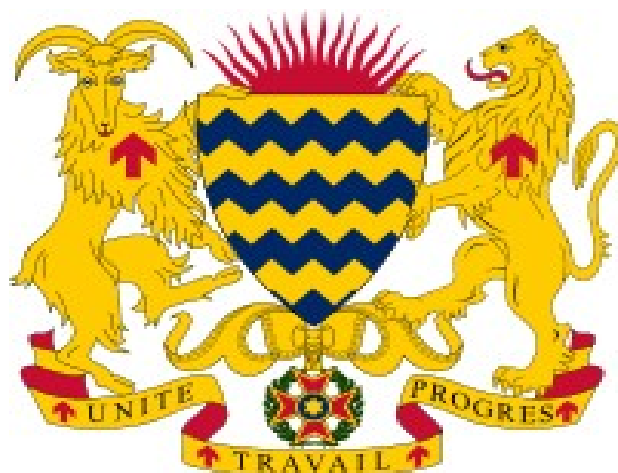


REPUBLIQUE DU TCHAD



MISE A JOUR DE LA
CONTRIBUTION DETERMINEE NATIONALE
(CDN)

OCTOBRE 2021

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List of abbreviations and acronyms

AFAT:	Agriculture, forestry and other land uses
Alliance for Resilience	AGIR: Global
GCCA:	Global Climate Change Alliance
AfDB:	African Development Bank
BaU:	business-as-usual scenario
BET:	Borkou-Tibesti-Ennedi
CC:	Climate Change
UNFCCC:	United Nations Framework Convention on Climate Change
NDC:	Nationally Determined Contribution
CEDAW:	Convention on the Elimination of All Forms of Discrimination against Women
CH ₄ :	Methane emissions
CILSS:	Comité Inter-États de Lutte contre la Sécheresse au Sahel
CNA:	Normal course of business
CNCC:	National Communication on Climate Change
CNS:	Sovereign National Conference
COP :	Conference of the Parties
CO ₂	Carbon dioxide (carbon dioxide)
CPDN	Expected contribution determined
nationally	
DEELCC:	Direction de l'Éducation Environnementale et de la Lutte contre les Changements Climatiques (Department of Environmental Education and the Fight against Climate Change)
FAO:	Food and Agriculture Organisation of the United Nations 11 ^{ème}
EDF:	European Development Fund
GEF:	Global Environment Facility
GEF-AFD :	Lake Chad preservation project: contribution to the Lake Chad development strategy
IFAD:	International Fund for Agricultural Development
LDCF:	Least Developed Countries Fund
GCF:	Green Climate Fund
GACMO:	Greenhouse Gas Abatement Cost Model
GHG:	Greenhouse Gases
Gg :	Gigagram
GHI:	Global Hunger Index
IPCC:	Intergovernmental Panel on Climate Change
HCNE:	High National Committee for the Environment
HDI :	Human Development Index
INSEED:	Institut National de la Statistique, des Études Économiques et Démographiques
LEAP:	Software for calculating greenhouse gases
CDM:	Clean Development Mechanism
MRV/MNV:	Measurement, Reporting and Verification/Measurement, Notification and Verification
MW:	Mega Watt
N ₂ O :	Nitrous oxide
SDGs:	Sustainable Development Goals
NGOs:	Non-governmental organisations

PACNSC:	Action Plan for the implementation of the National Framework for Climate Services in Chad
PANA :	National Adaptation Programme of Action
PAN-LCD:	National Action Programme to Combat Desertification
	PARSAT: Projet d'Amélioration de la Résilience des Systèmes Agricoles au Chad
GDP:	Gross Domestic Product
NAP:	National Adaptation Plan
	NDP: National Development Plan
PNE :	National Environment Policy
PNISRT:	Plan National d'Investissement du Secteur Rural du Tchad
UNEP:	United Nations Environment Programme
	UNDP: United Nations Development Programme
PRESAO:	Seasonal forecasts for West Africa in Cameroon and Chad
	PRG: Global Warming Potential
PRODEBALT:	Lake Chad Basin Sustainable Development Programme
P2RS:	Projet de Renforcement de la Résilience à l'Insécurité Alimentaire et Nutritionnelle au Sahel (Project to build resilience to food and nutrition insecurity in the Sahel)
PRRRPS:	Regional programme to strengthen the resilience of Sahelian countries
	TFP: Technical and Financial Partners
CAR :	Central African Republic
REDD+:	Reducing Emissions from Deforestation and Degradation
	SBN: Nature-based solutions
SDDER :	Master Plan for the Development of Renewable Energy in Chad
SNLCC:	Stratégie Nationale de Lutte contre les Changements Climatiques au Tchad
EU:	European Union
AU:	African Union
UNSD:	United Nations Statistics Division

Foreword

The Government submits the updated Nationally Determined Contribution (NDC) of the Republic of Chad for the period 2021-2030, in response to the call under Article 3, 4.2, 4.6, and 4.11 of the Paris Agreement despite the challenges of the Covid-19 pandemic.

To meet its international climate commitments, Chad, through this update of its **NDC**, confirms its participation in the collective ambition to keep the increase in global average temperature to less than 2°C, ideally to 1.5°C above pre-industrial levels, as well as in the global objective of strengthening adaptation capacities to increase the resilience of natural and human systems to the adverse effects of climate change.

In Chad's updated NDC, significant proposals have been made to avoid 71% (NDC, 2015) of our emissions from the reference or "business-as-usual" scenario by 2030. This will require substantial assistance from partners to achieve zero carbon reduction beyond 2030. Chad's NDC also focuses on resilience by improving adaptation in the face of current and future threats to our populations and their livelihoods from climate extremes. The aim is to increase resilience through a range of priority adaptation measures based, among other things, on agro-sylvo-pastoral and fisheries activities. In addition, this NDC encourages efforts to achieve the government's vision of balanced economic development while safeguarding the biophysical environment.

Chad's NDC is a key reference document for implementing adaptation and greenhouse gas emission reduction commitments. It has been developed through a consultative process and agreed in the context of national development priorities. This NDC is aligned with all the strategies, plans and visions of the Republic of Chad.

Chad's NDC is guided by principles outlined in the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The implementation of the NDC should not be seen as the responsibility of the government alone, but its successful implementation will require concerted efforts with the participation of all stakeholders including non-governmental organisations (NGOs), civil society, the private sector, academia and the general public.

The Ministry of Environment, Fisheries and Sustainable Development through the Directorate of Environmental Education and the Fight against Climate Change (DEELCC), in its capacity as UNFCCC Focal Point for Chad, will coordinate the implementation of the **NDC**. The DEELCC will involve all stakeholders in the implementation of various aspects of the NDC and report on the same, in order to take account of the progress of implementation. It is the Government's expectation that implementation will be successful and deliver the expected results.

The Ministère de l'Environnement et de la Pêche

**et de
Développement Durable**

MAHAMAT AHMART LAZINA



Executive summary

In accordance with Articles 4.1, 4.2 and 4.3 of the Paris Agreement, paragraphs 23 and 24 of decision 1/CP.21 and other relevant provisions of the Agreement, Chad is submitting its updated Nationally Determined Contribution (NDC). It is divided into two main areas with a view to confirming its participation in the collective ambition to keep the increase in global average temperature to less than 2°C, ideally to 1.5°C above pre-industrial levels, as well as in the overall objective of strengthening people's ability to adapt and their resilience and reducing their vulnerability to climate change.

This NDC combines the vision of an emerging Chad with a climate-resilient, low-carbon development path, focusing on the water, agriculture/agroforestry, livestock and fisheries sectors, as well as cross-cutting axes (capacity building, technologies, rainfall forecasts, risk management, etc.). It is clear from this strategic document that Chad's ambitions have been revised upwards, pending support from the various technical and financial partners in the priority sectors for both mitigation and adaptation to climate change. This strategic document is also aligned with Chad's Vision 2030 in terms of the main objective of Axis 4, which is to improve the living conditions of the population and reduce social inequalities, while ensuring the preservation of natural resources and adaptation to climate change.

This NDC provides for a cumulative reduction in GHG emissions between now and 2030 of 88,350 kt CO₂eq (unconditional and conditional measures), with an overall mitigation target of 19.3% compared with the reference scenario. The investment required to implement the NDC mitigation actions is estimated at USD 6,700.2m.

Thus, the financing needs to respond to the high level of climate risks expected in Chad could amount to more than USD 375 million from 2021 (based on an estimate of 3% of gross domestic product), rising to an annual cost of USD 645 million by 2030. On this basis, projections for the period 2021-2030 could amount to more than USD 5,002 billion. Without neglecting the importance of domestic and private sources of funding, international financial contributions from Technical and Financial Partners will have to play a very significant role.

Priority international contributions for adaptation are estimated at around 75% of financing needs, and should amount to more than USD 281 million/year from 2021, rising to more than USD 483 million/year by 2030. It should be noted that the Green Climate Fund Country Programme has an estimated budget of US\$2,280 billion for eleven (11) adaptation projects up to 2030, and that the programme addresses only part of the priority sectors identified by this updated NDC. To facilitate the strengthening of climate governance within the government of Chad, the feasibility of implementing a Chad Climate Fund (CTF) should be explored on the basis of national and international experience, which could be responsible for mobilising funding opportunities for the implementation of the activities of the NDC and other activities related to mitigation and adaptation to climate change in the long term.

In addition, the Covid-19 pandemic has had a significant economic impact on the country and has contributed to delaying the implementation of planned mitigation and adaptation actions. The pandemic has also increased the vulnerability of rural communities to climate change, particularly those most at risk and marginalised, including women.

1 Introduction

The Government of Chad hereby submits an update of its 2015 NDC for the period 2120-2030, in accordance with Articles 4.2 and 4.1 of the Paris Agreement, paragraphs 23 and 24 of decision 1/CP.21 and other relevant provisions of the Agreement.

To meet its international climate commitments, Chad, through this update of its NDC, confirms its participation in the collective ambition to keep the increase in global average temperature to less than 2°C, ideally to 1.5°C above pre-industrial levels, as well as in the overall objective of strengthening adaptation capacities, building resilience and reducing vulnerabilities to climate change.

The NDC, the National Communications as well as the National Adaptation Plan (NAP) are the main means of communication that the Government uses to inform the international community of the actions it intends to take to address climate change. The first NAP was prepared jointly and contributed to the process of updating this NDC.

The adaptation contribution incorporates data collected during national and provincial consultations and studies analysing vulnerability to climate change in sensitive priority sectors, which identified the main climate risks and impacts, vulnerable groups, affected sectors and proposed adaptation measures. It also reflects the co-benefits of adaptation interventions, as well as potential synergies with the Rio Conventions and Sustainable Development Goals (SDGs)/2030 Development Agenda.

This NDC has been designed to integrate gender equality into its planning, supporting the inclusion of gender-sensitive adaptation and mitigation measures that have been recommended through consultations at national and regional levels and that will contribute to more effective climate action.

It is also based on the analysis of the convergence of the priorities of the Green Climate Fund (GCF) and Chad to develop the country programme in terms of interventions in priority sectors for both mitigation and adaptation to climate change.

The conclusions and recommendations of this CSD reflect the contributions of all the stakeholders concerned at national and regional level, who were able to take stock of the various climate risks facing communities in different regions of the country, who expressed their concerns and provided options for improving their well-being and income-generating activities in order to increase their resilience to the impacts of climate change.

2 Background to the Chad NDC

Chad is one of the world's Least Developed Countries (LDCs). Around $\frac{3}{4}$ of its territory is desert. It is also one of the world's hottest countries, and one of the most vulnerable to climate variability and change. This is because Chad is particularly affected by low yields and reduced harvests, which are exacerbated by poor forecasting, preparedness, response and adaptation.

The country ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 and the Kyoto Protocol in 2009. As part of its commitments to the UNFCCC, the country drew up two National Communications on climate change in 2001 and 2012 respectively, its National Adaptation Programme of Action (NAPA) in 2010, and submitted its first NDC in 2015. Through its NDC, and its ratification of the Paris Climate Agreement in 2016, Chad has committed itself to the new dynamic of international cooperation on climate change.

climate change, to contribute to the global effort to reduce greenhouse gas emissions and build resilience to climate change.

The first NDC in 2015 combined the vision of an emerging Chad by 2030 with a climate-resilient, low-carbon development pathway, focusing on the water, agriculture/agroforestry, livestock and fisheries sectors. The NDC also set out the main priorities for adaptation, both sectoral (water, agriculture, livestock and fisheries) and cross-cutting (capacity building, technologies, rainfall forecasts, risk management, etc.).

The NDC anticipated the implementation of around ten programmes in the area of adaptation and a dozen priority programmes in the area of mitigation. The estimated possibilities for achieving the objectives of the NDC included: (i) Adaptation: a total of USD 14.17 billion over the 2030 commitment period, including USD 11.38 billion to achieve the conditional objective (with contributions from the international community), (ii) Mitigation: a total of USD 7.063 billion over the commitment period, including USD 6.54 billion to achieve the conditional objective. The total cost of implementing the NDC was \$21.23 billion, of which \$17.92 billion was to meet the conditional targets. In the medium and long term, the Green Climate Fund will provide a substantial share of the financing for the implementation of Chad's NDC.

Based on studies carried out as part of the National Adaptation Programme of Action (NAPA), the 2015 NDC defined cross-cutting and sectoral adaptation priorities. This NDC aims to update these priorities. In terms of adaptation, the update was to build on the work carried out as part of the NAPA process, as the latter would provide a mechanism for improving capacity and ownership in relation to adaptation planning, budgeting, implementation and monitoring. The NAP process will also improve individual and institutional capacity to provide climate services for adaptation planning in priority sectors.

In line with the Government of Chad's development policy, Chad aims to become an emerging country by 2030. To this end, the Government intends, among other things, to strengthen environmental protection, the mitigation of greenhouse gas emissions and adaptation to the effects of climate change.

Covid-19 has had a significant economic impact on the country and has contributed to delaying the implementation of mitigation and adaptation actions. The pandemic has also increased the vulnerability of rural communities to climate change, particularly those most at risk and marginalised.

2.1 New elements contributing to the update

According to the above-mentioned policy guidelines of the Government of Chad, national commitments in the area of climate change are set out in the policy and strategy documents drawn up to define the strategic guidelines for government action in this area.

Since the publication of the NDC, important policies and strategies have been adopted to support the country's efforts to combat climate change, such as "Vision 2030, the Chad we want". The 2017-2021 NDP is based on this Vision, and is a model for integrating the "climate change" dimension into a development policy. The National Investment Plan for Chad's Rural Sector (2016 - 2022), the National Strategy to Combat Climate Change (2017), the National Environment Policy (2017) currently being validated, the Action Plan for the Implementation of the National Framework for Climate Services in Chad (2016-2020) and the Master Plan for the Development of Renewable Energy in Chad (2018) are other frameworks for implementing this vision.

In addition, following the adoption of the new framework for action at Sendai, a National Action Plan for Capacity Building in Disaster Risk Reduction, Preparedness and Response (2015-2020) was drawn up by the Ministry of Territorial Administration and the Ministry of Economy and Development Planning, with technical support from the United Nations Development Programme (UNDP). It recommends establishing a specific National Strategy for Disaster Management Preparedness that clarifies the roles and responsibilities of existing structures in the event of an emergency operation.

The process of updating the NDC thus offered an opportunity to evaluate, adjust and strengthen national strategies and align them with national priorities. It was also an opportunity to better integrate climate issues into national development planning and to reassess mitigation and adaptation options for the years 2020-2030 while strengthening stakeholder participation.

In parallel, the NAP was launched by the government of Chad in October 2019 and will eventually cover 19 provinces in the Sahelian and Sudanian zones. This initiative will make it possible to address the risks associated with climate change in the short, medium and long term, establish policy and capacity-building efforts, integrate climate change into development planning and budgeting processes, and catalyse investment in adaptation to climate change.

2.2 Process for updating CDN

The Ministry of the Environment, Fisheries and Sustainable Development, through the Directorate for Environmental Education and the Fight against Climate Change, which is responsible for drawing up the NDC, has organised national and regional consultations to prepare the 2021 NDC, using participatory and interactive approaches with stakeholders. These stakeholders include various public and private institutions, regions, traditional chiefs and local communities, technical departments of sectoral ministries, higher education, leaders of civil society organisations, representatives of the private sector, leaders of media organisations, associations of producers' organisations, women's organisations, youth and communal authorities, technical and financial partners.

The objective of these consultations was to inform and consult stakeholders on the two ongoing climate change processes. The consultations were designed to validate the analysis of the climate change situation in Chad, gather additional information, and discuss and agree on strategic priorities for adaptation and mitigation.

The regional workshops took place in the Province of Logone Occidental (Moundou), Logone Orientale (Doba), Tandjilé Est (Lai), Mayo Kebbi Est (Pala) and Moyen-Chari (Sarh), the Province of Hadjer-Lamis (Massakory), Kanem (Mao), Bahr el Gazal (Moussoro) and Lac (Bol), the Province of Guerra (Mongo), Batha (Ati), Ouaddaï (Abéché) and Biltine (Biltine). These workshops were very important not only for raising awareness and involving local authorities and communities in the process, but also for gathering additional information on mitigation and adaptation from stakeholders in the regions. The process was completed by a national pre-validation workshop, which enabled national and regional stakeholders to validate and complete the data used in the analyses and the NDC's priority actions on adaptation and mitigation.

The development of the NDC has also contributed to training and technical capacity building in terms of learning how to use a GHG trajectory modelling tool (LEAP). The NDC scenarios and impacts of the mitigation measures considered were developed on the basis of the national GHG inventory updated in 2021 for the period 2010-2018 and the GACMO (Greenhouse Gas Abatement Cost Model) tool.

The updating of this NDC took into account the priorities defined in the NAPA, the first NDC, and the analyses of the vulnerability of climate-sensitive sectors. In addition, an analysis was carried out on the basis of national studies, reports, strategies and plans, in order to incorporate the most recent information in terms of climate risks and vulnerabilities and the main vulnerable sectors. In this respect, the 2017 national climate change strategy is important in the context of the revised NDC as it sets out the main key sectors impacted by climate change. In this context, the country programme of the Green Climate Fund Chad 2019 is also important as it provides assessments of vulnerability and the impacts of vulnerability by sector.

An analysis of recent studies on gender and climate change and on gender mainstreaming was carried out and showed the poor understanding of the concept of gender by the various stakeholders and the links with climate change. It is also important to note that the role of women in ecological management and the inequalities in access to and control over resources that exacerbate their vulnerability remain little recognised.

This update benefited mainly from the support of the Climate Action Transparency Initiative (CATA), the UNDP (GEF-NAP Project, Climate Promise and NAP Global Support Programme, NAP-GSP), the NAP Global Network and the European Union, and the coordination of the NDC Partnership.

2.3 Vision of the CDN of Chad

Always keen to contribute to the fight against climate change under the Paris Agreement, Chad remains firmly committed to increasing its ambitions compared to its previous commitments, which is reflected in the vision of this updated NDC for mitigation and adaptation and expressed in these terms:

"To support, by 2030, a diversified economy that is resilient to climate change and part of a development trajectory that emits less greenhouse gas for the well-being of the Chadian population, while protecting ecosystems and an economy that is resilient to climate change, capable of anticipating, managing and reducing risks and extreme environmental and climatic phenomena, while reducing social inequalities and ensuring the preservation of natural resources".

This vision is in line with Chad's Vision 2030 "an emerging middle-income country, driven by diversified and sustainable sources of growth and added value". It is also aligned with the main objective of its Axis 4, which is to improve the living conditions of the population and reduce social inequalities while ensuring the preservation of natural resources and adaptation to climate change (Vision 2030).

In this context, it is important to guide and bring together institutional, technical, scientific and financial policy initiatives to tackle climate change. More specifically, promote energy efficiency and renewable energies, particularly solar, wind and biogas, in all sectors. Encourage sustainable land and forest management to reduce emissions from degradation and deforestation. As well as integrating gender dynamics throughout the process of developing and implementing NDCs.

3 Circumstances national

Chad, the fifth largest country in Africa, is a landlocked country in Central Africa, comprising the Saharan, Sahelian and Sudanese zones. The relief is varied and contrasting. It consists mainly of a vast basin bordered by mountainous massifs.

The hydrographical domain is dominated by rivers and lakes, the permanent ones being the Chari and Logone. These rivers form the Chari-Logone system, with a catchment area of 600,000 km².¹ Lake Chad, part of a vast inland sea, is the largest body of open water in Chad.

Chad's tropical climate is divided into major bioclimatic zones: Saharan in the north, Sahelian in the centre and Sudanian in the south. In terms of biodiversity, the main plant formations from north to south are *as follows*: (i) shrub steppes with spiny plants and annual herbaceous plants; (ii) tree and shrub steppes with spiny and non-spiny plants and annual herbaceous plants; (iii) tree and shrub combretaceous savannahs with annual herbaceous plants and perennial herbaceous plants; and (iv) wooded savannahs and open forests dominated by a perennial herbaceous layer.

Chad shares its biomes with its neighbouring countries: (a) Saharan desert biomes with Libya, Sudan and Niger; (b) Sahelian biomes with Sudan, Niger and Nigeria; (c) dry savannahs with Sudan, the Central African Republic (CAR), Cameroon and Nigeria; and (d) wet savannahs with CAR and Cameroon.

The structure of the country's economy, which remains largely undiversified, is heavily dominated by the primary sector (oil, agriculture, livestock farming and mining). The agricultural sector, which is limited to food crops such as cereals, and cash crops such as cotton, sugar cane and gum arabic, is highly vulnerable to the vagaries of the weather. The private sector is made up entirely of small and medium-sized enterprises, most of which operate in the informal economy.

The effects of vulnerability in the agriculture, forestry and land use sector will manifest themselves in significant reductions in yields and production (-10 to -25%) of food crops (millet, sorghum, maize) due to water deficits caused by successive droughts, high temperatures, late onset of the rainy season and/or early cessation. In addition, vulnerability due to poor irrigation, desertification and land and forest degradation has a major impact on the entire food chain of the Chadian population.²

Extreme weather phenomena such as droughts, floods and heat waves have a severe impact on the natural resources on which Chad's largely rural population depend for their livelihoods.

Chad has a population estimated at almost 15 million in 2018. Of this, 50.6% are women, 78.1% live in rural areas and 50.6% are under the age of 15. Women and girls in Chad have unequal access to resources (education, land) in a general context of socio-cultural constraints: customs, norms and traditions weigh heavily on women and hinder the effective application of their rights³. In addition, women are not in the same position as men to cope with the negative impacts associated with climate change, and do not have the same capacities and opportunities to deal with them, which means that they are more exposed or vulnerable.⁴

3.1 Climate change and variability in Chad

Like other Sahelian countries, Chad's climate has undergone a number of distinct changes over the last few decades. These changes can be measured in terms of the climate profile, which will highlight the main observed and future climate hazards, the vulnerable groups and sectors, the impacts and the capacity to adapt, which are the components of vulnerability.

¹ Atlas of Chad, August 2013.

² Green Climate Fund Country Programme, 2019

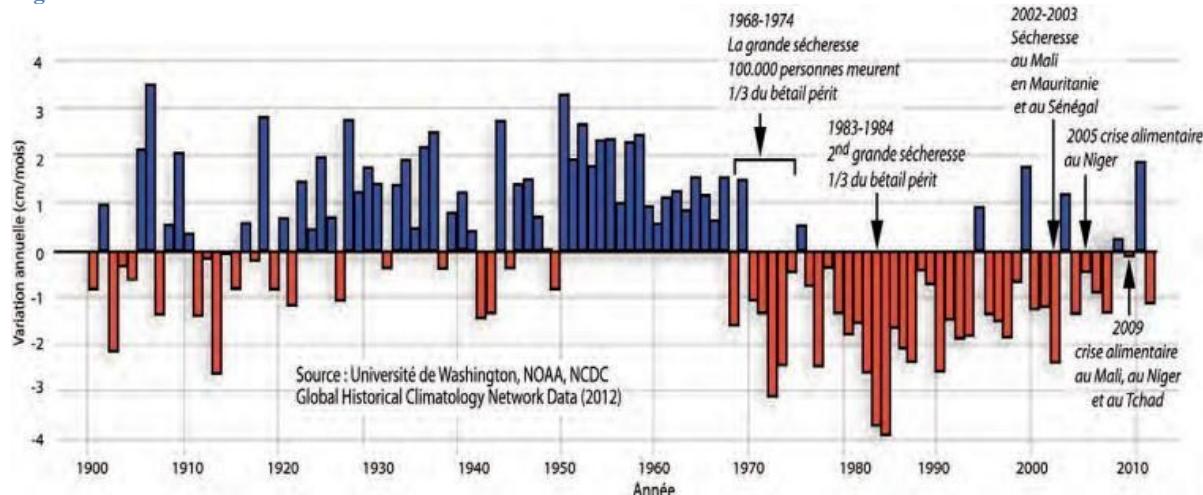
³ Study on gender mainstreaming in the NAP process in Chad, 2021.

⁴ Study on gender mainstreaming in the NAP process in Chad, 2021.

3.1.1 Annual variation in rainfall in the Sahel

Prior to the 1970s, the region experienced a succession of wet years, before being severely affected by two decades of drought (1970-80). From the 1990s onwards, rainfall improved overall, but was still highly irregular (Figure 1).

Figure 1: Index of annual rainfall variation in the Sahel between 1900 and 2010.



Source : Washington University , NOAA, NCDC. Global Historical Climatology National Data (2012)

3.1.2 Climate profile at Chad

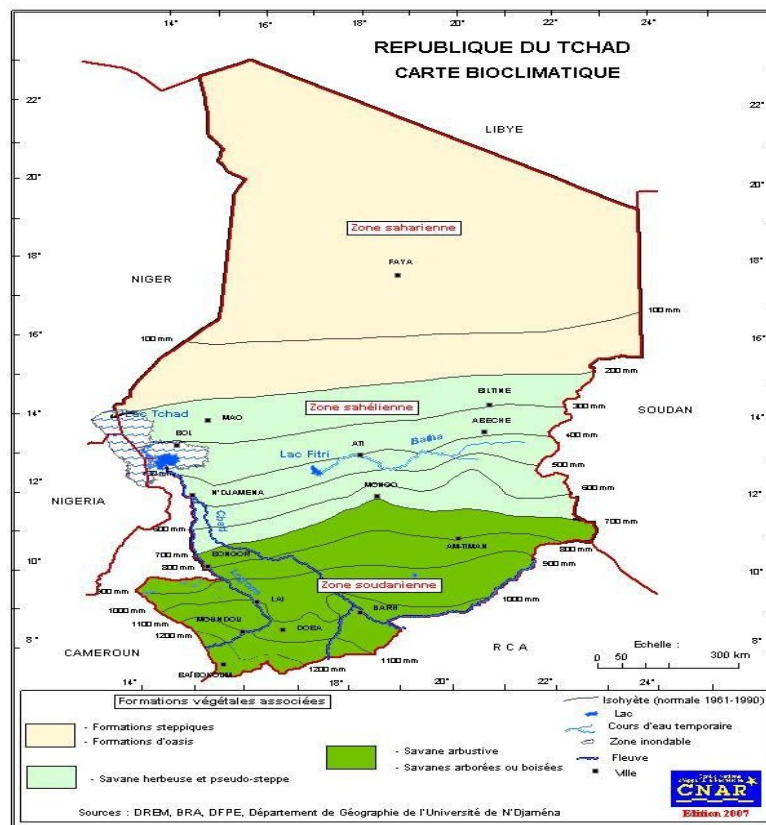
Chad's dry tropical climate lies between isohyets 0 and 1,200 mm in three major bioclimatic zones (Figure 2):

The Saharan or desert zone in the north, covering the northern part of the provinces of Borkou-Tibesti-Ennedi (BET) and the northern parts of the provinces of Kanem and Batha, i.e. 47% of the national territory. With rainfall of less than 100 mm/year, only oasis agriculture and camel and small ruminant farming can be practised. The rainy season lasts from two months in the north to almost zero in the far north.

The Sahelian zone in the centre of the country covers 43% of the national territory. With rainfall ranging from 100 to 800 mm/year, there are major contrasts between the arid northern part (Saharo-Sahelian climate with annual rainfall of between 100 and 200 mm) and the Sahelo-Sudanian zone in the south, characterised by rainfall of between 600 and 800 mm/year.

The Sudanian zone in the south of the country, between the 800 and 1,200 mm isohyets, represents only 10% of the national territory. However, it is home to almost half of Chad's population. The subhumid tropical climate - rainfall in the Sudano-Guinean zone in the extreme south of the country is over 1,200 mm - allows for a wide variety of agricultural production and the rearing of numerous species (cattle, goats, sheep, pigs, poultry).

Figure 2: Chad's three main bioclimatic zones



Source: PANA, Ministry of the Environment and Water, 2009.

3.1.3 Rainfall

After the wet years of 1950 and 1960, the decline in rainfall began towards the end of the 1960s, in line with what was observed in the Sahel, and intensified during the 1970s and 1980s before easing slightly from the 1990s and 2000s. Changes in the national rainfall index show a high degree of variability from 1965 onwards, with a downward trend having repercussions on natural and human systems.

The length of the agricultural season is also subject to significant inter-annual variability, with a marked trend towards shorter seasons. Another trend is the increased frequency of prolonged dry periods during the rainy season.

3.1.4 Temperatures

In Chad, the interannual change in the temperature index from 1950 to 2019 shows a continuous rise in temperature from the early 1980s to the present day. Globally, 1990 and 2000 were the hottest years since meteorological records began in Chad. Maximum temperatures rose by an average of 1.1°C across the country. Minimum temperatures are estimated to have risen by 2°C over the period 1951-2010 and maximum temperatures by 1°C, with high values between 2002-2010 (Mbaiguedem, 2012).

3.1.5 Extreme weather events observed

In Chad, the resurgence of extreme weather phenomena (droughts, floods, heat waves, violent winds, etc.) is one of the highlights of climate change in recent decades (PANA, 2010). The droughts of the 70s and 80s caused a drop in agricultural and livestock production, loss of human life and biodiversity, degradation of plant cover, migration of the population and livestock, and food insecurity (PANA, 2010).

The drought that prevailed during the 2009/2010 season affected almost 2 million people, with a reduction in the cereal harvest of around 31% compared with the five-year average, and more than 50% in the Sahelian zone (FAO, 2011).

The climate is having a major impact on the major hydrographic systems of the Lake Chad and Niger basins, as well as on natural, agro-sylvo-pastoral, fishing and human systems. They involve dysfunctions in agricultural seasons, disruptions to the biological cycles of crops and a drop in cereal production.

3.1.6 Climate projections

Climate models show that it is very likely that temperatures in Africa will rise by an average of 3 to 4°C over the 21st century, or 1.5 times more than the global average. This temperature increase will be greatest in arid continental regions.⁵

The results of the projections of changes in precipitation and temperature based on 29 global models from the CMIP6 experiment for 2030 compared with the most optimistic scenario (RCP4.5 or representative profile of changes in greenhouse gas concentrations) and the pessimistic scenario or RCP8.5, indicate a significant increase in surface temperatures relative to the period 1981 to 2010. According to these RCPs, the average temperature in Chad would rise by an average of +1°C for the optimistic scenario, particularly in the northern part of the Sahel and the entire Saharan zone. For the RCP8.5 (pessimistic scenario), this increase would be around + 1.5°C by 2030 in the far north of the country. With regard to rainfall, the projections indicate widespread increases throughout the country. This increase, which varies from 10 to 20%, will be greater in the northern parts of Chad.⁶

At the N'Djamena station, the change in temperature over time from 1950 to 2100 relative to the 1981-2010 climatological reference shows an increase in temperature of around +1°C in 2030 and +2°C in 2100.⁷

However, these climate projections, particularly those relating to rainfall, are subject to numerous uncertainties (AGRHYMET, 2015). Between global factors and regional and continental dynamics, the climate of Sahelian Africa is subject to considerable uncertainty.⁸

3.2 Policies, strategies and institutional frameworks

As part of the government's development policy, Chad, which aspires to become an emerging country by 2030, intends, among other things, to strengthen environmental protection, adapt to the effects of climate change and considerably reduce greenhouse gas emissions.

⁵ National Strategy to Combat Climate Change in Chad, 2017.

⁶ National Strategy to Combat Climate Change in Chad, 2017.

⁷ National Strategy to Combat Climate Change in Chad, 2017.

⁸ National Strategy to Combat Climate Change in Chad, 2017.

greenhouse effect. However, given the country's high exposure to the effects of climate change, the Republic of Chad has ratified several international agreements on climate change and has also developed several policies, strategies and initiatives aimed at effectively combating the harmful effects of climate change.

Environmental protection is enshrined in the Chadian Constitution (Articles 47 and 52 and Law N°014/PR/1998. National climate policy is entrusted to the Ministry in charge of the environment - currently the Ministry of the Environment, Fisheries and Sustainable Development - through the Department of Environmental Education and the Fight against Climate Change (DEELCC).

By signing and ratifying the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and 1993 respectively, and by ratifying its Kyoto Protocol in 2009 and the Paris Climate Agreement in 2015, the Chadian government committed to making the medium- and long-term changes needed to mitigate greenhouse gas (GHG) emissions and adapt to the harmful effects of climate change by developing more resilient and appropriate strategies. Within this framework and in line with its commitments, Chad has developed and implemented policies, strategies and plans that address the impacts of climate change:

- (i) The 1st National Communication on climate change in 2001 and the 2nd^{ème} in 2012⁹ ;
- (ii) National Action Programme to Combat Desertification (PAN-LCD) adopted in 2000, with four priority objectives: sustainable development of sectors, safeguarding threatened ecosystems, combating desertification and risk management;
- (iii) National Adaptation Programme of Action (NAPA) presented in 2009 ;
- (iv) Nationally Determined Expected Contribution (NDEF) which became NDC after the ratification of the Paris Agreement came into force on 12 January 2017;
- (v) Chad's National Rural Sector Investment Plan (2016 - 2022) ;
- (vi) Action Plan for the implementation of the National Framework for Climate Services in Chad (2016-2020) ;
- (vii) National Development Plan (NDP 2017-2021);
- (viii) Chad's National Strategy to Combat Climate Change (SNLCC) 2017 ;
- (ix) National Environment Policy (PNE), 2017 currently being validated ;
- (x) Vision 2030, the Chad we want (2017) ;
- (xi) The National Adaptation Plan is currently being drawn up;
- (xii) Update of the CDN.

4 The updated mitigation contribution

Chad's updated NDC is based on updated information, in particular a GHG emissions inventory covering the period from 2010 to 2018, the year chosen as the reference year. The target set in the conditional scenario is to reduce GHG emissions by 19.3% in 2030, compared with a baseline scenario. Chad intends to achieve this conditional target while continuing its development efforts and making sustainable use of its available resources.

4.1 Reference situation

4.1.1 Coverage of CDN

The NDC covers national GHG emissions from the energy, agriculture, forestry, land use and waste sectors. Emissions from industrial processes have not been included due to lack of data. Nevertheless, they are considered to be low given

⁹ The Third National Communication was submitted to the UNFCCC Secretariat in September 2021 but was in the process of being formalised at the date of submission of the NDC.

no emitting processes have been identified, except for non-energy uses of fuels and cooling appliances.

The revision of Chad's NDC has made it possible to review the GHG emissions inventory over the 2010-2018 time series by applying the latest IPCC guidelines on the basis of available statistics. Emissions from new sectors, such as fugitive emissions, CH₄ and N₂O emissions from wood combustion, wastewater treatment emissions, etc. have been included.

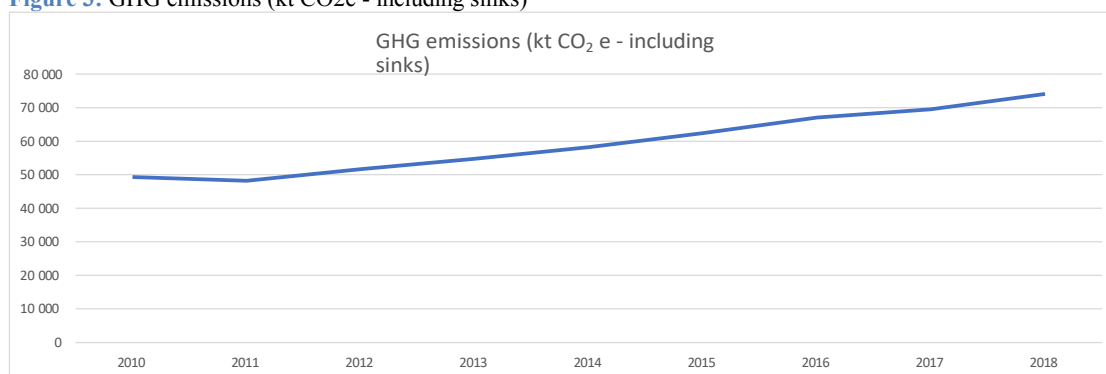
The GHGs covered are CO₂, CH₄ and N₂O. The GWPs applied are those of the IPCC AR4. The 2006 IPCC guidelines are applied to all the sectors covered.

4.1.2 GHG emissions inventory

The updated GHG emissions inventory covers the period 2010 to 2018 and the following sectors:

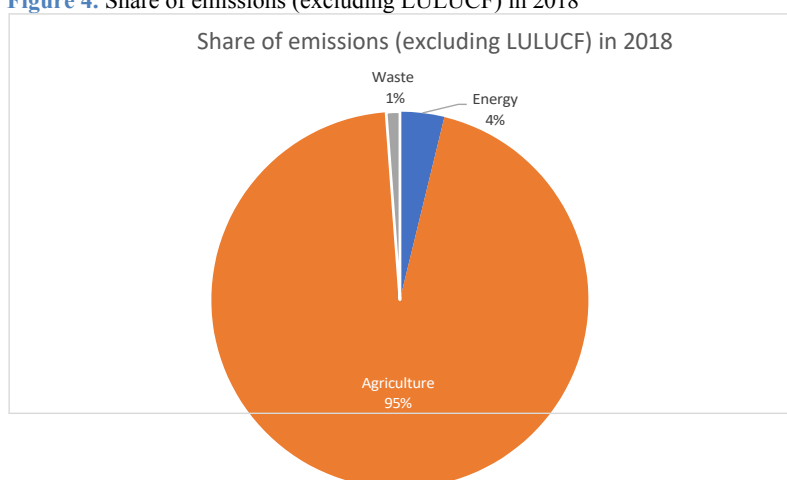
- Energy: power generation, industry, transport, housing, fugitive emissions from oil and gas extraction and charcoal production,
- Agriculture,
- Land use, land-use change and forestry,
- Treatment of solid and liquid waste.

Figure 3: GHG emissions (kt CO₂e - including sinks)



According to the inventory results, GHG emissions including sinks rose from 49,320 kt CO₂eq to 74,090 kt CO₂eq between 2010 and 2018, an increase of 50%.

Figure 4. Share of emissions (excluding LULUCF) in 2018



Agriculture is the main GHG-emitting sector in Chad, accounting for around 95% of GHG emissions.

4.1.1 The reference scenario

Under this reference scenario, GHG emissions would increase from 74,090 to 84,960 kt CO₂e between 2018 and 2030. This projection was developed using the GACMO tool, taking into account the following sectors:

Table 1 GHG emissions (kt CO₂eq) according to the reference scenario over the period 2018-2030

kt CO ₂ eq	2018	2020	2025	2030
Energy	2 834	2 988	3 605	4 299
Industrial processes	NE	NE	NE	NE
Agriculture	71 019	72 444	76 140	80 024
UTCATF	- 641	- 654	- 687	- 722
Waste	878	954	1 157	1 360
TOTAL	74 090	75 733	80 214	84 960

The energy sector

The energy sector covers the energy production and transformation sectors, as well as the uses in the various sectors. The energy balances of the United Nations Statistics Division (UNSD), which are consistent over the period 2010 to 2018, were used to estimate GHG emissions from this sector. For biomass consumption, only CH₄ and N₂O emissions are considered in this sector, in accordance with IPCC guidelines. CO₂ emissions linked to biomass consumption are accounted for in the LULUCF sector.

The Chadian economy is largely dependent on oil production (20% of GDP and more than 80% of goods exports in 2019), which began in 2003 and enabled the country to enjoy a period of rapid growth until 2014 (average annual growth rate of 13.7%). Fugitive emissions from oil extraction are estimated to account for around 30% of energy emissions in 2018. As this is a recent and modern industry, emission factors from developed countries have been applied. Fugitive emissions from charcoal production are also estimated on the basis of the 2019 refinement of the IPCC guidelines and represent 18% of energy emissions.

In terms of electricity production, the rate of access to electricity was around 11% in 2020, concentrated mainly in N'Djamena and certain urban areas. According to the 2021-2023 Emergency Electricity Access Plan, the objective for 2030 is to achieve an electricity access rate of 53% throughout the country. Activity and associated emissions linked to electricity production therefore increase rapidly in the reference scenario.

In terms of final consumption, the transport sector is the main consumer of petroleum products.

The residential/tertiary sector consumes mainly wood and charcoal.

Manufacturing industry is underdeveloped and consumes mainly biomass and electricity.

In the absence of official projections, annual growth rates of between 4% and 6% are applied depending on the sector, on the basis of estimated changes in GDP and population over the period. For electricity generation, the growth rates follow the population's electricity connection targets.

Industrial processes

Manufacturing is marginal, based mainly on beer and soft drinks production, sugar production and cotton ginning.

Only emissions linked to energy consumption are recorded for this sector. Emissions linked to the non-energy use of fuels and fluorinated gas leaks are not estimated and are considered negligible.

Agriculture

Chad's GHG emissions in the agriculture sector are mainly linked to livestock farming (79% of the sector's emissions, of which 50% are due to enteric fermentation and 29% to manure) and the burning of savannah (13%). They also come from rice-growing activities (2%), the use of fertilisers and the burning of agricultural residues (3%).

Emissions from livestock farming were estimated using statistics provided by the Central Bureau of the General Livestock Census for the period 2010 to 2020, using a Tier 1 method and the IPCC's default emission factors.

Emissions linked to agricultural production (rice growing, burning of crop residues and direct and indirect N_2O emissions from cultivated soils) were also estimated using data on surface area, production and fertiliser consumption provided by Chad's statistical services. Assumptions regarding the burning of residues on cotton and cereals were based on references to practices in Mali, and rice growing was assumed to be rainfed with a growing season of 183 days from May to October. Emissions were then calculated using the Tier 1 methods of the 2006 IPCC guidelines. As for GHG emissions linked to savannah burning, data on the surface area and biomass burnt were retrieved directly from the FAO website, to which the methodologies in the 2006 guidelines were applied.

Forest and Land Allocation

Chad is divided into two very distinct zones: the desert zone in the north, with almost no vegetation cover, and the Sudano-Sahelian zone, with around 128,400,000 ha of vegetation cover.

Emissions/removals related to the Land Use, Land Use Change and Forestry (LULUCF) sector were estimated on the basis of the 2006 IPCC guidelines. Changes in land use were estimated on the basis of maps produced by the U.S. Geological Survey Earth Resources Observation and Science (USGS EROS) centre, which show changes in land use over the period 1975-2015. The characterisation of the different types of land use (forest, savannah, etc.) in terms of productivity is based on data collected from the P-SIDRAT Land Use Database (BDOCS). Estimates of wood consumption are also based on work carried out as part of the SIDRAT programme.

The LULUCF sector's sink, estimated at -5,144 kt CO_2eq in 2010, has fallen to -641 kt CO_2eq in 2018 due to a high rate of deforestation.

Waste

The quantities of waste produced in 2030 are estimated on the basis of a historical average per capita of around 88 kg/capita/year (World Bank data). This rate of waste production is considered stable until 2030.

The reference scenario envisages a continuation of the same waste management practices as currently observed: around 86% of the quantities of waste go to open landfill sites, considered as shallow unmanaged landfill sites, and the remainder is treated by open fires.

Under these conditions, the emissions associated with solid waste treatment, calculated by applying the 2006 IPCC guidelines, would increase from 326 kt CO_2eq in 2018 to around 546 kt CO_2eq in 2030, an average increase of 5% per year over the period.

For wastewater, the quantities of BOD (biochemical oxygen demand) produced are estimated at almost 293 kt per year in 2030 compared with almost 222 kt in 2020. Continuing current management practices would lead to GHG emissions of 814 kt CO₂eq in 2030, compared with 552 kt CO₂eq in 2018.

Cumulative emissions from the three sub-sectors (open fires, water storage and treatment) are estimated at around 1,360 kt CO₂eq in 2030, compared with 878 kt CO₂eq in 2018, representing an average annual increase of 4.3%.

4.2 Mitigation objectives

4.2.1 Approach

Chad presents mitigation objectives in terms of reductions relative to the baseline scenario by 2030. The impact of the actions considered, in terms of reducing GHG emissions, is estimated using the GACMO tool. The actions essentially cover the power generation, industry, residential, fisheries and forestry sectors.

Two scenarios are considered for the emissions projections: an unconditional scenario (where only nationally funded actions are implemented) and a conditional scenario (with additional mitigation actions covered by international support).

4.2.2 Results

The unconditional scenario results in a minimal reduction of 0.5% in 2030 compared with the reference scenario.

Most of the actions have been included in the conditional scenario, which enables a 19.3% reduction in GHG emissions to be achieved by 2030 compared with the reference scenario, i.e. 16,372 kt CO₂eq of emissions avoided by 2030 and 88,350 kt CO₂eq of emissions avoided cumulatively between 2018 and 2030. This scenario is very ambitious given that the reduction in emissions is based solely on the energy sector (electricity production and energy efficiency), on increasing the carbon sink and very slightly on the waste sector.

Figure 5. Chad's GHG emissions according to the unconditional and conditional scenarios for the period 2010-2030

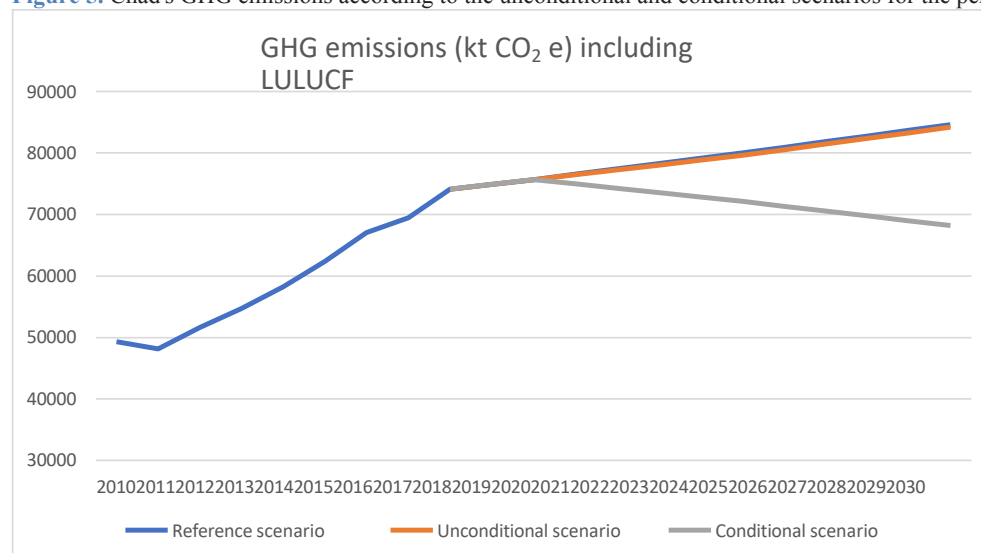


Table 2 GHG emissions (kt CO₂eq) and impacts of the different scenarios over the period 2018-2030

kt CO ₂ eq	Reference scenario		Unconditional	Conditional
	2018	2030	2030	2030
Energy	2 834	4 299	3 909	2 320
Industrial processes	NE	NE	NE	NE
Agriculture	71 019	80 024	80 024	80 011
UTCATF	- 641	- 722	- 722	- 15 049
Waste	878	1 360	1 360	1 305
TOTAL	74 090	84 960	84 571	68 588
% discount			0,5	19,3

The actions considered are described below:

The energy sector

The projects considered between now and 2030 in the scenarios for the electricity generation sector are:

Unconditional scenario :

- The construction of a 210 MW gas turbine power station at N'Gouri in the Lac Province;
- The inclusion of 2.2 MW of wind turbines;
- The installation of improved drying ovens for the fisheries sector (150 chokor-type ovens and 200 improved drying racks), enabling savings of 30 to 40% in wood consumption compared with a traditional oven for smoking fish.

Conditional scenario (additional actions) :

- The construction of two biomass power stations (2x15 MW each) in Moundou and Sarh;
- Implementation of the project to interconnect the electricity grid between Chad and Cameroon, which would make it possible to use hydroelectric power (40 MW);
- The construction of several large-scale photovoltaic power stations totalling 240 MW in the very short term (2025) and 400 MW by 2030;
- The construction of hybrid solar-diesel power plants totalling 60 MW (several projects are under study in Sarh, Moundou and Pala);
- The construction of a 65 MW solar power plant with storage in the city of N'Djamena;
- The construction of 100 MW wind farms at Bol, Mao, Amdjarass, Faya, Biltine, Fada, Guéréfa, Iriba, Kalaite and Arada;
- Extending the use of improved ovens and drying racks for the fishing industry (1,500 chokor ovens and 2,000 improved drying racks), thereby reducing wood consumption for this activity.
- In terms of energy efficiency, the actions are :
 - o The distribution of 3,000,000 low-energy LED lamps to households and 100,000 LED bulbs to offices;
 - o An ambitious plan to distribute 3,000,000 improved wood-burning stoves and 1,500,000 charcoal-burning stoves;
 - o The efficient production of 300,000 tonnes of charcoal, making it possible to improve production yields and thus reduce wood consumption and CH₄ emissions.
- Lastly, the avoidance of CH₄ by installing 10,000 digesters on farms to reduce fossil fuel consumption is considered in the conditional scenario.

The implementation of these actions by 2030 will make it possible to avoid the emission of 6,900 kt CO_{2eq} compared with the reference scenario, of which 1,979 kt CO_{2eq} are accounted for in the energy sector, 4,909 kt CO_{2eq} are accounted for in forestry (due to the drop in wood consumption in the residential and industrial sectors) and finally 12 kt CO_{2eq} with the avoidance of CH₄ emissions.

This commitment could be strengthened in the future by implementing mitigation measures in the transport sector, in particular through the construction of railway lines, the development of public transport in towns and cities and improving the energy efficiency of the vehicle fleet, in particular by banning imports of vehicles that are too old. This sector has not been considered in the actions, due to the lack of precise data on the rolling stock and consumption at national level. A more precise inventory of this sector should be carried out in order to assess the actions to be implemented and their impact in terms of mitigation.

Agriculture

Agriculture is the largest emitting sector in Chad. However, none of the actions planned (apart from the installation of digesters on farms, which is counted as energy) are directly aimed at reducing agricultural emissions, as the main objectives are linked to the country's food security and the development of agricultural productivity.

The priority for this sector should therefore be to refine the activity data and practices that will enable the GHG emissions inventory to be refined, so that a detailed action plan can be drawn up in line with the priorities defined at national level.

Forest and Land Allocation

Reforestation and reforestation actions are underway or planned to improve the carbon sink by 2030. As part of the Bonn Challenge, Chad has committed to reforesting a total of 5 million hectares by 2030, including shrub savannahs in the Sahel (3.5 Mha) and wooded savannahs in the Sudan (1.5 Mha). The 2030 action plan also includes protection measures to prevent deforestation (877,000 ha) and restoration measures (50,000 ha).

The impact of these actions is estimated at additional absorptions of 9,400 kt CO_{2eq} in 2030, plus 4,909 kt CO_{2eq} of emissions avoided as a result of energy efficiency actions.

Waste

The implementation of a national waste management policy is crucial in terms of public health and the country's development. The conditional scenario takes into account the setting up of waste treatment plants in the major urban centres, with an estimated reduction of around 10% in emissions linked to solid waste management. The priority is still to improve knowledge of the sector and to implement effective waste collection and treatment measures, such as the recovery of methane generated in managed landfill sites. The treatment of wastewater (particularly in urban areas) and the introduction of waste composting should also be studied.

5 The updated adaptation contribution

Adaptation is a key element in Chad's NDC, given its extreme vulnerability to climate change, resulting from a combination of severe poverty among the majority of the population, high risks of drought and flooding, and frequent conflicts. Chad is considered by the international scientific community to be one of the world's climate change hotspots. Indeed, Chad was classified as the country most at risk, out of 186 countries assessed, as part of a study on climate vulnerability.¹⁰

¹⁰ Climate Change Vulnerability Index 2017. Verisk Maplecroft 2016

Aware of these challenges, the Government of Chad clearly emphasised the need for adaptation in its first NDC, which defined several priority sectors and measures. Since then, the government of Chad has developed a number of strategies and action plans that reinforce actions aimed at building a more climate-resilient economy and society. These include "Vision 2030, the Chad we want" and the National Development Plan 2017 - 2021, the National Strategy to Combat Climate Change and the National Environmental Policy (2017).

5.1 Status of adaptation at Chad

The priority sectors for intervention and the groups vulnerable to climate change described in the first NDC carried out by the NAPA were taken up and slightly updated in the second national communication and the Green Climate Fund Country Programme. It should be noted that Chad does not have complete and detailed studies of the vulnerability of the population and socio-economic sectors. This task has been identified as a priority in the UNDP project financed by the Global Environment Facility (GEF) "Plan National d'Adaptation du Tchad (PNA)".

The updating of this NDC, in terms of adaptation actions, took place in parallel and in close collaboration with the preparation of the first NAPA. This made it possible to carry out consultations at national and regional level and to update the list of the main climate hazards, vulnerable sectors and strategic priorities in terms of adaptation, taking into account as a starting point the priorities defined in the NAPA, the first NDC, the national strategy to combat climate change and the FVC country programme, which are summarised in the table below.

Table 3 Priorities defined in the NAPA, the first NDC, the SNLCC and the FVC country programme

2015	PANA-2009CDN -	National Strategy to Combat CC - 2017	Green Climate Fund Country Programme - 2019
Water	Water	Agro-sylvo-pastoral and fisheries production systems	Improving the resilience of agricultural production systems and urban systems
Agricultural production	Agriculture		
Grazing	Breeding		
-	Fishing	Managing the risks of extreme events	-
Risk Management	Risk Management		Preventing risks and managing extreme weather events

The importance of adaptation to climate change in national and sectoral policies is demonstrated by the integration into national plans and strategies of aspects related to the sustainable management of natural resources, the effective coordination and convergence of climate change initiatives, the integration of adaptation into national planning and into policies and strategies at central, regional and local levels. As well as the effective application of relevant and easily understandable weather and climate information and services.

5.2 Climate risks and vulnerable sectors

According to the national and provincial consultations undertaken during the preparation of the 2021 NDC and the NAP-GEF studies, the main climate hazards and impacts in Chad are as follows:

Table 4 Main climate hazards and impacts in Chad

Main climatic hazards	Priority sectors	Factors increasing vulnerability	Main impacts
<ul style="list-style-type: none"> • Droughts 	<ul style="list-style-type: none"> • Breeding • Agriculture • Water and sanitation • Health/Nutrition, Environment • Fishing • Social • Education, Trade 	<ul style="list-style-type: none"> • Reduced biodiversity and degradation of productive and forest ecosystems • Deterioration in the quality of water resources and fragility of aquatic ecosystems 	<ul style="list-style-type: none"> • Reduction in drinking water reserves • Loss of potential for agriculture and livestock farming, and associated income (loss of crops, livestock) • Loss of fishing potential and associated income • Malnutrition • Loss of life • Loss of natural habitats for wildlife and birds • Erosion
<ul style="list-style-type: none"> • Rising temperatures 	<ul style="list-style-type: none"> • Breeding • Agriculture, Health/Nutrition, Environment, Education • Social • Water and sanitation • Trade 	<ul style="list-style-type: none"> • Urbanisation • Degradation of agro-forestry systems • Deterioration in the quality of water resources, and weakening of the aquatic ecosystems 	<ul style="list-style-type: none"> • Reduced water reserves potable • Loss of potential for agriculture and livestock farming, and associated income (loss of crops, livestock) • Loss of fishing potential and associated income • Malnutrition, • Loss of life • Increased attacks by pests and harmful insects

			<ul style="list-style-type: none"> Impacts on biodiversity and ecosystem degradation
<ul style="list-style-type: none"> Flooding 	<ul style="list-style-type: none"> Water and Sanitation Breeding Agriculture Health/Nutrition Environment Fishing Social Commerce, Infrastructure and Housing Transport Tourism 	<ul style="list-style-type: none"> Erosion Solid and liquid waste No territorial planning Inadequate sewerage systems 	<ul style="list-style-type: none"> Extension and multiplication of flood zones Destruction and loss of land, habitats, community resources and associated income Disturbance of certain natural and productive ecosystems, and associated income Loss of grazing Crop losses Loss of public and private infrastructure Diseases Loss of life
<ul style="list-style-type: none"> Violent winds 	<ul style="list-style-type: none"> Breeding Agriculture Health/Nutrition Environment Fishing Social Water and sewerage, Trade Infrastructure and housing Transport Tourism 	<ul style="list-style-type: none"> Degradation of forest and plant cover Inadequate infrastructure 	<ul style="list-style-type: none"> Destruction and degradation of infrastructure Loss of livestock Silting up of wells and ponds, Eye diseases, Wind erosion

It should be noted that these hazards and impacts vary in importance and priority according to the bioclimatic zones of Chad.

Table 5 Bioclimatic zones of Chad, hazards and priority sectors

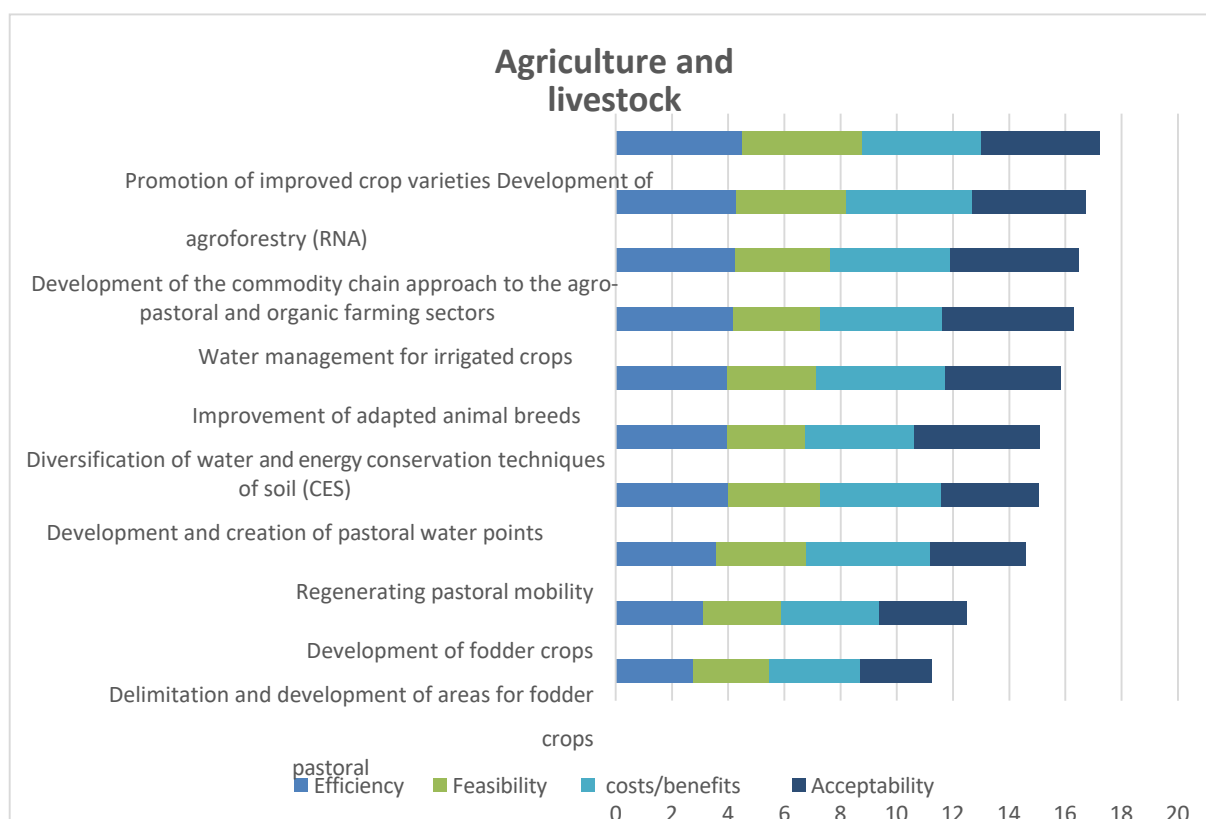
Bioclimatic zone	Significant risks	Priority sectors
Saharan	<ul style="list-style-type: none"> Heatwave crisis 	<ul style="list-style-type: none"> Breeding Agriculture

	<ul style="list-style-type: none"> • Intense cold • Sandstorm • Acute drought 	<ul style="list-style-type: none"> • Trade • Steppes • Crafts • Water resources
Sahelian	<ul style="list-style-type: none"> • Seasonal drought • Sandstorm • Intense rainfall 	<ul style="list-style-type: none"> • Water resources • Agriculture • Breeding • Crafts • Fishing • Forests • Energy
Sudanese	<ul style="list-style-type: none"> • Intense rainfall • Seasonal drought • River flooding 	<ul style="list-style-type: none"> • Water resources • Agriculture • Breeding • Fishing • Forests • Energy • Trade

5.3 Priority areas for action adaptation

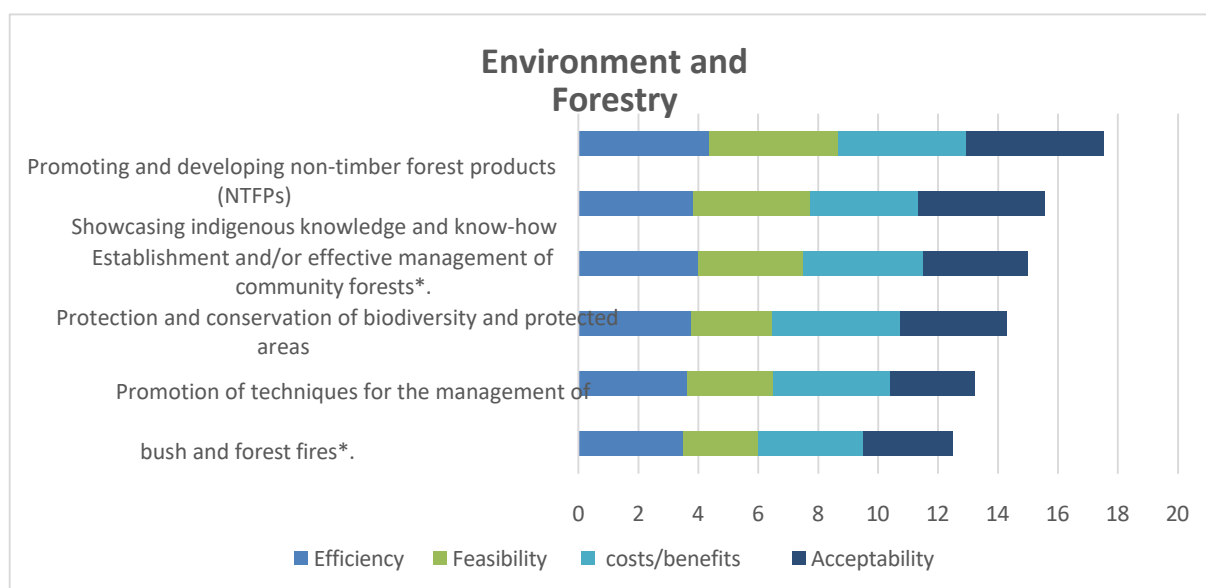
Priority adaptation options were identified for each intervention area on the basis of national priorities, consultations with stakeholders at national and regional level, as well as consultation in the regions with communities and regional officials and analysis of the vulnerability of Chad's climate-sensitive sectors. The studies used a combination of literature review, focus group discussions and individual interviews. The following graphs summarise the priority measures for each area of intervention, ranked according to a score compiling assessments of the effectiveness, feasibility, cost/benefit ratio and acceptability of each measure.

The following areas of intervention have been classified according to the results of consultations with stakeholders: Agriculture and Livestock, Environment and Forestry; Water and Sanitation; Renewable Energy; Gender and Social Protection; Education and Communication; Risk Management, Infrastructure and Spatial Planning; and Fisheries Resources and Aquaculture. It should be noted that the number and order of priority intervention areas has changed in comparison with the first NDC. Stakeholders have also identified an additional number of priority intervention areas, namely the environment, gender and social protection and education.



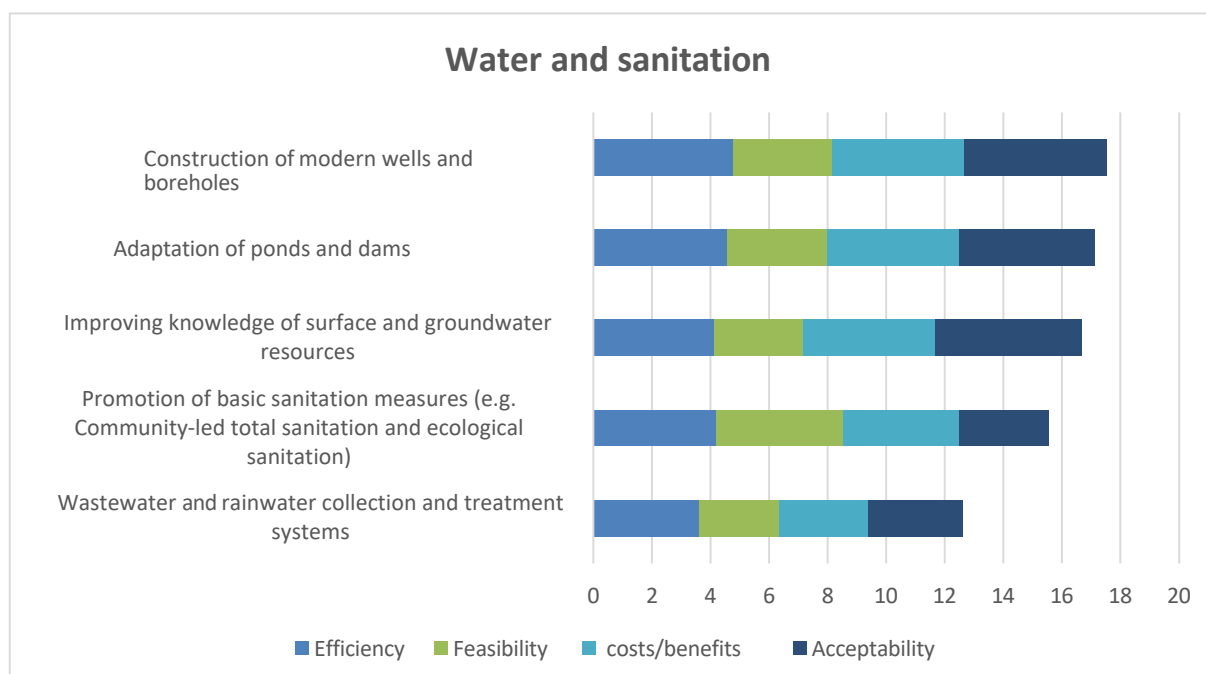
Agriculture and livestock farming: As a landlocked country, its economy is essentially based on agriculture and livestock farming, sectors that are highly sensitive to climate change. The agricultural sector, which is dependent on climatic conditions, is strongly affected by climate change (reduced harvests, shrinking crop areas, drought, etc.). The limited capacity of local populations to adapt to climate risks is also a major obstacle to building resilience.

The priority adaptation options envisaged represent a number of measures aimed at becoming more resilient. They revolve around reducing threats by intervening in hazards, notably through the promotion of improved crop varieties, which offer higher and more stable yields and better resistance to the climate. Other priority options in terms of agriculture and livestock farming also include the development of agroforestry and the development of the commodity chain approach to agro-pastoral sectors, improving the overall efficiency of livestock farming, investing in improved pasture management, regulating pastoral mobility and diversifying water and soil conservation techniques.



Environment and forests: Rising temperatures and more frequent droughts could affect the renewal of forest systems, leading to irreversible deforestation. Protected areas cover 12% of the country but are subject to strong pressures: pastoral pressure, poaching, fishing, demographic pressure, over-exploitation of natural resources, bush fires and agriculture. In Chad, there is a significant lack of environmental data, which limits the possibility of assessing impacts.

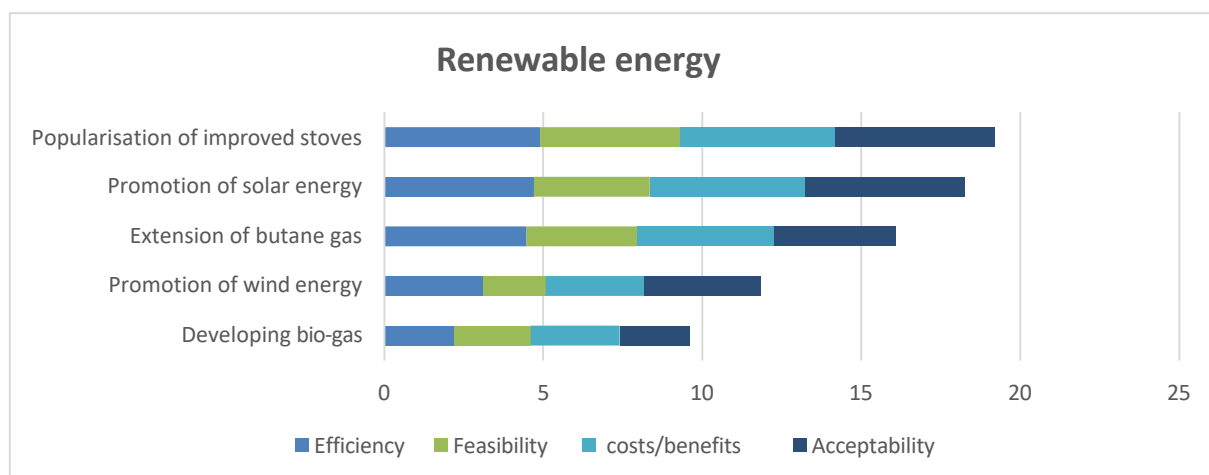
The adaptation measures identified will support forest restoration and sustainable forest management, for example, through the promotion of non-timber forest products, which will benefit biodiversity conservation and reduce deforestation and the impact of flooding, as well as contributing to the development of income-generating activities for communities.



Water and sanitation. Current projections of water availability in Chad are highly uncertain under both GHG emission scenarios. The combined effects of reduced rainfall and high temperatures are leading in some cases to the drying up of certain watercourses and drinking water installations. When flooding occurs

When floods occur, they increase the pollution of surface and groundwater. Floods also pollute groundwater through poorly protected catchment structures. In urban areas, most people relieve themselves in latrines that are leaky or leaking and dug deeper than the water table. Access (or lack of access) to water, sanitation and hygiene makes a major contribution to Chad's structural vulnerability, and affects the country's health and nutrition situation. In terms of education, shortcomings in water, sanitation and hygiene also penalise the development of human capital.

The proposed water, sanitation and hygiene options will improve health and contribute to the economic benefits of communities. These measures will improve community access to basic water and sanitation and support climate-resilient water and sanitation infrastructure. As well as the sustainable use, protection and management of surface and groundwater resources, and the resilient management of solid and liquid waste.



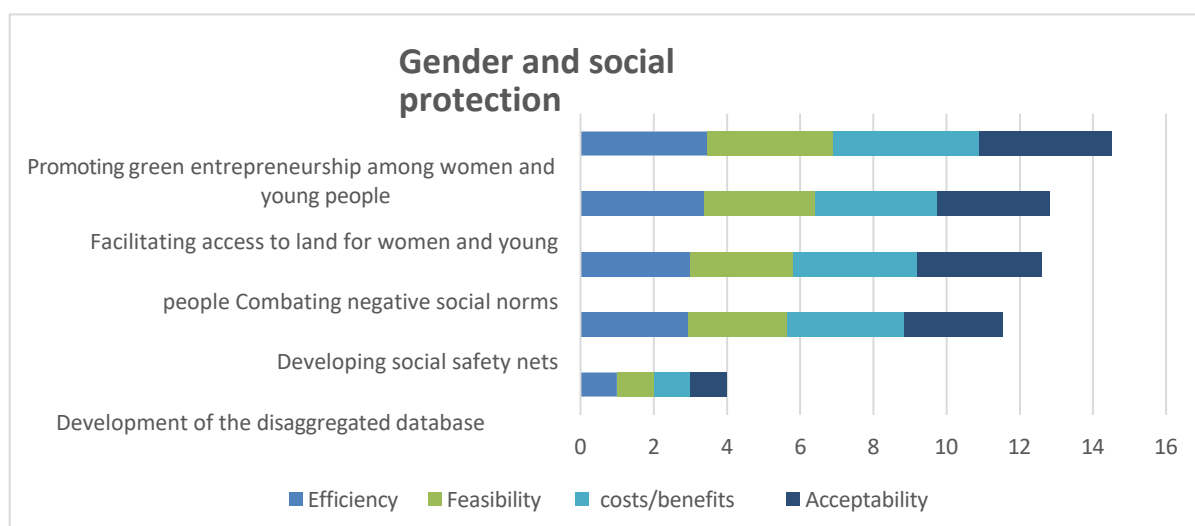
Renewable energies. 96.5% of national energy consumption is dominated by the consumption of wood fuels, the productivity of which is highly dependent on the climate and its variations.¹¹ This over-exploitation of wood resources for household use, combined with climate change, has led to deforestation of more than 90% of the national heritage and the extinction of certain plant species from 1970 to the present day.¹² As the main source of energy for cooking is wood or charcoal, the vulnerability of wood energy can have a considerable impact on the households that depend on it, especially the poorest people.¹³

The priority options identified include measures that will promote and support the use of renewable energies, such as biogas and solar energy, which will help to reduce communities' dependence on firewood. This will help to reduce deforestation and land cover degradation, and will have a positive impact on the economy, public health and the environment.

¹¹ Country Programme for the Chad Green Climate Fund, 2019

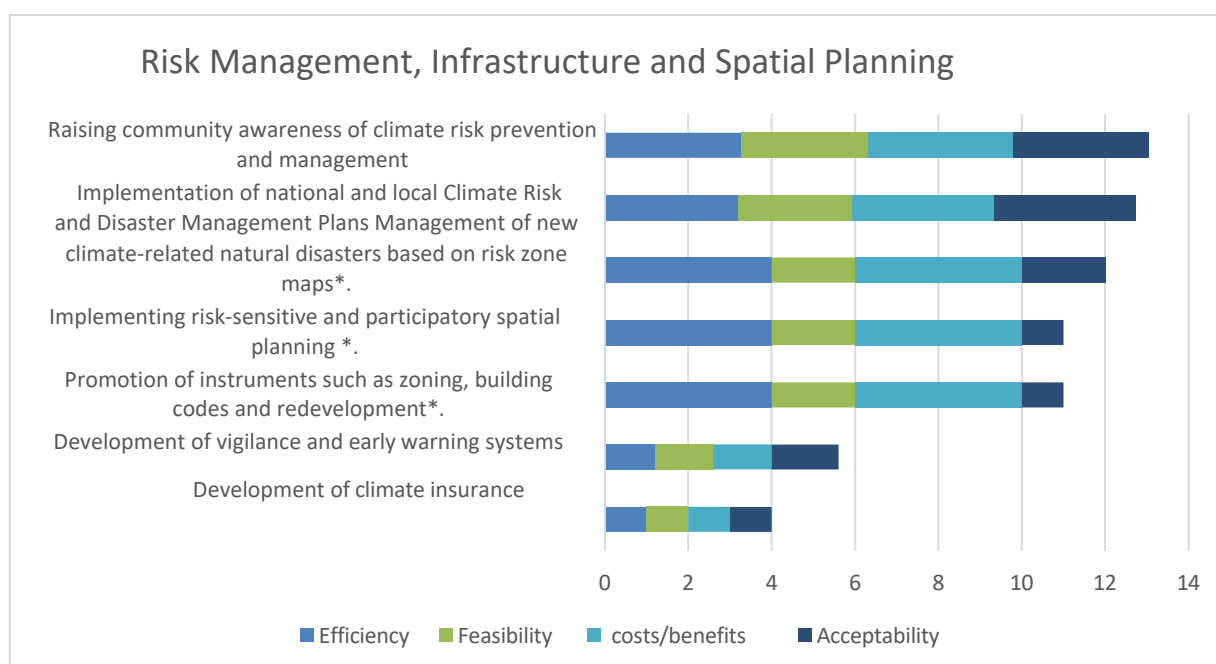
¹² Country Programme for the Chad Green Climate Fund, 2019

¹³ Country Programme for the Chad Green Climate Fund, 2019



Gender and social protection. Limited education, cultural barriers, unequal social responsibilities and the low level of participation by women in decision-making are at the root of their vulnerability and hamper their ability to adapt to climate change¹⁴. Women are not in the same position as men to face the negative impacts associated with climate change and do not have the same capacities and opportunities to deal with them, which exposes them or makes them more vulnerable.

The priority options identified to address these issues include facilitating women's access to land, developing social safety nets and developing a disaggregated national database.

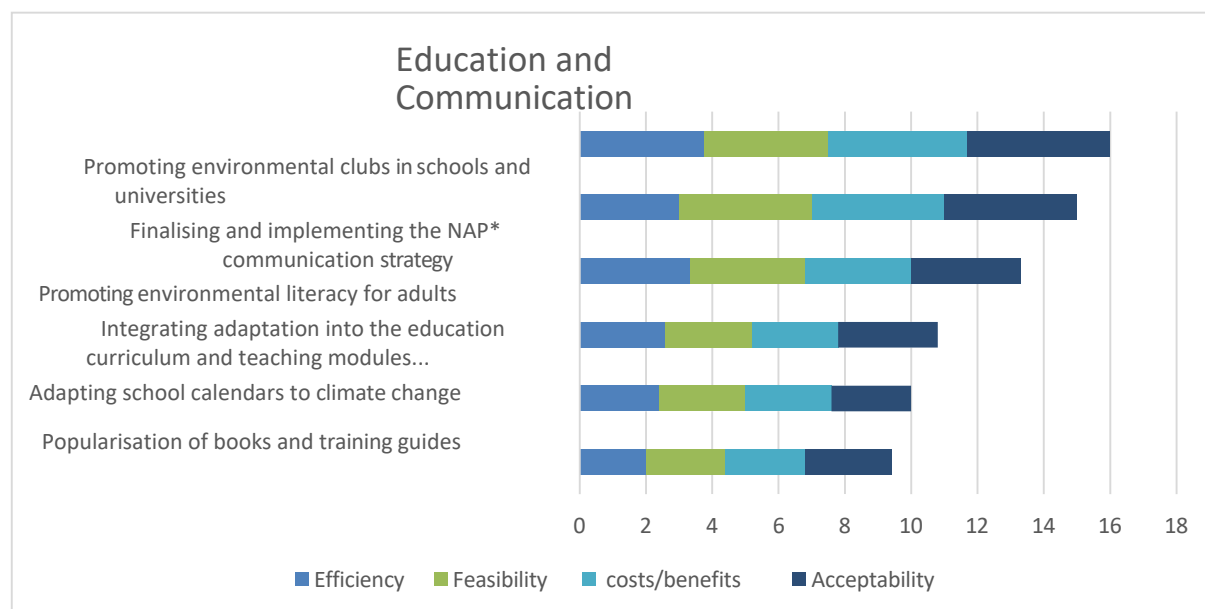


Areas of intervention risk management, infrastructure and spatial planning. Climate change will have a major impact on human settlements and economic production sites, particularly in densely populated urban areas such as N'Djamena, Moundou or Sarh. Urban centres are already facing episodes of flooding during heavy rains or river flooding. Chad relies heavily on road transport, but the country's road density ranges from 6 to 40.5 km per 1,000 km² and many roads are not paved.

¹⁴ IISD. MEP. 2021. Integration of gender in the NAP process in Chad.

Asphalt roads become impassable during the rainy season, leaving many villages and rural communities isolated.

Priority options will improve community preparedness and include the integration of risk reduction measures such as early warning mechanisms for floods and droughts. Adaptation measures will benefit urban settlements by reducing their vulnerability to the effects of extreme weather events through risk mapping, climate-resilient building codes and infrastructure rehabilitation.

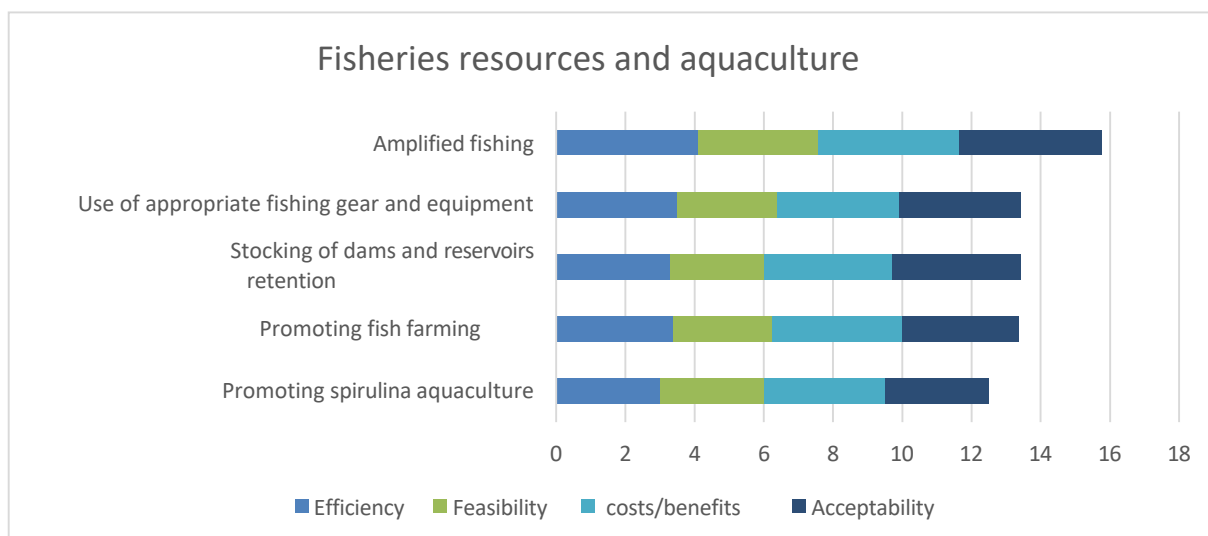


Education and communication.

Education is a key sector for advancing all of Chad's development objectives. It is directly and indirectly affected by climate change, particularly extreme events (floods, heat waves, etc.), which can kill schoolchildren and teachers or have an impact on school infrastructure. According to UNICEF's Climate Risk Index for Children (CRIC), Chad is the second country in the world where children are most at risk from climate change.¹⁵

Consequently, and through the priorities identified for this area of intervention, the expected result is that adults, young people and children improve their knowledge and information while encouraging them to take part in school activities focusing on climate adaptation and resilience in order to contribute to solutions to climate change.

¹⁵ UNICEF. 2021. Unicef. 2021. The climate crisis is a crisis of children's rights.



Fisheries resources and aquaculture: Variations in rainfall patterns and water use have an impact on freshwater fishing activities. Climate variability has a greater impact on fishing and small-scale spirulina production. Consequently, irregular rainfall leads to low productivity in fisheries and spirulina-producing wadis. The fishing and aquaculture sector is essentially small-scale and is faced with recurring droughts, the clogging up of rivers and lakes due to erosion in the catchment areas as a result of accelerated deforestation. The integration of climate change in this sector is very weak due to the insufficient quality of economic analyses and in-depth assessments of the risks and vulnerability of the fisheries sector.

The priority options identified include measures that will help communities to better adapt to climate impacts and, at the same time, improve their livelihoods, such as the practice of enhanced fishing or the stocking of dams and retention basins.

6 Cross-cutting adaptation-mitigation issues and priorities

6.1 The gender dynamic

Two studies have recently been carried out, the first on gender and climate change in Chad¹⁶, the second on gender mainstreaming in the NAP process¹⁷, and have highlighted the importance of integrating the gender component into climate change programmes in Chad.

The two studies also highlighted the poor understanding of the concept of gender by the various players (national decision-makers, and some women themselves) and the links with climate change. This is partly due to a lack of training in inclusive development approaches, but also to the lack of development initiatives based on the systematic collection of data disaggregated by sex and age. For example, the role of women in ecological management and the inequalities in access to and control over resources that exacerbate their vulnerability remain little recognised. The two studies highlighted three cross-cutting priorities that will be important to advance in the two strands of the NDC, adaptation and mitigation:

¹⁶ Sarr and Djoula. 2020. Chad - gender and climate change analysis. Project to strengthen the resilience of local communities to the impact of climate change in Chad. National Water Fund.

¹⁷ Global Network of National Adaptation Plans and Ministry of the Environment, Water and Fisheries. 2021.

- Strengthen the capacity of the ministry responsible for gender and other ministries involved in the fight against climate change to play their role as catalysts for integrating gender into gender-sensitive adaptation planning, budgeting and formulation systems,
- Systematically implement the gender approach when drawing up climate policies and sustainable development strategies, plans, programmes and projects,
- Guaranteeing women's access to decision-making bodies through support that provides education, information and economic empowerment.

6.2 Regional planning

Spatial planning has emerged as an important cross-cutting element in the planning and effectiveness of the NDC's mitigation and adaptation priorities.

Effective land-use planning is an important element of a successful response to climate change, as it can both influence greenhouse gas emissions and represent a cost-effective adaptation strategy at a national, regional or local scale. Land-use planning choices significantly influence the ultimate impacts of climate change and can increase resilience to the impact of climate change through the location, mix and design of development. Currently, more and more countries are integrating consideration of climate risks into risk-sensitive planning decisions, particularly in urban areas.

Decisions about land use and infrastructure can either significantly reduce or increase risk, particularly in cities. If investments in infrastructure, housing and other facilities have been made in hazardous locations, the risk is locked in for decades and it would be much more costly to correct it than to avoid its creation. It will be important to further integrate risk reduction measures that take into account the effects of climate variability and change, with the help of flood and drought early warning mechanisms to improve community preparedness. Adaptation actions will benefit urban settlements by reducing their vulnerability to the impacts of extreme weather events through risk mapping, climate-resilient building codes and infrastructure upgrades. Measures will also include improvements to the energy efficiency of buildings, green spaces and parks, which will have a beneficial impact on mitigation.

6.3 Measures generating co-benefits

One of the important elements to emerge from the consultations in Chad is the importance of emphasising and prioritising actions that create synergies and co-benefits in terms of adaptation and mitigation. Indeed, between now and 2030, Chad will be implementing a number of climate change adaptation measures that will result in benefits in terms of mitigation, especially nature-based solutions (NBS), which will have the advantage of strengthening resilience to climate change, contributing to the capture of GHGs and also making it possible to achieve other SDGs. These actions will also have beneficial effects on biodiversity, health and the socio-economic well-being of communities.

As such, and given the vulnerability of agriculture to changes in rainfall patterns in the country, the promotion and support of SBN relating to sustainable and climate-smart agriculture as well as agroforestry which as nutrient management of cropland, tree planting in croplands and conservation agriculture offer a significant mitigation return coupled with a considerable number of adaptation benefits with environmental and socio-economic benefits in terms of improved biodiversity and ecosystem services as well as increased agricultural production, improved livelihoods, food security and nutrition.

Livestock management and sustainable grazing and feeding practices can have benefits in terms of improving soil fertility, vegetation cover and grassland ecosystems, which will have associated climate adaptation and carbon sequestration benefits. These actions will also be associated with manure management practices and composting, which will have mitigating effects by reducing methane (CH⁴) and nitrous oxide (N₂O) emissions.

Other adaptation measures with mitigation benefits will support forest restoration and sustainable forest management, which will benefit biodiversity conservation and reduce deforestation, and the impact of flooding, which will contribute to carbon sequestration and help communities set up alternative income-generating activities.

Integrating adaptation and mitigation into access to water, sanitation and hygiene will improve health and contribute to the economic benefits of communities. Adaptation measures will improve communities' access to basic water and sanitation and support climate-resilient water and sanitation infrastructure. Mitigation measures will also be integrated in terms of wastewater treatment and the use of solar energy to extract water, which can reduce emissions.

It is also important to note that stakeholders have identified renewable energy as an important area of intervention for adaptation, as promoting and supporting the use of renewable energy, such as biogas and solar energy, will generate co-benefits by reducing methane (CH⁴) and nitrous oxide (N₂O) emissions from manure and will reduce communities' dependence on firewood. This will help to reduce deforestation and the degradation of vegetation cover, which, as well as increasing carbon sequestration, is an important element in reducing vulnerability to climate change and will have economic, public health, health and environmental benefits.

6.4 Contributions to the Rio Conventions and SDGs

Most of the adaptation and mitigation measures in this NDC are in perfect synergy with Chad's commitments under the three Rio conventions on biodiversity, climate change and desertification, as well as with the Sustainable Development Goals and its commitments under the Bonn Challenge to restore 5 million hectares of degraded and deforested land by 2030.

In this context, the priority adaptation measures identified and the mitigation actions promoted by this NDC will support the restoration of forests and land, tackle the causes of biodiversity loss, land degradation and reduce greenhouse gas emissions.

In this way, and through nature-based solutions, these actions will contribute to the objectives of neutrality of land degradation by 2030. At the same time, they will promote the conservation, management and restoration of several ecosystems, as well as interventions that call for the protection and conservation of biodiversity and the restoration of ecosystems and their services, which are part of the objectives of the strategic plan of the Convention on Biological Diversity.

Some of the response measures will also generate synergies and co-benefits, particularly in terms of mitigation, from activities generating reductions in greenhouse gas emissions, which will be carried out in the agriculture, forestry and other land use (AFAT) sectors.

The NDC also generates synergies that can also generate co-benefits for several of the SDGs, particularly with regard to activities linked to themes such as drinking water and sanitation, agriculture, resilience, infrastructure, land use and management, forests, ecosystems, the environment, disaster risk reduction and awareness-raising,

employment, well-being, resource efficiency and adaptive capacity, which are linked to SDGs 1, 2, 3, 4, 5, 6, 7, 9, 10, 13 and 15.

7 Means of implementation

7.1 Follow-up of actions and needs in terms of support

7.1.1 Monitoring mitigation actions

The mitigation actions considered in the scenarios are clearly identified, which will make it possible to effectively monitor their implementation and their real impact in terms of reducing GHG emissions, as well as the support received. Monitoring indicators and the entities responsible for monitoring will be defined in the NDC implementation plan for each of the actions.

7.1.2 Investment requirements

The investment required to implement the NDC mitigation actions is estimated below:

Table 6 Investment required to implement the NDC mitigation actions

Sector	Unconditional scenario (MUSD 2020)	Conditional scenario (MUSD 2020)	TOTAL (MUSD 2020)
Energy			
<i>Power stations</i>	296,9	1 613,6	1 910,5
<i>Electrical network</i>	111,2	956,9	1 068,1
<i>Energy efficiency</i>	0,1	111,8	111,9
Agriculture - Digester	-	2,5	2,5
Forestry	-	3 556,2	3 556,2
Waste	6,6	44,4	51,0
TOTAL	414,8	6 285,4	6 700,2

Implementation of the actions covered by the conditional scenario will require international financial support of USD 6,285,385,669, or 94% of the investment required to achieve the national objective.

7.2 Funding requirements for adaptation measures

The review of the achievements of the 1^{ere} NDC reveals that the adaptation funding committed during the 2016-2020 period is insufficient in relation to needs. The revised NDC also considers a larger number of priority sectors and measures.

Given the lack of studies and quantified data to determine the socio-economic impacts of climate change on the various sectors in Chad, it was difficult to estimate the cost of adaptation interventions. The funding requirements for this NDC have therefore been estimated on the basis of a range.

The minimum amount is estimated using a "top-down" approach, which estimates adaptation needs as a percentage of GDP. This approach is based on global simulations of adaptation needs developed by the UNEP (*top-down* approach taken from the *Adaptation Gap Report*), as well as several reports and studies which have estimated that adaptation costs could be equivalent to a

annual loss of between 1.5 and 3% of GDP in Africa by 2030.¹⁸ As Chad is one of the most vulnerable countries in the world, the estimate of 3% of GDP was chosen.

According to this approach, the financing needs to respond to the high level of climate risks expected in Chad could amount to more than USD 375 million from 2021 (based on an estimate of 3% of gross domestic product), rising to an annual cost of USD 645 million by 2030 (Table 7). **Based on these annual simulations, financing requirements for the period 2021-2030 could amount to more than USD 5.002 billion.**

Table 7 Summary of adaptation financing needs (top-down approach)

(In millions of USD over the period 2021-2030)

	GD P		Requirements of financing at 3% GDP (USD million)
	Annual growth	(USD billion)	
2021	IMF estimate	12,531	375,9
2022	IMF estimate	13,269	398,1
2023	IMF estimate	13,98	419,4
2024	IMF estimate	14,96	448,8
2025	IMF estimate	16,01	480,3
2026	IMF estimate	17,03	510,9
2027	6%	18,05	541,5
2028	6%	19,13	573,9
2029	6%	20,28	608,4
2030	6%	21,50	645
Total			5002,2

The proposed financing needs of USD 5.002 billion for the revised NDC are more conservative than the adaptation financing needs included in the 2015 NDC, which totalled USD 14.169 billion. This value is kept as the maximum value of adaptation costs for the period up to 2030. It is derived from the extrapolation of the costs of two Chadian national programmes focusing on resilience: the Chad Country Resilience Programme as part of the Global Alliance for Resilience (AGIR) (PRP_AGIR) and the National Rural Sector Investment Plan (PNISR) covering the period. The costs of these two programmes were extrapolated by applying an annual population growth rate of 3.5% and an annual inflation rate of 2.9%¹⁰ to arrive at a figure of USD 14.169 billion.

The PNISR, worth a total of FCFA 2,301.7 billion, is based on five programmes:

- Sustainable management of natural resources and adaptation to climate change (CFAF 243.6 billion);
- development of infrastructure and equipment for the rural sector (CFAF 1,277.1 billion);
- development of agro-sylvo-pastoral and fisheries sectors (CFAF 360.1 billion);
- food and nutritional security, gender and strengthening the resilience of rural households (CFAF 94.6 billion);
- research, technology adoption and dissemination, and human and institutional capacity building (CFAF 326.3 billion).

¹⁸ Watkiss, P. 2010. *The economics of climate change*.

The overall cost of the GWP is CFAF 1,241 billion over a 5-year period up to 2020, and its priorities are based on the following 4 pillars:

- Pillar 1: improve social protection for the most vulnerable communities and households to secure their livelihoods (FCFA 415.7 billion) ;
- Pillar 2: strengthen nutrition in vulnerable households (CFAF 249 billion) ;
- Pillar 3: sustainably improve agricultural and food productivity, the incomes of the most vulnerable and their access to food (CFAF 564 billion);
- Pillar 4: strengthening governance of food and nutritional security (CFAF 12 billion).

The actual cost of adaptation by 2030 is estimated at between 5 and 14 billion US dollars. More detailed cost estimates of adaptation needs will be drawn up by the NAP-GEF.

Priority international support required

Without neglecting the importance of domestic and private sources of funding, international financial contributions from Technical and Financial Partners will have to play a very significant role. Given that Chad is one of the least developed countries, priority international contributions are estimated at around 75% of financing needs, and should amount to more than USD 281 million per year from 2021, rising to more than USD 483 million per year by 2030.

It should be noted that the Green Climate Fund Country Programme has an estimated budget of USD 2.280 billion for eleven (11) adaptation projects up to 2030, and that the programme addresses only part of the priority sectors identified by this updated NDC.

Climate investment plan

Given that the anticipated financing needs require large-scale investment, which the government of Chad cannot make available on its own, a specific approach is required in terms of access to financial resources to achieve the country's NDC objectives.

An investment plan will define the priorities and funding programme required to implement the various measures. A list of project concepts will be drawn up, with funding proposals to be submitted to funding sources. In this context, Chad will need a combination of national budget allocations, external sources of funding and private sector financing.

Among other things, the climate investment plan will estimate the resource requirements and propose additional financial mechanisms and instruments needed to finance the NDC. It will also propose mechanisms to encourage or mobilise the private sector in order to promote the mobilisation of resources. It will also help to propose a mechanism for monitoring the investments made for the implementation of the NDC and to propose a framework for the annual report on the funds mobilised and the investments made for the implementation of the revised NDC.

In addition, and in order to strengthen climate governance within the government of Chad, the feasibility of implementing a Chad Climate Fund will be explored on the basis of national and international experience, which could be responsible for mobilising funding opportunities for the implementation of NDC activities and other activities related to the mitigation and adaptation to climate change in the long term.

7.3 Capacity building and technology transfer

Attenuation

In order to reduce the inherent institutional, technical, political and financial risks, the technical, research and coordination capacities of the stakeholders must be strengthened. Chad encourages the Parties listed in Annex 1 of the Convention to provide technical and financial support for the implementation of initiatives to monitor and evaluate the NDC in Chad. In particular, support for the establishment of the National MRV Agency involving the various sectors will enable the establishment of a national transparency system covering the regular updating of GHG inventories, the definition and reporting of mitigation action monitoring indicators and the necessary and received support.

Capacity building in the field of national statistics and the definition of mitigation actions at sectoral level. This is particularly the case in the context of the energy transition (energy accounting, forecasting, programming of energy management actions, monitoring and evaluation of actions implemented, definition of new sectoral action plans, etc.) but also in other sectors such as agriculture, LULUCF (with the introduction of a forest inventory and monitoring over time of the impact of actions) and waste treatment. Building the capacity of stakeholders to implement the carbon market mechanisms provided for in Article 6 of the Paris Agreement, as well as technology transfers.

Chad has a high need for capacity building and technology transfer, in addition to land, security, climate and financial risks. The country's attractiveness to the private sector is also very low due to a number of complex socio-economic and geopolitical factors. Local capacity in the value chain of sustainable energy projects is insufficient, and statistical data on energy resources is limited.

Given the government's priorities in terms of renewable energy, rural electrification and energy efficiency ("The Energy Policy Letter (LPE) (2018 - 2030), the level of development of the sustainable energy sector in Chad and the urgent need to intervene in the electricity sector, the following actions are in urgent need of capacity building and technology transfer:

- ▶ Strengthening the electricity sector :
 - Improving the legal and regulatory framework needed for the sector to function properly;
 - Restructuring of SNE and review of its fundamentals (pricing policy, collection policy);
 - Lower production cost per kWh ;
 - Developing and improving electricity distribution and transmission networks across the country;
 - Institutional capacity building to enable an efficient energy market;
- ▶ Increasing access to energy for the entire population;
 - Development of electrification in main and secondary towns;
 - Developing electrification in rural areas using decentralised solutions such as mini-grids or solar kits;
 - Develop alternatives to firewood for cooking;
- ▶ Promoting the share of renewable energy in Chad's energy balance ;
 - Increasing the contribution of renewable energies to the electricity grid ;
 - Promoting renewable energy solutions for rural electrification;
 - Promotion of social RE electrification projects;
 - Strengthening local technical skills in renewable energies and improving market control procedures;

- Support for actions relating to technologies and innovation in the field of Energy Efficiency:
 - Strengthening support procedures and developing the domestic and industrial EE market;
 - Promotion of improved fireplaces and clean cooking;
 - Promoting local technical skills in EE and improving market control procedures;

The cost of capacity-building is estimated at between USD 20 and 30 million, with international support.

Adaptation

In order to reduce vulnerability and increase resilience, adaptation needs include human, institutional and technical capacity building, financial support and technology transfer.

Human and institutional capacity-building needs :

- Informing, educating and communicating about climate risks and adaptation technologies (developing people's capacity to react);
- Strengthen the skills of stakeholders (especially women and farmers) in new technical itineraries as part of intensified and sustainable production methods;
- Support research and encourage technology transfer between research bodies and agro-sylvo-pastoral stakeholders;
- To support institutions in defining adaptation priorities according to socio-economic sectors in line with the needs of the population and to promote cross-sectoral coherence, particularly when drawing up the National Adaptation Plan.

Organisational capacity-building needs :

- The country's civil society organisations and local authorities need to be strengthened in terms of :
- Definition of a vision and strategy to better address the concerns of disadvantaged and/or vulnerable groups;
- Definition of appropriate organisational structures ;
- Setting up mechanisms for seeking funding and resource management systems (financial and human).

Technical organisational capacity-building needs :

- Local and regional authorities need capacity in participatory formulation and implementation of climate change adaptation strategies, programmes and projects that are integrated into local sustainable development plans;
- Players need knowledge and expertise in :
 - Construction of protective structures against the impacts of climate change;
 - Designing and implementing greener modes of production and consumption;
 - Identification of vulnerable species ;
 - Design and development of warning and prevention systems for disasters resulting from climate change;
- Knowledge and know-how of active participatory research methods (devolved administrations), associations, NGOs, researchers and other development players - these training courses

should focus on the adaptation of vulnerable groups to the impacts of climate change.

Capacity-building needs in terms of access to information and knowledge :

- Elaboration and implementation in each country of a communication strategy between the administration coordinating the climate change component and the other development players;
- Development of a national awareness, information and training programme on climate change or support for existing programmes;
- Support for all relevant stakeholders to participate in global, regional and sub-regional climate change fora;
- The need to inform and train the leaders and facilitators of provincial, local and community forums on themes relating to the adaptation of vulnerable groups to climate change.

Research and development capacity-building needs :

- Support to identify and develop action research projects in the field of policy and regulation to increase the necessary know-how in voluntary carbon trading, the mobilisation of the resulting financing and transparent and equitable benefit-sharing mechanisms.

7.4 Political mechanisms and institutional arrangements

Adaptation and mitigation require the active participation of different actors and responses at multiple levels. The consequences of climate change are felt at the local level and, as a result, the active participation of stakeholders at local, national and regional levels is essential to promote the adaptation decisions that are taken during the UNFCCC negotiations.

Chad already has a number of structures and an institutional framework for implementing the Paris Agreement. In particular, within the ministry responsible for the environment, the Department of Environmental Education and the Fight against Climate Change (DEELCC) is designated as the national focal point for the Paris Agreement, and coordinates climate action with all public and private stakeholders, especially with all sectoral ministries (Ministry of Agriculture, Ministry of Livestock, Ministry of Public Health, Ministry in charge of mines, energy and petroleum, Ministry in charge of infrastructure and transport, Ministry in charge of regional planning, Ministry in charge of trade and industry, Ministry of national education, Ministry in charge of higher education, Ministry in charge of information and communication, Ministry in charge of women and social affairs, Ministry in charge of national defence).

The High National Committee for the Environment (HCNE), created by Decree No. 822/PR/MET/95 of 20 October 1995, is another important body in this institutional system, since it ensures the effective application of the articles of the Constitution relating to environmental protection; the effective integration of the environment and development; and the practical implementation of sustainable development policies. The HCNE also has an arbitration function in the event of conflicting options between development and environmental protection priorities.

During the consultations to update the CSD, it was noted that there was an urgent need to improve and, above all, to operationalise and ensure the stability of the institutional framework and the focal points in order to avoid wasting energy on climate governance. This action is essential to guarantee the sustainability of the implementation of climate actions and projects.

These actions to strengthen the institutional framework must also reinforce the role of non-state actors and local communities in the formulation and implementation of policies and decision-making processes.

A more in-depth study of the institutional framework with a view to recommending practical structures is required.

7.5 Voluntary cooperation under Article 6 of the Paris Agreement

For the preparation and implementation of mitigation projects, the country intends to seek international assistance from the various sources available, including development assistance agencies, bilateral and multilateral financial institutions, the financial mechanisms of the UNFCCC as well as recourse to the market-based mechanisms for sustainable development of Article 6.4 but also non-market-based approaches that are provided for in Article 6.8 of the Paris Agreement.

ANNEX 1

Information required to facilitate the clarity, the transparency and understanding (ICTC)

1. Quantifiable information on the reference point (including, as appropriate, a reference year)	
a. The reference year(s), reference period(s) or other starting point(s)	2018 is the reference year for emissions projections to 2030.
b. Quantifiable information on the reference indicators, their values during the reference year(s), reference period(s) or other starting points and, where appropriate, the target year.	For the reference year 2018, total emissions, including the LULUCF sector, are 74,090 kt CO ₂ eq. The national target is expressed as a percentage reduction in GHG emissions compared with the reference scenario in 2030.
c. With respect to strategies, plans and measures referred to in paragraph 6 of Article 4 of the Paris Agreement, or policies and measures forming part of Nationally Determined Contributions, where subparagraph b) of paragraph 1 above shall not apply, the Parties must provide other relevant information	Not applicable
d. A target in relation to the benchmark, expressed numerically, for example as a percentage or an amount of reduction.	The target is to reduce GHG emissions by 19.3% in 2030 compared with the baseline scenario. The unconditional scenario, based on the country's own resources, will lead to a 0.5% reduction in emissions in 2030 compared with the reference scenario. Implementation of the conditional scenario, based on international support, would enable a total reduction in emissions of 19.3%.
e. Information on sources of data used to quantify the reference point(s)	GHG emissions for the base year are quantified according to the 2006 IPCC guidelines for all sectors. The GWPs applied are those of AR4.
f. Information on the circumstances in which the Party may update the values of the benchmark indicators.	The national inventory of GHG emissions for the period 2010 to 2018 has been updated to 2021. It could be improved and supplemented, in particular by estimating emissions from industrial processes and by relying on national statistics rather than international databases, especially for the balance sheet, energy and waste treatment.
2. Timeframe and/or implementation period	
a. The timetable and/or period of implementation, 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)	2021-2030
b. Whether the objective is annual or multiannual, as appropriate	The target is set for the year 2030
3. Scope and field of application	
a. A general description of the target	An unconditional reduction target of 0.5% in 2030 compared to a reference scenario (- 389 kt CO ₂ eq reduction).

	This target has been increased to a total of 19.3% under the of the conditional scenario (-16,372 kt CO ₂ eq reduction) with international support.
b. The sectors, gases, categories and reservoirs covered by the contribution determined at national level, including, where appropriate, in accordance with the guidelines of the Intergovernmental Panel on Climate Change (IPCC)	CDN covers : <ul style="list-style-type: none"> - All of France; - All sectors in accordance with IPCC guidelines (energy, agriculture, LULUCF, waste), with the exception of Industrial processes whose emissions are considered negligible; - The following GHGs; CO₂, CH₄ and N₂O; AR4 GWPs are applied.
c. The manner in which the Party has taken into account subparagraphs (c) and (d) of paragraph 31 of decision 1/CP.21	Chad's NDC includes all the anthropogenic emissions and removals covered by the 2006 IPCC guidelines, except for industrial processes, whose emissions are considered to be as negligible.
d. The mitigation benefits resulting from the Parties' adaptation actions and/or economic diversification plans, including a description of projects, actions and initiatives relating in particular to the Parties' adaptation actions and/or economic diversification plans.	<p>The Republic of Chad has identified a number of mitigation benefits from adaptation measures, particularly in agriculture, which is a highly vulnerable sector. Adaptation techniques should make it possible to reduce emissions in this sector, particularly through intelligent agriculture. Implementing climate-resilient agricultural projects will generate mitigation and adaptation co-benefits. Other programmes below:</p> <ul style="list-style-type: none"> -Local governance for access to land and land tenure security for the most vulnerable groups in the Lac Province - Promotion of the solar pumping system to mobilise water, energy and agricultural diversification in the Lake Province - Promoting the use of composting through pilot sites - Construction of ponds with solar-powered boreholes and an anti-erosion system to provide access to water (for drinking and livestock watering) on the vulnerable plain - Support for climate governance, agricultural production adapted to climate change and the empowerment of women and young people in the Lac province - Boosting innovative farming practices that are intelligent and resilient to climate change in vulnerable regions -Promoting intelligent livestock rearing practices adapted to climate shocks through the processing, conservation and marketing of animal products
4. Planning process	
a. Information on the planning processes followed by the Party in preparing its contribution determined at the national level and, if available, on the Party's implementation plans, including, where appropriate on :	
i. National institutional arrangements, public participation and collaboration with local communities and indigenous peoples, by taking gender issues into account ;	This NDC has been designed to integrate gender equality into its planning, supporting the inclusion of gender-sensitive adaptation and mitigation measures .

	recommended during consultations
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	at national and regional level and will contribute to more effective climate action.
ii. Contextual issues, including, inter alia, as appropriate :	
a. National situation, including geography, climate, economy, sustainable development and poverty eradication	<p>A landlocked country, Chad covers an area of 1,284,000 km² and lies between latitudes 7 and 24 degrees North and longitudes 13 and 24 degrees East. It is bordered to the north by Libya, to the south by the Central African Republic, to the east by Sudan and to the west by Niger, Nigeria and Cameroon.</p> <p>Demographic indicators show that Chad's population, which was 11.1 million in 2009 (density: 8.6 inhabitants/km²), is expected to reach 15.1 million in 2018. According to the final results of the RGPH2, women and young people under the age of 15 are still in the majority, with a proportion of 50.6%, and the average annual intercensal growth rate is estimated at 3.6% (including refugees). Socially, the proportion of the Chadian population living below the monetary poverty line fell from 55% in 2003 to 46% in 2011 (ECOSIT3, INSEED, 2014). The Human Development Index (HDI) over the last five years (0.392 in 2015) has risen by 5.9% compared with 2012. In 2015, Chad committed to achieving the Sustainable Development Goals (SDGs, 2016-2030) under the aegis of the United Nations. The country is divided into 23 regions, 63 departments and 250 communes.</p> <p>Chad's climate is Saharan in the north, Sahelian in the centre, Sudano-Sahelian in the south and Sudanian to sub-humid in the extreme south. There are six (6) climatic zones (DREM, Service météorologie; 2009): the Saharan zone (< 100 mm); the Saharo-Sahelian zone (100 to 200 mm); the Sahelian zone (200 to 600 mm); the Sahelo-Sudanian zone (600 to 800 mm); the Sudanian zone (800 to 1200 mm) and the Sub-Guinean zone (>1200 mm). The rainy season lasts from two months in the north to more than six months in the extreme south of the country. Throughout the country, average minimum and maximum temperatures range from 19 to 21°C and 34 to +10°C respectively. 37 °C.</p>
b. Best practice and experience from the development of the nationally determined contribution	<p>Chad's revised NDC has benefited from a very solid architecture under the supervision of the Ministry in charge of the Environment and Climate Change. This facilitated :</p> <ul style="list-style-type: none"> • data collection; • organising consultations with stakeholders (public sector, private sector, civil society) and TFPs; • field missions ; • The organisation of focus groups in the country's departments at regional level,

	<ul style="list-style-type: none"> • The organisation of awareness-raising and training workshops on the application of scenario software emissions (LEAP and GACMO)
<p>c. Other aspirations and contextual priorities recognised when joining the Paris Agreement</p>	<p>With its self-sufficient oil resources, the Republic of Chad aspires to be an emerging country by 2025 and advocates development in line with the SDGs, as well as the African Union's Agenda 63. The priorities are :</p> <ol style="list-style-type: none"> 1- Mitigation low-carbon development strategy ; 2- In the field of Adaptation ; • 3- Financing ; • Setting up financial mechanisms for climate change ; 4- Capacity building and education; Capacity building strategy 5- Technology transfer; Assessing technology needs 6- Food safety ; 7- Gender equality ; 8- Youth initiatives ; 9- The Sustainable Development Goals (SDGs).
<p>d. Specific information applicable to Parties, including regional economic integration organisations and their member States, that have agreed to act jointly in accordance with Article 4, paragraph 2 of the Paris Agreement, including the Parties that have decided to act jointly, and the terms of the relevant agreement, in accordance with Article 4, paragraphs 16 to 18 of the Paris Agreement</p>	<p>At the UN climate summit in Washington in 2019, the Republic of Chad reaffirmed its determination to increase its ambition to contribute to efforts on climate change, and to include new sectors that were not considered in Chad's NDC published in 2015. Stakeholders were made aware of the content of the Paris Agreement, the IPCC's special report on the 1.5 degree and the CAFI letter of commitment for the forests of Central Africa during the sectoral workshops.</p> <p>These documents enabled the various stakeholders to understand the issues involved in revising the CDN to boost Chad's ambitions.</p> <p>The country specifies that its ambition has been revised upwards, in comparison with the 2015 UNFCCC and the conclusions of the last COP, which called for greater reduction ambition on the part of countries.</p>
<p>e. How the Party's preparation of its nationally determined contribution has been informed by the results of the global stocktaking, in accordance with Article 4.9 of the Paris Agreement.</p>	<p>Each Party shall communicate a nationally determined contribution every five years in accordance with decision 1/CP.21 and any relevant decisions of the Conference of the Parties serving as the meeting of the Parties to this Paris Agreement and taking into account the results of the global stocktaking provided for in Article 14.</p> <p>The Republic of Chad must clearly express the measures planned in its NDC in terms of adaptation and how this will lead to co-benefits for mitigation. The main socio-economic sectors identified as being the most vulnerable to the impacts of climate change are: agriculture, forestry, natural resources and land use.</p> <p>land and livestock farming. Most of these sectoral actions</p>

	<p>adaptation have strong synergies and co-benefits with mitigation. These co-benefits are :</p> <ul style="list-style-type: none"> - Reducing emissions ; - Promoting clean and renewable energy - Introducing the population to new energy efficiency technologies, reducing deforestation and promoting non-timber forest products - Elimination of diseases ; - Improving the added value of food crops and creating jobs for young people.
<p>f. Each Party with a nationally determined contribution under Article 4 of the Paris Agreement, consisting of adaptation actions and/or economic diversification plans that generate mitigation benefits in accordance with Article 4, paragraph 7 of the Paris Agreement,</p>	<p>Paragraph 7 of Article 4 of the Paris Agreement emphasises that the mitigation benefits of Parties' adaptation actions and/or economic diversification plans may contribute to mitigation outcomes under this Article.</p> <p>Chad is a country that produces its own hydrofuel needs and favours adaptation and economic diversification measures to achieve the Sustainable Development Goals. In particular, there is a lack of awareness and communication about the process of implementing and monitoring the SDGs, and poor mobilisation of resources for monitoring and implementing the SDGs. These measures are often subject to the threats and risks of fluctuations in commodity prices, the development of regional conflicts, the harmful effects of climate change and uncontrolled migratory flows, as well as long and porous borders.</p> <p>The information is contained in the NDC (list of projects and the social and economic benefits of mitigation and adaptation measures).</p> <p>Chad's updated 2021 NDC also sets out how it will contribute to achieving the SDGs.</p>
<p>5. Assumptions and methodological approaches, including those relating to the estimation and accounting for anthropogenic greenhouse gas emissions and, where appropriate, anthropogenic removals :</p>	
<p>a. The assumptions and methodological approaches used to account for anthropogenic greenhouse gas emissions and removals corresponding to the Party's nationally determined contribution, in accordance with paragraph 31 of decision 1/CP.21 and the guidelines for the accounting adopted by the CMA</p>	<p>The assumptions and methodological approaches used to account for anthropogenic GHG emissions and removals are based on the 2006 IPCC guidelines.</p>
<p>b. The assumptions and methodological approaches used to account for the implementation of policies and measures or strategies in the contribution determined for the national level</p>	<p>Emissions up to 2030 are based on projections and the calculation of the impact of the mitigation measures considered in the various scenarios were developed using the GACMO model (Greenhouse Gas Emissions Model). Gas Abatement Cost Model).</p>
<p>c. Where appropriate, information on how the Party will take into account existing methodologies and guidelines under the Convention for accounting for anthropogenic emissions and removals, in accordance with the</p>	<p>The GHG inventory data was collected in accordance with the 2006 IPCC guidelines, taking into account the basic principles for compiling GHG emission inventories, which are transparency, accuracy, completeness, comparability, etc. The data was compiled in accordance with the 2006 IPCC guidelines, taking into account the basic principles for compiling GHG emission inventories, which are transparency, accuracy, completeness, comparability, etc.</p>

	and data consistency.
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paragraph 14 of article 4 of the Agreement of Paris, as appropriate	
d. The IPCC measurement methods and parameters used to estimate emissions and greenhouse gas emissions. anthropogenic absorption of greenhouse gases	Methodologies : 2006 IPCC Guidelines. GWPs applied: the GWPs are those of the IPCC AR4 : CO ₂ = 1 ; CH ₄ = 25 ; N ₂ O = 298
e. Assumptions, methods and approaches specific to a sector, category or activity, in line with the IPCC, as appropriate, including, where relevant :	
i. The approach used to deal with emissions and subsequent absorptions of natural disturbances on farmland	Not applicable
ii. The approach used to account for emissions and removals of harvested wood products	Emissions and emissions from the comparison of harvested wood products have not yet been estimated. The default approach of instantaneous oxidation is therefore applied.
iii. The approach taken to deal with the effects the structure of age classes in forests	Not applicable
f. The other assumptions and methodological approaches used to understand the contribution determined at national level and, where appropriate, to estimate emissions and greenhouse gas emissions. corresponding absorptions, in particular :	
i. The manner in which the reference indicators, reference level(s), including, where appropriate, sector, category or activity specific reference levels, are constructed, including, for example, key parameters, assumptions, definitions, methods, data sources and models. used	The methodologies used to calculate GHG emissions from 2010 to 2018 follow IPCC methods, with Tier 1 emission factors applied by sector. The reference scenario is based on the differentiated growth rates by sector provided in GACMO, applied over the period 2018 to 2030.
ii. For Parties whose Nationally Determined Contributions contain elements other than greenhouse gases, information on the assumptions and assumptions made by the Parties in the preparation of their Nationally Determined Contributions. methodological approaches used in relation to these elements, as appropriate	Not applicable
iii. For climate forcing factors included in nationally determined contributions that are not covered by the IPCC guidelines, information on the way in which these factors are estimated	Not applicable
iv. Other technical information, as required	Not applicable
g. The intention to resort to voluntary cooperation under Article 6 of the Paris Agreement, where applicable	This article provides for a system of greenhouse gas emissions trading between countries that emit too much and countries that emit less. In practical terms, emission reductions achieved by one country could be bought by another. Chad is considered one of the least developed countries, and intends to use voluntary cooperation.
6. How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances	

<p>a. The way in which the Party considers that its nationally determined contribution is fair and ambitious in the light of its national situation</p>	<p>Taking into account its socio-economic situation, the Republic of Chad considers that its updated NDC is fair and sufficiently ambitious to contribute to the fight against climate change by 2030. Chad's contribution to global emissions of greenhouse gases, but it is determined to stay the course on</p>
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	<p>development of its economy while using clean, low-carbon tools and technologies.</p> <p>The updated Chad NDC is led by :</p> <ul style="list-style-type: none"> - the desire to combat poverty (MDG1), to achieve a low-carbon economy that is resilient to climate change, to achieve sustainable development by moving towards the energy transition and the use of renewable energies, and to promote the use of renewable energies. <p>emissions, particularly in relation to responsibility for past and future emissions, and the ability to invest in mitigation policies.</p>
b. Equity considerations	<p>Since the beginning of the 21st century, Chad has made real progress in forest governance and the effective implementation of actions on the ground in the fields of energy, conservation and sustainable forest management. Chad is making enormous efforts to conserve and sustainably manage the ecosystems of Lake Chad. Stakeholders at the national level consider that these efforts are important but insufficient and invite the international community to recognise not only its efforts, but also to reward the country's efforts.</p>
c. The way in which the Party has taken into account paragraph 3 of Article 4 of the Paris Agreement ¹⁹	<p>Chad's updated NDC represents an improvement on its nationally determined contribution reported in 2015. This represents a broadening of the scope of sectors targeted for mitigation.</p> <ul style="list-style-type: none"> • The contribution determined at national level benefited from the extensive participation of stakeholders (NGOs, key ministries, experts from various sectors). • The updated CDN also incorporates gender issues and the participation of women in the fight against climate change. • The updated NDC benefited from the expertise of national consultants in its preparation and drafting.
d. The way in which the Party has taken into account paragraph 4 of Article 4 of the Paris Agreement ²⁰	<p>In this context, Chad is relying on the following strategy REDD+, which proposes low-carbon development activities for the long term.</p>
e. The manner in which the Party has taken into account paragraph 6 of Article 4 of the Paris Agreement ²¹	<p>Not applicable</p>
7. The way in which the nationally determined contribution contributes to the achievement of the objective of the Convention as set out in Article 2.	
a. The way in which the contribution determined at national level contributes to achieving the objective of the Convention as set out in its Article 2 ²²	<p>It should be remembered that the ultimate objective of the UNFCCC and any related legal instruments that the Conference of the Parties to this Convention may adopt (including the Paris Agreements on climate change) is to stabilise greenhouse gas concentrations in accordance with the relevant provisions of this Convention.</p> <p>in the atmosphere at a level that prevents any dangerous anthropogenic disturbance of the system</p>

¹⁹ How does the NEC represent progress beyond the Party's previous NEC and reflect its greatest possible ambition?

²⁰ Developing countries: Information on how they continue to strengthen their mitigation efforts, and how they intend to move over time towards the Economy-wide emission reduction or limitation target (EWERLT) in the light of different national circumstances.

²¹ Least Developed Countries and Small Island Developing States may establish and communicate low greenhouse gas emission development strategies, plans and measures appropriate to their particular circumstances.

²² Article 2 of the UNFCCC sets out the ultimate objective of "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC 1992). The second sentence specifies that this stabilisation must be achieved "within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed".

	<p>climate.</p> <p>This level needs to be reached in sufficient time for ecosystems to adapt naturally to climate change, for food production not to be threatened and for economic development to continue in a sustainable manner. In the case of Chad, the degradation of the terrestrial ecosystems of Lake Chad and of food production is significant. The threats are likely to be irreversible.</p> <p>This revised NDC helps to achieve Article 2 of the Convention in terms of preserving the country's ecosystems and promoting food production.</p> <p>This contribution is based on a growing political will to strengthen the unconditional contribution and integrate climate change into the Government's sectoral policy priorities.</p> <p>The proposed measures are based on the policies, measures, strategies and plans in force in the Republic of Chad. The measures proposed in the revised NDC should not jeopardise the development the country's socio-economic situation. This should not endanger natural ecosystems or food production.</p>
<p>b. How the nationally determined contribution contributes to Article 2 paragraph 1 (a) and Article 4 paragraph 1 of the Paris Agreement²³</p>	<p>The Paris Agreements on Climate Change underline this:</p> <ul style="list-style-type: none"> - Article 2, paragraph 1, that limiting the increase in global average temperature to well below 2°C above pre-industrial levels and continuing efforts to limit the increase in temperature to 1.5°C above pre-industrial levels would significantly reduce the risks and impacts of climate change. - With a view to achieving the long-term temperature objective set out in Article 2, the Parties shall aim to achieve the global cap on greenhouse gas emissions as soon as possible, it being understood that the cap will take longer for developing country Parties, and to make early reductions thereafter in accordance with the best available science so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century, on the basis of equity, and in the context of sustainable development and poverty alleviation. <p>In the case of Chad, the country's GHG emissions are insignificant. Nevertheless, this revised NDC contributes to the implementation of Article 2 and Article 4 of the UNFCCC Paris Agreements, in particular by strengthening the activities and projects of the</p>

²³ Article 2.1(a) of the Paris Agreement includes two global temperature targets - "well below 2 degrees" and "1.5 degrees". Article 4.1 qualifies these by stating that "Parties aim to achieve the global cap on greenhouse gas emissions as soon as possible, recognising that this will take longer for developing country Parties, and to undertake early reductions of such emissions. and to undertake early reductions thereafter in accordance with the best available science...", and that Parties will also strive to "achieve a balance between anthropogenic emissions by sources and emissions by sinks" in the second half of the century

	<p>renewable energy and energy efficiency across the country.</p> <p>Chad's efforts in its NDC aim to contribute to achieving the global objective of not reaching 2 degrees Celsius.</p>
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