NAP

NAP-CITIES

EXECUTIVE SUMMARY

National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay

Ministerio de Vivienda y Ordenamiento Territorial

Ministerio de Ambiente

SNRCC Uruguay

National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay (NAP-Cities)

Executive Summary

Ministerio de Vivienda y Ordenamiento Territorial

Ministerio de Ambiente

SNRCC Uruguay

Uruguay
2021

This plan has been developed within the framework of the URU/18/002 *Project, Integration of the Adaptation Approach in Cities, Infrastructure and Land Planning*, between 2018 and 2021. The project was led by the Ministry of Housing and Land Planning (MVOT, by its acronym in Spanish) and the Ministry of Environment (MA, by its acronym in Spanish), implemented by the United Nations Development Programme (UNDP), financed by the Climate Green Fund, and supported by the Uruguayan International Cooperation Agency (AUCI, by its acronym in Spanish).

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Director Florencia Arbeleche Perdomo

NATIONAL DIRECTORATE OF HOUSING
Director Jorge Ceretta Gómez

NATIONAL CLIMATE CHANGE AND VARIABILITY RESPONSE SYSTEM COORDINATION GROUP
(August 2021 integration)

MINISTRY OF ENVIRONMENT (MA)
Natalie Pareja
Mariana Kasprzyk
Juan Labat
Cecilia Penengo
Belén Reyes
Emiliano Sánchez
Virginia Sena
Paola Visca
Mónica Moscatelli

MINISTRY OF LIVESTOCK, AGRICULTURE AND FISHERIES (MGAP)
Cecilia Jones
Felipe García

PLANNING AND BUDGET OFFICE (OPP)
Leonardo Seijo

MINISTRY OF NATIONAL DEFENCE (MDN)
Luis Felipe Borche

MINISTRY OF ECONOMY AND FINANCES (MEF)
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Antonio Juambeltz

MINISTRY OF EDUCATION AND CULTURE (MEC)
Alberto Majó
Graciela Morelli

MINISTRY OF INDUSTRY, ENERGY AND MINING (MIEM)
Beatriz Olivet
Laura Lacuague

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Carmen Ciganda
Gastón Casaux

MINISTRY OF TOURISM (MINTUR)
Ignacio Curbelo
Karina Larruina

MINISTRY OF HOUSING AND LAND PLANNING (MVOT)
Norbertino Suárez
Rossana Tierno
Ana Álvarez

CONGRESS OF GOVERNORS (CI)
Leonardo Herou (Canelones)

NATIONAL EMERGENCY SYSTEM (SINAE)
Sergio Rico
Walter Morroni

NATIONAL INSTITUTE OF METEOROLOGY (INUMET)
Invited organisation
Luis A. Loureiro *(until September 2021)*
Lucía Chipponelli

URUGUAYAN AGENCY FOR INTERNATIONAL COOPERATION (AUCI)
Invited organisation
Viviana Mezzetta

PROJECT BOARD

Stefan Liller
Resident Representative
UNITED NATIONS DEVELOPMENT PROGRAMME

Norbertino Suárez
Director
NATIONAL DIRECTORATE OF LAND PLANNING

Natalie Pareja
Director
NATIONAL DIRECTORATE OF CLIMATE CHANGE

Carolina Ferreira - Senior Advisor
Viviana Mezzetta - Head of Environment,
Science, Technology and Innovation
URUGUAYAN AGENCY FOR INTERNATIONAL COOPERATION

NAP-CITIES TECHNICAL COMMITTEE

Myrna Campoleoni
Head Consultant NAP-Cities

Gustavo Olveyra
Consultant NAP-Cities

Magdalena Preve
PNUD

Mariana Kasprzyk y Mónica Gómez
DINACC

Rosana Tierno y Elba Fernández
DINOT

Adriana Piperno
DINAGUA

Carolina Passeggi
DINAVI

Paloma Nieto
DINACEA Y DINABISE

Ana Guerra
PMB

Guillermo Rey, Ignacio Ferrari y Stella Zuccolini
ANV

Alejandra Cuadrado
(until March 2020)
DINAGUA

Cecilia Curbelo
(until December 2020)
DINAVI

Cristina Sienra
(2018, 2019)
MEVIR-DR. ALBERTO GALLINAL HEBER

Gabriela Pignataro
(until August 2020)
DINACC

The URU 18/002 project started in 2018. National elections took place during the process and this caused changes in authorities and technical staff in the project's Board and in the Technical Committee. This page mentions current authorities. Nevertheless, we thank all participants from earlier stages.

PROJECT TECHNICAL TEAM
Myrna Campoleoni (Head Consultant)
Alicia Iglesias
Ana Laura Surroca
Andrés Bentancor
Florencia Etulain
Gonzalo Pastorino
Gustavo Robaina
Gustavo Olveyra
Helena Garate
Silvina Papagno
Sinay Medouze
Virginia Arribas

COLLABORATING TECHNICAL EXPERTS
Adriana Bozzo
Alida Alvez
Ana Abellán
Ana Sena
Andrés Fernández
Cecilia Alonso
Claudia Moroy
Cristina Zubillaga
Estefanía Ronca
Fabián Camargo
Janet Bocija
Magdalena Mailhos
Mariana García
Nora Bertinat
Patrick Van Laake
Santiago Benenati
Victoria Laens
Viviana Centurión

INSTITUTIONAL TECHNICAL TEAMS

MINISTRY OF ENVIRONMENT
NATIONAL DIRECTORATE OF WATERS
Viveka Sabaj
Amalia Paniza
Jose Rodolfo Valles Leon
Juan Pablo Martínez Penadés
Daniel Alonso
Cecilia Emanueli
Alejandra Cuadrado
Andrea Gamarra
Diana Azurica
Lucía Facio
Daniela Astrada

NATIONAL DIRECTORATE OF CLIMATE CHANGE
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Mario Batalles
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Martín Etcheverry

ENVIRONMENTAL EDUCATION
Luján Jara

MINISTRY OF HOUSING AND LAND PLANNING
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Ana Álvarez
Rodrigo García
Natalia Da Silva
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Luciana Mello

NATIONAL DIRECTORATE OF HOUSING
Carolina Passeggi
Cecilia Curbelo
Julia Frantchez

EXTERNAL CONSULTANTS
DICA & Asociados
Factor CO2

INSTITUTIONAL AGREEMENTS
Facultad de Agronomía (UDELAR)
Facultad de Arquitectura, Diseño y Urbanismo (UDELAR)
CENUR Litoral Norte (UDELAR)
Facultad de Ciencias (UDELAR)
Facultad de Ingeniería (UDELAR)
Fundación Ricaldoni

STYLE EDITING
Susana Aliano Casales

TRANSLATION
Mariví Martínez M.

GRAPHIC DESIGN
Ana Laura Surroca

PHOTOGRAPHY
Carlos Lebrato

The analysis and policy recommendations in this report do not necessarily reflect the opinion of the United Nations Development Programme, its Executive Board or its Member States.
The use of language that does not discriminate between men and women is one of the concerns of our team. Nevertheless, there is no consensus among linguists on how to achieve this in Spanish. To that effect and with the intention of avoiding explicit reference to both genders, we have decided to use the generic masculine form on the understanding that all statements refer to both men and women.

CONTENTS

PROLOGUES

With the creation of the Ministry of Environment (MA, by its acronym in Spanish) Uruguay has established an institutional structure which sets the tone for a new State vision regarding the protection of natural resources and the environment and stresses the significance of the environmental agenda. Within this framework, the National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay (NAP-Cities) becomes a strategic tool which allows progress in policies and environmental urban-related planning processes taking place in Uruguay, considers climate change impact and embraces ecosystem services which prove essential in the adaptation process.

Our country has come a long way in the international climate agenda. Uruguay has ratified the main commitments defined in the UN Framework Convention on Climate Change and has promoted the creation of new regulations and specific institutional structure at a national level in order to address the challenges that climate change and variability will pose to mankind under a local perspective and considering the climate hazards that Uruguay is facing as well as our people's specific needs.

Our Ministry has stressed the importance of these issues, granting the hierarchy of a National Directorate to the office in charge of policies associated to climate change and variability.

Additionally, the Climate Change National Directorate (DINACC, by its acronym in Spanish) is working on a long-term climate strategy within the framework of the Climate Change and Variability National Response System (SNRCC, by its acronym in Spanish) -- the institutional structure of the Directorate. In such context, NAP-Cities provides a fundamental roadmap to move ahead in the creation of resilient cities, environment-friendly and ready to address climate threats to the short, medium, and long-term.

Thus, MA takes the lead in key issues related to urban adaptation such as coastal management, valuation and protection of city ecosystem services, integrated management of water resources, and education in environmental issues. Following its active participation in the design of this plan through strong inter institutional and interdisciplinary work with authorities and technical experts, MA will also be part of the implementation process through the following agencies: National Directorate of Biodiversity and Ecosystem Services, National Directorate of Environmental Quality and Evaluation, National Directorate of Waters and the Climate Change National Directorate together with other national and departmental institutions.

We hope the institutional effort and commitment expressed in this plan may help the cities of our country be better prepared to address one of the main contemporary challenges. Our main goal is that this can improve the lives of those who live in urban areas now and in the future.

Adrián Peña
Minister of Environment

The Ministry of Housing and Land Planning hereby presents a new planning and management instrument in order to respond to the many challenges that climate change and variability will pose to cities and infrastructures in our country.

Uruguay is characterised by its significant and increasing urbanisation level, being one of the countries in Latin America with the highest urban population index. Over 94 % of its inhabitants live in cities and over 70 % of the population lives in coastal areas. It is in those cities where a significant number of activities and services can be found. Therefore, understanding and finding solutions to the main climate hazards in urban areas is a priority to ensure quality of life for our country's population.

Considering current and future climate scenarios is a strategy in the different national directorates that make up this government office.

The authorities and experts of the National Directorate of Land Planning have played a key role in the preparation of the Plan. This means that a valuable tool will be available for integrating approaches in planning and management actions related to the adaptation of cities and infrastructures in our territory -- a central pillar of national planning in all scales and dimensions.

NAP-Cities also supplies key components for guiding the design and planning of housing and neighbourhood improvement policies that our ministry runs. It systematises and proposes measures to address climate hazards, such as heat or cold waves, or increasing rainfall frequency and volume, and provides specific protocols to adapt houses and their respective environments to flood events or to offer energy-efficient alternatives, among other options needed to find the best solution for each case.

But such a plan not only offers a strategic perspective. It also boosts and helps focus institutional capacities in many ways. On the one hand, it enables and facilitates inter-institutional work, as well as interaction with society, since there is a shared vision and path. But it also contributes with substance and reflection on how to be more efficient when selecting, allotting and utilising public resources.

Therefore we thank and celebrate the team effort behind this publication.

Irene R. Moreira Fernández
Minister of Housing and Land Planning

National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures.

Executive summary

The government of the Oriental Republic of Uruguay introduces the first National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay (NAP-Cities).

NAP-Cities is a planning tool to reduce the country's vulnerability to the impact of climate change and variability, to promote adaptive capacity and resilience and to facilitate its integration to planned development actions. Identifies medium and long term adaptation needs and presents the implementation of strategies and programmes to address them. NAP-Cities was established under the COP16 Cancun Adaptation Framework (2010). It is a continuous, progressive and iterative process that allows for a country-driven, gender-responsive, participatory and transparent approach.

Its formulation and dissemination received the support of the Integration of the Adaptation Approach in Cities, Infrastructure and Land Planning project (URU/18/002). This project started in 2018 and was active over a period of three years. It was led by the Ministry of Housing, Land Planning & Environment (MVOTMA, by its acronym in Spanish) until the functions were transferred to the new Ministry of Housing & Land Planning (MVOT, by its acronym in Spanish), and the Ministry of Environment (MA) created in 2020. The United Nations Development Programme (UNDP) was in charge of its implementation, while the Climate Green Fund financed it together with the Uruguayan International Cooperation Agency and the National Climate Change and Variability Response System.

NAP-Cities was prepared between May and November 2021 in consultation and validation with all stakeholders. Several activities have been carried out in coordination with the project's Technical Committee by experts from the ministries and from the consultant team, as well as with the support of strategic institutional partnerships and specific agreements.

PHOTO
Rambla, Montevideo.
Carlos Lebrato

1

National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay - Why?

1.a. Characteristics

With a total area of 176,220 km^2, Uruguay is the second smallest country in South America. Its economy is based on agro-industrial production and service industry, with great dynamism of tourism over the last years. With a low population density stressed by its low birth rates, 93.4 % of Uruguay's total population (3,286,314 inhabitants) lives in cities and a steady trend continues in that direction. The capital, Montevideo, is the biggest city, with 1,304,729 inhabitants. Population exceeds 50,000 inhabitants in 8 more cities, 31 cities are between 10,000 and 49,999 inhabitants, and 30 cities are between 5,000 and 9,999 inhabitants. These cities face multiple climate hazards due to a greater frequency and intensity of severe climate events, such as intense precipitation and floods alternating with drought periods, heat / cold waves, storms and strong winds and rising sea level. Population, activities and infrastructure are all predominantly concentrated in areas that are exposed to climate risks. These factors make the country highly vulnerable to climate change and variability, which explains the political priority given to implementing measures to increase resilience and adaptation to adverse effects derived from climate change, as well as to mitigate greenhouse gas emissions both through local efforts and with international support granted through the UN Framework Convention on Climate Change.[1][2][3][4][5][6]

Responding to climate change demands coordinated actions from governments. This is why Uruguay created in 2009 the National Climate Change and Variability Response System, which consists of government agencies coordinating competencies, objectives and capacities with other national stakeholders like academy, productive sectors and the civil society organizations. This System led the preparation of the National Policy on Climate Change under a wide participatory process. It also led the Nationally Determined Contribution (NDC) which was subject to public consultation. Both were approved in 2017. The NDC was conceived as a policy implementing tool and contains objectives, context and main mitigation and adaptation measures. Within this framework, Uruguay started preparing the National Adaptation Plans (NAP) for Coastal Zones, Energy and Health areas, while the preparation of plans for agriculture and cities has been completed.

1.b. Planning of city adaptation in Uruguay

From an institutional perspective, the Uruguayan government has expressed its commitment and concern in addressing variability and climate change issues and their effects by subscribing international agreements and creating regulations, institutionalism, and tools for land and sectorial planning.

NAP-Cities joins a long standing country process where different initiatives have been collected and systematised to reassess their value and diversity. This long experience allows us to build the adaptation plans on what the country, its institutions and its society know how to do, incorporating new approaches and lessons learned. It also provides a framework to guide the coordination and implementation of adaptation initiatives, and is also a planning tool to define and monitor priority activities.

The preparation of NAP-Cities was based on recommendations from the National Adaptation Plan technical guidelines prepared in December 2012 by the Least Developed Countries Expert Group. It emerges from a participatory and iterative process which began with the inter-institutional preparation of the Integration of the Adaptation Approach in Cities, Infrastructure and Land Planning (URU/18/002) project, whose activities started in May 2018 and will end in November 2021. Such process of collective construction builds on workshops, meetings and interviews for designing and validating the proposed strategy.[7]

[1] Source: World Bank. Available at: <https://datos.bancomundial.org/indicador/ag.srf.totl.k2?locations=UY>.

[2] INE, Population Census 2011. Available at: <https://www.ine.gub.uy/documents/10181/35289/analisispais.pdf>.

[3] URU/18/002 Project document Integración del enfoque de adaptación en ciudades, infraestructura y ordenamiento territorial en Uruguay. Available at: <https://www.gub.uy/ministerio ambiente/politicas y gestion/planes/plan nacional adaptacion cambio climatico ciudades infraestructuras nap ciudades>.

[4] INE, Population Census 2011. Available at: <https://www.ine.gub.uy/c/document_library/get_file?uuid=d83c4ee8 3e4d 4a00 a2d2 698ca25&groupId=10181>.

[5] URU/18/002 Project document Integración del enfoque de adaptación en ciudades, infraestructura y ordenamiento territorial en Uruguay. Available at: <https://www.gub.uy/ministerio ambiente/politicas y gestion/planes/plan nacional adaptacion cambio climatico ciudades infraestructuras nap ciudades>.

[6] Presidency of the Republic, Presidency of the Republic, Sustainable Development Goals Voluntary National Review 2021. Available at: <https://ods.gub.uy/images/2021/Informe_Nacional_Voluntario_Uruguay_2021.pdf>.

[7] United Nations Framework Convention on Climate Change, Technical Guidelines for the National Adaptation Plan Process 2012. Available at: <https://unfccc.int/files/adaptation/application/pdf/21209_unfccc_nap_es_lr_v1.pdf >.

Throughout its three years of activity the project worked in close collaboration with a Technical Committee formed by representatives from the MVOTMA, and whose roles were later moved to the MVOT and the MA (created in 2020), and the UNDP. Authorities and representatives from the Climate Change National Directorate, National Directorate of Land Planning, National Directorate of Waters, National Directorate of Environmental Quality and Evaluation, National Directorate of Biodiversity and Ecosystem Services, and National Directorate of Housing participated in the Committee, as well as other agencies from the Housing Public System such as the Neighbourhood Improvement Programme, MEVIR-Dr Alberto Gallinal Heber, and the National Housing Agency. The Committee assessed and validated each decision and progress made towards the construction of the Plan and its intermediate products. It also submitted the plan's development to the consideration of a broad institutional network of contacts.

NAP-Cities was based on coordinated work with political leaders and technical staff from international, national, departmental and local government agencies as well as with the academy and private sectors, the education system, civil society organisations and other related projects and activities, such as the preparation of NAP-Coasts and the Regional Program on Climate Change adaptation in vulnerable coastal Cities and Ecosystems of the Uruguay River.

To secure the process, the participation and communication strategy of NAP-Cities has been to plan and develop information and dissemination actions for different target audiences. Information transfer, training and awareness processes have been conceived as intermediate key phases of the participation process.

Each and every one of the actions in which the project and related institutions were involved became opportunities to build links and strengthen networks that will transcend the project itself and support the future implementation of NAP-Cities.

PHOTO
Thunderstorm.
La Unión, Montevideo.
Carlos Lebrato

2

Reasons to promote adaptation in Uruguay

2.a. Assessing climate, variability and climate change scenarios in Uruguay[8]

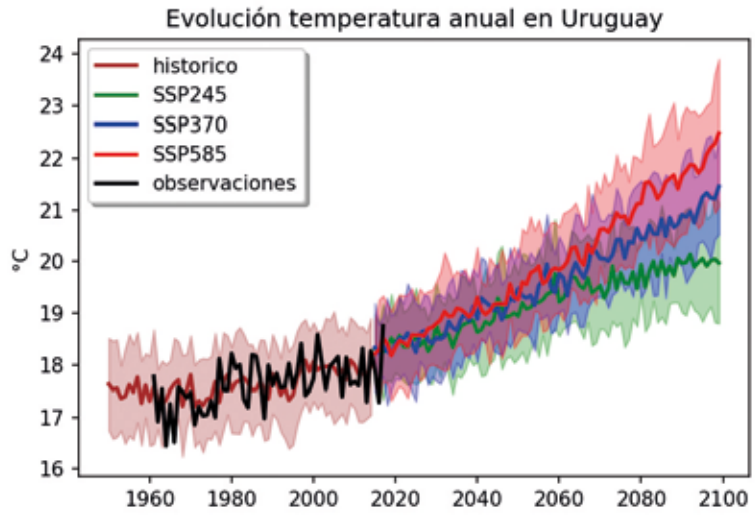
From a global perspective, the main climate risks for cities are extreme temperatures and temperature rise, coastal sea level rise, droughts, intense precipitations associated with floods, and extreme winds (IPCC-AR5). These are steady trends in 2021, according to the Sixth Evaluation Report (IPCC-AR6), where mean temperatures in South America have risen and where current sea level in the South Atlantic has risen at a higher pace than the global mean sea level. This has contributed to an increase of coastal flooding in low areas, and to the coastline regression in most sand beaches. In areas with high climate variability, like Uruguay, it is particularly hard to detect changes in these variables and attribute them to human activity. Consequently, this section summarises not only observed trends but also mean conditions and natural variability of the country's climate. Additionally, it includes projections based on state of the art climate models. Focus is made on separately describing temperature, rainfall and winds. However, it also points out that these variables are interrelated by atmospheric dynamics, which means that any change in any of them will generally affect the rest. [9] [10]

Temperature

For a short-term horizon (2020 2044) models project temperature rises between 0.5°C and 1.6°C compared to the 1981 2010 period and no significant differences in global socio-economic change scenarios (SSP). For a long-term horizon (2075-2099) models project temperature rises between 1.5°C and 5.5°C compared to the 1981-2010 period. Such figures heavily depend on the global socio-economic scenario under consideration and on the associated emissions of greenhouse gases. Indeed, scenario SSP245 shows an increase between 1.5°C and 3.0°C; SSP370 shows between 2.2°C and 4.6°C, and SSP585 shows between 2.6°C and 5.5°C. As far as extreme numbers, it is worth mentioning that heat waves in the region will rise in amount and duration by the end of the 21st century.[11] [12] [13]

Attention should be paid to the fact that a rise in temperature will also carry an increase in water vapour content in the atmosphere, and increment in storms and rainfall are to be expected in the absence of other changes.

FIGURE 1
Observed evolution, historical simulation and projections of mean annual average temperatures in Uruguay for several scenarios. Simulation curves show averages for 10 CMPI6 models, shaded areas show dispersion. Source: Barreiro *et al.* (2019). [14]



[8] This section was based on "Análisis del clima y escenarios de cambio y variabilidad climática en Uruguay". Marcelo Barreiro (1); Fernando Arizmendi (1,2), Nicolas Díaz (1), Romina Trinchin (1,2). (1) Department of Atmospheric Sciences Physics Institute Faculty of Sciences UDELAR. (2) National Institute of Meteorology Deliverable 4. June 2021. This work was prepared within the framework of the PNUD UDELAR Agreement, led by the Project URU/18/002 *Integrating adaptation into cities, infrastructure and local planning in Uruguay*.

[9] Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment Report (AR5), 2014. Available at: <https://www.ipcc.ch/assessment report/ar5/>.

[10] Intergovernmental Panel on Climate Change (IPCC), Sixth Assessment Report (AR6) 2021. Available at: <https://www.ipcc.ch/assessment report/ar6/>.

[11] Climate projections are based on models that numerically solve (using supercomputers) mathematical equations which characterise how mass and energy move in the atmosphere, oceans, continents and ice, and its exchange between them.

[12] Shared Socio-economic Pathways (SSPs), or global socio-economic scenarios of change, describe alternative socio economic future scenarios in the absence of climate policy intervention (IPCC, Glosario).

[13] According to CMIP5 models, from the Coupled Model Intercomparison Project of the World Climate Research Programme. Available at: <https://www.wcrp climate.org/wgcm cmip/wgcm cmip5>.

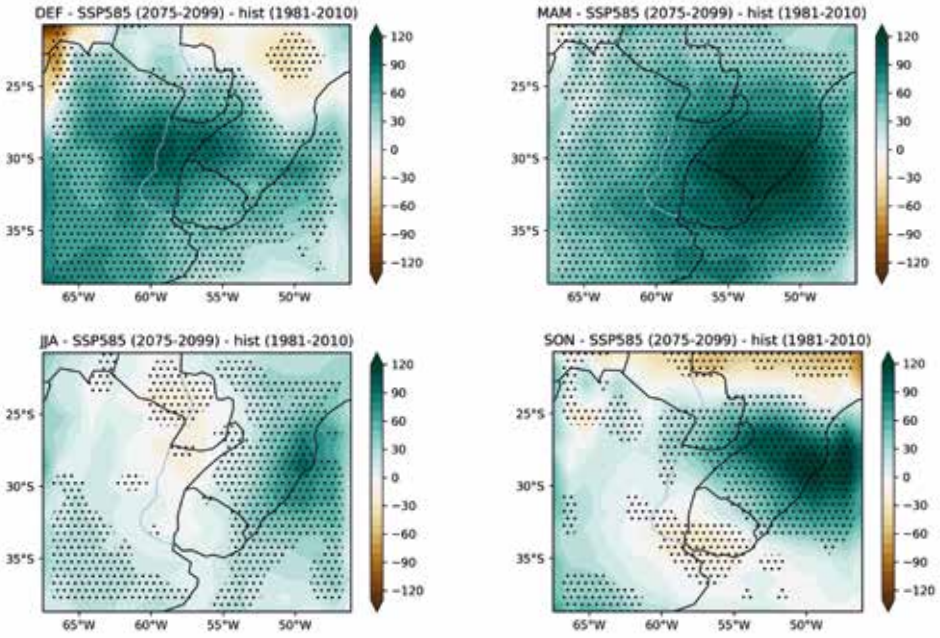
[14] Marcelo Barreiro, Fernando Arizmendi, Romina Trinchín (2019): *Variabilidad y cambio climático en Uruguay*. Department of Atmospheric Sciences, Physics Institute, Faculty of Sciences, University of the Republic. Technical staff training material for national institutions. MVOTMA-UDELAR agreement. PNUD URU/16/G34 project. Available at: <https://www.dinama.gub.uy/oan/documentos/Variabilidad y cambio clim%C3%A1tico en Uruguay. Material de capacitaci%C3%B3n dirigido a T%C3%A9cnicos de Instituciones Nacionales1.pdf>.

Precipitations

Future projection of mean annual rainfall throughout the country shows a high inter-annual variability overlapping with a positive gradual trend. Depending on scenario and model applied, the accumulated annual rainfall for Uruguay shows a variation between -5 % and 10 % for a short-term horizon, and between -7 % and 35 % for a long-term horizon. Although the trend is upwards, the range includes negative numbers, which would indicate a decrease in the annual accumulation.

The increase in the accumulated total is accompanied by an increase in the frequency of extreme rainfall events and a decrease in the number of days with light rain by the end of the 21st century. These changes are greater for scenarios with a greater use of fossil fuels.

FIGURE 2
Change of rainfall projections for 1981 2010 in CMIP6 models under a SSP585 scenario for a long-term horizon in all seasons. Black dots indicate regions where at least 7 of the 10 models coincide in the direction of the change. Source: Barreiro *et al.* (2021). [15]

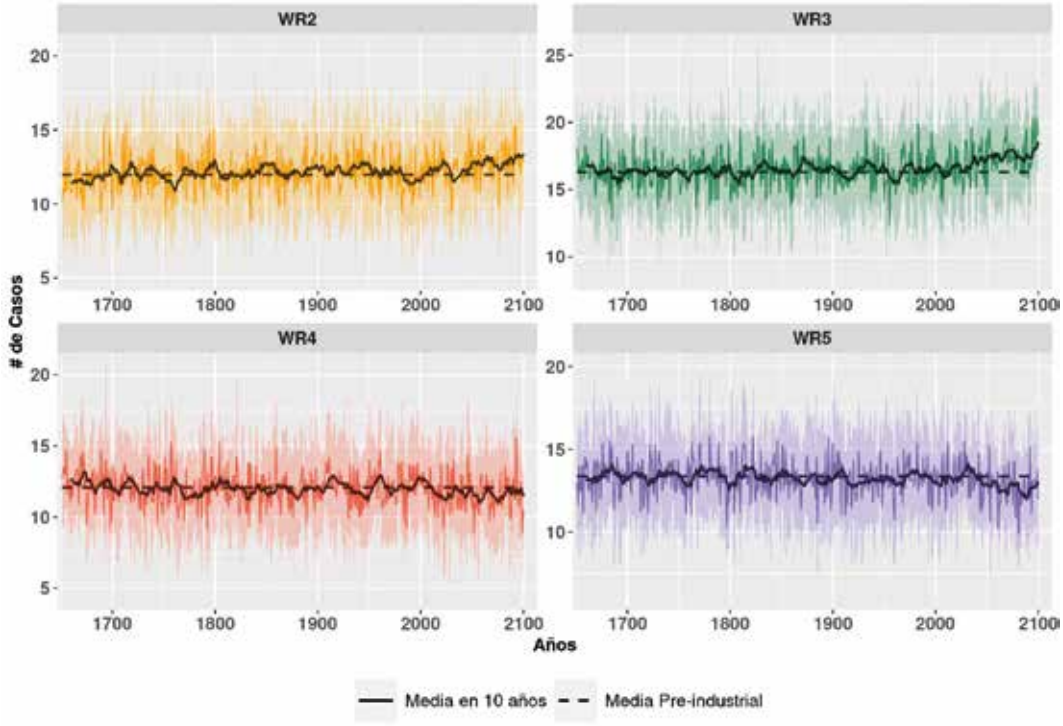


Winds

Climate model projections indicate future changes in recurring circulation patterns. Results under the SSP585 scenario indicate that trends for winters in the 21st century would continue as detected for the last 70 years. This means that there would be a decrease in the frequency of low-pressure systems and southern winds occurring in southern Uruguay, together with an increase in cyclones and anti-cyclones over the Atlantic Ocean. Therefore, an increase in the number of extreme wind events may be expected, particularly in winter in the south of Uruguay.

[15] Marcelo Barreiro, Fernando Arizmendi, Romina Trinchín (2021): Análisis del clima y escenarios de cambio y variabilidad climática en Uruguay, Faculty of Sciences UDELAR, INUMET. PNUD-UDELAR agreement. URU/18/002 project *Integración del enfoque de adaptación en ciudades, infraestructura y ordenamiento territorial en Uruguay.*

FIGURE 3
Frequency evolution of regional recurring patterns 2, 3, 4 and 5 for winter, according to an ensemble of 8 CMIP6 models. The ensemble mean value is shown in a medium shade and a 10-year smoothing of the series in dark shade. Dispersion of the ensemble is shown in the lighter shade. Each model series comprises 200 years of pre-industrial period, a historical period (1850- 2014) and the projection for SSP585 scenario (2015-2100). Source: Barreiro *et al.* (2021).[16]



2.b. Vulnerabilities

According to IPCC (2014)[17], vulnerability is the propensity or predisposition to be adversely affected. Addressing it may be based on sensitivity, defined as the set of characteristics which confer the disposition to be affected, or on its adaptive capacity, i. e.: the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences. This is one of the interacting factors when defining climate change risk, together with exposure and climate hazards.

Climate hazards for Uruguay cities are a set of effects and impacts which have intensified as a consequence of global warming.

The rise of mean and extreme temperatures includes an increase in number and duration of heat waves. This will affect urban areas with a higher building density and vegetation deficit where urban heat islands may happen, problems with the supply of or demand for water and energy may arise, as well as public health issues related to heat, cold and associated conditions, including vectors proliferation.

The increase in precipitations shown by projections --together with its own peculiarities and changes associated with large scale phenomena which may even affect the number and duration of droughts-- suggests that water and surface run-off will remain to be critical for cities due to problems associated, such as floods, impact on infrastructure, effects on climate-dependent activities, problems with water quantity and quality, and pollution.

[16] Marcelo Barreiro, Fernando Arizmendi, Romina Trinchín (2021), op. cit.

[17] IPCC, 2014. Climate Change 2014: Impact, adaptation and vulnerability - Summary for Policymakers. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea y L.L. White (eds.)]. World Meteorological Organization, Geneva, Switzerland, 34 pages.
Available in: https://www.ipcc.ch/site/assets/uploads/2018/02/ar5_wgII_spm_en.pdf

The increase in extreme winds frequency affects cities and their setting in aspects such as food production, infrastructure and buildings stability, continuity of activities and safety of individuals.

In coastal areas, the combination of changes in winds and precipitations with the rising of sea level increases the risk of floods and erosion due to overflows, tidal waves, loss of beach sands and cliff recession, thus affecting activity, ecosystems and key urban infrastructure.

Such issues have a dissimilar impact and higher costs fall upon the most vulnerable cities and populations. According to IPCC (2014), vulnerability is multidimensional. This is a consequence of social realities such as income inequality, unequal opportunities and access to services, gender discrimination, social stratification, ethnicity, disabilities and age. Some communities are more vulnerable than others. Differentiated risks determine fewer opportunities to develop the necessary adaptation skills to cope with a constantly changing climate which intensifies extreme temperatures and impact and frequency of climatic events.

Exposure characterisation was based on information available for the whole country and over the 2005-2018 period about the influence of extreme climatic events that cause emergency response in urban and rural areas (Table 1). Data were statistically processed to reflect this information in cities.[18]

TABLE 1
Total damage by type of climatic event 2005-2018. Source: Robaina y Pastorino (2021) from Desinventar database (SINAE).

TYPE OF DAMAGE		FATALITIES	EVACUEES	SELF EVACUATED	DAMAGED HOUSING
TYPE OF EVENT	Flood	1	53.129	65.781	21.033
	Heat Wave	0	0	0	0
	Cold Wave	2	50	0	0
	Storm	36	8.620	490	7.359
	Tornado	5	353	250	1.638
	TOTAL	43	62.152	66.521	30.030

Assessment was made for informal settlement areas in the cities, average of deceased and total evacuees due to climate extremes every 10,000 inhabitants, percentage of people on flood areas, average of affected houses every 10,000 inhabitants, and vital infrastructure exposed to flood risk.

Geographical distribution of damage showed a higher incidence in some departments which are frequently affected by floods.

Distribution of climatic events over the period of 13 years under consideration does not lead to the identification of a behaviour pattern nor of damage caused. Still, some years may be singled out for a larger amount of evacuated and self-evacuated population.

[18] Gustavo Robaina and Gonzalo Pastorino (2021): Informe de vulnerabilidad al cambio y variabilidad climática, URU/18/002 project *Integración del enfoque de adaptación en ciudades, infraestructura y ordenamiento territorial en Uruguay.* Based on data analysis of Desinventar (SINAE).

Cities with the highest figures of evacuated and self-evacuated population coincide with cities where floods occurred, which confirms the need to prioritise such events. These can be found in different departments and cities, and they are associated with damage to housing and livelihoods, risk of pollution-related diseases and vectors associated with water. The cases with the highest fatality rates are associated with storms, especially thunderstorms or strong wind gusts, where major damage is produced in short periods. No data are available regarding effects of heat waves. Conversely, there are data logs for fatalities and evacuees caused by cold waves. Conditions in Uruguay are favourable for tornadoes, and a need to strengthen prediction and alerting capacities for cities has been identified. During the period under consideration two tornadoes have been registered in populated areas.[19]

Analysed data show that cities with settlements on flood areas are distributed along the banks of different water bodies all over the country. The exposure probably originated from not considering flood risk at the time of planning. The reasons for this are yet to be determined, but the lack of historical records could have influenced. Settlements with the highest percentage of people exposed are located in low-lying areas of the Río de la Plata coastal zone. The fact that there are several cities with relevant figures in other areas justifies the need for measures to reduce exposure to flooding in NAP-Cities, in line with existing public policies.[20]

The period's annual average of homes damaged by extreme events shows that the most damaged areas are those where evacuations and deaths occurred. Particularly noteworthy is the case of the 2016 tornado, where significantly high figures reflect around 1.800 damaged homes. Additionally, there are five cities with values between 27 % and 46 % damaged homes.

Sensitivity to climate change has been assessed in 42 cities of more than 10,000 inhabitants. This was done through a set of indicators, such as poverty rate, labour informality rate (associated to quality of income, health and social security coverage), and the rate of people who have completed lower secondary education (which provides information on local labour force, as it grants the means to address a crisis and to manage climate associated risks). The dependency rate was also assessed for people under the age of 15 and over 65, together with other attributes reinforcing existing inequalities such as social evaluation of disability --with urban design limiting accessibility for essential activities such as circulation--, ethnic background --with a negative impact on opportunities for population groups of Afro-descendants-- , and gender inequalities --which increase female vulnerabilities--.

Analysis of these indicators (poverty rate, labour informality, less basic education, higher degree of dependency, higher percentage of disabled persons, Afro-descendants, and female-headed single parent households) shows that 3 out of 42 analysed cities belong to the upper third of cities with the highest values for six indicators, three for five indicators and six for four indicators. These cities belong to different regions of the country.

Evaluation of habitat conditions (buildings, infrastructures, public services) also provides information on the population's sensitivity. Work was done based on their relationship with urban areas corresponding to informal settlements, house density data, materiality and habitability conditions, land tenure and ownership status, accessibility to basic services, such as drinkable water and sewage, and availability of social services (healthcare, educational and public care centres).

The largest informal settlements of the country are located in cities along the Uruguay River, on the Montevideo metropolitan area, along the Brazilian border, in the centre of the country and on coastal areas of the Río de la Plata and the Atlantic Ocean. Although they may differ in size, it can be said that informal settlements are a reality throughout the country. Data confirm that unsatisfied basic needs (UBN) of building material, water and sewage are factors that increase sensitivity in some of these cases.

[19] Gustavo Robaina and Gonzalo Pastorino (2021), op. cit.

[20] Gustavo Robaina and Gonzalo Pastorino (2021), op. cit., based on information from MA-DINAGUA.

The adaptive capacity of communities involves the development of land planning instruments and processes, ecosystem services, and the ability for practical implementation of changes in the habitat as a response to climate risk and to address emergencies and disasters. Some indicators were: public open space per capita, total public open space and its population, percentage of green and blue spaces out of the total urban area, and the contribution to providing relevant ecosystem services for adaptation around each city.

The density of healthcare, educational and public care centres in relation to total users provides information about coping capacities. An assessment was conducted for accessibility to services and public infrastructure in primary, secondary and vocational education, given its importance in relation to climate change education and awareness as well as their role as infrastructure, support and care sources to the youngest population during emergencies.

Analysis of these coping capacities was complemented with an assessment of institutional response capacities in local emergencies and disaster. To do so, institutions were requested to build an index of institutional capacities, including the evaluation of aspects such as political level, technical and administrative capacities and available human resources.

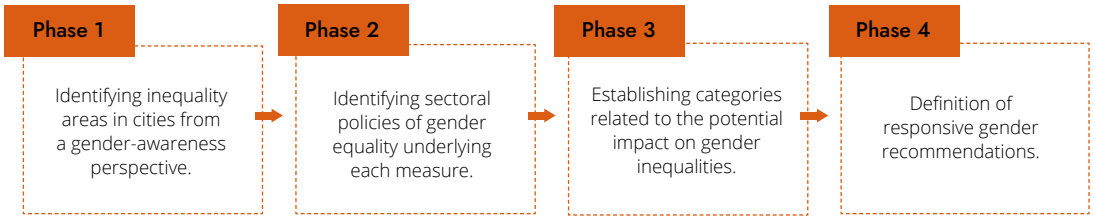
Systematised data show a variety of situations and provide information to develop and promote adaptation to climate change and variability and to increase the presence of green and blue infrastructures and public spaces - well-distributed throughout the city and its environment-, in order to boost its ecosystem services and its role in adaptation. Quantification of the availability of healthcare, educational and public care centres allows to identify the need for improvement. Assessment of emergency and disaster coping capacities provides initial information, which may be later followed up through implementation.

The results of such analysis provide data for an informed decision making of programming and implementation of national and local adaptation actions.

2.c. Gender

As a consequence of different gender-based social standards, rules and cultural imposition, the degree of vulnerability between men, women, elderly, boys, girls and teenagers is different in terms of climate change and the many ways they experience cities. One of the distinguishing features of this Plan is its strong commitment to incorporating generational and gender perspectives with a human rights-based approach. NAP-Cities measures have been categorised according to their potential transformation impact on urban gender inequalities based on three analysis areas: a) accessibility to services (mobility, infrastructure and public spaces), b) political participation and c) economic inclusion.

FIGURE 4
Phases in incorporating and widening gender perspective



Recommendations are made to incorporate and widen the perspective in city planning along a four-phase process as shown in Figure 4 with the purpose of incrementing independence of women in the economic, physical and decision-making areas in order to improve their adaptation capabilities.

These recommendations were applied to the NAP-Cities measures, which led to adjusting the formulation process meant to boost their impact on gender inequalities and to redefine the recommendations for implementation.

2.d. Information Gaps and Training

During consultations and interviews along the preparation process of this Plan, several key areas were detected in relation to strengthening the capacities associated with its implementation phase. Information gaps and lack of articulation as well as the need for specific training in different subjects were identified. During the development of NAP-Cities there was progress in the generation of knowledge and strengthening of capacities to solve the information gaps that had been identified. This was made through studies, preparing guidelines and procuring supplies for the planning stages, as well as through implementing pilot experiences in several issues agreed with participating institutions. NAP-Cities acknowledges the importance of solving gaps and lack of information and knowledge, and of addressing the need for training. To that effect, it incorporates measures and actions along a specific strategy, identifies key actors in the implementation stage and suggests institutional agreements to generate, maintain, analyse, process, make available and activate information for planning and management action.

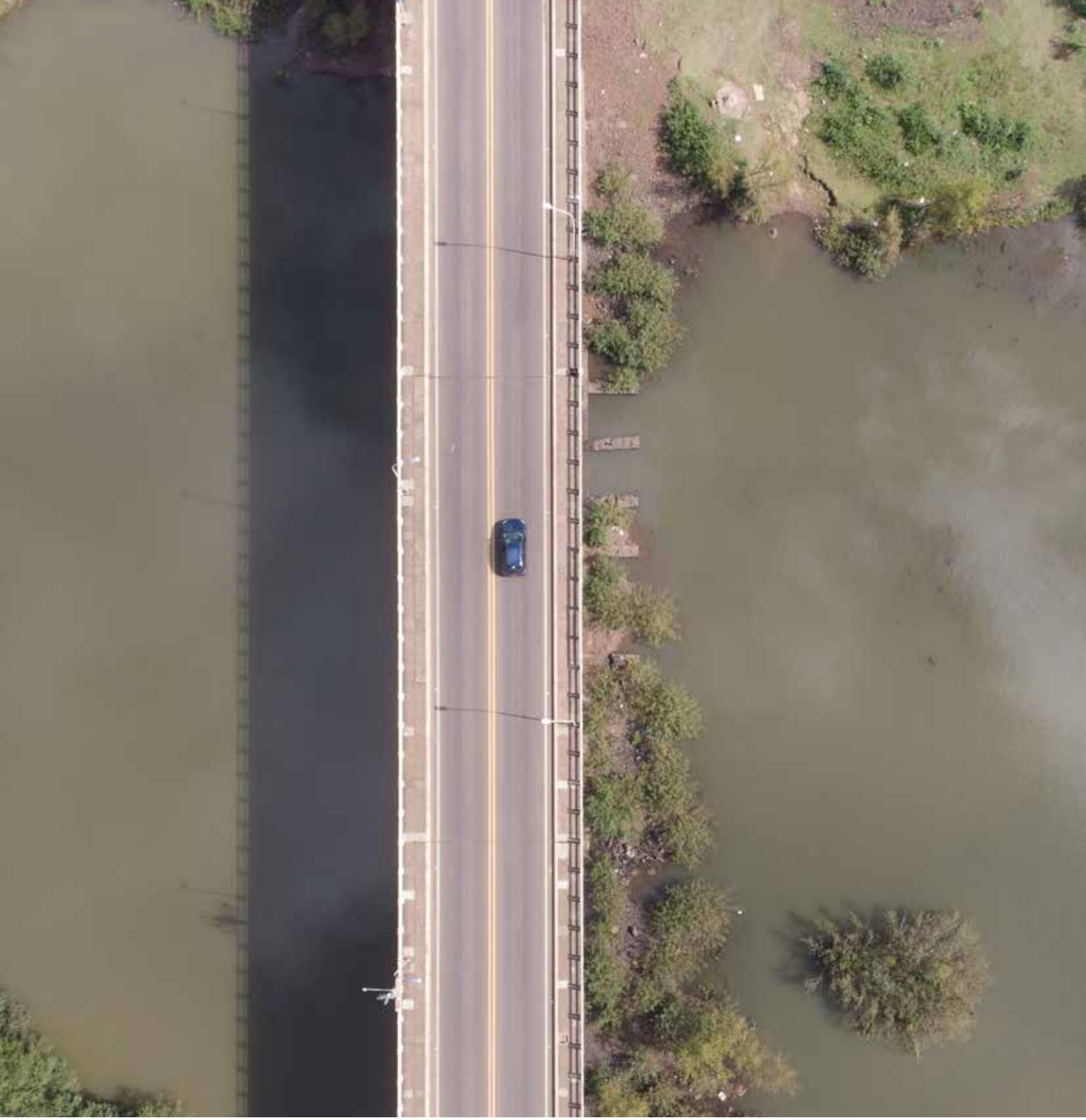


PHOTO
Concordia International
Brigde, Artigas.
Carlos Lebrato

3

Uruguay Implementation Strategy for NAP Cities

3.a. Principles, Conceptual Framework, Objectives and Strategic Lines

The implementation strategy suggests a general structure for NAP-Cities as illustrated in Figure 5: guiding principles, conceptual framework, general and specific objectives and strategic lines for the implementation of adaptation measures.

FIGURE 5
NAP-Cities Structure

Guiding Principles

- Adaptive and flexible.
- Generation of knowledge and information as a public asset.
- Sustainability.
- Gender and generational perspective with a human rights based approach.
- Participation.
- Transparency and open government.
- Decentralisation.

Conceptual Framework

- Adaptation with a territorial approach.
- Integrated management of water resources.
- Nature-based solutions.
- Adaptation-mitigation co-benefits.

General Objective

To reduce the vulnerability of communities to the effects of climate change and variability by creating adaptive capacities and resilience in cities, infrastructures and urban environments, integrating adaptive measures to policies, to new and pre-existing programmes and corresponding activities, and to national and local planning processes and strategies with the purpose of improving the population's quality of life.

Specific Objectives	Strategic Lines
To increase the adequate incorporation of mitigation and of adaptation to climate change and variability in urban and land planning and landscape.	**SL1** Land planning and city planning. **10 measures**
To adequately integrate mitigation and adaptation to climate change and variability and ecosystem services to the design, construction, management and maintenance of households, infrastructure, equipment and public service provision.	**SL2** Changes of urban habitat. **12 measures**
To consolidate the Integrated Risk Management of disasters from a prospective, corrective and compensatory approach for the recovery and for making decisions that will allow for a "better reconstruction" and that will reorientate planning processes by acting on pre existing risk causes.	**SL3** Integral risk management for emergencies and disasters. **4 measures**
To strengthen capacities related to mitigation and adaptation to variability and climate change in cities, communities and human settlements at national, departmental and local levels by training human resources and financing actions, as it may correspond in terms of budgetary competencies at the respective levels of government.	**SL4** Strengthening capacities, awareness and communication. **12 measures**
To promote sustainable production and consumption methods by increasing the efficiency in the use of resources.	**SL5** Transition towards sustainable production and consumption methods. **3 measures**

Management mechanism: [SNRCC (MA DINACC)] · [(Management team MA MVOT) Adaptation Working Group] · [Working Group PMRV] · [Action Plan Actors].

Monitoring and evaluation strategy: State of adaptation indicators-Action Plan progress indicators.

Financing strategy: Financial sources, mechanisms and alternatives.

NAP-Cities is built up from a series of postulates which shall act as governing principles and will guide the different phases. It shall be flexible and adaptive, allowing for continuous feedback. It considers generation of knowledge and information to be a public asset, accessible to society. It is governed by the sustainability principles in the 2030 Agenda for Sustainable Development, takes gender and generational perspectives into consideration and promotes informed participation of stakeholders as part of the framework of transparency and open government led by the country and strengthening local governments as main actors of adaptation in agreement with the decentralisation process.

There are four key concepts which underpin NAP-Cities. They refer to an approach of adaptation that is territorial, local, participatory and that is coordinated at multiple scales; integrated management of water resources and urban floods, understanding access to drinking water and sewage as fundamental human rights; nature-based solutions to protect, manage and sustainable restore natural or modified ecosystems which effectively and adaptively address social challenges by simultaneously granting benefits to human welfare and biodiversity and co-benefits derived from mitigation and adaptation sound policies.

The general objective of NAP-Cities is to reduce the vulnerability of communities to the effects of climate change and variability by building adaptive capacity and resilience in cities, infrastructures and urban environments, integrating climate change adaptation into relevant new and existing policies, programmes and activities, and into development planning processes and strategies in order to improve the population's quality of life.

The five-year programmed Action Plans set its time horizon on year 2050.

There are five specific objectives (SO) which contribute to achieving the general objective:[21]

- **SO1.** To increase the adequate incorporation of mitigation and adaptation to climate change and variability in urban and land planning and landscape.
- **SO2.** To adequately integrate mitigation and adaptation to climate change and variability and ecosystem services to the design, construction, management and maintenance of households, infrastructure, equipment and public service provision.
- **SO3.** To consolidate the Integrated Risk Management of disasters from a prospective, corrective and compensatory approach for the recovery and for making decisions that will allow for a "better reconstruction" and that will reorientate planning processes by acting on pre existing risk causes.
- **SO4.** To strengthen capacities related to mitigation and adaptation to variability and climate change in cities, communities and human settlements at national, departmental and local levels by training human resources and financing actions, as it may correspond in terms of budgetary competencies at the respective levels of government.
- **SO5.** To promote sustainable production and consumption methods by increasing the efficiency in the use of resources.

Inasmuch as adaptation is a long-term task, the implementation of Strategy 2050 is carried out through five strategic lines (SL) which group 41 medium- and long-term measures.

- **SL1.** Land planning and city planning.
- **SL2.** Changes of urban habitat.
- **SL3.** Integral risk management for emergencies and disasters.
- **SL4.** Strengthening capacities, awareness and communication.
- **SL5.** Transition towards sustainable production and consumption methods.

[21] The Plan's specific objectives and strategic lines derive from the National Policy on Climate Change, particularly from the three lines of action in Paragraph 11, which refer to promoting the development of cities, communities, human settlements and sustainable and resilient infrastructures that contribute to reducing greenhouse gas emissions facing climate change and variability. They also integrate actions regarding Paragraph 10, which refers to strengthening climate-associated risk management, and Paragraph 12, as regards action with ecosystems, ecosystem services and sustainable production and consumption practices.

3.b. Measures

NAP-Cities decided to review existing actions, identify needs and plan adaptation actions to strengthen, enhance, broaden and ensure coherency in measures of public policies for adaptation. Consequently, measures must be interpreted as a strategic reference framework for decision making processes in the hands of stakeholders in charge at each level of government.

The 41 measures described in Table 2 are contained in NAP-Cities detailed sheets which include a description of their contribution to adaptation, a list of actions to be taken for their implementation, identified key actors and other institutions recommended for participation, climate hazard to which they respond, financing options, their category associated with their potential impact on gender inequality and a set of recommendations for incorporating and broadening gender and generational perspectives with a human rights-based approach.

Additionally, there are comments on the strategic alignment of each measure with international commitments and other national mechanisms such as current policies, plans and strategies.

TABLE 2
Description of NAP-Cities measures

Nº	MEASURE NAME	MEASURE DESCRIPTION
Strategic Line 1. Land planning and urban planning		
Measure 1	Strengthen the incorporation of strategies for reduction of risks associated to land and urban planning climate projections.	Move ahead in the application of techniques and methodologies for assessing climate projections and multiple associated hazards, risk assessment and adaptation strategies to be incorporated into the processes of land planning and urban planning.
Measure 2	Strengthen planning processes in the integrated management of water resources and its coordination with land, environmental and urban planning.	Strengthen preparation and implementation processes of water resources integrated management plans, with a multi-scale basin approach, including surface and underground waters, as well as risks associated to climate change and variability. Improve articulation between these plans and decentralisation, land planning and sustainable development policies.
Measure 3	Intensify protection and restoration of ecosystems in planning	Strengthen the articulation between land planning decisions and the strategies and tools for protecting ecological integrity of aquatic and terrestrial ecosystems, reclaiming the value and preserving key ecosystems such as temperature regulation, coastal defence, flood buffering, regulation of water run-off, preserving the hydrological cycle, sequestration of pollutants in water, air and soil, provision of food and other benefits derived from biodiversity.
Measure 4	Strengthen the incorporation of a climate risk management approach when planning public services for drinkable water, sewage and rainwater drainage.	Intensify actions of adaptation to climate change and variability and reduce associated risks through the analysis of climate projections when planning public services for drinkable water, sewage and rainwater drainage in Uruguayan cities.

Nº	MEASURE NAME	MEASURE DESCRIPTION
Measure 5	Strengthen the incorporation of strategies for reducing climate risks when planning sectoral activities and investment for development.	Promote the design of strategies in sectoral development plans for reducing climate risks, including planning of infrastructure and services (public and private).
Measure 6	Strengthen access to urban land public policies, with an approach for risk management and sustainable use of natural resources.	Strengthen public policies for better availability and sustainable use of urban land in social housing and urban development programmes by incorporating a climate risk management approach which include climate and demographic projections, as well as sustainable use criteria for natural resources.
Measure 7	Progress in climate change response at national, regional and local levels.	Strengthen the planning of climate change response, with national, regional and local level articulation, and move ahead with its implementation, evaluation and updating stages. Extend climate action to other regions and cities of the country with a territorial approach and reclaim the value of participation and lessons learnt in past or current experiences.
Measure 8	Strengthen analysis of risks derived from climate projections in environmental impact assessment of human activities.	Incorporate analysis of risks derived from climate projections in environmental evaluation and environmental management plans of activities, projects and works, both, for those under the national environmental regulations, as well as for those which aren't but are subject to other socio-environmental management systems.
Measure 9	Progress in the incorporation of climate change perspective in strategic environmental assessment during the preparation of policies, plans and programmes.	Advance in methodological development and promote the incorporation of strategic environmental assessment under a climate change perspective when designing policies planes and programmes for sustainable development of activities involving cities and infrastructure.
Measure 10	Progress in integrated urban planning that includes sustainable urban mobility.	Reinforce integration of sustainable urban mobility for urban planning, acknowledging interrelation between land use, mobility and urban configuration. Foster city models which reduce the need for long journeys by car, and instead facilitate displacements which can be done either walking, riding or using public transport.

Nº	MEASURE NAME	MEASURE DESCRIPTION
Strategic Line 2. Changes in urban habitat		
Measure 11	Progress in urban habitat improvement and universal access to public services.	Intensify strategies for improving urban areas and the population's universal access to public services under an integral approach.
Measure 12	Boost the role that vegetation and public spaces play in cities for a better performance in relation with climate.	Increase the presence of vegetation and absorbing soil, as well as the availability of public spaces, applying full habitability, access and enjoyment criteria.
Measure 13	Increase the efficiency in the use of resources in public spaces and infrastructures in cities.	Increase the efficiency in the use of resources in public spaces and infrastructures in cities, considering initial, operational and maintenance costs, structural stability, life cycle analysis of components, energy efficiency and a rational use of water through the incorporation of technology and management solutions.
Measure 14	Strengthen the development of green and blue infrastructure in cities.	Promote the incorporation of green and blue infrastructure in cities. This implies a systemic approach of natural and semi natural spaces, urban green areas, water bodies and other environment and landscape elements, strategically designing and managing them as a network to facilitate natural processes in multiple territorial scales.
Measure 15	Intensify improvements in public woodlands and green spaces management systems.	Strengthen the capacities of departmental and municipal governments, and promote the incorporation of strategic and planning tools for an integral, efficient and sustainable management of urban woodland and public green spaces, in order to boost their contribution to climate adaptation in cities.
Measure 16	Boost the creation and management of green areas located in high flood risk areas in the city.	Extend the creation and management of resilient green areas at flood risk, such as parks, squares, recreation areas and other urban green areas, with plain areas with a high flood risk. Articulate this strategy with environmental actions protecting, recovering and maintaining ecosystem services which benefit cities.
Measure 17	Progress in the development of urban solutions adapted to climate for transitioning into sustainable mobility.	Incorporating technological and design solutions adapted to climate for sustainable mobility in infrastructure, public spaces, buildings, equipment, vehicles and management systems for mobility and public transport.
Measure 18	Improve integral management of urban solid waste.	Promote and implement improvements in technology, infrastructure and management of urban solid waste with the purpose of achieving management with a climate risk approach. This measure is complementary to the development of land use policies, climate change mitigation and boosting sustainable consumption and circular economies.

Nº	MEASURE NAME	MEASURE DESCRIPTION
Measure 19	Incorporate technical requirements into construction regulations to reduce risk and improve performance facing climate challenges.	Review and update technical requirements for construction in order to improve performance facing climate conditions and associated risk reduction.
Measure 20	Implement policies to improve climate performance of existing buildings.	Strengthen public policies to implement design, construction and financial solutions for the adaptation of buildings exposed to climate risks. Promote the participation of the private sector in these processes.
Measure 21	Strengthen public policies related to relocating population dwelling on areas that are unsuitable for human settlement.	Strengthen the implementation of relocation plans into safe urban land for housing on areas unsuitable for human settlement by incorporating criteria for climate risk management and improving climate performance in buildings and public spaces in coordination with other land use public actions, urban management, risk assessment and management and access to urban land.
Measure 22	Promote the incorporation of technological solutions to improve buildings climate performance.	Promote the incorporation of technological solutions and management and certification systems which can contribute to improve the buildings performance in relation to climate change and variability in the public, private and residential sectors in issues such as vegetation-based solutions, thermal comfort, energy efficiency, sound water management and risk reduction for winds, floods and rainfall.
Strategic Line 3. Integral management of emergency and disaster risks		
Measure 23	Intensify planning of integral urban risk management, incorporating hazards derived from climate change and variability.	Strengthen integral risk management by incorporating assessment of multiple hazards derived from climate change and variability in cities. This shall be done through continuous improvement of methodologies, inter institutional articulation and social participation.
Measure 24	Strengthen articulation and expanding coverage of early warning systems.	Strengthen existing early-warning systems by intensifying inter-institutional coordination, improving generation and management of information, progressing in methodological and technological development, and allocating additional resources to cover more cities and subjects. Incorporate new hazard response systems related to climate change and variability.
Measure 25	Intensify articulation in city planning and management with adaptation to climate change and variability in the health sector.	Strengthen the articulation between institutions and urban planning and management areas with the Ministry of Public Health and all institutions within the health sector with the purpose of integrating specific lines of climate action and urban integral risk management.
Measure 26	Improve infrastructure and management systems of public services in order to ensure continuity under emergency situations and climate extremes.	Review and update the infrastructure of public services in cities and their management systems under new design and operation standards which consider the risk of climate change affectation and incorporate measures to prevent collapse and interruptions, and ensure operational continuity during climate extremes and emergency situations.

Nº	MEASURE NAME	MEASURE DESCRIPTION
Strategic Line 4. Strengthening capacities, awareness and communication		
Measure 27	Promote technical and academic studies which contribute to improve the evaluation of urban risks derived from climate change.	Promote the generation of knowledge, techniques and methodologies that contribute to improve the evaluation of risk and impact derived from climate change and variability in cities through financing, incentives and agreements which enable basic and applied research in order to solve knowledge gaps.
Measure 28	Foster the development and dissemination of knowledge on ecosystems and on green and blue infrastructure.	Apoyar el desarrollo y la difusión de investigaciones, de sistematización de experiencias y trabajos de corte propositivo que contribuyan a conocer en mayor profundidad y poner en valor los ecosistemas terrestres y acuáticos, el arbolado público, los espacios verdes y sus procesos naturales.
Measure 29	Foster the generation of information and knowledge to improve resilience to extreme hydro-meteorological events and disasters.	Support research, development and innovation with agreements, funding and support lines for studies in the academic and industrial sectors, in coordination with the need for knowledge and information in public institutions.
Measure 30	Promote research on solutions for construction, technology and suitable materials to improve performance and infrastructure in buildings to face climate change.	Apoyar la investigación sobre el desempeño frente al clima de materiales, tecnologías y sistemas constructivos utilizados en infraestructuras y edificaciones, incluyendo proyecciones climáticas y enfoques, como análisis del ciclo de vida y economía circular.
Measure 31	Increase knowledge about climate risk in institutions in the public sector.	Intensify training and awareness on adaptation to climate change and variability and associated risk management among technical staff in national public institutions, departmental and municipal governments.
Measure 32	Strengthen technology and capacities for generating data, information and knowledge related to adaptation.	Strengthen the capacity to generate, manage, provide and apply quality information to decision making processes in institutions which provide climate, hydrological, geographical and statistical data, in public institutions from the National Climate Change Response System, and in institutions participating in the planning and management of cities and infrastructures.
Measure 33	Intensify the incorporation of contents related to climate change and variability in professional education of those who participate in urban planning, construction and management processes.	Strengthen training in climate change adaptation and risk management in the syllabus of tertiary undergraduate and graduate courses, as well as in continuing professional education in key areas related to urban planning, management and natural resources.
Measure 34	Intensify land planning processes through methodological support in the incorporation of the environmental dimension, risk reduction and climate change adaptation.	Develop and update methodologies, and create new tools in order to improve the incorporation of the environmental dimension, risk reduction and climate change adaptation to land planning tools.
Measure 35	Increase availability of updated guidelines and handbooks for dealing with adaptation to climate change and variability in buildings and infrastructure.	Update guidelines and handbooks to improve performance of buildings and infrastructure in relation to climate change and variability. Extend availability of these tools as a way to provide support in the application of new regulations and calculation rules.
Measure 36	Incorporate studies on climate, climate change and its risks into formal and informal education.	Intensify training actions in discipline and subjects related to the study of climate, climate change and associated risks at different formal and informal levels.

Nº	MEASURE NAME	MEASURE DESCRIPTION
Measure 37	Promote awareness of civil society through public awareness campaigns on climate change.	Intensify awareness and dissemination actions for different target audiences on issues related to climate change and variability, associated risks and mitigation and adaptation measures in cities.
Measure 38	Increase the use of ICTs for adaptation to climate change and variability.	Increment the use of information and communication technology (ICT) to generate, manage and disseminate information and to facilitate social participation in adaptation and climate change related issues.
Strategic Line 5. Transition towards sustainable production and consumption methods		
Measure 39	Prioritise green-job creation towards development under sustainable production and consumption paradigms.	Identify and prioritise areas which contribute to development under sustainable production and consumption paradigms, as well as to the greening of cities and infrastructure in public and private organisations by prioritising the creation of relevant jobs.
Measure 40	Promote sustainable production and consumption activities.	Promote the transition into more inclusive, low-carbon and environmentally responsible new production and consumption formats.
Measure 41	Promote urban agriculture and agro-ecology.	Foster urban and suburban agriculture on agro-ecology bases.

PHOTO
Drone view of Canelones city.
Carlos Lebrato

4

Action Plan for the implementation of the adaptation strategy

In order to gradually implement the above mentioned 2050 Strategy, the 2021-2025 Action Plan was prepared. This Action Plan considers long-term actions in the NAP-Cities, puts forward goals for the inception period right after its adoption with progress indicators and identifies reporting institutions.

It was prepared in consultation with involved institutions, considering accomplishment of programmed activities for the period, as well as other planning instruments and existing international commitments.

Goals for year 2025 aim at stimulating implementation and contributing to the achievement of each measure, though they constitute only a part of actions necessary for that purpose. After generating those first goals and an adequate monitoring of results, NAP-Cities plans the programming of new five-year action plans, which may be more ambitious and increase their scope at the time they allow for redefining and adjusting the Plan itself.

4.a. NAP-Cities coordination framework

Given the multiplicity of stakeholders, NAP-Cities plans inter-institutional coordination structures for a sound implementation.

- The National Climate Change Response System and its Coordination Group, chaired by the Ministry of Environment through the Climate Change National Directorate.
- The NAP-Cities driving group will be a Management Team comprising members from the National Directorates of the Ministry of Housing and Land Planning and the Ministry of Environment and will continue the work that the NAP-Cities Technical Committee carried out at its design phase. It will operate as a specialised team of the Workgroup for Adaptation from the National Climate Change Response System, which focuses on adaptation action and implementation of the National Adaptation Plans as a whole.
- The Workgroup for Programming, Monitoring, Reporting and Verification of the National Climate Change Response System is focused on the First Uruguay Nationally Determined Contribution and on National Policy on Climate Change, and will collaborate with the Management Team in the programming of action plans and evaluation of adaptation in cities through NAP-Cities impact indicators.

These groups will establish the necessary articulation with all institutions involved in urban adaptation as identified in the measures.

4.b. 2025 Roadmap. Phases, stages and activities required for implementing the plan

Table 3 shows an implementation roadmap of the first Action Plan with a 2025 time horizon for the four years following its completion.

TABLA 3
Hoja de ruta para la implementación del PNA Ciudades

PHASE	STAGES AND ACTIVITIES	ACTION PLAN 2021-2025			
		2021-2022	2023	2024	2025
IMPLEMENTATION	Disseminate the contents of NAP-Cities so that institutional, sectoral and social stakeholders may embrace it and make an impact on achieving objectives and goals.				
	Make institutional agreements for implementing, and defining roles and responsibilities.				
	Strengthen institutional capacities for implementation.				
	Prepare the 2025-2030 Action Plan based on the evaluation of the 2025 Plan, its achievements and new issues / institutions / knowledge.				
	Prioritise adaptation measures from the 2030 Action Plan. Design programmes and projects.				
MONITORING AND EVALUATION	Review of monitoring and evaluation indicators in the NAP-Cities.				
	Establish baselines for indicators.				
	Define internal reporting, monitoring and verification follow up mechanisms.				
	Report monitoring and evaluation system results.				
FINANCING	Assess financing options for climate change adaptation at international levels.				
	Identify national budget lines allocating funds to adaptation activities for the 2021- 2025 period.				
	Reach inter-institutional agreements towards budgetary prioritising of climate change and variability adaptation measures.				
	Design a mechanism to raise international funds for implementing climate change and variability adaptation measures.				

PHOTO
Port of Piriapolis
Carlos Lebrato

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Plan funding

Damages and losses derived from climate extremes have serious economic consequences with associated costs that are expected to rise as average global temperature keeps increasing. Economic resources are insufficient to respond to present needs, and will become even scarcer as a greater proportion of the public budget is increasingly destined to investment and remedies after a climate extreme occurs. In order to reduce such loss, the country must invest in reducing the effects of climate extremes. Implementing climate change adaptation measures requires that all pertinent sources of resources and stakeholders get involved.

The adaptation measures funding strategy runs along three guiding lines:

1) Introduce climate change response in mainstream policies and programmes of public bodies, incorporating risk analysis to legislation and regulation processes, and planning, execution and implementation of investment projects in all sectors of the Uruguayan economy.
2) Modify the tax-and-duties system to promote production, activities with sustainable consumption methods and less environmental impact, and impose taxes to polluting or high environmental risk activities to promote a shift in the population habits within an urban environment and contribute to a sustainable use of natural resources.
3) Establish funding mechanisms in which all stakeholders may participate --from either public or private sectors, or from social and solidarity-based economy-- both for designing as well as for implementation, maintenance or financing processes.

NAP-Cities measures acknowledge prerequisites or conditions of possibility for funding. They have been classified into: a) measures which entail regulatory and legislative changes, b) measures which generate institutional enabling conditions, and c) measures which consist of investments on infrastructure and real estate.

Finally, several funding sources were identified for this purpose: public budget for operating or investment projects; specific taxes; international cooperation; participation of private companies; participation of real estate owners and stock market.

PHOTO
Air view of Isla de la Sirena, Atlántida.
Carlos Lebrato

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Monitoring and evaluation

In order to measure results, a monitoring and evaluation strategy is put forward, integrating public tools available in the country, such as specialised agencies and evaluation and monitoring units from institutions involved in the implementation of this proposal.

The strategy is based on selecting a set of indicators designed to measure the impact of NAP-Cities, the results in terms of specific objectives, and the progress in terms of goals stated in the action Plans.

The monitoring and evaluation strategy will be effective insofar as it enables learning during the implementation process, as it allows for adjusting goals and resources allotted to actions planned in the strategic lines, selected measures and actions for compliance, and as it feeds into the design of new five-year action plans. Its implementation will offer opportunities to design indexes of exposure, awareness and adaptive capacity, as well as to build technical and methodological agreements to design an index to assess vulnerability to climate change and variability. Additionally, working with geo-referenced indicators at city scale whenever pertinent and feasible will offer opportunities for visualising and better identifying the adaptation status. During the design of NAP-Cities, some methodological approaches and pilot experiences have been carried out. These will remain available to feed in these processes within the institutions that will manage NAP and the monitoring and evaluation strategy.

The NAP-Cities visualising and interactive tools are under development at the institutions and are meant for planners, decision makers and communities. The objective is to enable enquiries about adaptation options for different issues in Uruguayan cities including previously generated geo-reference data.

Access to the National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay (NAP-Cities) full version.


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