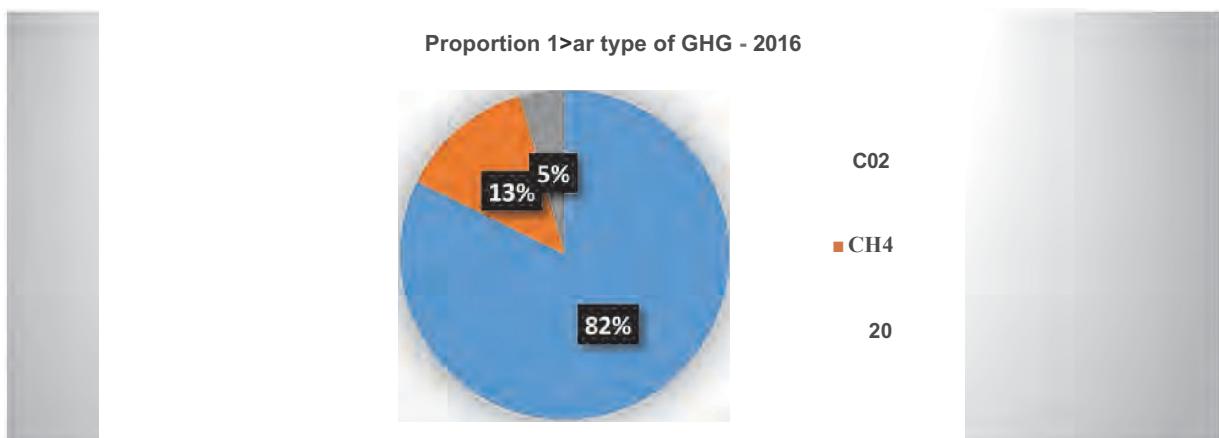


Figure 1: Proportion by type of GHG

1.4 CLIMATE SCENARIOS FROM MALI TO L'HORIZON 2100

The methodology used for these scenarios is based on the IPCC's MAGICC and SCENGEN tools.

The results obtained are the expected values for the whole country of climatic parameters over the time horizons between 2015 and 2100 for rainfall and temperature.

For all localities in Mali, the most plausible climate scenario predicts a decrease in rainfall, the rates of loss of which compared to normal are reported in Table 2.

Table 2: Decrease in rainfall

Years	2020	2025	2030	2050	2100
Loss in %	there5	2 to 6	Sà8	5 to 10	22

The results of this study showed that for all localities, there would be a decrease in rainfall which would result in a shift of the isohyets to the south

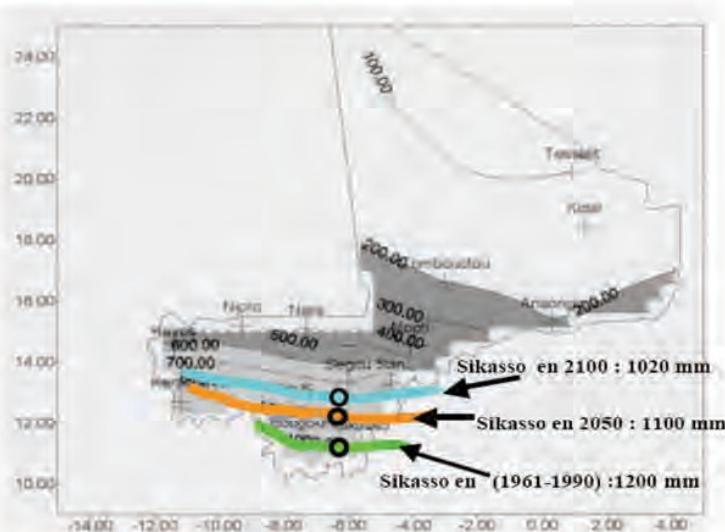


Figure 2 : Déplacement des isohyètes

Les températures seraient en hausse dans toutes les localités du Mali avec un taux moyen donné dans le tableau 3.

Tableau 3 : Hausse des températures

Années	2020	2025	2030	2050	2100
Augmentation de la température	0,5°C	1°C	1,5°C	1,7°C	3°C

Selon l'analyse des événements extrêmes durant la période très humide du mois de juillet au Mali, la température maximale qui était de 30,5°C pour la période 1961-1990 serait de :

- (i) 32,5°C en 2050 et l'occurrence des températures supérieures à cette valeur serait de 40%
- (ii) 34,5°C en 2100 et l'occurrence des températures supérieures à cette valeur serait de 36%.

Dans le cas d'une diminution de 20% de la pluviométrie (comme le prévoit le scénario plausible construit à partir des années 2075), on obtiendra une pluviométrie semblable à celle de la période sèche dans les mêmes zones climatiques.

Des situations de sécheresse seraient constatées sur la première moitié de l'hivernage (mois de mai, juin et juillet) à partir de l'horizon 2025 sur toutes les stations du pays pour une sensibilité climatique moyenne.

Suite à ces déficits pluviométriques, les sources d'approvisionnement naturelles en eau des communautés, constituées par les eaux de surface et les eaux souterraines



CHAPTER II

METHODOLOGY FOR THE DEVELOPMENT OF THE REVISED NDS



2.1 USE OF IPCC GUIDELINES 2006

GHG emission inventories were carried out according to the IPCC 2006 IPCC guidelines and the LEAP tool.

Box 1: Overview of the IPCC Guidelines

The preparation of forecasts and the choice of data were done during consultation meetings. They are relevant at the sectoral level for the four main sectors of emissions of

IPCC Guidelines for National Greenhouse Gas Inventories

The IPCC Guidelines for National Greenhouse Gas Inventories are a set of guides that bring together default methods and data that can be used to quantify emissions from all major source sectors. The objective of the IPCC Guidelines is to provide a common set of methodologies and a framework for reporting GHG emissions to facilitate transparency in the quantification and accounting of GHG emissions between countries. The 2006 IPCC Guidelines (i.e. published in 2006) are the most comprehensive set of guidelines. In 2019, a "refinement" of the 2006 IPCC Guidelines was published; it includes updated methodologies and updated default data in some sectors, which, for the sectors

replaces the 2006 IPCC Guidelines.

The IPCC Guidelines aim to be applicable globally, i.e. in the same way in countries with large data resources and in those where data are available.Limited. As such, different methodologies of varying complexity are included in the Guidelines to take into account the availability of data in different countries. The methodologies are categorized into 3 levels that reflect the increasingly complex methods and data requirements.

Tier 1 methodologies are the simplest, and can be applied with minimal data, and often default data is provided for use when data for these sectors is not available. Tier 2 methodologies are more complex and require more nationally-specific data than are required for the level

1. Finally, Tier 3 methods are the most complex and often require direct measurement of emissions at source to provide locally appropriate emission factors.

To this end, the computer tool was used through the greenhouse gas spreadsheets (agriculture, forestry and land-use change, energy, waste).

These consultations made it possible to:

- ▶ Identify and exploit Mali's national programmes and forward-looking orientations that have served as a basis for the development of the CON;

- ▶ Validate the technical data collected by the BUR team for the period 2015-2019;
- ▶ Determine the programs and baseline data values for the years 2020-2030 in the different sectors for the baseline scenario and for the mitigation scenario.

The GHG calculations in the CON were carried out by sector and then aggregated over two periods:

- ▶ The first period is that of the years 2015-2019 for which the values of GHG emissions are derived from calculations made during the preparation of Mali's first biennial report (BUR), based on real data provided by the technical services. This period is the reference period of the revised ONC;
- ▶ The second period concerns 2020-2030 and provides two forecast scenarios:

The baseline scenario resulting from forecasts reflecting the normal development trend of Mali (Business-As-Usual scenario). This scenario has been developed in the light of national policies and sectoral consultations:

The mitigation scenario is a more ambitious and proactive scenario in order to reduce GHG emissions over the period 2020-2030. It was developed by Mali in order to contribute to the collective ambition to achieve the ultimate objective of the Convention (less than 2°C). This scenario is conditioned by the implementation of human, material and financial resources by Mali on the one hand for the unconditional scenario and on the other hand by its bilateral and multilateral partners for the conditional scenario.

In addition to the technical calculations, the Government of the Republic of Mali has adopted a participatory approach to not only involve regional actors but also to take into account the gender dimension in the revision process, through regional consultations and a gender analysis in the sectors of the NDC.

2.2 REGIONAL CONSULTATIONS

In view of the strong interactions between actors, the territories seem to be an important gateway to dealing with development planning issues in their entirety. Thus, the Government of the Republic of Mali has initiated a number of institutional reforms in this direction, in particular the law determining the conditions for the free administration of the territory, the law on the code of local authorities. Another element in considering the territory as a relevant input to the climate issue is the transversality as well as the interactions of the different sectoral policies (energy, agriculture, forestry, transport and the transport framework). Today, decentralization is effective with the creation and establishment of local authorities in accordance with Law No. 95-034 of 12 April 1995, assigning to the municipalities the mission of developing and implementing their social, economic and cultural development (PDSEC). This makes it possible to predispose local authorities to build the resilience of local communities. Despite the planning tools designed

To this end, we are witnessing a timid action to take climate change into account in the local planning tools, whereas the success of the territorialisation of the CON depends on the appropriation of the various tools and mechanisms of climate change by local authorities.



It will therefore be necessary to give a prominent place to local actors in the process of updating the NDC in order to obtain an effective and inclusive tool for the fight against climate hazards that is perfectly in line with Mali's ambition to move towards regionalization.

This revision, which was part of a participatory and inclusive approach by all stakeholders, was therefore based on a territorial approach through regional consultations, the objective of which is to take into account regional specificities in the new NDC. This innovation was based on the observation that the 2015 CON had not involved regional and local stakeholders in the definition of projects contributing to the achievement of these emission reduction and adaptation objectives. The implementation of the CON at the regional level offers an opportunity for these actors to make proposals for local climate policies based on regional specificities and the challenges that are specific to each region. This highlights a need to discuss at the national level, what development planning approach should be chosen in a context of the fight against climate change and the promotion of sustainable development? In the long term, Mali will integrate resilience into regional and local development plans through planning and budgeting.

Regional consultations , an innovative approach to the revision of NDCs

In collaboration with regional stakeholders and the technical and financial partner (UNDP), the Agency for Environment and Sustainable Development (AEDD) organized regional consultations as part of the process of revising the CON. These consultations took place in five regions and the District of Bamako. These were spaces for exchange and discussion on the level of vulnerability of these regions to climate change. Discussions have been initiated on what type of mitigation and adaptation strategy these regional actors can put in place.

It emerged from these regional consultations that the different regions in different agro-ecological zones are unequal in the face of the effects of climate change. It was noted that climate change affects natural resources on the one hand and economic activities on the other, thus hindering the socio-economic development of these regions in different ways. For example, some regions are more affected by the alteration of their natural resources, because of the extent of climate change (disturbances in rainfall patterns), or because their resources are more fragile or limited in these regions (water reserves, already overexploited, as in the case of Kayes, Koulikoro and Mopti). The impact on economic activities is greater in other regions, because these activities are directly dependent on the climate, for example agriculture (the case of Sikasso, Ségou and Mopti) and also, these regions have less resilient infrastructures. It should also be noted that the extent of vulnerability in the central regions (e.g. Mopti) has led to a strong migration of populations to the southern regions (Sikasso and Bamako). This justifies the need for each region or territory to take into account its specificities in terms of climate change.

These consultations have made it possible to better target adaptation and mitigation actions.

2.3 GENDER MAINSTREAMING IN THE NDC REVISION PROCESS

Climate change is a global phenomenon with impacts on all aspects of human life. It is therefore important to consider global and local solutions to address the adverse effects that are becoming more and more severe as the years go by.

For several years, it was assumed that the negative impacts of climate change and efforts to mitigate them had similar effects on women and men. However, the world has gradually recognized that women and men experience climate change differently and that gender inequalities worsen women's adaptive capacity
{avoid reducing gender to women only ...)

Due to gender inequalities and exclusion, women and girls are particularly disadvantaged. Climate change tends to exacerbate existing gender inequalities; Women and girls in particular, therefore, could face greater negative impacts due to their limited access to development dividends and opportunities

Their low participation in control processes , decision-making processes and labour markets aggravates inequalities and often prevents them from fully contributing to planning, development, implementation, monitoring and the evaluation of climate-related policies . Women also make up the majority of the world's poor population, while they are most often responsible for household food production, child care and child care. the elderly, family nutrition and natural resource management in sectors that are particularly sensitive to climate change

It was also recognized that women are important agents of change and holders of important knowledge and skills related to mitigation, adaptation and reduction of risks in the face of climate change, making them essential agents in this field. Therefore, there is an urgent need for a gender-responsive approach in climate change policymaking and programming.

On the one hand, women are victims of the adverse effects of climate change, but on the other, certain women's activities, such as the dyeing of Bazin and the artisanal processing of agricultural products, have negative impacts on the environment (AfDB Gender Profile of Mali in 2012). It is important to include women's voices, needs and expertise in climate change policies and programmes and to show how women's contributions can strengthen the effectiveness of climate change measures

It should also be noted that practitioners and policymakers do not always have sufficient knowledge and skills with regard to the linkages between gender equality and climate change and their importance in relation to the achievement of the Sustainable Development Goals.

In light of these findings, the United Nations Framework Convention on Climate Change process has adopted the Lima Gender Action Plan. This action plan, which recognizes the role of women in the fight against climate change by promoting climate policies that promote gender equality and the integration of a gender perspective in the fight against climate change, is a key part of the implementation of NDCs.



As the gender dimension is cross-cutting in all sectors of the NDC, to ensure its effective integration, the following actions will be undertaken:

- ▶ Revision of all sectoral policies and programmes will be to integrate:
sector-specific analysis with sex-disaggregated data on: adaptation and mitigation measures; gendered impacts and vulnerabilities; gender contributions (contributions both in terms of aggravating and mitigating the adverse effects of climate change);
strategic orientations to address inequalities and vulnerabilities based on on gender, maximizing the contribution of both men and women; enabling equitable access to benefits and facilitating responses to women's practical and strategic needs while ensuring that a project does not exacerbate inequalities between men and women .develop for each sector objectives and indicators of results and impacts related to gender equality in the areas of mitigation and adaptation.
- ▶ Mainstreaming Gender in the NDC Roadmap

Integrate the above dimensions into the NDC Roadmap ;Adopt gender-responsive budgeting and ensure the quantitative and qualitative representation of women in decision-making bodies at different levels.

- ▶ Capacity building of stakeholders

The aim will be to familiarize the various stakeholders with the concepts of gender but above all with their application in the different areas of the NDC and throughout the programming cycle (planning, implementation, evaluation) in an approach that respects human rights and positive cultural values.

In addition, a team of international experts from the Stockholm Environment Institute (SEI) analysed emissions from the energy, agriculture and waste sectors and short-lived pollutants using software using IPCC guidelines. the LEAP (Long-range Energy Alternatives Planning system). The general LEAP modelling framework is presented in Figure 3. In addition to emissions accounting , LEAP also links energy supply and demand modeling, which means that the interactions between energy supply and demandenergy are taken into account in the development of baseline and mitigation scenarios.

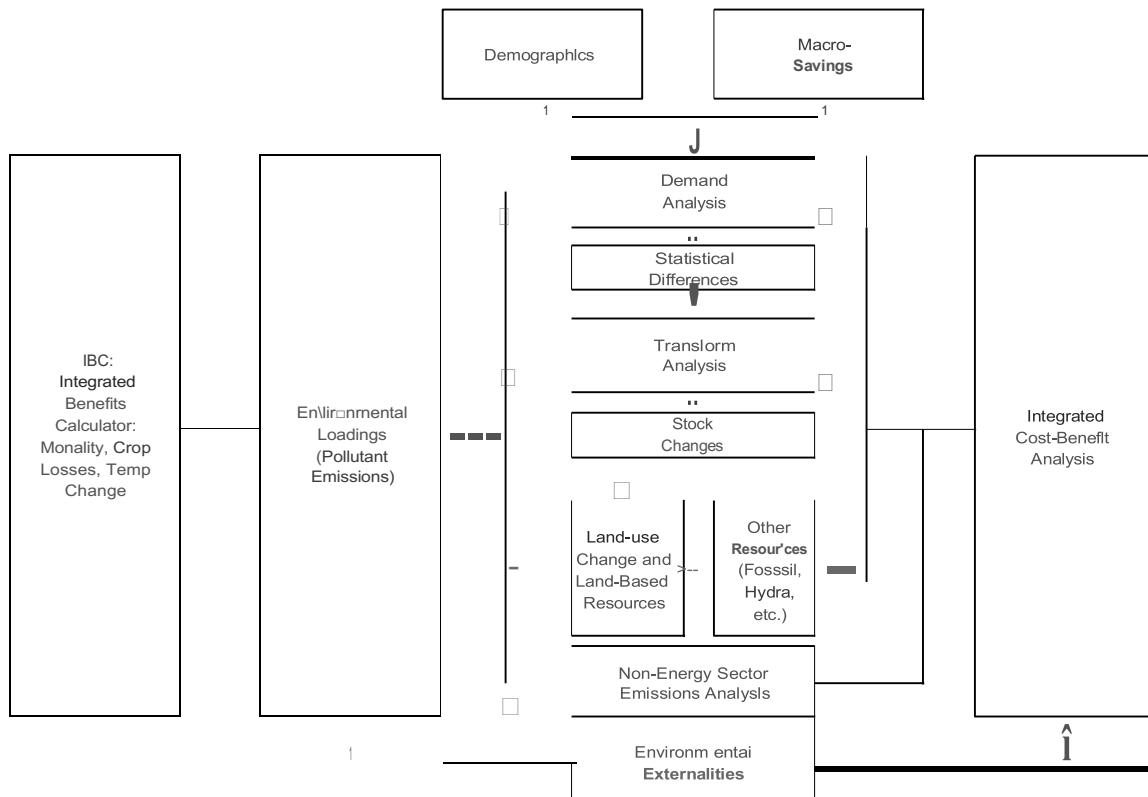


Figure 3: Representation of the LEAP Modeling Framework

With regard to adaptation, the NDC is developing its forecasts in line with the ongoing work on the preparation of Mali's National Adaptation Plan.

The criteria for selecting the projects were as follows:

Compliance with the CREDD national guidelines and the Sustainable Development Goals (SDGs),

Analysis of the vulnerability of the populations and environments concerned (ecosystems and agrosystems);

- Taking into account a healthy environment and sustainable development, in particular to combat desertification, ensure sustainable agriculture and food security, combat pollution, and ensure sustainable management of renewable natural resources;
- Identification of credible financial resource mobilization strategies.

One of the innovations of this NDC is the integration of the gender dimension across all relevant sectors, based on the following factors: (1) climate change has differentiated impacts on men and women; (2) men and women offer differentiated and complementary contributions in the field of mitigation and adaptation, (3) women and men must benefit equally from the opportunities offered by control programmes.

contre les changements climatiques au niveau pratique et stratégique (accès aux nouvelles technologies, aux nouveaux emplois verts etc.)

Les risques liés à l'élaboration et à la mise en œuvre de la CDN

L'élaboration de la CDN s'est effectuée surtout en 2020 sous la pression du COVID 19 et il a fallu intégrer le risque correspondant dans les différents contacts pour rechercher l'information, la traiter et concevoir les activités. Les réunions se sont déroulées avec les précautions d'usage et les vidéo-conférences ont été largement utilisées. Il faudra être attentif à l'évolution du risque sanitaire au cours de la mise en œuvre des actions.

La mise en œuvre de la CDN se fera notamment à travers la participation des régions, des cercles et des communes sur l'ensemble du territoire national. Sachant que les deux tiers de ce territoire est une zone d'insécurité et bien que les zones concernées soient souvent peu peuplées, il faudra insérer ce risque dans la préparation des actions.

2.4 CONTRAINTES ET LACUNES POUR LES INVENTAIRES DE GES

Informier régulièrement et durablement la COP du meilleur état des émissions d'un pays est la clé de voûte de la prise de décision en matière de réduction des émissions de GES, en vue de stabiliser le niveau des GES dans l'atmosphère pour limiter le réchauffement climatique et ses impacts. Ainsi, toutes les parties signataires devraient être en mesure de le faire grâce à la réalisation d'inventaires de GES de bonne qualité sur une base durable.

Au Mali, l'AEDD a été mandatée pour l'élaboration des rapports des inventaires de GES. Cependant après trois communication nationales, l'agence fait toujours face à des contraintes. Une contrainte récurrente dans l'estimation des GES pour les secteurs du GIEC est le manque de données d'activité de bonne qualité. Les données disponibles ne sont pas suffisamment cohérentes dans tous les secteurs du GIEC.

Le manque de cohérence des données d'activité et des informations sur les processus entraîne une forte dépendance à l'égard des sources de données internationales, des extrapolations et des avis d'experts pour générer les données d'activité manquantes et combler les lacunes lors de l'estimation des émissions et des puits de GES dans le pays. Cela augmente le niveau d'incertitude et empêche l'adoption des niveaux supérieurs plus précis, car il n'existe pas de facteurs d'émission nationaux plus adaptés aux circonstances nationales que les facteurs d'émission par défaut du GIEC. Le Mali ne dispose pas encore d'un système fonctionnel de gestion des inventaires de GES, avec des dispositions institutionnelles solides pour la production durable d'inventaires.

Bien que le Premier rapport biennal actualisé (BUR1) du Mali ait fait des efforts de collecte et d'archivage des données pour les statistiques nationales et à développer un réseau de points focaux, le système actuel doit être considérablement amélioré. La collecte de données servant au calcul des GES doit intégrer le système de collecte de données des ministères et les autres parties prenantes concernées par les domaines d'activité émetteurs de GES. L'AEDD devrait renforcer sa collaboration avec les systèmes de collecte de données déjà existant (SIFOR pour les forets les écosystèmes, SIE pour l'énergie) et renforcer son système de contrôle de la qualité des données d'activité afin d'en garantir la cohérence et la fiabilité.

CHAPTER III

MITIGATION AND FORECASTING OF GHG EMISSIONS

3.1. CHARACTERIZATION OF SECTORS AND EMISSIONS BALANCE FOR THE 2015-2019 REFERENCE PERIOD

3.1.1 Energy sector

Characteristics of the energy sector

Mali has significant renewable energy potential , including: solar energy: 6

Kwh/m² (7 to 10 hours of sunshine per day);

biomass: 2000 ha of jatropha plantations, 1,400.0001 of alcohol from the sugar cane sugar;

hydropower : 1150 MW (only 22% operated);

- ▶ wind power : 3 to 7 m/s.

Despite this potential, the energy sector is underperforming with regard to its main indicators, in particular:

an energy balance dominated by wood energy (firewood and charcoal) up to 75%, resulting in strong pressure on national forests;

a 100% import dependence rate of petroleum products;

- >- low energy consumption: 0.3 toe/hbt (0.45 for the ECOWAS zone; 0.5 for Africa) in 2018;

↳ Low power consumption : 159 Kwh/hbt;

- ▶ a low electrification rate: 48% national (93% urban, 25% rural) in 2018;

- ▶ an increase in electricity demand: 10% annually;

▶ low integration of renewable energies in electricity production: 13% The structure of final energy consumption by source is illustrated by the following figure.

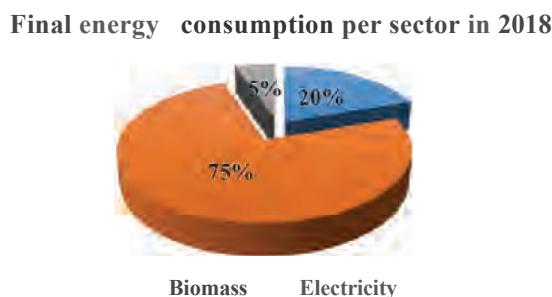


Figure 4: Structure of final energy consumption by source in Mali

This figure shows that the share of biomass energy in final energy consumption remains the highest (75%), followed by that of petroleum products (25%) and electricity (5%). It should be noted that this high consumption of biomass energy is carried out at the household level (domestic energy).This reflects the enormous pressure on forest ecosystems resulting in a decrease in their carbon stock.

The 2019 BUR report and Mali's three national communications established that the energy sector is one of the three sectors that emit the most greenhouse gases.

Evolution of GHG emissions in the energy sector

GHG emissions in the energy sector are rising sharply, as shown in the figure below.

Over the periods 2004 to 2008 and 2008 to 2017, GHG emissions increased from 79% to 90% respectively.

Over the period 2004 to 2017, CO₂ emissions increased from 1597 kT to 5416 kT, an increase of more than double over the 13 years.

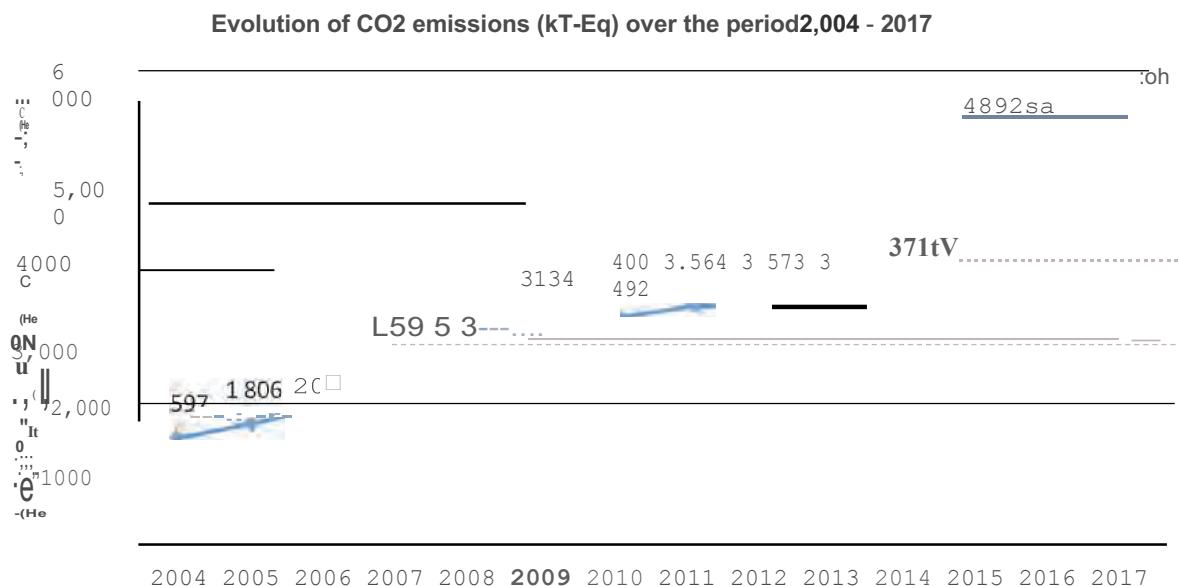


Figure 5: Evolution of CO₂ emissions at the energy sector level over the period 2004-2017

Between 2010 and 2016, GHG emissions from energy production and consumption increased from 3,400 kTe CO₂ to 5,007 kTe CO₂ eq, an average annual increase of 6%.

In view of the above, policies to mitigate GHG emissions in the energy sector should be oriented towards the energy industries, transport and residential.

The implementation of large power plant projects with associated evacuation lines as well as the application of energy efficiency measures combining rational use of energy, energy saving and energy management are expected to lead to a significant decrease in GHG emissions by horizon 2025 and 2030. The combination of all these measures made it possible to construct the baseline and mitigation scenarios.

Figure 5 summarizes the distribution of GHG emissions related to energy use by subsector over the period 2010 and 2017.

Analysis of this distribution shows that the subsectors of the energy industry and transport are responsible for the majority of GHG emissions with contributions of 31% and 40% respectively. They are followed by the other sectors (residential and agriculture/fisheries) and manufacturing and construction with contributions of 18% and 12% respectively in 2017.

This strong contribution of the energy sector to total direct GHG emissions can be explained in particular by the high consumption of gasoline and diesel for transport and energy industries.

Repartition des Emissions annuelles de direct GE (KT C02 eq) in 2017



Figure 6: Distribution of C02 emissions by energy sub-sector in 2017

Distribution of emissions by type of gas

The figure below summarizes the distribution of emissions by type of gas: carbon dioxide (C02), methane (CH4) and nitrogen dioxide (N02).

In terms of energy, carbon dioxide (C02) accounts for 83% of total emissions, followed by methane (CH4) 12% and N02 4%.

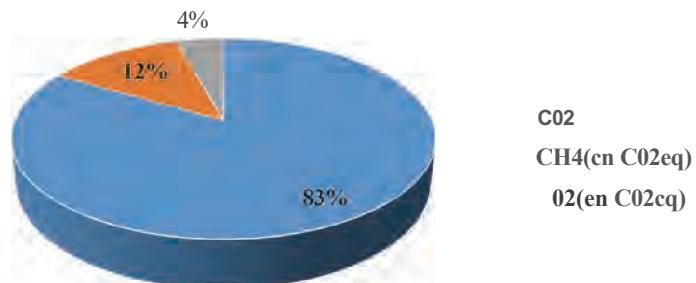


Figure 7: Distribution of the units by type of population

3.1.2. Sector of ! Agriculture

Characteristics of the sector in relation to climate change

The sector of ! Agriculture includes the agricultural production subsector, the livestock subsector and the fishing subsector. This sectorsupports the main socio-economic activity of the Malian population, about 80% (INSTAT, 2018). It is the basis of the Malian economy and is highly dependent on climatic variations.

It is characterised by a great agro-ecological diversity, which is reflected in production systems based on cotton in thesouthern regions, dry cereals and pastures in the centre and oases in the far north.

The development of cultivated areas is detrimental to the environment as a result of the clearing of more or less wooded areas, soil degradation and increased GHG emissions.

As far as the pastoral system is concerned, it is extensive and extremely vulnerable to climatic hazards due to: i) the large interannual fluctuation in the availability of fodder, ii) the growing competition between livestock and livestock farming.(iii) poor hydraulic network, leading to under-exploitation orover-exploitation of pasture resources .

According to the AGRECO study report, livestock farming accounted for 7.9% of nominal GDP in 2010 (IMF, 2013). It is made up of cattle, small ruminants, donkeys, horses and camels.

About 75% of Malian livestock are made up of herds. This situation leads to environmental impacts which are, among others: methane emissions, CO₂, thedestruction of the herbaceous carpet, soil degradation, desertification by overgrazing, destruction of forest resources by pruning trees during lean seasons, bush fires often caused by herders and conflicts between herders and farmers.

GHG emissions in the agriculture sector

The sector of !Agriculture comprises the following subsectors:

- ▶ Eievage, where the production of methane (CH₄) occurs by: (i)enteric fertilization resulting from the digestive process of animals; (ii) the management of manure that may cause it to decompose under anaerobic conditions;
- ▶ Rice farming: the anaerobic decomposition of organic matter in flooded ricefields produces CH₄ which is released into the atmosphere mainly via rice plants during the growing season;
- ▶ Burning of savannahs and agricultural residues in situ: burning in this sector produces mainly carbon monoxide; in this subsector as a whole, there are instantaneous emissions of carbon dioxide (C0₂) with no balance because the CO₂ emitted is released into the atmosphere and reabsorbed at the same time.during each new growing season.

- Agricultural soils and fertilizer management: This subsector produces N2O, including: (i) direct emissions from cropland (including cropping systems and effects of grazing animals) and from soils from livestock production;
- (ii) indirect emissions from nitrogen used in agriculture.

The distribution of Emissions GHG by Subsector and by type of gas is Summarized in the Table 4 below :

Table 4: CO₂ eq emissions by subsector and gas type - period 2015-2019

Années	Elevage		A&tl Jtu.r.e		Sous total	Sous total	
	CH4	NO2	CM4		CH4	NO2	
2015	15,590	8 311,28	20 040,48	\$15,335.91	35 631	23 647	59 277,81
2017	17,233	9 894,46	41 133,46	\$16,910.04	58,367	26 804	85,171.00
2019	18,465	\$ 10,821.51	30 266,05	17 795,116	48,731	28 617	\$ 77,347.44

Source: BUR Report, 2019

The overall GHG emissions from the agriculture sector are 77,347 KT CO₂ eq. Figures 7 and 8 summarize the distribution of emissions by subsector and type of gas.

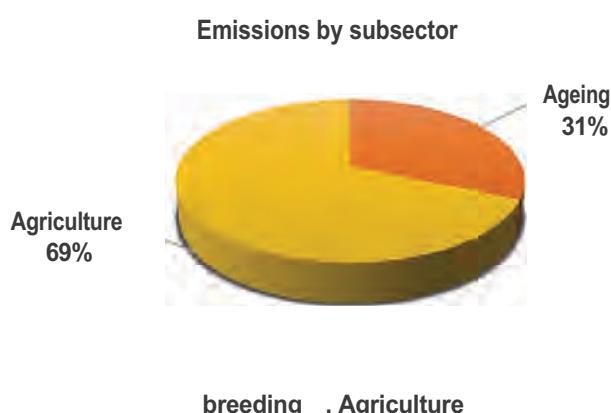


Figure 8: Distribution of emissions by subsector and type of gas

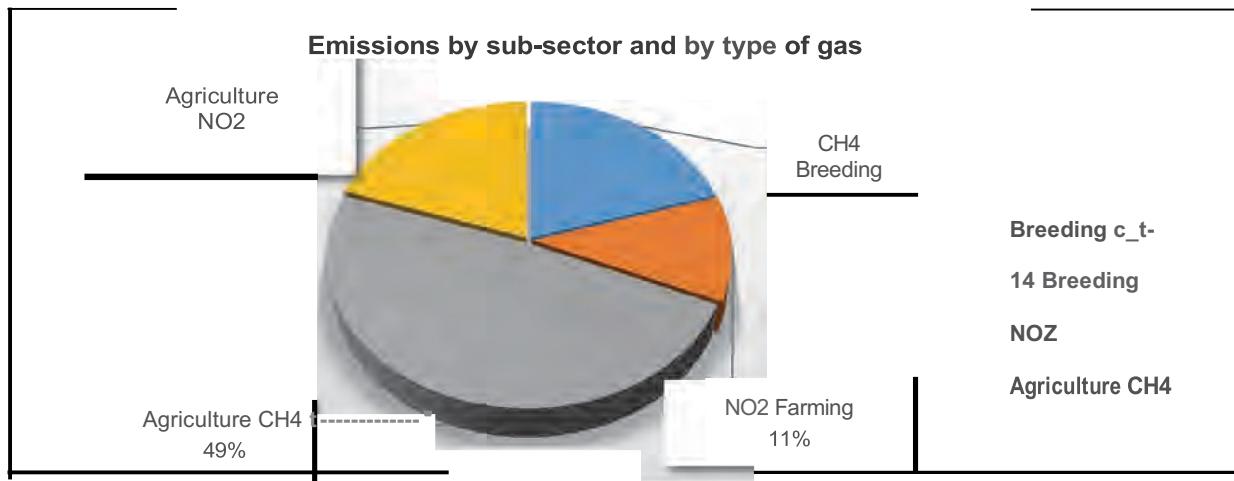


Figure 9: Distribution resignations by Subsector

The GHG emissions situation by sub-sector and by type of gas shows the following proportions:

- For agriculture: CH₄ emissions represent 49% compared to 20% for NO₂;
- For the livestock subsector: CH₄ emissions represent 20% compared to 11% for NO₂,
- Production of NO₂ in the Agriculture 20% of the total gas produced.

The summary of GHG emissions by sub-sector shows that the agriculture and livestock sector accounts for 69% and 31% of the total gases produced.

GHG mitigation measures in the Agriculture will focus on these two (02) sub-sectors (agriculture and livestock).

3.1.3 Forestry TerritoryReset Changes Sector

Characterization of the Forestry Sector and Ecosystems

The forestry sector represents the sequestration component in the calculation of GHG emissions balances in terms of climate change. This component is essentially made up of the areas of forest formations and the potential of forest resources. It includes the classified (classified forests, protected areas) and unclassified (protected areas) areas of the State and that of individuals.

In Mali, the forestry sector is at the heart of the production and consumption systems of the economy. Indeed, the national economy is based on the primary sector consisting of agriculture, livestock, forestry and fishing. Together, these activities consume carbon and emit more GHGs than any other development sector of the economy. As a result, the forestry sector is more affected by the impacts of agricultural and livestock production on its carbon stock.

The Sources of Emissions from that sector are the Following:

the types of land use and land use and its change of use in time and space in the context of land management;

forest resource development activities and land management practices;

- bush fires that ravage the vegetation formations of different types of land use.

The various data on these sources are used to calculate the GHG emissions balance. Types of land use and occupation

The Types of land use and occupation are constituted by: the forest land, the agricultural land, pastoral rangelands and pastures the earths humid ones, the built areas and urbanized, and other earths. The table 5 ci-then recapitulates the situation of the Areas of the six categories of land (in thousand ha) 2015- 2020.

Table 5: Areas of land types (in thousands of ha) from 2015 -2020 **Land**

categories	2015	2016	2017	2018	2019	-! Oâl	2020
Other Types of Land	61 688,3	61,869.3	62 050,4	62231,4	62 412,4	62 145,3	
Cropland	13 064	13 362	13 661	13 959	14,258	\$ 14,436.8	
Forest land	23 675	23 644	23 613	23 582	23 551	\$ 23,519.9	
Wetlands	4472	4 472	4472	4472	4472	4472	
Pastoral Lands and Pastoral Rangelands	17,567	17 050	\$ 16,533.1	16 016	\$ 15,499	\$ 15,618.2	
Urbanized land	3 655,5	\$ 3,724.4	3 793,3	3 862,2	3931,1	3931.1	

Source: BUR Report 2019.

According to the BUR 2019 report, the area of forest land increased from 23.6 to 23.5 million ha over the period 2015-2020. Annual land use changes on these are estimated at about 31.1 thousand ha. This change in the area of forest land is to the detriment of an increase in the area of cropland and pasture. This situation sufficiently reflects the phenomena of land use change which is responsible for GHG emissions in the forestry sector.

Cropland is made up of areas allocated to irrigated crops and dry crops (savannah-orchards).

The surface area of forest land, cropland (savannahs, orchards) and fallow land are decisive in the sequestration of GHGs and the country's emissions balance as a "carbon sink>>.

In 2015, the area of dry and fallow crops represented 12,582,338 ha compared to 13756,236 ha in 2020, an increase of 1.8% per year (rate of land use change over the period 2015 and 2020). They act spatially in the fixation of forest carbon.

The areas of reforestation over the periods 2013 to 2019 cover an average of 16,120 ha (BUR, 2019) while those of legal (authorized) clearing are 1700 ha on average. Those

achievements in the forestry sector and land-use change are insufficient to curb and compensate for the reduction in the sector's sequestration capacity.

The forest area taken into account by the sector includes wooded areas and savannahs. The main data used for gas assessment are: the area of forest areas, the area of forest plantations, the amount of timber harvested, and the area of mineral soils. The high use of firewood and charcoal as household fuel in household activities has significant negative impacts, the main ones being deforestation

of about 400,000 ha per year and greenhouse gas emissions (15.45 MT of carbon dioxide ;

dependence on biomass and increased workload for rural women as fuelwood collection is increasingly carried out further and further away from homes.

In the Forestry and Land Use Change sector, GHG sequestration, with an average value of 781473 Kilo Tons of CO₂ per year, is ensured solely by the forest area.

On the other hand, emissions, with an average value of 560,976 Kilo Tons of CO₂ per year, come from mineral soils, assigned to agricultural systems and silvo-pastoralism and converted land (meadows and cleared areas).

Table 6 summarizes carbon sequestration over the period from 2015 to 2017

Table 6: GHG sequestration and emissions over the period 2015-2017 in KTEq CO₂

Années	CO2 sequestration	Emissior.i CP14"	Emission N2O
2015	-317 974	36941	23039
2016	-322,055	51539	23929
2017	-325 309	61623	25719

Source: BUR Report 2019

The net balance of the forestry sector and land use change is a GHG sequestration balance that allows Mali to be a carbon sink.

Level of carbon sequestration by region

The carbon stock of each region is an indicator of the region's potential for carbon sequestration . It is evaluated using national forest inventory data (2006 and 2014) compiled by SIFOR. This stock is the subject of the table below for the year 2015.

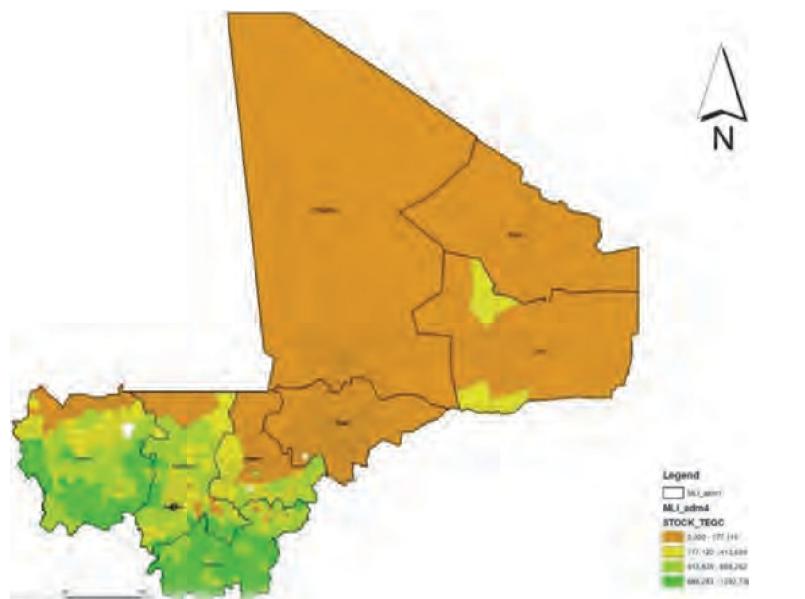
Table 7: Carbon stock by region (year 2015)

Regions	Surface area of vegetation formations (ha)	Stock de carbone en tonne par ha
Gao	6 829 421,13	\$2,868.76
Kayes	12 204 511,00	47 226,77
Koulakoro	9 067 847,48	44 173,23
Mopti	6 606 605,70	2 622,76
Segou	6 618 006,00	30 911,17
Sikasso	7 156 607,45	92 421,37
Timbuktu	6 493 154,22	534,80
Bamako	24 539,00	1 136,26
Kidal	0,00	0,00

The level of carbon sequestration (in tonnes per ha) by forest formations and by administrative entities (municipalities, regions) for the year 2015 is shown in the figure below.

These data represent a line of reference that makes it possible to guide interventions in the context of the implementation of actions at the level of a given territory.

LEVEL OF DECARBONIZED SEQUESTRATION BY PLANT FORMATIONS AND BY COMMUNE (EO Tonne per ha)-ANNEE2015



3.1.4 Emissions in the Waste Sector

Industry Characteristics

Depending on its nature, waste is classified into two types of waste, solid waste and liquid waste, and according to its category, it is classified as Household Solid Waste and Industrial Waste.

The national solid waste management strategy provides for packaging at the household level, pre-collection to transit depots and disposal to final landfills or landfill sites.

In Mali, waste management suffers from a lack of treatment infrastructure.

At the national level, there are two final landfills (in Bamako and Sikasso) and seven wastewater treatment plants in Bamako (Sotuba, Point G, Mali Hospital, Administrative City, CANAM), Mopti, Timbuktu and Sikasso.

This lack of infrastructure opens the door to inappropriate and uncontrolled waste management, which in turn leads to the multiplicity of illegal dumping and dumping of faecal sludge into the environment.

Illegal or illegal dumping is the dumping of garbage that is improperly dumped into the environment, either intentionally or negligently, in publicly accessible areas or on private land with or without the consent of the owner.

Waste disposal routes and systems vary greatly from region to region and depend on many factors such as population density, urbanization and economic conditions.

GHG emissions vary depending on the type of waste produced.

Table 8 below identifies the sub-categories of the waste sector set out in the 2006 IPCC Guidelines. Each sub-category emits only certain gases.

Table 8: Waste category and corresponding gas types

Category	Subcategory	Gaz émis
Solid waste disposal	Municipal Solids	CH4
	Industrial Solids Composting	CH4
Biological treatment of solid waste	Anaerobic digestion	CH4,
	Mechanical biological treatment	N2O
Incineration and open combustion of waste	Waste incineration	CH4N2 O CH4, N2O
	Open air combustion of waste	CO2 (Fossil carbon , CH4 and N2O) CO2 (Fossil carbon , CH4 and N2O)

Wastewater treatment and discharge	Incineration of fossil liquid waste Treatment and disposal of domestic waste water Industrial wastewater treatment and disposal	CO2 (Fossil Carbon) CH4,N2O CH4, N2O
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The majority of GHG emissions from waste are attributed to methane (CH4) in landfills and wastewater treatment plants. Nitrous oxide emissions from wastewater (N2O) and carbon dioxide (CO2) from incineration are also sources of emissions from the sector.

GHG emissions in the waste sector

Table 9 below summarizes the GHG emissions situation in the waste sector. In 2019, overall emissions were 436.12 k^t CO2 eq.

Table 9: Emissions in KT CO2 eq by type of gas

Years	CO2	CH4	N2O	Net Emission /year (KT equivalent CO2)
2015	37,51	217.14	101,68	356,33
2017	31,16	229,95	160,5	421,61
2019	\$32.44	243.18	160.5	436.12

The following diagram shows the distribution of emissions by type of gas. Emissions are dominated by methane (CH4) at 56%, followed by nitrogen dioxide (NO2) for 37% and carbon dioxide (CO2) for 7%.

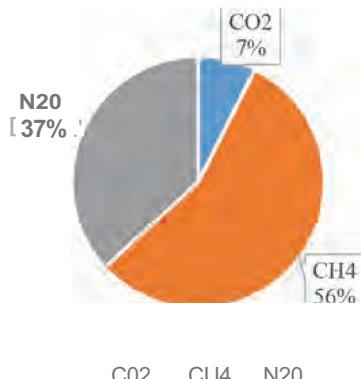


Figure 10: Proportion of emissions by type of gas

3.2. GHG EMISSIONS FORECASTS FOR THE PERIOD 2020-2030

3.2.1 GHG emissions in the energy sector for the period 2020-2030

The poor performance of Mali's energy balance and significant energy potential have motivated the development and implementation of policies, programmes and plans in the short and medium term leading to the completion of power plant projects and energy efficiency projects combining the rational use of energy, energy saving and energy management. These actions concern all aspects of the energy sector, from production to consumption.

The GHG mitigation scenarios in the energy sector have been developed on the basis of the National Energy Policy and related policies and the actions resulting from them.

The main actions concerned are:

- ▶ the Priority Optimal Investments for the Electricity Sector in Mali;
- ▶ the National Action Plans for Renewable Energy (NEAF), Energy Efficiency (PANEE) and the National Action Programme SE4ALL;
- ▶ the Large-Scale Renewable Energy Upgrading Programme (SREP) for \$US 258 million;
- ▶ The Desert-to-Power (DtP) initiative will make it possible in its area of intervention (11 countries including Mali) to increase the production capacity of grid-connected solar energy by about 10 GW, to strengthen and extend national and regional grids, to deploy decentralized energy solutions, to improve the financial and operational capacity of public operators in Mali and to strengthen the environment conducive to increased private investment.

The various initiatives envisaged should aim to:

- ▶ improve women's access to modern services, energy technologies and equipment; less expensive and less energy-consuming;
- ▶ create employment opportunities for women in traditionally male-dominated fields, such as energy infrastructure management and innovative transformation technologies;
- ▶ To promote renewable energy sources and alternative fuels to wood energy (butane gas, lamp oil, coal briquettes and plant residues).

Table 10: Programmes and projects in the energy sector planned for implementation in the period 2020-2030

Origin	Description	Puissance GWh	TE-CO2	Coût Milliards F
ONE EDM	32 projects by: Studies and Construction of Solar Power Plants Studies and Power Plant Construction hydroelectric Rehabilitation and hybridization of hydroelectric power plants	3.099,78	1453 797	963,65
AER-Mali	8 projects by: Construction of solar power plants Electrification of localities by solar systems Realization from Wind farms and solar (WAPP) Electrification project and water supply drinking water in the villages Realization of pumps Solar Irrigation Project solar	925	434	402,768
AMADER	4 projects by : Rural electrification hybrid system Rural Electrification Project Solar Energy for Development Project Rural	23	15	75
Mining companies	4 Gold Mining Hybrid Solar Power Plants	149	69	65
ANADEB	6 Projects by : Dissemination of bioenergy technologies Study of the construction of a biogas power station Multi-Energy Project for Resilience and Resilience Integrated Terroir Management - (MERIT) Realization of an Electrified Business Park	1404		\$12,415

GHG emissions from the energy sector

Table 11: Emissions GHG for the Period 2019-2030

Years	Emission eq KTE-C02	
	Base scenario	ScenariQ d'atténuation
2019	20,331	20 331
2020	21550	21550
2021	22,844	18,086
2022	24 214	19 091
2023	25,667	19 629
2024	27 207	20152
2025	28 839	21235
2026	30 570	20 837
2027	32,404	22,574

	2028	34 348	22 029
	2029	36409	24 241
	2030	38594	26 630

The following figure illustrates these emissions and allows for a comparison of the dynamics of the baseline and mitigation scenarios.

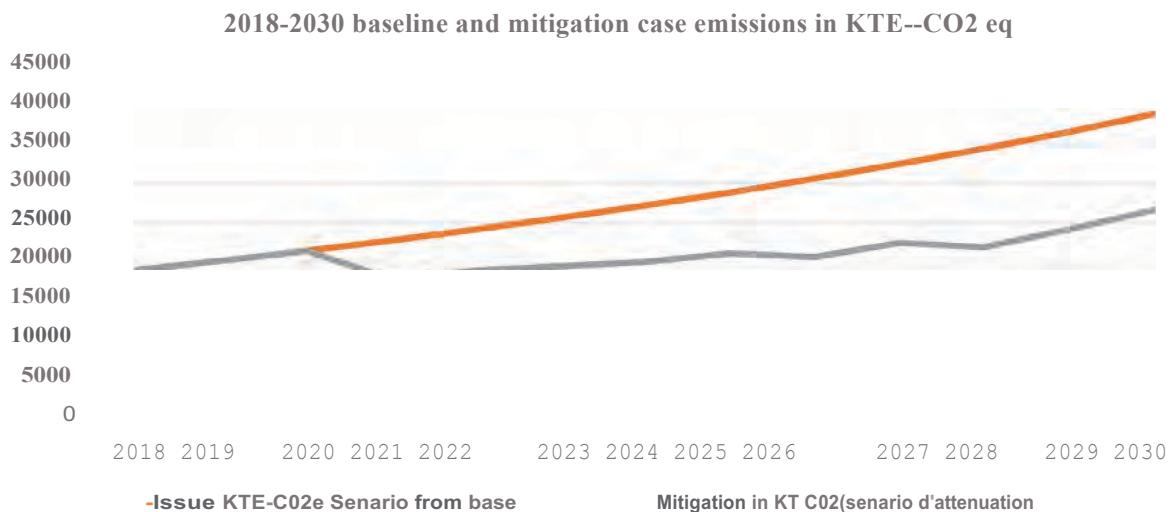


Figure 11: Baseline and mitigation scenario emission curves for the period 2018-2030

The baseline scenario shows that GHG emissions will increase by 21,550 kTe CO2 in 2020 to 28,839 kTe CO2 in 2025 to reach 38,594 kTe CO2 in 2030. This gives an average annual rate of 6% between 2015 and 2030.

The consequences of the mitigation measures between 2020 and 2030 will reduce the level of emissions from 28,839 kTe CO2 to 21,235 kTe CO2 in 2025 (i.e. 7,604 kTe CO2) and from 38,594 kTe CO2 in 2030 (i.e. 11,964 kTe CO2).

Thus, compared to the baseline scenario, emissions will reach a 31% decrease for the mitigation scenario in 2030.

Cost of mitigation measures

Structures responsible for the projects	Estimated cost in billions of CFA francs
ONE	964
AER	403
AMADER	75
ANADEB	12,5
MINES	65
TOTAL	1518

The corresponding cost is 1518 billion CFA francs, or 3.036 billion US dollars over the period 20-2030.

3.2.2 GHG emissions in the ! Agriculture for the period 2020-2030

The summary of GHG emissions by sub-sector showed that the Agriculture sector represents 69% and the Livestock sector 31% of the total gases produced.

GHG mitigation measures in the agriculture sector will therefore focus on these two subsectors (agriculture and livestock)

Policies, Plans and Programs

The policies, strategies, plans and programs that underpin GHG mitigation assessments include:

- ▶ Agricultural Development Policy (ADP);
- ▶ The National Livestock Development Policy;
- ▶ the National Policy for the Development of Fisheries and Aquaculture in Mali;
- ▶ The National Investment Plan for the Agricultural Sector (PNISA) 2015-2025;
- ▶ The National Programme for the Scaling up of the Intensive Rice Cultivation System (PN-SRI);
- ▶ The Cashew Sector Support Project in Mali (PAFAM);
- ▶ The Regional Project for the Appui of Pastoralism in the Sahel (PRAPS-ML) PHASEII;
- ▶ The CMDT's climate program;
- ▶ The Strategic Investment Framework for Sustainable Land Management;
- ▶ The Smart and Climate-Resilient Agriculture Development Pilot Program;
- ▶ The Rainwater Drainage and Stoking Programme.

In addition, the objectives assigned to the Agricultural Development Policy are in line with the directives of the Agricultural Orientation Law and take into account the major challenges and issues to which Malian agriculture is confronted and reflects the vision of the country.

Main actions resulting from this:

- ▶ the system of intensive rice cultivation (SRI);
- ▶ the location of the fertilizer (microdose, deep placement of urea);
- ▶ the production and use of organic manure;
- ▶ prohibiting the burning of crop residues (burying crop residues in the soil or using them for the preparation of organic manure);
- ▶ the substitution of urea with a high nitrogen content by organic manure.

Promoting resilient agriculture for women farmers by:

- ▶ the adoption of agro-ecological practices and the diversification of production in the interest of maximum protection of biodiversity
- ▶ the improvement of the system for allocating railways and;

the strengthening of the strategic positioning of women in all links of the value chain of promising sectors in order to diversify sources of income and reduce pressure on agricultural areas.

Forecasting of programmes for the baseline scenario

The forecasts are based on the implementation of the above-mentioned policies, plans and strategies and with an average annual growth rate of emissions of 4.2%.

The projects and programmes identified as underway or planned for the period 2020-2030 are :

- The Strategy for the Dissemination of Techniques and Technologies Proven by the FFS/CEAP Approach in Mali (2021-2024);
- The Programme for the Promotion of the Use of Organ Fertilization and Urea Localization (2022-2030);
- The WTDC Climate Programme;
- The Programme for the Development of Resilient and Sustainable Aquaculture Production Capacities adapted to climate change and climate variability at the MALF;
- The Fisheries Sector Support Project (2018-2024);
- Fish farming projects with partners (UN, FMES) and other NGOs;
- The Smart Agriculture Development Project;
- The Climate Resilient Pastoral Management Project.

Emissions balance of the agriculture sector

Table 12: GHG emissions in KT CO₂ eq over the period 2020-2030

Years	Base scenario	Mitigation scenario
2020	76 667	76 667
2021	76 299	64,854
2022	76 226	64 792
2023	76 435	61148
2024	76 913	61 530
2025	77 648	62,118
2026	78 631	62 905
2027	79,855	63 884
2028	81 311	60 983
2029	82,995	62 247
2030	84 903	63 677

The figure below summarizes the status of GHG emissions projections and mitigation as of level of the Agriculture sector.

E'OLUTION OF EMI JO 'S OF G.E'S 'IVEAU DU □CTEUR DE L'ACRIC LTLIRE.

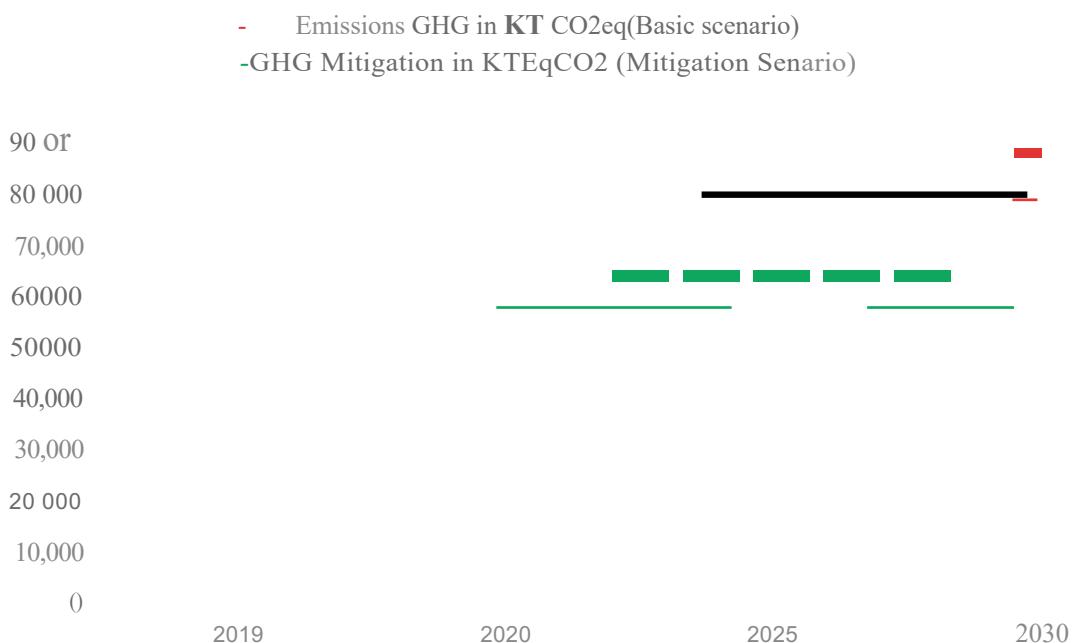


Figure 12: Emission evolution curves of the baseline and mitigation scenarios for the period 2020-2030

The projected GHG emissions by 2030 are 84,903 KT CO2 eq for the baseline scenario and 63,677 KT CO2 eq for the mitigation scenario, respectively. Thus, the implementation of various mitigation programs will reduce GHG emissions at the level of the ! - agriculture by 25% (i.e. 21,226 KT CO2 eq).

The cost of the mitigation scenario is \$US 150.8 million for agriculture and \$164.8 million \$US for livestock farming, i.e. a total of 315.6 million \$US for the sector.

3.2.3. Emissions in the Forestry and Ecosystems sector for the period 2020-2030

Policies and strategies on which foresight is based

The GHG mitigation scenarios in the forestry sector were developed on the basis of the National Forestry , Environmental and Climate Change Policies and related strategies and the resulting actions.

The policies, plans and programmes on which this foresight is based are:

- ▶ The National Climate Change Policy, its Strategy and Action Plan;
- ▶ The National Biodiversity Strategy ;
- ▶ The National Environmental Protection Policy ;
- ▶ National Forest Policy;

The National Strategy for the Management of Protected Areas;

- The national strategy for the promotion and enhancement of Non-Timber Forest Products (NTFPs).

Guidelines of the National Forest Policy

The strategic axes of the National Forest Policy (strategic axes n°2, Object. N°2), provide for actions within the framework of the fight against degraded land. These actions in the next 10 years correspond to:

- 275.00 ha of restored areas (i.e. 25,000 ha per year), 100 ha of stabilized dunes ;
12,500ha of reforestation secured by 2030;
- 15 000 ha of reforestation secured with species of economic value; Management of forests for improved forest cover rates;
- Forest management to strengthen the carbon of forest formations.

Programs and projects that are related to reducing GHG emissions or enhancing carbon sequestration.

The following programmes are selected as the backbone of the basic scenario:

National programmes(initiated from the national budget):

- Program 2.070, Safeguarding and Integrated Management of the Resources of the Niger River Basin : protection/development of the river banks, economic and environmental rehabilitation of the river, mowing and cleaning of the river;
- Programme 2.0711 Protection and Preservation of Nature;
- Program 3.004, Support for the management and protection of wildlife;
- Program 3.0051 Support for forest management and protection.

Programs in partnership with TFPs and private developers

Programs/Projects	Actions	Partenaires
Global Climate Change Alliance Phase II Program	Reforestation Natural Regeneration, Agroforestry	EU-State
Decentralized Forest Management Program Phase III	Development and management plans for forest areas Rational use of wood energy in these	ASDI-State
Sustainable Development Programme in the Niger Delta phase II	Preparation and implementation of development and management plans for Classified Forests Plantations of village groves and fruit trees	ASDI-State
Project to Fight Against! Silting up of the Niger River	Fixation of dunes Forest plantations	WAEMU EU-State

NGO projects involved in reforestation and sustainable management of land and forest resources		NGO -PTF
Regional Project for the Appui of Pastoralism in the Sahel (PRAPS)	Creation of pastoral perimeters, - Lighting/rehabilitation of transhumance tracks,	BM- State
Improved Cookstove Project (CDM)	Popularization of energy-efficient wood stoves Production of briquettes through the pennies agricultural products.	Private Developers
Energy Recovery Project	Planting of Jatropha curcas (Pourghère) for rural electrification	Preferential Developers
Reforestation and Livestock Production Project	Planting of Acacia senegal	Private developers
Biofuel (CDM)	Installations of biocarbon production units	Private developers
Afforestation Project (CDM)		Private developers
Fuel briquettes project		Private developers

Table 13: Programmes and projects in the framework of cooperation with TFPs

The actions of these various programs or projects are directly related to the mitigation of GHG emissions or carbon sequestration at the level of the forestry sector. They relate to forecasts of improvements in forest cover, in particular through reforestation, forest development and management, assisted natural regeneration, agroforestry and sustainable agriculture programmes (gum arabic arboriculture, d1mango cashew, etc.).¹

REDD+ potential as a programme to be implemented over the period 2020-2030 under the mitigation scenario

The forestry sector, a key component of carbon sequestration, plays a key role in GHG accounting. This carbon reservoir is subject to the direct actions of the sub-sectors of agriculture (land clearing), livestock (pruning and bush fires) and energy (biomass energy). These actions are at the origin of the reduction of forest areas and the deterioration of forest resources, ecosystems and biodiversity.

The REDD+ potential can be exploited through the implementation of CON 2020.

Indeed, at the level of the forestry and land-use change sector, activities concern logging, land clearing, bush fires and reforestation and other agroforestry actions.

In addition, the analysis of forest resource degradation phenomena on the basis of data from the forest inventories of the PIRL (1990) and the AGCC programme (2007 and 2014) results in about 250,000 ha (i.e. about 1.6% of the surface area of the formations on average) per year of areas covered by AFOLUs. This situation leads to reductions in the capacity of the

sequestration of forest formations despite the efforts made by the various programmes and projects to improve the rate of vegetation cover.

Thus, all the forecasts of achievements in the context of the Reduction of Emissions due to Deforestation and Degradation of Forests and Biodiversity (REDD+) should contribute to reaching about 1,540,000 ha by 2030. This target contributes to the improvement of the vegetation cover of +2.81% (i.e. a total sequestration gain equivalent to 358,001 KT of C02) of forest or agricultural land at the national level.

Within the framework of the 2020 NDC, the implementation of GHG mitigation actions at the level of the AFOLU sector (agriculture and forestry and land use change sectors) will be devoted to three (03) Broad REDD+ programmes with each of the institutional components, strengthening of productive capital, and value chain organization and training:

Programme 1: Integrated programme with the sectors of industry and local authorities on the development of the production of gum arabic and other NTFPs and the resilience of agro-forestry ecosystems in arid and Seedlings has wrinkles and local communities. The aim of this programme is to carry out, by 2030, 200,000 ha of plantations (13% of the 1,540,000 ha) plantations of Senegal acacia, cashew nuts and other forest fruits;

Program 2: the National Reforestation Plan (PNR). The goal is to carry out, by 2030, 340,000 ha (22% of the 1,540,000 ha) of reforestation. It will form the basis of all future reforestation work that will be undertaken by the actors (State, local authorities, NGOs and private planters);

- ▶ Program 3; Enhancing forest carbon sequestration through the implementation of forest management and controlled exploitation of forest formations in classified areas (classified forests, protected areas) and unclassified areas of the State (protected area) and that of individuals. The 2030 target is to
 - o 1,000,000 ha (65% of the 1,540,000 ha) of natural formations subject to forest management and their protection for the maintenance of productive capital, biodiversity and the fight against soil degradation.

This vast REDD+ programme enshrines the bulk of mitigation and adaptation programmes in the forestry sector. In addition, it will account for the current or future direct or indirect C02 sequestration achievements of the AGCC, PDD-DIN and GEDFOR programs.

Mitigation scenario costs for the forestry sector

Table 14: Mitigation Projects with Adaptation Co-Benefits for the Forestry Sector

PROJECT TITLES	AMOUNT (\$US)	RESPONSABLES
Programme No. I: Development of the Production of Gum Arabic and Other NTFPs and the Resilience of Local Communities in the Agro-Forestry Ecosystems of the	170 000 000	DNEF

Programme n°2: Programme 2: the National
Reforestation Plan (PNR).

289 000 000

DNEF

Program n°3 : Strengthening the
carbon sequestration by the development of forest
formations in classified and unclassified areas of the
State, the protected area and that of individuals.

250 000 000

DNEF

Total

000 000

The overall cost of the forest mitigation scenario is US\$709 million. Forecasting

GHG emissions in the forestry sector

Table 15 below shows the emissions balance of the Forest sector for the baseline and mitigation scenarios

Table 15: Emissions (sequestration) balance of the forest sector

REPORT ON FOREST SECTOR SEQUESTRATIONS (KT CO₂)

Years	Scénario de base	Seénada d'attéh:uat em
2020	-334 386	-334 386
2021	-334 348	-334 348
2022	-334 309	-336 362
2023	-334 271	-346 256
2024	-334 232	-354 148
2025	-334 194	-385 981
2026	-334 155	-398 884
2027	-334 117	-411 789
2028	-334 078	-430 696
2029	-334 039	-437 604
2030	-334 001	-463 456

Figure 13 below summarizes the trends in GHG emissions (sequestration) at the level of the Forest sector for the baseline and mitigation scenarios

Forest Sector Emissions for the Baseline and Mitigation Scenarios

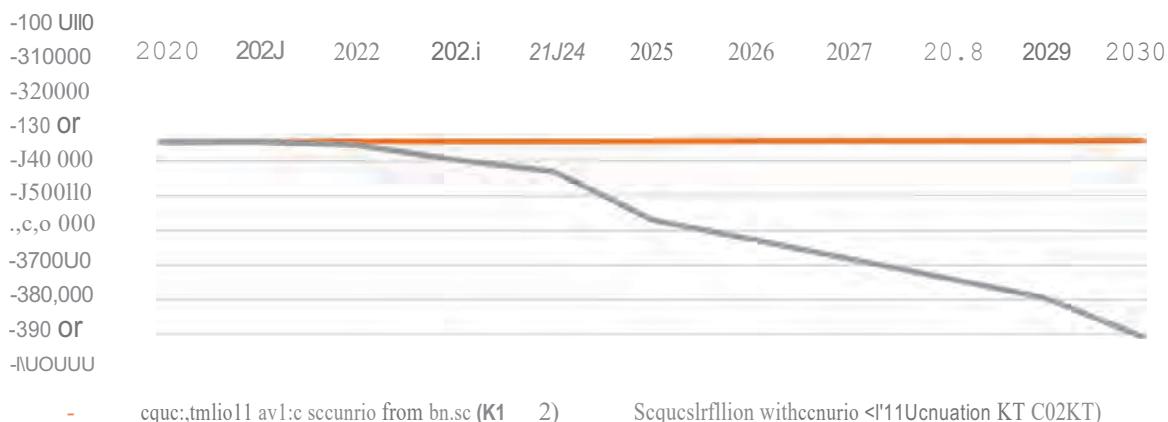


Figure 13 Emission sequestrationin KT eq C02 at the level of the forest sector

The projected GHG emissions in 2030 are -334,001 KT CO2 eq for the baseline scenario and -463,456 KT CO2 eq for the mitigation scenario, respectively.

The implementation of various programs in the mitigation scenario will reduce GHG emissions in 2030 from the forest sector compared to the baseline scenario by 38.7% (i.e. 129,455 KT CO2 eq).

It should be noted that changes in land use are not taken into account here with forests but with agriculture.

The various mitigation programmes (the three REDD+ Programmes mentioned above) will contribute to the improvement of GHG sequestration capacity; this will allow Mali to strengthen its status as a "carbon sink" and improve its national contribution to GHG reduction.

Given the participation of women in deforestation actions in search of firewood, this CON will give them a prominent place in:

- reforestation actions to restore destroyed forests;
- assisted natural regeneration;
- the management of classified forests and protected areas.

3.2.4 GHG emissions from the waste sector for the period 2020–2030

Policies and strategies on which foresight is based

- National environmental protection policy ;
- The National Sanitation Policy;

- The national solid waste management strategy;
- The National Liquid Waste Management Strategy;
- The National Strategy for the Management of Special Waste; The National Stormwater Management Strategy .

Programmes and projects considered in the mitigation scenario:

- Construction of a solid waste recovery and processing unit in Noumouougou as part of the Bamako Urban Resilience Project; Construction by the company Katura International of a solid waste-to-energy unit on the Noumouougou site;
- Oxalor-Pyrocox _ project; Integrated Household Solid Waste Management Project in the six communes of the district of Bamako and in certain regions of Mali: Sikasso, Ségou, Kayes and Mopti;
- Plastic waste recycling project in the city of Bamako at the industrial level (SIGMA - Mamaplastico); Project for the recovery and transformation of plastic waste in Commune V of the District of Bamako by the Stromme Foundation (Municipality of Commune V);
- Project for the recovery of used tyres by PSI MALI in GAO {Mairie de GAO}. Sanitation program for the cities of Kayes, Koulikoro, Ségou, Mopti, Bougouni, Kita and Koutiala for the installation of a thermo-compaction plant for waste recovery.

Forecasting of GHG emissions over the period 2020-2030

The forecasts are based on the implementation of the identified strategies and programmes . The growth rate of emissions is 16% for the baseline scenario and 7.4% for the mitigation scenario

The table below summarises the emissions in KT CO₂ eq and per year at the level of the waste sector.

Table 16: Projected emissions in KT CO₂ eq (baseline and mitigation scenarios)

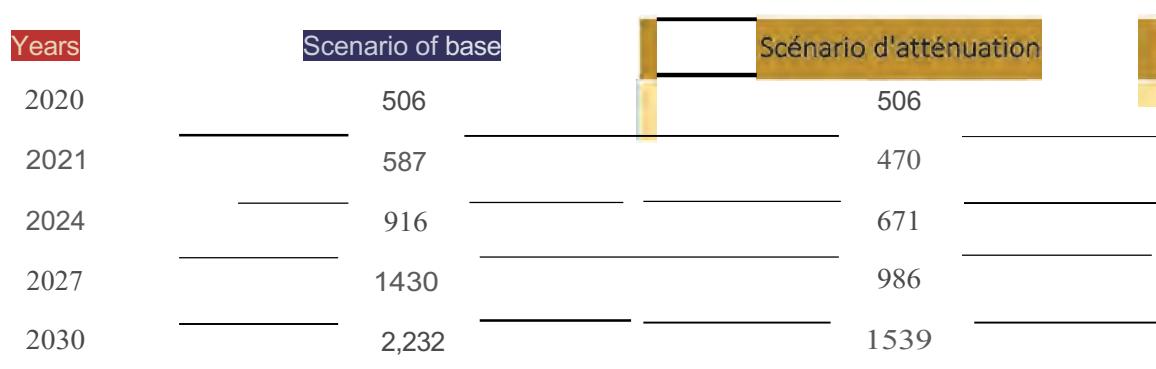


Figure 14 below summarizes the evolution of GHG emissions from the waste sector over the period 2020 - 2030, baseline and mitigation scenarios

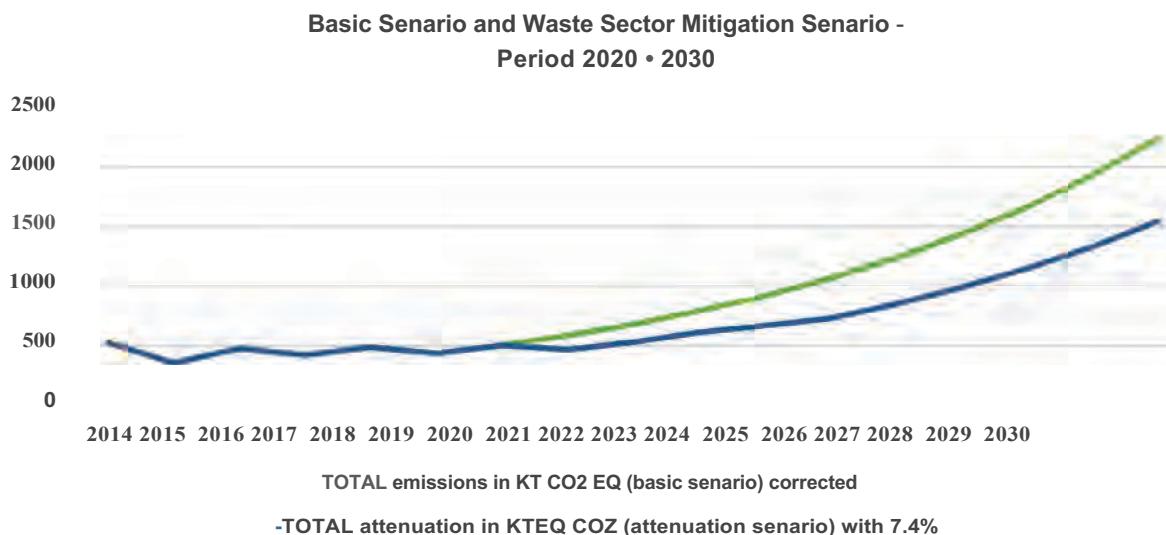


Figure 14: GHG emissions from the waste sector over the period 2020 - 2030 baseline and mitigation scenarios

The GHG emissions projections for the year 2030 are 2,232 KT CO2 eq for the baseline scenario and 1539 KT CO2 eq for the mitigation scenario, respectively.

Thus, the implementation of the various programs and projects in the mitigation scenario will reduce GHG emissions in the waste sector by 31% (i.e. 693 KT CO2 eq) compared to the baseline scenario

The involvement of women and girls in the management of household waste is crucial. It will be a question of placing particular emphasis on'.

- ▶ support for women's businesses in the management and recycling of household waste to create profitable and sustainable jobs while protecting the environment; the adoption of textile processing and production techniques that protect the environment (the case of manufacture and dyeing of bazins).

The cost of the mitigation scenario for the Waste sector is \$US 283,200,000

3.2.5 Emissions forecasts for all sectors for the period 2020-2030

The table below summarizes the overall situation of the four sectors: energy, agriculture, forestry, and land-use change and waste.

Table 17: Evolution of global emissions in KT CO2 equivalent Eq, baseline and mitigation scenarios

Années	Sequestration (Forest sector)		Cumulative emissions of the 4 sectors		Global Emissions	
	Scenario attenuation n	Scenario of scenario	Scenario d'atténuation	Scenario of base	Base Mitigation	
2020	-334 386	-334 386	95 443	98,723	-238 943	-235 663
2025	-334 194	-357 005	106 337	86 788	-227 857	-270 217
2028	-334 078	-373 998	114,638	86,858	-219 440	-287 140
2030	-334,001	-391,030	122 137	94547	-211 864	-296,483

The overall net emissions balance for the four sectors (Forestry and Land Use Change, Agriculture, Energy and Waste) is a GHG sequestration balance, worth -296,483 Kilo Tons of CO2 in 2030, which allows Mali to maintain its as a "carbon sink" and this even in the baseline scenario (-211,864 tonnes of CO2)

Figure 15 below summarizes the evolution of global GHG emissions and mitigation for all four sectors and over the period 2020-2030 (Baseline and Mitigation Scenarios).

Evolution of Global Net GHG Emissions and Mitigations : Baseline and Mitigation Scenarios - All Sectors - Period 2020 to 2030

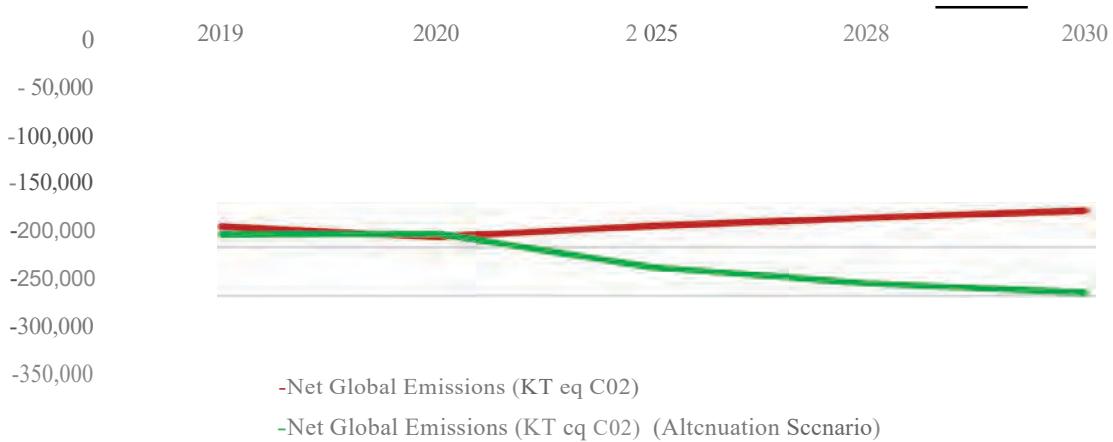


Figure 15: Evolution of Global Net Emissions and Mitigations for all sectors

The baseline scenario shows that net GHG emissions range from -200,000 to -200 Article 250.000 KT CO₂ eq until 2030, when they reach - 211,864 KT CO₂ eq for all sectors. The mitigation scenario will increase to -296,483 KT of CO₂, an improvement of 39.9 % (84,618 KT CO₂e) net carbon reduction gain by 2030

These overall GHG emissions come mainly from:

- AFOLU (Agriculture, Forestry and Land Use Changes) sector for 66%;
- ... energy sector for 32%;
- ... waste sector for 2%.

As for the types of GHGs, emissions are dominated by CO₂ (57%) followed by N₂O (23%) and CH₄ (minus 1%).

The diagram below shows the overall emissions situation by sector of activity and by type of GHG

Proportions of total emissions of GES by sectors of acm "t" - Period 2020--2030

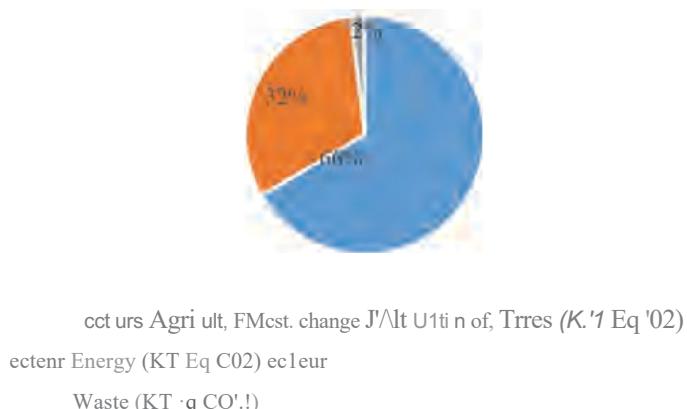


Figure 16: Proportion of GHG emissions in CO₂ eq by sector of activity

Overall emissions by type of GES:

The diagram below shows the overall emissions situation by type of GHG for all sectors of activity and by type of GHG

Proportion some Emissions global in equivalent CO₂ by Types GHG

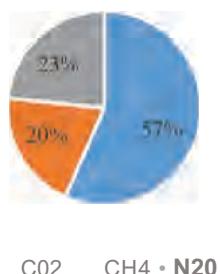


Figure 17: Proportion of total emissions by type of gas for all sectors

Three main gases make up the bulk of GHGs. Carbon dioxide (CO₂) is dominant with 57% of GHGs, followed by nitrogen dioxide (N₂O) with 23% and methane with 20%

The financing of all the NDC mitigation scenarios is estimated at \$US 4.344 billion.

3.3 SHORT-LIVED AIR POLLUTANTS

Climate change and air pollution issues are closely linked because, (i) in many cases, greenhouse gases and air pollutants are emitted from the same sources (Myhre et al., 2013; Priddle, 2016), and (ii) some of the same substances contribute to climate change and the impacts of air pollution, such as methane, carbon monoxide, and ground-level ozone, i.e., pollutants climatic to short

service life (SLCP) (Figure 11). Both of these linkages offer considerable opportunities to design strategies and identify mitigation measures that can both reduce air pollution and mitigate climate change. Global and regional studies have been conducted

shown that there are a variety of strategies and actions that can be taken to target the main sources of SLCP and simultaneously improve air pollution at the local level while reducing a country's contribution to global climate change (Kuylenstierna et al., 2020; Nakarmi et al., 2020; Shindell et al., 2012; Stohl et al., 2015; UNEP/WMO, 2011; UNEP, 2019, 2018).

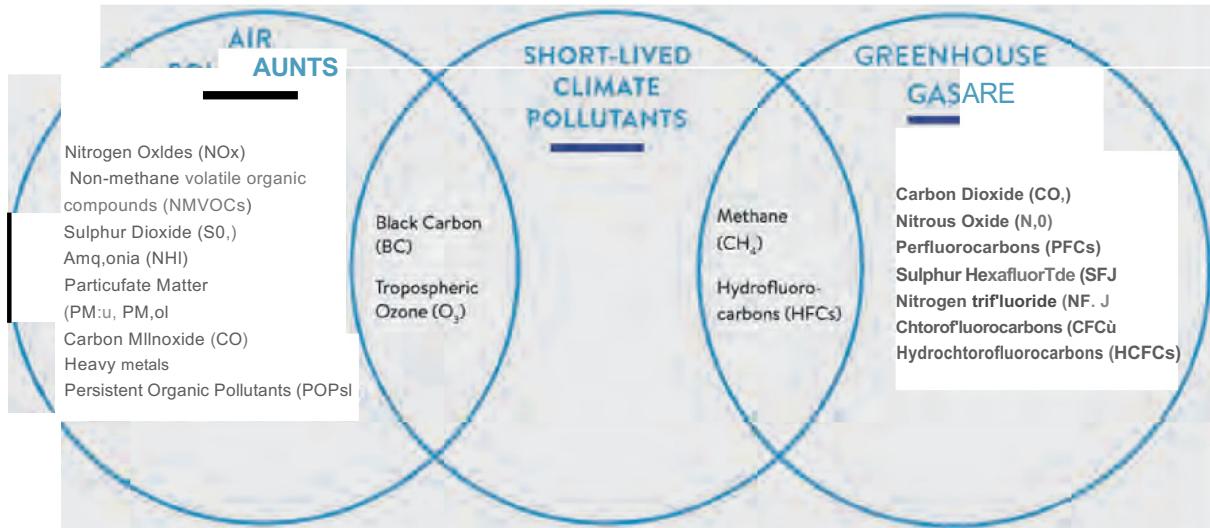


Figure 18: Summary of pollutants that are classified as air pollutants, climate pollutants at short-lived life and greenhouse gases (Source: CCPA SNAP, 2019).

Short-lived climate pollutants

Black Carbon (CB): A component of direct particulate matter (PM) emissions that contributes to the negative effects of air pollution on human health. Black carbon emissions also warm the atmosphere through direct absorption of incoming solar radiation and through indirect effects such as deposition on snow and ice and interactions with clouds. With an atmospheric lifetime of a few days, it is a short-lived climate pollutant .It is mainly emitted by incomplete combustion.

Atmospheric pollutants

- ▶ Particulate matter (PM_{2.5} and PM₁₀): Particulate matter (with an aerodynamic diameter of less than 2.5 µm (PM_{2.5}) and 10 µm (PM₁₀)) are small solid particles present in the atmosphere. They contribute most to the effects of air pollution on human health through their effects on the cardiovascular and respiratory systems. The PM_{2.5} and PM₁₀ emissions calculated here represent direct emissions of particulate matter into the atmosphere. However, other gaseous pollutants, such as nitrogen oxides, sulphur, ammonia and volatile organic compounds, also contribute to the concentrations of PM_{2.5} and PM₁₀ to which people are exposed, through chemical reactions in the atmosphere that transform gaseous pollutants in solid particles.
- ▶ Nitrogen oxides (NO_x): An atmospheric pollutant that is a precursor to the formation of particulate matter and ground-level ozone, NO_x is composed of two pollutants, nitrogen oxide (NO) and nitrogen dioxide (NO₂).
- ▶ Sulfur dioxide (SO₂): an air pollutant that is a precursor to the formation of particulate matter.
- ▶ Ammonia (NH₃): An air pollutant that is a precursor to the formation of particles.

- ▶ Organic Carbon (OC): A component of direct particulate matter (PM) emissions that contributes to the negative effects of air pollution on human health.
- ▶ Non-methane volatile organic compounds (NMVOCs): A set of different organic molecules emitted from a range of emission sources. NMVOCs are precursors to the formation of ground-level ozone and particulate matter.
- ▶ Carbon monoxide (CO): A gaseous air pollutant that contributes to the formation of ground-level ozone.

The UNEP/ WMO Integrated Assessment of Black Carbon and Ground-level Ozone (2011) was a global assessment of the benefits of taking action to reduce black carbon and ground-level ozone. Mitigation measures that targeted major sources of black carbon and major sources of methane (a precursor to ground-level ozone) were assessed based on their impacts on air quality and climate. A total of 16 measures were identified as providing 90% of the climate benefits among the hundreds of measures assessed. These include 9 measures targeting black carbon, including measures in the residential, agricultural, transport and transport sectors and 7 measures for methane in the agriculture, oil and gas, and waste sectors (Chapter 4 includes a full description of these measures). The assessment calculated that the full implementation of these measures would have substantial benefits in terms of air quality and climate, estimating that 2.4 million premature deaths would be avoided in 2030 compared to the baseline scenario, as well as an additional 52 million tonnes of 4 staple crops (rice, wheat, maize and soybeans) due to reduced damage to crops due to ozone exposure. These air quality benefits are disproportionately achieved at the local level, in the countries and regions where emission reductions take place. At the same time, the implementation of these measures would also prevent a 0.5°C increase in global temperature, thus making an important contribution to limiting the increase in the global temperature when combined with rapid and ambitious mitigation of CO₂ emissions (Figure 19). Black carbon, methane and ground-level ozone, as well as hydrofluorocarbons, have been referred to as "short-lived climate pollutants" because of the relatively short time they occur.

pass through the atmosphere once emitted (from a few days to two decades) and their impact on climate and air quality (with the exception of HFCs, which only have an impact on climate). This means that actions on SLCPs can quickly produce multiple benefits for air quality and climate change (Shindell et al., 2012).

CLIMATE MITIGATION PATHWAYS

Avoided Job 1 am1 by2050

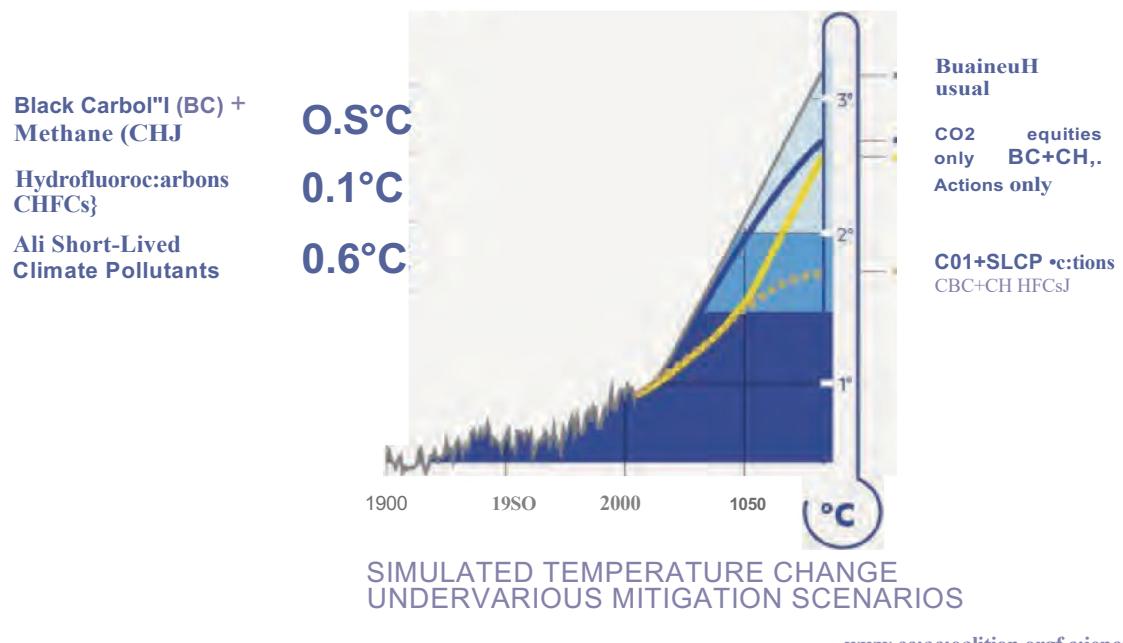


Figure 19: Overview of the benefits of action on short-lived climate pollutants for climate change

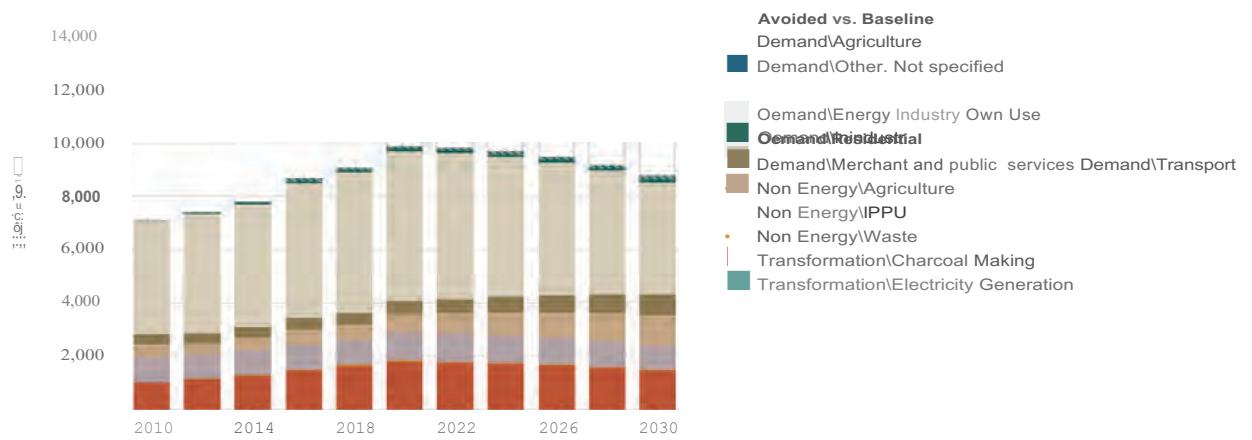


Figure 20: Reduction in black carbon emissions resulting from the implementation of the greenhouse gas mitigation measures assessed.

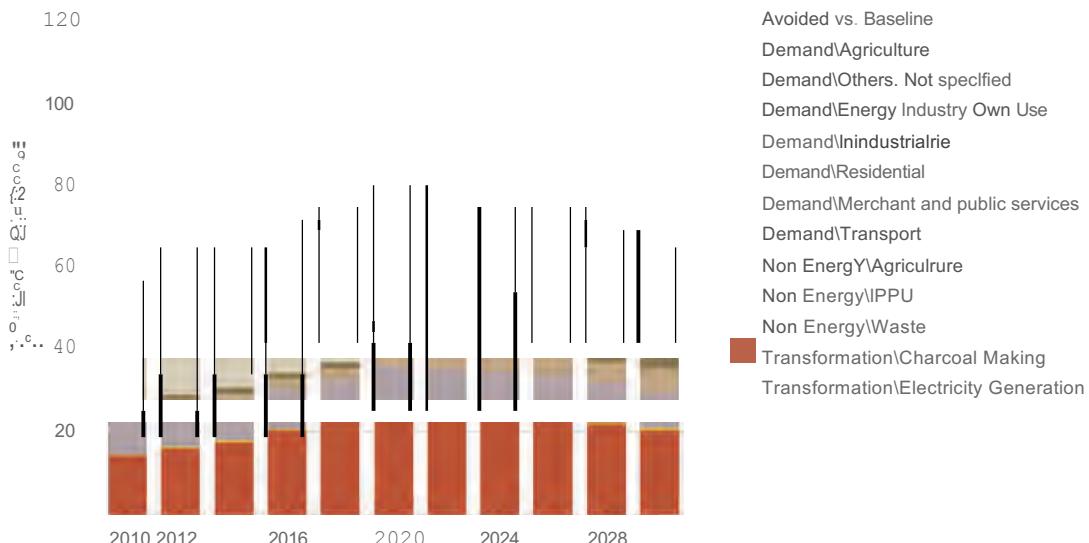


Figure 21: Reduction of fine particulate matter (PM_{2.1}) emissions through the implementation of assessed greenhouse gas mitigation measures.

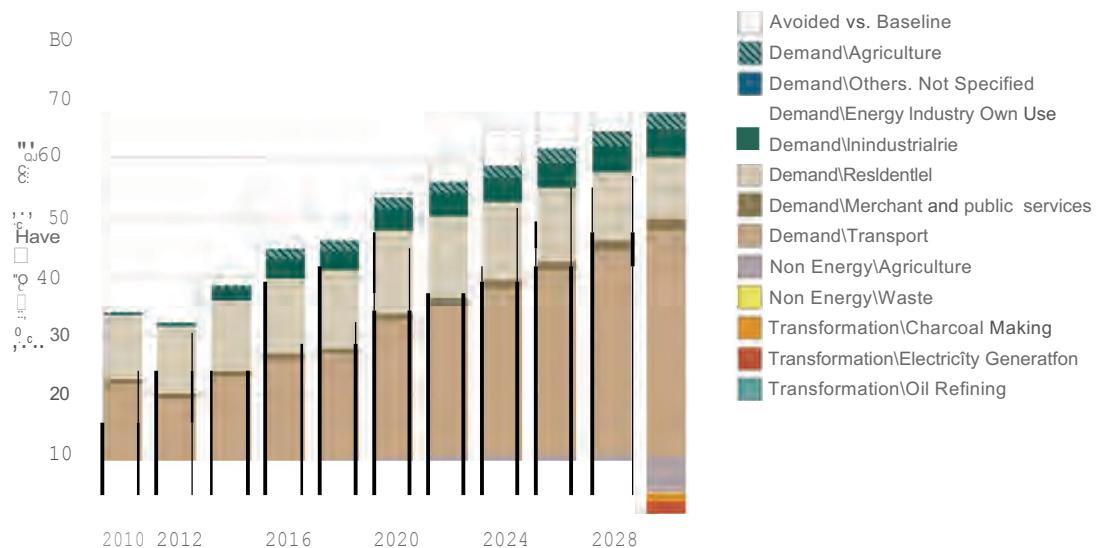


Figure 22: Reduction in nitrogen oxide (NO_x) emissions resulting from the implementation of the greenhouse gas mitigation measures assessed.

Gas mitigation measures assessed in Table 18 are also effective in reducing emissions of air pollutants and short-lived climate pollutants. Implementing the 15 mitigation actions listed in Table 42 would reduce black carbon emissions by 42% in 2030 compared to a baseline scenario, fine particulate matter (PM_{2.5}) emissions by 45% and nitrogen oxide emissions by 21%. They are also harmful air pollutants that have negative health impacts due to respiratory and cardiovascular diseases.

Reducing emissions of black carbon and other air pollutants means that the measures taken to reduce the contribution climate change will also benefit Malians through improved climate change. air quality.

Table 18: Individual GHG reductions in 2030 compared to abaseline scenario

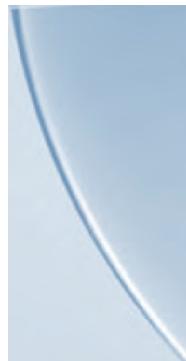
			Réduction des émissions de GES (kilotonnes) par rapport au niveau de référence 2030
			Baseline GHG emissions for 2030:
			Including forestry: -187,800 Excluding forestry: 42,400
			109 kilotons
1	Production electricity	To build a 6.8 MW hydroelectric power plant in Sotuba (Production 82 GWh)	
2	Production electricity	To build a 63MW hydroelectric power plant in Mali, Senegal, Mauritania, Boueina/Kayes (Production: 560/620 GWh)	807 island
3	Production electricity	Build the 60 MW Akuo Energy Kita solar photovoltaic power plant (76.02 GWh production)	101 kilotons
4	Production d'electricity	Install 1416 MW of energy capacity renewable d'here 2030, i.e. 58,3% of the capacity Installed and a production of 3558 GWheither 37.1 of total electricity production.	985 kilotons
5	Kitchen	100% of the population cooking with biomass uses biomass stoves at yield Residential improved by 2030.	-2.451 kilotonnes (emissions avoided at the point of combustion)
6	Transport	11% of petrol replaced by bioethanol by 2030	-13,867 kilotonnes (emissions avoided through reduced firewood losses in forests)
7	Transport	5.4% of diesel replaced by ICI 2030 biodiesel	396 kilotons
8	Production d'electricity 2030	Reduce the transmission and Distribution of electricity from the grid at 10% in	28 kilotons
9	Industry	Increasing energy efficiency in industry by 21% in 2030	118 kilotons
10	Livestock	Improving livestock productivity by Artificial inseminationshe and the Health/Diet Animal	662 kilotons
11	Production fields from rice	Promote Ventilation intermeumittente rice Irrigated	-5.152 kilotonnes
12	Residues Agricultural	Increase Agricultural Residue Use as briquettes for fuel	839 kilotons
			93.4 kilotons

13	Production végétale	Remplacement de 20 % des engrais à base d'urée par des engrais organiques d'ici à 2030 (objectif fondé sur l'avis d'experts).	-118,1 kilotonnes
14	FOLU	Reforester 76 000 hectares de terres par an	12 377 kilotonnes (émissions évitées grâce au renforcement du puits de carbone)
15	Déchets	Mise en place d'une décharge contrôlée suivant les meilleures pratiques en matière de tri des déchets : 22 % des déchets sont détournés vers le recyclage et le compostage d'ici 2030 (objectif basé sur l'avis d'experts).	53,2 kilotonnes
			Toutes les mesures mises en œuvre : - 40,939 kilotonnes



CHAPTER IV

INVOLVEMENT OF NON-STATE ACTORS IN THE NDC



4.1 INVOLVEMENT OF CIVIL SOCIETY ACTORS

In general, civil society actors are not provided with sufficient resources to carry out their programmes, due to the lack of difficulties in eligibility for the various funding windows (green fund, climate fund, etc.) and do not have instruments to measure the greenhouse gas emissions generated by their interventions.

For the period 2020-2030, civil society (mainly NGOs) has planned several projects likely to strengthen the reduction of emissions but, above all, the adaptation actions of the population. These are the following programmes and projects:

- ▶ Support Program at Improvement from Environment through the Community Actions (CAAP);
- ▶ Natural Resource Governance Program in the Nara and Banamba Circles and pastoral hydraulic network;
- ▶ Sustainable Energy Access for All Project and Dissemination of Bioenergy Technologies (Faso Bio 15 & Lorena) in some Communes of Mali;
- ▶ Multi-Energy Project for Resilience and Integrated Land Management (MERIT);
- ▶ Project to reduce air and water pollution related to the use of pesticides and other harmful products;
- ▶ Sub-regional Advocacy and Capacity Building Programme "Citizens' Voice for Climate Change" (Mali, Burkina Faso, Benin, Côte d'Ivoire);
- ▶ Programme to Strengthen Capacities for Adaptation to Climate Change in Mali. (PARCAC);
- ▶ Programme to Strengthen the Resilience of Vulnerable Agro-pastoral Communities in the Western Sahel to the Effects of Climate Change.

The overall amount is 30 billion CFA francs, or 60 million dollars from 2020 to 2030, which is included in the adaptation chapter

4.2 INVOLVEMENT OF LOCAL AUTHORITIES

The territory of Mali is divided into several levels of territorial collectivities: the regions, the District, the circles and the communes.

The distribution of powers between the different levels of government is organized in such a way that local authorities and the central administration contribute to the management of State affairs.

In addition to their actions that fall directly within their competences, local authorities develop local and territorial policies, the success of which requires the mobilization of citizens and all local economic actors.

While the success of a territorial project is based on strong political support, it also requires the mobilisation of all the players in the territory: citizens, businesses, farmers, institutions. Local authorities are in a good position to set in motion concerted dynamics, to promote and to value the efforts of each one.

With regard to the protection of the environment and natural resources and the fight against climate change, local and regional authorities, in view of their general competences, constitute the ideal level par excellence for the application of the various principles and the implementation of environmental policies as envisaged by the Conventions and Agreements.

They are increasingly empowered and their multiple skills in various fields lead them to orient their policies towards sustainable development actions.

It is in view of this observation that the revision of the NDC has seen the participation of local authorities in the various phases of its preparation (regional consultations, sectoral meetings), in order to mobilize their participation as best as possible .

The contribution of the local authorities to the dynamics of the CON will be made through their representative associations, which are the Association of Municipalities of Mali (AMM), the Association of Circled Communities of Mali (ACCM) and Association of Regions of Mali (ARM). The High Council of Communities (HCC) will also be called upon to contribute, in accordance with its constitutional powers . The HCC has also drawn up an environmental charter which will be one of the basic tools actions to be taken.

The municipalities, as well as the circles and regions, will play an important role, especially since they are responsible for planning at the field level through their PDSEC.

The main areas of their participation will be to strengthen their capacity and training in terms of climate change, to take climate change into account in their planning and their participation field projects that take climate change into account.

4.3 INVOLVEMENT OF THE PRIVATE SECTOR

With strong ambitions to positively influence decision-making for the adoption of policies conducive to climate-resilient development, Mali's private sector is an important player in the fight against climate change. This is what justifies its involvement in the revision of the NDC.

The Malian private sector is interested in the long-term environmental and social challenges of climate change, economic and gender inequalities, and the degradation of natural resources.

It has the responsibility, because it is a major political orientation of Malian policy, to take appropriate measures to reduce their greenhouse gas emissions in their processes by technological innovations that emit less greenhouse gases and also to engage in the search for low-carbon processes.

Such initiatives are an important link in turning a vision into a reality through innovation and financial means, as the implementation of the NDC involves public funding, but also in order to make investments more sustainable.

The Ministry of Industry is very supportive of promoting such initiatives and a joint working group with the Ministry of Environment is being set up.

Par ailleurs, le programme « Gomme Arabique », développé par le Ministère en charge de l’Environnement en collaboration avec le Ministère de l’Industrie et du Commerce, prévoit des activités de réhabilitation et de plantations des gommerais à hauteur de 200.000 hectares qui seront réalisées dans huit régions du Nord, Ouest et du Centre du Mali.

La CDN prévoit dans ce sens un vaste Programme national intégré entre les secteurs de l’industrie, des Collectivités Territoriales et des Forêts portant sur le Développement de la Production de gomme arabique et autres Produits Forestiers Non Ligneux. Le but de ce programme est la réalisation, à l’horizon 2030, de 200 000 ha de plantations d’Acacia Sénégal, d’anacarde et autres produits forestiers à valeur ajoutée. Quatre secteurs sont concernés :

- Le secteur de l’industrie pour dynamiser et harmoniser la récupération de la gomme arabique, sa transformation, sa commercialisation ainsi que la participation au financement des plantations ;
- Le secteur forestier national pour l’identification des zones de plantation, l’assistance technique aux paysans (directement et par la formation de techniciens), la création de pépinières et la gestion de l’aspect climatique et environnemental ;
- Le secteur des collectivités territoriales pour l’organisation des communes et des collectivités locales ;
- La société civile sera également concernée par la création ou le renforcement d’ONG chargées de l’assistance technique aux planteurs.

Les organisations socio-professionnelles (APCAM, ...) seront également associées à ce programme et à d’autres programmes induits par la CDN

Par ailleurs, plusieurs entreprises malienne, sensibles à l’environnement et aux changements climatiques, se sont déjà engagées dans une dynamique écologique notamment dans les domaines de :

- La fabrication de briquettes combustibles à partir de déchets agricoles et forestiers. Cette technologie permet de limiter le déboisement dû aux combustibles ligneux (Société Yiriimex) ;
- La transformation des déchets plastiques de Bamako en objets utilitaires par des processus industriels performants du type mamaplastico (Société SIGMA).

Ces initiatives montrent que des entreprises peuvent jouer un rôle de meneur dans la recherche d’une réponse ambitieuse aux côtés du Ministère de l’Industrie pour affronter les changements climatiques.



CHAPTER V

ADAPTATION TO CLIMATE CHANGE



5.1 NATIONAL POLICIES AND STRATEGIES

Mali's climate, which is Sahelian, is characterized by inter- and intra-annual variability in climatic parameters and by the intensification of droughts since 1970. This situation is exacerbated by the fragility of ecosystems and production systems (agriculture, livestock, fisheries, forestry, etc.) and by the needs of population growth, thus making the country very vulnerable and weakening its adaptive capacities.

In order to ensure sustainable development, climate change adaptation measures are needed in all sectors of development.

It is in this context that Mali has developed several policies, strategies and action plans (table below) that integrate national adaptation guidelines

These programmes are currently being revised in order to develop Mali's National Adaptation Plan (NAP) to climate change by 2030 to better guide and coordinate actions.

Table 18: National Policies and Strategies and their Objectives

Politiques ou Stratégies	Objectifs
National Environmental Protection Policy	Ensuring a healthy environment and sustainable development, combating desertification, ensuring food security, preventing and combating pollution and reducing poverty.
National Climate Change Policy, complemented by its strategy and action plan	Reference and steering framework for all projects and programmes implemented in Mali relating to the fight against climate change.
National Forest Policy	Ensuring integrated and sustainable management of renewable natural resources: forests, terrestrial wildlife and aquatic the resources in earths and the biodiversity Contribute at sustainable development of the country, through the provision of energy services accessible to the widest possible population at the lowest cost and promoting socio-economic activities
National Energy Policy	Promote sustainable, modern and competitive agriculture based primarily on family farms Contribute to poverty alleviation and sustainable development by providing appropriate solutions to water-related problems
National Water Policy	Structuring the entire sanitation sector around a realistic development project.
National sanitation policy	To give economic development planning a territorial dimension, within the framework of an organization of space that takes into account decentralization.
National Spatial Planning Policy	Strengthen the process of democratization of society and adapt the missions and organization of the State to the need to promote local initiatives
National Decentralization Policy	Reversing trends in land degradation to ensure food security, reduce poverty and vulnerability
Strategic Investment Framework for Sustainable Land Management	Anticipating the potential impacts of climate change on the forestry sector in Mali and analysing vulnerabilities
National Strategy for the Adaptation of Mali's Forestry Sector to the Impacts of Climate Change Strategy for the Development of Renewable Energies	Promote the wide use of Renewable Energy technologies and equipment
National Strategy for the Development of Biofuels	Increase local energy production at a lower cost through the development of biofuels.
National Population Policy	Controlling and managing the evolution of Mali's population Improving the involvement of women in the country's management process
National Gender Policy	Improving transport systems in Mali to ensure adequate access to the country
Transport Policy	

The role of water is particularly important because water is a cross-cutting sector that concerns all the sectors of the NDC of which it is a major constituent: energy as a driving force, agriculture and agriculture. the forest, of which it is a basic constituent with soils and climate, and the

as a vector for sanitation mechanisms. Water is present in all development and climate change adaptation initiatives.

This makes it necessary to have an integrated management of water resources, which Mali is implementing with an integrated water resources management mechanism, IWRM.

5.2 CRITERIA FOR SELECTING ADAPTATION PROJECTS

Adaptation remains the priority of developing countries, and more particularly the least developed African countries, including Mali, which are more vulnerable to the effects and risks of climate change, as stipulated in Articles 4, 5 and 9 of the Convention and Articles 7, 9, 11 and 18 of the Paris Agreement .

The degree of vulnerability of regions, circles and municipalities to climate change is an important factor to be taken into account. As well as population growth and gender sensitivity , the availability of climate data and the technical and financial capacities available to deal with it.

The criteria for selecting projects are as follows :

- ▶ Taking into account visions, policies, national strategies and action plans related to climate change, reference to the implementation of CREDO and the Sustainable Development Goals (SDGs);
- ▶ Taking into account the results of the capacity-building study to better guide and coordinate future actions of the ONC process;
- ▶ Criteria for environmental protection and reducing the vulnerability of the population to ecosystem-level climate change;
- ▶ Analysis of the potential for accessibility to the mobilization of financial resources for the adequate financing of projects.

5.3 ADAPTATION PROJECT FORECASTS FOR THE PERIOD 2020-2030

Mali's vision is to make the green and climate-resilient economy a priority but also a reality. Adaptation actions remain very important and crucial for the coming years in the fight against climate change.

The implementation of adaptation policies, strategies, plans and programs in Mali is carried out through the following programs and projects:

The priority programs contained in Mali's announcements at the World Climate Summit in September 2014 in New York. These are:

- ▶ forest management for the restoration of degraded ecosystems for reforestation 325,000 hectares, to promote natural regeneration and the fight against silting up and to strengthen the protection of protected areas on 9 million hectares;

- ▶ development of a smart and climate-resilient agriculture, for the hydro-agricultural development of 92,000 ha in the context of sustainable land management with the commitment of the State to devote 15% the National Budget for Agriculture;
- ▶ climate-resilient pastoral development aiming at the materialization of 3,300 km of transhumance axes in order to reduce conflicts between farmers and herders, the creation of 21 perimeters and pastoral areas of a total area of 400,000 ha;
- ▶ Rainwater collection and storage to contribute to universal access to drinking water and access to water for other uses, through the creation of 20 systems drinking water supply and 200 surface water catchment structures and surface water bodies for the benefit of 75,000 rural households (men and women);
- ▶ development of renewable energies and ! Energy Efficiency, aiming to install more than 100 MW of renewable energy (objective aimed at achieving the target of 10% of the energy mix by 2020, by developing photovoltaic, wind, small-scale hydro-electricity and biomass energy).
- ▶ The amount of these projects for the period 2020-2030 is 0.708 billion \$US

Projects in the land-use change and forestry sector:

- ▶ project to manage the silting up of watercourses in order to develop agricultural and aquaculture production systems and river transport for an amount of 1,000 million francs. \$US;
- ▶ reforestation project and the planting of thousands of hectares of fruit trees in order to reconstitute the vegetation cover and protect agricultural areas from erosion, water and wind at a cost of 0.5 billion \$US.

REDD+ programmes already included in the mitigation programme:

- ▶ integrated program with the sectors of industry and local authorities on the development of the production of gum arabic and other NTFPs and resilience of local communities in agro-forestry ecosystems arid and semi-arid areas by 2030, with the objective of building 200,000 ha of Acacia Senegal, cashew nut and other forest fruit plantations;
- ▶ National Reforestation Programme providing for the realisation, by 2030, of 340,000 ha of plantations. It will be the basis for all future reforestation work by the actors (State, local authorities, NGOs and private planters);
- ▶ programme to strengthen carbon sequestration by putting forest formations under management. The objective by 2030 is 1,000,000 ha of natural formations subject to forest management for the maintenance of productive capital, biodiversity and the fight against soil degradation.

This REDD+ programme covers a large part of the mitigation and adaptation programmes in the forestry sector. In addition, it will account for the achievements of direct or indirect CO₂ sequestration in the course of or in the future of the AGCC, POO-OIN and GEDEFOR programs.

Projects under the National Action Programme for Adaptation to Climate Change (PANA):

- ▶ development and extension of improved and adapted crop varieties, animal types and fodder crops;
- ▶ the promotion of cereal banks;
- ▶ Income Generating Activities (IGAs);
- ▶ small-scale agricultural development and land conservation;
- ▶ Meteorological products and information and capacity building.

Sectoral projects

The table below summarizes the sectoral projects

Table 19: Sectoral Adaptation Projects

TITLE PROJECTS	AMOUNT (\$US)	RESPONSIBLE
Projects in the field of agriculture		
Programme to promote the use of organic manure and fertilisers by micro doses.	2500 000,00	DNA
Programme for the Promotion of Intermittent Irrigation and SRI in Irrigated Rice Cultivation	\$US 0.59 billion	DNA
Programme for the conversion of surface and sprinkler irrigation to localised irrigation on areas important for agriculture and market gardening	2 000 000,00	DNH/DNA
Climate programme of the Malian Textile Development Company (CMDT) to boost the promotion of cotton in Mali.	53 940 500,00	WTDC Communities
Capacity Building Support Program for Adaptation to CC in MALI	5 000 000,00	AEDD, technical str, civil company, CTs,
The conversion of surface and sprinkler irrigation localized irrigation on areas of importance for agriculture		and market gardening

\$US 1.0 billion;

DNA

The implementation of the Technology Action Plan for Adaptation	1.0 billion \$US	AEDD
Programme to Strengthen the Resilience of Vulnerable Agro-pastoral Communities in the Western Sahel to the Negative Effects of Change Climate	1000 000	DNPIA
He		
Energy projects		
Sustainable Energy Access for All Project and Dissemination of Bioenergy Technologies (Faso Bio 15 & Lorena) in some Municipalities of Mali	9 400000	DNE
Multi-Energy Project for Resilience and Integrated Land Management (MERIT),	22 225 000	DNE
Weather Project		
Programme for technical capacity building, collection and processing of climate data and information (rehabilitation, creation of stations, training, equipment)	8000000,00	Mali-METEO
Civil society and local government projects		
Support Programme for Adaptation to Climate Change in the Sahelian Zone of Mali (PAAACC/Sahel),	2 000 000,00	Civil Society and TC
Support Programme for the Improvement of the Environment in through Community Actions (PAEAC),	4 000 000,00	Civil Society and TC
Natural Resource Governance Program in Nara and Banamba Circles	13 819140,00	Civil society and society
Sub-regional Advocacy and Capacity Building Programme « Citizens' Voice for Change (Mali, Burkina Faso, Benin, Côte d'Ivoire)	4 000 000,00	Civil society and society
Program from Building Resilience Communities Vulnerable agro-pastoralists Sahel	of the of the	1 000 000,00 Civil Society and TC

Facing the Negative Effects of Climate Change

Projects in the field of waste

Reduction of air and water pollution linked to the use of pesticides and other harmful products. \$US 0.3 billion DNACPN

Wastewater treatment and its reuse for needs, in particular for irrigation, for their irrigation \$US 0.5 billion DNACPN

the development of the Banconi, Molobalini, Foloni, Dougouradji and Bamafalani collectors in the district of Bamako for protection against flood risks 35 million \$US DNACPN

the development of the Kotroni collector in Sikasso for protection against flood risks 15 million \$US DNACPN

the development of the lotio collector in Sikasso for protection against flood risks 10 million \$US DNACPN

Integrated programme for the collection and transformation of urban plastic waste at the industrial level using techniques developed by Mamaplastico in Bamako 0,5 billion \$US Society **SIGMA**

Oxalor-Pyrocox: Integrated Household Solid Waste Management Project in the six municipalities of the district of Bamako and in some regions of Mali , namely Kayes, Sikasso, Ségou and Mopti, 262 million \$US Oxalor-Pyrocox

Projects in the area of capacity building

Sub-regional Advocacy and Capacity Building Programme "Citizens' Voice for Climate Change" (Mali, Burkina Faso, Benin, Côte d'Ivoire) 4 000000

Support Programme for Capacity Building for Adaptation to Climate Change in Mali. (PARCAC) 3 000000

Programme to Strengthen the Resilience of Vulnerable Agro-pastoral Communities in the Western Sahel to the Negative Effects of Change Climate 1000000 DNPIA

Capacity building of local authorities for the integration of Climate Change in the CESCR and for a change in the behaviour of the training centre for local authorities	10 million \$US.	AEDD
Capacity building in the face of climate change for all actors in the public and private sectors, including gender and youth	0.Billion \$US.	

Adaptation Finance is valued at \$US 8 billion.

The Integrated Water Resources Management (IWRM) Programme

In 2002, Mali adopted the law on the Water Code and in 2006 the National Water Policy (PNE). Mali's Integrated Water Resources Management Action Plan (PAGIRE) was adopted by the Council of Ministers in 2008 in accordance with the recommendations of the World Summit on Sustainable Development held in Johannesburg in 2002.

By following the recommendations of SDG N°6 "Ensure the availability and sustainable management of water and sanitation for all"), Mali has committed to improving water quality, reducing the risk of water and water pollution. Reducing water scarcity, implementing integrated water resources management, promoting transboundary cooperation and protecting water-related ecosystems

To this end, the Government of Mali has decided to undertake a review of the National Water Policy (NWP) with four programmes : (i) National Programme for Access to Drinking Water; (ii) National Programme for Integrated Water Resources Management; (iii) National water development programme; (iv) National Water Sector Governance Programme.

Objectives of IWRM

Development objective

The development objective of PAGIRE is to make water a factor of economic growth and social well-being, thus contributing to the fight against poverty. This is the ultimate goal pursued by the implementation of an integrated water resources management framework for the country.

The general objective of the PAGIRE is to have an operational framework for IWRM in 2030, which respects the Dublin and Rio principles: cross-sectoral management, management by river basin or aquifer, participation of all actors in decision-making and at relevant levels, equity for access to water, a financing mechanism where water pays for water management according to user-pays and polluter principles.the role of women and minority groups in water management . This is a major change in the modalities of water management and the PAGIRE proposes the steps "to be taken to achieve this change.

Objectifs spécifiques

Le PNGIRE 2019-2030 vise quatre objectifs spécifiques :

La mise en place d'un cadre institutionnel adapté à la GIRE,

La fonctionnalité d'une contribution financière GIRE basée sur les principes utilisateur-payeur et pollueur-payeur, et mobilisée au bénéfice du secteur de l'eau,

La fonctionnalité d'une Police de l'eau, avec deux volets : la sensibilisation / l'éducation des populations et le contrôle / la répression,

Le renforcement des capacités, avec trois volets : programme de formations diplômantes à long terme ; poursuite du développement d'instruments techniques de la gestion de l'eau, de ses usages et des risques ; renforcement des services techniques.

Quatre approches transversales se superposeront à ces quatre objectifs : le genre, la communication, l'équité sociale et l'adaptation au changement climatique.

CHAPTER VI

MEANS OF IMPLEMENTATION



6.1 STRATEGIES AND MOBILIZATION OFFINANCING

Financing is fundamental to the Paris Agreement. It guarantees the implementation of policies and actions with a view to achieving the objectives identified in the nationally determined contributions.

In line with the obligations of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, the country receives funding to fight against climate change.

CC. This financing comes from various sources, including funds under the Convention, support from Technical and Financial Partners, bilateral and multilateral development banks, the private sector, etc.. However, it should be noted that^{1no comprehensive assessment} of the support received for the implementation of all mitigation actions has been carried out since the implementation of the Paris Agreement.

However, in the Funds account under the UNFCCC, there are:

- Funds for the environment: Mali has mobilized to the period 2015-2018 under the GEF61 aLocation of US \$9.158.030 and US\$10.34 at title of the FEM? for the period 2018- 2022.
- Adaptation Fund: Mali has mobilized US\$ 8.5 million
- Green Climate Fund : from 2016-2021, Mali mobilized US\$ 130 million for 8 projects.

In addition, according to the Secretariat for the Harmonization of Public Aid, Mali received aid that amounted to 217 billion CFA francs in 2016. This funding came from bilateral and multilateral cooperation.

As part of the implementation of the actions of the new NDC, the following strategy will be developed in three stages:

Axel: development of portfolios of projects:

The mobilization of financial resources is strongly linked to the availability of projects or programs and their qualities. Projects are brought together in the form of an investment plan or portfolio of projects. This portfolio will consist of projects identified in the framework of the revision.

Axis 2: Improving access to sources of financing

Access to the various sources of financing is mostly through an accredited entity. It is important for resource mobilization to increase the number of direct access entities and, above all, to

to create a framework for operational consultation with the international entities operating in Mali. For financing outside the UNFCCC mechanism, Mali will use international cooperation.

Axis 3: Improving internal mobilization

Today, the majority of climate funds at the international level require co-financing for major projects. To facilitate the mobilization of these resources at the international level, it is important that the state make efforts through the special investment budget.

6.2 TECHNOLOGY TRANSFER AND INNOVATION

In Mali, following the process of studying technology transfer needs and a technology action plan, the following four priority sectors for combating climate change and water resources emerged, the technologies that areFollow.

Pros!Mitigation includes hydropower, solar photovoltaics, improved cookstoves, biofuels, the rice intensive farming system (SRI), microdosing, reforestation.

For adaptation, it is the practice of fodder crops to cover ecological zones; the development of cropland according to contour lines; agro-meteorological techniques to minimize climatic risks to agricultural production; the use of improved crop varieties (millet, rice, maize, and sorghum) adapted to climate change; boreholes, small water retention dams, over-digging of ponds and large-diameter wells .

The implementation of these technologies during 2015-2019 has generated several small projects related to these technologies.

Several flagship projects have been implemented with the support of international organizations and the Climate Technology Centre and Network (CTCN):

- ▶ The reduction of HFC emissions, following the Montreal Protocol programme, has been implemented in Mali by banning the import of the refrigerators concerned, reinforced by the Kigali decision. The elimination and total conversion of hydro-chloro-fluro-carbon (HCFCs) by 2030 could lead to a reduction of about 17.3 tonnes of CO₂eq.
- ▶ Gender mainstreaming for a climate-resilient energy system in ECOWAS is being implemented to implement the Sustainable Development Goals (SDGs) and the Sustainable Energy for All (SE4ALL) goals.
- ▶ The Technical and Economic Feasibility Study with the Action Group for the Modernisation of the Agriculture (GAMA) in southern Mali and MaliFolkCenter to remove barriers to the implementation of okra, mango and potato drying and storage technologies to support safety alimentary.
- ▶ Strengthening the implementation of climate change adaptation and clean development actions by rural communities in Mali.
- ▶ The ongoing Multi-Country Forest Biomass Waste Energy Recovery Study to assess the carbon sequestration potential in line with the prospects of the Deforestation and Degradation Emissions Reduction Programmeforests (REDD+) and the clean development mechanism (CDM).

In addition, as part of technological innovation, actions have been carried out in the biennial report (BUR) in relation to the Clean Air Coalition (CCAC) relating to air pollutants and short-lived greenhouse gases. The gases and pollutants identified are black carbon, methane and ground-level ozone, and hydrofluorocarbons.

It is also necessary to continue the implementation of the Technological Action Plan, which remains topical to fight climate change, but also to strengthen measures to combat air pollutants and short-lived gases by setting up instruments



appropriate measurements in the field (pollution measurement station) and a reinforced programme for mastering the tools for assessing all gases and pollutants.

The estimated costs of the needs amount to 2.5 billion \$US.

6.3 CAPACITY BUILDING

Capacity building for vulnerable communities, institutions, decision-makers and all NDC stakeholders must take into account the following shortcomings:

- ▶ Conflicts of competence, the compartmentalization of the various institutions and the poor and/or non-application of laws and regulations;
- ▶ The lack and/or weakness of academic training, information, awareness and communication (specialized media) on the issues of climate change issues;
- ▶ The weakness of expertise in qualified human resources, research laboratories specialized in the field of climate change, a national system for the acquisition, processing and archiving of sufficient and reliable data.
- ▶ The lack of an appropriate mechanism for collecting and processing data by software of the cutting edge.

However, advocacy, training, awareness-raising and communication actions have been carried out with actors and stakeholders. It emerges that these capacity-building activities are continuing in order to strengthen the scientific and technical understanding of the climate phenomenon, financing, technology transfer, sharing of experiences and good practices as well as the communication and perfect implementation of actions in the NDC.

More specifically, Mali has strengthened the capacity to assess climate change mitigation and updated GHG inventories in the BUR in order to strengthen the country' s capacity to develop a mitigation plan consistent with its NDC, development strategies and plans . Other actions have been taken in the context of the degradation of natural resources.

In perspective, it would be necessary to:

- ▶ Promote awareness-raising activities among the population and key stakeholders of the effects of pollution on health and the environment;
- ▶ Actively involve local and regional authorities by including in the CESDPs actions to promote domestic energy equipment
- ▶ Train community leaders on conflict management and social cohesion
- ▶ Promoting inter-municipal cooperation around local agreements for the management of natural resources
- ▶ In addition to the resources put in place by Mali, form a technical team for the assessment of short-lived climate pollutants (SLCPs) likely to act on human health, vegetation and climate change.

In addition, through the CNCCM's "Capacity Building" thematic group , several ongoing activities will be pursued in order to achieve the objectives of financing actions and implementing Mali's NDC through workshops of:

- ▶ Exchange, Lobbying and Advocacy, Awareness-raising, Information and Capacity Building, University Training in order to further involve private financial institutions in the banking sector, organizations, civil society, gender and communities.
- ▶ Sensitization on the NDC at the level of the following stakeholders: AN, CESC, HCC, private sector (National Employers' Council of Mali), TFP, civil society, AMM, Buildings and Public Works, CMDT, Regions of Koulikoro, Kayes, Mopti, Ménaka, Gao, Timbuktu, Kidal, Ségou, Sikasso, Taoudéni and the district of Bamako.

6.4 MANAGEMENT FRAMEWORK AND IMPROVEMENTS FOR NDC MONITORING

The institutional framework for climate change in Mali is organized around the actors of the National Council for the Environment, which brings together state structures, private actors, civil society and technical and financial partners.

For the implementation of Multilateral Environmental Agreements (MEAs), important actions are being taken, including: the development and adoption of a multitude of legislative and regulatory texts to manage environmental issues in general and climate change in particular.

A Steering Committee of the National Climate Change Council of Mali (CNCCM) and a Technical and Scientific Committee of the BUR, responsible for the scientific and technical quality of the study reports and all the documents drawn up in the cadre of the BUR Mali have been created.

In addition, the National Framework for Climate Services (CNSC), set up by MALI-METEO, makes it possible to federate actions relating to food security, water resources and natural disasters.

In addition, it should be noted that the coordination of the implementation of the National Climate Change Policy (NCCP), the preparation of national communications, Nationally Determined Contributions (NDCs) and biennial reports (BUR) are the responsibility of the MEADD through the AEDD.

With regard to the revision of the NDC, an institutional mechanism for managing implementation and monitoring has been set up and led by AEDD, with specific objectives, in a manner that will allow the promotion of the involvement of stakeholders (sectoral ministries in charge of the environment, energy, agriculture, forestry, waste and other targeted sectors).

A monitoring and coordination committee, composed of members (state structures, civil society, private sector, local authorities, youth organizations and resource persons) is set up and benefits from the support of technical and financial partners.

This mechanism for coordinating and monitoring the implementation of the CON has made it possible to

- ..,- Establish an investment plan, broken down into programmes and projects with their costs and financial partners. Its implementation contributes to the achievement of the objectives aimed at reducing greenhouse gas emissions ;
 - Have proven expertise in gender and climate change to support the Monitoring and Coordination Committee.
- Establish a communication mechanism, to promote the flow of information and the commitment of national and international partners in resource mobilization.
- Collect data at the level of existing information systems (SNGIE, SIFOR, SNIE and others;
 - Report regularly to the Minister and partners on developments in the implementation of all stages of the NDC review ;
- To create the C-CASA science and policy exchange platform in Mali, which brings together the main institutional actors who can promote the consideration of climate change in all rural development policies and actions;
- Implement a Climate programme at the level of the Environment and Sustainable Development Department (DEDD), dedicated exclusively to taking environmental issues into account, with the main missions of contributing to the implementation of the management strategy Environmental Protection and Sustainable Development, the impact of which is aimed at the adaptation of farmers to the adverse effects of climate change and the mitigation of their effects. The MRV emissions monitoring system is based on the data collection system for Reporting and Verification. It is the tool of the institutional framework for monitoring emissions, where MEADD is the overall supervisor of the national system in collaboration with stakeholders and AEEDD is the central entity responsible for coordinating and supervising the institutional arrangements of the activities of the working groups.

6.5 GUIDELINES FOR THE CREATION OF A CLIMATE MRV IN MALI

Information on National Measurements, Notifications and Verifications

The Bali Action Plan introduced the principle of measurement, reporting and verification (MN V) for developed and developing country Parties to strengthen action at the international and national levels to mitigate the climate change. Decision 1/CP.13 of the Bali Action Plan stipulates, in operative paragraph I(b), that "enhanced national/international action for climate change mitigation" would include consideration of, inter alia, developing country Parties:

"Nationally appropriate mitigation actions by developing country Parties within the framework of sustainable development, supported and enabled by technology, finance and capacity building, in a measurable, reportable and verifiable manner"

Paragraphs 61 and 62 of decision L/CP.16 require non-Annex I Parties to also measure, report and verify national and international supported mitigation actions, which are also subject to the International MRV. MRV promotes transparency and accuracy of mitigation information while allowing for the monitoring of

Revised Nationally Determined Contribution

emission reductions and support received and needed for the implementation of mitigation measures. This underlines the need for non-Annex I Parties to develop and implement a national MRV system to meet their commitment under this Decision.

General Procedures, Principles and Requirements for MRV

Under the Convention, Parties are encouraged to establish the following general procedures in order to optimize limited resources for national MRV:

- ▶ Designate a single entity responsible for the overall coordination of the national MRV;
- ▶ Assign roles and responsibilities for the implementation of the national MRV system, including the identification of entities responsible for the collection and management of source/relevant data;
- ▶ Establish schedules and work plans that include all stages of MRV and ensure that sufficient time and resources are available to enable entities to follow best practices;
- ▶ Collect sufficient activity data, process information and factors and/or other parameters (source/relevant data) necessary to support the quantification of emissions and removals, to monitor the impact of the implementation of emission reduction activities, and then to verify the chosen methodology and its Reported impact;
- ▶ Measure emissions/removals or other measurement performance parameters To assess the progress of these measures and provide feedback for the development of enhanced mitigation measures and support needs; and to examine ways to improve the quality of theData and other information

To ensure the integrity of the national MRV system, the process should be guided by the IPCC's five Good Practice Guidance (GCP) reporting principles, which are consistency, transparency, comparability, comprehensiveness and accuracy of information (UNFCCC, 2009). Mali will need to align itselfwith these principles when developing its national MRV system.

State of play of MRV in Mali

Mali does not formally have an MRV system.Indeed, the collection and archiving of data as well as the planning of activities at the level of the various sectors in Mali are ensured by INSTAT through the planning and statistical units (CPS). The latter carry out the mission of planning and statistical information in relation to the technical services concerned and transmit them to INSAT, which ensures their centralization. In addition, an important link in this reference system for the MRV Climate system in Mali is the National Environmental Information Management System (SNGIE) which depends on the Environment Agency and the National Environment Agency of Sustainable Development (AEDD) of the Ministry of the Environment of !Sanitation and Sustainable Development (MEADD).

The SNGIE, by virtue of its missions, is a tool on which the climate MRV in Mali could be anchored. Indeed, the SNGIE is responsible for identifying, centralizing, processing and disseminating all environmental data and information (including those related to climate) on all

the extent of Mali's territory. To this end, it networks the technical services that provide environmental data and maintains the space for dialogue between them and the users of environmental information.

Development of an MRV system in Mali

The development and implementation of a national **MRV system represents a serious challenge** for non-Annex 1 countries , as it is a new and additional responsibility in the preparation of the BUR and National Communications. Mali has some existing initiatives and capacities in its current monitoring and evaluation system that can serve as a basis for the development of the national MRV system after appropriate improvements.

Proposed institutional framework, MRV system of emissions and measures

The MRV system reflects Mali's national situation, with the underlying legal framework spanning different levels of administration/government. It contains both mandatory and voluntary elements. The Ministry of Environment, Sanitation and Sustainable Development is the overall supervisor of the national MRV system in collaboration with the various stakeholders. The Agency for the Environment and Sustainable Development is the central entity responsible for coordinating and supervising institutional arrangements through its Environmental Information Department, which oversee the more detailed activities of the working groups themselves. The latter will be composed of representatives of various ministries, the private sector, civil society organisations, educational and research organisations, depending on the specificity of the activities.

Analysis of the different parts of the MRV system of emissions and measurements

► Measurements

GHG emission measurements will be carried out as follows:

Data collection: data are collected from the relevant services by designated focal points and members of working groups . Existing databases are the primary sources. These are the Forest Information System (SIFOR), the Energy Information System (EIS), the databases of INSAT and the Secretariat for Harmonization of Aid (SHA). The first data quality checks are carried out at this level by the directorates of the services concerned before sending them to the coordination team. A second check is carried out by the project coordination team.

To ensure the sustainability of data collection, a memorandum of understanding for the collection and sharing of data necessary for emission estimates has been signed between AEDD and the sectoral structures

Emission estimation: The calculation of GHG emissions, uncertainty analysis and key categories are carried out by the focal points who are members of the working groups. They are often assisted by national experts;

Interpretation of the results: the results of the estimates are interpreted and validated by the working groups themselves. A third check is carried out at this level by the

Project coordination. The team verifies the emission calculations as well as the interpretations of the results;

Quality assurance: The recalculation of GHG emission estimates is intended to provide quality assurance. It is carried out by the scientific committee. The Scientific Committee is a group of academics and researchers specialized in different fields;

Monitoring of indicators: it will be led by a specific group which will be responsible for defining and proposing appropriate, relevant, measurable and necessary indicators for measuring the impacts of mitigation, adaptation and development actions. It will also have to collect and analyse data on the progress of the reference levels and monitor the emissions avoided by the various mitigation, adaptation and development projects. A register of national indicators should be established at the level of the (SNGIE) and will be regularly updated.

► **Reporting**

Reporting concerns the publication of the processed and interpreted data and their availability to national decision-makers and/or international partners on climate issues.

This reporting will be done in the form of technical reports (e.g. inventories, mitigation results on a project-by-project basis, etc.), the State of the Environment report to be published every two years. This will help in decision-making on planning for climate-smart and climate-resilient development.

► **Verification :**

It is co-edat the international level through the ICA Biennial Reports, which is a process aimed at increasing the transparency of mitigation actions and their effects, and the support received and needed. National communications are not subject to the ICA.

At the national level, verification is implemented through national MRV mechanisms established by non-Annex 1 parties , the general guidelines of which were adopted at COP 19 in 2013. In order to improve transparency and ensure the sustainability of the emissions verification process, procedures for regular and systematic documentation and archiving will be established. The SNGIE database will be used for this purpose.

6.6 NDC INDICATORS AND ALIGNMENT WITH THE SDGS

The SNGIE and climate change

The SNGIE gives the AEDD and its partners the opportunity to provide data and indicators for which they are responsible. The architecture of the SNGIE offers a framework for secure data sharing and analysis while allowing the dissemination of information to the non-specialist citizen. Visualization tools offer the possibility of combining various information into a single overview. In addition, the system is scalable, as it allows for the addition of new topics and new indicators.

Eight sectors are dealt with by the SNGIE. Each of them addresses several environmental themes and provides indicators. Climate is one of these sectors, but it has not yet been operationalized.

The choice of SNGIE indicators (150 indicators), officially validated by the various ministries concerned, is a basis for the choice of NDC indicators. Of these indicators, 27 have been shortlisted for the CON.

OOD concerned by the CON

N°.	Wording of the Sustainable Development Goals (SDGs)
ODD 1	Eradicating poverty in all its forms everywhere
ODD 2	Ending hunger, ensuring food security, improving nutrition and promoting sustainable agriculture
ODD 3	Enabling healthy lives and promoting well-being for all
ODD 4	Ensuring equitable, inclusive and quality education and lifelong learning opportunities for all
ODD 5	Achieving gender equality and empowering all women and girls
ODD 6	Ensuring access to sustainably managed water and sanitation services for all
ODD 7	Ensuring access to reliable, sustainable and modern energy services for all, at an affordable cost
ODD 8	Promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
ODD 9	Building a resilient infrastructure, promoting inclusive sustainable industrialization and fostering innovation
ODD 10	Reducing inequalities within and between countries
ODD 11	Keeping cities and human settlements open to all, safe, resilient and sustainable
ODD12	Establishing sustainable consumption and production patterns
ODD13	Taking urgent action to combat climate change and its impacts
ODD 15	Preserving and restoring terrestrial ecosystems, ensuring that they are exploited sustainably , sustainably manage forests, combat desertification, halting and reversing land degradation and halting biodiversity loss
ODD 16	Promote peaceful and inclusive societies for sustainable development, ensure access to justice for all and develop at all levels, Effective, accountable and inclusive institutions

Proposed indicators for monitoring the NDC

In addition to the 27 technical indicators from the SNGIE database (status, priority or response indicators), there are three indicators for monitoring the general functioning of the CON (on the periodic monitoring of greenhouse gas emissions, on the progress of NDC projects and on the monitoring of CON funding), bringing the number of ON monitoring indicators to 30.

The balance of these indicators is shown in the following table.

Table 20: Proposed indicators for monitoring the implementation of the ONC:

No.	Indicators		SDGs
1	Access Rate at Rural Electricity	ONE	SDGs 7° and 9
2	Access Rate at Urban Electricity	ONE	SDGs 7° and 9
3	Share of renewable energies in the energy mix	ONE	SDGs 7° and 9
4	Rate of change in butane gas consumption	ONE	SDGs 7° and 9
5	Number of solar power plants Installed to Evil	AER- Mali	SDGs 7" and 9
6	Agricultural area under total water control	DNGR/DNA	00D2
8	Areas of cultivated land in The Z's Damp Ones	DNA	00015
9	Areas cleared annually by agriculture	DNA/DNEF	SDG15
10	Amount of Persistent Organic Pollutants stored/used	DNA DNACPN	0D012
11	Amount of pesticides used	DNA/CUSTOMS	00D6:
12	Area of degraded land	DNA/DNEF	ODD 15
13	Area of Fallows	DNA/DNEF	O0D12
14	Rate of increase in the on-road vehicle fleet	DNTTMF/OT	00D12
15	Area of cleared areas/year	DNEF/SIFOR	0D015
16	Forest cover rate of the country	DNEF/SIFOR	ODD 15
17	Areas burned by bushfires	DNEF/SIFOR	00D15
18	Production woody Wooded formations	DNEF/SIFOR	ODD 15
19	Reforested areas	DNEF/SIFOR	0D015
20	Area of classified forests and protected areas	DNEF/SIFOR	ODD 15
21	National consumption of wood energy	DNEF/DNE	SDG12
22	Area of Forest Formations by Region	DNEF	ODD 15
23	Surface area of pastoral areas developed	DNPIA	OD015
24	Livestock size	DNPIA	ODD 15
25	Length of marked and/or rehabilitated transhumance trails (km)	DNPIA	0D015
26	Area sown to fodder crops (ha)	DNPIA	ODD 15

27	Quantité d'eaux usées traitée	ANGESEM	ODD 6 et ODD12 :
28	Emission annuelle de CO2 par habitant	AEDD-	ODD13/ ODD 8
29	Emission annuelle de CH4 par habitant	AEDD	ODD13
Indicateurs de fonctionnement général et de suivi de la CDN			
28	Evaluation périodique des émissions de gaz à effet de serre en regard des prévisions de la CDN	AEDD	ODD17/ ODD 16
29	Evaluation périodique de l'état d'avancement des projets relevant de la CDN en regard de leur programmation	AEDD	ODD17/ ODD 16
30	Evaluation périodique des financements de la CDN par l'Etat, les bailleurs de fonds et la finance climat		ODD17/ ODD 16

Ces indicateurs devront être analysés au crible des caractéristiques requises pour les indicateurs par la communauté scientifique internationale, notamment :

- leur typologie dans le modèle Pression – Etat – Réponse et complémentairement celui des indicateurs d'impact ;
- le respect des critères SMART par ces indicateurs ;
- le fait qu'ils soient faciles à renseigner et n'entrant pas de surcoût notable

Les indicateurs relatifs à l'égalité du genre et l'autonomisation des femmes seront détaillés dans la Feuille de Route et seront articulés entre autres sur les aspects suivants :

- Le nombre de projets et programmes présentés dans la CDN touchant les problématiques d'adaptation ou d'atténuation visant l'égalité du genre et l'autonomisation des femmes
- Les impacts qualitatifs et quantitatifs différenciés sur les hommes et les femmes des programmes réalisés dans le cadre de la CDN
- Le pourcentage des femmes occupant des postes de leadership dans la gestion globale de la CDN les projets sectoriels d'atténuation ou d'adaptation changements climatiques ;

La gestion des changements climatiques dans le cadre de la mise en œuvre de la Contribution du Mali à l'accord de Paris et du suivi des communications nationales périodiques sur l'émission des gaz à effet de serre (inventaires nationaux) est déjà prise en compte par des programmes nationaux appuyés par les Nations Unies : Troisième communication (qui sera suivie d'une quatrième) et BUR. Ces programmes, qui sont gérés par l'AEDD, suivent les recommandations du GIEC. L'information sur le suivi des émissions de GES existe mais pas forcément dans un format compatible avec le SNGIE. Cette mise au format pourrait se faire par la création d'un nouveau Système de suivi des émissions de gaz à effet de serre en symbiose avec le futur MRV Climat puis par le MRV national lorsqu'il sera créé.

Ce système pourrait de plus gérer des modules spécifiques par exemple sur le plan régional ou sur le plan sectoriel (énergie, développement rural, forêts et changements d'affectation des terres ...).

CONCLUSION

In the face of climate challenges, the Government of the Republic of Mali is determined to assume its responsibilities through a participatory approach, in an ambitious manner, by building a new paradigm that fully integrates the human dimension in addition to the economic and ecological dimensions.

Mali expects its partners that they assume equally their own responsibilities under the United Nations Framework Convention on Climate Change. A signal strong would a significant and ambitious contribution from the Green Climate Fund and the others Climate finance tools.

The implementation of the priority projects/programmes identified in the NDC, for which the mobilisation of resources is a conditionality, are in line with the guidelines of the Strategic Framework for Economic Recovery and Sustainable Development (CREDD) and the National Policy on Climate Change (PNCC).

It is in this context that Mali is embarking on a low-carbon and climate-resilient economic development trajectory, also contributing to global efforts to stabilize greenhouse gases , as part of our common but differentiated responsibility.

ANNEXE

ANNEXE 1 : TABLEAU ICTU

Informations sur la clarté, la transparence et la compréhension de la CDN (ICTU)

1. Informations quantifiées sur le point, l'année ou les années de référence																								
Type de cible	Cible conditionnelle de réduction des émissions de GES dans 4 secteurs (énergie, Agriculture, FAT et déchets) en 2030 par rapport au BAU																							
Période de référence	<p>Période de référence : 2014-2019</p> <p>Elle correspond à la période de premier projet BUR qui a fourni les données de gaz à effet de serre mesurées objectivement dans les secteurs énergie, agriculture, forêts, changement d'affectation des terres et déchets.</p>																							
Ces informations sont dans le chapitre 3.1 de la CDN. A titre d'exemple émissions par catégorie de gaz en KTEq CO ₂ :																								
Agriculture	CH4	NO2	Total																					
2015	35 631	23 647	59 277,81																					
2017	58 367	26 804	85 171,00																					
2019	48 731	28 617	77 347,44																					
<table border="1"> <thead> <tr> <th>Foret AT</th><th>CO2</th><th>CH4</th><th>N2O</th><th>Total</th></tr> </thead> <tbody> <tr> <td>2015</td><td>-317 974</td><td>36941</td><td>23039</td><td>-257 994</td></tr> <tr> <td>2016</td><td>-322 055</td><td>51539</td><td>23929</td><td>-246 587</td></tr> <tr> <td>2017</td><td>-325 309</td><td>61623</td><td>25719</td><td>-237 967</td></tr> </tbody> </table>					Foret AT	CO2	CH4	N2O	Total	2015	-317 974	36941	23039	-257 994	2016	-322 055	51539	23929	-246 587	2017	-325 309	61623	25719	-237 967
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2017	-325 309	61623	25719	-237 967																				
Une cible par rapport à l'indicateur de référence, exprimée numériquement, par exemple en pourcentage ou en montant de réduction	<p>% en 2030 de réduction des GES du scénario d'atténuation / scénario de base :</p> <p>Secteur énergie : 31%</p> <p>Secteur Agriculture+chgtAT : 25%</p> <p>Secteur Forêts : 39%</p> <p>Secteur Déchets : 31%</p>																							
Paramètres utilisés pour formuler la contribution d'atténuation	Emissions des GES en Kilo-Tonnes Equivalent CO ₂ pour chacun des secteurs et chacun des gaz																							
Indicateurs utilisés pour quantifier le point de référence (métriques, données sources, valeurs).	<p>Valeur des émissions, des séquestrations et des émissions évitées en Kilo-Tonnes Equivalent CO₂ par secteur et globale</p> <p>En 2019 : 436,12 KT Eq CO₂ (CDN page25)</p>																							

Information on the data sources used to quantify the reference point(s) The data sources used to quantify the baseline period are the national GHG inventories developed by the TCN and BURI projects

The baseline scenario will be updated : with the national GHG inventory as part of the projects in perspective: BUR2 and 4th National Communication.

News on the circumstanceswrath national of GESà Through the pof the BUR report in which the Partie can put who would base it on the at data day. he I need to remember at day onIndicator values fromas part of the from the revision of the NDC, the BURde 2019 was a reference The effort to put at Data day relative at 2015 to 2018 baseline scenario, in accordance with IPCC. This effort has been capitalised on and valued in the context of the revision

2 Implementation Timelines

The timetable and/or implementation period, including start and end dates, in accordance with any other relevant decision adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA)

2020- 2030

Whether it's an annual or multi-year goal, as the case may be

2030

3 Scope and coverage

Coverage of the NDC in relation to IPCC guidance on national greenhouse gas inventories, including on sectors, gases, categories including land categories, as appropriate

The baseline scenario is based on forecasts reflecting the normal development trend in Mali. It results from the implementation of national policies and strategies

a A general description of the 2020- target

Scenari DMitigation is a scenarioio plus ambitious in order to from reduce the Emissions from GHG during the the pPeriod 2030.). This scenario has beenity drawn up, after consultation with the non-working sectors,PAr the Consultation meetings by integrating programmes and projects that 1/ are in line with national policy orientations and 2/ include actions that are particularly climate-friendly The target for each sector is conditional

b. The sectors, gases, categories and reservoirs covered by the contribution determined at the level

including, where applicable, accordingly the guidelines of the Panel of Experts

The sectors and gases covered by the updated NDC are :

Sectors	Gaz
Energy	CO2, CH4, N2O
Agriculture	CH4,N2O
Forest and Waste Use Change	CO2, CH4, N2O
	CO2, CH4, N2O

intergovernmental

ernational Convention on Climate Change (IPCC)

c. The manner in which the Party has taken into account paragraph 31 (c) and (d) of decision **L/CP.21**

Int

Emission calculations at the level of the Forest and Land Use Change sector are carried out on the basis of data from two (02) forest and land use mapping projects. This made it possible to estimate the gains and loss of area related to deforestation activities . This information and data, coupled with that of reforestation and timber and forest products activities, made it possible, with the use of expansion factors in accordance with the IPCC guideline, to estimate the emissions of land use change and the sequestrations at the sub-sector level .

PIUP and other inventory categories:

The Industrial Processes and Use of Solvents and Products (PIUP) sector does not include the activities of Chemical Production Industries (2B), Metallurgical Industry (2).

The sector is characterized by the use of hydrocarbons and solvents. Fugitive emissions from fuels do not give rise to activities, and therefore are not accounted for.

For hydrocarbons (fuel), combustion emissions have been reported in the corresponding part of the source categories of the Energy sector.,e (normally 1A1 or 1A2).

In addition , emissions from the use of solvents {2F} and other products as substitutes for ozone-depleting substances such as HFCs and PEFs are included in the national inventory of GE.li.

Solvents are used in the various industrial units, including the paint, foam (mattress) manufacturing, phytosanitary products, soap, cement, and ceramics.

Its products are used in the production of cement, lime and soap. There are no direct CO₂ emissions .

On the other hand, HFC and PEF emissions from the use of these solvents and other products are very low in this sector. As a result , this sector was not considered a priority in the choice of sectors.

IPCC assessment report used for GWP values; the 2019 R.important BUR, which is based on the GHG inventory according to the IPCC guidelines

c. How the country Party has taken into account paragraphs 31 (c) and (d) of decision 1 / CP.21.	Mali's CON includes all categories of anthropogenic emissions and removals estimated in gas inventories developed by the BUR. The three sectors from the previous version of the CON (2015) have been taken over; a new sector has been taken into account: waste
d. Co-benefits Mitigation resultant Accommodations and/or the Parties' economic diversification plans, including descriptions of specific projects, measures and initiatives of the Accommodations and / or some Diversification plans	The CON also mobilizes new non-state domains: local authorities (regions, circles, municipalities), the private sector and civil society and non-governmental organizations Uh number Import dActions of adaptation from the CON Have also a mitigating co-benefit. For example, three major adaptation programmes under Dorn; Forestry and Ecosystems (Development of Elabic Gum Production, National Development Programme) Reforestation, Strengthening carbon sequestration page 51 of the CON) are also shares Mitigation Registered in the REDD+ mitigation scenario (page 34 of the CON)
Geographical coverage	The CON takes into account the total geographical coverage of Mali and all ecological and human diversity

4 Plan Process1f1cat1on

The country developed its National Adaptation Programme of Action (NAPA for the adverse effects of climate change) in 2007, which is currently being revised. It presented its first, eleventh and third national communication to the Convention and completed its first biennial BUR programme.

Mali has developed policies and strategic frameworks that underpin the CON process:

- in 2011 its National Policy on Climate Change,

Laws, policies, legal frameworks with a strategy and action plan

Institutional and Institutional Frameworks, Plans and - a Strategic Framework for the Achievement of a Resilient and Green Mali relevant processes for the in 2018

CON :

- revision in 2018 the National policy protection from Environment
- At the macro-economic level, the country integrates the environmental dimension and climate change in particular into planning processes, particularly in the implementation of the Strategic Framework for Economic Recovery and Development Sustainable Development Policy (CREDO), which constitutes the single reference framework for all the country's development policies for the period 2019-2023.

National Policies: National Forest
Policy National Policy Energy

The national planning processes that the Parties have

undertaken to determine their CON	National Agricultural Policy National Spatial Planning Policy National Sanitation Policy
The responsibilities - consultations with Stakeholders and Other process for reach the Objectives of the CON, including with Populations Native; Communities Local; the seniors and the youths; transition just; gender; rights Human; Other considerations Important Process	The development of the CON was based on a broad national consultation of the following parties: - All the technical services of the State - Local authorities on the ground (town halls, circles, regions) in particular through these regional consultations - Private sector: industries, professional organizations - Civil society mainly through NGOs
Led in the conception from the NDC How different Organizations and levels of government have helped at conceive the NDC.	The sectoral consultations (at the level of each of the four sectors) were largely based on the National Directories of the sectors taken into account and on the public bodies concerned (CMDT, Universities, Research Organizations...)
Information gaps , obstacles or problems that the Party faced during the NDC design process ; How NDC relates to development plans or strategies	Problems of insecurity have limited the scope of regional consultations in the affected regions.
How NDC relates to plans or Strategies d'eradication from the poverty	Development strategies are extensions of national policies used At through the CREED

S. Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and removals

d. Methodologies and parameters used by the IPCC to estimate anthropogenic greenhouse gas emissions and removals.

Methodologies: Logkiel new version 2.69 of the IPCC- Sept 2019 integrating TIER2 methods in the 2006 guidelines for most categories in the Energy, IPPU and waste sectors, as well as for the "agriculture" categories in the AFOLU sector

Metrics: Global warming potential as per the IPCC Fourth Assessment Report (AR4).

For the energy sector, the source well categories have the following IPCC codes:

1.A: Fuel combustion activities (sectoral approach).
The codes of the subcategories used

- 1. A.1; 1.A.2; 1.A.3; 1.A.4 (1.A.4.a; 1.A.4.b; 1.A.4.c: Gases not estimated)
- 1. B: Fugitive Emissions from Fuels
- 3. C.5 Indirect N2O emissions from managed soils (L 2004, L 2017, T) - N2O

IPCC Tier 1 methodological level 1 was applied for all subcategories. Emission factors (EFs) and emission parameters are default values proposed by the 2006 IPCC Guidelines for national GHG inventories.

The main GHGs are: CO₂, CH₄ and N₂O.

The GWP values used are those determined in (AR4): GWP CO₂ = 1 (by convention); GWP CH₄ = 25; GWP N₂O = 310; GWP HFCs:, 1.5-14 800

For the IPUP :

The general methodology used for the estimation of emissions linked to each of the industrial processes is the product of the level of activity, i.e. the quantity produced or consumed of material, and a factor of emission per unit of consumption/associated production.

For AFOLUs

Categorization of land according to IPCC guidelines and its evolution over time from national forest inventory data and remote sensing.

For livestock farming, the number of livestock is obtained to be taken from the national livestock census.

For agricultural farming, statistics on cereal production, types of crops (irrigated and non-irrigated) for food or cash crops, agricultural inputs (fertilizers) and their evolution per year were used

The expansion and default factors were applied in accordance with the IPCC guidance at the AFOLU level.

- e. Sector, category or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance as appropriate, including, as appropriate:

All emissions and removals reported in Mali's GHG inventory are included in the CON,

- . There is no specific approach to exclude subsequent emissions removals from disturbances from natural disturbances.

on managed lands.

Thus, for absorptions the territory has been divided in six (06) Land Categories at from the data of the Forest inventories (2014) and 2006)

Changes in the use of different tenure systems and the categories of "managed land" and <<unmanaged land " were established

in accordance with the IPCC guidelines. This made it possible to take into account the emissions and removals related to disturbances on them.

The nature of the savannah formations of dry tropical and rural Africa does not permit the

iii. Approach used to treat the effects of the Determination and structuring into age groups. That structure are of the old coppice under forests. As a result, the

Belongings

of the age class structure in forests are not taken into account.

Harvested wood products such as timber, service wood and dead wood are estimated at

through statistics in terms of activity data. The factor by default. ut has been applied in accordance with the IPCC guidelines.

ii. Approach to account for emissions and removals from harvested wood products

