



REPUBLIC OF ECUADOR

**FIRST NATIONALLY DETERMINED CONTRIBUTION TO THE PARIS
AGREEMENT UNDER THE UNITED NATIONS FRAMEWORK
CONVENTION ON CLIMATE CHANGE**

MARCH, 2019



GLOSSARY OF ACRONYMS

Acronym	Description
AME	Association of Ecuadorian Municipalities
CICC	Inter-Agency Committee on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
COA	Organic Environmental Code
CONGOPE	Consortium of Provincial Governments of Ecuador
COPFP	Organic Code of Planning and Public Finances
COVNM	Non-Methane Volatile Organic Compounds
DA	Activity Data
ENCC	National Climate Change Strategy
ENOS	El Niño-Southern Oscillation
ESCOs	Energy Management Companies
ESPA	Continuous Agricultural Area and Production Survey (AAPS)
FAOSTAT	United Nations Organisation of American States Corporate Statistics Database Food and Agriculture Organization of the United Nations
GACMO	Greenhouse Gas Abatement Costs
GAD	Decentralised Autonomous Government
GBP	Good Practice Guide
GEI	Greenhouse Gases
LPG	Liquefied Petroleum Gas
GWP	Global Warming Potential
INEC	National Institute of Statistics and Census
INGEI	National Greenhouse Gas Inventory
IPCC	Intergovernmental Panel on Climate Change
LEAP	Long-Term Energy Alternatives Planning System Outreach
MAE	Ministry of Environment
MAG	Ministry of Agriculture and Livestock
MERNNR	Ministry of Resources
MIDUVI	Ministry of Urban Development and Housing
MSP	Ministry of Public Health
MTOP	Ministry of Transport and Public Works
NDC	Nationally Determined Contribution
PDOT	Land Management Plan
GDP	Gross Domestic Product
PNA	National Adaptation Plan
REDD+	Reducing emissions from deforestation and forest degradation
SENAGUA	National Water Secretariat
SENPLADES	National Secretariat for Planning and Development
SNAP	National System of Protected Areas
NIS	National Interconnected System
SOTE	Trans-Ecuadorian pipeline system
TCN	Third National Communication
USCUSS	Land Use, Land Use Change and Forestry

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FIRST NATIONALLY DETERMINED CONTRIBUTION (NDC) TO THE PARIS AGREEMENT UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

1. National circumstances, institutional arrangements and legal framework

1.1 Physical circumstances

Ecuador is an Andean country located in the western hemisphere, in the northwest of South America, with a total area of 256,370 km² covering both the continental surface, composed of 3 regions: Coast, Highlands and Amazon, as well as the Insular region. Given its status as a developing country, Ecuador is highly vulnerable to external factors

The country has a remarkable variety of ecosystems and an immense wealth of natural heritage. Twenty per cent of the territory corresponds to protected areas of different categories, with sites such as the Yasuní National Park and the Galapagos archipelago, unique in the world for their invaluable and endemic biodiversity, standing out. The National System of Protected Areas groups together the set of natural areas that guarantee the coverage and connectivity of important ecosystems at the terrestrial, marine and marine-coastal levels, as well as their cultural resources and main water sources. In the period 2008-2014 the rate of change of forest cover in continental Ecuador was -0.37%, which translates into an average net deforestation of 47,497 ha/year.

The country also has 376,018 hm³ of annual water resources, of which 361,747 hm³ are surface water resources while 56,556 hm³ are groundwater resources. The average annual volume for the regions of the country, Coast, Highlands and Amazon, is 70,046 hm³, 59,725 hm³ and 246,246 hm³, respectively.¹ Due to atmospheric factors, but also to its geography, Ecuador has multiple climates and microclimates that vary over very short distances, ranging from warm to glacial cold. of various kinds, ranging from natural or anthropogenic events to external market impacts, mainly due to its status as a primary-exporting economy.

Climate change has exacerbated the country's vulnerability, which is critical in several areas, for example, in the coastal zone, where changes in coastal dynamics require the implementation of adaptation measures in the face of rising average sea levels, receding coastlines, rising water temperatures, acidification, lack of protection against extreme weather events, and human and economic losses. Although there are no verifiable forecasts on sea level rise in Ecuador, the data managed at the global level foresee rises that allow us to consider this phenomenon as a threat with a significant impact, fundamentally in the lowest areas, which could lead not only to the

¹ Data from the Plan Nacional de la Gestión Integrada e Integral de los Recursos Hídricos de las cuencas y microcuencas hidrográficas del Ecuador, (SENAGUA, 2016).

The main causes are not only increased flooding, but also accelerated coastal erosion and the salinisation of aquifers and the final reaches of rivers.

Likewise, the intensification of natural variability phenomena, such as El Niño-Southern Oscillation (ENSO), which is one of the main phenomena affecting the region and the country, and which has a 3-, 5- and 7-year cycle of occurrence, generates alterations mainly due to increases in precipitation (El Niño phase) and precipitation deficits (La Niña phase)². This phenomenon triggers severe droughts and floods that have historically affected the national territory, including the coastal zone, causing significant damage that translates into human, socio-economic and environmental losses.

The main changes observed in precipitation, mean temperature and absolute maximum and minimum temperatures in Ecuador in the period 1960-2010 include an increase in temperature and spatial and seasonal variations in precipitation throughout the national territory. In the Galapagos Islands, recognised as a World Heritage Site, a positive change in mean, maximum and absolute minimum temperatures of 1.4°C, 1°C and 1.1°C, respectively, was observed. On average, the country's volcanoes have lost about 50% of their glacier area over the last half century.

Projections of future climate made in the framework of Ecuador's Third National Communication on Climate Change show that, if the current temperature trend continues, the change that could be expected in Ecuador would be approximately a 2°C increase by the end of the century; and even the Amazon and Galapagos would show increases greater than this value.

Considering a sectoral approach to the issue of adaptation, it is worth mentioning that the Food Sovereignty, Agriculture, Livestock, Aquaculture and Fisheries sector is one of the sectors prioritised by the National Climate Change Strategy, due to the effects that changes in temperature and alterations in rainfall patterns have on food production (domestic consumption and exports) and the repercussions that this has on prices, access to products for the population, among others.

In turn, the Productive and Strategic Sectors and the Human Settlements Sector are highly vulnerable to the effects of climate change, due to potential impacts on trade, transport, urban and rural infrastructure. Groups and settlements vulnerable to extreme weather events would see increased risk factors due to increasingly frequent and intense precipitation and extreme temperatures. In the health sector, increases in diseases and epidemics are expected to be exacerbated by climatic changes, as the distribution of disease transmitters is expected to expand and adapt to new altitudinal zones (increasingly higher altitudes).

In the case of the Water Heritage and Natural Heritage sectors, they are particularly sensitive to changes in precipitation and temperature, and would be strongly affected by the accentuation of deficit and temperature conditions.

² Ecuador: *Basic References for Risk Management*, 2014.

water surplus in water basins and altered environmental conditions in the country's ecosystems, which are characterised mostly by being very fragile.

From the point of view of greenhouse gas emissions generated by the country, it should be noted that the total emissions of the INGEI 2012 of Ecuador amount to 80 627.16 Gg of CO_{2eq}, of which the Energy sector generates the largest contribution with 46.63% of these emissions, followed by the USCUS sector, with 25.35% of the total net emissions (net value resulting from emissions minus removals). The Agriculture sector is in third place with 18.17% of GHGs emitted to the atmosphere. The Industrial Processes and Waste sectors together account for approximately 10% of the country's emissions, accounting for 5.67% and 4.19%.

The results of the estimation of emissions from sources and removals by sinks of GHGs at the national level for 2012 and the analysis of the time series 1994-2012 were carried out according to IPCC guidelines. The GHGs assessed were: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), carbon monoxide (CO), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO₂) not controlled by the Montreal Protocol. For reporting purposes, emissions/removals are expressed in units of carbon dioxide equivalent (CO₂-eq) to make them comparable with each other.

1.2 Economic and social circumstances

Ecuador has 17,267,986 inhabitants (INEC, population projections for 2019), of which 50.5% are women. Peoples and nationalities are identified: mestizos, montubios, indigenous peoples (14 peoples, 18 nationalities and 3 groups in voluntary isolation), Afro-Ecuadorians, whites and others. According to the 2010 Census characterisation, 72% of the population recognises itself as mestizo. By 2019, 63.9% of the population is expected to live in urban areas (Ecuadorian population projection, by calendar years, according to regions, provinces and sex).

According to data published by INEC, the illiteracy level of the population in 2017 was 5.9%. The net attendance rate for basic general education reached 96.06% in 2017, while the baccalaureate rate reached 70.8% in the same year (education tabulations of the national survey of employment, unemployment and underemployment-ENEMDU). In terms of access to basic services, 88.5% of the national population had access to drinking water in 2017 (urban households with access to the drinking water network accounted for 96.6% of all urban households and 69.8% of urban households with access to the drinking water network accounted for 69.8% of urban households). As of 2017, 89.4% of households nationwide have an adequate excreta disposal system, 88.1% of households have rubbish collection services, and 99.1% of households have access to electricity (housing tabulations of the national survey on employment, unemployment and underemployment - ENEMDU).

As of December 2018, income poverty stood at 23.2%, which, compared to 2015 (23.3%), has decreased by 0.1 percentage points, and represents a notable reduction compared to 2010 (9.6 percentage points). In the same year, urban poverty stood at 15.3% and rural poverty was 40%; extreme income poverty was 8.4%, with a higher incidence in rural areas (17.7%).

The Gini Coefficient, reported as of December 2018, was 0.469 compared to 0.505 reported for 2010 (poverty and inequality indicators from the National Survey of Employment, Unemployment and Underemployment-ENEMDU).

In 2014, 41.4% of the population had some form of health insurance, which had decreased compared to 2006. Some of the main causes of infant mortality (children under 1 year old) are: respiratory distress in the newborn (14.68%) and pneumonia (6.24%) (INEC).

Between 2010 and 2017, the real Gross Domestic Product (GDP) presented an average growth of 3.38%. As of 2017, Ecuador's nominal GDP reached 104,296 million dollars. The nominal GDP forecast for 2018 was 109,454 million dollars, and for 2019, 113,097 million dollars. The country's main exports are centred on oil (44%) and processed seafood products (25%) (Macroeconomic information from the Central Bank of Ecuador).

1.3 Institutional arrangements and legal framework

The Constitution of the Republic of Ecuador was passed by Legislative Decree 0 (zero) published in the Official Register 449 of 20 October 2008. Article 3, paragraphs 1 and 7 of the Constitution establishes the primary duties of the State as guaranteeing, without discrimination, the effective enjoyment of the rights established in the Constitution and in international instruments, in particular education, health, food, social security and water for its inhabitants and the protection of the country's natural and cultural heritage, while people have the right to live in a healthy, ecologically balanced environment, free of pollution and in harmony with nature, according to Article 66, paragraph 27.

Article 14 recognises the right of the population to live in a healthy and ecologically balanced environment that guarantees sustainability and good living, Sumak Kawsay, and declares of public interest the preservation of the environment, the conservation of ecosystems, biodiversity and the integrity of the country's genetic heritage, the prevention of environmental damage and the recovery of degraded natural spaces; to this end, according to Article 15, the State shall promote, in the public and private sectors, the use of environmentally clean technologies and non-polluting, low-impact alternative energies.

Article 389 of the Constitution provides that the State shall protect persons, communities and nature in the face of negative effects of disasters of natural origin. The National Decentralised Risk Management System is composed of the risk management units of all public and private institutions at the local, regional and national levels. The National Decentralised Risk Management System is composed of the risk management units of all public and private institutions at the local, regional and national levels.

According to Article 414, the State shall adopt adequate and cross-cutting measures to mitigate climate change by limiting green house gas emissions, deforestation and air pollution;

take measures for the conservation of forests and vegetation and protect the population at risk and promulgates the need to promote energy efficiency, renewable energy and the use of low-impact clean technologies that do not jeopardise food sovereignty and the ecological balance of ecosystems (Art. 413).

Likewise, the National Environmental Policy, the Executive Decree declaring climate change adaptation and mitigation as State policy (2009), the National Climate Change Strategy (2012), and the Executive Decrees related to the creation, formation and functioning of the IPCC (2009, 2010, 2017) are a substantive part of public policies for climate change management. In addition, there are several Ministerial Agreements issued by the National Environmental Authority (Ministry of the Environment), which also acts as the technical focal point before

The Ministry of Foreign Affairs of the United Nations Framework Convention on Climate Change is in charge of the Presidency of the IPCC and, through the Undersecretariat for Climate Change, of the Technical Secretariat of the IPCC.

In this context, Ecuador signed the Paris Agreement in New York in July 2016 and its ratification is established by Executive Decree No. 98 of 27 July 2017.

The Organic Environmental Code (2017) updates, complements and clarifies the regulations established in Ecuador for climate change management, and represents a fundamental tool to facilitate inter-institutional and inter-sectoral articulation and enable the integration of adaptation into development planning at the local level by Decentralised Autonomous Governments.

Ecuador also recognises, through its Organic Code of Planning and Public Finance (COPFP, 2010), that the design and implementation of public investment programmes and projects will promote the incorporation of ecosystem-friendly actions, mitigation and adaptation to climate change, and the management of vulnerabilities and natural and anthropogenic risks.

Article 3 of the Regulation to the Law on Public and State Security determines that the governing and executing body of the Decentralised National System of Risk Management is the National Secretariat of Risk Management, in charge of ensuring that all public and private institutions incorporate risk management in their planning and management in a cross-cutting manner.

In terms of international policy, Ecuador ratified the UNFCCC in 1994. (through its promulgation in the Official Gazette No. 562) and is working on a progressive adaptation of its governance and institutional framework to strengthen climate change management in the national territory.

In line with this, Ecuador adopted the 2030 Agenda for Sustainable Development as a State policy through Executive Decree N° 371 in April 2018.

While losses of lives and livelihoods caused by non-climatic natural disasters have remained stable, those caused by meteorological disasters have increased dramatically over the past three decades as a result of the

climate change. Therefore, the estimated global risk protection gap due to extreme weather events is USD 1.7 trillion, making disaster risk reduction a priority in the fight against climate change.

Based on this scenario, Ecuador is a signatory to the Sendai Framework, a framework that expresses the importance of integrating disaster risk reduction into sustainability and recognises the importance of addressing climate change as one of the drivers of disaster risk.

In this context, the National Development Plan 2017-2021 "Toda Una Vida" is aligned with the 2030 Agenda and its 17 Sustainable Development Goals. It should be noted that the Development Plan establishes the axes, objectives, policies and goals that guide government management, positioning every Ecuadorian as a subject of rights, throughout the life cycle. The National Development Plan (PND) 2017-2021, a national planning instrument, proposes three axes linked to climate change management: Axis 1. Economy at the service of society; Axis 3. More society, better State.
the

The National Territorial Strategy (NTS) represents a constituent part of the NDP, whose determinations will have a binding character and will be mandatory for all institutions of the National Decentralised Service for Participatory Planning (SNDPP). In addition, mention should be made of the National Territorial Strategy, as an expression of national public policy in the territory and an instrument of territorial planning on a national scale, which includes criteria, directives and guidelines for action on territorial planning and orients the management of natural resources, infrastructure, human settlements, economic activities, equipment and protection of the natural and cultural heritage on the basis of the objectives and policies of the NDP.

On the other hand, the National Climate Change Strategy (ENCC) 2012-2025 through Ministerial Agreement 95, published in the Official Gazette Special Edition 9 of 17 June 2013, is the document that establishes the prioritised sectors for adaptation (Food Sovereignty, Agriculture, Livestock, Aquaculture and Fisheries; Productive and Strategic Sectors; Health; Water Heritage; Natural Heritage; Priority Attention Groups; Human Settlements; and Risk Management) and climate change mitigation (Agriculture; Land Use, Land Use Change and Forestry; Energy; Solid and Liquid Waste Management; and Industrial Processes).

The political decision-making body is the Inter-Institutional Committee on Climate Change (CICC), created by Executive Decree No. 495 in 2010 and reformed in 2017 by Executive Decree 064. The CICC is the political body that directs climate change management at the national level within the framework of the international agreements in force on the subject, and is made up of the institutions in charge of the environment, foreign affairs, agriculture and livestock, electricity and renewable energy, energy, industry and productivity, water, risk management, the Association of Municipalities of Ecuador and the Consortium of Provincial Governments of Ecuador.

The Technical Working Groups attached to the CICC, formed according to specific needs, provide technical assistance and inputs for decision-making and in practice constitute bodies that allow for the broadened participation of public, private, academic, research, trade and other actors, as appropriate in each case.

Other technical and local bodies for climate change management at the local level, in which Decentralised Autonomous Governments at the provincial and municipal level participate, are the Global Covenant of Mayors for Climate and Energy, the Climate Leadership Group (C40), and the Provincial Action Project on Climate Change. Universities and Polytechnics participate through schemes generated for coordination with academia.

Ecuador spares no effort to join the global fight to combat climate change according to its capabilities, despite the fact that it is responsible for a minimal percentage of greenhouse gas emissions into the atmosphere worldwide. In this sense, it presents its Nationally Determined Contribution, in compliance with the obligations arising from the Paris Agreement.

Thus, since mid-2017, Ecuador began the process of collecting and processing information, mapping actors and roles, identifying sectoral initiatives and necessary institutional arrangements, building unconditional and conditional scenarios, and proposing/prioritising measures and lines of action for the construction of its first NDC. The participatory NDC process has been designed with three guiding principles:

1. Facilitate the participation of stakeholders as agents of change and encourage their engagement in the NDC formulation process.
2. Mainstream gender in every phase of the process.
3. Generate mechanisms for continuous improvement of NDC results and activities.

In order to carry out an adequate incorporation of the gender perspective and its mainstreaming in the formulation of the NDC, one of the strategies implemented in the participatory methodology consists of counting on the technical advice and permanent accompaniment of relevant actors on the issue at the national level, such as the Council for Gender Equality.

Gender mainstreaming involves the integration of a gender perspective in the preparation, design, implementation, monitoring and evaluation of policies, regulatory measures and initiatives, with the aim of promoting equality between women and men and combating discrimination. In the participatory process, the guiding principles of gender mainstreaming and the generation of didactic resources for joint reflection on social and gender aspects related to climate change have been presented, with a focus on capacity building, but also a commitment of the actors involved to incorporate gender analysis in each of the instances of their daily work.

The results in this regard will be seen over time as continuous processes are generated in terms of gender-sensitive and gender-transformative indicators. This phase is the beginning of work on gender that is expected to be continuously developed and improved over time.

Process development evaluation is based on systems thinking and supports innovation through real-time data collection and analysis in a way that leads to informed and continuous decision-making as part of the design, development and implementation process.

It is important to stress the strong involvement of governmental and non-governmental actors, academia, private sector, local governments, etc. throughout the construction of this instrument ensures its validity and technical strength.

This process has taken about a year and a half since its inception. Thus, in the first months of 2019, the official process of technical and political validation of the NDC document was carried out with institutions involved in its formulation process. Below are the relevant data on the formulation of Ecuador's NDC.

Description	Results
Number of workshops held	30
Number of bilateral meetings with sectoral institutions	More than 75
Numbers of people involved	1000 (approximate figure)
Number of institutions involved	More than 150 entities from the public and private sectors, academia, civil society, and international.
Equal participation	50% men and 50% women (approximate figure)

It is necessary to remember that climate change is the historical result of a production and development model that is based on the indiscriminate exploitation of nature as a provider of natural resources, affecting people and destroying the natural environment, which puts future generations at risk.

The fact that climate change negotiations are among the most contentious in the international arena is not unrelated to the fact that this is a reflection of the interests surrounding the issue. This global effort must therefore be accompanied by the provision of timely and adequate means of implementation through the provision of finance, technology transfer and capacity building, and above all, through the leadership of climate action with the ratification of the Doha Amendment to fill the legal vacuum of the pre-2020 period, without which there will be no solid basis for achieving the Paris Agreement.

It should be noted that the implementation of the lines of action and measures contemplated in this NDC, both in terms of mitigation and adaptation, are of national application and their execution will involve the participation of the public and private sectors, subnational governments, academia and society in general. Details of the implementation of these measures will be included in the reports to be submitted in accordance with the provisions of the Paris Agreement.

2 Description of general objectives of the NDC - implementation of the objectives of the Convention and the Paris Agreement.

Ecuador is committed to the fight against climate change, and as a country highly vulnerable to its effects, it must make the best use of international and national mechanisms and instruments for the design and implementation of policies.

mitigation and adaptation plans and projects that in turn operationalise the provisions of the Constitution, the National Development Plan, the National Climate Change Strategy and national policies related to climate change management.

Additionally, the fight against climate change in Ecuador is informed and guided by the relevant international instruments in force, including the 2030 Agenda and the Sustainable Development Goals, the Paris Agreement and the United Nations Framework Convention on Climate Change, Sendai Framework, which form the framework under which Ecuador designs and implements a series of actions in this area, including its NDC.

Therefore, the overall objective of the NDC for Ecuador is to implement policies, actions and efforts that promote the reduction of greenhouse gases and the increase of resilience and decrease of vulnerability to the adverse effects of climate change in the sectors prioritised in the National Climate Change Strategy. These actions and efforts will be guided by the strategic lines and measures identified in the subsequent sections of the document.

Through the implementation of this NDC, Ecuador seeks to comply with the obligations of the Paris Agreement to contribute to the achievement of its overall objective and its specific objectives as stipulated in its Article 2. This implies generating arrangements and designing actions and efforts to better implement all commitments stipulated in Article 4 of the Convention, as well as the specific objectives of the Paris Agreement related to a) limiting global temperature increase to well below 2 degrees Celsius above pre-industrial levels, b) enhancing the ability to adapt to the adverse impacts of climate change and increase food resilience in a way that does not threaten food production, and c) making financial flows consistent with low-emission and climate-resilient development. These actions should be guided in all countries by the principles and provisions of the UN Framework Convention on Climate Change and the Paris Agreement.

In this context, it is recalled that the Paris Agreement (Article 3 and Article 4, paragraph 2) requires each country Party to prepare, communicate and maintain successive Nationally Determined Contributions (NDCs) that it intends to meet and to include in them domestic mitigation actions that reflect the country's ambition to reduce emissions and adapt to the adverse effects of climate change, taking into account its domestic circumstances and capabilities.

On mitigation, in general terms, it has been agreed that countries should peak greenhouse gas emissions "as soon as possible", recognising that peak emissions will take longer for developing countries, but not for developed countries.

establish specific years or periods. Ecuador will, through this first NDC, make initial efforts towards this end.

In terms of the general framework for adaptation, Ecuador highlights that the Paris Agreement establishes an overarching goal of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change and thus contributing to sustainable development; This objective is paramount for the country as a developing country, so a large component of the country's NDC aims to determine actions on adaptation to climate change that contribute to its achievement, taking into account the priority for the country of adaptation in the fight against climate change and the commitments of developed countries to channel financial resources for adaptation in vulnerable countries such as Ecuador.

For this reason, Ecuador has chosen to submit the country's first adaptation communication as the adaptation component of its first NDC, in line with the guidelines adopted at COP24.

3 Mitigation component

The specific objective of the NDC in terms of mitigation is to contribute to global efforts to reduce greenhouse gases by identifying sectors, measures and lines of action that contribute to the mitigation of climate change in the country. Through these actions, the aim is to implement Article 2(a) of the Paris Agreement, which stipulates as one of the objectives of the Agreement: "to keep the increase in global average temperature well below 2°C above pre-industrial levels, and to pursue efforts to limit this temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change".

To support the achievement of this global objective, Ecuador, through the National Climate Change Strategy, has proposed creating favourable conditions for the adoption of measures to reduce greenhouse gas emissions and increase carbon sinks in strategic sectors.

3.1 Description of the approach adopted

Ecuador has designed its NDC considering a series of efforts in corresponding lines of action with a potential to reduce greenhouse gas emissions, based on an aggregated analysis including the sectors: Energy, Agriculture, Industrial Processes and Waste. The Land Use, Land Use Change and Forestry (LULUCF) sector has been analysed separately due to the difference in methodology applied in the sectors. For both the aggregate analysis and the USCUS sector, two mitigation scenarios are considered: i) one derived from national efforts (unconditional); and, ii) another scenario that could be achieved with international support (conditional). The GHG emission reduction potential for the aggregate analysis is set against the baseline scenario and for the USCUS sector against the reference level of forest emissions from deforestation (2000-2008).

Within the NDC formulation process, the mitigation component addressed the five sectors prioritised in Ecuador's National Climate Change Strategy 2012-2025 (ENCC):

- Energy
- Industrial Processes
- Agriculture
- Land Use, Land Use Change and Forestry (USCUSS)
- Waste

The cross-cutting themes in the NDC are intersectorality, participation and the gender approach, which are developed in relation to the principles described in the National Climate Change Strategy that refer to regional and international articulation, consistency with international principles on climate change, emphasis on local implementation, environmental integrity, citizen participation, proactivity, protection of vulnerable groups and ecosystems, intergenerational responsibility, and mainstreaming and integrality.

In this way, the participatory process based on the gender approach sought reflection and the formulation of proposals that promote the involvement of women and men from civil society, community and private organisations and representatives of the different levels of public administration. Both the cross-cutting axes and the principles are oriented towards the use of citizen participation mechanisms that promote rights and equal opportunities in the construction of measures for GHG reduction.

Along with mitigating its GHG emissions, Ecuador aims to reduce poverty, reduce inequality and continue moving towards sustainable development that is in harmony with nature, competitive, inclusive, resilient and low-carbon, promoting respect for and enforcement of the rights of nature as stipulated in its Constitution. To meet these challenges, the country will have to use all its national capacities and international partnerships will have an essential role to play in reducing the positive relationship between economic growth and GHG emissions growth.

3.2 Quantifiable benchmark information

The quality and quantity of information, as well as national and international policies, were considered in establishing the benchmarks.

The parameters used for the formulation of the baseline and reference scenario are as follows:

- Base year 2010 for the sectors Energy, Agriculture, Industrial Processes and Waste.
- Reference year 2008 for the USCUSS sector.
- Geographical coverage for quantification of emissions: National
- Projection Year: 2025
- Period of analysis:
 - 2010-2025 (sectors: Energy, Agriculture, Industrial Processes and Waste)
 - 2008-2025 (USCUSS sector)

For both the baseline scenario and the reference level, an ex-ante analysis has been established, i.e. a baseline representation into the future, based on the information available at the time of the projection.

Table 1. Parameters considered for the construction of the baseline and reference scenario.

SECTOR PARAMETERS	ENERGY	INDUSTRIAL PROCESSES	WASTE	AGRICULTURE	USCUSS
Variables considered	Gross Domestic Product (GDP) Population Energy Intensity	Gross Domestic Product	Annual population growth rate (compound)	Number of livestock Crop production Crop area Use of synthetic nitrogen fertilisers	Average rate of gross deforestation of native forest, period 2000-2008
Sources of data used	<ul style="list-style-type: none"> Energy Statistics (2016) National Energy Balance (2015) National Energy Efficiency Plan (2016-2035) Electricity Master Plan 2016-2025 OGE & EE Development Plan (2013-2017) e additional updated information 	<ul style="list-style-type: none"> First Biennial Report Ecuador Update Report Inventory Greenhouse Gas Inventory (year 2010) 	<ul style="list-style-type: none"> First Biennial Report of Ecuador Greenhouse Gas Inventory (year 2010) Projection of Ecuadorian Population Growth 	<ul style="list-style-type: none"> First Biennial Update Report of Ecuador Statistics: FAOSTAT, INEC (ESPAC) Greenhouse Gas Inventory (year 2010) 	<ul style="list-style-type: none"> First Biennial Update Report of Ecuador Reference Level of Forest Deforestation Emissions from Deforestation in Ecuador (2000-2008)
Methodology for the quantification of emissions	<ul style="list-style-type: none"> IPCC 1996 In order to maintain consistency with the variables considered, the data sources used, the methodology for the quantification of emissions, the metrics, the GHGs considered, and the GHGs used, it is essential that the data sources used are consistent. 				<ul style="list-style-type: none"> IPCC 2003
Metric	100-year Global Warming Potential (GWP-100), IPCC AR2 Values				
GEI considered in the contributions	<ul style="list-style-type: none"> CO₂ CH₄ N₂O 	<ul style="list-style-type: none"> CO₂ 	<ul style="list-style-type: none"> CO₂ CH₄ 	<ul style="list-style-type: none"> CH₄ N₂O 	<ul style="list-style-type: none"> CO₂
Tool used for the projection of	LEAP System (Long-Term Energy Planning Software)	GACMO model (GHG Abatement Cost Model).	GACMO model (Greenhouse Gas Abatement Cost)	Prepared spreadsheets for the estimation of	N/A

<div>SECTOR</div> <div>PARAMETERS</div>	ENERGY	INDUSTRIAL PROCESSES	WASTE	AGRICULTURE	USCUSS
emissions	term)	Greenhouse)		GHG emissions based on the revised IPCC Methodology 1996 and 2006, in accompanying the GBP 2000	
Circumstances under which the country could update indicators and benchmarks.	<ul style="list-style-type: none">Significant changes in the variables considered for the baseline emissions projection, mitigation scenarios.Extreme weather effects or unforeseen situations, which prevent the fulfilment of the measures and actions within the lines of action.Methodology update (IPCC 2006).				<ul style="list-style-type: none">New reference level of emissions from deforestation 2000-2014Methodology update (IPCC 2006)
Note: The information presented in summary form in this table has been taken from sectoral technical reports for the setting the baseline scenario and reference level, respectively.					

3.3 Implementation periods

The implementation period of the NDC covers the period 2020-2025. During this period, the country will implement lines of action identified from the multi-level, multi-stakeholder, multi-sectoral participatory process. The progress of the implementation of the identified lines of action will be evaluated in 2025.

3.4 Scope and coverage

Ecuador's NDC presents the country's commitment in lines of action by sector, whose mitigation contribution has been included in an aggregate estimate for the sectors: Energy, Agriculture, Industrial Processes and Waste. The USCUS sector was analysed separately. The results are shown in illustrations 1 and 2 respectively.

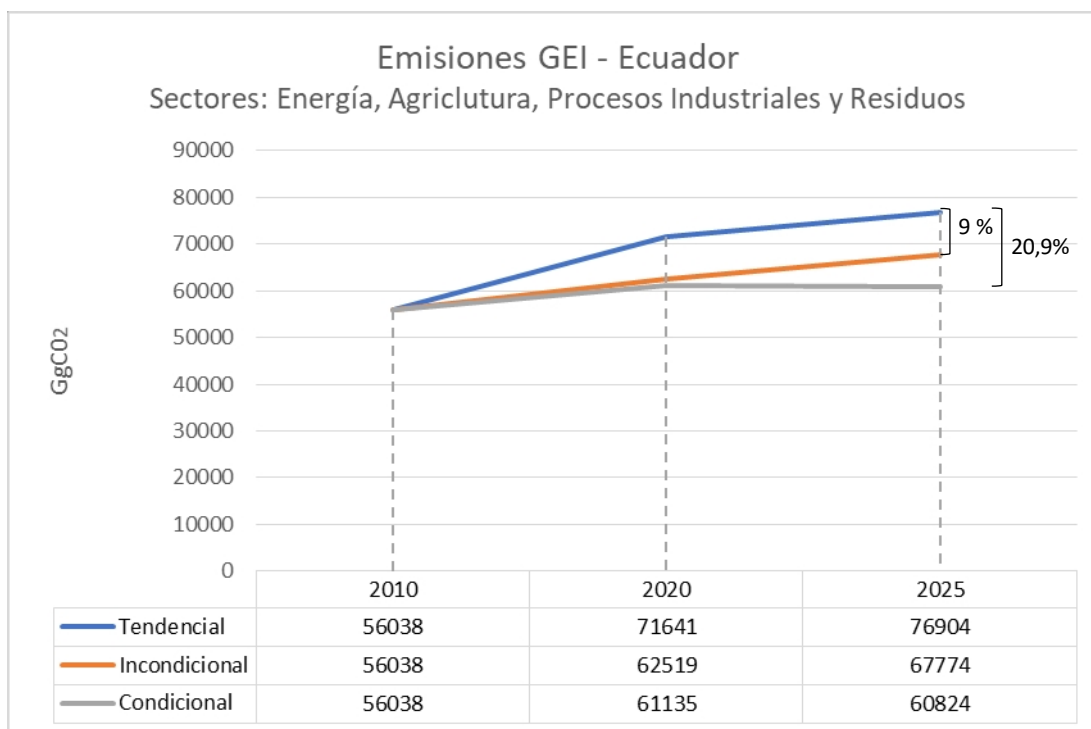


Illustration 1 - GHG emission scenarios: baseline, unconditional and conditional aggregate of the Energy, Agriculture, Industrial Processes and Waste sectors
Source and elaboration: Ministry of Environment (2019)

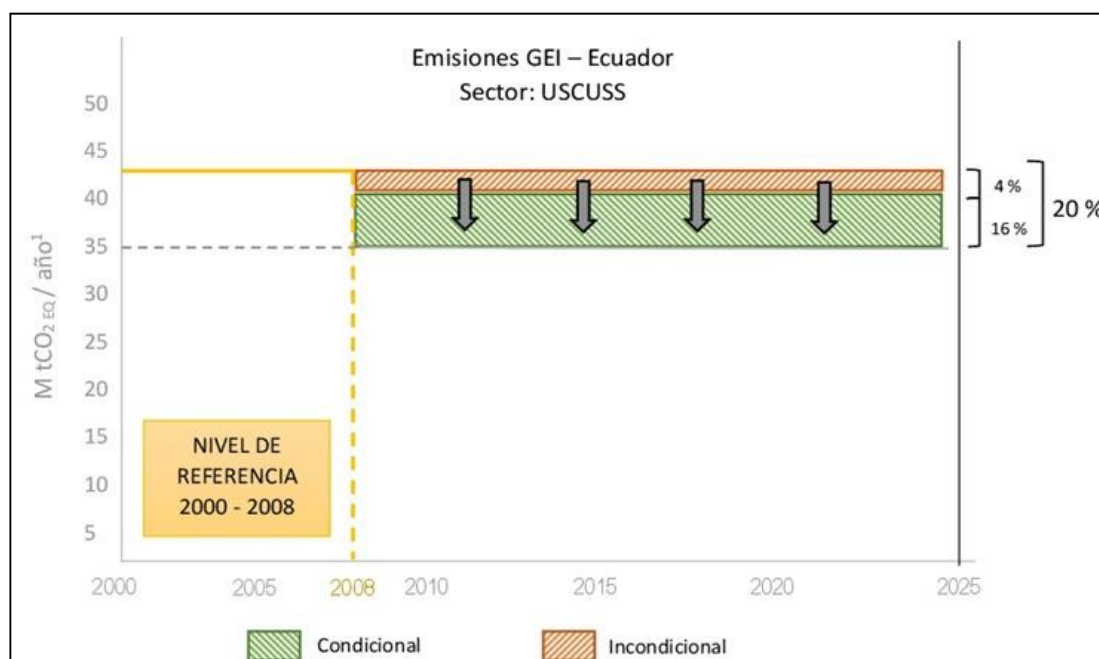


Illustration 2 Reference level and unconditional and conditional mitigation scenarios for the USCUS sector.
Source and elaboration: Ministry of Environment (2019).

The identified action lines and initiatives correspond to an emission reduction potential through national efforts (unconditional) as well as with international support (conditional), and are presented in Table 2 and 3:

Lines of action: These are conceived as strategies for orienting and organising different initiatives in such a way as to promote the articulation, integration and continuity of efforts to support climate change mitigation.

Initiatives: These are identified plans, programmes, projects, actions and measures that contribute to climate change mitigation.

Unconditional scenario: Refers to measures and actions that the country can implement based on its own resources and within its own capabilities (UNEP DTU PARTNERSHIP, 2015)³.

Conditional scenario: A scenario that goes beyond the unconditional contribution, which the country is willing to undertake if means of support from international cooperation are available (UNEP DTU PARTNERSHIP, 2015).

These scenarios will be achieved through the implementation of the following lines of action and initiatives.

Table 2 Unconditional Scenario Mitigation Action Lines

ENERGY SECTOR	
<u>Lines of action</u> Promote the use of renewable energy. Strengthen energy efficiency and consumption behaviour change. Promote and implement sustainable mobility.	
<u>Initiatives</u>	<u>Description</u>
<i>Hydroelectric Power Plant Development</i>	Use of water resources for electricity generation.
<i>Energy Efficiency Programme - Optimisation of Electricity Generation and Energy Efficiency (OGE&EE)</i>	Reduction of associated flare gas flaring. Use of oil-associated gas for electricity and gas-fired power generation LPG production.
<i>Non-Conventional Renewable Energy</i>	Promotion of wind, solar and landfill biogas.
<i>Efficient Cooking Programme</i>	Replacement of Liquefied Petroleum Gas (LPG) cookstoves with induction cookstoves
<i>Efficient Public Transport</i>	Operation of the Quito Metro (22 km) and Cuenca Tramway (12km).

³ UNEP DTU Partnership (2015). Guidance note: Development INDCs on mitigation.

AGRICULTURAL SECTOR	
<u>Lines of action</u> Develop research and generation of information systems to strengthen climate change management in the agricultural sector. Promote sustainable livestock development at the national level.	
<u>Initiatives</u>	<u>Description</u>
<i>Climate-smart livestock practices (promotion of climate-smart livestock management, integrating the reversal of land degradation and reducing desertification risks in vulnerable provinces)</i>	Implementation of sustainable livestock practices at the national level that reduce GHG emissions, contribute to climate change resilience and increase productivity.
INDUSTRIAL PROCESSES SECTOR	
<u>Lines of action</u> Reduce GHG emissions through additions in cement production.	
<u>Initiatives</u>	<u>Description</u>
<i>Reducing GHG emissions in the cement sector</i>	Replacement of clinker in cement by additions.
WASTE SECTOR	
<u>Lines of action</u> Promote active methane capture in landfills.	
<u>Initiatives</u>	<u>Description</u>
<i>Active methane capture and electricity generation from El Inga landfill site (Quito).</i>	Active capture and flaring of biogas.
<i>Active methane capture and generation electricity from the Pichacay landfill (Cuenca)</i>	
USCUSS SECTOR	
<u>Lines of action</u> Conserve the natural heritage. Strengthen sustainable forest management. Strengthen the restoration of natural heritage. Strengthen and increase the establishment management of sustainable commercial forest plantations. Strengthen forest monitoring. Strengthen the National System of Protected Areas.	
<u>Initiatives</u>	<u>Description</u>
<i>Programme Integral Amazonian Programme of Forest Conservation and Production</i>	Linking national efforts to reduce greenhouse gas emissions and reduce greenhouse gas emissions greenhouse with priority agendas

<i>Sustainable (PROAmazonia)</i>	and policies of the productive sectors to reduce the causes and drivers of deforestation, as well as to promote sustainable and integrated management of natural resources, in the framework of the REDD+ Action Plan of the Ecuador "Forests for Good Living" 2016-2025.
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Table 3 Mitigation action lines of the conditional scenario

ENERGY SECTOR	
<u>Lines of action</u> Incorporate, reformulate and update regulations that promote the use of sustainable energy and energy efficiency in an inclusive manner in each of the sub-sectors. Develop and implement safe and sustainable transport. Promote the use and development of renewable energy, ensuring full accessibility. Promote the use and development of energy efficiency and change of consumption behaviour. Promote research for the implementation of energy solutions, reducing the gender gap.	
<u>Initiatives</u>	<u>Description</u>
<i>National Energy Efficiency Plan</i>	Projects to identify energy end-uses in the residential, commercial and public sectors. Equipment replacement programme in the industrial and residential sector. Energy Efficiency Standard (ISO 50001) Cogeneration in industry. Development and promotion of a market for Energy Management Companies (ESCOs).
<i>Energy Efficiency Programme - Optimising Electricity Generation and Energy Efficiency (OGE&EE)</i>	Reduction of associated flare gas flaring Use of gas associated with oil for electricity generation and LPG production. (Programme).
<i>Renewable Energies</i>	Non-conventional Renewable Projects Block. Geothermal energy. Hydro-energy: Santiago I, II
<i>Freight and passenger transport NAMAs</i>	Actions to reduce GHG emissions in freight transport. Actions to reduce GHG emissions in passenger transport in Quito, Guayaquil and Cuenca.

<i>Energy efficiency in the hydrocarbon sector</i>	Replacement of engines of the Trans-Ecuadorian Oil Pipeline System (SOTE). Refinery Combined Cycle. Connection to System Interconnected National Grid (SNI).
AGRICULTURAL SECTOR	
<u>Lines of action</u> Develop research and information systems to strengthen climate change management in the agricultural sector. Promote sustainable livestock development at the national level. Develop and implement sustainable agro-productive systems (agriculture, livestock and forestry) at the national level.	
<u>Initiatives</u>	<u>Description</u>
<i>Project Sustainable at Livestock</i>	Implementation of practices sustainable livestock practices at the national level.
<i>Implementation Plan for REDD+ Measures and Actions for Reducing Deforestation and Forest Degradation in Developing Countries (REDD+) forests in sustainable livestock farming</i>	Implementation of sustainable livestock practices at the national level that reduce deforestation.
INDUSTRIAL PROCESSES SECTOR	
<u>Lines of action</u> Reduce CO ₂ emissions through additions in cement production. Promote research on mitigation measures for the Industrial Processes sector. Support the generation, exchange and dissemination of information to promote mitigation actions in the Industrial Processes sector.	
<u>Initiatives</u>	<u>Description</u>
<i>Reducing GHG emissions in the cement sector</i>	Replacement of clinker in cement by additions (extension).
WASTE SECTOR	
<u>Lines of action</u> Generate public-private partnerships for the reduction of greenhouse gases in waste management (solid and liquid) through the implementation of mitigation measures. Promote inclusive campaigns to raise awareness among the population and industry on solid and liquid waste management, towards a circular economy.	
<u>Initiatives</u>	<u>Description</u>
<i>Active methane capture in Santo Domingo de los Tsáchilas landfill.</i>	Capture activates y burning from biogas (extension).

<i>Active methane capture in landfill Ambato.</i>	
<i>Composting with forced aeration.</i>	Composting from waste organic waste from markets and garden waste.
USCUSS SECTOR	
<u>Lines of action</u> Strengthen e increase the area of areas under mechanisms conservation mechanisms. Strengthen sustainable forest management. Promote actions for the restoration of natural heritage. Strengthen and increase the establishment and management of sustainable commercial forest plantations. Strengthen forest monitoring. Strengthen forest fire prevention. Strengthen and increase the surface area of the National System of Protected Areas. Conserve areas of water importance.	
<u>Initiatives</u>	<u>Description</u>
<i>Action Plan REDD+ of Ecuador "Forests for Good Living" 2016-2025</i>	Contribute to national efforts to reduce, monitor, report and verify deforestation and forest degradation through conservation, sustainable forest management, and the optimisation of other land uses to reduce pressure on forests, thereby contributing to associated GHG emission reductions.

Additional initiatives that are quantifiable in greenhouse gas emission reductions may be submitted to support climate change mitigation in the implementation period of this NDC in both the unconditional and conditional scenarios. These should be linked to the lines of action described above.

Finally, in compliance with the provisions of the Paris Agreement and as a result of the intersectoral participatory process, with multiple actors at different levels of the NDC formulation, the lines of action that have been identified and that contribute to climate change mitigation in the Energy, Agriculture, Industrial Processes and Waste sectors result in an estimated GHG emissions reduction potential that corresponds to **9% compared to** the baseline scenario for 2025. Likewise, a GHG emission reduction potential of **20.9%** has been identified for the same period, subject to the support of international cooperation to implement the lines of action established in this conditional scenario. This would lead to an increase in mitigation ambition of 11.9% compared to the baseline scenario by 2025.

With regard to the USCUSS sector and the action lines established from national efforts, a GHG emission reduction potential has been identified.

emissions by 4% compared to the baseline level in 2025. However, in the case of support from international cooperation to develop the lines of action of the conditional scenario in this sector, there would be an additional mitigation potential of 16%, i.e. a total reduction of GHG emissions of 20% compared to the baseline level by 2025.

3.5 Methodological assumptions and approaches, including those for estimating and accounting anthropogenic greenhouse gas emissions and, where appropriate, removals.

Ecuador, through the Ministry of Environment, as technical focal point before the United Nations Framework Convention on Climate Change (UNFCCC), led a participatory process that had the support and participation of around 150 institutions from the public and private sectors, academia, civil society and international cooperation for the formulation of the NDC, which has provided legitimacy to the process and its associated results.

For the mitigation component of Ecuador's NDC, an aggregated analysis has been carried out including the sectors: Energy, Agriculture, Industrial Processes and Waste. The USCUS sector has been analysed separately due to differences in the methodologies applied in the sectors; and two mitigation scenarios are presented: one conditional and one unconditional, compared to a baseline and reference level scenario, respectively.

For the aggregate analysis, the baseline, unconditional and conditional scenarios were established by applying the Greenhouse Gas Abatement Cost Model (GACMO) based on the Clean Development Mechanism (CDM) methodologies of the Kyoto Protocol. The main (general) variables used are the compound annual population growth rate, GDP, IPCC and national emission factors.

At the sectoral level, methodologies were applied that respond to the needs and characteristics of each of the sectors analysed for the mitigation component. A description of the assumptions and methodological approaches used is presented below:

Energy Sector

For the design and construction of the scenarios for the energy sector, information from the National Economic and Energy Statistics was used. The main information collected is based on the variables of Gross Domestic Product (GDP), population growth and energy consumption. Additionally, information on energy consumption was collected for the categories and subcategories of the National GHG Inventories in order to disaggregate the information for the initiatives.

The LEAP long-term energy planning model allowed projections of the variables based on the historical data collected. The LEAP model used the IPCC 2006 emission factors to estimate GHG emissions and determine the emissions for each initiative.

Agriculture Sector

Emissions in the baseline scenario for the Agriculture sector were calculated year by year, considering 2010 as the starting point and 2025 as the target year. Activity Data (DA) and the methodology described in the 2010 National Greenhouse Gas Inventory Report (NIR) of Ecuador, which corresponds to Tier 1 of the revised 1996 IPCC Guidelines and default Emission Factors (EF) for all source categories, in line with the 2000 IPCC Good Practice Guidelines (GBP) and the 2006 IPCC Guidelines, were used for the calculation.

The greenhouse gases considered in this calculation were: methane (CH_4) and nitrous oxide (N_2O), for the transformation to CO_2 equivalent the global warming potentials (GWP) of the IPCC Second Assessment Report (AR2) were used.

The estimation of mitigation data in the conditional and unconditional initiatives in the Agriculture sector was carried out using the historical emission series of the baseline scenario together with the mitigation potential of the prioritised measures, taking into account their level of implementation.

It should be noted that initiatives contributing to climate change mitigation in the sector were registered during the formulation process.

Industrial Processes Sector

Within the Industrial Processes sector, the main sources of information for the design of the scenarios are derived from the First Biennial Report of Ecuador, which includes greenhouse gas inventories calculated from the IPCC 1996 guidelines. Additionally, the economic model is considered, with the projection of the Gross Domestic Product (GDP) of Ecuador (UNDP, 2018), and the information used in the GACMO model where information provided directly by the cement industry was entered.

For the construction of the aforementioned scenarios, the GACMO Model relates the sector variables. That is, Greenhouse Gas Emissions (GHG), which are taken from the inventory of the corresponding base year (2010) and are related to the Gross Domestic Product (GDP), for the periods: 2010-2020; 2020-2025, considering that the growth of the industrial processes sector is directly related to this variable.

Waste Sector

GHG emissions have been quantified using IPCC emission factors, using the 1996 methodology. This information was obtained from the National GHG Inventory presented in the First Biennial Update Report. For the design of the baseline scenario, the GACMO model was used, using the compound annual population growth rate as a support variable.

In relation to the quantitative estimation of the mitigation of unconditional and conditional initiatives in the Waste sector, actual (historical) data were used.

for the first case (*Active methane capture and electricity generation from El Inga landfill - Quito*), and for the second (*Active methane capture and electricity generation from Pichacay landfill - Cuenca*): data defined in referential technical studies.

It is worth mentioning that some initiatives of a non-quantifiable nature in terms of GHG mitigation were registered within the formulation process.

USCUSS Sector

The USCUSS sector has unique characteristics, which is why it was decided to treat the sector differently from the other sectors reported in the INGEI. There are two main methods for accounting in this sector:

1. **Land-based approach:** assesses emissions from specific land use categories (forest land, agricultural land, grassland, wetlands, settlements, other).
2. **Activity-based approach:** where emissions from specific land use activities (deforestation, degradation, carbon stock enhancement, etc.) are assessed.

The approach adopted in this analysis is the activity-based approach, as it is consistent with the progress the country is making in REDD+ implementation. In addition, this accounting method is convenient because it allows the country to take a stepwise approach to include additional land use activities based on data availability and capacity.

In relation to the calculation methodology for the emission scenarios, the INGEI methodology of the USCUSS sector has been used. This methodology is based on the IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry, published in 2003.

Activity data are from the historical time series of land cover and land use maps, produced by MAE for the years 2000 and 2008.

Data on forest carbon stocks for the nine natural forest types were generated by the country from the results of the National Forest Inventory of Ecuador. The information includes the following carbon pools: aboveground biomass, belowground biomass, dead wood and litter (MAE, 2015)⁴.

GHG emissions were calculated by multiplying the activity data (gross deforestation of each stratum of native forest) by its respective emission factor (carbon stocks). The biomass immediately after deforestation is also assumed to be zero, according to the methodological level 1 of the IPCC 2003 "Good Practice Guidance for Land Use, Land Use Change and Forestry".

⁴ MAE. (2015). Ecuador's Forest Reference Emission Level for Deforestation. Quito.

The other REDD+ activities related to emissions and removals (degradation, enhancement of carbon stocks, conservation and sustainable forest management) will be phased in as international funding becomes available and national circumstances are appropriate.

4. Adaptation Component - Ecuador's First Adaptation Communication

4.1 National circumstances

A synthesis that provides context on the progress of actions to address climate change in Ecuador, specifically in relation to climate change adaptation, is shown through the following key aspects, detected during the preparation of Ecuador's Third National Communication on Climate Change (2017) and in the formulation phases of Ecuador's NDC and the National Adaptation Plan (NAP), between 2017 and 2018:

- Institutionalised experience in the analysis of risk management (climate and non-climate) at local and national level, from a prospective and reactive perspective to extreme natural events, including availability of public policies, methodologies and mechanisms for planned risk management.
- Updated quantitative and qualitative information, as of 2015, on evidence of climate change, and on impacts and adaptation actions implemented to address the effects of climate change.
- Lessons learned from management models used in climate change adaptation projects co-implemented with communities, local governments and sectoral entities.
- Pilot processes developed for mainstreaming climate change into local government development plans since 2014.
- Coordination with the country's lead planning and development institution for the implementation of articulating mechanisms to facilitate the incorporation of climate considerations in local and/or sub-national planning instruments (in progress).
- Climate change projections adapted to the conditions of climate, relief and other characteristics of the country, generated taking as a reference the IPCC methodology and information in the framework of the Fifth Assessment Report.
- Identification of mechanisms (technical, administrative and political) that enable the generation, management, processing and dissemination of meteorological, hydrological and climate data as a state policy.
- Existence of climate change adaptation projects financed with fiscal resources, international cooperation funds, multilateral banks, bilateral cooperation resources and mixed financing (national and international funds), through innovative mechanisms, to reduce the vulnerability of livelihoods, population and ecosystems.
- Evolution of public policy, legal framework and planning instruments for the adequate management of climate change adaptation.
- Institutionalisation of climate change management through the Inter-institutional Committee on Climate Change, National Climate Change Strategy, and Book IV on Climate Change of the Organic Environmental Code.

- Private, public and community actors interested in strengthening their capacities and replicating their successful experiences in initiatives related to climate change adaptation management.
- Pioneering experiences in developing methodologies for the identification and estimation of mitigation co-benefits linked to adaptation actions.

4.2 Impacts, risks and vulnerability

Ecuador is very sensitive to external factors of a diverse nature, as mentioned in section 1 of this document. In addition, climate change and the intensification of natural climate variability phenomena, such as the El Niño-Southern Oscillation (ENSO) and the El (ENSO), irrefutably affect the country's development, as its geographical location, rugged terrain and atmospheric characteristics prevailing in this area of South America favour the occurrence of such climatic hazards with increasing frequency, causing severe impacts on its economy. Climate change is undoubtedly one of the greatest challenges facing Ecuador.

The data below shows the historical behaviour of precipitation and average temperature for the reference period 1960 - 2010⁵ : In the coastal region of Ecuador, there is evidence of a 33% increase in rainfall and a 0.6°C increase in average temperature. In the highlands, there is a 13% increase in rainfall and a 1.1°C increase in average temperature. In the Amazon region, a 1% reduction in precipitation and a 0.9°C increase in average temperature are observed. For the island region (San Cristóbal station), a 66% increase in precipitation and a 1.4°C increase in mean temperature is evident.

Niño-Southern Oscillation (ENSO), are also affecting Ecuador.

Past extreme events, related to rainfall, are represented in Ecuador by the floodable area involved, and have the potential to reach a total of 40,860 km² , i.e. 15.9% of the national surface, in which a population of 7.17 million inhabitants, equivalent to 49.5% of the country's total population, was settled as of 2010. On the other hand, intense droughts have affected the agricultural area by 2.03 million ha, which constitutes 66.7% of the total agricultural area of the country. The area of cultivated pasture affected by drought reached 2.10 million ha, or 53.7% of the total pasture area (data from the National Plan for the Integrated and Comprehensive Management of Water Resources in Ecuador's river basins and micro-watersheds, 2016).

During the first quarter of 2019, rainfall has been recorded that far exceeds "historical averages", thus constituting significant anomalies, which has led to the provinces of Guayas, El Oro, Santo Domingo de los Tsáchilas and Esmeraldas being declared on orange alert for flooding.

For the future, climate projections available for the national territory⁶ , show that, if current trends continue, the average temperature increase will vary by at least 0.5°C to 1°C up to 2040, compared to the

⁵ Information from INAMHI, taken from the Third National Communication on Climate Change of Ecuador (MAE, 2017).

⁶ Data generated from information from Ecuador's Third National Communication on Climate Change - RCP 4.5 Scenario, period 2011 - 2040.

The average temperature observed in the period 1981-2005 will continue to rise until the end of the century, with increases of no less than 2°C expected over almost the entire Ecuadorian mainland and even greater increases in the Galapagos Islands. Alterations in spatial and temporal rainfall patterns will also aggravate water deficit and surplus conditions at the national level.

Some of the most representative impacts, risks and vulnerabilities are shown below from a sectoral perspective (referring to the six priority sectors for adaptation established by the National Climate Change Strategy):

Sector	Impacts, risks and vulnerability
Natural Heritage	<p>Biodiversity and ecosystem functions (ecosystem services, biodiversity provided by ecosystems), are highly sensitive to climate change. Considering that Ecuador is a mega-diverse country, potential impacts and damage to the natural heritage are expected. High mountain ecosystems such as the páramos, coastal ecosystems such as mangroves, the entire Ecuadorian Amazon, as well as the island region with the Galapagos Islands are highly fragile and therefore highly vulnerable to the expected impacts of climate change in the short, medium and long term. The species that inhabit these ecosystems are especially vulnerable to climate threats due to modifications in their habitats, which force them to disappear or modify their behaviour acquired through the evolutionary process over thousands or millions of years. For example, it is known that Andean biomes will show upward vertical displacement, with the páramo biome suffering the greatest loss of its current range. The results reported for the of plant and bird species show a similar pattern.</p>
Water Heritage ⁷	<p>Ecuador, despite being a country with abundant water, factors such as hoarding, redistribution and the updating (under climate change scenarios) of authorisations for the use and exploitation of water resources could trigger potential conflicts and competition among users. On the other hand, excess water could cause floods and landslides.</p> <p>Note that 88% of the Ecuadorian population is located in the Pacific basin, but in this area water availability is limited and only 31% of water resources are found there. Similarly, at the national level, 80% of the population</p>

⁷ According to the Constitution of Ecuador (2008) Art. 318 "Water is national heritage [...This is reflected in the Organic Law on Water Resources, Uses and Development of Water (LORHUyA 2014), which establishes water resources as public water domain, which will have a planning for its integrated and comprehensive management, respecting the order of priority between the different destinations or functions of water resources, which are a) Human consumption; b) Irrigation to ensure food sovereignty c) Ecological flow; and, d) Productive activities.

Sector	Impacts, risks and vulnerability
	<p>In rural areas, however, these figures are decreasing, reaching coverage of less than 40% in communities of less than 200 families. Climate change is expected to exacerbate these conditions, worsening the population's access to water, especially in the most vulnerable areas.</p> <p>It is expected that impacts related to extreme precipitation excess could manifest in the coastal and Andean regions, mainly in the central and southern zones, while those related to the precipitation shortage period would be accentuated in the central coastal zone and in the central and southern zones of the Sierra.</p> <p>Another impact associated with water resources is the retreat of glaciers, which have lost more than 50% of their surface area in the last 50 years, causing significant repercussions for water users in Andean communities, especially in terms of landslide risks.</p>
Food Sovereignty, Agriculture, Livestock, Aquaculture and Fisheries	<p>Droughts, frosts and extreme weather events have caused in the past, and could cause in the future, reductions and/or losses in agricultural, fisheries and aquaculture production, foreshadowing the potential impacts that will eventually intensify with the threat of climate change. Impacts will continue to increase, especially those associated with the El Niño phenomenon, prolonging periods of low rainfall in the central Andes and the Coast, and increasing flooding on the coast towards the southern Andes.</p>
Health	<p>A combination of direct and indirect impacts related to climate change (especially temperature increases and prolonged periods of extreme precipitation) are expected in the near future, and their effects on public health conditions include the following: reduced access to food, favourable conditions for respiratory diseases (intense cold waves and abrupt changes in temperature during the day), proliferation of mosquito-borne tropical diseases, and changes in the quality of water for human consumption. Seventy percent of Ecuador's territory is located in tropical and subtropical areas, with favourable habitats for the development and propagation of disease vectors such as dengue, malaria and leishmaniasis (the presence of <i>Aedes aegypti</i> has been detected up to 1650 metres above sea level in the eastern cordillera). Populations living on the Ecuadorian coast and in the Amazon are particularly vulnerable to such changes in the climate.</p> <p>climate, as well as the areas located in the foothills of the Ecuadorian Andes, which cross the country from north to south.</p>

Sector	Impacts, risks and vulnerability
Productive and strategic sectors	Within the Strategic Sectors, the infrastructure subsectors (roads, ports, mining and oil production facilities, among others) and hydroelectric energy production, mainly those located on the coast and in the Paute, Coca and Pastaza river basins, are highly vulnerable due to the increased frequency and intensity of climatic hazards and extreme events, both in terms of deficit and excess of precipitation (for example generating landslides, or bringing greater amounts of sediment into reservoirs). A similar situation is foreseen in the sub-sectors: agriculture, agro-industry, agriculture, agriculture and fisheries. industrial and services.
Human Settlements	Human settlements and cities in Ecuador are particularly vulnerable to climate hazards. Housing infrastructure with inadequate characteristics and located in risky areas (typical aspects of informal settlements) increases vulnerability levels to the effects of climate change. Cities such as Quito and Guayaquil and other medium and small cities, especially on the coast, have this type of irregular settlements in risky conditions. Ecuador has an analysis of precarious housing, with a lack of basic services, with a lack of access to basic services, and with a lack of access to basic services. irregular ownership (lack of titles and/or deeds) and, in some cases, located in risky areas.

Sources: NAP Project Document (2019) and water sector information provided by SENAGUA (2019).

Notwithstanding what is stated in numeral 4.1, considering the predominant social and economic conditions in the country, and taking into account that in Ecuador the adaptive capacity of human and natural systems located in the national territory is still very little developed, it is possible to conclude that, in general, the country maintains a high vulnerability status in the face of climate variability and climate change, being therefore fundamental to address this problem from a perspective that increases adaptive capacity as the primary way to increase resilience and reduce the vulnerability of these systems.

4.3 National adaptation priorities, strategies, policies, plans, objectives and measures

The priority sectors for climate change adaptation, established by the National Climate Change Strategy (2012), are:

- a) Human Settlements;
- b) Water Heritage;
- c) Natural Heritage;
- d) Productive and Strategic Sectors;
- e) Health; and,
- f) Food Sovereignty, Agriculture, Livestock, Aquaculture and Fisheries.

Risk management and prioritisation of priority groups are cross-cutting priority approaches across all six sectors.

From an adaptation perspective, the specific objective of Ecuador's NDC is to contribute, at national, sub-national and local levels, to global efforts to increase adaptive capacity, promote climate resilience and reduce risk to the effects of climate change, in a context of equity, sustainable development and poverty eradication, respecting the principle of common but differentiated responsibilities, and in accordance with the country's capacities.

The Nationally Determined Contribution will be progressive and will be implemented through a participatory and transparent approach, based on national realities and taking into account aspects such as:

- The need to reduce gender gaps;
- The impact of adaptation on priority target groups;
- The need for scientific information with sufficient rigour; and,
- Consideration of traditional / ancestral knowledge of local actors.

The contribution is expected to be gradually integrated into Ecuador's development planning at inter-sectoral and local levels, taking the form of measures, "aligned with or embedded in" policies, strategies, plans, programmes, projects, processes and initiatives of a social, economic, environmental or other nature, to be developed in the country.

The National Adaptation Plan⁸ will be a tool to facilitate the implementation of adaptation measures (contributions) and will contribute to the generation of useful instruments for the management of adaptation to climate change in Ecuador.

The objectives of the National Adaptation Plan are:

- a) Reduce vulnerability to climate change impacts by increasing adaptive capacity and building resilience in the prioritised sectors set out in the National Climate Change Strategy.
- b) Facilitate the coherent integration of climate change adaptation into development planning processes, policies and strategies in the six sectors prioritised for adaptation in Ecuador, as well as in new or existing programmes and projects that contribute to adaptation.

The construction of the National Adaptation Plan seeks to build the enabling conditions for the integration of climate risk into development planning through:

- a) Improved climate projections, climate risk and vulnerability analysis and impacts on human and natural systems, in terms of spatial and temporal coverage and resolution, from a gender perspective;

⁸ Ecuador's National Adaptation Plan Project will start in April 2019, with the enabling conditions for climate change adaptation and the National Adaptation Plan itself expected to be available in 2022.

- b) Strengthening institutional capacities through guidance documents (standards, technical guidelines, among others), regulations (at national and local level), standardised methods and tools to facilitate climate risk management, using a gender perspective;
- c) Training of key staff, technical peers and strategic actors (public and private) to facilitate the integration of climate change adaptation into development planning, implementation of actions, and budgets at sectoral, territorial and local levels.
- d) Design of mechanisms for measurement, reporting and verification for the National Adaptation Plan process, and for adaptation actions implemented by strategic actors, incorporating a gender approach.
- e) Formulation of strategies to ensure that the financing, sustainability, scaling up and replication of climate change adaptation actions meet the established requirements.

As a result of the agreements and commitments made during the process of formulating Ecuador's NDC (2019), the sectoral ministries directly linked to climate change adaptation management are:

Sectors	Institutions (Ministries, Secretariats ⁹)
Strategic: Hydrocarbons, Mining and Electricity. Transport.	Ministry of Energy y Non-Renewable Natural Resources (MERNNR) Ministry of Transport and Public Works (MTOPE)
Natural Heritage	Ministry of Environment (MAE)
Water Heritage	Secretariat of Water (SENAGUA)
Human Settlements	Ministry of Development Development y Housing (MIDUVI)
Food Sovereignty, Agriculture and Livestock.	Ministry of Agriculture and Livestock (MAG)
Health	Ministry of Public Health (MoPH)

Based on this work, the following climate change adaptation measures have been identified and prioritised from a sectoral perspective. It should be noted that, with the exception of the measures that are planned to be implemented only under a conditional scenario, with available international support, the remaining measures are included both conditionally and unconditionally, with a different degree of implementation.

⁹ In principle, other entities are expected to collaborate with climate change adaptation management, including: Ministry of Foreign Affairs and Human Mobility, National Secretariat of Planning and Development, State Bank, National Institute of Meteorology and Hydrology, National Risk Management Service, Consortium of Autonomous Provincial Governments, Association of Municipalities of Ecuador, Institute of Geological and Energy Research, PETROAMAZONAS EP, National Institute of Public Health Research, Water Funds and Higher Education Institutions.

Natural Heritage Sector

Macro level

Improving public policy instruments for natural heritage that incorporate climate change adaptation.

Operational level

Increasing the area of forests, remaining natural vegetation cover and conserved or sustainably managed marine and coastal ecosystems to maintain their ecosystem functionality under climate change scenarios.

Implementation of sustainable natural resource use practices in zones of influence of areas under different conservation status, vulnerable to the effects of climate change. Establishment of conservation and restoration corridors of secondary forests and buffer zones to maintain landscape connectivity, reduce (current and expected) climate change impacts and increase ecosystem resilience.

Capacity building and strengthening of social, academic, research and governmental actors on climate change and natural heritage **management****.

Water Heritage Sector

Macro level

Strengthening of the National Strategic Water System as a mechanism for sectoral coordination and interaction to increase the adaptive capacity of the water sector in the territory. ******

Operational level

Implementation of a national information system for the water sector as a tool to support the management, monitoring and evaluation of the effects of climate change. Formulation and implementation of a national water culture strategy, including practices and knowledge of ancestral peoples, as a mechanism to contribute to local awareness of the effects of climate change. ******

Generation and implementation of mechanisms for the economic and social valuation of the impacts of climate change in the water sector. ******

Incorporation of climate change criteria into national and sectoral water sector strategies and plans. ******

Inclusion of climate change variables in the technical feasibility and in the regulation and control of water resources. ******

Management of national water supply and demand integrating climate change variables, with emphasis on water-stressed areas. ******

Water Heritage Sector

Implementation of communication, dissemination and capacity building programmes to raise awareness of the effects of climate change among stakeholders in the water sector and water users.

Generation and establishment of mechanisms for the conservation of water sources and implementation of their management plans to ensure water quantity and quality in the future.

Design and implementation of actions that contribute to increase the adaptive capacity of water infrastructure (existing and new) for multiple uses. **

Health

Macro level

Issuance of public policies, based on the best available information, to address the health impacts of climate change.

Operational level

Generation of knowledge and scientific studies on the effects of climate change on health and the interactions between changes in climate and the dynamics of vector-borne pathologies. **

Strengthening of institutional capacities, local governments and citizens in the implementation of responses to the impacts of climate change on health. Issuance of public policies, based on the best available information, to address climate change impacts on health.

Development of a Single Registry of People Affected and Affected by the Impacts of Climate Change and implementation of a programme of simulations and drills linked to climate-related health hazards to facilitate the population's attention and effective response.

Generation of climate vulnerability and risk analyses at the national level to enable the implementation of an early warning system to address the impacts of climate change.

Strategies for the implementation of an integrated surveillance and monitoring system environmental health and epidemiological health risks in the context of climate change.

Human Settlements Sector

Macro level

Development and implementation of public policy on habitat, land use, territorial planning and land management, with criteria for adaptation to climate risks.



Development of policies and strategies to deal with temporary or permanent migration of the population due to conditions linked to climate change. **

Operational level

Reducing the population's climate risk through the validation of safe land, promotion and provision of decent, accessible and affordable housing in areas with low exposure to climate hazards.

Development of local public policy instruments for climate action that prioritise adaptation measures to the effects of climate change.

Design and provision of public support systems that are resilient to the occurrence of climate hazards. **

Capacity building for multi-stakeholder and multi-level governance for climate risk management in human settlements at national and local levels, promoting civil society participation.

Generation of lines of research for the assessment of the vulnerability of human settlements to the adverse effects of climate change.

Productive and Strategic Sectors

Macro level

Inclusion of the climate variable in public policies and risk management instruments and sectoral planning (Hydrocarbons, Mining, Electricity and Renewable Energy Sectors). **

Integration of climate projections in the development of new road infrastructure studies.

Climate Risk Reduction in the value chains of the oil and mining industry, and in the electricity generation, transmission, distribution and commercialisation infrastructure, through the development of sector-specific Climate Risk and Vulnerability studies, which allow for the identification, proposal and implementation of adaptation measures to the effects of climate variability and climate change. **

Operational level

Generation of vulnerability and climate risk studies for road infrastructure, to identify, propose and implement adaptation measures to the effects of climate variability and climate change in the design, construction, operation and maintenance phases of road infrastructure projects. **

Food sovereignty, agriculture, livestock, aquaculture and fisheries

Food sovereignty, agriculture, livestock, aquaculture and fisheries

Macro level

Design and implementation of public policy to strengthen the climate resilience of agri-food systems.

Promotion of responsible governance on land use and management that ensures sustainable agricultural production and resilience to the effects of climate change.

Operational level

Issuance of regulations and technical standards for the integration of climate change adaptation into development planning at sectoral (agricultural and livestock sectors) and local level (at the level of decentralised autonomous governments).

Promotion of initiatives aimed at responsible consumption of agricultural production that is resilient to the effects of climate change.

Development, promotion and implementation of sustainable agricultural production models and technologies that are resilient to the effects of climate change.

Strengthening local capacities in the agricultural sector (including sustainable land use) through participatory learning methodologies with a focus on environmental sustainability and resilience to climate hazards.

Capacity building and scientific research for the generation of information related to agricultural production resilient to the effects of climate change.

Generation of information to strengthen agro-climatic risk management, enabling the establishment of early warning strategies for extreme climate events. **

Transversal to all sectors

Promotion of financial mechanisms, instruments and tools to manage resources for the implementation of adaptation actions to the impacts of climate change.

Updating and strengthening programmes for the generation, processing, quality control, dissemination and free access to meteorological and hydrological data, in support of the processes of adaptation to the negative effects of climate change.

Increasing the capacity of the national financial system to manage resources from international cooperation for climate change management.

Notes:

According to SENPLADES, climate change adaptation measures are classified as strategic or macro-level and operational or management-level.

The measures marked with ** are those initially considered to correspond exclusively to the conditional scenario.

4.4 Support and implementation needs.

According to the table of prioritised adaptation measures, financial resources, technical assistance and technology have been foreseen under the unconditional scenario to implement effective actions aimed at reducing the risk of climate change and increasing the resilience of natural and human systems linked to the priority sectors of adaptation to climate change in Ecuador.

However, the implementation of the aforementioned measures, under the conditional scenario, will only be possible if the means of implementation in terms of financing, capacity building and technology transfer are available from developed countries.

An assessment of support and implementation needs will be carried out in accordance with the guidelines and methodologies set out in the implementation framework of the Paris Agreement and the United Nations Framework Convention on Climate Change, which allow for the quantification of support and implementation needs for climate change adaptation.

As a conclusion of the process for the adaptation component of the NDC, it is evident that the current capacities are not sufficient to implement the stipulated measures in a comprehensive manner, which will limit the implementation and compliance of the NDC, affecting the national capacity to meet the objective framed in Article 2.b of the Paris Agreement.

4.5 Actions and implementation plans

4.5.1 Adaptation efforts of developing countries for recognition

a. Developments in the applicable legislation (the case of the COA)

A transcendental milestone in the management of adaptation to climate change in Ecuador is the explicit incorporation of the issue in the Organic Environmental Code (2017), which provides a comprehensive, modern and effective regulatory framework to integrate adaptation into the country's sectoral and local development planning, and to promote the development of effective actions by the different public and private actors, aimed at increasing the resilience and decreasing the vulnerability of the country's human and natural systems.

A summary outlining and describing in general terms the main articles of this code is included below.

TITLE I. CLIMATE CHANGE		
Chapter	Article	Compendium
Chapter I: Provisions general	Article 247	It mentions that the purpose of Book IV of the COA is to establish the legal and institutional framework for the planning, articulation, coordination and monitoring of public policies aimed at designing, managing and implementing at local, regional and national level, climate change adaptation actions in a cross-cutting, timely, effective, participatory, coordinated and articulated manner with the international instruments ratified by the State and the principle of common responsibility. but differentiated.
	Art. 249	The measures and actions for the management of climate change will give priority consideration to reducing and minimising the impact on people at risk, priority groups and those living in poverty, infrastructure, national and strategic projects, the productive sectors, the environment and the environment. ecosystems and biodiversity.
Chapter II. Instruments for climate change management	Art. 250	Climate change management shall be carried out in accordance with the National Climate Change Policy and Strategy, and its instruments to be issued and updated by the National Climate Change Commission. National Environmental Authority.
	Art. 252	Climate change adaptation criteria shall be mandatorily incorporated into planning processes, plans, programmes, specific projects and strategies at different levels. government and state sectors.
TITLE II. ADAPTATION AND MITIGATION OF CLIMATE CHANGE		
Chapter	Article	Compendium
Chapter I. General provisions for adaptation and mitigation measures for climate change adaptation and mitigation climate change	Art. 257	The country's capacities to cope with the impacts of climate change will be built and strengthened, with an emphasis on reducing vulnerability and in accordance with the priorities established by the National Environmental Authority.
		The State will prioritise investment for climate change adaptation with special emphasis on disaster prevention in vulnerable or high-risk areas.

	Art. 258	<p>Criteria for the development of adaptation:</p> <ol style="list-style-type: none"> 1. Safeguarding the quality of life of the population and ecosystems; 2. Consider current and future climate change scenarios in spatial planning instruments, infrastructure development, development of productive activities and services, human settlements and ecosystem protection; 3. Establish optimal and acceptable scenarios, derived from current and future climate variability models, to be included in the National Development Plans and those of the Autonomous Decentralised Governments to guarantee the quality of life of the population and the nature.
Chapter II. Minimum measures for adaptation and mitigation	Art. 261	<p>The National Environmental Authority will coordinate with the sectoral entities prioritised for this purpose and based on local capacities, the following:</p> <p>Elaboration and dissemination of the national map of vulnerabilities to climate change; Definition of guidelines and sustainable criteria for climate change management in development plans and land use planning; Rehabilitation and protection of areas vulnerable to floods, droughts, frost, and soil degradation, according to the prioritisation dictated for this purpose; Integrated management of the coastal marine zone, as well as the promotion of its adaptive capacity to the effects of climate variability and climate change; Design and promotion of training, education, awareness-raising and sensitisation programmes on climate change management, taking into account the official languages of intercultural relations; Promoting the implementation of preventive and control actions on diseases derived from the effects of climate change; Promoting the restoration of degraded and affected areas and ecosystems and promoting and articulating measures to protect natural forests.</p>

b. Progress in integrating adaptation into local development planning (the case of Land Use and Development Plans).

The integration of the climate dimension, including adaptation issues, has been a priority for the governing body of climate change management since 2014. In this regard, a pilot process was undertaken at national level in 2014 to provide technical instruments to the country's Decentralised Autonomous Governments to incorporate the climate change variable in their Development and Land Use Plans (PDOT) and for the preparation of Climate Change Plans.

Since then, more than 60 local governments at different levels (provincial, cantonal and parish) have embarked on such an effort and have to date planning instruments useful for adaptation purposes at sub-national level.

national. This initiative was voluntary.

Subsequently, as of 2018, the initiative is incorporated into the process being carried out by the National Secretariat for Planning and Development (SENPLADES), in its capacity as the governing body for territorial planning, for the updating of Guidelines for Development and Territorial Planning Plans for provincial, cantonal and parish Autonomous Decentralised Governments, and the generation of a Toolbox, consisting of a set of inputs that will enable the GADs to apply the aforementioned Guidelines in the territorial planning process. As of March 2019, this process is ongoing.

4.5.2 Barriers, challenges and gaps related to the implementation of adaptation

The main barriers, challenges and gaps related to the implementation of climate change adaptation in Ecuador revolve around "limited conditions for mainstreaming climate change adaptation into development planning at sectoral, territorial and local levels, and are composed of:

- i) Lack of policies and technical standards to integrate climate change adaptation into development planning.
- ii) Limited resolution of available climate projections and low territorial coverage for climate change vulnerability analyses.
- iii) Insufficient training and limited capacities to develop climate risk analysis (under the conceptual and methodological framework of the IPCC 5th Report) at sectoral, territorial and local levels.
- iv) Limited capacities and high turnover of technical staff (public and private) to integrate climate change adaptation into development planning.
- v) Insufficient coordination and involvement between sectoral ministries and the different levels of Decentralised Autonomous Governments (GAD) for the implementation of climate change adaptation actions in the territory and their incorporation into development planning at sectoral, territorial and local levels.
- vi) Little information on the impacts of climate change in the country's coastal marine region.

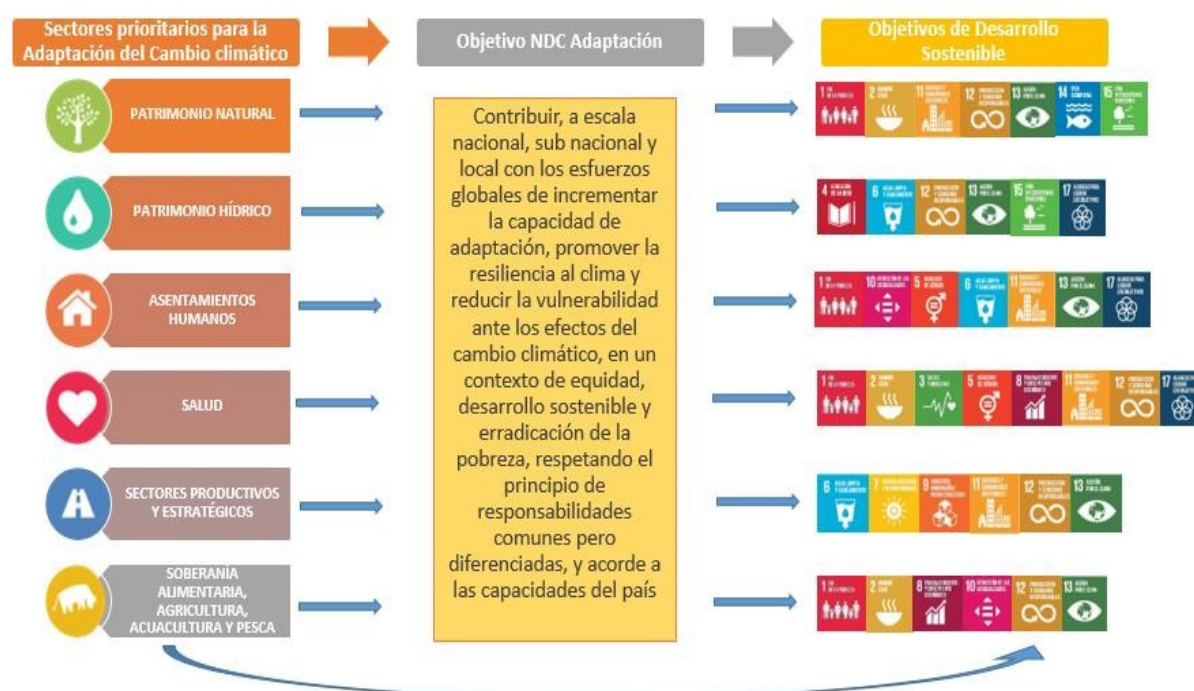
In addition, other barriers, challenges and gaps have been identified such as:

- Insufficient dissemination of existing regulations related to the management and development of climate change adaptation planning.
- Lack of budget to assume the responsibilities and functions inherent to the management of climate change adaptation.
- Weak technological capacity (e.g. hydrological and meteorological stations, equipment, software, and measurement, reporting and verification systems for climate change adaptation, among others).
- Insufficient quality and quantity of information (e.g. baseline climate information, information for climate risk analysis, etc.).
- Low dissemination and application of scientific findings on the impacts of climate change, coupled with poor communication to civil society on this issue.
- Lack of knowledge of the costs and effects of no adaptation action, or of "maladaptation", and the impacts on the economy or communities.

4.6 Information on how the planned adaptation actions contribute to the achievement of the Sustainable Development Goals.

The graph below shows some of the main interactions between the climate change adaptation measures envisaged to be implemented under Ecuador's NDC and the Sustainable Development Goals.

1. CONEXIÓN DE LA NDC – COMPONENTE ADAPTACIÓN CON LOS OBJETIVOS DE DESARROLLO SOSTENIBLE (ODS)



Source and elaboration: Ministry of Environment (2019).

Ecuador's NDC includes concrete measures to address the impacts caused by climate change. The approach applied during the formulation of the adaptation component of the NDC allowed for the alignment of initiatives and measures with the goals of the National Development Plan "Toda una Vida" and the National Climate Change Strategy. The NDCs also aim to be a mechanism that contributes to the fulfilment of the 17 Sustainable Development Goals set out in the 2030 Agenda, which, in general, aim to eradicate poverty, protect the planet and ensure prosperity for all human beings.

By way of example, the measures that make up the NDC of the Water Heritage Sector promote the generation of quality information and the strengthening of institutional and human capital capacities to contribute to the conservation and responsible management of water resources, and thus ensure the availability of water for the population in a context of climate change. In this context, NDC measures contribute to SDG 4, SDG 6, SDG 12, SDG 13, SDG 15 and SDG 17.

5. Information on how the country considers its NDC to be fair and ambitious, in the light of its national circumstances.

Ecuador's NDC process represents an effort of unprecedented ambition in Ecuador's design and implementation of climate change policy, particularly in the face of its national circumstances.

Ecuador is a country with marked needs for sustainable development and pressing urgencies to solve social problems that limit its standard of living in comparison with developed countries. As of 2018, national poverty stood at 23.2 per cent and extreme poverty at 8.4 per cent. Urban poverty reached 15.3% and rural poverty 40%, with extreme poverty levels at 17.7%. In that year, the national Gini coefficient was 0.469. Multidimensional poverty was 37.9% at the national level; with 23.9% in urban areas and 67.7% in the rural sector. (INEC, 2018).

With regard to the rates relevant to employment, in 2018 there was 16.5% underemployment, 9.9% unpaid employment and 28.8% non-full employment with a national unemployment of 3.7% and child labour of 8.56%. (INEC, 2018).

Similarly, the net rates of the population achieving a baccalaureate remained at 70.8% at the national level, 75.65% at the urban level and 62.77% at the rural level until 2017. (INEC, 2018)

All these circumstances, among others, add to the limitations of the population's capacity to access basic services, basic and high school education, reduce infant and maternal mortality rates, and generate adverse social consequences across the board, including overcrowding, child malnutrition, illiteracy and poverty.

Despite these conditions, Ecuador is committed to the fight against climate change. The EU's climate change strategy, framed in its efforts to eradicate poverty, guarantee food and water sovereignty, access to basic services and on the basis of existing international commitments.

Among these commitments, Ecuador reiterates its willingness to implement all the provisions of the United Nations Framework Convention on Climate Change and the Paris Agreement derived from it, including everything related to the development of national greenhouse gas inventories, the formulation, implementation and updating of programmes and measures to mitigate climate change, the management, conservation and strengthening of carbon sinks, the generation of efforts to adapt to the adverse effects of climate change, among others. However, Ecuador stresses that the fulfilment of these actions and commitments derived from international agreements are linked to the fulfilment of commitments of the entire international community, in particular those that refer to the provision of financial resources by developed countries in line with articles 4.3, 4.4, 4.5 and 4.7 of the Convention and articles 9, 10 and 11 of the Paris Agreement.

The joint implementation of all these commitments by the international community will allow Ecuador to make use of its full potential in the global fight against climate change, taking advantage of all the opportunities identified in this NDC to reduce and limit the emission of greenhouse gases and implement measures and actions to reduce vulnerability and increase the resilience of systems to the adverse effects of climate change.

Nevertheless, despite national circumstances and the necessary conjunction of international commitments, Ecuador has maintained a process of unprecedented proportions at the national level for the design of its first NDC. Stakeholders from the public, private, academic, non-governmental and research sectors, among others, have been consulted. Dialogues, workshops and technical meetings have been held to identify those aspects that require additional financial resources for implementation but also those that are within the national capacity to be implemented without additional resources, and as a result, measures and goals have been defined that will be implemented with the participation of sectoral entities, private companies, subnational governments and a series of actions that will be mapped in the NDC implementation plan, expected for 2020.

In addition, it is worth noting that the actions that have been identified as part of the NDC have national coverage and their implementation is expected to include actors at all levels of the state. At the same time, these actions have been disaggregated by sector in line with the National Climate Change Strategy, which has implied a commitment on the part of sectoral actors at various levels, positioning the climate change issue on the agenda at all levels.

For these reasons, and for the series of measures and lines of action identified, Ecuador's first NDC is undoubtedly ambitious and fair to its national circumstances.



as a developing country, its international commitments and responsibilities and gives a robust step towards the implementation of medium- and long-term measures in the country to combat climate change.