MINISTRY OF THE ENVIRONMENT

National Adaptation Plan to Climate Change

Final Report on the Monitoring and Assessment

2016-2020 Cycle

Federative Republic of Brazil

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SECRETARY OF CLIMATE AND INTERNATIONAL RELATIONS

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LIST OF ACRONYMS AND ABBREVIATIONS

A

ABC Plan	Sectoral Plan for the Consolidation of a Low Carbon Economy in Agriculture (PlanHab)
AbE	Ecosystem-Based Adaptation
AgriTempo	Agrometeorological Monitoring System
AM	Amazonas State
ANA	National Water Agency and Basic Sanitation
ANAC	National Civil Aviation Agency
Antaq	National Agency of Waterway Transportation
ANTT	National Agency of Land Transportation
Anvisa	National Health Surveillance Agency
ARPA	Amazon Protected Areas Program
AVA-SUS	Virtual Learning Environment of the Unified Health System

C

CAISAN	Unified Registry for Social Programs from the Ministry of Citizenship
CAR	Environmental Rural Registry
CASIAN	Interministerial Chamber for Food and Nutritional Security
CDB	Convention on Biological Diversity
CDP	The Carbon Disclosure Project
CEBDS	Brazilian Business Council for Sustainable Development
CEMADEN	National Center for Monitoring and Alerting Natural Disasters
Cenad	National Center for Risk and Disaster Management
CEPEDES	Center for Public Health and Disaster Information
CF	Forest Code
CGPEQ	General Coordination of Biodiversity Research and Monitoring
CG-PNGATI	Steering Committee on the National Policy for Environmental and Territorial Management of Indigenous Lands
CGVAM	General Coordination of Environmental Health Surveillance of the Ministry of Health
CGU	Brazilian Government Accountability Office
CIEVS	Center for Strategic Information and Health Surveillance Response
CIM	Interministerial Committee on Climate Change
CITSAS	Center for the Integration of Technologies in Health, Environment and Sustainability

CMCA	Coordination of Climate Change and Agriculture
CNA	Brazilian Confederation of Agriculture and Livestock
CNI	National Confederation of Industry
COI	Unesco Intergovernmental Oceanographic Commission
Conab	National Supply Company
Concar	National Cartography Commission
CONSEA	National Council for Food and Nutrition Security
COP21	The 21st Conference of the Parties of the United Nations Framework Convention on Climate
Copel	Paraná Energy Company
CPRM	Mineral Resources Research Company or Geological Survey of Brazil
CT-COST	Technical Chamber for Integration with Environmental and Territorial Management
CTIBC	Low Carbon Industry Technical Committee
CT-MC	Technical Chamber of Climate Change of the PNGATI Steering Committee

D

DADPI	American Declaration on the Rights of Indigenous Peoples
DDRU	Department of Regional and Urban Development of the National Secretariat of Mobility, Regional and Urban Development of the MDR
DECO	Department of Conservation of Ecosystems
DESASTE	Department of Environmental and Occupational Health and Surveillance of Public Health EmergenciesDGAT Department of Territorial Environmental Management
DIBIO	Biodiversity Directorate
DNIT	National Department of Transportation Infrastructure

E

EAD	Distance Learning
EEMU	Energy Efficiency in Urban Mobility
Embrapa	Brazilian Agricultural Research Company
EIRD	International Strategy for Disaster Reduction
ENCTI	National Strategy for Science, Technology and Innovations
EPANB	National Biodiversity Strategy and Action Plan
EPISUS	Epidemiology Applied to the Services of the Unified Health System
EPL	Planning and Logistics Company S.A.
ES	Espírito Santo

F

FGVCes	Center for Sustainability Studies at the Getulio Vargas Foundation
Fiocruz	Oswaldo Cruz Foundation
FMUSP	Medical School at the University of São Paulo
Funai	National Indigenous Foundation

Funasa	National Health Foundation of the Ministry of Health
FURG	Federal University of Rio Grande

G

GCF	Green Climate Fund
GEF	Global Environment Facility
GIDES	Integrated Risk Management in Natural Disasters
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH*
GRD	Disaster Risk Management

I

IBGE	Brazilian Institute of Geography and Statistics
Ibram	Brazilian Mining Institute
ICMBio	Chico Mendes Institute for Biodiversity Conservation
IEC	Evandro Chagas Institute
IEC	CEBDS Climate Business Initiative
IICA	Inter-American Institute for Cooperation on Agriculture
ILO	International Labor Organization
Inmet	National Institute of Meteorology
INPE	National Institute for Space Research
IP	Industry Plan
IPCC	Intergovernmental Panel on Climate Change
IPÊ	Institute for Ecological Research
IPEA	Institute of Applied Economic Research
IVA	Impacts, vulnerability and adaptation actions
IWRA	International Water Resources Association

K

km	kilometer

L

Labre	League of Brazilian Amateurs of Radio Broadcasting
LSPA	Systematic Survey of Agricultural Production

M

MA	Maranhão
MAPA	Ministry of Agriculture Livestock and Supply
MapaInsan	Map of Food and Nutrition Insecurity
MC	Ministry of Citizenship
MCTI	Ministry of Science, Technology and Innovations
MCTIC	Ministry of Science, Technology, Innovation and Communications (defunct)
MDR	Ministry of Regional Development
ME	Ministry of Economy
MInfra	Ministry of Infrastructure
MMA	Ministry of the Environment
MME	Ministry of Mines & Energy
MS	Ministry of Health

N

NDC	National Determined Contribution
NAP	National Adaptation Plan

O

OCB	Cooperative Organization of Brazil
OCDE	Organization for Economic Co-operation and Development

P

PAC	Growth Acceleration Program
PBPQ-H	Brazilian Program for Habitat Productivity and Quality
PCTs	Traditional Peoples and Communities
PD&I	Climate Change Portfolio
PDE	Ten-Year Plan for Energy Expansion
PE	Pernambuco
Pemob	National Survey on Urban Mobility
Petrobras	Petróleo Brasileiro S.A. (Brazilian Petroleum Corporation)
PGTA	Environmental, Territorial and Environmental Management Plans of PNGATI
Planafe	National Plan for Strengthening Extractive and Riverside Communities
Planapo	National Plan for Agroecology and Organic Production
Planaveg	National Plan for the Recovery of Native Vegetation
PlanHab	National Housing Plan
Plansab	National Basic Sanitation Plan
PLANSAN	National Plan for Food and Nutrition Security
PMBC	Low Carbon Mining Plan
PNBSB	National Plan to Promote Socio-biodiversity Products
PNCLM	National Plant to Combat Sea Trash
PNDU	National Urban Development Policy
PNE	National Energy Plan
PNEA	National Environmental Education Policy
PNGATI	National Policy for the Territorial and Environmental Management of Indigenous Lands
PNGC	National Coastal Management Plan
PNI	National Irrigation Policy
PNLI	National Integrated Logistics Plan
PNMA	National Environmental Policy
PNMC	National Policy on Climate Change
PNMU	National Urban Mobility Policy
PNPCT	National Policy for the Sustainable Development of Traditional Peoples and Communities
PNPDEC	National Policy on Civil Defense and Protection
PNPSB	National Plan for the Promotion of Socio-biodiversity Products
PNRH	National Water Resources Policy
PNRS	National Solid Waste Policy
PNS	National Health Survey
PNS	National Health Plan
PNSAN	National Food and Nutrition Security Policy

PNSB	National Dam Safety Policy
PNSH	National Water Security Plan
PNT	National Transportation Policy
PNUMA	UN Program for the Environment
PNVS	National Health Surveillance Policy
PPA	Multiannual Plan
PPCDAm	Action Plan for the Prevention and Control of Deforestation in the Legal Amazon PPCerrado Action Plan for the Prevention and Control of Deforestation and Fires in the Cerrado
PR	Paraná
Pro-Adapta	Project Supporting Brazil in the Implementation of Its National Agenda for Adaptation to Climate Change
Proagir	Integrated Agro Risk Management Program
ProBiogás	Brazil-Germany Project to Promote the Use of Biogas Energy in Brazil
PROCEL	National Energy Conservation Program
Procosta	National Program for the Conservation of the Coastline
Prodes	Project to Monitor Deforestation in the Brazilian Amazon
PROGESTÃO	Program to Consolidate the National Pact for Water Management
PronaSolos	National Program for Soil Survey and Interpretation in Brazil
Proveg	National Plan for the Recovery of Native Vegetation
PRS	Sustainable Rural Project
PSR	Rural Insurance Grant Program

R

Ramsar	Convention on Wetlands of International Importance
Rede Clima	Brazilian Research Network on Global Climate Change
Renere	National Amateur Radio Emergency Network
RSI	International Health Regulations

S

S2ID	Integrated Disaster Information System
SAN	Food and nutritional Security
SBio	MMA Biodiversity Secretariat
SCenAgri	Agricultural Scenario Simulator
SCRI	Secretary of Climate and International Relations of the MMA
SDGs	United Nations Sustainable Development Goals
SEDEC	National Policy on Civil Defense and Protection of the MDR
SEDR	Secretariat of Extractivism and Rural Development
SEISP	National Secretariat for Social and Productive Inclusion
Senar	National Rural Learning Service
Siageo	Interactive Geospatial Analysis System of the Legal Amazon
SIGABC	Governance System of the ABC Plan
SINGREH	National Water Resources Management System
SISAGUA	Surveillance Information System on Water Quality for Human Consumption

SISAM	Environmental Information Integrated to Health System
SISLA	Interactive System for Support to Environmental Licensing
Sisvan	Food and Nutrition Surveillance System of the Ministry of Health
SisVuClima	Climate Vulnerability System
SMCQ	Secretariat of Climate Change and Environmental Quality
SMDRU	National Secretariat for Mobility and Regional and Urban Development of the MDR
SNDU	National Secretariat for Urban Development of the Ministry of Cities
SNH	National Housing Secretariat of the MDR
SNSH	National Secretariat for Water Security of the MDR
SNUC	National System of Nature Conservation Units
SOMAI	Indigenous Amazon Observation and Monitoring System
SQA	Environmental Quality Secretariat of the MMA
SUS	Brazilian Unified Health System
SVS	Secretariat of Health Surveillance of the Ministry of Health

T

TI	Indigenous Territories

U

UC	Conservation Sites (Units)
UFRJ	Federal University of Rio de Janeiro
UF	Federative Unit (State)
UKSIP	United Kingdom Sustainable Infrastructure Program
UN	The United Nations
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
USAID	Agency for International Development
USGS	United States Geological Service

V

VIGIÁGUA	National Program for the Surveillance of Water Quality for Human Consumption
VSA	Environmental Health Surveillance

W

WHO	World Health Organization

Z

ZARC	Agricultural Zoning of Climate Risk

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Foreword

The National Adaptation Plan (NAP), lauched in May of 2016, is one of the instruments of the National Policy on Climate Change – PNMC[1] and reflects the effords by the Federal Government, in partnership with society, to promote the management and reduction of risks associated with climate change in the country. The NAP[2] odds to the effords of the mitigation agenda in an attempt to implement the PNMC and contribute to achieving the commitments made under the United Nations Framework Convention on Climate Change (UNFCCC). It primarily seeks to provide guidance on implementing adaptive measures for the numerous sectors and themes in the Brazilian territory.

This document is a Report on the monitoring and assessment of the NAP´s First Execution Cycle (2016-2020). In this First Cycle, 11 sectoral and thematic strategies were addressed: Agriculture; Biodiversity and Ecosystems; Cities; Disaster Risk Management; Industry and Mining; Infrastructure (Energy, Transport and Urban Mobility); Vulnerable Peoples and Populations; Water resources; Health; Food and Nutritional Security and Coastal Zones, in addition to Cross-cutting Goals. This sectoral and thematic approach also followed the legal precepts for the division of jurisdictions within the Federal Government and the priorities and urgencies in relation to the adaptation agenda. The sectoral powers and duties are shown when addressing the Results by Strategic sector.

The construction of a text structured on sectoral strategies was determined based on the fact that the NAP should pursue the same logic adopted by the PNMC (GT ADAPTAÇÃO/MMA, 2015). This sector-related logic of plans featuring intersectorial objectives was not exclusive to Brazil and has been adopted in a number of different countries. There are challenges involved, both from a conceptual point of view (classification of climate change adaptation policies) and in terms of comparative monitoring at the global level. It does, however, reflect the stark reality of a political field that is still becoming entrenched and that relies heavily on incremental changes in a context of climate uncertainty (HENSTRA, 2016).

The NAP stipulates that information on Impacts, Vulnerability and Adaptation to Climate Change (IVA) should be integrated in different regional and local geographic areas across all strategic sectors in order to provide useful information that helps with risk management strategies precisely where adaptation happens: in the territories.

This Report offers a people-centred approach. It attempted to assess the extent to which the initiatives implemented by the strategic sectors generated: a. *Contributions to the preservation of people's physical integrity*; b. *Contributions to promoting people's well-being, and c. Contributions to the institutional and organizational environment.*

The results presented were produced under the coordination of Ministry of the Environment and involved the participation and collaboration of agencies and entities from the Federal Government, the business sector, and support from partner institutions.

1 The National Policy on Climate Change was instituted under Law nº 12.187, of December 29, 2009. **Available at:** http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/l12187.htm. **Accessed on**: october 2, 2020.

2 The National Adaptation Plan was introduced through Ordinance No. 150 of May 10, 2016, of the State Minister of the Environment, and was posted in the Federal Official Gazette of May 11, 2020. **Available at:** https://www.in.gov.br/web/guest/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/22804297/do1-2016-05-11-portaria-n-150-de-10-de- May-2016-22804223 . **Accessed on**: october. 2, 2020.

Introduction

This Report provides the final assessment of the First implementation Cycle (2016-2020) for the National Adaptation Plan (NAP). This plan is one of the instruments of the National Policy on Climate Change – PNMC and reflects the efforts by the Federal Government, in partnership with society, to promote the management and reduction of risks associated with climate change in the country.

The NAP foresees four-year implementation cycles and a review after the last year of each cycle. The First one covered the period from 2016 to 2020. As such, this assessment includes an examination of the breakthroughs and challenges that have occurred since its launch to provide inputs for preparing the next cycle.

The methodological proposal of this Report included the identification of relevant questions and priority actions that place the lives of human beings at the center of the process for adaptation to climate change. This can be observed in the "People-Centered Approach" item, in which each sector showed the relationship of the initiative/action with the perspectives of the proposed action.

The methodology attempted to capture the perceptions of government agencies that are responsible for implementing the sectoral and thematic strategies and thereby gather elements to support the process of building the new cycle.

Between 2019 and 2020, in conjunction with public and private agencies and entities, the Ministry of the Environment conducted discussions and a survey of qualitative and quantitative data along with the focal points of the strategic sectors, yielding inputs to help prepare this document. As was the case in the 1st NAP monitoring and assessment report (2016-2017), this report covers the adaptation actions undertaken or suggested implementations, as well as no-regrets measures, which those that are justifiable from an economic, social or environmental perspective, regardless of whether or not climate change will take place, reducing the country's vulnerability. In addition to offering an overview the achievements over the past four years, the analysis have also provided lessons learned.

Additionally, the strengths and weaknesses, along with any opportunities created throughout the process, could be identified through an analysis of the report from the agencies and entities responsible for implementing the Plan's sectoral strategies. As a result, the actors involved reported that **First Cycle of the NAP Execution was crucial in having the theme of adaptation inserted into the country's public policies.** It was also pointed out that the principle of mainstreaming[3] adaptation to the public agenda was pursued in these four years by having climate risk management inserted into government planning, as described in the Results by Strategic Sector section. Likewise, there was an increase reported in the understanding over the importance of adaptation climate change as an agenda in national institutions.

Some strategic sectors stressed the importance of the participatory process of preparing the Plan, carried out between 2013 and 2016. A number of focal points mentioned that drawing up the NAP helped prompt actions that were in progress or had been planned. Accordingly, one of the more meaningful advances of the First NAP Cycle was the training conducted under the scope of the different projects, which helped gain a better understanding of the climate change adaptation agenda.

As a point to be improved, it was suggested that the climate change adaptation agenda needs to involve the most strategic levels of government agencies. Since the NAP was drafted, the theme has been restricted to the technical level. So the suggestion was made to institutionalize the Plan in order to ensure that actions continued and to facilitate more financial and human resources to strengthen the country's resilience. Institutionalization is also expected to lead to a greater engagement by the upper management of the institutions involved.

3 Adaptation mainstreaming is the integration of climate change adaptation into a country's public agenda (Mogelgaard et al, 2018).

The assessment was also able to identify the need for having the tools and information produced in the scientific field adapted to make them more user-friendly to decision-makers and the general public. This enhanced dialog between science and decision makers at different levels (national, state and municipal) will help prepare for the challenge of raising awareness on the need for climate risk management and adaptation in Brazil. At the same time, the focal points of the sectoral strategies indicated the effective coordination with state, municipal and local entities in the construction phase of the next cycle of the Plan in an effort to broaden the involvement of federated entities at various administrative levels.

The actions reported point to the alignment of national adaptation initiatives with the challenges of the international agenda. This included the 2030 Agenda and its respective Sustainable Development Goals (SDGs)[4], as well as the United Nations Framework Convention on Climate Change (UNFCCC) and its Paris Agreement, signed on December 12, 2015, signed on April 22, 2016, and ratified through Decree No. 9.073 of June 5, 2017. This Report demonstrated that Brazil has been implementing activities allied with that agreement and making use of its tools, particularly those related to the transparency framework to verify mitigation and adaptation efforts. It was precisely the persistence in seeking this alignment with the challenges of the international climate agenda that allowed a number of strategic sectors from the NAP to prioritize the allocation of new resources (financial and human) to continue with the actions that had been initiated.

This report also contains recommendations made by the agencies responsible for the 11 strategic sectors for the next execution cycle of the NAP. As such, it represents a valuable means of feedback for Brazil's adaptation strategy, and is part of an incremental process that allowed us to identify: a) where progress has been made; b) how the priorities are listed; c) the ability for implementation and cooperation; and d) where there are any gaps in actions and knowledge.

In an effort to increase the scope of the monitoring and assessment process, we also sought participation from the business sector (following the same logic applied in the first report) through the support of the primary networks involved in the climate change theme (Climate Network of the National Confederation of Industry – CNI and Business Climate Initiative – IEC made up of: Carbon Disclosure Project – CDP, FGV Sustainability Studies Center – FGVces, Brazilian Business Council for Sustainable Development – CEBDS, Ethos Institute and Rede Brasil of the United Nations Global Compact).

4 Brazilian Indicators for Sustainable Development Goals. **Available at**: https://odsbrasil.gov.br/. **Accessed on:** october 30, 2020

The Report is structured into two blocks. In the first one, the findings from the information survey with the Federal Government sectors are described. In the second, the results of content information analysis obtained from the business sector are shown. The aggregated results take the data obtained in the 1st Monitoring and Evaluation Report (2016-2017) into account and the most recent data, collected from the strategic sectors from 2018 to 2020.

OVERALL OBJETIVE OF THE NATIONAL ADAPTATION PLAN – NAP

The **Overall Objective** of the NAP is to *promote the management and reduction of climate risk in the country in the face of the adverse effects associated with climate change in a way that takes advantage of emerging opportunities, preventing losses and damages and building instruments that allow natural, human, productive and infrastructure systems to be adopted*.[5]

Over a long-term horizon up to 2040, the NAP's objective is to promote the Federal Government's capacity for adaptation and the reduction of risks associated with climate change in a systemic way. There was an understanding during the First Cycle of the NAP that the strategy to be implemented was to insert climate change risk management into existing sectoral and thematic public policies and plans, including in national development strategies.

SPECIFIC OBJECTIVES

During the time that the NAP was drafted, it was determined that the Federal Government needs to have a structuring role in the First Execution Cycle (2016-2020). Adaptation actions should be guided according to sectorial and thematic perspectives. As a result, and based on the observation of existing best practices in the domestic and international realm and the discussions with society, governments and the private sector, the following specific cross-cutting objectives were defined:

Objective 1 – To provide guidance on the development and spread of **scientific, technical and traditional knowledge**, supporting the production, management and dissemination of information on climate risk, and deploying **capacity building** for government entities and the general public.

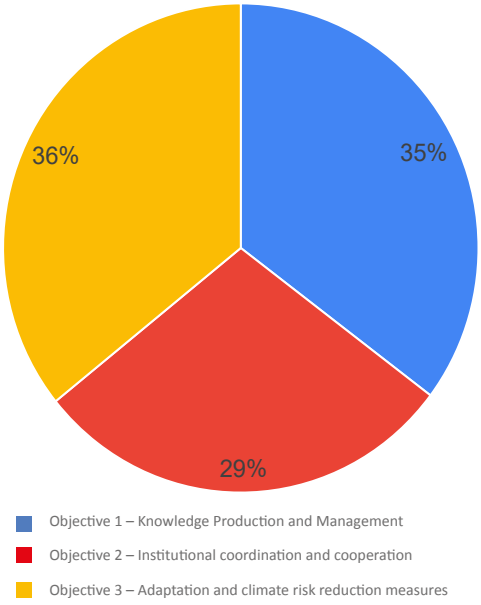
Objective 2 – To promote **coordination and cooperation between public agencies** to manage climate risk through **participatory processes** with overall **society**, with a view toward continuously improving actions for climate risk management.

Objective 3 – To identify and propose **measures to promote adaptation and risk reduction** associated with climate change.

At this time in the evaluation process, the link between the different sectoral guidelines with these three objectives was analyzed. The summary is illustrated in Chart 1, which allows us to see a relative balance, with a slightly lower percentage of the guidelines associated with Objective 2.

5 NAP, Executive Summary, page 5. **Available at**: https://mma.gov.br/images/arquivo/80182/LIVRO_NAP_Resumo%20Executivo.pdf. **Accessed on:** october 2, 2020.

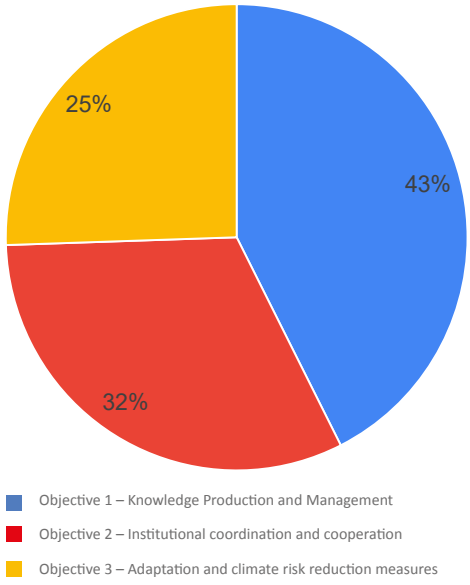
CHART 1 – LINKING SECTORIAL GUIDELINES WITH THE SPECIFIC OBJECTIVES OF THE NAP



Source: Reports from Strategic Sectors for Cycle I of the NAP (2016-2020)

In this Report, an attempt was also made to establish the relationship between the set of goals and the three objectives. It was found that the goals were predominantly linked to Objective 1. Next, the links to Objective 2 and finally to Objective 3 appear, as demonstrated in Chart 2.

CHART 2 – LINKING BETWEEN THE SECTORIAL GOALS WITH THE SPECIFIC OBJECTIVES OF THE NAP



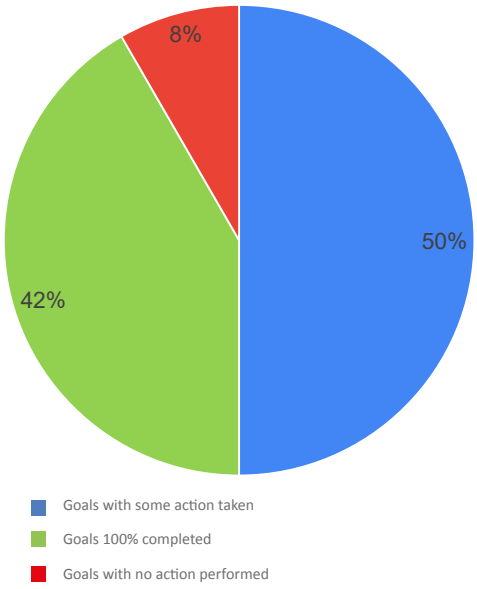
Source: Reports from Strategic Sectors for Cycle I of the NAP (2016-2020)

IMPLEMENTATION STAGE OF THE GUIDELINES AND GOALS OF THE NAP

The First Cycle of the NAP featured 24 goals and 136 guidelines, including cross-cutting and sectorial strategies that were intended to structure institutional, methodological and scientific bases to promote the reduction and management of risks associated with climate change.

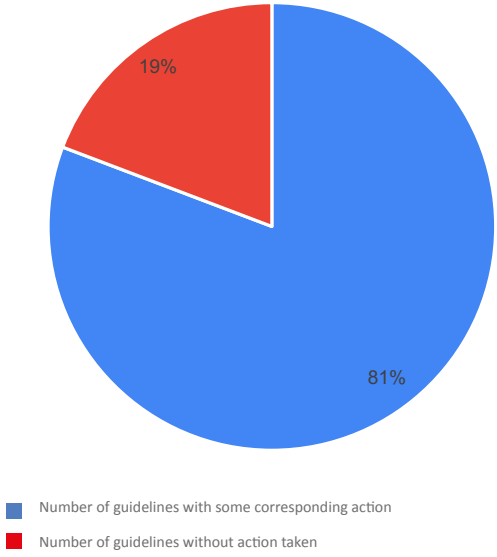
It was found that **92% of the goals had some type of action performed**, with 42% of the goals completed in their entirety (Chart 3). Only 8% of the goals had no action taken. As for the guidelines, **81% had some corresponding action implemented** (Chart 4).

CHART 3 – STAGE OF IMPLEMENTING GOALS



Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

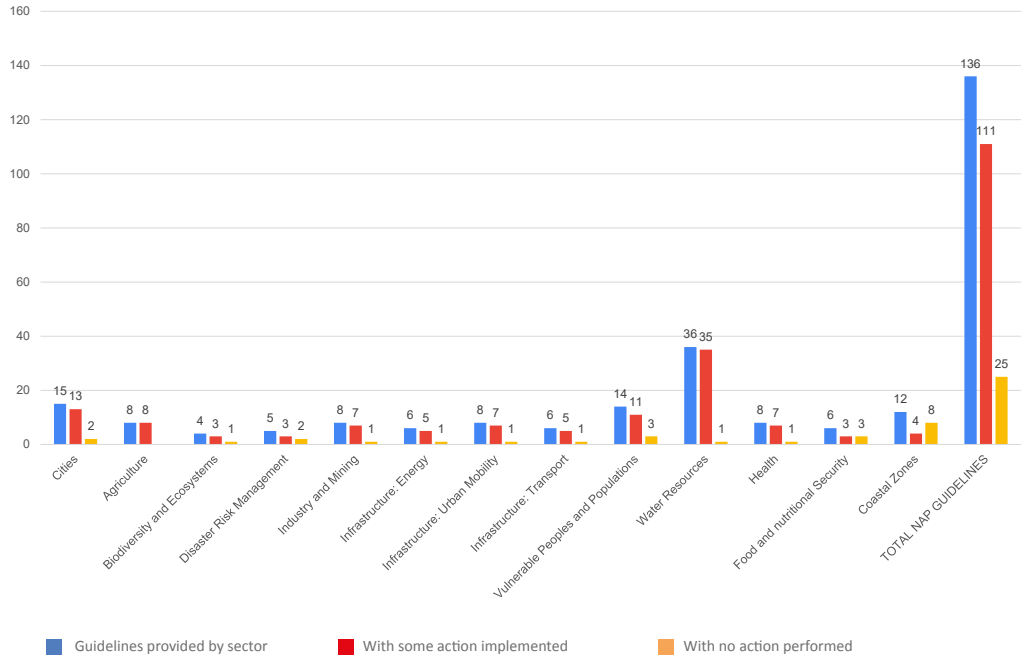
CHART 4 – STAGE OF IMPLEMENTING THE GUIDELINES



Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

Chart 5 illustrates the implementation stage of the sectorial guidelines by strategic sector, with a significant share of actions carried out in the period for most sectors.

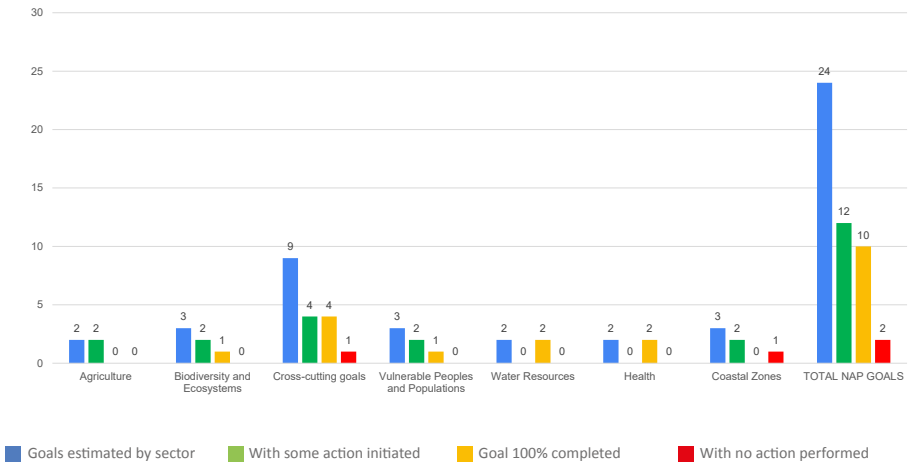
CHART 5 – STAGE OF IMPLEMENTING GUIDELINES BY SECTORIAL STRATEGY



Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

Chart 6 depicts the implementation stage of the cross-cutting goals (under the responsibility of the MMA and the MCTI) and the sectoral goals reported by the implementing agencies. **Of the 24 proposed goals, 22 (91.67%) showed actions.**

CHART 6 – STAGE OF IMPLEMENTING GOALS BY SECTOR STRATEGY

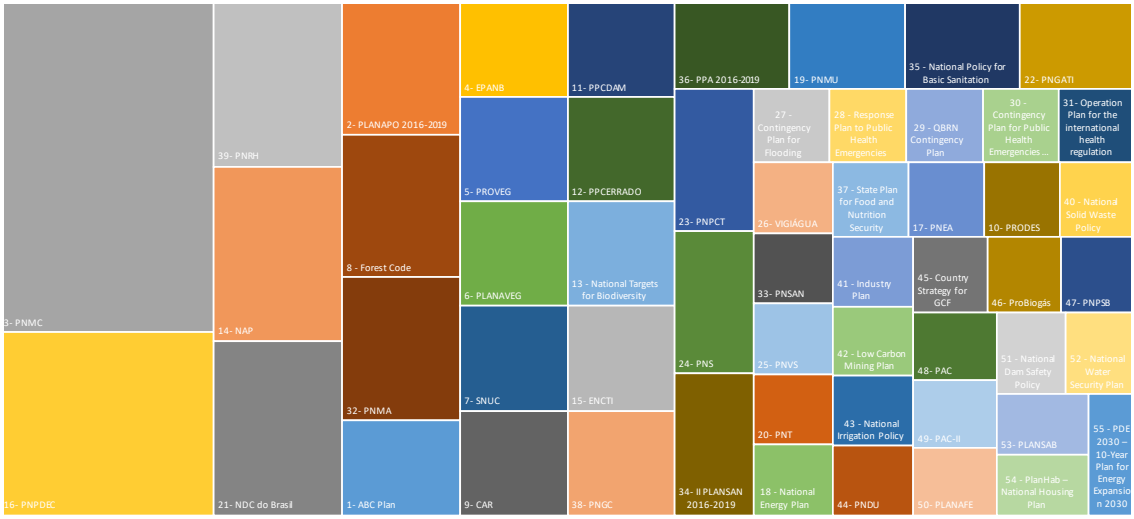


Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

NATIONAL AND INTERNATIONAL POLICIES

In all, 55 national policies, plans and/or government programs, according to the focal points of the sectoral strategies, were strengthened between 2016 and 2020, with relative intensity, from the process of implementing the NAP (Chart 7). This alignment between the Guidelines and Goals implemented in the NAP and the national initiatives that had already existed confirm an increase in synergy in decision-making process and the success of efforts to mainstream the adaptation agenda done by the various strategic sectors of the NAP (the lists of National and International Policies identified by the sectoral strategies are provided as an annex to this publication). In Chart 7, the area occupied by a specific public policy is directly proportional to the number of times it was mentioned by the focal points of the sectoral strategies as having been bolstered. The PNMC, for example, identified by number 3 in Chart 7, was the most strengthened in the period of the first cycle of the NAP.

CHART 7 – NATIONAL POLICIES LISTED IN THE NAP GUIDELINES AND GOALS



Source: Reports from Strategic Sectors for Cycle I of the NAP (2016-2020)

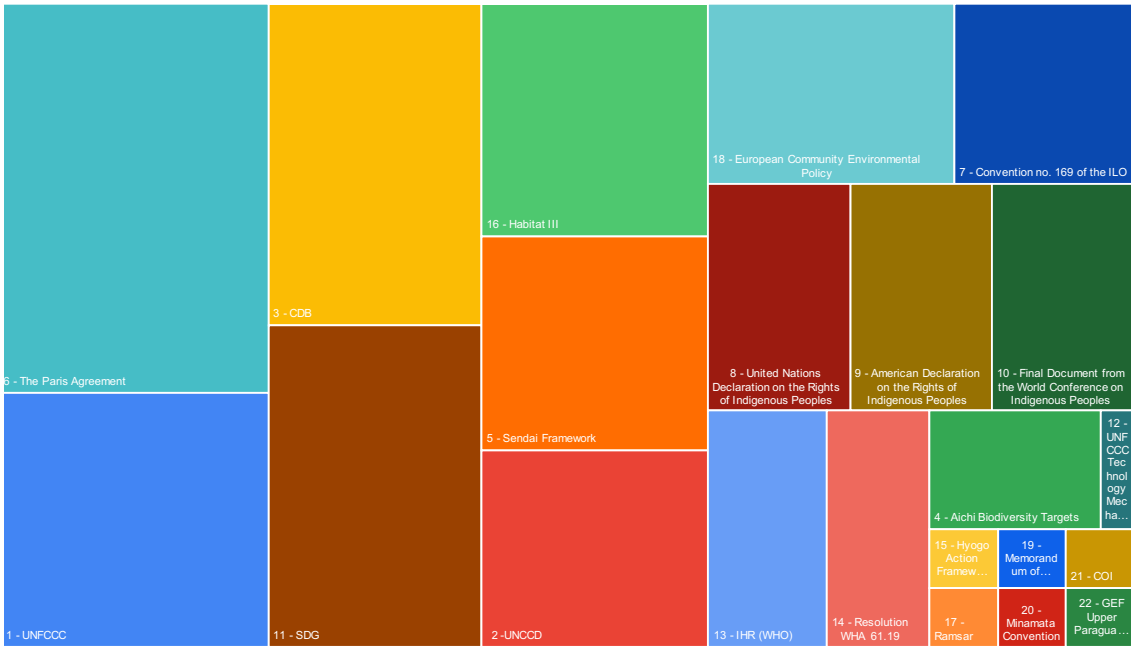
LEGEND:

1. ABC Plan – Sectoral Mitigation and Adaptation to Climate Change for the Consolidation of an Economy of Low Carbon Emission in Agriculture Plan
2. Planapo 2016-2019 – National Plan for Agroecology and Organic Production
3. PNMC – National Policy on Climate Change
4. EPANB – National Biodiversity Strategy and Action Plan
5. Proveg – National Plan for the Recovery of Native Vegetation
6. Planaveg – National Plan for the Recovery of Native Vegetation
7. SNUC – National System of Conservation Units
8. Forest Code
9. CAR – Environmental Rural Registry
10. Prodes – Project to Monitor Deforestation in the Brazilian Amazon
11. PPCDAm – Action Plan for the Prevention and Control of Deforestation in the Legal Amazon
12. PPCerrado – Action Plan for the Prevention and Control of Deforestation and Fires in the Cerrado
13. National Biodiversity Targets
14. NAP – National Adaptation Plan
15. ENCTI – National Science, Technology and Innovation Strategy
16. PNPDEC – National Policy on Civil Defense and Protection
17. PNEA – National Policy on Environmental Education
18. PNE 2050 – 2050 National Energy Plan

19. PNMU – National Policy on Urban Mobility
20. PNT – National Transportation Policy
21. NDC of Brazil – Nationally Determined Contribution of Brazil.
22. PNGATI – National Policy for the Territorial and Environmental Management of Indigenous Lands
23. PNPCT – National Policy on the Sustainable Development of Traditional Peoples and Communities
24. PNS – National Health Survey
25. PNVS – National Health Surveillance Policy
26. VIGIÁGUA – National Water Quality Surveillance Program for Human Consumption
27. Contingency Plan for Flooding
28. Response Plan to Public Health Emergencies
29. CBRN Contingency Plan (Chemical, Biological, Radiological and Nuclear)
30. Contingency Plan for Drought and Drought-related Public Health Emergencies
31. Operation Plan for International Health Regulation
32. PNMA – National Environmental Policy
33. PNSAN – National Food and Nutrition Security Policy
34. II PLANSAN 2016-2019 – National Plan of Food and Nutritional Security
35. National Policy for Basic Sanitation
36. PPA 2016-2019 – Multiannual Plan
37. State Plan for Food and Nutrition Security
38. PNGC – National Plan for Coastal Management
39. PNRH – National Policy of Water Resources
40. National Solid Waste Policy
41. Industry Plan – Sectoral Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Emission in the Manufacturing Industry
42. Low Carbon Mining Plan
43. National Irrigation Policy
44. PNDU – National Policy on Urban Development
45. Country Strategy for GCF – Green Climate Fund
46. ProBiogás – Brazil-Germany Project to Promote the Use of Biogas Energy in Brazil
47. PNPSB – National Plan for the Promotion of Socio-biodiversity Products
48. PAC – Growth Acceleration Program
49. PAC II – Growth Acceleration Program II
50. Planafe – National Plan for Strengthening Extractive and Riverside Communities
51. PNSB – National Dam Safety Policy
52. PNSH – National Water Security Plan
53. Plansab – National Sanitation Plan
54. PlanHab – National Housing Plan
55. PDE 2030 – Ten-Year Expansion Plan for Basic Energy 2030

Within the framework of international agendas related to climate change, the First Implementation Cycle of the NAP (2016 to 2020) plays a role in strengthening 22 international milestones, as demonstrated in Chart 8.

CHART 8 – INTERNATIONAL POLICIES RELATED TO THE NAP GUIDELINES AND GOALS IMPLEMENTATION



Source: Reports from Strategic Sectors for Cycle I of the NAP (2016-2020)

LEGEND:

1. UNFCCC – United Nations Framework Convention on Climate Change
2. UNCCD – United Nations Convention to Combat Desertification
3. CBD – Convention on Biological Diversity
4. Aichi Biodiversity Targets
5. Sendai Framework for Reducing the Risks of Disaster
6. The Paris Agreement
7. International Labour Organization (ILO) Convention 169
8. United Nations Declaration on the Rights of Indigenous Peoples
9. American Declaration on the Rights of Indigenous Peoples
10. Final Document from the World Conference on Indigenous Peoples
11. SDGs – Sustainable Development Goals
12. UNFCCC Technology Mechanism
13. RSI – International Health Regulations (OMS)
14. WHA Resolution (World Health Assembly) 61.19
15. Hyogo Framework for Action (International Strategy for Disaster Reduction – EIRD)
16. Habitat III

17. Convention on Wetlands of International Importance – Ramsar
18. European Community Environmental Policy
19. Memorandum of Understanding BR 20000 signed between the National Water and Basic Sanitation Agency – ANA, CPRM – Company for Research of Mineral Resources or Geological Service of Brazil and the USGS – United States Geological Service
20. Minamata Convention
21. IOC – Intergovernmental Oceanographic Commission UNESCO
22. GEF Cross-Border Cooperation Project for Conservation, Sustainable Development and Integrated Management in the Upper Paraguay Basin

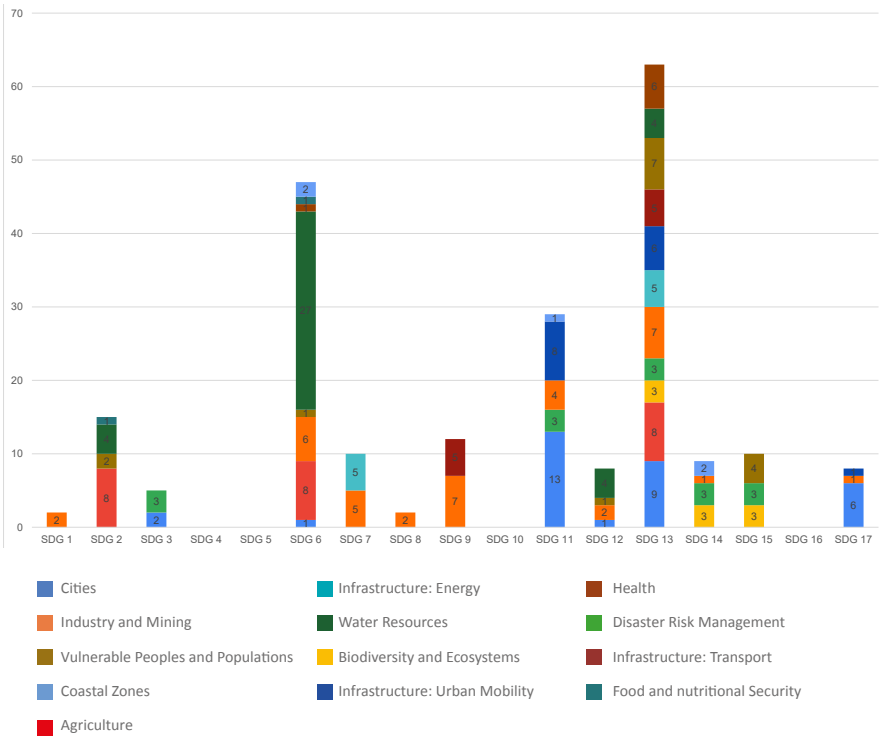
SUSTAINABLE DEVELOPMENT GOALS AND THE NAP

The implementation of the 2030 Agenda for Sustainable Development, adopted on September 25, 2015, by 193 UN Member States, including Brazil (*UN General Assembly Resolution 70/1*), had begun the same year as the NAP in 2016, continuing the Millennium Development Agenda (2000-2015). This agenda addresses economic development, the eradication of poverty, despair and hunger, social inclusion, environmental sustainability and good governance at all levels, including peace and security. In its First Implementation Cycle, **the NAP contributed to strengthening the Brazilian implementation of the 2030 Agenda through actions related to 15 of the 17 Sustainable Development Goals – SDGs.**

FIGURE 1 – SUSTAINABLE DEVELOPMENT GOALS

Chart 9 shows that the SDGs most frequently cited by sectoral strategies, as per the Plan's guidelines, were SDG 13 (Climate Action), 6 (Clean Water and Sanitation), 11 (Sustainable Cities and Communities), 2 (Zero Hunger and Sustainable Agriculture) and 15 (Life on Land).

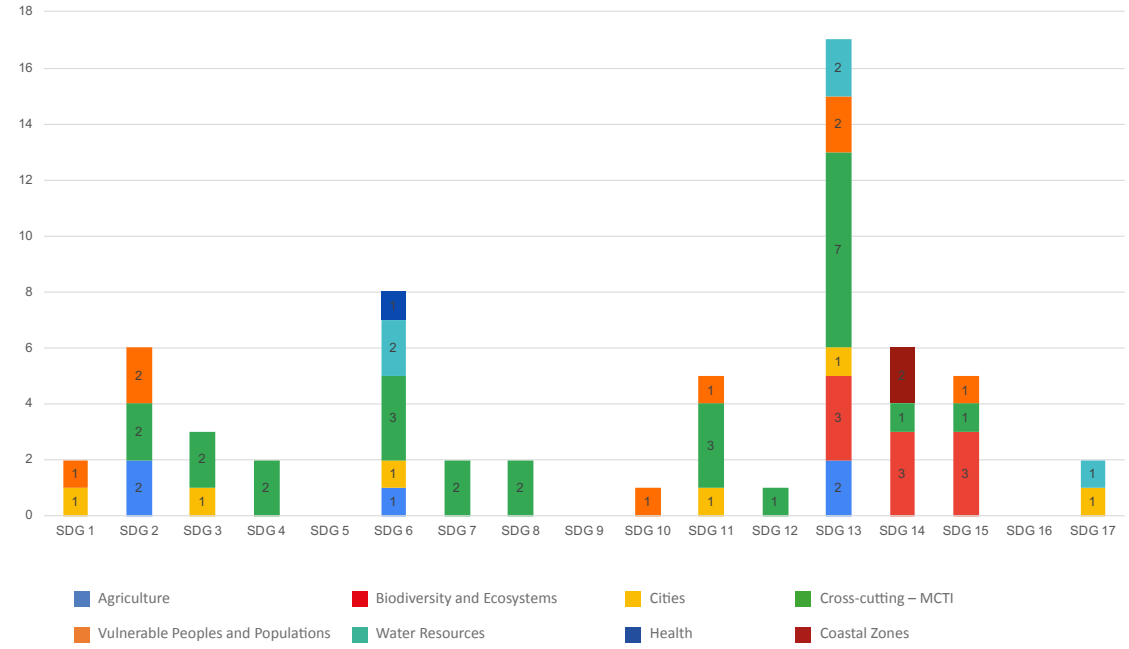
CHART 9 – NUMBER OF SDGS CITATIONS BY GUIDELINES AND SECTORIAL IN THE NAP



Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

Chart 10, on the other hand, presents the SDGs most frequently mentioned in the NAP goals. It was found that the most cited SDGs were: SDG 13 (Climate Action), 6 (Clean Water and Sanitation), 2 (Zero Hunger and Sustainable Agriculture), 14 (Life in Water, Conservation and Sustainable Use of the Oceans), 15 (Life on Land) and 11 (Sustainable Cities and Communities).

CHART 10 – NUMBER OF SDGS CITATIONS BY GOALS AND SECTORIAL IN THE NAP



Source: Reports from the Strategic Sectors for Cycle I of the NAP (2016-2020).

PEOPLE-CENTERED APPROACH

The integration and interaction between climate and society underscore the critical need to place climate change adaptation into broader socioeconomic, environmental and political processes. As such, a people-centered approach to adaptation takes the reduction of vulnerability into account through the preservation of physical integrity, and the promotion of citizens' well-being, while seeking improved institutional and organizational coordination of actions to strengthen resilience to climate change. This analysis centered on individuals and their environment, coupled with international and domestic initiatives and top-down climate models, allows for a deeper insight into the challenges, as well as the opportunities provided by climate change.

Against this backdrop, the links of the actions carried out with three perspectives of action centered on people were explored in the data survey performed to identify the advances made after the first NAP monitoring and assessment report (2016-2017):

a. *Action Perspective 1 – Contributions from the actions of the sector to preserve people's physical integrity in the face of climate change*. Climate change may pose a real risk factor for people's physical integrity, such as human health, but it can also indirectly influence other risk factors for individuals.

b. *Action Perspective 2. Contributions from the actions of the sector to promote people's well-being.* Well-being is a widely used expression, but its meaning has evolved over the years. These days, the definition of well-being has become much broader, closely related to the definition of health in Brazil, encompassing aspects of mental, emotional, social, and physical health.

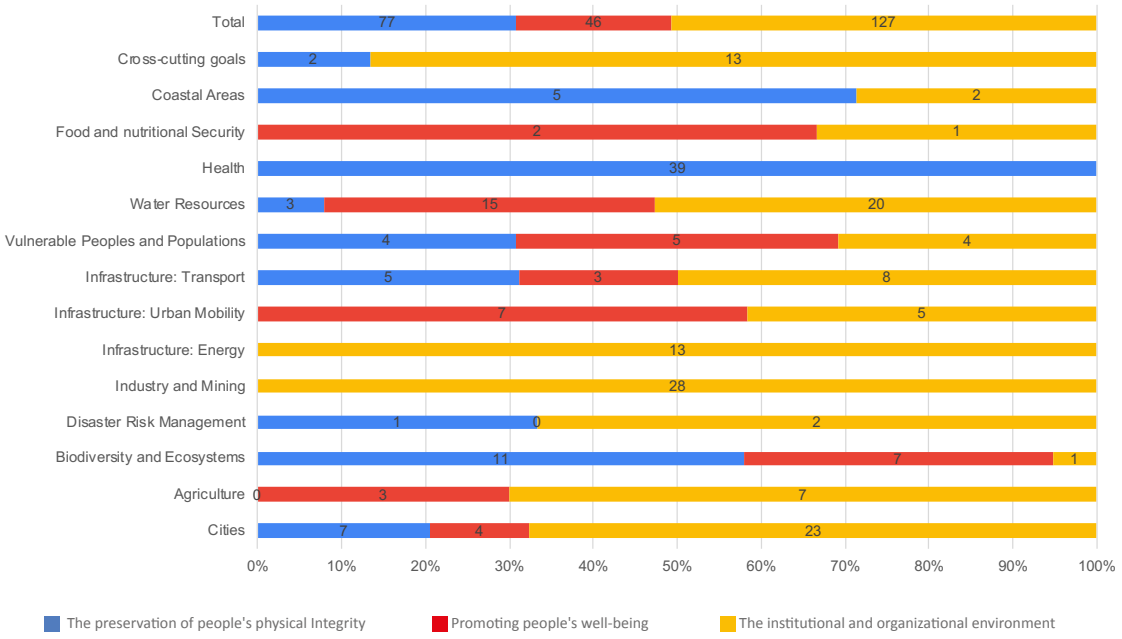
c. *Action Perspective 3. Contributions from the actions of the sector to the institutional and organizational environment*. The institutional environment is the set of economic, political, social, moral and legal rules that establish the foundation for social behavior and for production and distribution in the economy. The organizational environment, on the other hand, consists of structures created to support the system (companies, universities, cooperatives, associations) [6]. Through capacity building (specific technical knowledge and know-how, soft skills such as networking, collaboration, leadership and change management, including financial and human resources and infrastructure) a mutual learning process is created that helps individuals, institutions, organizations, sectors and communities to manage transformation processes, including adaptation to climate change.

The NAP sectors were able to identify which of their actions were linked to the perspectives of people-centered action between 2018 and 2020. Overall, the vast majority of NAP sectors reported a significant link between their actions and the perspectives of a people-centered action that were stated in the survey.

Chart 11 reveals that 51% of the initiatives were related to Action Perspective 3 (contributions to the institutional and organizational environment). For the other perspectives, there is a correlation of approximately 31% of the initiatives related to Action Perspective 1 (preserving the physical integrity of people), and 18% related to Action Perspective 2 (promoting people's well-being). It can be therefore inferred that the higher percentage of initiatives related to Action Perspective 3 is due to the initial stage in which the subject of adaptation to climate change in the country was maturing, during which many sectors sought their institutional training and strengthening. For example, there is the Infrastructure sectors – Energy and Industry and Mining, which related 100% of their initiatives to this action perspective.

6 FONSECA, V. S. da; MACHADO-DA-SILVA, C. L. Indivíduo, organização e ambiente: bases para conversação entre três perspectivas de estudo da estratégia em organizações. In: **25º ENANPAD**, 2001. Rio de Janeiro. Anais da ANPAD. 1 CD ROM.

CHART 11 – NUMBER OF SECTORIAL INITIATIVES RELATED TO THE ACTION PERSPECTIVE FOR SECTORIAL STRATEGY



Source: Reports from the NAP Strategic Sectors, 2018-2020.

It is also worth emphasizing the indication made by the Health sector of 100% of its actions related to Action Perspective 1 (preservation of the physical integrity of people), although the sector itself has reported that, considering the concept of Health adopted by the Ministry of Health, the physical integrity and people's well-being are aspects that are intrinsically related.

The key results gathered in the First Cycle of the NAP by strategic sector are presented below. The information was extracted from the forms completed by the sector representatives, which were used in both the preparation of the First Monitoring and Assessment Report and this Final Report.

Responsible Institution	Ministry of the Environment – MMA Ministry of Science, Technology and Innovation – MCTI
Collaborating Institutions	National Institute for Space Research – INPE and Brazilian Network for Research on Global Climate Change – Rede Clima
E-mails	NAP@mma.gov.br and cgcl@mctic.gov.br

EXPECTED GOALS

1. A strategy to improve the quality of climate projections as a way to support public adaptation policies, prepared and implemented.
2. Action plan to implement Technological Needs for Adaptation (TNA), prepared.
3. Online platform to manage knowledge in adaptation created and made available to society.
4. Strategy to expand and strengthen the Rede Clima created and implemented.
5. Data integration project for monitoring and observing the impacts of climate change implemented – AdaptaBrasil MCTI (former SISMOI).
6. Capacity-building strategy on adaptation development and implemented for different target audiences.
7. NAP Monitoring and Assessment System developed and implemented.
8. Study with systematized information on financing and economic incentives for adaptation made available.
9. Strategy to promote the formulation of public policies for adaptation by the federal entities elaborated.

KEY ADVANCES

Throughout the First Cycle of the NAP, 4 of the 9 cross-cutting goals were implemented and another 4 had their implementation started with the development of some corresponding action or initiative. It should be pointed out that most of the actions are ongoing and can thus be improved for the next cycle of the NAP. As coordinator of the adaptation agenda in the country, the MMA has fulfilled the goals under its responsibility. Given its position of producing information in a cross-cutting way to the different sectors, the MCTI played a strategic role in the adaptation agenda of providing subsidies for formulating policies and decision-making. The issue of climate change is at the forefront of science, particularly when it comes to adaptation, which demands breakthroughs in understanding specific issues in the country in an integrative manner. The implementation of MMA and MCTI actions attempted to lay the foundations for effective adaptation, and foster synergies between sector-related and thematic strategies. Furthermore, the initiatives/actions linked to the Cross-cutting Goals executed in the period contributed to 11 of the 17 Sustainable Development Goals (SDGs) and to strengthening 4 National Policies and 6 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- New climate change models generated and research under development to improve the quality of climate projections.
- Capacity-building strategy for adaptation developed and validated, and courses given and materials developed.
- Mapping carried out on sources of financing for adaptation and mitigation, available on the MMA website.
- Mapping Brazil's vulnerability to drought events, on a municipal scale.
- Support in the development of a guide to orientating the development of municipal adaptation plans.
- Pilot project for the AdaptaBrasil MCTI Platform (formerly known as SISMOI) prepared with an initial focus on the semi-arid region and on sectors linked to water, energy and food security. The platform will offer consolidated information on the impacts of climate change for various sectors in all regions throughout the country in order to provide input to managers and decision-makers.
- Adaptation knowledge platform Adaptaclima created and made available to society.
- PROJETA platform containing climate change projections for South America regionalized by the ETA Model.

- Climate Projections in Brazil (http://pclima.inpe.br/) Platform containing projections for the country from different data sets.
- Identification of the vulnerability of Brazilian municipalities to biophysical and socioeconomic impacts associated with climate change.
- Support for the preparation process of Rede Clima's integrative projects, which are: i. water, energy and food security; and ii. social and environmental security.
- Support for mainstreaming the adaptation agenda in federated entities: developing actions that have helped to formulate public policies for adaptation by Union, States, Municipalities and the Federal District.
- Climate Science: through INPE, consistent progress in climate science were achieved, given the production of climate information, and the training and application of this information in the context of adaptation, both at the local and national levels.
- CITinova Project: a project dealing with solutions for sustainable cities, notably synergistic with the adaptation agenda.
- Dialog between science and decision-making: A number of partnerships constructed and/or strengthened, with a view towards developing and providing scientific information applicable to different decision-making contexts.

Responsible Institution	Ministry of Agriculture Livestock and Supply – MAPA Brazilian Agricultural Research Corporation – Embrapa
Collaborating Institutions	MAPA, Embrapa, Inmet, Conab, IBGE, INPE, Cemaden, OCB, CNA and Senar
Email	sdi@agricultura.gov.br

PLANNED GUIDELINES

1. The Adaptation Program for Agriculture will be coordinated by government departments with the proper technical sectorial jurisdiction, and its implementation shall rely on shared responsibilities with other portfolios and institutions related to the sector.
2. The Adaptation Program for Agriculture is an essential part of the actions to combat climate change by the agricultural and livestock sector. It is also a coordinated action that is concerned with mitigating GHG, which jointly seeks to increase the sustainability of the sector, and is considered already built under the PNMC, the ABC Plan within the Sectorial Plan.
3. Adaptation measures need to comply with the needs of crops in light of various possible changes in the climate structure, including increased temperature and thermal gradient, water intensity and distribution, and others. The first premise to take into consideration is that the sustainability of agricultural systems (in the broad sense of the term, agriculture that involves agricultural crops, livestock and forestry, as well as the various types of integrated systems) needs to be attained and guaranteed by the intensive use of knowledge to improve their processes.
4. The development of an adaptation strategy has to be based on the best set of information available and its effectiveness will depend on structuring the means of implementation that ensure its continuity over time, an ongoing process of review and improvement with structured investments in science and technology.
5. The focus of the actions for agriculture are initiatives and instruments that will help motivate and create conditions for rural producers to structure and maintain sustainable production systems, in all their diversity of scale, technology, nature of labor and market direction. Two important actions will need to be considered in this sense, apart from developing appropriate technologies for each reality: the establishment of the Agriculture Climate Intelligence Center and the development of the Agricultural Risk and Vulnerability Monitoring and Simulation System, based on some of the instruments that are already in place and are active.
6. Geographic Area of Implementation: National – agriculture is the central base of activity throughout the entire country and is susceptible to changes in its weather pattern. The Program should therefore discuss structuring and cross-cutting federal actions, in addition to establishing a strategy for localized action.
7. Regional Strategy: the specification of regional goals for actions needs to be based on a mapping of vulnerabilities, opportunities and/or investments and the social profile of various regions, recognizing the priority for action in the family farming sector. Similar to the development of the ABC Plan, regional and state specifics will be developed with the construction and eventual revision of the ABC State Plan, which is under the responsibility of the State Management Groups, already implemented in all Brazilian states, and responsible for the implementation and management of the ABC Plan in each State.
8. Influence of risk management in sector-related policies: sectoral policies now include a concern over climate risk, which is intrinsic to the agricultural sector. The assessment of these policies within the perspective of climate change needs to take place during the more detailed discussion of the Adaptation Program for Agriculture, attempting to assess their relevance, potential gaps and pitfalls, and strategies for their strengthening.

EXPECTED GOALS

1. Agricultural Risk and Vulnerability Monitoring and Simulation System – developed and implemented.
2. Center for Climate Intelligence in Agriculture – dedicated to Applying Climate Risk into Brazilian Agricultural Policy – is created.

KEY ADVANCES

Throughout the period, new opportunities were identified, particularly for financing and international partnerships. The instruments that are typical of agricultural policy and research were reinforced, specifically through the Sectoral Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low-Carbon Economy in Agriculture (National ABC Plan), the Agricultural Zoning for Climate Risk (ZARC) and other instruments involving the management of agricultural risk, for the support that rural producers need to confront climate uncertainty. The 2 goals set for the sector have implemented related actions. Actions were also implemented under the 8 guidelines proposed by the sector. The initiatives done in the period contributed to 3 Sustainable Development Goals (SDGs) and to strengthening 4 National Policies and 5 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- National ABC Plan (Interministerial Ordinance/ MAPA-MDA No. 984 of October 8, 2013): along with the initiatives to mitigate greenhouse gas emissions, adaptation initiatives for the agricultural sector were devised to complement the actions established in the National ABC Plan. In this period, there were some important deliveries and international projects within the scope of the National ABC Plan, which promote technologies for agriculture that are more resilient to climate change: ABC Cerrado, Sustainable Rural Project – PRS Cerrado, PRS Caatinga, PRS Atlantic Forest and Amazon and Rural Landscapes. The ABC National Plan covers the entire country and has been in place since 2020. The Plan is currently being revised to establish a new cycle of actions for the next decade. All 27 Federative Units have established state management groups and developed their own State ABC Plans.
- Multi-Institutional Platform for Monitoring Reductions of Greenhouse Gas Emissions in Agriculture – ABC Platform: work performed on monitoring and measuring the results of the National ABC Plan, published in June of 2020. The ABC Plan Governance System (SIGABC) is in progress, pending the establishment of adaptation indicators and mitigation co-benefits.
- Agro Integrated Risk Management Program – Proagir: created in order to monitor and simulate agricultural risk and vulnerability. It integrates all actions related to climate risk management and promotes the importance of taking out rural insurance. The Garantia-Safra was specifically restructured for family farming, primarily in the Northeast and the northern areas of Minas Gerais and Espírito Santo. This initiative includes the involvement of Inmet, Cemaden, and LSPA/IBGE. There was also a program established to digitize the Proagro Special Committee for Resources, as well as a program to classify agricultural experts, through the creation of the Crop Guarantee and the Rural Insurance Subsidy Program (PSR), which integrated supervision, training, quality control, registration of experts and network management actions.
- Integrating the Agricultural Risk and Vulnerability Monitoring and Simulation System into the national monitoring and alert networks (Cemaden and Cenad).
- Climate Intelligence Program – Climate Intelligence Center: they have helped reduce climate uncertainties in decision-making by agencies and rural producers. They need, however, to increase their scale and reach.
- Agricultural Zoning of Climatic Risk – ZARC : received a significant improvement in 2019, with increased detail to guide crop cultivation, help prevent crop losses and strengthen rural insurance. Under the ZARC framework, the Agrometeorology Working Group was created and a diagnosis of the priority actions that can be developed by MAPA was made within the scope of agricultural meteorology and climate monitoring services. As part of the group's work, Inmet released the new Agroclimatological Bulletin. Since the 2019-2020 harvest, ZARC has been available in an app for tablets and smartphones: the ZARC Plantio Certo. The ZARC Risk Indication Panel was also created, whereby the results can be displayed for all crops according to more detailed climatic risk

levels, with planting periods listed according to the risk level (20%, 30% and 40%).

- Products generated by the following Embrapa systems and partners: AgriTempo (Agrometeorological Monitoring System); ZARC; SCenAgri (agricultural scenario simulator); TerraClass; Siageo (Interactive Geospatial Analysis System of the Legal Amazon), SISLA (Interactive System of Support for Environmental Licensing).
- Brazilian Soil Survey and Interpretation Program(PronaSolos): was initiated in order to detail the classification of soils in Brazil to a minimum scale of 1:100,000, meaning that each centimeter of the map is equivalent to one kilometer of the land. The Program will be able to mobilize dozens of partner institutions to investigate, document, take inventory and interpret Brazilian soil data. The aim is to map 1.3 million km^2 of soil in the country over the first ten years, and another 6.9 million km^2 by 2048, in scales ranging from 1:25,000 to 1:100,000. The mapping will provide for improved agricultural planning and will help analyze agricultural risks and vulnerability in relation to climate change.
- Publication of Decree No. 10.269 from March 6, 2020, which institutes the Strategic Committee and the Executive Committee of the National Soil Survey and Interpretation Program in Brazil.
- In the area of plant and animal breeding:
  a. screening for drought tolerance genes for the genetic improvement of maize, rice and beans;
  b. identifying epigenetic patterns associated with environmental variations and water stress in eucalyptus;
  c. characterizing creole varieties and wild cassava (mandioca) species;
  d. analyzing the vulnerability of seeds and seedlings from forest species native to the Caatinga;
  e. selecting cultivars and production systems for sunflower cultivation;
  f. identifying molecular markers of thermal comfort and studying strategies to increase reproductive performance in Girolando dairy cattle;
  g. studying drought tolerance in banana plants for the selection and identification of genotypes for use in water-deficient regions;
  h. gene and proteomic analysis for the development of citrus and banana cultivars;
  i. managing forage grasses in crop-livestock integration systems (iLP) and SPD;
  j. increasing the adoption of inoculant technology based on the biological nitrogen fixation process (BNF) in order to develop low carbon emission agriculture.
- PD&I – Climate Change Portfolio: universities, public institutions (including Embrapa) and private research, through their portfolio of climate change projects, have made significant advances in defining innovation challenges and developing solutions. For Embrapa, Project themes in the context of research development include the sustainable use of water that resulted in:
  a. evaluation of hydrological, hydro-geological, hydro-meteorological and pesticide transport mathematical models applied to the impacts of production systems on agriculture;
  b. monitoring and qualitative and quantitative characterization of water resources, relating them to land use;
  c. integrated analysis and study of future climate change scenarios and land use impacts on water availability and demand;
  d. assessment and adaptation of technologies for the sustainable use of water in agriculture and improving cotton production process through the no-till farming system (SPD, in Portuguese) and integration with crop rotation.

Responsible Institutions	MMA/ Biodiversity Secretariat – Sbio / Department of Ecosystem Conservation – DECO ICMBio/DIBIO/General Coordination of Biodiversity Research and Monitoring – CGPEQ
Collaborating Institutions	*GIZ* (Atlantic Forest Project), IPÊ, USAID, Gordon Moore Foundation, ARPA Program and World Bank (GEF-Mar)
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PLANNED GUIDELINES

1. Incorporating information on climate change in the planning and execution of public policies for the conservation, restoration and sustainable use of biodiversity.
2. Expanding and bolstering existing biodiversity conservation actions as no-regret measures to reduce biodiversity vulnerability to climate change.
3. Devoting efforts into creating a coordinating institutional structure that integrates the various actions and policies focused on managing biodiversity.
4. Providing guidance on how to prepare research notices and knowledge management systems in climate and biodiversity to support decision-making geared towards reducing the vulnerability of biodiversity in Brazil.

EXPECTED GOALS

1. A strategy of Ecosystem Based Adaptation Measures (EbA) in areas at risk for extreme events and other impacts from climate change prepared.
2. Modeling the impact of climate change on biodiversity designed for use by public policies for the conservation, restoration and sustainable use of biodiversity.
3. Monitoring implemented in 50 federal conservation units (protected areas) to perform an *in situ* assessment of the impacts of current and future climate change on biodiversity.

KEY ADVANCES

Actions were taken to implement 3 goals established in the Plan, including 1 goal fully implemented and 2 goals partially initiated. Of the 4 proposed guidelines, 3 contain ongoing actions that will contribute to fulfilling 3 Sustainable Development Goals (SDGs) and to fortifying 12 National Plans/Policies and 5 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Decree 10.234, dated February 11, 2017: approves the ICMBio Regimental Structure, including the theme of adaptation to climate change.
- Ecosystems-based Adaptation – EbA: the actions that have been done took place under the Biodiversity and Climate Change in the Atlantic Forest Technical Cooperation Project, coordinated by the MMA in partnership with Germany, which ended in December of 2020. The EbA capacity-building strategy that was implemented included qualification for over 69 trainers and promotion of EbA experiences and knowledge, in cooperation with educational and research institutions to institutionalize EbA expertise in Brazil. Over 279 key actors at local, regional and national levels from public agencies, academia, organized civil society and the private sector were sensitized on climate change and EbA through courses and workshops. A Distance Learning course in EbA was introduced in September of 2020 by the MMA, with 2,000 spots available.
- A revised methodological roadmap for drafting and implementing the Municipal Plans for the Preservation and Recovery of the Atlantic Forest, providing methodological tools for integrating climate change and EbA into the plans.
- Guide to best practices for including EbA in Conservation Unit management plans is prepared.
- Pilot-projects, in municipalities within the Atlantic Forest, for the incorporation of EbA in different territorial planning instruments.
- Integrated fire management plans developed for Conservation Units in the Cerrado.
- Studies conducted that analyze the impact of climate change on biodiversity.

- A diagnosis and mapping of the biophysical impacts of climate change in the Atlantic Forest in order to identify areas that have the potential for flooding, water erosion, landslides, soil water availability, agroclimatic zoning, occurrence of phytophysiognomies and distribution of dengue vectors.
- ICMBio's National Biodiversity Monitoring Program: running in 89 Federal Conservation Units, subdivided into three Subprograms – Terrestrial, Continental Aquatic, and Coastal Marine. From 2017 to 2019, progress was made in the number of conservation units taking part in the Program and the Monitor Program Report was published for the 2014-2016 period.
- Study done on restoration techniques and cost estimates per hectare for each biome.
- Progress in structuring the Marine and Coastal and Continental Aquatic subprograms, with the forestry component being the most developed in implementation. The Monitora Program is supported by USAID, Moore Foundation, ARPA, World Bank, MCTI.

Responsible Institution	Ministry of Regional Development – MDR National Secretariat for Mobility and Regional and Urban Development – SMDRU - MDR National Housing Secretariat – SNH - MDR
E-mails	snh@mdr.gov.br cct-snh@mdr.gov.br gab.smdru@mdr.gov.br

PLANNED GUIDELINES

1. Promoting federal-level coordination between the three spheres of government aiming with a view towards reducing vulnerability to climate change through inter-federative planning and management between municipalities and states, especially public roles of common interest in metropolitan regions and urban agglomerations.
2. Consider adaptation to climate change when promoting the rehabilitation of consolidated and degraded urban areas with installed infrastructure, promoting urban diversity and helping reduce urban expansion and the population's exposure to risks arising from the occupation of susceptible areas.
3. Consider adaptation to climate change in promoting the urbanization of precarious settlements with the aim of raising the habitability of the settlements and improving the living conditions of the population.
4. Consider climate change adaptation in the production of social housing at scale and guarantee that low-income families and those found in vulnerable situations have access to housing in good locations featuring quality and resilient infrastructure, which also include urban, social and cultural amenities and services along with leisure opportunities.
5. Strengthening any urban expansion planning processes with the objective of preventing natural disasters and the emergence of risks from occurring by means of specific urban expansion projects, providing guidance on urban land parceling, use and occupation of urban land within adequate standards and adapted to the risks related to climate change.
6. Bolstering actions related to slope containment projects and preparing a Municipal Risk Reduction Plan (PMRR, in Portuguese), increasing the number of municipalities that are benefited, especially among those included in the National Register of Municipalities with Areas Susceptible to the Occurrence of Landslides, Floods or Geological Processes or Correlated Hydrological Processes (CadRisco), established in Law No. 12.608 of April 10, 2012.
7. Consider adaptation to climate change in the implementation of the National Basic Sanitation Plan – Plansab.
8. Strengthening sustainable urban drainage actions aimed at reducing floods and waterlogging, considering works and services geared towards implementing flood damping reservoirs.
9. Supporting the implementation and improvements of water supply and sewage systems that consider the economic & social, public health, ecological and infrastructural effects of the measures adopted in an effort to maximize the beneficial effects on health and the environment directly associated with these systems, specifically seeking the decontamination of water bodies to facilitate multiple uses of water, stimulating the efficiency of energy use through the use of biogas derived from treating sewage and urban solid waste, and other renewable energies.
10. Supporting actions to improve urban cleaning and solid waste management systems with a view towards expanding selective waste collection in municipalities, the proper disposal of waste and eradication of dumps, given that the increase in heavy rainfall resulting from climate change causes a greater carry-over of slurry from dumps to water bodies and increases the effects of inappropriate disposal of urban waste, done in a haphazard manner along water courses, both in dumps and in dense urban areas, aggravating the flooding issue.
11. Supporting the management and promotion of information related to climate change, which can provide support for preparing a diagnosis and the development of adaptation strategies in synergy with urban planning.
12. Assisting in the development of studies on the impacts of climate change in different cities, which can support further development of methodologies for adaptation urban

infrastructure that will be incorporated into urban development policies.

13. Supporting the formation and qualification of human resources and the dissemination of technological resources for the use and management of information, aiming at the application of established strategies and methodologies.

14. Consider adaptation to climate change in improvements for urban planning models, seeking to improve the management of land use and occupation correlated with environmental preservation associated, particularly with the prevention of risk in natural disasters.

15. Supporting the coordination of initiatives to revise technical standards and regulations for construction and urban parameters so that they can foster resilient solutions related to the construction of buildings and urban infrastructure.

KEY ADVANCES

Even when faced with a challenging scenario for implementing the NAP, 13 of the 15 guidelines proposed in the Plan had some corresponding linked action, helping to fulfill 6 of the 17 Sustainable Development Goals (SDGs) and to the strengthening of 11 National Plans/Policies and 5 international initiatives[7].

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Review of the *Minha Casa, Minha Vida* (My Home, My Life) Program, with the inclusion of urban specifications aimed at qualifying housing projects and units.
- Publication of Provisional Measure No. 759/2016, converted into Law No. 13.465 of July 11, 2017, which is intended to reduce bureaucracy and simplify the process of land regularization in urban centers.
- Regulation of Law No. 13.456, of June 26, 2009, through the Decree No. 9.310 of March 15, 2018, which stipulates general rules and procedures that are applicable to urban land regularization and establishes the procedures for the assessment and sale of the Federal Government's properties.
- R$ 2.264 billion were invested in 66 water supply projects, 59 sewage projects, 10 urban drainage projects in vulnerable municipalities and 8 solid waste management projects.
- Creation of Geotechnical Maps for Urbanization Suitability in 7 municipalities.
- Manual for the Preparation of Structural Measures and Plans against the Collapse of Slopes and Technical Manual for Disaster Risk Reduction Applied to Urban Planning prepared within the scope of actions to strengthen the National Strategy for Integrated Natural Disaster Risk Management.

7 The Ministry of Regional Development – MDR was created through Decree No. 9666/ January 2, 2019, which promoted the merger of the Ministries of Cities and National Integration. In this context, the subjects under the purview of the former National Secretariat for Urban Development of the Ministry of Cities (SNDU/MCidades, object of Decree No. 8.927, of 2017, were redistributed among 3 Secretariats in a new Department: Urban Land Issues under the purview of the new National Housing Secretariat (SNH); Risk management in the National Secretariat for Civil Defense and Protection (SEDEC); and Planning and Urban Management in the National Secretariat for Regional and Urban Development (SDRU).

- Technicians and local managers trained in Analysis and Approval of Slope Stability Projects.
- Brazilian Program for Productivity and Quality of Habitat – PBPQ-H: an instrument from the Federal Government to fulfill the commitments established by Brazil when the Istanbul Charter was signed during the 2nd World Conference on Human Settlements – Habitat II/1996 . After the Conference, Brazil took on the challenge of organizing the civil construction sector around two key issues: the improvement of habitat quality and productive modernization. For this reason, the PBPQ-H was created under the scope of the MDR. In addition to objectives related to housing quality, there are also environmental goals: improved performance and efficiency in the use of natural resources, reduction of solid and liquid waste and gaseous effluents.
- Development of strategies for energy efficiency in housing, focusing on social housing and sustainable urban development.
- Capacity building. Furthermore, within the framework of the Strategies for Energy Efficiency in Housing, appropriate techniques, workshops, courses, training and practical application in prototypes are being developed in order to implement and promote a new culture of energy efficiency and reduction of environmental impacts, especially on the climate, arising from the production and operation of housing and urban functions.
- Review of the National Housing Plan – PlanHab for the 2023 to 2040 timeline, in which the principles of bioclimatic adequacy, energy efficiency and sustainable urban development will be prioritized.
- Andus Project – development of Components 1) Knowledge management and promotion of innovative practices: (i) Qualification Course for drafting Municipal Master Plans; (ii) Methodology and capacity-building course on how to integrate ecosystem services in urban planning and; 2) Improvement and integration of national instruments for sustainable urban development. The development of the Project also resulted in the publication of the Guide for drafting and revising Master Plans.
- Promotion of training courses on bioclimatic adaptation of housing and energy efficiency in affordable housing.
- Implementation of National Basic Sanitation Plan – Plansab , established through Decree No. 8.141 of November 20, 2013, including actions in the municipalities.

Responsible Institution	Ministry of Regional Development / National Secretariat for Civil Defense and Protection / National Center for Managing the Risks of a Disaster
E-mails	cenad@mdr.gov.br

PLANNED GUIDELINES

1. Regulation of the National Civil Defense and Protection Policy – Law 12.608 and fulfillment of the planned actions.
2. Ecosystem-based Adaptation Measures (EbA).
3. Consolidation of an Early Warning System.
4. Insurance or risk transfer mechanisms.
5. Encourage research focused on understanding the risk of disaster.

KEY ADVANCES

Disaster Risk Management (DRM) in Brazil is under the purview of the National Policy for Civil Defense and Protection (PNPDEC), instituted by Law No. 12.608 of April 10, 2012, and is the responsibility of the entire National System for Protection and Civil Defense, which consists of the federal, state, Federal District and municipal public administration agencies and entities and by public and private entities that operate in the area of civil defense and protection. Of the 5 guidelines planned for this sector-related strategy, actions were done for 3 of them. This includes the publication of Decree No. 10.593 on December 24, 2020, which, among other matters, led to the creation of the Federal Civil Defense and Protection System, designed to improve the coordination of risk and disaster management actions for the group of Federal Government agencies and also introduced guiding elements for the preparation of the National Civil Defense and Protection Plan. This initiative is directly related to bolstering governance, one of the 4 action priorities from the Sendai Framework, in addition to fostering an understanding of disaster risk; investing in disaster risk reduction for resilience; and improving disaster preparedness, which were also included. The multiple actions undertaken by the strategic sector that are linked to adaptation guidelines for this sector played a role in achieving 5 of the SDGs and in strengthening 3 National Policies and 2 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Publication of Decree No. 10.593 of December 24, 2020, which provides for the organization and functioning of the National Civil Defense and Protection System and the National Civil Defense and Protection Council and the National Civil Defense and Protection Plan and the National Disaster Information System.
- Technological and regulatory modernization on monitoring and alerts: 1. Publication of Ordinance No. 413 of September 13, 2018; 2. CENAD provides alerts on the IDAP platform; together with 25 federal units; 3. Broadcasting of alerts via Cable TV, with national coverage, 4. Monitoring of LP No. 1450 of 2015, which amends Law No. 12.608 of April 10, 2012, which establishes the National Policy for Protection and Civil Defense to institute the National Disaster Information and Monitoring System. The LP is still being debated on the floor of the House of Representatives.
- Improvement of the Integrated Disaster Information System (S2ID) with functional modules related to civil defense actions.
- Boosting the number of users registered in the alert system and integrating new priority municipalities, especially managing equipment in the observational network. There was also an alert system established with cable television providers in all federative units, whose alerts do not depend on the registration of users. It is also an ongoing and permanent action of the National Center for Risk and Disaster Management – Cenad.
- Protocols established for concerted actions with partner agencies involving monitoring and warning of natural disasters.
- Start of preparations for the National Civil Defense and Protection Plan, which needs to be rolled out within 30 months from the publication of Decree No. 10.593 of December 24, 2020 and contains other guiding elements for its formulation.

- Start of the Institutionalization of the Federal Civil Defense and Protection System, created through Decree No. 10.593 of December 24, 2020.
- Review of the SEDEC's activities with the National Amateur Radio Emergency Network – Renere and League of Brazilian Radio Broadcast Amateurs – Labre.
- Publication of Ordinance No. 70.389 of May 17, 2017, which, among other measures, created the National Registry of Mining Dams, the Integrated Management System for the Safety of Mining Dams, particularly related to Municipal Contingency Plans for Dams through the Guidebook to Support the Development of Municipal Contingency Plans for Dams.
- Performing a diagnosis, assessment and improvement of logistic models for the purchase, transportation and distribution of humanitarian assistance kits.
- Consolidation of the MDR's participation in committees related to risk and disaster management – National Nuclear Protection System Committees, which are: 1. Response Planning Committee for Nuclear Emergency Situations in the Municipality of Resende; 2. Response Planning Committee for Nuclear Emergency Situations in the Municipality of Angra dos Reis; 3. Committee of Coordination in the Security and Logistics Areas of the Protection System of the Brazilian Nuclear Program Protection System Copren/RES, 4. Coordination Commission of Protection to the Brazilian Nuclear Program; 5. Safety Committees for Critical Infrastructure of Dams and Water Supply; 6. Technical Committee for Hydro-Meteorological Services.
- Technical Cooperation between the National Water and Basic Sanitation Agency (ANA), Ministry of Regional Development to take action in the event of an emergency involving dam safety.
- Strengthening the coordination between South American countries in the subject of risk and disaster management, through Mercosur and the *Foro Progresso de América del Sur – PROSUR,* in their respective structures and thematic areas. *estión del Riesgo de Desastres y Desarrollo Resiliente*.
- Mapping of municipal civil defense structures: reinforcing the National Civil Defense and Protection System through coordination with the entities in the system, particularly municipal civil defenses, by carrying out a diagnosis of municipal civil defense structures, which is being prepared by SEDEC/MDR.
- Sourcing and conducting studies for the development of insurance mechanisms or risk transfers.
- Rollout of the Second Phase of the Água Doce Program in 2020 with an update of state plans for the 2020-2029 period and the closing of the bidding process to implement 396 desalination systems through direct implementation.
- Introduction of the Strategic Action Plan for Rehabilitation of Federal Dams (Planerb) in 2019.
- Preparation of the ex-post Assessment of the National Dam Safety Policy (Law no. 12.334 of September 20, 2010), with an identification of the risks.
- Approval by the National Water Resources Council of the Report from the Working Group for Mapping the Standardization Needs of Law no. 12.334 of September 20, 2010, with specification of Decree, Resolutions and Ordinances required to improve the National Dam Safety Policy.
- Project for the Integration of the São Francisco River with the North-Northeast Hydrographic Basins – PISF: implementation of the largest water infrastructure project in the country. Intended to guarantee water security for 12 million people living in the Northeast region.
- Launch and implementation of the National Water Security Plan – PNSH.

Industry and Mining

Responsible Institutions	Ministry of Economy Ministry of Mines & Energy
Collaborating Institutions	National Confederation of Industry – CNI and Brazilian Mining Institute – Ibram
E-mails	sgm.gab@mme.gov.br sdic.gabinete@economia.gov.br

PLANNED GUIDELINES

1. Building knowledge about specific impacts and vulnerabilities for industrial subsectors.
2. Establishing an institutional framework that facilitates the implementation of adaptation measures.
3. Developing tools to support decision-making in Adaptation related to Industry.
4. Raising awareness among micro and small companies in order to introduce the theme of adaptation in the sustainability agenda.
5. Introducing climate risk as a consideration in the sector's public policies and encouraging it to be recognized in business decisions.
6. Fostering the capital goods Industry that promotes an increase of society's resilience.
7. Fostering a strategy of coordination with Unions and Federations in conjunction with the National Confederation of Industry (CNI) to develop joint climate risk management strategies in industries located in vulnerable regions.
8. Encouraging Ecosystem-based Adaptation (EbA) practices as a tool to increase territorial and industrial resilience.

KEY ADVANCES

This sector-related chapter shows contributions to the adaptation agenda developed in industry and Mining. Industry actions were coordinated by the now-defunct Ministry of Development, Industry and Foreign Trade (MDIC), which took an active part in the process of preparing the NAP in partnership with entities from the industrial sector represented by the CNI. Together, they acted in synergy towards structuring the foundations for implementing the guidelines proposed in the NAP. In June 2017, along with the Brazilian Industry Climate Network, the CNI began the discussion process on prioritizing the guidelines for the implementation plan for the Industry and Mining chapter of the NAP. This prioritization was based on the following criteria: 1) incorporating the concepts of adaptation to climate change into the industrial agenda; 2) learning more about the financial impacts of climate risks on the operations and infrastructure in the industrial sector; 3) the need to create capillarity within the industrial sector of the climate change adaptation agenda, and 4) the influence of decision making on processes involving adaptation to climate change in the industry. For the actions taken by the Mining area, the guidelines were provided by the Ministry of Mines and Energy, which, among other aspects, was involved in dam safety.

In this regard, of the 8 guidelines provided, 7 presented actions that contribute to fulfilling 10 of the SDGs and to strengthening 8 national plans/policies and 2 international initiatives: the Paris Agreement and the Minamata Convention.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED INDUSTRY

- Strengthening the emerging adaptation agenda in different segments of the industrial sector, and fostering an understanding of the sector's climate vulnerabilities and the best strategies to deal with them.
- Establishment of the Low Carbon Industry Technical Committee (CTIBC) to discuss the suitability of the industry's climate policy for the post-Paris Agreement period.
- "Inclusion of Adaptation in Industrial Development Policies" prepared, a study that served as the basis for the Action Plan of Adaptation for Industry.
- The "Industry's Contribution to the National Strategy for Adaptation to Climate Change" document prepared by the CNI's Technical Chamber for Adaptation to Climate Change.
- Coordination with the National Agency for Waterway Transportation (ANTAQ) and with the MMA, performed by the CNI, within the scope of the ANTAQ's Project to Assess the Impacts of Climate Change in Brazilian Ports.

- Technical cooperation agreement entered into between the former MDIC, the CNI and the National Water and Basic Sanitation Agency (ANA) to promote water reuse in the industrial sector; economic instruments and public financing to improve water efficiency; a study conducted on the modeling of industrial water demand; training for stakeholders from the private sector.
- A more systemic approach to adaptation based on the transfer of skills from the former MDIC to the Ministry of Economy.
- Infrastructure resilience and internalization of climate risk in the structure of the current Ministry of Economy regarding the cost and benefit assessments of public construction projects.
- Signing of a Term of Commitment by CNI as an institutional partner in the "AdaptaClima" Platform, intended to promote mobilization measures and assessment actions and to update thematic contents on the Platform. This also includes preparing technical studies to support and train the industrial sector in the climate change adaptation agenda.
- Release of the Climate Change and Brazilian Industry Publication in 2018: strategic recommendations for the implementation and financing of Brazil's NDC (http://www.mdic.gov.br/index.php/component/content/article?id=3374), where the efforts by the industrial sector to comply with the Paris Agreement were outlined in 7 structural pillars, one of them being specific actions in the adaptation agenda. This has been the industry's guide for promoting its activities in the adaptation agenda.
- "Resilient Industry: A guide for industry to adapt to the impacts of climate change": in 2020, in partnership with the Federation of Industries of Santa Catarina, CNI released the Guide to help the industrial sector prepare their adaptation plans in different sized companies and sectors, using the methodology from the United Kingdom Sustainable Infrastructure Program (UKSIP), and adapted to the Brazilian context by the Sustainability Studies Center of the Getúlio Vargas Foundation – FGVces and certified by the MMA.
- Capacity Building, Resilience, Corporate Finance and Governance. For the last year of the NAP's First Cycle of execution (2020), the priority adaptation agenda of the CNI was divided into 4 major sub-themes: 1. Increased capacity to manage climate risk prevention; 2. Infrastructure resilient to the modified climate; 3. Corporate finances and; 4. Governance.

MINING

- Dam Safety: the National Dam Safety Policy, established through Law No. 12.334 of September 20, 2010, and regulated by resolutions from the National Mining Agency, forms the legal and regulatory framework that determines the ongoing, real-time monitoring of the dams that are subject to receiving special attention given their dimensions and construction models, the decommissioning – or "deconfiguration" – of dams that pose risks and that are particularly vulnerable to climatic and meteorological fluctuations.
- Reuse of tailings: the Geology, Mining and Mineral Transformation Agency (SGM/MME) is working on constructing legal and regulatory instruments that allow tailings to be reused with a consequent reduction of waste from the activity, as a measure to increase the use of mineral wealth, attracting innovation and technology to the sector and promoting resilience and longevity in the activity.
- Mapping and evaluating small and medium mining. Partnership with the Organization of Cooperatives of Brazil (OCB) through a cooperation agreement and with the Intergovernmental Forum for Mining, Metals and Sustainable Development (IGF), which Brazil is a member of, seeking to map and assess all aspects of small and medium mining, especially environmental and climatic facets, involving adaptation particularly in relation to food security.

- Draft of the National Action Plan for Compliance with the Minamata Convention in partnership with UNEP, with the support of the Global Environmental Facility (GEF).
- Mining and Society Project, with the World Bank.
- New Institutional Framework for Artisanal and Small Scale Mining. Proposed institutional and regulatory changes to specifically address the needs of Artisanal and Small-Scale Mining.

Responsible Institution	Ministry of Mines and Energy
Email	spe@mme.gov.br

PLANNED GUIDELINES

1. Promoting further involvement by institutions from the electricity sector in the theme of adaptation, aiming towards adaptation institutional policies to new climate parameters whenever applicable.
2. Intensifying studies of impacts on the electricity sector in specific regions, given climate change trends.
3. Conduct studies of potential risks to the infrastructure of the energy sector in light of climate change in an effort to improve the management of activities, focusing on the contingency of extreme situations.
4. Assessing the possible co-benefits and synergies between mitigation and adaptation related to a range of alternatives applied to the energy sector.
5. Assessing, where relevant, intersections in adaptive measures between water, energy, land use and biodiversity, so that their interactions can be understood and managed.
6. Conduct studies to define the need to improve planning tools in order to adapt their parameters according to shifts in weather events observed on a scientific basis.

KEY ADVANCES

There were significant advances in the development of the agreed-upon guidelines for the energy sector in the period from 2018 to 2020. Studies that were underway had been completed and made public, thereby contributing to improved awareness of the climate area in the energy sector. Increasing this knowledge is important to not only understanding how structures related to energy generation react to the impacts of climate change but also how planning methodologies can incorporate these effects into their procedures. Furthermore, in this cycle of the NAP, studies were completed that improved knowledge on the vulnerability of hydroelectric plants. It should be pointed out that, due to a some established partnerships, possibilities now existed over the next two years to develop new studies focused on expanding knowledge to other technologies, in addition to hydroelectric power plants.

Regardless of the work done thus far, there was also progress made in implementing adaptation measures, particularly with respect to the diversification of the energy matrix and strengthening of the transmission system. These initiatives provide the sector with improved energy security against the adverse effects of climate change. The increasing role of renewable energies, biofuels, hydraulics, biomass, solar and wind power showcase the low carbon emissions in the national energy matrix. In terms of the composition of the energy matrix, we can see an increase in the share of renewable sources from 45.5% in 2018 to 46.1% in 2019. This represents a 2.8% increase in the supply of renewable sources compared to the previous year. Brazil currently has a 4.3 times higher participation of renewables in its energy matrix than the average for OECD countries and 3.3 times more than the average for the rest of the world. One of the goals of the energy sector is to combine a low-carbon emission matrix with a higher degree of resilience. In addition to analyzing the impacts of climate change on the energy systems, another analysis that should be done in the field of energy involves how energy systems can help reduce the vulnerabilities in other sectors of society. As such, making access to modern energy services more universal, like electricity, strengthens the resilience of vulnerable communities to the impacts of climate change. In this sense, the Brazilian government has provided programs for access to electricity since 2003, which have helped millions of people who did not have access to these services.

In all, of the 6 guidelines planned for the strategic sector in the NAP, actions were done for 5 of them. Ongoing actions linked to the guidelines contributed to 2 of the 17 SDGs and to strengthening 3 national policies and 1 international initiative.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- 2050 National Energy Plan: a series of studies that provide support for the outline of the government's long-term strategy related to the expansion of the energy sector. The strategy is a collection of recommendations and guidelines used to define the actions and initiatives that will be implemented throughout the 2050 time period that address climate change issues.
- 2030 Ten-Year Energy Expansion Plan: a document pointing out the prospects for expanding the energy sector over a ten-year horizon, based on an integrated vision for the various energy sources. One of the conditions for planning the expansion of the system is the diversification of the energy matrix, an essential component in strengthening the sector's resilience.
- 3rd PAR Procel: The Resource Application Program determines the projects and budgets where funding for energy efficiency coordinated by PROCEL will be invested. Developing more efficient technologies boosts industrial competitiveness, benefits consumers and reduces environmental impacts. Increased energy efficiency ensures greater security in satisfying demand and staves off the need for investments in the electrical system, contributing to resilience.
- National Biofuels Policy – RenovaBio: RenovaBio is a state policy intended to outline a joint strategy to recognize the strategic role of all types of biofuels (ethanol, biodiesel, biomethane, biokerosene, second generation, etc.) in the Brazilian energy matrix. This applies to both their contribution to the energy security, with predictability, and to the mitigation of the reduction of greenhouse gas emissions in the fuel sector. In order to attain these goals, RenovaBio introduces market mechanisms to recognize the capacity of each biofuel to reduce emissions, individually, per production unit.
- Pipelines for transporting fuel: Pipelines for fuel transport, like the ethanol transport project that links the municipalities of Guararema and São José dos Campos in the state of São Paulo, are efficient infrastructures for long-distance transport. Pipelines reduce the number of trucks on the roads by mitigating greenhouse gas emissions, as well as local pollution, playing an important role in the transition to low carbon.
- Generation and spread of knowledge in adaptation:
  - Study: "Analysis of the impacts of climate change on planning methodologies for electrical systems". This study attempts to identify how shifts in climate parameters, projected over a long-term horizon and in light of its constraints, affect methodologies and models for planning electrical systems.
  - Study: "Analysis of the vulnerability of hydroelectric plants to the impacts of climate change". This research seeks to analyze the vulnerability of the Brazilian energy system to the effects of climate change related to hydroelectric plants within a hydrographic basin and proposes procedures to strengthen its resilience.
  - Study: "Climate services in Brazil and the transmission lines sector". This study provides a baseline on the current state of climate services in Brazil and the use of climate information by the transmission line sector.
- Future Energy Systems Program: established under the Basic Technical Cooperation Agreement between Brazil and Germany with the objective of strengthening the role of renewable sources and promoting increased energy efficiency.
- More Light for the Amazon Program: A program that facilitates access to electricity for the Brazilian population located in remote regions of the Legal Amazon states, thereby targeting the social and economic development of these communities. It also promotes activities geared towards augmenting family income and the sustainable use of natural resources in the

region, striving for the integration of actions from the various levels of Government and the consequent promotion of citizenship and dignity for that population.

- Diversification of the energy matrix and strengthening of the transmission system: There was progress made in implementing adaptation measures, particularly with respect to the diversification of the energy matrix and strengthening of the transmission system. These initiatives provide the sector with improved energy security against the adverse effects of climate.

Responsible Institution	Ministry of Regional Development / National Secretariat for Mobility and Regional and Urban Development
Email	gab.smdru@mdr.gov.br

PLANNED GUIDELINES

1. Institutional coordination at the governmental level that seeks to align national adaptation plans and policies with local planning and actions, involving stakeholders from the private sector, civil society and academia.
2. Consideration of vulnerability studies in urban mobility in order to draft adaptation and resilience programs at the local level, integrated with relevant sectors.
3. Incorporation of planning for adaptation and resilience within the scope of urban mobility plans that is integrated with the planning of land use and occupation in cities and taking into account the principles of Ecosystem-based Adaptation (EbA).
4. Strengthening and qualifying the infrastructure of public transport and individual non-motorized transport, providing conditions that encourage greater participation of these methods into the urban travel matrix, ensuring intermodal integration and system flexibility.
5. Stimulating studies on the need to revise technical standards for both the design and maintenance of urban mobility infrastructure, incorporating adaptation.
6. Promoting awareness about climate change and its impacts on mobility and transportation, encouraging people to prepare for and help mitigation and adaptation efforts.
7. Publicizing information about the transport network in cities.
8. Supporting innovation in projects that reduce carbon emissions and increase adaptive capacity to climate change.

KEY ADVANCES

The guidelines that address adaptation in the urban mobility sector proposed in the National Adaptation Plan (NAP) were linked to the National Policy for Urban Mobility (PNMU), with three purposes: to safeguard the transport infrastructure and its inherent value; to guarantee the reliability of mobility and economic activities; and to ensure the quality of life and safety of urban populations. The guidelines were initially institutionalized by the Ministry of Cities, whose mandate was absorbed by the current Ministry of Regional Development (MDR). There were structural changes, which implied the reorganization of teams and the redistribution of demands. A favorable environment was created to implement the guidelines through the execution of projects focused on the theme of Urban Mobility, Sustainability and Climate. Of the 8 proposed guidelines, 7 contain ongoing actions that will contribute to fulfilling 3 of the 17 Sustainable Development Goals (SDGs) and to fortifying 3 National Plans/Policies and 1 international Agenda.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Technical study on Climate Change Adaptation in Urban Mobility drafted and published: it identifies the key climate risks and impacts to urban mobility, providing a conceptual analysis of associated vulnerabilities in four dimensions, as well as a projection and analysis of climate scenarios based on specific indicators.
- Climate Change Adaptation in Urban Mobility Project: an initiative supported by the British Embassy that helped increase knowledge about climate change and urban mobility and provided a favorable environment for the implementation of the guidelines. Likewise, over time, as the changes have taken place, prioritization has moved to other areas of urban mobility.
- Support for the preparation and/or review of Plans, Studies, and urban mobility projects in at least 42 municipalities.
- Adoption of line of financing for non-motorized public transport to sub-national entities and making financing available at lower rates for electromobility.

- Publication of the TPC GUIDE: Guidelines for the selection of technologies and implementation of public transport projects, including the "Collection of Technical Guidebooks for Urban Mobility Projects" aimed at improving infrastructure projects.
- Development and Publication of the National Survey on Urban Mobility – Pemob.
- Holding a workshop with specialists in adaptation and urban mobility and the International Seminar on Challenges and Opportunities for Adaptation to Climate Change in Urban Mobility.
- Support for laying 1,465 km of sidewalks, provided for in the Growth Acceleration, Paving and Road Qualification Program.
- Support for the implementation and/or requalification of systems on tires in 72 municipalities, with 84 km already completed in 2016.
- Support for the implementation and/or requalification of systems on railways in 16 municipalities, with 45 km already completed in 2016.
- Implementation of the National Urban Mobility Policy – PNMU: guidelines for adaptation in the urban mobility sector were proposed in the NAP in an effort to protect the transportation infrastructure and its inherent value, guarantee the reliability of mobility and economic activities, and ensure the quality of life and safety of the urban population.
- Low Carbon Urban Mobility Program: A project focused on urban mobility, sustainability and the climate financed by the GEF, developing technical tools and knowledge for the planning and implementation of sustainable urban mobility projects and activities. Among other aspects, it incorporates the potential reduction of greenhouse gases (GHG) associated with mobility in large Brazilian cities. The purpose is to contribute to enforcing the National Policy on Climate Change (Law No. 12.187, of 2009), as well as the National Policy of Urban Mobility (Law No. 12.587, of 2012).
- Energy Efficiency in Urban Mobility Project – EEMU.

Infrastructure – Transportation

Responsible Institution	Ministry of Infrastructure
Collaborating Institutions	Ministry of Infrastructure – MInfra, National Land Transport Agency-ANTT, National Transportation Agency Aquaviários – ANTAQ, National Civil Aviation Agency – ANAC, National Department of Transport Infrastructure – DNIT, Planning and Logistics Company SA – EPL, VALEC Engenharia, Construções e Ferrovias SA and Brazilian Airport Infrastructure Company – Infraero
E-mails	executiva.sust@infraestrutura.gov.br

PLANNED GUIDELINES

1. Promoting the transportation sector's increased involvement in issues related to climate change adaptation through training and publicizing the information.
2. Consider, where applicable, issues on climate change adaptation in its institutional plans, programs and projects.
3. Producing studies and research on the relationship between climate change and the vulnerability of the infrastructure for transportation, seeking a way to support public policies, planning and the identification of solutions for the sector while taking into account the Ecosystem-based Adaptation (EbA).
4. Evaluating the possibility of co-benefits and synergies between mitigation and adaptation related to the different alternatives applied to the transportation sector.
5. Improving the production and availability of information on extreme events related to the transportation system.
6. Increasing the transportation sector's responsiveness to extreme weather events through plans, action protocols and preventive measures.

KEY ADVANCES

During the period for implementing the First Cycle of the NAP, some significant actions were taken to promote introducing climate change adaptation strategies into the transportation infrastructure. Given the importance of the issue, mitigation and adaptation to climate change were incorporated into the Sustainability Guidelines of the Ministry of Infrastructure (MInfra). The implementation of the Guidelines is supported by a periodic Sustainability Agenda. Of the 6 guidelines proposed in the NAP for the Infrastructure-Transportation subsector, all present actions throughout the First Cycle of the NAP, helping to fulfill 2 Sustainable Development Goals and strengthening 2 national plans and policies.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- A National Plan for Integrated Logistics (PNLI) drafted that considers the interaction of the effects of climate change on the national production matrix in the planning and development process of moving cargo.
- A Plan for Adaptation Federal Highways to Recurring Natural Disasters: developed in order to assess the risk and impacts of disasters on federal highways and to provide guidelines for preventive actions.
- Making a website available that presents the conditions of stretches of federal highways affected by the rains that are under the responsibility of DNIT.
- Training provided on the Socio-environmental Guidelines of the former MTPA, using distance learning and on-site modules to address the specific topic of Climate Change (mitigation and adaptation).
- Training on Climate Change as part of the Expansion of Climate Services for Investment in Infrastructure and Adaptation to Climate Change and Climate Risks project.
- Climate change incorporated into MInfra's Sustainability Guidelines, created through Ordinance/MInfra No. 5, of January 31, 2020, as well as the institution of sustainability criteria and the MInfra 2020-2022 Sustainability Agenda.
- Venture Certification: MInfra has been developing the certification process and issuing green bonds aligned with CBI requirements for rail transportation ventures.
- Survey of the impacts and risks of climate change on federal infrastructure for land transportation (roads and railways), waterways and ports (existing and projected): Current climate variability and climate change have exposed the transportation sector to risks and uncertainties. In order to address this challenge, the Ministry of Infrastructure and its related entities, partnered with the German Cooperation

Agency for Sustainable Development (*Deutsche Gesellschaft für Internationale Zusammenarbeit – GIZ GmbH*), have been performing studies to identify the impacts and risks of climate change on the federal infrastructure of land transportation (roads and railways), waterways and ports (existing and planned), as support for the development of adaptation strategies in the sector.

- Environmental Management Committee – COGEA: within the scope of MInfra, the COGEA was created to deal with social and environmental issues, including climate change. In addition, the Sustainability Guidelines and the Sustainability Agenda were published.
- Institution of VALEC Standards for Environmental Risk Management Programs and Emergency Response Plans (SDG 9, Goal 9.1; SDG 13, Goal 13.11.
- Institution of VALEC Environmental Standard No. 9 (NAVA 9) – Prevention against burning on railways (SDG 9, Goal 9.1; SDG 13, Goal 13.8).
- Institution of Environmental Standard No. 18, of 2010, of VALEC-NAVA 18: contingencies to avoid and/or mitigate accidental impacts on the environment in railways – emergency responses (SDG 9, goal 9.1; SDG 13, goal 13.9).
- Insertion of the interaction of the effects of Climate Change on the national productive matrix in the National Logistics Plan – PNL (SDG 9, goal 9.1; SDG 13, goal 13.4).
- Preparation of the Environmental Booklet that will be part of the National Logistics Plan, taking into account the climate risks and adaptation actions (SDG 9, goal 9.1; SDG 13, goal 13.5).
- Production of research and doctoral thesis by an Infraero employee with the title: Operational impacts and the resilience of airports to adverse weather conditions (2018) (SDG 9, goal 9.1; SDG 13, goal 13.17).
- Conducting Studies on the Impact and Risks of climate variability on the coastal port sector (SDG 9, goal 9.1; SDG 13, goal 13.18). Available at: http://portal.antaq.gov.br/index.php/meio-ambiente/.

Responsible Institutions	Ministry of the Environment, National Indigenous Foundation – MJSP Ministry of Citizenship – MC / National Secretariat for Social and Productive Inclusion – SEISP
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EXPECTED GUIDELINES – GENERAL

1. Build cooperation strategies between states and municipalities.
2. Construct methodologies for identifying and measuring social vulnerabilities taking into account the diversity of groups and territories in different biomes.
3. Foster multisectoral and cross-cutting actions aimed at promoting more synergistic government policies, particularly those related to basic health infrastructure and prevention against climate change and associated extreme events.
4. Promote social inclusion for more vulnerable people by emphasizing capacity building to generate autonomy in populations highly dependent on government subsidies.
5. Identify poverty hotspots in the territory and where these places intersect with areas of greater physical-environmental and climatic vulnerability.
6. Encourage territorial planning initiatives that ensure access to the territory and the development of productive inclusion efforts tied to the sustainable management of the territory's resources and the recovery of degraded areas, when applicable.
7. Encourage Ecosystem-based Adaptation (EbA).

EXPECTED GUIDELINES – INDIGENOUS PEOPLES

1. Recognizing, promoting and enhancing the contribution of indigenous territories and peoples, with their know-how, technologies and traditional practices related to the occupation, use and management of natural resources, for preserving biodiversity, for stemming deforestation, for maintaining the balance of climatic conditions and for forming and implementing public policies to adapt and mitigate the effects of climate change.
2. Ensure budget resources and international cooperation, among other things, to implement the PNGATI – a successful instrument for coordinating public policies for Indigenous Lands, enhancing actions geared towards adaptation and coping with the effects of climate change. In order to support the development of future programmatic actions, the following guidelines are suggested to support the adaptation of these strategies by indigenous peoples.
3. Broaden and strengthen the protection, inspection and full land title regularization for areas traditionally occupied by indigenous peoples. This should be done in a coordinated and integrated manner in an effort to promote territorial and environmental management of their territories.
4. Reinforce the participatory and ongoing process of implementing the National Policy for Territorial and Environmental Management of Indigenous Lands, promoting synergies with the guidelines, objectives and instruments of the National Policy on Climate Change and prioritizing actions for the protection, recovery, conservation and sustainable use of the natural resources of indigenous lands and territories, with compatible budgetary allocations.
5. Promote the proper training, information, participation and consultation processes related to the topic of climate change that are presented in community bases and various societal components (in terms of age group and gender, for example), as well as support for the creation of networks to share experiences and dialogs.
6. Ensure that indigenous peoples take part in the decision-making processes and the discussion, drafting and implementation of policies related to the theme, such as the National Adaptation Plan, the National REDD+ Strategy, the REDD+ Social and Environmental Safeguards Information System, the National Policy on Territorial and Environmental Management in Indigenous Lands (PNGATI), and in other forums and instruments related to climate change and payment for environmental services.
7. Promote studies, mappings and diagnoses that carry out an in-depth analysis of vulnerabilities to climate change (current and potential), of indigenous peoples and their knowledge,

practices and adaptive strategies, prioritizing participatory methodologies, inter-cultural dialogs that include indigenous researchers and coordination with broader educational/ training processes.

EXPECTED GOALS

1. Diagnosis of Vulnerability to Climate Change in target populations of the National Policy for Territorial and Environmental Management of Indigenous Lands – (PNGATI).
2. Diagnosis of vulnerability to Climate Change in target populations of the National Plan for Food Security and Nutrition (PLANSAN).
3. Diagnosis developed and the reduction of vulnerability to climate change promoted in vulnerable populations and beneficiaries of agro-extractivist public policies.

KEY ADVANCES

Throughout the implementation period of the First Cycle of the NAP for the sector-related strategy of Vulnerable Peoples and Populations, actions were taken to raise awareness among its target audience, with inter-institutional coordination, as well as advances in structuring the climate change adaptation agenda under the scope of implementing the National Policy for Environmental and Territorial Management of Indigenous Lands – PNGATI, through the creation of the Technical Chamber on Climate Change of the PNGATI Management Committee (CT-MC). The technical chamber included Funai, the MMA (with the former SMCQ and SEDR), the Indigenous Committee on Climate Change and indigenous and indigenist organizations (non-indigenous civil society). Priority strategies for the implementation of the NAP 2018-2020 were drafted within its scope. Furthermore, in 2018, data from the Map of Food and Nutrition Insecurity (MapaInsan) was updated and published in order to identify families and individuals who are food and nutrition insecure, with an emphasis on Traditional Peoples and Communities (TCPs). There were also actions taken to identify vulnerabilities to the impacts of climate change in Brazilian municipalities under the coordination of the MMA, providing support for the future planning of adaptation measures in areas that are at risk for disasters, given that most of the vulnerable Brazilian population lives in urban centers. 2 of the 3 planned goals initiated actions and 1 was implemented in its entirety, and of the 14 guidelines provided, 11 of them implemented actions. The actions linked to the adaptation goals and guidelines for this sector contributed to 8 of the 17 SDGs and to strengthening 8 national policies/plans and 5 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- 4 Awareness-raising events for the sector's target audience about climate change adaptation.
- Food and Nutritional Insecurity Map prepared and consolidated.
- 1 distance learning course structured on climate change and targeting municipal managers.
- A public notice announced to train leaders and managers of Conservation Units who are benefiting from the Bolsa Verde Program.
- Insertion of 2 guidelines in Planafe concerning climate change adaptation.
- Agreement between Funai and USAID to support territorial and environmental management of Indigenous Lands in the states of Maranhão, Roraima and Rondônia.
- Public call for support for Territorial and Environmental Management plans in Maranhão.
- Support for the preparation, review and implementation of 31 Territorial and Environmental Management Plans for Indigenous Lands – PGTA.
- Indigenous Amazon Observation and Monitoring System platform – SOMAI developed and made available on the web.
- Institutional partnership with IPAM for: a) studies related to climate change and indigenous peoples; and b) training, including how

to use the SOMAI Platform and the "Indigenous Climate Alert" Application.

- 3 Studies on vulnerability analysis to climate change prepared by the MMA, which contribute to future vulnerability analyzes involving vulnerable peoples and populations.
- Including the climate change issue in discussions of quilombola territories on territorial and environmental management.
- In addition to the initiatives linked to the goals and guidelines of the NAP, many of the actions taken during the period were not planned coming from a vision focused on the effects of climate change on indigenous peoples, or rather, through a "climate lens". However, the effects of these actions play a role in reducing the vulnerability of indigenous peoples to the adverse effects of climate change. Some of the most noteworthy include: 1) Capacity Building. Holding a Seminar on the "Challenges in Environmental Management of Indigenous Lands in the Cerrado and Caatinga"; conducting 14 training activities in the environmental and territorial management of indigenous lands geared towards indigenous people and public support workers; 2) Territorial and Environmental Management of Indigenous Lands. Initiating the Territorial and Environmental Management Plans (PGTA) for the Kaxixó, Kapinawá, Pankararu and Tremembé Indigenous Lands; 14 supported Environmental and Territorial Management Plans, with: 5 new actions supported in 2019; 9 actions to continue ongoing Territorial and Environmental Management Plans; preservation and restoration in 46 indigenous lands. 17 preservation and restoration projects were conducted in 2019 involving 46 Indigenous Lands; execution of community infrastructure projects on indigenous lands; 3) Improved food security and income generation. Between 2018 and 2020, 236 projects focused on improving food security and income generation were run; food baskets were distributed to food insecure indigenous communities.
- MapaInsan for Traditional Peoples and Communities – PCT: in 2018, data from MapaInsan was updated and published with an emphasis on PCT. The first edition of the study was released in 2016 and represents an important diagnostic tool for planning and implementing public policies for PCTs using data from the Unified Registry for Social Programs of the Ministry of Citizenship and data from the Ministry of Health's Food and Nutrition Surveillance System – Sisvan.
- Based on this work done by CAISAN, another study was drawn up in 2018 in partnership with Embrapa that identified priority municipalities to implement cisterns and other water access technologies in the Semiarid region, including food insecurity identified and characterized in MapaInsan as one of the criteria: https://www.embrapa.br/busca-de-publicacoes/-/publicacao/1097918/identificacao-de-municipiosprioritarios-para-implantacao-de-cisternas-eoutrastecnologias-de-acesso-a- agua-no-semiarid.
- The initiatives under the direct responsibility of the MMA were designed to identify the vulnerability of Brazilian municipalities to the impacts of climate change, thereby providing support for the planning of adaptation measures for areas at risk of disasters, given that the majority of the population Brazilian lives in urban centers. Accordingly, two activities played a significant role in 2 of the 3 guidelines set out in the Plan for the MMA, and for the implementation of the total target established for by this agency. They are: 1 – Creation of the Management Committee of the National Policy for Environmental and Territorial Management of Indigenous Lands (CGPNGATI); 2- Developing the 'Identification of the Vulnerability of Brazilian Municipalities regarding the biophysical and socioeconomic impacts associated with climate change" study. One of the results obtained included maps of the potential impact of climate change in Brazilian municipalities with respect to natural disasters related to: landslides; floods, flash floods and mudslides; droughts. Additionally, pilot municipalities were identified to propose adaptation measures.

- As for activities related to promoting Ecosystem-based Adaptation (EbA), actions were developed by the MMA in synergy with the Biodiversity and Ecosystems sectoral strategy. These can also be found in the Cross-cutting Goal related to the development of capacities in adaptation to climate change.

Responsible Institutions	Ministry of Regional Development / National Water and Basic Sanitation Agency – ANA National Secretariat for Water Security – SNSH
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EXPECTED GUIDELINES – LINE OF ACTION: URBAN WATER SUPPLY

1. Consideration of additional vulnerabilities associated with changes in water availability.
2. Integration with planning water resources and other sectors.
3. Reduction of losses, rationalization of use and monitoring of the quantity and quality of water from springs and other sources.
4. Increase investments in sewage collection and treatment, particularly in watersheds that are subject to scarcity so that the loss of quality does not constitute an additional obstacle to the use of water resources.

EXPECTED GUIDELINES – LINE OF ACTION: IRRIGATION

1. Training and capacity building of users to formulate and implement contingency plans.
2. Improvement of water availability forecasts for irrigation over the short and medium-term.
3. Replacement of irrigation technologies with more efficient methods for using water and energy.
4. Adoption of an efficient management of irrigated areas.
5. Infrastructure to ensure supply integrated with other uses and with water resources planning.
6. Soil conservation strategies with an impact on water production, such as direct planting, maintenance and restoration of Permanent Preservation Areas (PPAs), promotion of conservation and increased infiltration in aquifer recharge areas.

EXPECTED GUIDELINES – LINE OF ACTION: ENERGY

1. Increasing the interannual reserve capacity in energy production projects.
2. Greater integration of multiple uses in reservoirs.
3. Increased investments in local power generation solutions in a manner that complements the energy coming from the National Interconnected System (SIN).
4. Increased investments in PPA conservation and recovery measures in order to reduce siltation in reservoirs and increase their useful life.

EXPECTED GUIDELINES – LINE OF ACTION: INDUSTRIES

1. Increased investment in reservations.
2. Encouraging the rational use and reuse of water.
3. Use of alternative sources, new sources or relocation of industrial plants.
4. Investment in more water-efficient technologies extended to all types of industries.
5. Preparation of contingency plans for conditions involving extreme hydrological events, defining procedures and mechanisms to be adopted during extended periods of drought, for example.

EXPECTED GUIDELINES – LINE OF ACTION: WATER QUALITY AND ENVIRONMENT

1. Implementation of a system to monitor water quality.
2. Introduction of water safety plans and procedures for control and surveillance of the quality of water for human consumption.
3. Investment in technologies focused on reducing pollutants discharged into water bodies.
4. Increased investments in effluent treatment.
5. Ensuring the effectiveness of the instrument to classify water bodies according to their preponderant uses.

6. Investment in PPA recovery and revitalization of water resources.

EXPECTED GUIDELINES – LINE OF ACTION: WATER RESOURCES GOVERNANCE SYSTEM AND PROCESSES

- Increased responsiveness of institutions to uncertain and shifting future scenarios:
    1. Information and knowledge: generate and provide reliable and timely information and insight on natural and human systems, incorporating uncertainties (reliable and current user records, climate forecasts, monitoring, adequate hydrological series, and others).
    2. Conflict management: creating or adaptation mechanisms that are intended to resolve any potential conflicts, including specific entities endowed with the needed jurisdictions, contingency plans and water allocation in drought situations, etc.
    3. Compliance with rules: establishment of clearly defined rules for using water resources that are consistent with the local scenario and widely known, with enforcement mechanisms that include penalties for violations and the capacity to implement them.
    4. Presence of infrastructure: physical infrastructure (reservoirs, canals, water mains, wells, etc.), technological (computer models, climate forecast models, weather radars, sensors, etc.) and an institutional legal structure (institutional diversity, user participation, legislation, etc.) that are sufficient for acting on the possible effects of climate change.
    5. Learning and adaptation: institutions must be built to provide the transformation needed to deal with new problems and shifting contexts, in a constant process of learning and adaptation. To this end, there should always be attempts to map and evaluate actions taken by the public sector and by sectors of the Brazilian economy.
- Increased coherence and consistency between public policies on water resources and related sectors:
    1. Reinforcing governmental management, making sure that the coordination needed is implemented so that water resources are taken into consideration during the process of drawing up plans and public policies for the related sectors, including the environmental policy.
    2. Supporting the role of municipalities in the National Water Resources Management System (SINGREH), given their key role in land use and occupation, urban solid waste management, local environmental licensing and sanitation.
    3. Explanations of concepts and principles dealing with legislation for water resources, notably for handling critical events that may require rationing, a suspension of permits and/or reallocation of availabilities.
- Increased effectiveness of watershed governance:
    1. Priority is given to local approaches to problem areas, with compatible institutional structures.
    2. Application of the principle of subsidiarity, in addition to strategic territorial cuts, like critical/priority regions.
    3. Consideration of more appropriate management models for the Amazon regions, the Brazilian Semi-Arid region and the South, Southeast and Midwest regions.
    4. Increasing initiatives geared towards integrating water resources management activities between the three levels of government and increasing the capacity of state management systems (especially state management entities), through, for instance, the establishment of targets and incentives for their achievement.

5. Search for alternatives that allow different institutions to act as an executive in the management of water resources, through agreements, management contracts or public-private partnerships.
6. Reduction of the distance between decision-making collegiate structures and water resources management agencies, thereby increasing SINGREH's execution capacity.
7. Guarantee of transparency and accountability.

EXPECTED GUIDELINES – LINE OF ACTION: COMMUNICATION

1. Communication between scientists and decision makers – There is a disconnect between those providing the information and those using it. As such, there is a need to strengthen the consensus on the need to actively combine understanding and action and the link between science and policy in the field of water resources. In order to do this, communication channels to promote science need to be reinforced, making tools that allow findings to be shared with society and decision makers available in plain language and demonstrating the applicability of that knowledge to solving problems. Scientist need to provide the best possible information (technical component) to decision makers to allow them to jointly evaluate them with the political component and make a decision.
2. Understanding and incorporating risk – Despite the uncertainties they entail, climate change projections provide valuable information if communicated to users in an efficient manner. Decision makers are accustomed to dealing with unreliable or incomplete information, but they need to better understand the sources and degree of uncertainty involved. A clear characterization of potential climate risks and confidence in their forecasts can provide a sounder basis for planning and deciding on any necessary adaptation measures. There is also a need to consider strategies for communicating risks to sectors that use water, clearly stating the potential impacts associated with climate change on water availability and the possibility there will not be service, so that they are prepared to absorb such risks.
3. More transparent communications with society – Timely and proper communication is crucial in allowing society to prepare for impacts associated with climate change, particularly with when it comes to the occurrence of extreme hydrological events. To prepare the general public, channels of constant dialog need to be established between governments and society, particularly as it relates to the most vulnerable populations. These channels will provide transparency to government actions, in addition to improving communications with the business sector, academia and entities that represent civil society.

EXPECTED GUIDELINES – LINE OF ACTION: SCIENCE, TECHNOLOGY AND INFORMATION

1. Make it a priority to develop the following lines of research: climatic and hydrological processes, prognosis of hydroclimatic variables, assessment of the impacts of hydroclimatic scenarios and respective strategies for adaptation and mitigating impacts, the correlation between land use and shifts in the flow pattern of streams and water quality.
2. Preparation of an assessment and modernization study of the physical and hydrological database in an effort to improve the existing hydro-meteorological network (new technologies, regions that are difficult access, availability of series and information, seasonal and short-term forecasts).
3. Ensuring that products originating from monitoring and scientific research are appropriate to be applied in the area of water resources, especially in terms of (1) temporal and spatial resolutions, (2) time for updating information, (3) data standardization and network operation.

4. Fostering technology transfer and capacity building in accordance with the Capacity Building principles established by the UNFCCC.
5. Ensuring systematic monitoring of key hydrological variables that facilitate the characterization of the risks and uncertainties involved in the process in three types of networks: (1) systematic observation; (2) reference watersheds; (3) alerts.

EXPECTED GOALS

1. Incorporate climate change adaptation measures into the actions developed by the National Water and Sanitation Agency.
2. Develop integrated climate and hydrological models and analyze their impacts on the management of water resources.

KEY ADVANCES

The management of water resources is closely connected with the theme of adaptation to climate change. The adaptation agenda is incorporate into various ANA actions in both the regulatory sphere and in the implementation of the National Water Resources Policy. In 2019, the MDR and ANA launched the National Water Security Plan (https://pnsh.ana.gov.br/), a national water infrastructure planning instrument designed to reduce the impacts of droughts and floods, with an indication of construction. Besides the additional studies and projects that are required to make them feasible, the plan provides for investments of R$ 24.6 billion up to 2035 and was used as input for the Regional Development Plans for the Amazon, the Midwest and the Northeast, which are currently under debate in the National Congress. Moreover, the MDR has made some inroads when it comes to coordinating a broad effort for Revitalizing Hydrographic Basins, consistent with the NAP. With the health crisis brought on by COVID-19, the scaling up of investments in water and sanitation (including the new role assigned to ANA in 2020 related to the regulation of the sanitation sector in an effort to universalize and, alternatively, to adapt to climate change), the control of demand and the pursuit of long-term sustainability have all gained prominence and importance in the post-pandemic economic recovery. In this context, the 2 goals were completely fulfilled, as well as the 35 guidelines spread across 8 lines of action resulted in initiatives that contribute to the fulfillment of 4 of the 17 of the Sustainable Development Goals and to strengthening 6 policies/national plans and 3 international initiatives.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Insertion of the climate change issue into the development processes for the Piranhas-Açu, Paranapanema, Grande and Paraguay Basin Plans.
- 895 desalination systems have been deployed in northeastern municipalities, intended to provide water security for human consumption, totaling a public investment of approximately R$ 337 million up to May 2021.
- Studies commissioned to provide technical support to plan for the adaptation goals that will be used within ANA and the water resources management agencies in the states and user sectors.
- Support for the execution of the Adaptation of Planning and Operation of Water Resources Project to climate variability and shifts in the Extended Basin of São Francisco.
- Publication of announcements for research projects with CAPES and CNPq, covering the theme of climate change and water resources, including support and encouragement in the creation of graduate degree programs.
- Studies on an assessment of drought impacts and modeling of climate change impacts, accounting for economic aspects, in the Piracicaba, Capivari and Jundiaí basins in the state of São Paulo, and Piranhas-Açu, which includes part of the states of Paraíba and Rio Grande do Norte.

- 96 River Basin Committees from 10 states signed on to the Pro-Committees Program to provide progress in implementing management instruments.
- Execution of the Consolidation Program of the National Pact for Water Management – PROGESTÃO, with the objective of supporting actions involving institutional strengthening and management of water resources.
- Investments to obtain hydro-meteorological and water quality data (National Hydrometeorological Network – RHN, National Water Quality Assessment Program – PNQA and the Program to Stimulate the Disclosure of Water Quality Data – QUALIÁGUA) and the Drought Monitor Program, which generates monthly maps monitoring the drought situation in the states covered to support decision-making.
- Inclusion of the climate change topic in the plans of the Grande and Paraguai river basins.
- Updates from the National Information System on Water Resources – SNIRH (snirh.gov.br), where information on waters in Brazil is made available, including documents and databases to evaluate possible impacts resulting from climate change on water resources.
- The Federal Government reorganization in 2019 (Law No. 13.844 of June 18, 2019) included the water and sanitation agenda into a single ministry (MDR) and brought Water Security into the center of state action.
- Project to Integrate the São Francisco River with the River Basins in the Northeast – PISF: implementation of the largest water infrastructure project in Brazil, designed to ensure water security for 12 million people living in the Northeast region.
- Introduction of the Strategic Action Plan for Rehabilitation of Federal Dams (Planerb) in 2019.
- In 2019, the MDR and ANA launched the National Water Security Plan, a national water infrastructure planning instrument designed to reduce the impacts of droughts and floods, with an indication of construction. The Plan calls for investments of R$ 24.6 billion up to 2035 and was used as input for the Regional Development Plans for the Amazon, the Midwest and the Northeast, which are currently under debate in the National Congress.
- Technical Cooperation between the National Water and Basic Sanitation Agency (ANA), Ministry of Regional Development to take action in the event of an emergency involving dam safety.
- Introduction of the Brazilian Waters Program for Revitalizing Watersheds, mobilizing the Private Sector in various regions of the country, aligned with the NAP.
- Scaled-up investments in water and sanitation, controlled demand and pursuit of long-term sustainability have become more prominent in health and are even more important during the post-pandemic economic recovery.
- In 2020, Law no. 14.026 of july 15, 2020 modified the legal framework for sanitation, assigning ANA a central role in regulating the sector in an effort to universalize and, alternatively, adapt to climate change.

Responsible Institution	Ministry of Health – MS / Secretariat of Health Surveillance – SVS
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PLANNED GUIDELINES

1. Improve the quality of information and processes to communicate risks in order to support the actions of the SUS in public health emergencies associated with climate change.
2. Promote and encourage studies and research on the effects of climate change on human health by using popular and traditional knowledge, regional characteristics and ecosystems when constructing this knowledge.
3. Promote actions to orientate, raise awareness and educate the population and SUS professionals on the effects of climate change on the health of human beings and the importance of sustainable development as a motivating agent for change, encouraging communities to take part in policy-making processes for mitigation and adaptation.
4. Strengthening intersectoral and interinstitutional coordination to define and see the effectiveness of cross-cutting actions by making data and information available to produce knowledge, the transfer of technology and the development of actions that promote adaptation and mitigation in the health sector.
5. Formulation of specific policies that boost the resilience of social groups who are most vulnerable to climate change, such as rural, water, forest, indigenous and homeless populations.
6. Strengthening the implementation of national sanitation and health policies aimed at universalizing access to drinking water and sanitation.
7. Fortifying Health Surveillance in an effort to identify risks to human health associated with climate change, with a view towards supporting the adoption of adaptation measures within the scope of the SUS.

EXPECTED GOALS

1. Increase the percentage of Brazilian municipalities equipped with the National Water Quality Surveillance Program for Human Consumption (VIGIÁGUA) to 85% by 2019.
2. Study, research, monitoring and communication network on climate and health to broaden technical-scientific knowledge, and to subsidize the analysis of the health conditions and consolidated decision-making in the SUS.

KEY ADVANCES

Under the Ministry of Health[8], ANVISA and FIOCRUZ, advances were made in the implementation of the NAP. Some goals and guidelines are part of the current actions performed by these agencies, characterized as no-regret actions that promote the improvement of the adaptive capacity of the sector. As such, the 2 goals proposed in the NAP were fully implemented. In addition, of the 8 proposed guidelines, 7 contain implemented and or ongoing actions that will contribute to fulfilling 2 of the 17 Sustainable Development Goals (SDGs) and to fortifying 13 National Plans/Policies and 5 international frameworks.

8 Between 2018 and 2020, the Ministry of Health underwent an important internal reorganization. Decree No. 9.795 of May 17, 2019 modified its regimental structure and the organizational chart of the Ministry with the merger and incorporation of internal departments and the relocation of various positions among the units that comprise it. In this context, the Department of Environmental Health and Surveillance of Emergencies in Public Health (DESASTE) incorporated units such as the Center for Strategic Information and Response in Health Surveillance (CIEVS) into its structure and now has new duties that include managing surveillance aspects related to public health emergencies. In this process, the General Coordination of Environmental Health Surveillance (CGVAM), a part of DESASTE's structure and responsible, among other duties, went through a period of adaptation and reformulation of its internal administrative routines by coordinating the implementation of the National Environmental Health Surveillance Policy (VSA). The Management Committee and the Executive Committee of the Health Sector Plan for Mitigation and Adaptation to Climate Change was dissolved under the Ministry of Health, pursuant to Decree No. 9.759 of April 11, 2019.

Health

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Climate Vulnerability System – SisVuClima: 6 states – AM, ES, MA, MS, PE and PR – have a Municipal Vulnerability Index to Climate Change generated, thanks to the Project.
- A 15% increase, compared to 2014, in the number of municipalities covered by the National Program for the Surveillance of Water Quality for Human Consumption – VIGIAGUA.
- Support for the "Study of extreme climate events to support the process of adaptation to climate change within the Health sector" and the "Study of climate-related diseases and injuries to support the process of adaptation to climate change within the Health sector".
- In 2018, the Climate change, water-related disasters and health seminar was held. The "Semi-Arid Health Monitor" was introduced at the seminar. It was designed to track and display the intensity and spatial extent of droughts and their impacts on the health of populations in the Brazilian Semiarid Region.
- Educational Module on the health of rural, forest and water populations, developed in the Virtual Learning Environment of the Unified Health System – AVASUS.
- National Seminar on Health, Environment and Traditional Communities: participation of representatives in social movements from rural, forest, water and traditional communities; public managers at the federal, state and municipal levels; and the academic community.
- Holding a "Climate and Health Course" to train SUS health workers, as well as Distance Learning courses, specialized in Atmospheric Pollution and Human Health for health professionals, coordinated and conducted by the University of São Paulo Medical School – FMUSP, through a partnership with CGVAM, and the Specialization Course in Environmental Health Surveillance – Distance Learning Course offered by the Human Resources Training Program in Environmental Health Surveillance of the Distance Learning Laboratory of the Institute for Studies in Public Health at UFRJ.
- Course offerings: Preparation and Response to Public Health Emergencies of the Unified Health System; Specialization in Emergency and Disaster Risk Management in Public Health; and offering a course specifically for MS managers in Public Health Emergencies. Beginning in October 2019, the training course for managers and technical staff from the State and Municipal Health Secretariats who work on activities in which the quality of water for human consumption is monitored, in addition to other stakeholders.
- Publication of the chapter "Impact of air pollution on mortality from chronic non-communicable diseases in Brazil in 2006 and 2016" in the book: "Saúde Brasil 2018: an analysis of the health situation and chronic diseases and conditions: challenges and perspectives"; publication of the Semiarid Health Monitor. Structuring the Semiarid Health Monitor in 2018 as part of the Climate and Health Observatory.
- Hiring 8 consultants in 2018 and 2019 under the CGVAM. Selection of 4 public employees from the Ministry of Health's staff to become part of the CGVAM workforce, in addition to having 2 trainees from the training program in Epidemiology Applied to the Services of the Unified Health System (EPISUS), focused on issues related to subject of Environmental Health.
- In 2018, the Climate change, water-related disasters and health seminar was held. The "Semi-Arid Health Monitor" was introduced at the seminar. It was designed to track and display the intensity and spatial extent of droughts and their impacts on the health of populations in the Brazilian Semiarid Region. Technicians from the Ministry of Health and Fiocruz took part at the Seminar *Instrumentos y Metodologías para un observatorio del Clima y su impacto en la salud humana*, in September 2019.
- Publication of the following communication instruments for the general public:

- "Guidelines for the treatment of water for human consumption within the home in disaster situations" Folder;
- "Guidelines for the prevention of accidents by venomous animals during and after periods of floods" Folder;
- "Prevention of Infectious Respiratory Diseases" Folder;
- "Accidental tetanus injuries with debris can lead to infection" Folder;
- "Learn what to do in the event of flooding – shelters" Booklet;
- "Learn how to act in the event of floods" Booklet;
- "Taking precautions with food for human consumption in case of floods" Folder;
- "Personal hygiene care in shelters" Folder;
- "Power outage" Folder;
- "Leptospirosis" Folder;
- "Procedures for water tank disinfection" Folder;
- "Emotional Recovery" Folder;
- Publication of the booklet "Water Quality for Human Consumption – A booklet for the promotion and protection of health", with guidelines for the general public on taking care of water for human consumption.

- Gathering news in the media related to risks to public health, and subsequent institutional coordination with the respective State Health Secretariats; making news clippings that are of interest to public health; and preparation of a weekly report by the General Coordination of Public Health Emergencies in order to monitor events in the national territory.
- Environmental Information Integrated to Health System – SISAM: information on the influence of climate on health. Financing and monitoring of the implementation for the SISAM data Update Project. SISAM is a tool for analyzing punctual and spatial data that combines information on concentrations of pollutants obtained from estimates of emissions from wildfires and urban/industry emissions, monitoring data from outbreaks of wildfires and past meteorological data, enabling studies on the influence of climate in the occurrence of diseases or health problems in Brazil.
- Climate and Health Observatory: conducting 4 thematic workshops in 2018 and 2019: 1 on information and preparation for climate disasters in Salvador; a workshop on drought and its impacts on health in Fortaleza; a technical meeting with experts on the water crisis and its effects on the health of the general public; a review of the interface of the Climate and Health Observatory Site, done through face-to-face meetings and electronic forms completed by users of the system and organizing the Semiarid Health Monitor within the Climate and Health Observatory in 2018.
- SISAGUA: making tools available that allow providers of water supply services to automatically enter water quality control monitoring data for human consumption from the System and; developing online dashboards available for view on monitoring the quality control of water for human consumption, aiming to facilitate risk management of the forms of water supply, as well as to plan actions and make decisions.
- Integration of climate, environmental and socioeconomic risk analysis with the monitoring processes of public health emergencies in the SUS.
- Creation of strategic information panels on climate and health to support strategic management in the SUS.
- Creation of a center for the integration of technologies in Health, Environment and Sustainability (CITSAS) integrated with the National Observatory for Climate and Health and the Center of Knowledge in Public Health and Disasters – CEPEDES.

Responsible Institution	Ministry of Citizenship/ National Secretariat for Social and Productive Inclusion – SEISP
Email	cgmas.seisp@cidadania.gov.br

PLANNED GUIDELINES

1. Reinforce programs for access to water for human consumption and food production in the semiarid region.
2. Reduce poverty and the vulnerability of rural social groups by strengthening rural productive inclusion policies.
3. Broaden the inclusion of family farming into agro-ecological, organic and socio-biodiversity-based production systems through Planapo and PNBSB.
4. Fortify the implementation of the National Policy for the Territorial and Environmental Management of Indigenous Lands.
5. Contribute to spreading the global climate change theme in SISAN.
6. Boost storage capacity and public food stocks.

KEY ADVANCES

Of the 6 guidelines established for the sector[9], 3 have had actions implemented. The actions linked to the guidelines contributed to 2 of the 17 Sustainable Development Goals (SDGs) and to reinforcing 5 national policies/plans, in addition to State Plans for Food and Nutritional Security (SAN).

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- II National Plan for Food and Nutritional Security – PLANSAN 2016-2019 drafted, containing a specific goal related to climate change.
- 600 community seed banks implemented.

9 The National Secretariat for Social and Productive Inclusion (SEISP), formerly known as the National Secretariat for Food and Nutritional Security (SESAN), is the unit in charge of planning, implementing, coordinating, supervising and monitoring programs, projects and actions for social and productive inclusion in the Ministry of Citizenship. Due to changes that took place in 2019 as a result of the administrative reform of the entities of the Presidency of the Republic and of the Ministries in the food and nutrition security agenda (SAN), National Food and Nutrition Security System (SISAN) agencies, like the National Council of Food and Nutritional Security (CONSEA) and the Interministerial Chamber of Food and Nutritional Security (CAISAN) underwent a restructuring process. Although CAISAN has been in the final stages of a reorganization since 2019, the SAN agenda has not had a formal instance of intersectoral governance among the different public bodies that comprise it. In addition to continuing to perform its activities and, in the absence of CAISAN, SEISP continued to support the structuring of SAN's state and municipal systems to the fullest extent through monitoring, inspection and management qualification of local actions. As of 2020, 418 municipalities had joined the System, in addition to 26 states and the Federal District. However, SEISP no longer plays the role of coordinating the actions and initiatives of the federal government, a position it has performed up to the end of 2018 through CAISAN, which acted as executive secretary of the Chamber. In its former structure, CAISAN was comprised of 20 federal agencies (ministries and special secretariats) and was responsible for preparing and monitoring the National Plan for Food and Nutritional Security - Plansan.

- Increase from 70,000 to 90,000 families benefiting from the *Bolsa Verde* Program.
- Expanding access to the market for extractivists, through activities involving publicity, training and promotion of studies on production costs to have new products included in the agenda of the Minimum Price Guarantee Policy.
- 194 initiatives from Planapo 2016-2019 that have been agreed to, intended to reach about 1 million family farmers, land reform settlers and traditional peoples and communities that can be inserted into the agro-ecological and organic production systems.
- Support for the preparation, review and implementation of 31 Environmental Management Plans for Indigenous Lands – PGTA.
- 16 State Plans for Food and Nutritional Security prepared by 2020.
- Deployment of 161,536 cisterns and other social technologies used to facilitate access to water for human consumption from 2016 to 2020.
- Rollout of 39,068 social technologies that allow access to water for food production from 2016 to 2020.
- Implementation of 5,527 cisterns in rural public schools from 2016 to 2020.
- Inclusion of 87,343 families into the Program to Promote Rural Productive Activities from 2016 to 2020.
- Programs and initiatives contained in the state SAN Plans that contribute to adaptation to climate change. All states in Brazil have joined SISAN, and 16 have already drawn up their plans. All plans contain specific measures related to climate change. For example irrigation with solar or wind energy, production and sustainability of agro-villages, measures to preserve and conserve the environment, sanitation and solid waste management initiatives, water resources management, etc.

Coastal Zones

Responsible Institution	Ministry of the Environment/ Department of Environmental Quality – SQA
Collaborating Institutions	National Committee of Cartography – Concar and Federal University of Rio Grande – FURG
Email	gerco@mma.gov.br

PLANNED GUIDELINES

1. Do the Coastal Zones Planimetric Mapping (Related to the impact: erosion, flooding and extreme events).
2. Create a continuous and standardized data acquisition program (biotic and abiotic factors) – (Impact-related: erosion, flooding and extreme events).
3. Integrate and operate information and data systems for monitoring (Impact-related: erosion, flooding and extreme events).
4. Integrate territorial planning instruments into different spheres, with a focus on coastal erosion (Impact-related: erosion, flooding and extreme events).
5. Determine priority areas for intervention (Impact-related: erosion, flooding and extreme events).
6. Establish contingency plans for the Coastal Zones (Impact-related: erosion, flooding and extreme events).
7. Improve integration between coastal management and basin management (Impact-related: saline intrusion).
8. Generate knowledge for diagnosis, monitoring and prediction of impact and response (Impact related: saline intrusion).
9. Integrate public policies to increase preventive and corrective actions (Impact-related: commitment of natural resources and biodiversity).
10. Insert the climate lens in Coastal Management (Impact-related: commitment of natural resources and biodiversity).
11. Produce Knowledge about acidification (Impact-related: acidification).
12. Promote the Conservation and management of CO2 sinks (Impact-related: acidification).

EXPECTED GOALS

1. Reference Centers for Coastal Management created, forming and organizing information and tools for modeling climate risks and generating informed responses in the Coastal Zone.
2. Strategy to make continental altimetry compatible with marine bathymetry (Alt-Bat), with resources defined for its execution.
3. Revised Coastal Zone Macro-diagnosis (MDZC), considering vulnerability related to climate change.

KEY ADVANCES

During the early years of the First Cycle of the NAP, a few structuring actions were taken to help facilitate adaptation measures within the scope of coastal management. Based on the Ministry of the Environment's new structure, the Department of Territorial Environmental Management (DGAT/SQA/MMA), the focal point of the Coastal Zones strategy in the NAP, it began to prioritize the National Plan to Combat Garbage at Sea under the National Urban Environmental Quality Agenda. The PNCLM's strategy is to significantly reduce solid waste dumped in ecosystems, including beaches, wetlands and rivers, as well as to perform actions focused on the correct disposal of solid waste, in an effort to promote improved quality of life and health for the Brazilian population and the environment, and to encourage improved adaptive capacities. In addition, the MMA instituted the Lixão Zero National Program, approved by Ordinance No. 307 of April 30, 2019. The idea is to support states and municipalities in managing urban solid waste, focused on a final disposal that is environmentally responsible. The Program can produce adaptive benefits to climate change with respect to human health, as proper waste management helps in reducing disease vectors, including in coastal zones. Of the 12 guidelines planned, actions were done for 4 of them. Of the 3 goals set, 2 were already underway. The initiatives done from 2016 to 2020 contributed to 3 of the 17 Sustainable Development Goals and to strengthening 5 national policies/plans.

SUMMARY OF ACTIONS/INITIATIVES CONDUCTED

- Creation of a coalition of institutions to support the implementation of Reference Centers for Coastal Management.
- Established regional criteria for defining the Coastal Management Reference Cores.
- Thematic Group created under the purview of the National Committee of Cartography to develop the methodology and determine the costs of making continental altimetry compatible with bathymetry.
- Inventory performed of existing data from a macro diagnostics of the Coastal Zone.
- Cooperation with FURG to create the requirements of the new macro diagnosis of the coastal zone, including a platform with a database under the domain of the MMA.
- Approval of Brazil's participation in the preparation of the next IPCC Report in the chapter on Oceans and Cryosphere.
- Prioritization of the PNCLM, established through Ordinance No. 209 of March 22, 2019, within the scope of the National Urban Environmental Quality Agenda. The PNCLM's strategy is to significantly reduce solid waste dumped in ecosystems, including beaches, wetlands and rivers, as well as to perform actions focused on the correct disposal of solid waste, in an effort to promote improved quality of life and health for the Brazilian population and the environment.
- Creation of the Lixão Zero National Program, established by Ordinance No. 307of April 30, 2019, with the objective of subsidizing states and municipalities in the management of urban solid waste and with a focus on an environmentally friendly final disposal. The Program can produce adaptive benefits to climate change pertaining to human health, given that the proper management of waste contributes to the reduction of greenhouse gas emissions and a reduction of diseases caused by vectors, such as dengue and Zika viruses[10]. Cleaning of beaches, rivers, and wetlands conducted in the 17 coastal states.
- Creation of the National Program for the Conservation of the Coastline (Procosta), instituted through Ordinance No. 76 of March 26, 2018. The program was designed to promote the integrated management of the coastline, its technical and scientific knowledge, its variations according to extreme events and climate change, multiple uses and protection of marine and coastal ecosystems.
- Publication of the Guidelines for The Prevention and Protection of Coastal Erosion and the book An Overview of Coastal Erosion in Brazil, published in 2018, both of which are references on the topic of climate change adaptation in the coastal zone.
- With the publication of Decree No. 10.000 of September 3, 2019, which provides for the National Council of Water Resources, the CT-COST was renamed the Technical Chamber for Integration with Environmental and Territorial Management.
- Institution of a Working Group to integrate water resources management with coastal management in the Technical Chamber for Integration with Environmental and Territorial Management of the National Water Resources Council.
- Brazil's part in preparing the Special Report on Climate Change, Oceans and the Cryosphere of the Inter-governmental Panel on Climate Change (IPCC), approved on September 24, 2019 by the 195 member governments of the IPCC, provided further evidence of the benefits of limiting global warming to the lowest possible level – in line with the target that governments themselves set in the 2015 Paris Agreement.

10 "The disease caused by the Zika virus (ZIKV) and transmitted by mosquitoes of the genus Aedes. **Available at** https://www.paho.org/pt/topicos/zika **Accessed on**: october 28, 2021.

THE BUSINESS SECTOR AND THE NAP

The information comes out of an aggregated analysis of responses from 56 companies that completed an open nationwide survey. 27 of them self-identified in the survey (9 of them requested that their names not be mentioned in the Final Report), and 29 chose to participate anonymously. The companies whose names were allowed to be mentioned in this Report were:

Centrais Elétricas Brasileiras S.A. – Eletrobras

Toroid do Brasil Ltda.

CMPC Brasil

LED Licenciamento e Desenvolvimento Ambiental Ltda.

Furnas

ITAIPU Binacional

Transportadora Gobor Ltda.

Grupo Sabará

Centrais Elétricas de Santa Catarina-Celesc

Companhia Paranaense de Energia – Copel

Klabin S.A.

Braskem

Espaço Namata

MRV Engenharia

Companhia Brasileira de Alumínio

Aratu Mineração Construção Ltda

Enel Brasil

Anglo American do Brasil

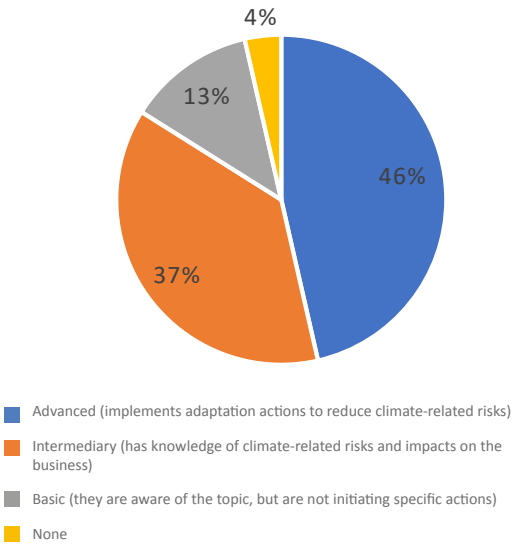
In this Report, the primary information gathered from the companies that took part in the survey conducted from October to November 2020 is presented. For more detailed information, we suggest viewing the "NAP and the Business Sector" document, included as an annex to this NAP report.

Of the 56 companies that participated in the survey, 82% are large, 11% micro and small and 7% mid-sized.

In terms of regions where the companies developed their activites, there was a relative balance between the South (24%), Southeast (24%), slightly lower for regions in the Northeast (21%) and Midwest (18%), and more tepid in the regions of the North (12%). A number of different industries were covered, including oil, gas and energy (16%), forestry (11%), electrometallurgical (11%), mineral (11%), services (9%), chemical industry (7%), construction civil (7%), cosmetics (5%), and others.

Chart 12 shows that **almost all (96%) of the companies responding to the survey are aware of the climate change adaptation agenda**, either at an intermediate level – they know the risks related to the climate and the impacts on business (37%) – or an advanced level – they implement measures to reduce climate-related risks (46%).

CHART 12 – KNOWLEDGE LEVEL ON CLIMATE CHANGE ADAPTATION (N=56)

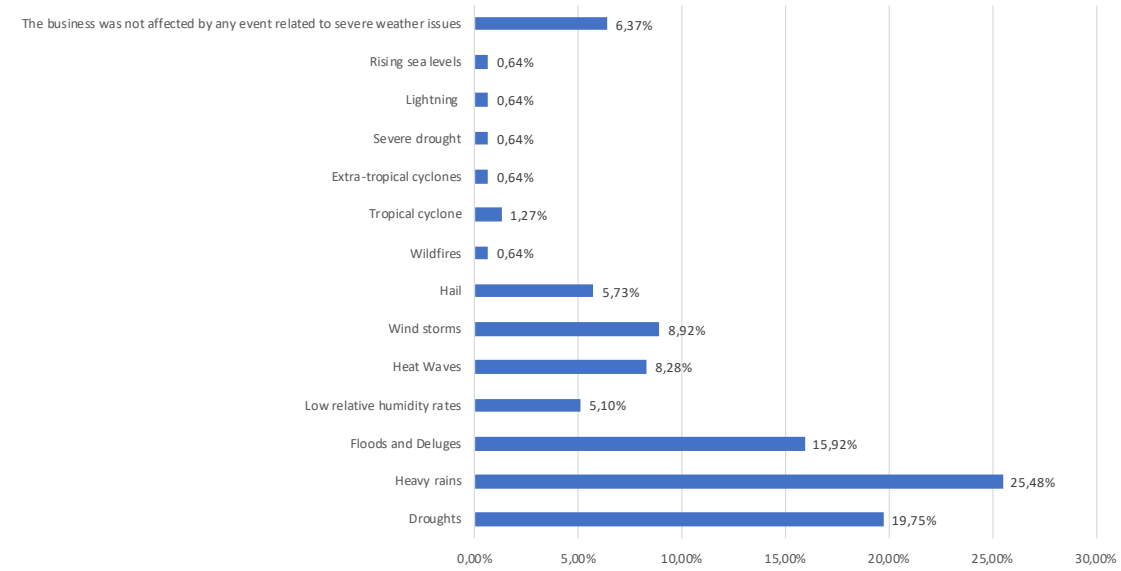


Source: Survey with the business sector (2020)

OVERVIEW OF THE ADAPTATION AGENDA AND THE BUSINESS SECTOR

The top extreme events that companies noted as having impacted business over the last five years were heavy rains (25%), followed by droughts (20%), and floods (16%).

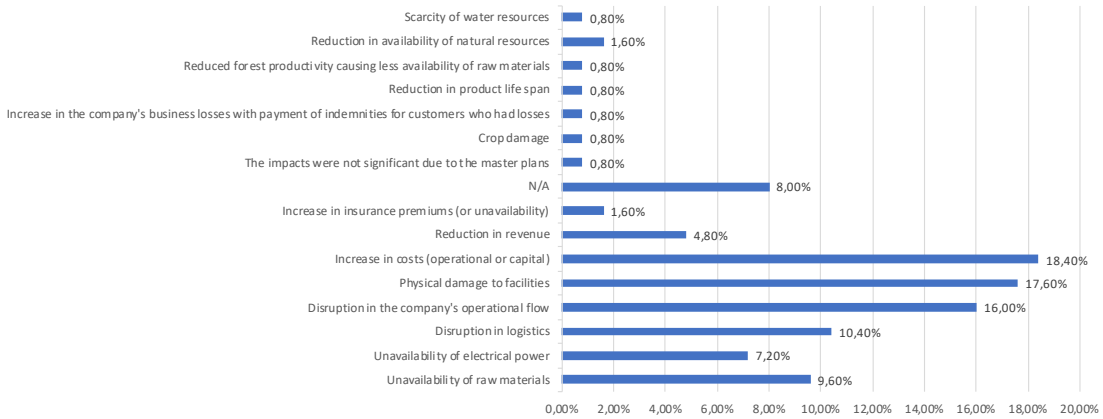
CHART 13 – MAJOR EXTREME EVENTS THAT AFFECTED BUSINESSES OVER THE LAST FIVE YEARS (N=157)



Source: Survey with the business sector (2020)

Chart 14 depicts the main economic impacts associated with extreme events that companies have seen, which are: an increase in costs (operational or capital), physical damage to the facilities and disruptions in the company's operation flow.

CHART 14 – MAIN ECONOMIC IMPACTS ARISING FROM EXTREME EVENTS (N=125)



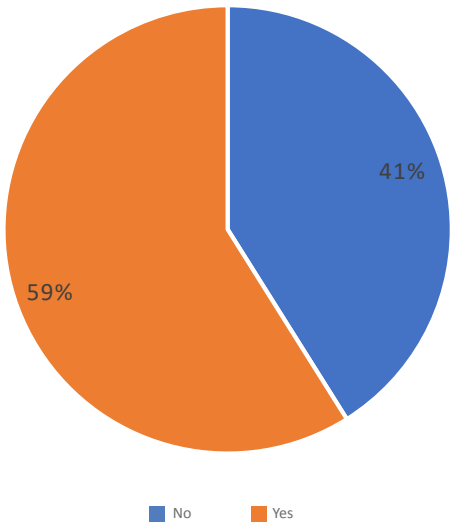
Source: Survey with the business sector (2020)

Most companies recognize that their operations may be affected by severe weather conditions in the future, and the perception of more impactful weather events remains very similar to extreme events experienced in the past and present, like heavy rains, floods and droughts.

MAIN ADAPTATION MEASURES IMPLEMENTED AND THE NAP

Among responding companies, 59% have some plan or strategy to adapt to climate change, as illustrated in Chart 15.

CHART 15 – EXISTENCE OF A PLAN OR STRATEGY FOR ADAPTATION TO CLIMATE CHANGE (N=56)



Source: Survey with the business sector (2020)

Of the actions listed, the primary adaptation measures involve: expanding the supply chain, searching for alternative sources of raw materials, searching for water autonomy and other measures to ensure water security (ex: reuse), conservation of ecosystems and biodiversity, forest restoration, diversification of the energy matrix, energy generation from alternative sources (such as solar, wind), risk analysis, development of studies (scientific and financial), innovation in product development, and developing crisis plans.

The breakdown of primary adaptation measures implemented by companies includes: (i) adoption of new technologies and/or products (19%), (ii) investment in new infrastructure (37%), (iii) improvements of existing infrastructure (13%); (iv) diversification of the energy matrix (12%); (v) R&D for new products and/or markets (11%); (vi) identification and implementation of new business opportunities (9%), and (vii) implementation of nature-based solutions (9%).

The relationship between the implemented measures and the sectorial strategies of the NAP was also analyzed. It was determined that the measures reported are primarily related to the infrastructure sectors – energy (20%) and water resources of the NAP (18%). There is also a significant relationship with the sectors of biodiversity (13%), disaster risk management (10%), industry and mining (13%), and agriculture (8%).

Among the three objectives of the NAP, the measures implemented are mainly related to objective 3 – implementation of adaptation measures and reduction of climate risk (52% of responses).

For companies that have not yet implemented adaptation measures, the main reasons they cited were: a knowledge gap on expected impacts and long-term results not generating incentives for implementation.

The long-term time frame for adaptation measures is still thought to be a challenge because it does not fit into the time period considered by the businesses, given that the benefits related to adaptation are felt in the medium to long term, while the cost of implementing the measures occurs over the short term. Along these lines, it was pointed out that it is important to illustrate the cost of inaction, which in most cases is greater than the cost of action. As such, companies need to account for the costs of the impacts of climate change on business, thereby providing a better measurement of risk and its translation into business language.

As for the different knowledge gaps (whether on predicted impacts, climate projections, concepts related to climate change adaptation and/or methodologies to address the topic internally), technical training is very important. It creates an internal capacity to collect and analyze the information needed to develop adaptation plans.

ADAPTATION MEASURES IMPLEMENTED AND THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The adaptation measures implemented contribute to fulfilling 15 of the 17 SDGs. SDG 1 – Poverty Eradication received the highest number of mentions (20%), followed by SDG 13 – Combating Climate Change (17%) and SDG 9 – Industry (12%).

LESSONS LEARNED IN THE FIRST CYCLE OF THE NAP (2016-2020) BASED ON THE REPORT OF THE 11 SECTORS PRESENT IN THE PLAN

All sectors in the NAP provided an analysis of the strengths, weaknesses and threats and opportunities that come out of the NAP to adapt to and reduce climate risks in the country. The summary of the recommendations is presented below.

1. Need to Continue Promoting Cross-Cutting Adaptation to Climate Change. There has been a lot of progress made in the conceptual assimilation and identification of actions needed to adapt to climate change in public policies under the responsibility of the sectors participating in the First Cycle of NAP Implementation (2016 to 2020). Cycle I of the NAP was encouraging, reflecting the issue's stage of maturity in most countries, and it suggested that adaptation to climate change continues to be a cross-cutting topic in public policies, plans and strategies implemented in the country.
2. Need to Expand the Coordination of NAP at Strategic Government Levels. Building progressive awareness on the need to adapt to climate change in various sectors was more restricted to the circle of representatives and departments in the Federal Government directly involved in the technical construction of the NAP, and not necessarily involving a commitment at the more strategic levels of specific departments or sectors.
3. Maturity of the NAP Governance Structure. The suggestion was made that, for the new NAP cycle, its governance could be revisited, encouraging a strategic and multi-sector focus and integration between sectors for the effectiveness of adaptation, both horizontally and at various levels. In addition, it is very important to make sure that the second cycle of developing the NAP continues on with a participatory process between federal and sub-national government entities, given that this was one of the positive aspects of the first cycle, notwithstanding opportunities for improvement.
4. Setting Goals and Efficient Monitoring. There was also a suggestion that concrete goals for adaptation, tied into indicators that could be monitored during the term of the plan, be proposed with a leaner NAP focused on the country's priorities. Similarly, to ensure the effective management of the Plan, a monitoring system needs to be established to execute the planned activities so that any potential measures can be identified and adopted to make sure that the goals are reached. Finally, further capacity-building measures were suggested, encouraging the production of useful knowledge for decision-making.
5. Promoting Greater Access to Information and Production of Knowledge to Minimize Uncertainty. Through ongoing collaboration between government, research institutions and society, the tools and knowledge produced and promoted under the NAP need to remain accessible in order to mitigate uncertainty and influence the behavior of various audiences and users (including national, state and municipal governments and large, medium and small-scale companies).
6. Reinforcing Brasilian Participation in the Agenda of International Negotiations on Climate Change. Brazil has made significant contributions to the Climate Convention and its position on the themes linked to the adaptation agenda needs to be strengthened.
7. Greater Government Coordination and Social Participation. The NAP activities have enhanced coordination (inter and intra-governmental) between the various entities and spheres of government on the topic of adaptation, but the articulation and territorial capillarity can be improved. As is the case in most other countries, this step is incremental and natural after the First Cycles of a NAP.

8. Production of Knowledge on Impacts and Vulnerability. The NAP has made it possible to make considerable progress in terms of generating knowledge on climate impacts and vulnerabilities and in building capacities between the various strategic sectors.

9. Gtadual Involvement of the Private Sector with the Theme of Adaptation to Climate Change. Understanding the need to adapt to the adverse impacts of climate change, private companies – especially large-scale ones – and tertiary sector organizations have included issues related to adaptation to climate change in their lines of action.

Closing Remarks

The First Cycle of the NAP has achieved its primary purpose of promoting a deeper knowledge about the management and reduction of climate risk in the country in view of the adverse effects associated with climate change in a way that takes advantage of emerging opportunities, preventing losses and damages and building instruments that allow natural, human, productive and infrastructure systems to be adopted.

As pointed out by certain sectors, most of the Plan's strategies were formulated based on policies, plans and projects, which were aligned with the objective of promoting more adaptive capacity through no-regrets measures.

Some differences were seen between the sectoral strategies related to the progress made in the period, which varied according to the involvement of stakeholder from each sector, their understanding of the climate agenda and the resources made available through projects and partnerships.

A number of challenges arose during the implementation of the NAP. Some of these included: actions initiated by the sectors that were discontinued and the scarcity or lack of access to financial resources, difficulties linked to the characteristics of the governance and management model of the NAP (including sluggishness and excess bureaucracy and shifts in the governance and management model of the NAP), a lack of inter-ministerial and inter-sector coordination, integration and synergy and, difficulties in implementing specific programs and policies.

In order to tackle the various challenges, a number of measures were introduced by the sectors: cooperation actions, networking, partnerships, awareness-raising activities on the importance of risk management and adaptation to climate change at various levels (national, regional, state and municipal), capacity building/training actions, decentralization of activities (reinforcing the territorialization of NAP actions) and creating content and recommendations from strategic sectors. In addition to these measures, there was a resumption of the Interministerial Committee on Climate Change (CIM) in 2020, an innovative measure to promote the consolidation of the governance structure through the involvement of the highest level of government, which had not convened to discuss the topic for almost 10 years. Accordingly, the climate agenda is no longer restricted to the technical level of government agencies, but has begun to receive the attention that the topic demands at both the national and international level.

The sectors of the NAP also identified a need to adopt additional actions, including: fostering integration and synergy between strategic sectors and entities responsible for the NAP, initiatives to raise awareness on climate risks and provide visibility to the adaptation agenda for society as a whole, making improvements in the Plan's governance process in an effort to not just restrict it to the technical level, greater access to financial resources, intensified monitoring of the impact of ongoing adaptation actions, and continuing to generate knowledge and tools to manage climate risk.

The Plan has experienced multiple achievements over these first four years of execution, such as an increase in scientific knowledge on adaptation to climate change and integrating the topic into other sector agendas (mainstreaming), promoting the incorporation of resilience criteria into other government policies and plans for strategic sectors, like Agriculture, Cities, Industry and Mining, Infrastructure (Energy, Urban Mobility and Transport) and Water Resources, and others.

The actions reported also demonstrate the alignment of national adaptation initiatives with the challenges of the international agenda, such as the 2030 Agenda and its respective Sustainable Development Goals (SDGs). This Report showed that Brazil has been implementing the commitments assumed in the Paris Agreement, including making use of its tools, particularly those related to the transparency framework to verify mitigation and adaptation efforts.

Closing Remarks

The First Cycle of the NAP was a major effort to understand the theme of adaptation to climate change among various sectors, implementing a significant number of actions, including the development of capacities for climate risk management.

As next steps, it was pointed out that there is a need to continue integrating the adaptation agenda with other government agendas through the strategic involvement of the top levels of the federal government, and to go beyond the diagnosis of the problem to initiate concrete measures to prevent any negative impacts of climate change. This will entail planning a future cycle of the NAP with more concrete actions that are better focused on the strategic priorities of the NAP in order to facilitate monitoring of actions that are efficient and effective. No less important is to consolidate the participatory construction process experienced in Cycle I in an effort to integrate the strategies, as well as the appropriate adoption of the agenda by the entities involved. In the business sector, the two priority forms of support from the Federal Government requested by companies that participated in the survey for this report were: (i) continuing to spread information on the impacts of climate change and its consequences to the general public and (ii) promoting public-private partnerships in order to effect adaptation measures, both with 22% of the responses. Three other actions that were also heavily mentioned by the companies were: (iii) continue to provide tools with information on climate services (such as regionalized climate projections) (19%); (iv) improve the regulatory environment (e.g. legislation) (18%); and (v) make information available on sources of climate change adaptation finance (17%).

The participating companies do not represent the whole universe of the country's business sector, as can be seen in the results published in this report. It contains the results from an analysis of the content coming out of the qualitative responses of managers involved in the implementation of strategic sectors and companies that took part in the consultation made to the business sector acting on the theme of climate change. Overall, the results of companies' perceptions of the NAP reveal that there is room to further strengthen dialog and actions between the government and the business sector.

Finally, for the second cycle of The National Adaptation Plan, efforts by the Brazilian State to reduce social and environmental vulnerabilities need to continue, including inter-federal coordination, and the country's resilience to climate change has to increase. Its scope needs to address the preservation of the physical integrity, safety and well-being of people, as well as sectors/strategic themes for socioeconomic development, reduction of inequalities, environmental protection, and other priority agendas. There also needs to be a contribution to a domestic and international institutional and organizational environment that promotes sustainable transformations, even amidst the uncertainties of the global climate, economic, and political scenarios.

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ANNEXES

ANNEX I – GLOSSARY

A. KEY CONCEPTS OF THE NAP

- **Systemic approach:** rather than focusing on sectors in a fragmented way, the systemic approach focuses on the interconnections between sectors as well as the relation to their environment[11].
- **Adaptation to climate change**: a strategy by any system to address **climate change** in an effort to prevent possible damage and explore potential beneficial opportunities. Unlike what happens in mitigation, the benefits resulting from this series of adjustments are local and short-term (https://www.mma.gov.br/informma/itemlist/category/137-ci%C3%AAncia-da-mudan%C3%A7a-do-clima.html).
- **Adaptive capacity:** the combination of skills, traits and resources available to an individual, community, society or organization that can be used to **prepare and act** on reducing adverse impacts, moderate damage or exploit opportunities (www.adaptaclima.mma.gov.br).
- **Effectiveness**: the effectiveness of an action is understood **as the effect or the concrete result (such as the results of adaptation to climate change)**. It also refers to the **transformative impact** caused by services or goods provided by an institution or organization under a reality that is intended to change. Effectiveness is represented by the direct or indirect benefits and impacts resulting from the exercise of the agency's institutional role[13].
- **Adaptation strategy**: Adaptation strategy: this strategy involves identifying the country's exposure to current and future impacts based on climate projections, identifying and analyzing any vulnerability to these potential impacts, and defining sector-specific adaptation actions and guidelines (NAP, https://www.mma.gov.br/clima/adaptacao/plano-nacional-de-adaptacao).
- **M&A of the NAP:** The objectives of the monitoring and assessment of the NAP are:
    1. To monitor the achievement of proposed goals (*monitoring*);
    2. To monitor the thematic and sectoral adaptation guidelines, in addition to local actions that can contribute to climate risk management in the country (*monitoring*);
    3. To promote feedback on the analyzes performed for the continuous improvement of the policy and its management (*assessment*);
    4. To ensure there is ample information on the actions being developed in the area of adaptation to climate change (*assessment*); https://www.mma.gov.br/clima/adaptacao/plano-nacional-de-adaptacao#monitoramento-do-NAP;
    5. To obtain subsidies for preparing and/or revising the NAP (assessment);
    6. Others.
- **Climate change**: includes shifts in temperature, precipitation and other phenomena as compared to historical averages (generally, between at least 20 and 30 years), interfering with the planet's climatic patterns. These changes, which include an upsurge in the frequency and intensity of extreme weather events (such as droughts and floods) and shifts in seasonality (e.g. winter may last for fewer months, it may no longer rain during the rainy season, etc.) occur through natural processes but can also take place due to human action (IPCC, 2014). Climate change is widely perceived to play a direct and indirect role in bringing about risks to the physical integrity and well-being of people, including

11 ARNOLD, ROSS D., WADE, JON P., *A Definition of Systems Thinking: A Systems Approach.* **Procedia Computer Science**, Volume 44, 2015, Pages 669-678. **Available at**: http://www.sciencedirect.com/science/article/pii/S1877050915002860. **Accessed on**: october 2, 2021.

the global burden of disease and death. (Ministry of Health, https://www.saude.gov.br/vigilancia-em-saude/vigilancia-ambiental/vigidesastres/mudancas-climaticas.

- **Climate risk**: the risk of climate-related impacts is the product of the interaction of weather hazards with the exposure of natural and human systems to them and their vulnerability. It is commonly represented as the probability that an event (hazardous) will occur multiplied by the impacts caused by it (IPCC, 2014).
- **Climate vulnerability**: propensity or predisposition to be adversely affected by climate change. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to damage and lack of ability to deal with and adapt to the adverse effects of climate change (IPCC, 2014).

B. PERSPECTIVES OF ACTION CENTERED ON PEOPLE

B1. ACTION PERSPECTIVE 1 – CONTRIBUTIONS FROM THE ACTIONS OF THE STRATEGIC SECTOR TO PRESERVE PEOPLE'S PHYSICAL INTEGRITY.

DEFINITIONS

Physical integrity in view of climate change: climate change may pose a real risk factor for people's physical integrity, such as human health, but it can also indirectly influence other risk factors for individuals (Conway et al, 2019). For example, a heatwave resulting from climate change represents a direct risk factor. The vulnerable population, in this case, the elderly and children, are exposed to temperatures that are above the expected norm and may result in sickness or even death. When climate change alters the habitat of a vector (for example, the dengue mosquito), we are faced with a case of a risk factor that affects another risk factor (increase in temperature and shift in precipitation, resulting in the proliferation of mosquitoes and likely increased incidence of diseases such as malaria or dengue).

Other factors of risk to physical integrity resulting from climate change include:

- Disasters generated by changes in rainfall (causing floods – flash floods, landslides, droughts, forest fires).
- A rise in Sea levels (including salinization of drinking water, causing hypertension).
- Lack of water and healthy foods (undernourishment and malnutrition...).
- Compromising the quality and quantity of water and food (diabetes, obesity).
- Forced migration of the population (poverty and mental illness).
- Change in air quality (underweight babies, respiratory diseases, with influence demonstrated on the spread of COVID-19, etc.).

In addition to the consequences of climate change for the physical integrity of people, it can also generate **mental/psychological (trauma), infections and nutritional consequences.** The intensity of the event and the social and economic vulnerabilities of the population, as well as the infrastructure and environmental conditions influence the magnitude of the effects. (https://www.saude.gov.br/vigilancia-em-saude/vigilancia-ambiental/vigidesastres/mudancas-climaticas).

B2. ACTION PERSPECTIVE 2. CONTRIBUTIONS OF THE STRATEGIC SECTOR'S ACTIONS TO PROMOTE PEOPLE'S WELL-BEING.

DEFINITIONS

- **Ecosystem-based Adaptation (EbA):** Throughout the world, different approaches have been taken to help human populations adapt to climate change. Among them is Ecosystem-based Adaptation (EbA), which advocates for the use of biodiversity and ecosystem services, or green solutions, as an option to reduce the risks and potential impacts associated with

this change. From the standpoint of harnessing the contributions of these services to people, EbA holds a range of additional benefits – among them, the conservation of ecosystems themselves, which are also exposed to climatic and non-climatic pressures in the context of development. Therefore, it is a people-oriented approach, but one that emphasizes the profound interdependence that exists between all living beings and their environment (MMA, Course Booklet on the Integration of the EbA in developing projects, 2018, p. 13, https://antigo.mma.gov.br/images/imagens/biomas/mata_altantica/Apostila_AbE_20_04_2018.pdf.

- **Well-being**: is a widely used expression, but its meaning has evolved over the years. In the 17th century, it was only linked to physical health and, in the 18th century, the meaning took on material issues, which, if people did not have them in order to satisfy basic needs, could impact health. Currently, the concept has become much broader, as reflected in the definition of "health" in Brazil: it is related to the perception of health in the mental, emotional, social, physical and environmental aspects.
- **Basic needs:** According to Abraham Maslow, people are motivated based on their needs, which are manifested in degrees of importance: physiological and security are the basic and initial needs. The ultimate needs involve self-fulfillment. The physiological needs that are the basis for the pyramid, according to Maslow, represent the needs related to the organism, such as food, sleep, shelter, water, excretion and others. Needs for security appear after physiological needs have been met. They are represented by needs for security and stability, including protection from violence, health protection, financial resources and others. Social, status, and self-fulfillment needs will only appear after basic needs (physiological and security) are satisfied.[12]
- **Environmental services:** some authors and institutions refer to ecosystem services as being synonymous with environmental services. However, there is a more recent trend among experts to distinguish them in a way in which ecosystem services refer to nature's contribution to societies and ecosystem services as human actions that improve ecosystem services (https://www.mma.gov.br/biodiversidade/economia-dos-ecossistemas-e-dabiodiversidade/servi%C3%A7os-ecossist%C3%AAmicos.html#servi%C3%A7os-ecossist%C3%AAmicos).
- **Ecosystem services**: are nature's benefits to people. They are vital to human well-being and for economic activities. There are different ways to classify ecosystem services. The Millennium Ecosystem Assessment (MEA), published in 2005, classifies ecosystem services into four categories: provision, regulation, cultural and supportive, also called support or habitat. Currently, with the initiative of Intergovernmental Platform of Biodiversity and Ecosystem Services (IPBES) and the Common International Classification of Ecosystem Services (CICES), three categories are considered: provision, regulation and cultural. Supporting ecosystem services, in more recent classification systems, have come to be considered not as a category, but as ecosystem functions (ecological processes such as atmospheric oxygen production, nutrient cycling, soil formation and retention, and water cycling) that are needed for the production of all other ecosystem services (https://www.mma.gov.br/biodiversidade/economia-dosecossistemas-e-da-biodiversidade/servi%C3%A7os-ecossist%C3%AAmicos.html#servi%C3%A7os-ecossist%C3%AAmicos).

12 KOLTKO-RIVERA, M. E., 2006. Rediscovering the later version of Maslow's hierarchy of needs: Self-transcendence and opportunities for theory, research, and unification. **Review of General Psychology** , 10 (4), 302–317.

B3. ACTION PERSPECTIVE 3. CONTRIBUTIONS OF ACTIONS FROM THE STRATEGIC SECTOR TO THE INSTITUTIONAL AND ORGANIZATIONAL ENVIRONMENT

DEFINITIONS:

- **Institutional and organizational environment**: institutional environment is the set of economic, political, social, moral and legal rules that establish the foundation for social behavior and for production and distribution in the economy. The organizational environment, on the other hand, consists of structures created to support the system (companies, universities, cooperatives, associations).[13]
- **Capacity building**: a process of mutual learning. It helps individuals, institutions, organizations, sectors and communities to manage transformation processes, including adaptation to climate change. The capacities encompass specific technical knowledge and know-how, "soft skills" likes networking, collaboration, leadership and change management, as well as financial and human resources and infrastructure.

13 FONSECA, V. S. da; MACHADO-DA-SILVA, C. L. Indivíduo, organização e ambiente: bases para conversação entre três perspectivas de estudo da estratégia em organizações. In: **25º ENANPAD**, 2001. Rio de Janeiro. Anais da ANPAD. 1 CD ROM.

ANNEX II – LIST OF NATIONAL POLICIES

Description	Associated Strategic Sector
Environmental Rural Registry (CAR)	Biodiversity and Ecosystems
Forest Code (CF)	Agriculture / Biodiversity and Ecosystems / Cross-cutting Goals
National Strategy and Action Plan for Biodiversity (EPANB)	Biodiversity and Ecosystems
National Strategy for Science, Technology and Innovations (ENCTI)	Biodiversity and Ecosystems
Country Strategy for the Green Climate Fund (GCF)	Cross-cutting Goals
Nationally Determined Contribution of Brazil (NDC of Brazil)	Cross-cutting Goals / Vulnerable Peoples and Populations
Growth Acceleration Program (PAC)	Cities
Growth Acceleration Program (PAC II)	Cities
10-Year Energy Plan (PDE)	Infrastructure – Energy
Industry Plan (IP)	Industry and Mining
Contingency Plan for Flooding	Health
QBRN Contingency Plan	Health
Contingency Plan for Public Health Emergencies due to Drought and Dry Spells	Health
Low Carbon Agriculture Plan (ABC Plan)	Biodiversity and Ecosystems / Agriculture
Response Plan to Public Health Emergencies	Health
Operational Plan of the National Focal Point for the International Health Regulations	Health
Sate Plans for Food and Nutrition Security	Food and Nutritional Security
National Agroecology Plan (Plan National Agroecology)	Biodiversity and Ecosystems / Agriculture
National Plan to Strengthen Communities Extractivists and Riverside Dwellers (Planafe)	Vulnerable Peoples and Populations
National Plan for Agroecology and Organic Production (Planapo)	Vulnerable Peoples and Populations / Food and Nutritional Security
National Plan for the Recovery of Native Vegetation (Planaveg)	Biodiversity and Ecosystems
National Food and Nutrition Security Policy (PNSAN)	Food and nutritional Security
National Housing Plan (PlanHab)	Cities
National Plan for Food and Nutrition Security (PLANSAN)	Vulnerable Peoples and Populations / Food and Nutritional Security
Low Carbon Mining Plan (PMBC)	Industry and Mining
National Environmental Policy (PNMA)	Cities / Health
National Solid Waste Policy (PNRS)	Coastal Zones
National Adaption Policy (NAP)	Industry and Mining
National Energy Plan (PNEA)	Infrastructure – Energy
National Environmental Education Policy (PNEA)	Disaster Risk Management

Description	Associated Strategic Sector
National Policy for the Environment and Environmental Management of Indigenous Lands (PNGATI)	Vulnerable Peoples and Populations
National Coastal Management Plan (PNGC)	Coastal Zones
Strategic Action Plan for Rehabilitation of Federal Dams (Planerb)	Disaster Risk Management / Water Resources
National Basic Sanitation Plan (Plansab)	Health
National Water Security Plan (PNSH)	Water Resources
National Policy on Climate Change (NPCC)	Cities / Cross-cutting Goals / Disaster Risk Management / Industry and Mining / Infrastructure – Mobility / Vulnerable Peoples and Populations / Health
National Dam Safety Policy (PNSB)	Water Resources
National Urban Mobility Policy (PNMU)	Infrastructure – Mobility
National Policy for the Sustainable Development of Traditional Peoples and Communities (PNPCT)	Vulnerable Peoples and Populations
National Policy on Civil Defense and Protection (PNPDEC)	Disaster Risk Management
National Plan for the Promotion of Socio-biodiversity Products (PNPSB)	Vulnerable Peoples and Populations
National Policy for Basic Sanitation (PNSB)	Food and nutritional Security
National Water Resources Policy (PNRH)	Industry and Mining / Water Resources / Coastal Zones
National Health Surveillance Policy (PNVS)	Health
National Health Plan (PNS)	Health
National Transportation Policy (PNT)	Infrastructure – Transportation
National Irrigation Policy (Law No. 12.787/2013) (PNI)	Water Resources
Multiannual Plan (PPA)	Health / Food and Nutritional Security
Action Plan for the Prevention and Control of Deforestation and Wildfires in the Legal Amazon (PPCerrado)	Biodiversity and Ecosystems
Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm)	Biodiversity and Ecosystems
Brazil-Germany Project to Promote the Use of Biogas in Brazil (ProBiogás)	Cities
Project of Monitoring the Brazilian Amazon Rainforest by Satellite (Prodes)	Biodiversity and Ecosystems
National Program for the Surveillance of Water Quality for Human Consumption (VIGIÁGUA)	Health
National Plan for the Recovery of Native Vegetation (Proveg)	Biodiversity and Ecosystems
National System of Nature Conservation Units (SNUC)	Biodiversity and Ecosystems

ANNEX III – LIST OF INTERNATIONAL INITIATIVES WITH ADHERENCE TO THE CLIMATE CHANGE ADAPTATION AGENDA

International initiative	Strategic Sector that Mentioned the Initiative
Treaty under the United Nations Framework Convention on Climate Change, which governs measures to reduce greenhouse gas emissions as of 2020 (The Paris Agreement)	Vulnerable Peoples and Populations / Infrastructure – Energy
Memorandum of Understanding BR 20.000 signed between ANA, Mineral Resources Research Company or Geological Service of Brazil – CPRM and the United States Geological Service – USGS (Memorandum of Understanding BR 20.000)	Water Resources
Green Card – European Community Environmental Policy (Green card)	Cities
Convention on Biological Diversity (CDB)	Agriculture, Biodiversity and Ecosystems / Cross-cutting Goals
UNESCO Intergovernmental Oceanographic Commission (COI)	Coastal Zones
Final Document from the World Conference on Indigenous Peoples (1st World Conference on Indigenous peoples)	Vulnerable Peoples and Populations
International Labour Organization (ILO) Convention no. 169 (Convention no. 169 of the ILO)	Vulnerable Peoples and Populations
American Declaration on the Rights of Indigenous Peoples (DADPI)	Vulnerable Peoples and Populations
United Nations Declaration on the Rights of Indigenous Peoples (United Nations Declaration on the Rights of Indigenous Peoples)	Vulnerable Peoples and Populations
GEF Cross-Border Cooperation Project for Conservation, Sustainable Development and Integrated Management in the Upper Paraguay Basin (GEF Upper Paraguay River Basin Project)	Water Resources
Hyogo Framework for Action (EIRD) – United Nations	Health
Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework)	Disaster Risk Management / Cross-cutting Goals / Health
National Targets for Biodiversity (Aichi Biodiversity Targets)	Biodiversity and Ecosystems
Minamata Convention	Health
Housing and Sustainable Urban Development – Habitat III – UN (New Urban Agenda – Habitat III)	Cities
Sustainable Development Goals (SDGs)	Agriculture
Convention on Wetlands of International Importance (RAMSAR)	Biodiversity and Ecosystems
Resolution WHA 61.19, approved by the 61st World Health Assembly of the WHO (Resolution WHA 61.19)	Health
International Health Regulations – IHR World Health Organization (RSI)	Health
United Nations Convention to Combat Desertification (UNCCD)	Agriculture / Cross-cutting Goals
UNFCCC Technology Mechanism (UNFCCC)	Cross-cutting Goals
United Nations Framework Convention on Climate Change (UNFCCC)	Agriculture/ Biodiversity and Ecosystems / Cities / Cross-cutting / Health

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