



Master's Degree in
Climate Change Law
and Economics



Good adaptation practices in five cities in Argentina

FLACSO Argentina with the support of Adaptation Research Alliance (ARA) and UKaid

March, 2022



This document presents five case studies on good practices of adaptation to climate change in cities in Argentina developed based on a co-creation process. It was carried out by professors, students and alumni of FLACSO Argentina's Master in Law and Economics of Climate Change (<http://www.flacso.org.ar/cambioclimatico>), and officials from the cities represented in the study. The project was funded by the Adaptation Research Alliance (ARA) and Ukaid.

The authors would like to thank Patricia Himschoot, Nahuel Pugliese, Valeria Massy and Nahuel Muñoz from the Autonomous City of Buenos Aires; Alejandro Cristiá, Gonzalo Talavera, Magalí Poupard and Rubén Albornoz from the city of Corrientes; Sebastian Fermani from the city of Mendoza; María Cantore, Agustina Rodríguez, Fernando Bertoni and Vanessa Herrera from the city of Rosario; Mauro Perez Toscani, Carolina Díaz, María Fernanda Negri and Virginia Rizzo from the city of Ushuaia; María Luz Falivene Fernández, María Pilar Bueno and Natacha Bollini.

Coordination: Delfina Godfrid and Soledad Aguilar.

Cite as: Godfrid, D., Aguilar, S., Blum, D., Heidel E., Espinoza Proaño, C., Ramirez Cuesta, A., Strugo, F. (2022). Good adaptation practices in five cities in Argentina. FLACSO Argentina, Adaptation Research Alliance.

Design: Emmanuel Orezzo and Alejandra Guzmán.



Executive summary

This paper presents the analysis of five cities in Argentina in relation to climate change adaptation. The study focuses on best practices that overcame barriers to the planning and implementation of climate change adaptation measures. The main aspects of each case presented are summarized below.

City of Buenos Aires

The City of Buenos Aires participated in the ICLEI and C40 city networks in a continuous and institutionalized manner, which helped to make the City's climate commitment visible and influenced the decision of the local Executive Branch authorities to prioritize the climate change issue in the government agenda. This prioritization from the Executive Branch served to promote the coordination between the different areas and thus build climate action jointly, for example, in developing the Climate Action Plan 2050. In addition, cooperation with scientific institutions was promoted to develop long-term climate projections.

Threats



Criteria

PUBLIC PARTICIPATION

COMPREHENSIVE AND HOLISTIC APPROACH

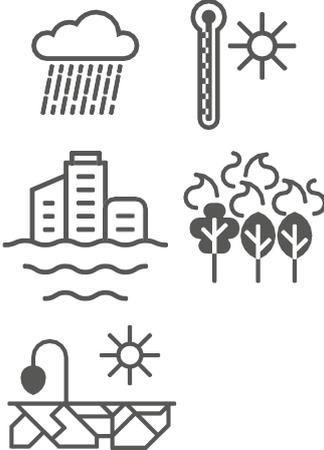


City of Corrientes

The city of Corrientes made the decision to continuously update its climate risk map in the face of an initial situation of lack of information during the diagnostic stage of the Local Climate Action Plan (2019). This made it possible to recognize new climate threats, such as forest fires. In addition, the city created strategic climate planning institutional structures and incorporated sustainable nature management as a central component of its adaptation agenda because of the multiple environmental services it generates and on which human wellbeing depends.

The City of Corrientes transformed the existing municipal planning criteria that classified forest and wetland ecosystems as vacant land for development, prioritizing nature-based adaptation actions over those of gray infrastructure. This led to the incorporation of the environmental variable in the city's main planning and land use instruments, including zoning.

Threats



Criteria

- COMPREHENSIVE AND HOLISTIC APPROACH
- PUBLIC PARTICIPATION
- TRANSFORMATIONAL IMPACT

City of Mendoza

The city of Mendoza has forged alliances with scientific-technical institutions institutionalized in a Municipal Climate Change Committee and, on the basis of collaboratively developed climate projections, worked on measures that complement gray infrastructure with nature-based adaptation. Partnerships with scientific-technical institutions allowed, among other actions, to overcome the lack of availability of local data on the piedmont, at the micro-scale level. In addition, to overcome financing restrictions, they worked with the World Bank on the project "Fifth stage of urbanization of the La Favorita neighborhood," a vulnerable low-income neighborhood at high risk of climate change. To encourage participation and social inclusion, environmental, social and urban promoters were designated.

Threats



Criteria

- COMPREHENSIVE AND HOLISTIC APPROACH
- PUBLIC PARTICIPATION
- TRANSFORMATIONAL IMPACT

City of Rosario

Rosario generated an intersectoral work process and a cross-cutting treatment of the environmental and climate agenda for the construction of the Local Climate Action Plan 2020. This experience facilitated the adoption of the nature-based adaptation approach for flood risk management in the city, action with an emphasis on triple impact (social, environmental and economic) and the promotion of participatory processes with citizens for climate risks management.

Threats



Criteria

- COMPREHENSIVE AND HOLISTIC APPROACH
- PUBLIC PARTICIPATION
- TRANSFORMATIONAL IMPACT

City of Ushuaia

Ushuaia created a participatory system with a triple impact approach (environmental, social and economic) to manage urban nature reserves and address the problem of urban unplanned sprawl.

The development of the reserves was carried out in parallel with the study and reduction of vulnerability in poor neighborhoods on the outskirts of the city, through public policies for social development. These projects involved different governmental areas, international organizations and civil society.

Threats



Criteria

- COMPREHENSIVE AND HOLISTIC APPROACH
- PUBLIC PARTICIPATION
- TRANSFORMATIONAL IMPACT

Resumen Ejecutivo

En este documento se presenta el análisis de cinco ciudades de Argentina en torno a la adaptación al cambio climático. El estudio se enfoca en las buenas prácticas que permitieron superar barreras a la planificación y la implementación de medidas de adaptación al cambio climático. A continuación se resumen los principales aspectos de cada caso presentado.

Ciudad de Buenos Aires

La Ciudad Autónoma de Buenos Aires participó en las redes de ciudades ICLEI y C40 de forma continua e institucionalizada, lo que ayudó a visibilizar el compromiso climático de la Ciudad e incidió en la decisión de las autoridades del Poder Ejecutivo local de priorizar la temática del cambio climático en la agenda de Gobierno. Esta jerarquización desde el Poder Ejecutivo sirvió para promover la articulación entre las distintas áreas y así construir la acción climática de forma conjunta, como se hizo para la realización del Plan de Acción Climática 2050. Además, se impulsó la cooperación con instituciones científicas para desarrollar proyecciones climáticas a largo plazo.

Amenazas



Criterios

PARTICIPACION PUBLICA

INTEGRALIDAD Y ABORDAJE HOLISTICO

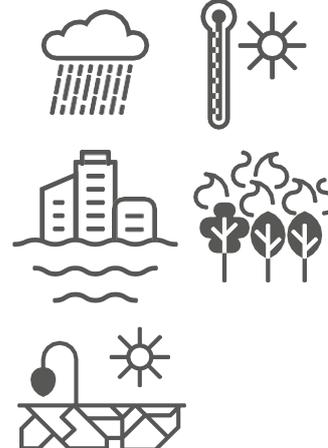


Ciudad de Corrientes

La ciudad de Corrientes tomó la decisión de actualizar continuamente su mapa de riesgos climáticos ante una situación inicial de falta de información durante la etapa de diagnóstico del Plan Local de Acción Climática (2019). Esto permitió reconocer nuevas amenazas climáticas, como es el caso de los incendios forestales. Además, la ciudad creó estructuras institucionales de planificación climática estratégicas e incorporó la gestión sostenible de la naturaleza como parte central de su agenda de adaptación, por los múltiples servicios ambientales que genera y de los que depende el bienestar humano.

Corrientes transformó los criterios existentes de la planificación municipal que clasificaban a los ecosistemas forestales y humedales como suelos vacantes urbanizables, priorizando las acciones de adaptación basadas en la naturaleza por sobre las de infraestructura gris. Esto llevó a incorporar la variable ambiental en los principales instrumentos de planificación y ordenamiento territorial de la ciudad, incluyendo la zonificación.

Amenazas



Criterios

INTEGRALIDAD Y ABORDAJE HOLISTICO

PARTICIPACION PUBLICA

IMPACTO TRANSFORMACIONAL

Ciudad de Mendoza

La ciudad de Mendoza llevó adelante alianzas con instituciones científico-técnicas institucionalizadas en un Comité Municipal de Cambio Climático y, sobre la base de las proyecciones climáticas desarrolladas de forma colaborativa, trabajó en medidas que complementan la infraestructura gris con la adaptación basada en la naturaleza. Las alianzas con instituciones científico-técnicas permitió, entre otras acciones, superar la falta de disponibilidad de datos locales del piedemonte, a nivel microescala. Además, para sobrepasar restricciones de financiamiento, se trabajó con el Banco Mundial en torno al proyecto “Quinta etapa de urbanización del barrio La Favorita”, un barrio popular con alto riesgo frente al cambio climático. Para fomentar la participación e inclusión social se desarrollaron figuras de promotores ambientales, sociales y urbanos.

Amenazas



Criterios

INTEGRALIDAD Y ABORDAJE HOLISTICO

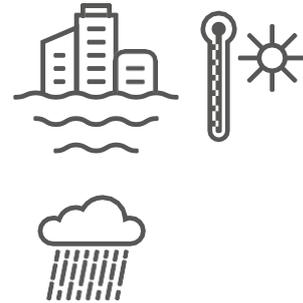
PARTICIPACION PUBLICA

IMPACTO TRANSFORMACIONAL

Ciudad de Rosario

Rosario generó un proceso de trabajo intersectorial y un tratamiento transversal de la agenda ambiental y climática para la construcción del Plan Local de Acción Climática 2020. Esta experiencia facilitó la adopción del enfoque de adaptación basada en la naturaleza para el manejo del riesgo de inundaciones en la ciudad, la acción con énfasis en el triple impacto (social, ambiental y económico) y la promoción de procesos participativos con la ciudadanía para la gestión de los riesgos climáticos.

Amenazas



Criterios

INTEGRALIDAD Y ABORDAJE HOLISTICO

PARTICIPACION PUBLICA

IMPACTO TRANSFORMACIONAL

Ciudad de Ushuaia

Ushuaia creó un sistema participativo con una lógica de triple impacto ambiental, social y económico para gestionar las reservas naturales urbanas y atender a la problemática de la expansión urbana no planificada. El desarrollo de las reservas se realizó en paralelo con el estudio y la reducción de la vulnerabilidad en los barrios populares de las periferias de la ciudad, mediante políticas públicas de desarrollo social. Estos proyectos involucraron a distintas áreas de gobierno, organizaciones internacionales y de la sociedad civil.

Threats



Criteria

INTEGRALIDAD Y ABORDAJE HOLISTICO

PARTICIPACION PUBLICA

IMPACTO TRANSFORMACIONAL

Table of contents

Executive summary	3
Resumen ejecutivo	6
Table of Contents	9
Table of figures	11
Table of acronyms	11
Introduction	12
Methodology	13
Conceptual framework	15
Governance	16
Adaptation to climate change	18
Adaptation measures types and approaches	19
Nature-based adaptation	20
Adaptation based on gray infrastructure	20
Adaptation based on hybrid infrastructure	20
Climate planning stages	22
Case studies	23
Argentina's context	24
Case of the Autonomous City of Buenos Aires	26
Planning stage	27
Good practices	27
Participation in global climate action networks	28
Horizontal cooperation and integrated approach to action	29
Liaison with the local academic community and science-based decisions	30
Next steps	31
Case of the city of Corrientes	32
Planning stage	33
Good practices	34
Continuous improvement of the climate risk map	35
Positioning adaptation actions based on nature	36
Next steps	37
Case of the city of Mendoza	39
Planning stage	40
Good practices	41

Partnerships with scientific and technical institutions institutionalized in a Committee	41
Grey infrastructure based on climate projections complemented by nature-based adaptation measures	43
Promotion of civil society participation through the creation of environmental, social and urban promoters	44
Next steps	45
Case of the city of Rosario	46
Planning stage	47
Good practices	48
Continuous improvement of horizontal coordination around resilience	48
Mainstreaming of the nature-based adaptation approach for the management of the flooding in the city	50
Raising public awareness of climate risks through improved information systems	53
Next steps	54
Case of the city of Ushuaia	55
Planning stage	56
Good practices	57
Participatory protected area system with a triple impact approach	57
Collaborative actions to reduce vulnerability of low income neighborhoods	59
Next steps	60
Conclusions	61
Bibliography	67

Table of figures

Figure 1: Relationship between time and benefits of different adaptation approaches	19
Figure 2: Hybrid adaptation	21
Figure 3: Map of Argentina's main hazards, vulnerabilities and exposure to climate change	24
Figure 4: Frequency of applicable good practice categories per case	61

Table of acronyms

3CNCC	Third National Communication on Climate Change	ICLEI	Local <i>Governments for Sustainability</i>
APrA	Environmental Protection Agency of the City of Buenos Aires	IPCC	Intergovernmental <i>Panel on Climate Change</i>
CMCC	Mendoza City Municipal Committee on Climate Change	PAC/PLAC	Climate Action Plan / Local Climate Action Plan
FVSA	Fundación Vida Silvestre Argentina	RAMCC	Argentine Network of Municipalities facing Climate Change
GEI	Greenhouse gases	RCP	<i>Representative Concentration Pathways</i>
GEF	Global Environment <i>Facility</i>	RENABAP	National Registry of Low Income Neighborhoods of Argentina
CONICET	National Council for Scientific and Technical Research	C40	Climate Leadership Group

Introduction

This project aims to contribute to local adaptation to climate change by presenting good practices implemented by five cities in Argentina. The analysis focuses on: the study of climate risks at the local scale; the planning stage of each city; overcoming barriers to planning; implementation of climate change adaptation measures; and next steps.

The effects of climate change on cities, such as the increased incidence of floods, droughts, heat waves and sea level rise, require local governments to design solutions to address climate change. Cities need to implement local climate action plans to increase their adaptive capacity and resilience.

The incorporation of the climate change adaptation agenda in urban planning implies overcoming major **barriers such as**, for example, the lack of coordination or dialogue between the different areas with competence in this topic, the existence of conflicting governmental interests, the frequent resource and technical capacity constraints and lack of data on climate-related risks and vulnerabilities (Revi et al., 2014).

The **good practices** presented in this document show examples of replicable actions that overcome these or other barriers and contribute to the advancement of planning or implementation of actions to address climate risk in the jurisdiction. These actions meet the criteria of comprehensiveness and holistic approach, public participation, inclusiveness and/or generation of transformational changes (Aguilar et al., 2021a).



Methodology

To select the case studies, a literature review and interviews with adaptation experts were conducted. The objective of this process was to identify Argentine cities that have developed successful, innovative, internationally relevant and replicable good practices for adaptation to climate change. The good practices were classified according to the following criteria:

Comprehensiveness and holistic approach: climate action is integrated and coherent with other broader development measures. A holistic approach allows for the generation of positive synergies with socio-environmental co-benefits.

Public participation: climate action has social license and support from civil society and other stakeholders.

Generating transformational change: climate action has the highest possible ambition, given the capabilities and possibilities of the jurisdiction in question.

Based on this process, five representative cities were selected from four large regions of Argentina (Pampeana, Litoral, Cuyo and Patagonia) with examples of good adaptation practices that met the criteria previously developed: the Autonomous City of Buenos Aires, Rosario, the City of Corrientes, the City of Mendoza and Ushuaia. Municipal officials in charge of good adaptation practices were contacted and interviewed in order to jointly construct the case studies. The cases were analyzed and elaborated using the following methodology planning framework built by FLACSO (described in the conceptual framework section), which was validated with local officials. Subsequently, there were exchanges, follow-up and review of the cases by the participating cities in order to co-create reflections and analysis frameworks.

In the last stage of the project, an open to the public webinar was held for the participants of the study to jointly present their findings and conclusions. During the webinar, the authors of the research, the cities and other participants drew key concepts (approaches, principles and actions from the good practices identified as features that climate action should include or reflect. Relevant concepts are presented as key points at the side of each case and are taken up again in

the conclusion, where a brief account of their relevance to each case is given.

The key concepts were condensed into thirteen categories: mainstreaming climate change; nature-based adaptation; political leadership; science-policy articulation; citizen participation; triple impact measures; social inclusion; sustained climate planning over time; alliance with climate action networks; improved climate diagnosis; systematization and data flow; incentives for environmental conservation; multilevel governance.



Conceptual Framework

*The case studies utilized the concepts of governance, climate change adaptation and climate planning, as well as different approaches to adaptation measures detailed below, to guide the identification of best practices **together** with local authorities.*



Governance

Climate change governance is characterized by its cross-cutting nature, given the need to integrate climate policies with sectoral and macroeconomic policies. In this sense, addressing climate change requires involving different areas and levels of government in joint actions, both locally and at the provincial and national levels. It also requires collaborating with private sector stakeholders and non-governmental actors to promote participation, to rely on their technical expertise and even to obtain funding. There are different approaches to governance. It is important to distinguish between them in order to exercise them in a complementary manner and achieve successful governance.

Horizontal governance refers to processes that involve different agents, entities or organizational units with the same jurisdictional hierarchy (local, provincial, national, international).

For example, different government secretariats within a municipality or different municipal governments can carry out actions jointly. Horizontal governance within a municipality can be institutionalized through the creation of intersectoral coordination spaces such as a Climate Change Cabinet and through the creation of alliances among different local governments.

Vertical governance refers to processes that involve different agents, entities or organizational units with different jurisdictional hierarchies.

For example, a municipal government and the national government may act jointly so that the municipality receives support and can implement national proposals in the territory.

Multilevel governance refers to processes involving vertical and horizontal governance. This approach emphasizes the specific role of each level of governance: global, regional, national, provincial, local. Each level has its own responsibilities, challenges and opportunities, as well as particular horizontal dynamics: peer learning, competition and cooperation. It includes all stakeholders in climate governance, including non-governmental actors (Aguilar et al., 2021b; Jänicke, 2017).

Polycentric governance is a type of multilevel governance that emphasizes networked relationships with different types and levels of hierarchy

and relative autonomy among multiple agents, entities or organizational units. Actors such as local governments, businesses, international networks, civil society organizations and social movements can exercise autonomous and simultaneous leadership, generating multiple decision-making "nodes" that operate in a decentralized way and with different kinds of linkages between them (Rüdiger, 2019; Jordan et al., 2018; Ostrom, 2009)

In all cases where mechanisms for citizen participation are carried out, it is important to foresee that the process allows for genuine participation where it is possible to incorporate the demands or comments that emerge (Aguilar et al., 2021c). It is possible to generate instances that involve a greater or lesser degree of openness in light of the nature of the measures discussed and the regulations of the jurisdiction.

In particular, in order to make decisions with a high degree of legitimacy and incorporation of diverse knowledge and perspectives, it is relevant to generate **co-creation** processes between different agents, entities or organizational units (Pham et al., 2021). Co-creation refers to activities where multiple agents contribute to the same process (Keeyes and Huemann, 2017). Based on this work modality, work processes can be established between, for example, the municipality, academia and civil society for the construction of joint climate actions.



Adaptation to climate change

Adaptation measures seek to achieve an adjustment to projected climate changes and their effects to moderate potential damages and take advantage of beneficial opportunities (IPCC, 2018). For example, to reduce the risk against heat waves, it is possible to create green spaces, which can result in mitigation co-benefits¹. In this sense, adaptation is not a concept independent from mitigation, but synergies can be generated between the two (Aguilar et al., 2021a).

It is particularly important for cities in developing countries to undertake and implement comprehensive climate change adaptation plans. The impacts of climate change will deepen existing socioeconomic problems, such as poverty and social inequality. In particular, Central and South America are highly exposed, vulnerable and heavily impacted by climate change. This situation is aggravated by high levels of poverty, weak water governance, unequal access to drinking water and sanitation services, and lack of infrastructure and financing, which reduce adaptive capacity and increase and create new vulnerabilities in the population (IPCC, 2022, p. 181.).

¹*Mitigation measures are technologies, processes or practices that contribute to reducing emissions or enhancing sinks of greenhouse gases (IPCC, 2018, p.85).*



Types of and approaches to adaptation measures

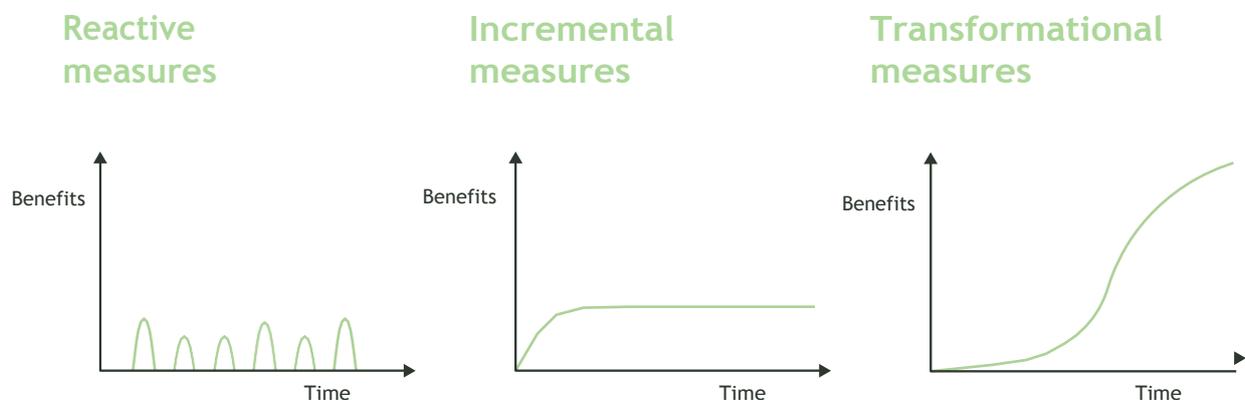
There are different types and approaches to adaptation. Measures can be either reactive or proactive, incremental or transformational. As climate risks increase, more ambitious actions are needed.

Reactive measures cope with the climate risks of the moment, bringing short-term benefits that may be reduced to zero with each new disaster or generate maladaptation, that is, actions or inactions that lead to increased risk, vulnerability or decreased welfare, in the present or in the future (IPCC, 2014).

Incremental measures are short to medium-term incremental actions that maintain or restore the integrity of existing structures and systems: technological, institutional, governance, and values. They work up to a certain level of risk, so additional measures are needed to address higher levels of risk.

Transformational measures are long-term systemic actions that alter fundamental system attributes in response to current or expected climate change. They include changes in perception and paradigms about adaptation and the relationship with other human and natural systems. These actions initially require more time and effort, but then bring greater benefits, requiring little additional adaptation to buffer extremely high levels of risk (Magrin, 2015; EEA, 2016).

Figure 1: Relationship between time and benefits of different adaptation approaches.



Source: Own elaboration based on EEA (2016).

Nature-based adaptation

Nature-based adaptation is a broad concept that refers to potentially low-cost and effective actions that help society adapt to the impacts of climate change by working with the nature by restoring, healthily managing and protecting it (IPCC, 2022). This approach is often used to address threats such as coastal zone flooding (e.g., restoring or protecting wetlands and mangroves), intense precipitation (e.g., working with floodplains and peatlands), rising temperatures (e.g., working with green infrastructure), and droughts (e.g., working with watersheds) (UN, 2020; EEA, 2021).

Adaptation based on gray infrastructure

There are retrofit approaches based on the construction of infrastructure works, also known as gray infrastructure. This comprises traditional engineering projects, where physical structures are made of often concrete or other long-lasting materials. A critical problem is that these solutions generally do not consider the climate change variable in their design parameters, which means that they are not resilient in the long term and can lead to maladaptation. Adaptation actions that follow this approach tend to be less affordable for low- and middle-income countries due to high construction and maintenance costs. In addition, if not adequately considered the biophysical environment and expected changes in climate, gray infrastructure can damage or eliminate processes necessary to sustain environmental services, ecosystems and habitats (e.g., through soil sealing or altered hydrology), with long-term ecological consequences (IPCC, 2022).

Adaptation based on hybrid infrastructure

Another adaptation approach is the combination of traditional engineering with nature's own functions, known as hybrid infrastructure. This approach combines gray infrastructure with nature-based adaptation. An example would be using porous pavement to reduce surface runoff, as well as biological channels and green roofs and walls (Depietri and McPhearson, 2017).

Figure 2: Hybrid adaptation



Source: Own elaboration based on Depietri and McPhearson (2017).



Climate planning stages

Climate planning involves several actions that can achieve incremental improvements or transformational changes. The actions involved in this process can be grouped into three stages: (1) diagnosis and preliminary work; (2) planning, governance and participation; and (3) implementation, monitoring and continuous improvement (Aguilar et al., 2021b).

1. In the **diagnosis and preliminary work** stage, an initial diagnosis of the current state of the city in relation to climate action is generated. The purpose of this stage is to understand, through risk analysis and greenhouse gas inventories, the jurisdiction's climate change adaptation and mitigation needs. In particular, an assessment of risks and vulnerabilities and their documentation in maps is central to this stage, given that climate risk is a key issue for the city. The risks faced by each city vary according to their exposure, vulnerability and climate hazards.
2. In the **planning and governance stage**, decision-makers define the objective of the action and the measures to be implemented, which may be sectoral, cross-cutting and with a greater or lesser degree of ambition. At this stage it will be crucial to contemplate different types and approaches to measures, both incremental and transformational. The different areas of government will also have to be involved in the definition of the plan's measures. These areas will have to implement the measures, so it is essential that they are aware and take ownership over them. At the same time, it is key to involve non-governmental actors in the process and to incorporate cross-cutting perspectives, such as those of gender and childhood.
3. Finally, in the **implementation, monitoring and continuous improvement** stage, the public policy instruments needed to achieve the measures incorporated in the plan are defined, financing is secured, and the action is carried out. The uncertainties and the materialization of the impacts of climate change over time require adaptive planning, so it is of utmost importance to construct a monitoring, feedback and continuous improvement system to enrich and regularly update the plan (Aguilar et al., 2021b).

Case studies

The case studies are presented in alphabetical order.

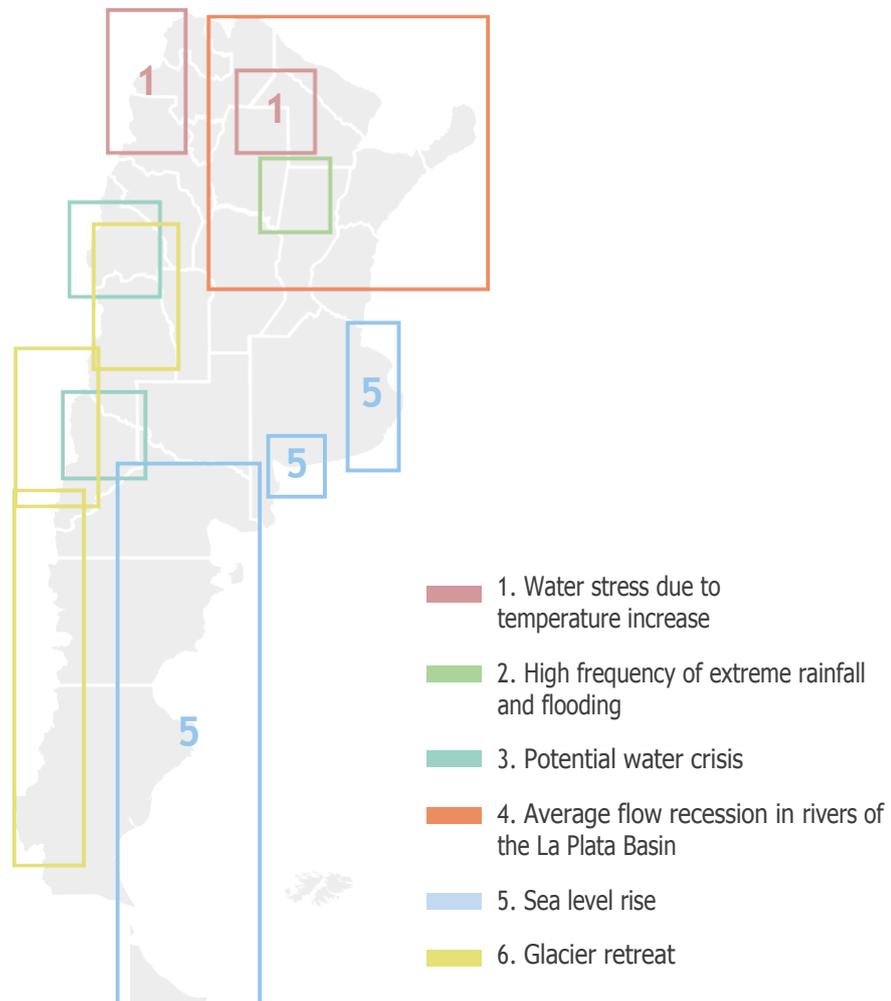


Argentina's context

Argentina's territory crosses regions with different climatic conditions, so the observed and projected hazards in Argentina are diverse and vary by region. According to the IPCC categorization (2022), in the Argentine region corresponding to the southeast of South America, where cities such as Buenos Aires, Corrientes, and Rosario are located, significant increases in the occurrence of extreme precipitation and heat waves are expected (IPCC, 2021). On the coast of the River Plate, sea levels are expected to rise, with the consequent risk of flooding. In the southernmost part of South America, where the city of Ushuaia is located, glaciers are projected to retreat (IPCC, 2022). In the Cuyo region, where the city of Mendoza is located, water stress, lack of snow and droughts are expected (Boninsegna, 2014).

Figure 3: Map of the main hazards and vulnerabilities and Argentina's exposure to climate change.

Threats



Vulnerability and exposure



Source: Own elaboration based on MAdS (2020).

Case: City of Buenos Aires



Basic Information	
Population	3,100,000 inhabitants
Area	202 Km ²
Main threats related to climate change	Increase in the amount and intensity of precipitation. Increased frequency and risk of flooding. Increased frequency and duration of heat waves.
Geography and climate	Pampas plains, humid temperate climate
Climate action plan	
Plan status	Updated to 2021
Temporal scope of the plan	2050
Adaptation or mitigation	Both
Climate risk assessment	Yes
Number of total climate actions and number of specific adaptation actions	The plan includes 24 actions with cross-cutting measures in different areas of government, of which 8 are specific to adaptation.

Source: Own elaboration based on GCBA (2021).

Planning stage

The City of Buenos Aires is in the implementation, monitoring, and continuous improvement stage of its Climate Action Plan (Aguilar et al., 2021b), having completed the implementation cycle of various adaptation actions from its first two plans of 2009 and 2015, which contained actions to be implemented up to and including 2030.

In particular, the city presented in April 2021 its third plan: the Climate Action Plan to 2050² (GCBA, 2021), which continues a process initiated by the previous plans, incorporating a qualitative leap in the capacity for long-term planning, as it has a longer time horizon. Continuity of climate action in the city is supported by Law No. 3,871 on Climate Change Adaptation and Mitigation of 2011 and its regulation of 2014, where it was established that a CAP must be carried out every 5 years (Aguilar et al., 2021c).

Good practices

Good practices			
Barriers	1. Participation in global networks for climate action	2. Horizontal cooperation and comprehensive approach to action	3. Decisions based on science and linkages with the local technology and science system
Need to integrate various specific agendas of agencies, areas of government and external actors.	✓	✓	
Lack of information on regional climate projections and need for support to deepen diagnosis.	✓	✓	✓

Source: Own elaboration

² Available at: https://www.buenosaires.gob.ar/sites/gcaba/files/pac_2050_0.pdf

Participation in global climate action networks

The agency in charge of designing the climate action plans of the Autonomous City of Buenos Aires is the APrA. The Climate Change Management team is made up of seven professionals, so external support was essential for the preparation of the Climate Action Plan (PAC) 2050.

In order to boost the climate action planning process, the Autonomous City of Buenos Aires began its active participation in ICLEI in 2003 and in the global network of cities against climate change C40³ in 2006. Participation in these networks made it possible to learn about the experiences of other cities that share similar characteristics and challenges and learn new methodologies. This, in turn, resulted in improved climate action planning processes.

Both ICLEI's support in the development of the first plan, and C40's network in developing the CAP to 2050 were central to the planning process. For example, C40 provided support in refining the City's Monitoring, Reporting and Follow-up methodology, suggesting the use of follow-up indicators. It also provided access to funding to conduct climate risk analysis studies, which allowed for a more in-depth climate risk diagnosis for the city (good practice 1 to overcome barrier 1).

In addition, participation in these networks increased the visibility of the city's actions and commitment to address climate change, and positioned it on the international scene. This, in turn, prompted the local executive branch to prioritize climate action within the government's agenda.

Sustained climate
planning over
time

Alliance with
climate action
networks

3 For more information see: <https://www.c40.org/>



Description:C40 Interministerial Team.

Source: GCBA (2019)

Horizontal cooperation and comprehensive approach action

Although APrA has enforcement competencies, many of the actions in its climate plans are implemented by other sectors. It was thus key for each government area to be part of the climate action planning process, and to incorporate the actions under its competencies in their own plans and programs (Aguilar et al., 2021a) (good practice 2).

Within the framework of a joint development process for PAC 2050, APrA led dialogue exercises with the government areas responsible for implementing PAC 2050 actions. These instances allowed them to take ownership of the actions: a key milestone for the success of the action's implementation phase. For example, the actions "large infrastructure works for less risk" (A1), "nature as a solution" (A2) and "prepared for storms" (A3) of the PAC to 2050 (GCBA, 2021), all aimed at adapting to higher rainfall, involved competencies from different government areas, such as Transportation,

Infrastructure and Emergency Management, among others. A positive consequence of working on climate action in a comprehensive and inter-institutional manner was that the PAC 2050 measures are not strictly segmented into "mitigation" or "adaptation", but all of them have, to a greater or lesser extent, a component of both.

The government's decision to prioritize climate change had a positive impact on the mainstreaming the issue and integrating the agendas of the different areas (barrier 2). The successful implementation of the PAC had to rely on strong leadership to engage areas with their specific agendas and priorities.

Liaison with the local academic community and science-based decisions

The city needs updated and accurate information to deepen the diagnosis of climate change impacts as part of the continuous improvement process. The lack of access to reliable information, especially long-term climate projections, is, however, a recurrent problem in Latin American cities (barrier 2).

To solve this information gap barrier, the city generated linkages among decision makers and the scientific community (good practice 3). In particular, through Law No. 3,871, it created an Advisory Council⁴ made up of scientists, experts and representatives of NGOs working on climate change who have the capacity to interpret complex technical analyses. In addition, as part of the guidance and support provided by the C40 network,

Mainstreaming
climate change

Political leadership

Science-policy
articulation

Improved climate
diagnosis

⁴ For more information see: <https://www.buenosaires.gob.ar/agenciaambiental/cambioclimatico/mesas-de-trabajo/consejo-asesor>

the city commissioned researchers from CONICET's Sea and Atmosphere Research Center⁵ to carry out climate projections for the city to the year 2050 under the RCP 4.5 and 8.5 scenarios and to analyze the changes observed in recent decades. Subsequently, in a collaborative work process for the interpretation and use of the results obtained, the Advisory Council was asked to contribute to the interpretation of the results and to associate them with actions that the city should take in order to better face climate change.

Next steps

As part of the continuous improvement process, the city is working to reach consensus on definitions and unify the working language between the different areas of government, as well as to align strategies and the definition of common monitoring indicators. In particular, definitions and priorities for nature-based adaptation are being agreed upon, for which a Working Group on Urban Nature was created, involving the six governmental areas related to the subject.

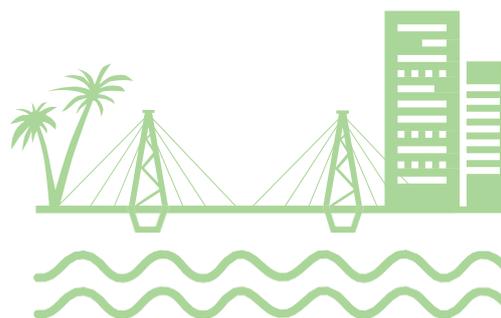
For its part, the Climate Change Management area is working on an extensive system of indicators associated with the actions defined in the PAC 2050 and validated by each government area. This work aims to achieve an effective monitoring of the actions and improve the system by which the areas report to APrA data on the actions in which they participate. Currently, this does not happen smoothly and there is a need to formalize the Monitoring, Reporting and Follow-up mechanisms.

Nature-based
adaptation

Systematization
and data flow

⁵For more information see: <http://www.cima.fcen.uba.ar/>

Case: Corrientes City



Basic Information	
Population	352,374 inhabitants
Area	522 Km ²
Main threats related to climate change	Increase in the amount and intensity of precipitation. Increased flooding due to river flooding Increased magnitude, frequency and extent of droughts, wildfires and heat waves
Geography and climate	Lowland and riverside city, subtropical climate
Climate action plan	
Plan status	Updated to 2019
Temporal scope of the plan	2030
Adaptation or mitigation	Both
Climate risk assessment	Yes
Number of total climate actions and number of specific adaptation actions	The plan includes 24 climate actions, 7 of which are specific to adaptation.

Source: Own elaboration based on Municipality of Corrientes (2019) and SAyDS (2014).

Planning stage

The city of Corrientes is mainly in the **implementation, monitoring and continuous improvement stage** of its Climate Action Plan (PAC). The plan was built as part of a commitment made together with the Argentine Network of Municipalities facing Climate Change (RAMCC) and the Global Covenant of Mayors for Climate and Energy⁶. Floods are the main cause of climate threat to the city, which is why the plan is now the central axis of its entire environmental policy.

Work is also underway on activities related to the other two stages of the climate planning process. In relation to the diagnosis stage, for the biannual update of the Climate Plan, in addition to increasing its carbon emissions reduction goal, the city is updating its risk map to incorporate wildfire risks, a new variable resulting from changing climate conditions that did not exist when the plan was formulated in 2018.

Regarding the planning, governance and participation stage, work is being undertaken to create a governance mechanism that promotes the coordination between different areas of the municipality to strengthen the mainstreaming of environmental and climate policies. Regarding the continuous improvement of its urban planning, the climate risk map was incorporated into the city's Land Use Plan (POT) presented in 2021, where the east of the city is declared an area of environmental vulnerability. This is where the peri-urban wetlands are located, which function as sponges in the face of intense rainfall. Corrientes also aims to incorporate climate risk into its Building and Planning Code through a traffic-light color system. This will make it possible to establish land use priorities for the future expansion of the city.

Linkage with
climate action
networks

⁶For more information see: <https://pactodealcaldes-la.org/>

All these activities are part of a process of transforming the urban planning paradigm: from conceiving all vacant land as developable land, to revaluing nature as a strategic ally in addressing climate change. Although mainstreaming this new approach in all areas of government requires time and great effort, it is expected to bring larger benefits and be more effective in the long term.

Finally, it should be noted that the City is currently working on climate action monitoring and reporting, using the existing monitoring system of the land planning area to unify efforts.

Good practices

Good practices					
Barriers	1. Continuous improvement of the climate risk map	2. Mainstreaming the environmental agenda in long term planning	3. Creation of institutional structures for strategic climate planning	4. Horizontal coordination and integrated approach	5. Political decision to promote a nature-based approach to adaptation
1. Lack of information for climate vulnerability analysis	✓			✓	
2. Primacy of the concept that all vacant land is developable land	✓	✓	✓	✓	✓
3. Lack of incorporation of environment agenda in land planning	✓	✓	✓	✓	✓

Source: Own elaboration

Continuous improvement of the climate risk map

In the diagnostic stage of the Corrientes Climate Action Plan, the technical team faced difficulties in accessing and generating information on climate vulnerability (barrier 1), therefore they decided to start by using existing information, with a commitment to undertake continuous updates to improve their analysis (good practice 1).

The city built its climate risk map in 2018 and moved forward to the planning stage, governance and participation of the plan. The risk map was progressively updated and improved as new data were obtained. For example, in 2019, information on the most vulnerable sectors of the city was incorporated thanks to a survey conducted by the National Registry of Vulnerable Low Income Neighborhoods (RENABAP) of the Argentine Ministry of Social Development, with the support of the municipality's Habitat Department.

In 2021, the collection of information was initiated to include a new variable in the map: the threat of wildfires. In 2018, when the map was made, wildfires did not represent a threat due to the city's high levels of average annual rainfall (1,800 mm). The prolongation of the dry season due to the change in climatic conditions transformed a common practice of cattle ranchers, such as burning to generate regrowth in pastures, into a threat that can start large-scale wildfire outbreaks.

Improved climate diagnosis

Systematization and data flow

Positioning nature based adaptation

The prevailing conception that all vacant land in the city is developable land (barrier 2) among public and private decision makers, as well as real estate developers, derived in urban and climate risk management's low valuation or concern for wetland and forest ecosystems in the periphery of the city of Corrientes. In fact, between 1951 and 2017, 35 ponds disappeared or were affected by an urban growth model that did not include modern conceptions of green infrastructure (Cristiá, 2021) (barrier 3). Political leadership was central to transform this paradigm.

The political decision in 2018 to place the environmental agenda among the city's four strategic axes prompted a change to mainstream the environmental component in the city's long-term planning (good practice 2) and place environmental care as a state policy. As a result of this process, the Undersecretariat for Environmental Policy Planning (SPPA) was created as an institutional structure for strategic climate planning (good practice 3). The risk map and the environmental agenda were also incorporated into the Basic and Strategic Plan approved by Municipal Ordinance No. 6,792/2019, which establishes the general guidelines for the future planning and expansion of the city. This incorporation raised the risk of urbanizing in certain areas and was the first major milestone to drive a paradigm shift in the city's urban planning, from the predominant conception of vacant land to a nature-based adaptation approach, which conceives nature as a strategic ally to face climate threats.

In 2021, a new milestone was reached on the road to this paradigm shift, when the city presented its Land Use Plan (POT), which used the Climate Plan and the risk map as fundamental inputs. The importance of incorporating environmental variables into the land-use planning process derived in the the city having a battery of active public policy tools that will follow this ordinance to guide investments in infrastructure and future real estate development, both public and private, through the generation of incentives.

The incorporation of the new vision in the Land Management Plan and in the Strategic Base Plan was complementary to the future update of the Urban Planning and Building Codes. This is because the Codes are legal regulations on permissions and prohibitions, whereas the plans are the documents that contain the municipality's guidelines. Corrientes has already established that the SPPA will participate in the Commission in charge of the necessary modification of these Codes (good practice 4).

Another crucial tool to organize the future growth of the city was the mapping of wetlands. In 2021, Corrientes reached another milestone when it created by ordinance the Municipal System of Protected Areas and the first Santa Catalina Municipal Nature Reserve. The 250-hectare site is located 9 km south of the city center and is crossed by three watercourses, including the Paraná River. These actions seek to conserve the flood valley of the three watercourses, increase the forest biomass that functions as a natural buffer, conserve the forests near the water bodies, and limit urban sprawl (Municipality of Corrientes, 2019). The creation of the Santa Catalina Municipal Reserve had a high social acceptance and is linked to other measures of the Climate Action Plan that incorporate the notion nature-based adaptation measures that are less advanced, such as the reforestation of the city and the creation of ecological corridors (best practice 5).

Next steps

In the Santa Catalina Municipal Reserve, a project to restore and reforest a native forest, degraded by anthropic action, is being undertaken. In addition, work is under way on the creation of ecological corridors: an interrelated system of parks linking the city's green areas and central urban parks, including the Santa Catalina Municipal Reserve. The corridors will be divided into main and secondary corridors. The former will link urban parks or nature reserves, and will be linear parks with aerobic circuits. The secondary corridors will link the main routes and, although they will have a more austere materiality than the main ones, they will have bike paths or bicycle lanes (Municipality of Corrientes, 2019). Regarding reforestation, the city

Mainstreaming
climate change

Political leadership

Nature-based
Adaptation

Environmental
conservation
incentives

Citizen
participation



Description: Restoration and reforestation actions in the Santa Catalina Municipal Reserve.
Source: Municipality of Corrientes (2020).

aims to plant 15,000 new trees by 2022-2025 (Cristiá, 2021). The ecological corridors and reforestation are expected to regulate surface runoff and reduce flooding from heavy rainfall, as well as regulate temperature through evapotranspiration and shading. Another step to be taken is to work together with engineers from the Public Works Department to prevent the removal of vegetation, including native forests, to clear and level the land.

It is also worth noting that the recent Land Use Plan is undergoing a process of social validation in stages. It is currently in the process of internal validation (within the municipality), and external validation (with the provincial government), to align provincial investments in infrastructure with the priorities established by the city. The next stage is to structure the citizen participation process and present the plan to different sectors of society.

Finally, although the risk map and wetlands inventory are already part of the planning, a crucial step remains: translating the mapping into a traffic light system to reflect the most vulnerable areas of the jurisdiction and incorporating them into the Planning and Building Codes. The city's peri-urban wetlands will be included in the red areas (most at risk) and urbanization processes will be prohibited in them.

Case: Mendoza City



Basic Information	
Population	120,051 inhabitants (DEIE projection, 2021)
Area	106.07 Km ²
Main threats related to climate change	Increase in the amount and intensity of precipitation. Landslide risk Increased magnitude, frequency and extent of droughts, forest fires, intense winds and heat waves
Geography and climate	The city extends over three geomorphological units: Andes mountain foothills, piedmont and plains, with a dry climate and distinct seasons.
Climate action plan	
Plan status	Published in 2020
Temporal scope of the plan	2030
Adaptation or mitigation	Both
Climate risk assessment	Yes
Number of total climate actions and number of specific adaptation actions	The plan includes 89 projects with cross-cutting measures in different areas of government. Of these, 15 are adaptation projects, 17 are mitigation and adaptation projects, and 57 are mitigation projects.

Source: Own elaboration based on Municipalidad de la Ciudad de Mendoza (2020), Municipalidad de la Ciudad de Mendoza (2019), Salomón (2017) and DEIE (2021).

Planning stage

The city of Mendoza is in the **stage of implementation, monitoring and continuous improvement**, so that, along with the implementation of projects included in the plan, it is progressively improving its climate actions. It has a Local Climate Action Plan (PLAC) published in 2020 with cross-cutting measures for all areas of government, following the declaration of a climate emergency in the city by Decree 95/2020. In particular, one of the central problems faced by the city is the urban advance towards the west, where the piedmont is found. These unplanned vulnerable neighborhood and private neighborhood urbanizations are not adapted to the piedmont environment (barrier 1). This generates environmental degradation and a local risk for the inhabitants of the area and the city (Abraham et al., n.d.).

The piedmont is a fragile ecosystem, characterized by a steep slope with a large number of temporary watercourses⁷. It is exposed to various climatic threats that are being intensified by climate change⁸ and a large percentage of the territory does not have basic services. In this context, Mendoza worked to increase the ambition of actions to adapt the La Favorita conglomerate, a group of highly vulnerable neighborhoods in the piedmont, whose location is a local risk for the inhabitants of the area and the city downstream (Abraham et al., n.d.).

Sustained climate
planning over
time

Political leadership

Mainstreaming
climate change

⁷ These watercourses fulfill a catchment and buffering function for rainfall, which despite being scarce (approx. 200 mm annually), occur in a short period, with high intensity and short duration during the summer. Thus these watercourses, according to their order, delimit suitable or unsuitable areas for settlements (Mesa, Giusso, 2013).

⁸ Climate change is expected to lead to a greater recurrence and intensification of destructive natural events in the area (floods, convective storms, hail, etc.), desertification, changes in the water regime (less snowfall, shrinkage and melting of glaciers, changes in water flow, etc.), as well as increases in drought, temperature, heat waves, higher solar radiation and wildfire risk.

Good practices

Good practices			
Barriers	1. Alliances with scientific and technical institutions formalized in a Committee	2. Grey infrastructure based on climate projections, complemented with nature-based adaptation	3. Promotion of civil society participation through the creation of the figure of environmental, social and urban promoters
1. Unplanned urbanization in areas at risk to climatic phenomena	✓	✓	✓
2. Lack of local data availability in piedmont	✓		✓
3. Scarce funding resources	✓		

Source: Own elaboration

Partnerships with scientific and technical institutions formalized in a Committee

A central barrier faced by the city of Mendoza in carrying out projects to promote the conservation, sustainable use and adaptation of the piedmont was the lack of local data on the area to generate a sufficiently in-depth diagnosis that would allow the definition of effective courses of action (barrier 2). Given this need and the scarcity of financial resources (barrier 3), the city decided to work together with science and technology research teams working on nature conservation issues in Mendoza in general and, in particular, on the piedmont's role in water regulation.

Collaborative work made it possible to combine existing efforts without incurring new economic costs, and was institutionalized and framed in the Municipal Climate Change Committee (CMCC) of the city of Mendoza (good practice 1). This is a consultative body that advises the municipal Executive Branch and is

integrated by representatives of the Province's universities and science and technology organizations, among others, where climate action measures are jointly worked on. The CMCC also interacts with different governmental areas in the development of specific projects. Within the CMCC, the need for specific studies of the piedmont was raised, and the J. A. Maza University decided to carry out and finance the research. The project aims to generate the necessary information at the micro-scale level of the municipal problems. In this context, a risk analysis of the piedmont was carried out as part of a micro-zoning process.



Improved climate
diagnosis

Science- policy
articulation

Description: Working meetings of the Municipal Committee on Climate Change (CMCC)
Source: Above Mendoza City (2019), below Mendoza City (2021).

Gray infrastructure based on climate projections complemented by nature-based adaptation measures

To build the necessary infrastructure in the piedmont, the Municipality won World Bank financing for urbanization, infrastructure and environmental remediation works through the Integral Habitat and Housing Program - IBRD 8712 AR La Favorita Fifth Stage Integral Project. This project is characterized by a vertical coordination process between the city of Mendoza, the national government and international institutions (World Bank). In addition, it also has a strong horizontal coordination component, since its execution depends on the Housing and Habitat area but involves collaboration and joint work with different government areas, among them: the Urban Development Secretariat, the Legal and Technical Secretariat, the Finance Secretariat and the Government Secretariat. All these areas interact with the World Bank in the development of the project at the macro level.

The project has a triple impact approach, as it seeks to transform vulnerable low-income neighborhoods through: the provision of basic social infrastructure; the construction of flood mitigation works; access to land ownership; the strengthening of community organization; and the formalization and regularization of neighborhoods. These actions, in turn, boost their economic development. Based on climate change projections for the region, specific flood defense works were executed, such as gabions, mattresses, embankments and retaining walls. The project is innovative because the gray infrastructure was designed considering future climatic risks, and in complement with nature-based adaptation measures, such as ecosystem conservation (Best Practice 2).

Nature based
adaptation

Social inclusion

Triple impact
measures

Multilevel
governance



Description: Landslide mitigation works
Source: Municipality of the City of Mendoza (2021)

Promoting the participation of civil society by means of the creation of environmental, social and urban promoters

In order to incorporate the views of the citizens in the urbanization process of La Favorita, participatory processes were carried out with the affected community. In particular, within the framework of the "Proyecto Integral La Favorita Quinta Etapa" the figure of environmental, urban and social promoters was created, who carry out a formalized social process to work continuously with these vulnerable communities (good practice 3). In the context of the CMCC, Maza University designed and elaborated the "Socio-environmental Diagnosis in Barrio La Favorita", a process of evaluation of the inhabitants' perception of risk and vulnerability. The promoters were in charge of executing the project and carrying out the survey.

- Citizen participation
- Incentives for environmental conservation

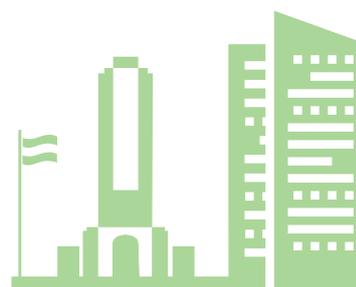


Description: Environmental, social and urban promoters working in the community of La Favorita.
Source: Municipality of the City of Mendoza (2021)

Next steps

Given that 70% of the piedmont lands are private, work is underway to generate interest in the conservation of the area. In this regard, a project to create environmental management units for private lands and the generation of benefits that allow their conservation is being developed. This project focuses on co-management and sustainable management of natural resources at the local scale both for mitigation and adaptation. Its purpose is to maintain and increase strategic environmental services such as biodiversity conservation, carbon storage and flood protection, among others. Within this framework, projects are being proposed, such as: "Urban guidelines for the piedmont" (a project for regularization, adaptation and conservation uses); "Participatory air quality monitoring"; "Restoration of slopes and impacted environments"; "Ecosystem services program"; "Implementation of artificial intelligence for the integrated management of micro-dumps"; "Local Biodiversity Conservation Units (ULCB)"; "Rainwater reuse"; "Water and erosion retention strategies in foothills", among others.

Case: City of Rosario



Basic Information	
Population	995,497 inhabitants
Area	178.69 Km2
Main threats related to climate change	Increase in the amount and intensity of precipitation. Increase in flooding. Increased magnitude and extent of heat waves.
Geography and climate	City located on the banks of the Paraná River, bordered by the Ludueña and Saladillo streams, with wetlands, several flood areas and humid temperate climate.
Climate action plan	
Plan status	Published in 2020
Temporal scope of the plan	2030
Adaptation or mitigation	Both
Climate risk assessment	Yes
Number of total climate actions and number of specific adaptation actions	The plan has 6 sectors, 21 sectoral guidelines and 77 actions between current and future projects. Of these, 8 are adaptation actions, 54 are mitigation actions and 15 are mitigation and adaptation actions.

Source: Own elaboration based on information from the Municipality of Rosario (2020) and Municipality of Rosario (2022).

Planning stage

Rosario is in the implementation, monitoring and continuous improvement stage of its climate planning process, thus updating existing projects. It is also still working on the executing elements of the planning, governance and participation stage.

Rosario published its latest Local Climate Action Plan (PLAC) in 2020 with a forecast to 2030. The Rosario 2030 PLAC was developed within the framework of Municipal Ordinance No 9,424/2015, which provides for the creation of a local climate change action plan as a guide for all local public policy.

The plan includes six sectors: energy; urban solid waste; transportation and mobility; water, resilience and risk; biodiversity and land use; and health. Each thematic axis contains its justification, strategic objectives, sectoral guidelines, mitigation and adaptation actions, projects and GHG reduction targets. The sectoral guidelines set the basis for the development of the projects.

The city of Rosario has an extensive track record working on adaptation and mitigation, having completed the process of implementing multiple climate actions. In relation to governance, a Local Advisory Council on Climate Change and Events is in the process of being formed as a consultative body. This Advisory Council will be made up of local governmental, academic, scientific, business and social actors, as well as representatives of the political parties represented in the Municipal Council.

Sustained climate
planning over
time

Political leadership

Good practices

Good practices			
Barriers	1. Continuous improvement of horizontal coordination around resilience.	2. Mainstreaming the nature-based adaptation approach to flood management in the city.	3. Raising public awareness of climate risks by improving information systems.
1. Difficulty of internal coordination among areas with competence in resilience.	✓	✓	✓
2. Failure to address flood hazards in a cross-sectoral manner.	✓	✓	✓

Source: Own elaboration

Continuous improvement of horizontal coordination around resilience.

The Municipality of Rosario is faced with the need to promote dialogue and horizontal coordination in order to articulate the work among its various municipal agencies during the implementation and continuous improvement of the PLAC. In particular, given the importance of the water issue in the city, initiatives in this regard have been worked on in coordination with different areas and levels of government, especially between the secretariats of Public Works (General Directorate of Hydraulics), Government (Civil Defense Coordination), and Environment and Public Space (General Directorate of Climate Action and Environmental Quality and other areas in charge of public space).

For example, one of the instruments used for risk prevention is the risk map, which allows the territorial visualization of the location of areas and populations most vulnerable to hydrometeorological hazards. Rosario's risk map was developed jointly by several agencies, through the formation of an interdisciplinary team, coordinated by Civil Defense. The National University of Rosario (UNR) also participated in the team and was supported by

the national government's Secretariat of Civil Protection and Integral Approach to Emergencies and Catastrophes (horizontal and vertical coordination). However, coordination difficulties persist due to the complexity of the resilience issue. In this regard, it is expected to incorporate the risk map in the municipality's strategic and sectoral plans, especially in the city's Urban Plan.



Citizen
participation

Multilevel
governance

Description: Working meetings for the construction of the Local Climate Action Plan.
Source: Municipality of Rosario (2018)



Description: Citizen workshops for the identification of climate vulnerabilities.

Source: Municipality of Rosario (2017).

Mainstreaming a nature-based adaptation approach for flood management in the city.

Rosario has suffered from urban flooding for several decades. In the 1960s, the design of a drainage master plan was initiated with infrastructure interventions of large trunk pipelines and secondary branches, with the objective of improving stormwater management and control conditions. Over the years, a series of instruments and measures were also adopted not requiring the construction of infrastructure to improve the urban habitat. At present, the Secretariat of Public Works, through the General Directorate of Hydraulics projects infrastructure works to address the city's hydrometeorological problems.

The increase in future flooding raises the need to make a greater effort to adapt to climate change. Within the framework of the PLAC, actions were developed based on the climate variability studies and the flood hazard vulnerability index prepared during the diagnostic stage.



Description: Citizen workshops for the identification of climate vulnerabilities.

Source: Municipality of Rosario (2017)

In addition, spaces for dialogue and intersectoral participation were carried out within the municipality, enabling the addressing of flood management from a cross-cutting approach and with a holistic perspective (barrier 2). This led to the identification of investments in gray infrastructure and nature-based adaptation measures. The elements identified in the participatory instances that were carried out to raise awareness of the effects of climate change, and the social construction of climate risk situations present in the territory, were also incorporated.

The nature-based adaptation approach was expanded to other areas of the Municipality, for example, to the environmental premises of Rosario's Urban Plan update, developed by the Secretariat of Planning. The Plan seeks to protect the environment, landscape, historical heritage and urban particularities, among other purposes. It also includes actions for the consolidation and extension of the edges of streams, as areas with high permeability and runoff rates, in order to reduce the flooding risks. In addition, it proposes to increase and protect the absorbent soil of the peri-urban fruit and vegetable zone, together with other risk management policies and regulations, to reduce the use of land in areas threatened by hydrometeorological phenomena.

Within this framework, the Green Belt Project is implemented in the peri-urban area of the city, where fruit and vegetable and extensive productions are located.

This project seeks to promote conversion processes towards sustainable agroecological and food systems and to promote an increase in the environmental services provided by these spaces. It has a collaborative and triple impact approach, that is, it involves environmental, social and economic benefits simultaneously: it limits urban and industrial expansion, which helps reduce the heat island effect and increases the conservation of absorbent soils; it improves rainwater infiltration; it reduces dependence on food from other territories and generates more local supply chains. This, in turn, reduces greenhouse gas emissions from food transportation and enables and promotes marketing spaces for producers.

Along with this project, the Urban Agriculture Program also contributes to the increase in green space and environmental benefits. This program allocates degraded public spaces, such as roadsides, for the production of community vegetable gardens. It began in 2001 as a social policy in response to the economic crisis and currently involves more than 250 local producers (Aguilar et al., 2021a; FAO, 2021).

Nature based
adaptation

Triple impact
measures

Social inclusion



Description: Green belt vegetable gardens
Source: Municipality of Rosario (2020)



Description: Rosario's biomarket

Source: Municipality of Rosario (2021)

Raising public awareness of climate risks through improved information systems

Finally, it is worth mentioning the joint work between the General Directorate of Hydraulics and the Civil Defense Coordination, which allows for the analysis of threat and risk situations on possible flood-prone areas and affected places, and to provide an effective response. The municipality has a set of tools that make up the early warning system: an integrated system for the detection of intense storms developed by the CONICET-UNR; a network of hydrological variables developed by the provincial government; and emergency protocols.

Systematization
and data flow

Science-policy
articulation

Through this system, information on hydrometeorological phenomena is presented in a public and accessible manner. The project combines the generation and promotion of free access to information to raise public awareness of climate risks in a preventive manner (good practice 3).

Next steps

Rosario has identified the importance of having instruments that promote institutional governance and the horizontal coordination necessary to implement its PLAC. To this end, it has proposed the plan's monitoring in two areas: the Local Advisory Council on Climate Change (mentioned above) and the creation of a Local Cabinet on Climate Change. The latter will function as an intermunicipal space with two lines of work around the challenges of mitigation and adaptation with a 2030 perspective. In the area of adaptation, the topics related to risk management, prevention and resilience for vulnerability reduction will be promoted, among other actions that have been identified in the PLAC.

Mainstreaming
climate change

Case: City of Ushuaia



Ushuaia created a participatory system with a triple impact logic (environmental, social and economic) to manage urban nature reserves and address the problem of unplanned urban sprawl. The development of the reserves was carried out in parallel with the study and reduction of vulnerability in low income neighborhoods on the outskirts of the city, through public policies for social development. These projects involved different areas of government, international organizations and civil society.

Basic Information	
Population	79,000 inhabitants
Area	108 Km ²
Main threats related to climate change	Increase in extreme weather events, such as extreme snowfalls Increased rainfall and increased risk of flooding Increase in heat waves
Geography and climate	Mountainous, surrounded by the Fuegian Andes and the Beagle Channel. Subpolar climate.
Climate action plan	
Plan status	Yes, completed in 2021
Temporal scope of the plan	2030
Adaptation or mitigation	Both
Climate risk assessment	Yes
Number of total climate actions and number of specific adaptation actions	The plan includes 28 cross-cutting actions in different areas of government, of which 7 are specific to adaptation.

Source: Own elaboration based on Municipality of Ushuaia (2022).

Planning stage

Ushuaia, the southernmost city on the planet, is in the final stages of the **planning, governance and participation stage** of climate planning (Aguilar et al., 2021c). Its Local Climate Action Plan (PLAC) commenced with the signing of the agreement between the RAMCC and the Municipality of Ushuaia, beginning the work on climate change adaptation and mitigation. The PLAC includes an adaptation component and a mitigation component and was finalized in 2021 with the support of the RAMCC and Fundación Vida Silvestre Argentina (FVSA). Currently, the city is organizing a broad participation instance where the plan will be evaluated by civil society according to local priorities and visions. Simultaneously, it is implementing various climate actions, which correspond to the implementation, monitoring and continuous improvement stage (Aguilar et al., 2021c).

At this implementation stage Ushuaia intends to face the problem of unplanned urban sprawl, a result of its great economic and demographic development in recent decades. This issue has led to the construction of up to twenty informal neighborhoods in areas not viable for urbanization, such as the mountain slopes surrounding the city, leading to the loss of urban areas of native forests and peatlands⁹ (barriers 1 and 2). As a result, risks have arisen from the alteration of water cycles and changes in land use, mainly floods and landslides. One barrier that the city had to face in order to address this problem was the dispersion of information among the different areas of government. The preparation of its PLAC was crucial to this end, made possible by

Adaptation based
on nature

Alliance with
climate action
networks

Mainstreaming
climate change

Political leadership

⁹ Peatlands are a type of wetland generated by the anaerobic degradation of mosses and vascular plants.

the interaction between multiple government areas, the RAMCC, the technical support of the FVSA and the coordination of the Secretary of Environment and Sustainable Development of the city of Ushuaia.

Good practices

Good practices			
Barriers	1. Incorporation of nature based adaptation	2. Participatory system for the management of nature reserves with a triple impact logic	3. Collaborative actions for the reduction of vulnerability in low income informal neighborhoods
1. Lack of incorporation of the environmental agenda in urban planning.	✓	✓	
2. Unplanned urbanization in areas exposed to climate hazards.	✓		✓

Source: Own elaboration

Participatory nature reserve system with triple-impact logic

The city has an extensive system of natural reserves within the municipal limits, composed of ten urban natural areas (Municipality of Ushuaia, 2021, p.13). The creation of these reserves is framed within a triple impact logic (environmental, social, and economic), as established by Provincial Law No. 55 (Legislature of Tierra del Fuego, 1992). On the one hand, reserves and urban natural areas in general contribute to water regulation and erosion control, which helps prevent floods and landslides and reduce greenhouse gas emissions. In addition, an increase in the amount of green space per inhabitant improves citizen's quality of life. Finally, the economic impact stems from a potential increase in tourism in the city due to greater natural attractions. The development of urban nature reserves is thus one of the local government's priorities, aiming to implement on-the-ground public policies and improve local adaptive capacity to climate change. All these actions, detailed in the PLAC, are framed within a nature-based adaptation approach (Municipality of Ushuaia, 2021) (good practice 1).

As established by the Municipality of Ushuaia, several of the reserves are managed through commissions with civil society participation (good practice 2), while the city's Secretariat of Environment and Sustainable Development is the authority in charge of enforcing municipal regulations. Among the participants of the different Commissions are: the University of *Tierra del Fuego*, the *Centro Austral de Investigaciones Científicas* (CADIC/CONICET), different local associations and the Birdwatchers Club, among other relevant actors.



Description: Bahía Encerrada Urban Nature Reserve, note the proximity to the urbanization (in the background), highlighting the link between the city and the reserve.

Source: Municipality of Ushuaia (2021)



Description: Joint training sessions between the Municipality and the Bahía Encerrada Association as part of the co-management of the reserves.

Source: Municipality of Ushuaia (2021)

Science- policy
articulation

Triple impact
Measures



Description: Municipal personnel together with members of the Yatana Forest Urban Nature Reserve Commission.

Source: Municipality of Ushuaia (2021).

Collaborative actions to reduce vulnerability in low-income neighborhoods

In parallel to the development of the reserves, the Municipality made progress since 2015 in reducing vulnerability in low income neighborhoods on the outskirts of the city through public policies for social development, which include the construction of a network of potable water, sewage and drainage systems, opening of streets and roads, and relocation of families settled in areas of natural reserves or steep slopes.

To assess the new General San Martín housing development's climate risk, the Municipality received support from the GEF (Global Environment Facility) through its "Integrated Low Carbon Investments and Conservation in Argentine Cities" program. In addition, to incorporate mitigation benefits, the Municipality worked with the Architects Association of Tierra del Fuego and the Secretariat of Habitat of the City to apply energy efficiency standards in new constructions (good practice 3).

Next steps

As next steps, the Secretariat of Environment and Sustainable Development of Ushuaia is submitting the PLAC for validation by all relevant sectors, so that a final version can be approved and disseminated to the local community and at the national level. The expansion of the city's system of natural reserves and the declaration of new protected areas are planned, while the urbanization process in low income neighborhoods continues.



Description: Workshop on citizen participation in the Local Climate Action Plan. Institutions and persons attending: INTA; CADIC; CONICET; UTN Ushuaia; UNTDF; Provincial Legislator Laura Colazo, Bloque Partido Verde TDF; Government Director of Territorial Planning; Provincial Port Authority; INFUETUR; VAG SMN Station; APN PNTDF; SENASA; Senator Matías Rodríguez's team; Councilwoman Laura Ávila's team; Municipal Habitat Secretariat; Women's Secretariat; Municipal Environment and Sustainable Development Secretariat; Municipal Tourism Secretariat; Municipal Civil Defense; Manekenk Association; COA Ushuaia; Ecovida Ambiente; Sin Azul no hay Verde; ABE Asociación Bahía Encerrada; A limpiar Ushuaia; Colectivo Bicisendas Ushuaia.

Source: Municipality of Ushuaia (2021)

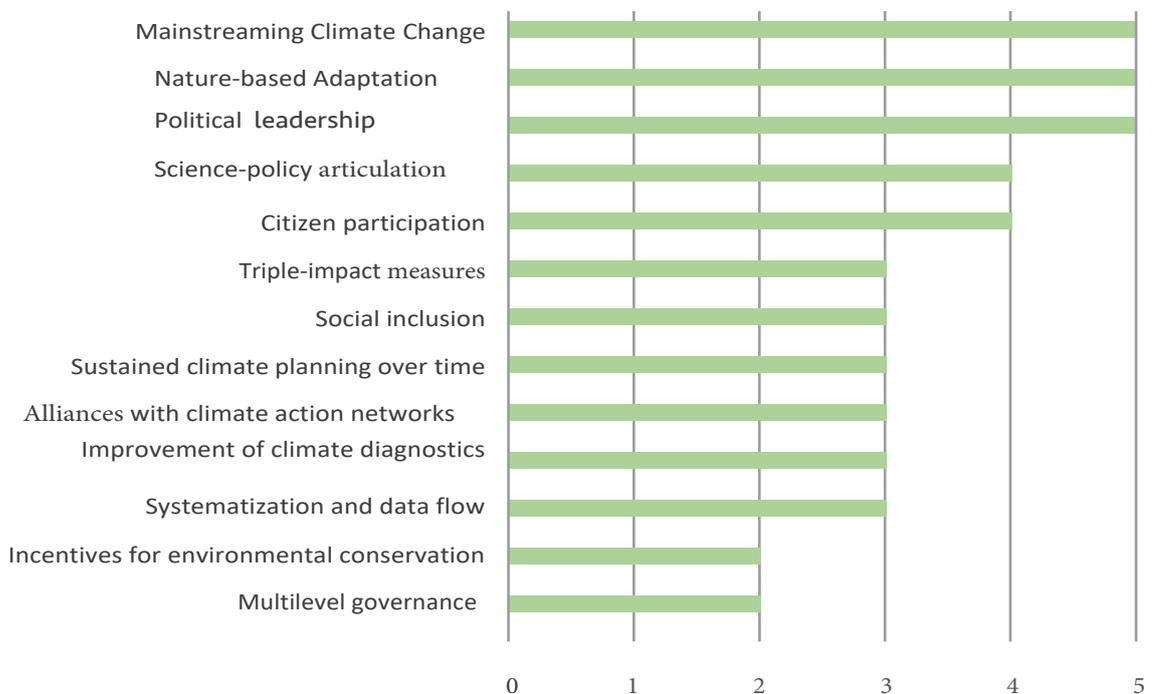
Public
participation

Conclusions

In the final stage of the project, the authors of the study, the cities and other webinar participants chose thirteen key concepts that are derived from the good practices already identified and encapsulate characteristics that climate action should include or reflect.

The following is an account of the relevance of key concepts in the cases. For example, it was found that the mainstreaming of climate change and the nature-based adaptation are relevant in all five cases, while environmental conservation incentives and multilevel governance in two. Figure 4 summarizes the frequency of the categories, where zero implies that the category is not relevant in any case and five that it is relevant in all cases.

Figure 4: Frequency of key concepts in the five case studies.



Source: Own elaboration

Mainstreaming climate change (5 cases)

In all the cases analyzed, the importance of mainstreaming climate change was identified. All the cities have some type of coordination body to work with the different areas of government, and most of the cases have institutional structures for working on climate change, both within the government, as well as in coordination with other actors from academia and civil society. With differences in the degree of progress, all cities have climate change cabinets or plans underway to generate similar structures.

Adaptation based on nature (5 cases)

In all the cases analyzed, the importance of the nature-based adaptation approach was highlighted. In order to promote its incorporation, the City of Buenos Aires created an Urban Nature Working Group to reach consensus on definitions and priorities for action in this regard. Rosario worked on this approach, especially in relation to water issues. Mendoza incorporated it as a complement to gray infrastructure measures to reduce the vulnerability of low-income piedmont neighborhoods. Corrientes is integrating it into its planning as part of a process of transformation of its urban planning paradigm. Ushuaia created a system of natural reserves within the municipal limits co-managed with civil society.

Political leadership (5 cases)

In all cases, mainstreaming climate change required strong leadership to get the areas involved with their specific agendas and priorities. In the cases analyzed, the highest local authorities prioritized climate action within the government agenda.

Science-policy articulation (4 cases)

Partnerships with universities or other research institutes with expertise in the subject are essential to overcome information gaps and technical and budgetary restrictions. Mendoza, Buenos Aires and Rosario decided to coordinate with the academic sector to work on their diagnoses and projections. Within the framework of Mendoza's Municipal Climate Change Committee, the need to carry out specific studies of its piedmont was highlighted and J. A. Maza University decided to carry out and finance the research.

For the City of Buenos Aires, having researchers from CONICET's Sea and Atmosphere Research Center enabled it to resolve information gaps on long-term climate projections. It also created an Advisory Council with the capacity to interpret complex technical analyses and associate them with climate actions to be taken by the city. For its part, Rosario developed an early warning system for the detection of intense storms with CONICET- Universidad Nacional de Rosario, and Ushuaia coordinated with academic institutions the management of several of its urban nature reserves.

Citizen participation (4 cases)

Citizen participation processes are key to the design, acceptance and implementation of climate action measures. Rosario, Mendoza and Ushuaia generated citizen participation processes that empower key actors. In the case of Mendoza, the figure of environmental, social and urban promoters was created, who, among other functions, derived the demands identified in the territory and carried out a survey of the perception of risk and vulnerability of the inhabitants within the framework of a project of the Municipal Committee on Climate Change. In turn, civil society also participates in the Commissions created by Ushuaia to manage several of its urban nature reserves. In Rosario, the Green Belt Project and the Urban Agriculture Program involved joint work with civil society, involving local fruit and vegetable producers. In addition, Rosario carried out participatory activities to raise awareness of the effects of climate change, where it also gathered information on the subject. Corrientes is in the process of structuring instances of citizen participation to validate its Land Management Plan.

Measures with triple impact (3 cases)

Triple impact measures are strategically designed to generate simultaneous environmental, social and economic benefits. Rosario, Mendoza and Ushuaia incorporated these types of measures in the cases analyzed. The city of Rosario carried out the Green Belt Project and the Urban Agriculture Program, which, among their benefits, reduce the heat island effect (environmental impact), generate local supply chains (social, economic and environmental impact) and enable and promote marketing spaces for producers (economic impact). The "Proyecto Integral La Favorita Quinta Etapa" in Mendoza, among other benefits, promotes the conservation of the piedmont ecosystem (environmental impact),

provides basic social infrastructure (social impact) and advances in the formalization of neighborhoods, which boosts their economic development (economic impact). In the case of Ushuaia, the reserve system contributes to water regulation and erosion control (environmental impact), an increase in the amount of green space per inhabitant (social impact), and a potential increase in tourism in the city due to greater natural attractions (economic impact), among other benefits.

Social inclusion (3 cases)

The risk of climate change increases if there are previous conditions of vulnerability. The cities of Ushuaia and Mendoza worked on social inclusion as a climate change adaptation measure, with the aim of transforming informal low income neighborhoods on the outskirts of the city, incorporating climate change projections for those areas. Rosario worked on social inclusion as part of its Urban Agriculture Program, which consists of allocating degraded public spaces, such as roadsides, for the production of community vegetable gardens. The program was created in 2001 as a social policy in response to the economic crisis.

Sustained climate planning over time (3 cases)

To update and sustain climate planning over time, it is important to have legislation to support the process. This makes it possible to progressively increase the climate ambition of cities. The climate action plans of Mendoza and Rosario are framed in specific municipal ordinances, while those of the City of Buenos Aires are framed in a climate change adaptation and mitigation law of 2011 and its regulation of 2014.

Alliance with climate action networks (3 cases)

The planning and continuous improvement of climate action process benefits greatly from the alliance with global networks of cities against climate change. Ushuaia's plan was developed in the context of the signing of an agreement between RAMCC and the city, from which work began on climate change adaptation and mitigation. Corrientes built its plan as part of a commitment made together with RAMCC and the Global Covenant of Mayors for Climate and Energy. ICLEI and C40 support was very relevant for the City of Buenos Aires both the climate planning process and to promote the issue on the government agenda.

Improvement of climate diagnosis (3 cases)

Cities do not always have up-to-date and accurate information at the time of preparing their plans. Corrientes, Buenos Aires and Mendoza deepened their diagnosis in a process of continuous improvement. Corrientes encountered difficulties in accessing and generating information, so it began to work on the development of its plan with available data and committed to progressively improve it. The City of Buenos Aires improved long-term climate projections and coordinated with its Advisory Council to connect data with climate actions. Finally, Mendoza generated micro-scale data on the piedmont through its link with the J. A. Maza University within the Municipal Climate Change Committee.

Systematization and data flow (3 cases)

Corrientes and the City of Buenos Aires are working on improving data processes. The City of Buenos Aires is working on a system of indicators validated by each government area to monitor and follow up on climate actions. Corrientes is starting to work on a climate action monitoring and reporting system, using the monitoring system already in place in other areas of the municipality. In addition, it incorporated vulnerability data from a National agency and since 2019 began collecting information to include the threat of wildfires in its risk map. For its part, Rosario worked on the creation of a set of tools through which information on hydrometeorological phenomena is presented publicly and accessible to citizens. These tools make up the city's early warning system.

Incentives for environmental conservation (2 cases)

Both Corrientes and Mendoza contemplate as a next step the generation of incentives to guide investments in infrastructure and change the behavior of the private sector. In the case of Corrientes, the aim is to modify the incentives of real estate developers, whose practices affect land use. Mendoza seeks to modify the behavior of private piedmont landowners.

Multilevel governance (2 cases)

Multilevel governance was identified in the cases of Mendoza and Rosario, where there were simultaneous vertical and horizontal governance processes. In Mendoza's "Proyecto Integral La Favorita Quinta Etapa", vertical coordination between the city of Mendoza, the national government and international institutions (World Bank) was found, as well as horizontal coordination for implementation of actions among different areas of government. In the case of the city of Rosario, different areas, levels of government, and academic institutions work on water issues.



Bibliography

Aguilar, S., D'Annibali, S., Godfrid, D., Caratori, L., Heins, A., Ramirez Cuesta A. (2021a). *Cities for Climate Alliance*. White Paper. Autonomous City of Buenos Aires.

Aguilar, S., Godfrid, D., Ramírez Cuesta, A., Scardamaglia, V., D'Annibali, S., Espinoza Proaño, C., Heidel, E., Heredia, A. S., Pacheco Alonso, A., Pugliese, N. (2021b). *"Cities facing climate change I: How to make a Climate Action Plan at the local level. Diagnosis and preliminary work for climate action."* FLACSO Argentina and Ciudad Autónoma de Buenos Aires. <https://ambienteycomercio.org/wp-content/uploads/2022/02/Manual-1-1.pdf>

Aguilar, S., Godfrid, D., Ramírez Cuesta, A., Scardamaglia, V., Heidel, E., Aneise, A. J., Cantore, M., Heredia, A. S., Magnelli, M., Pacheco Alonso, A., Pugliese, N., Rodríguez, G. V., Vogelfanger, A. D. (2021c). *"Cities facing climate change II: How to make a Climate Action Plan at the local level? Planning, governance and participation for climate action."* FLACSO Argentina and Ciudad Autónoma de Buenos Aires. <https://ambienteycomercio.org/wp-content/uploads/2022/02/Manual-2.pdf>

Aguilar, S., Godfrid, D., Ramírez Cuesta, A., Heidel, E., D'Annibali, S., Espinoza Proaño, C., Heredia, A., Pugliese, N., Scardamaglia, V. (2021d). *"Cities facing climate change III: How to make a Climate Action Plan at the local level. Implementation, monitoring and continuous improvement for climate action."* FLACSO Argentina and Ciudad Autónoma de Buenos Aires. https://ambienteycomercio.org/wp-content/uploads/2022/02/Manual-3_.pdf

Abraham, E., Roig, F., Salomón, M. (n.d.). *Planning and management of the piedmont west of Mendoza City. A pending issue*. Available at: https://www.asicprimerazona.com.ar/asic/publicaciones/planif_oeste_mza.pdf.

Boninsegna, J. A. (2014). *Impact of Climate Change on the oases of western Argentina*. CIENCIA E INVESTIGACIÓN - TOMO 64 N° 1 - 2014. Available at: https://notablesdelaciencia.conicet.gov.ar/bitstream/handle/11336/4849/p45-58-64-1-2014-5_1_.pdf?sequence=1&isAllowed=y.

City of Mendoza (2019). *The first Municipal Committee on Climate Change was created*. Creative Commons License. Available at: <https://ciudaddemendoza.gob.ar/2019/12/18/se-creo-el-primer-comite-municipal-de-cambio-climatico/>

City of Mendoza (2021). *City held the eighth meeting of the Municipal Climate Change Committee*. Retrieved 03/21/2022 from <https://ciudaddemendoza.gob.ar/2021/10/29/ciudad-realizo-la-octava-reunion-del-comite-municipal-de-cambio-climatico/>

Cristiá, A. (2021). *Climate Change Adaptation Strategy, Municipality of Corrientes*. Technical Workshops of Cities for Climate Alliance and FLACSO Argentina. Argentina.

Depietri, Y. and McPhearson, T. (2017). *Integrating the Grey, Green, and Blue in Cities: Nature- Based Solutions for Climate Change Adaptation and Risk Reduction*. Available at: <https://orenstein.net.technion.ac.il/files/2018/01/Depietri-e-McPhearson-2017-Integrating-the-Grey-Green-and-Blue-in-Cities-N.pdf>.

Dirección de Estadísticas e Investigaciones Económicas (DEIE) (2022). *Government of Mendoza*. Retrieved 04/03/2022 from <http://www.deie.mendoza.gov.ar/#/>

EEA (2016). *Urban adaptation to climate change in Europe 2016. Transforming cities in a changing climate*. Available at: <https://www.eea.europa.eu/publications/urban-adaptation-2016>

EEA (2021). *Nature-based solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction*. Available at: <https://www.eea.europa.eu/publications/nature-based-solutions-in-europe>.

FAO (2021). *Sustainable food production for a resilient Rosary*. Available at: <https://www.fao.org/agroecology/database/detail/es/c/1418219/>

Government of the Autonomous City of Buenos Aires (2021). *Climate Action Plan 2050*. City of Buenos Aires, Argentina. Available at https://www.buenosaires.gob.ar/sites/gcaba/files/pac_2050_0.pdf.

IPCC (2018). *Annex I: Glossary* [Matthews J.B.R. (ed.)]. In: *Global Warming of 1.5 °C, IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and the corresponding trajectories to be achieved by the IPCC. should track global greenhouse gas emissions, in the context of strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty* [Masson-Delmotte V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/10/SR15_Glossary_spanish.pdf.

IPCC (2021). *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate.

Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press. Available at:

https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Central_and_South_America.pdf.

IPCC. (2022). *Central and South America*. [Castellanos, E., M.F. Lemos, L. Astigarraga, N. Chacón, N. Cuvi, C. Huggel, L. Miranda, M. Moncassim Vale, J.P. Ometto, P.L. Peri, J.C. Postigo, L. Ramajo, L. Roco, and M. Rusticucci] In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press. Available at: https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_FinalDraft_Chapter12.pdf

Jänicke, M. (2017). *The Multi-level System of Global Climate Governance - the Model and its Current State*. Available at: <https://onlinelibrary.wiley.com/doi/10.1002/eet.1747>

Keeys, L. A. and Huemann, M. (2017). *Project benefits co-creation: Shaping sustainable development benefits. International Journal of Project Management*.

Magrin, O. G. (2015). *Adaptación al Cambio Climático en América Latina y el Caribe*. CEPAL. Available at: https://www.cepal.org/sites/default/files/publication/files/39842/S1501318_es.pdf

MAyDS (2020). *Second Nationally Determined Contribution of the Argentine Republic*. Ministry of Environment and Sustainable Development, Argentine Republic. Available at: https://www.argentina.gob.ar/sites/default/files/segunda_contribucion_nacional_final_ok.pdf

Mesa, N. A., Giusso, C. (2013). *Urbanization models in lands of high environmental vulnerability. Analysis of the occupation of the periphery of the Mendoza Metropolitan Area*. Nobuko EUDENE. Cuaderno Urbano.

Municipality of Corrientes (2019). *Climate Action Plan*. Available at: <https://pactodealcaldes-la.eu/biblioteca/plan-de-accion-climatica-corrientes-argentina/>.

Municipality of Corrientes (2020). *Informe de Gestión 2020*. Available at: https://ciudaddecorrientes.gov.ar/sites/default/files/informe_de_gesti_n_2020.pdf.

Municipality of Mendoza (2019). *Plan de Ordenamiento Territorial*. Available at: <https://ciudaddemendoza.gob.ar/wp-content/uploads/2019/04/PMOT.pdf>

Municipality of Mendoza (2020). *Local Climate Action Plan*. Creative Commons License. Available at: <https://gobiernoabierto.ciudaddemendoza.gob.ar/assets/pdf/plac.pdf>

Municipality of Ushuaia (2021). *Local Climate Action Plan 2030* (Preliminary version). City of Ushuaia, Argentina.

Municipality of Rosario (2020). *Local Climate Action Plan Rosario 2030*. Available at: <https://datos.rosario.gob.ar/ambiente/plan-local-de-accion-climatica>

Municipality of Rosario (2022). *Characteristics - Population by district according to Census 2010*. Retrieved 2/03/2022 from <https://www.rosario.gob.ar/inicio/caracteristicas>.

NASA (2022). *Wildfires Ravage Corrientes, Argentina*. Earth Observatory. Available at: <https://earthobservatory.nasa.gov/images/149478/wildfires-ravage-corrientes-argentina>

Noble, I.R., S. Huq, Y.A. Anokhin, J. Carmin, D. Goudou, F.P. Lansigan, B. Osman-Elasha, and A. Villamizar. (2014). *Adaptation needs and options*. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. 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, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 833-868. Available at: <https://www.ipcc.ch/report/ar5/wg2/>

UN (2020). *2020 Adaptation Gap Report. Executive Summary*. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/34726/AGR_sp.pdf?sequence=41

Ostrom, E. (2009). *A Polycentric Approach for Coping with Climate Change*. Available at: <https://ssrn.com/abstract=1934353> or <http://dx.doi.org/10.2139/ssrn.1934353>

Pham, T.T.T., Friðriksdóttir, R., Weber, C.T. et al. (2021). *Guidelines for co-creating climate adaptation plans for fisheries and aquaculture*. *Climatic Change*. Available at: <https://doi.org/10.1007/s10584-021-03041-z>.

Jordan, A., Huitema, D., Van Asselt, H., & Forster, J. (Eds.). (2018). *Governing Climate Change: Polycentricity in Action?* Cambridge: Cambridge University Press. Available at: <https://www.cambridge.org/core/books/governing-climate-change/033486F6DA7F2CD1F8F3D6011B17909B>.

Revi, A., D.E. Satterthwaite, F. Aragon-Durand, J. Corfee-Morlot, R.B.R. Kiunsi, M. Pelling, D.C. Roberts, and W. Solecki (2014). *Urban areas*. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. 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, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 535-612. Available at: <https://www.ipcc.ch/report/ar5/wg2/>

Rüdiger K.W. Wurzel, Duncan Liefferink & Diarmuid Torney (2019). *Pioneers, leaders and followers in multilevel and polycentric climate governance*. *Environmental Politics*, 28:1, 1-21, DOI: 10.1080/09644016.2019.1522033.

Solomon, P. (2017). *Comprehensive Landscape Analysis of Cerro la Gloria del Cerro la Gloria and its surroundings*. Mendoza, Argentina. Available at: <https://docer.com.ar/doc/n58vs10>

SAyDS (2014). *Tercera Comunicación Nacional de Cambio Climático*. Centro del Mar y de la Atmósfera. Buenos Aires, Argentina. Available at: <https://unfccc.int/resource/docs/natc/argnc3s.pdf>

University of Cuyo and United Nations Argentina (2015). *Forum on Climate Change: "Expectations in the face of COP21"*. Available at: <https://www.uncuyo.edu.ar/centroasuntosglobales/upload/foro-de-cambio-climatico-material-informtivo-base-naciones-unidas-en-argentina.pdf>.