



## CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

### PART I: PROJECT/PROGRAMME INFORMATION

**Title of Project/Programme:** Increasing socio-ecological resilience in the Uruguayan coastal zone and strengthening the adaptive capacity of its infrastructure: **REACC COSTAS**.

**Country:** Oriental Republic of Uruguay

**Thematic Focal Area:**

**Type of Implementing Entity:** Regional IE.

**Implementing Entity:** CAF, Corporación Andina de Fomento (Development Bank of Latin America).

**Executing Entities:** CND, Corporación Nacional para el Desarrollo.

**Amount of Financing Requested:** 10,000,000 (in U.S Dollars Equivalent)

**Project Formulation Grant Request (available to NIEs only):** Yes  No

**Amount of Requested financing for PFG:** Not applicable (in U.S. Dollars Equivalent)

**Letter of Endorsement (LOE) signed:** Yes  No

*NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: <https://www.adaptation-fund.org/apply-funding/designated-authorities>*

**Stage of Submission:**

- This concept has been submitted before
- This is the first submission ever of the concept proposal.

In case of a resubmission, please indicate the last submission date:

**Please note that concept note documents should not exceed 50 pages, including annexes.**

# Project/Programme Background and Context:

## Summary

1. Coastal erosion and coastal flooding are the main impacts of climate change on the Uruguayan coast. It is estimated that, already today, about 42% of the Río de la Plata coast and 32% of the Atlantic coast are subject to erosion, particularly during extreme events such as storms caused by wind and wave action. Flash floods are caused by a combination of meteorological and hydrological effects. The occurrence of high tides with large atmospherically induced storm surges has led to the deterioration and loss of beaches and dunes as well as damage to coastal infrastructure.
2. These problems are aggravated by rising sea levels and the increasing frequency of extreme events such as intense storms, a direct consequence of climate change. The ENSO phenomenon is of particular concern, as it has the greatest impact on precipitations. As a result, the threat to coastal cities, residential communities, infrastructure, beaches, wetlands, and ecosystems is increasing. The number of people affected grows in relation to the return periods of extreme events (RP5 several hundred; RP500 several thousand).
3. The economic cost of coastal erosion is already significant, reaching USD 45.5 million annually. This value is expected to increase by 25% by the end of the 21st century. It is evident that climate change will worsen existing challenges, such as drainage and river discharge problems, poor practices, and human-induced ecosystem degradation. These non-climatic factors add to the complex reality of a territory that is highly dependent on the tourism value chain.
4. The project has been conceived within the framework of the National Adaptation Plan for the coastal zone in the face of climate variability and change (NAP Costas), which has established a solid scientific evidence base on hazards and vulnerability and has carried out a broad multi-stakeholder and gender-sensitive and generation-sensitive consultation process to define priorities.
5. The project will be led by the Ministry of Environment, through its National Directorate of Climate Change (DINACC), which is the designated national authority before the Adaptation Fund and the institution responsible for the execution of the NAP Costas. CAF – Development Bank of Latin America will be the implementing agency (IE), and CND (*Corporación Nacional para el Desarrollo* in Spanish), will be the executing entity (EE), the same IE and EE as in the case of the binational project financed by the Adaptation Fund “Adaptation to climate change in cities and vulnerable coastal ecosystems of the Uruguay River” with which this project will coordinate actions and capitalize on the experience acquired.
6. The project will work in the six departments of the Uruguayan coastal zone: Colonia, San José, Montevideo, Canelones, Maldonado, and Rocha to increase the adaptive capacity of the population and the resilience of coastal ecosystems exposed to the risks of flooding and erosion, enhanced by climate change.
7. This project is based on a comprehensive and participatory approach that considers gender and generational aspects, supported by scientific evidence and the collaboration of diverse stakeholders at national, subnational, and local levels. It is oriented to promote the ecosystem-based adaptation (EbA) approach, seeking to transform the perception of the coast, promoting its care and resilience as a shared and accessible space for all people. It will focus on continuing to ensure the democratic access to public space on the coast in the long term, recognizing its value as a fundamental natural and social resource. In this way, it aims to achieve sustainable and equitable coastal development in the context of climate change.
8. The project, in compliance with the National Climate Change Policy<sup>1</sup> and international commitments (NDCs), will work on strengthening evidence-based coastal planning considering climate change (Component 1), promote investments in green and hybrid infrastructure to restore and conserve coastal ecosystems, improve drainage systems, and protect homes and buildings (Component 2), and raise awareness and build the capacity of coastal stakeholders to ensure that they are aware of risks and adaptation measures and actively engage in climate action (Component 3).

## The Uruguayan coast

9. The territory of the Oriental Republic of Uruguay is divided into nineteen administrative departments, six of which are located along the coastal zone on the Río de la Plata and the Atlantic Ocean. Such coastline is approximately 714 km long, of which 478 km correspond to the Río de la Plata and 236 km to the Atlantic Ocean. The predominant coastal formations are arc-shaped sandy beaches bounded by rocky points and dune ridges;

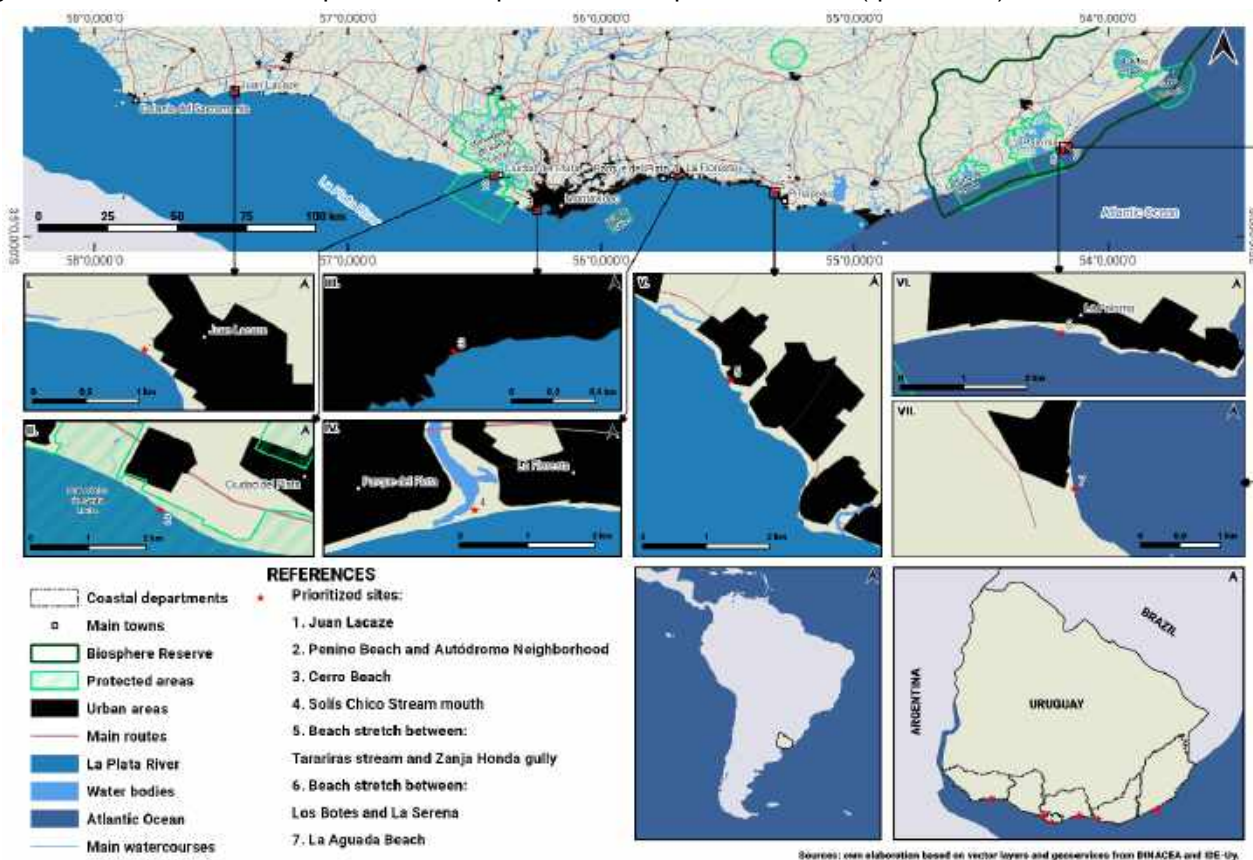
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<sup>1</sup> National Climate Change Policy. Strategic and programmatic instrument prepared by the National System of Response to Climate Change and Variability. Executive Order No. 310 of 3 November 2017.

coastal lagoons and wetlands are prominent along the ocean coast. The Uruguayan coastal zone contains very rich, diverse, and productive ecosystems, which provide goods and services that support activities such as fishing, tourism, navigation, port development projects, production of oil derivatives, and where urban and industrial establishments are located.

10. The following map shows the location of the six departments where the project will be implemented and the specific sites where investments in green and hybrid infrastructure will be focused (Component 2). These sites were selected following clear criteria. First, the pre-selection made by the departmental governments in the framework of the National Adaptation Plan for the coastal zone (NAP Costas) was taken into account. Then, the results of the population and ecosystem vulnerability analyses carried out during the formulation of the concept note were kept in mind and the prioritization criteria established by the Adaptation Fund were considered. As a result, the priorities of the departmental governments were combined with those of the Fund, which led to the selection of the sites presented below. It is important to note that, according to the results of the vulnerability analyses – presented later in this section – all of these sites present significant levels of climate risk.

**Figure 1.** General location map of coastal departments and prioritized sites (“pilot sites”).



## A) Social, environmental and economic context

### a) Demographic data in the project area

11. Uruguay has a land area of 17,621,500 hectares, the coastal zone is approximately 67,200 hectares long, of which 45,200 correspond to Río de la Plata and 22,000 to the Atlantic Ocean. Of the 6 coastal departments, 4 departments are on Río de la Plata (Colonia, San José, Montevideo and Canelones), while 2 departments are on the Atlantic Ocean (Maldonado and Rocha).
12. According to data from the 2011 Population Census, Uruguay has 3,286,314 inhabitants, 70% of whom live in the coastal departments.
13. The coastal area<sup>2</sup> represents 2.9% of the national surface and concentrates 49% of the national population, of which 38% corresponds to Montevideo, 5% to Maldonado, 4% to Canelones, 2% to Colonia, and San José and

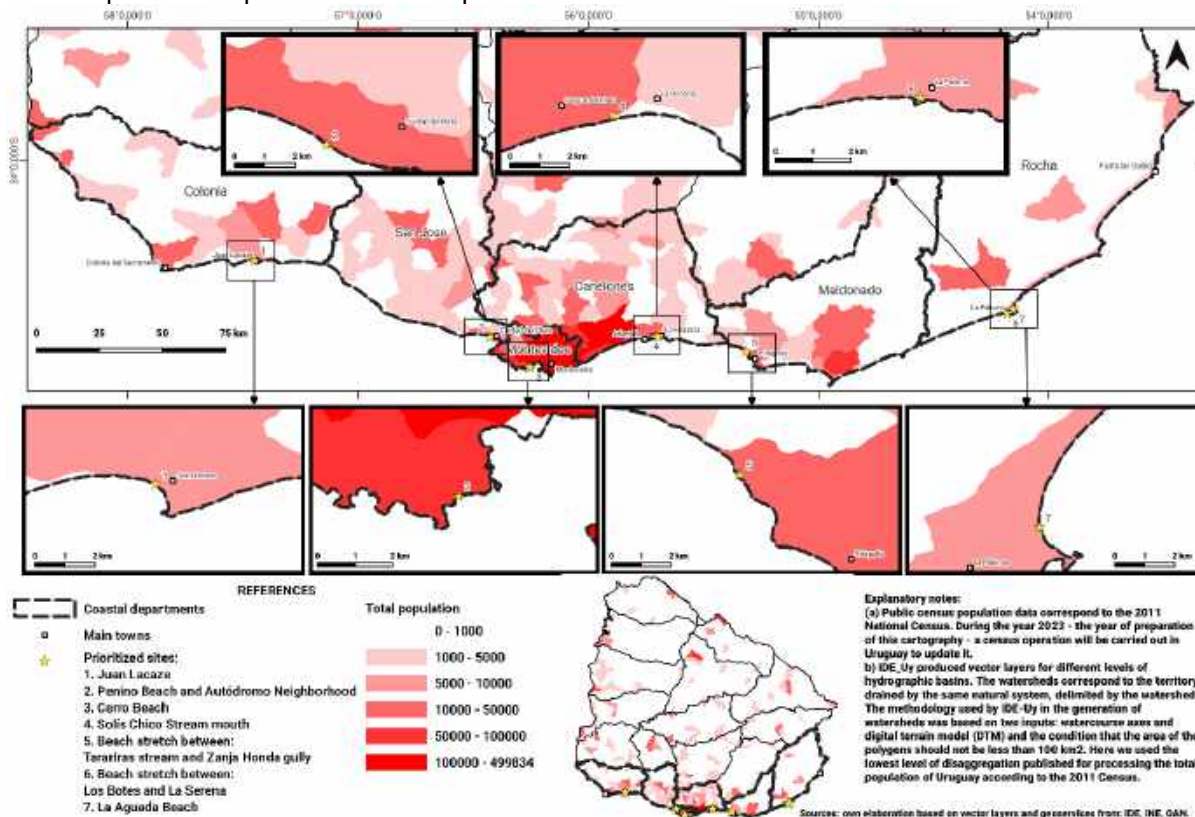
<sup>2</sup> Coastal area of Río de la Plata and the Atlantic Ocean, whose limitation is established in the National Directive for Territorial Planning and Sustainable Development of the Coastal Space of the Atlantic Ocean and Río de la Plata (Law No. 19772).

Rocha with values of less than 1%<sup>3</sup>.

**Table 1.** Population data of the coastal departments.

Coastal departments		Montevideo	Canelones	Colonia	Maldonado	Rocha	San José	Country total
Area (hectares)		53,053	453,098	610,995	479,706	1,055,703	500,893	17,621,500
Population	In absolute terms	1,319,108	520,187	123,203	164,300	68,088	108,309	3,286,314
	As the percentage of the total population	40.1%	15.8%	3.7%	5.0%	2.1%	3.3%	100.0%
	Percentage of the female population	53.4%	51.3%	51.1%	50.7%	51.1%	50%	52%
Population density per km <sup>2</sup>		2,488.9	114.7	20.2	34.3	6.5	21.7	18.6

**Figure 2.** Population map of the coastal departments.



14. **Education level:** In 2019<sup>4</sup>, the literacy rate of the population over 15 years of age was 98.8%. In turn, 29.9% of the population over 25 years of age had only completed primary school, while another 20.5% had tertiary education. Among the coastal departments, San José, Colonia and Rocha had the highest rates of adults with primary education (42%, 40% and 35.7%, respectively), while Montevideo had the lowest with 19.8%. Likewise, this department had the highest value (31.1%) of the population with tertiary level, while San José had the lowest (8.8%).
15. According to data from the Continuous Household Survey, ECH (*Encuesta Continua de Hogares*) 2019, in general, the female population has more years of education than the male population. Among the coastal departments analyzed, the population of Maldonado, Canelones and Montevideo has an average of between 9 and 10 years of education. It should be noted that in all of them, the average number of years of education for women is almost one year higher than that of men. This in turn has its correlation in the illiteracy rates by department, which are about half a point lower for women than for men. And the same trend is maintained for the female population in terms of attained tertiary education.

<sup>3</sup> Hoja Metodológica del Índice de Población Costera, Observatorio Territorial, DINOT – MVOT.

<sup>4</sup> Data based on the ECH 2019 of INE, Observatorio Territorio Uruguay.

16. Health and life expectancy: For the year 2016<sup>5</sup>, life expectancy at birth in Uruguay was 77.4 years, and in all departments, this indicator is around 77 years on average, except for Rocha and San José where it was lower, with 75.9 and 76.4 years respectively. Following the national average (80.6 for women and 73.8 for men), in all coastal departments, women have a higher life expectancy, with a difference of between 6 and 7 years depending on the department. Life expectancy at birth for women is higher in Colonia and Maldonado with respect to the national average: 81 years in both cases.
17. Disability: The percentage of people with disabilities to see, hear, walk or learn in Uruguay was equal to 15.7% in 2011 according to the national census (*Censo Nacional*). Within the coastal departments, Rocha had the highest proportion with 19.4%, followed by Canelones and San José with 16.8% for both. Maldonado presented the least with 13.8% of the total population.
18. Informal settlements: In 2018<sup>6</sup> the country, 330 irregular settlements were registered in Montevideo (54% of the country) and another 109 in Canelones (18% of the country). The other 4 departments add up to 38 more settlements. In Montevideo alone, 122,777 people lived in 34,425 homes in irregular settlements. Although most are concentrated in the north of the departments on the outskirts of the cities, there is a small percentage living on the coast, including the largest settlement in the country (Santa Catalina).
19. Unsatisfied basic needs: According to the 2011 census, 33.8% of the population had at least one unsatisfied basic need. The greatest deficit was concentrated in the lack of basic comfort items such as heating or water heating for bathing, while the second factor with the highest incidence was overcrowding. In addition, children and adolescents had a higher percentage of critical deficiencies than the adult population and there was a higher proportion of Afro-descendant population with UBN compared to the white population<sup>7</sup>. According to the 2006 Extended National Household Survey (ENHA 2006), the Afro-descendant population represents 9.1% of the total population.
20. Within the coastal departments, the highest percentages of people with at least one UBN were San José, Rocha and Maldonado with 35.7%, 35% and 34.5% respectively, while Montevideo had the lowest percentage with 26.8%.
21. Indigenous population: The reality of the groups that self-identify themselves as indigenous in Uruguay is different from that of other Latin American countries since they are not territorialized or living in communities directly from natural assets. In the ENHA 2006, the population that self-identified as indigenous was 2.9% of the total<sup>8</sup>.
22. Access to information technologies: The information surveyed in 2019<sup>9</sup> shows that almost 83.3% of the population in Uruguay uses cell phones and 82.9% has access to the internet. These numbers are similar in the coastal departments, except for Colonia, where the population with internet access represents the lowest number (75.7%). In terms of how men and women are linked to internet access and computer use, in all departments, women show greater use of cell phones, as well as greater access to the internet. In some cases, the differences are wider, for example in San José, where the percentage of women with internet access is 83.5% compared to 78.8% of men, or in Canelones and Rocha where there are more women with cell phones than men (85.6% and 83.5% respectively).

#### **b) Main economic activities (livelihoods)**

23. According to the World Bank, Uruguay's GDP in 2021 was USD \$ 61.41 billion and GDP per capita was equivalent to USD \$ 17,924. Montevideo contributes almost 50% of economic activity, Canelones 10%, Colonia and Maldonado around 5%, and Rocha and San José around 2.5%.
24. According to data from the Central Bank of Uruguay (*Banco Central del Uruguay*) in 2021, the tertiary sector represented 71.4% of Gross Value Added (GVA), the secondary sector 20.7%, and the primary sector 7.9%. Among the coastal departments, this composition differs: in Montevideo the participation of the primary sector is almost null, and the tertiary sector is more than 75% since it is an important financial and commercial center; Maldonado presents a similar structure with tourism as its main economic sector. Colonia and Canelones have a higher share of the industrial sector with more than 45% and 35% of GVA respectively, in the food and beverage, chemical products, machinery and equipment, and rubber and plastic products industries, among others. In Rocha and San José, the participation of each sector is more diverse: there is a greater participation

<sup>5</sup> Data based on information from INE, Observatorio Territorio Uruguay.

<sup>6</sup> Based on the Programa de Mejoramiento de Barrios (PMB-MVOTMA), Observatorio Territorio Uruguay.

<sup>7</sup> The Socioeconomic Vulnerability Analysis accompanying this Concept Note includes sex-disaggregated data for some unmet basic needs in the project intervention sites.

<sup>8</sup> Bucheli, M. & Cabella, W. (2007). Informe temático: Perfil demográfico y socioeconómico de la población uruguaya según su ascendencia racial. Encuesta Nacional de Hogares Ampliada 2006.

<sup>9</sup> Data based on the ECH 2019 of INE, Observatorio Territorio Uruguay.

of the primary sector (more than 20%), mainly in beef and dairy cattle production and cereals and oilseeds, but there is also an important participation of industry in San José and tourism in Rocha.

25. The tourism sector is very important for the economic activity of the project area in terms of generated income and employment. The tourism sector between 2015 and 2019<sup>10</sup> was equivalent on average to 7.5% of the national GDP and had a 43% incidence of the country's exported service revenues, with the main destination being Maldonado, followed by Montevideo and Rocha. It also creates a lot of employment: by 2019, 7.2% of total jobs were tourism jobs (127,664; 45.1% women) and were composed of 40.4% of the gastronomic sector, 21.2% of the transportation sector (land 16.8%, water 3% and air 1.4%), 16.6% of the accommodation sector and the remaining 21.8% was distributed among travel agencies and financial, recreational and cultural activities. Among the departments, in Maldonado it represented 12.3%, in Colonia 9%, in Rocha 7.2%, in Montevideo 6.9%, in Canelones 6% and in San José 3.6% of total jobs.
26. Fishing is a sector that is largely developed in the project area. In 2021<sup>11</sup> there were 767 vessels registered, of which 713 were artisanal fleets and had 1,590 crew members and 24% of the annual catch. 73% of the landings are marine fish and 16% are freshwater fish.
27. The national average per capita household income for the year 2022, according to the ECH, was equivalent to UYU \$28,648 (almost USD \$700). Only Montevideo was above the national average with UYU \$36,525 (USD \$888), Canelones and Colonia were the closest to the national average, together averaging around UYU \$26,741 (USD \$650), while Maldonado and San José averaged UYU\$ 23,544 (USD \$575) and Rocha was the lowest with UYU \$22,212 (USD \$540). However, if the poverty indicator is observed by income level and consumption basket for the year 2022, according to the ECH Montevideo is the coastal department with the highest proportion of poor population (12.8%), followed by Rocha with 11.4%, both are above the national average which was 9.9%, then Maldonado, Canelones and Colonia resulted in 7%, 6.3% and 4.5% of the population respectively and San José resulted in the lowest number with 1.8%. As for the indicator for people in households living in poverty, by 2022 there were no significant differences by sex, with the coastal departments following the trend recorded at the national level, whose data reflect a proportion of 9.5% for men and 10.3% for women.

### **c) Key ecosystems**

28. The coast of Río de la Plata and the Atlantic Ocean of Uruguay is made up of a mosaic of geomorphological formations and associated ecosystems such as rocky points, sandy beach arches, ravines, coastal lagoons and wetlands, all highly interrelated<sup>12</sup>. In a cross-sectional profile of a sandy coast, a healthy configuration implies a succession of ecosystems. First, there is the active littoral zone (ALZ) directly exposed to wave energy, where vegetation does not develop permanently and the fauna that inhabits it is adapted to these high-energy conditions. This is followed by the coastal dune ridge with herbaceous psammophilous vegetation. This cord serves as a buffer against wave energy and acts as a first protective barrier against extreme events. The vegetation that develops in association with the ridge allows the dune structure to reconfigure after the event<sup>13</sup>. Other dunes with a higher degree of stabilization (due to the vegetation) develop behind the first ridge. There the vegetation reaches a larger size, with an initial cover of shrubs and bushes and further into the territory of arboreal vegetation (forests). Behind the coastal dune ridge and between the dune fields there are topographically lower areas where wetlands, pools or temporary or permanent lagoons develop. These low areas are configured as microhabitats for many species due to the higher moisture content than the sandy environment.
29. There are also watercourses along the coast that flow into the coastal zone. In this hydrological basin, there are different types of wetlands or marshes that play an important role in buffering floods and retaining solids and nutrients, as well as reducing downstream discharges. The watercourses connect the coastal zone with the upper reaches of the basin and contribute sediment to the coastal system. In turn, the beach arcs are geomorphologically connected to each other through the coastal drift that transports sediments (in this case sandy) along the entire coast, in a predominantly NE direction from Cabo Polonio (Rocha) towards Brazil and in a SW or W direction from Cabo Polonio to Punta Gorda (Colonia), except for a stretch in a NE direction between La Paloma and La Pedrera (where La Aguada is included)<sup>14</sup>.

<sup>10</sup> Anuario Estadístico 2019, Ministerio de Turismo.

<sup>11</sup> Ministerio de Ganadería, Agricultura y Pesca (MGAP) - Dirección Nacional de Recursos Acuáticos (DINARA) - Economía Pesquera, Anuario Estadístico Nacional 2022.

<sup>12</sup> Trimble, M., Ríos, M., Passadore, C., Szephegyi, M., Nin, M., García Olaso, F., ... & Laporta, P. (2010). Ecosistemas costeros uruguayos: una guía para su conocimiento. Ed. Imprenta Monteverde, Montevideo, Uruguay.

Gómez, A., Echevarría, L., Caporale, M., et al. (2016). Introducción al Manejo Integrado de Zonas Costeras y Marinas. Montevideo: MVOTMA - UdelaR.

<sup>13</sup> Panario, D. & Gutiérrez, O. (2005). La vegetación en la evolución de playas arenosas. El caso de la costa uruguaya. *Ecosistemas*, 14(2).

<sup>14</sup> Panario, D. & Gutiérrez, O. (2006). Dinámica y fuentes de sedimentos de las playas uruguayas. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. & Conde, D. (Eds). Bases para la conservación y el manejo de la costa uruguaya. Vida Silvestre Uruguay, Montevideo. Pp. 21-34.

30. The flora and fauna composition, as well as the physicochemical characteristics of the ecosystems, vary along the east-west axis of the country due to the salinity to which they are exposed (with higher salinity towards the east). Uruguay's coastal strip has a high diversity of fauna. A high percentage of the country's tetrapod vertebrates inhabit the coast (56% of amphibians, 70% of birds, 66% of reptiles and 47% of mammals). These percentages are particularly high when considering the country's reduced coastal strip, which represents 2% of the continental territory and which has been suffering an accentuated process of habitat loss and fragmentation due to urbanization<sup>15</sup>.
31. Human intervention has generated anthropic ecosystems that have become part of the natural landscape of the Uruguayan coast over time. Although they do not fulfill the same functions as natural ecosystems, they do provide some ecosystem services<sup>16</sup>. These ecosystems consist of urban green and blue spaces and forest and agricultural crops.
32. Human activities that depend directly on ecosystems are related to artisanal and sport fishing in both oceanic and freshwater waters, the collection of reeds in wetlands and their use in construction, recreational and economic activities associated with sun and beach tourism, collection of plant material and shells for handicrafts, and port and sports activities, among other cultural services. In addition, ecosystems provide essential regulating services for the maintenance of human life and activities. The use of the beach as a public space is part of the recreational, economic and cultural activities of the local population (seasonal tourism and recreation). The differential use of this public space from a gender perspective shows that it is also perceived by women as a place where care activities are also carried out, as well as for care when they oversee children and adolescents<sup>17</sup>.
33. The historical human occupation of the coast (which had a very strong impulse in Uruguay in the 1940s) and the associated anthropic activities have led to a generalized affectation of coastal ecosystems, both by substitution (for example, by the advance of coastal urbanization over areas previously occupied by ecosystems) and by degradation of their quality (by contamination, the introduction of exotic species, logging or others), causing, in turn, a retreat of the coastline<sup>18</sup>. Of 22 plant formations described along the Uruguayan coast, 13 present conditions of conservation concern: four have been identified as endangered, six as vulnerable and three as rare<sup>19</sup>. This loss and fragmentation of ecosystems in turn leads to a loss of connectivity for fauna<sup>20</sup>.
34. The degradation of the beach ecosystem itself, as well as of the surrounding ecosystems intrinsically linked to it, has led to a situation of sand deficit that causes beach erosion problems all along the Uruguayan coast. The estimated loss for the present varies between 1,463 and 2,175 ha and is expected to increase by 21% by the end of the century, especially on the Rocha coast<sup>21</sup>.
35. The selected sites have different degrees of anthropization and therefore different degrees of ecosystem degradation. In some cases, urban development has severely restricted the growth of the ecosystems, degrading their structure and composition and conditioning the possibilities of future recovery and their capacity to provide ecosystem services as a buffer against hydroclimatological events. The site in the most extreme condition in this regard is Montevideo, where a boardwalk has been built immediately behind the coastal dune ridge.
36. There are different types of ecosystem protection measures at different territorial scales. In Juan Lacaze, the coast has been protected by categorizing the area as natural rural land in its Local Land Use Plan (*Plan Local de Ordenamiento Territorial*, PLOT). In Playa Penino and Autódromo, the categorization as natural rural land (*"Plan Local de Ordenamiento Territorial y Desarrollo Sostenible de Ciudad del Plata y su área de influencia"*) is combined with the previous declaration of the entire area as a nature reserve at the departmental level<sup>22</sup>. This site, in turn, borders a national protected area, the Santa Lucía Wetlands Managed Resource Protected Area

<sup>15</sup> Brazeiro A, Toranza C & Bartesaghi L (2009): Proyecto Biodiversidad Costera. Convenio EcoPlata-UdelaR/Facultad de Ciencias. Resultado 7 del Proyecto URU 06/016: 2.3.3

<sup>16</sup> Foley, J., DeFries, R., Asner, C., Barford, G., Bonan, S. R., Carpenter, F. S., ... & Snyder, P. K. (2005). Global Consequences of Land Use. *Science*, 309, 570-574.  
 Fernández, A. (2021). Guía de interpretación de información ambiental para el desarrollo de medidas de Adaptación Basadas en Ecosistemas en entornos urbanos. Informe final. Proyecto URU/18/002, "Integración del enfoque de adaptación en ciudades, infraestructuras y ordenamiento territorial". MA-UNDP.

<sup>17</sup> "Recomendaciones de género en la Zona Costera". Talleres en sitios pilotos: La Paloma, Piriápolis, Atlántida, Playa del Cerro y Kiyú. Plan Nacional de Adaptación al cambio Climático en la Zona Costera" (Guchin, M., August 2022)

<sup>18</sup> Gutiérrez, O. & Panario, D. (2006). Evolución de la desembocadura del Arroyo Pando (Canelones, Uruguay): ¿tendencias naturales o efectos antrópicos. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. & Conde, D. (Eds.). Evolución de la desembocadura del Arroyo Pando (Canelones, Uruguay): ¿tendencias naturales o efectos antrópicos

<sup>19</sup> Fagúndez C. & F. Lezama (2005). Distribución espacial de la vegetación costera del litoral platense y atlántico uruguayo. Informe Freplata. Ecology section, Faculty of Sciences -Udelar. Montevideo.

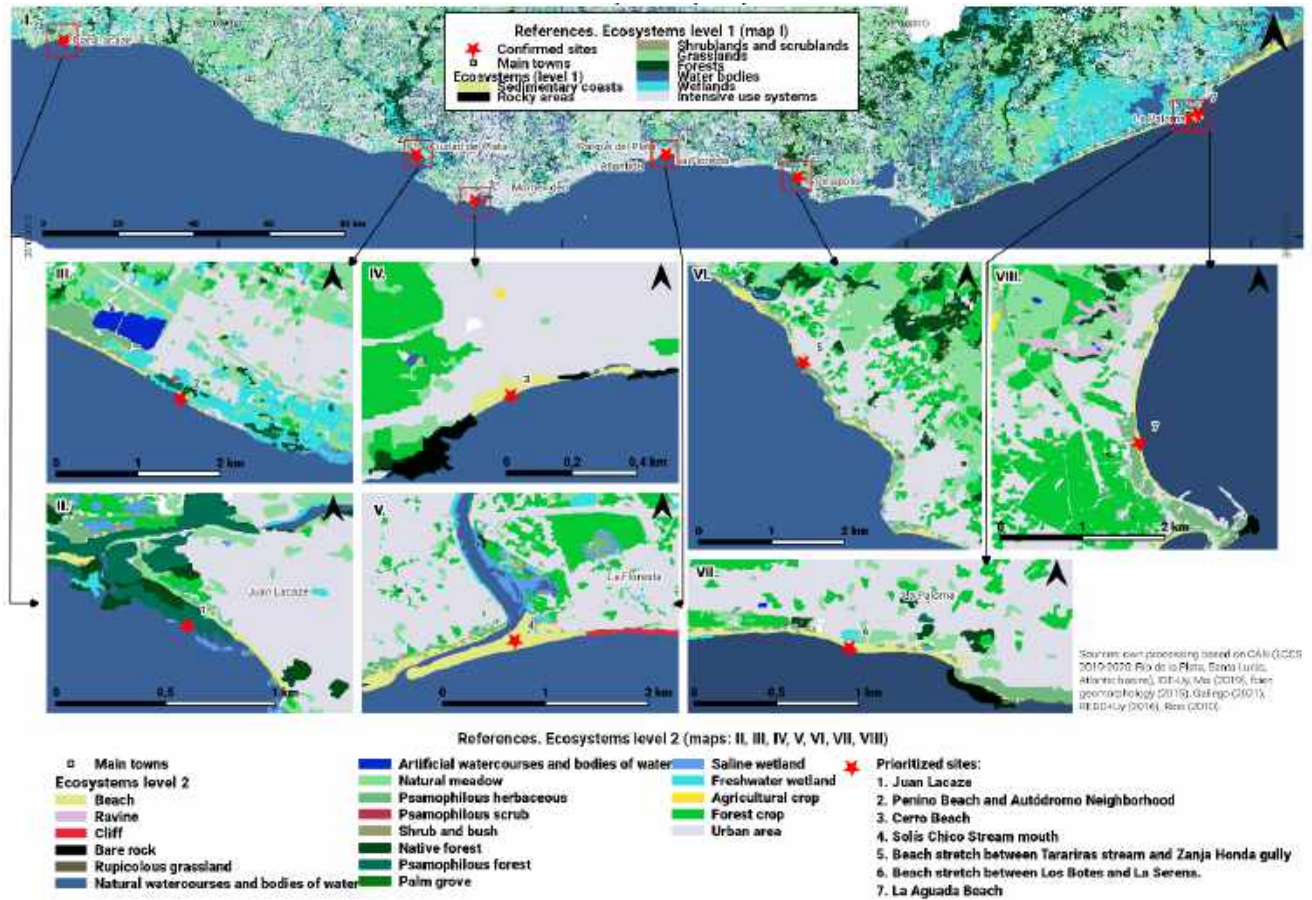
<sup>20</sup> Bartesaghi, L. (2015). Fragmentación y conectividad del paisaje costero para vertebrados e invertebrados prioritarios para la conservación Master's thesis in Biological Sciences. University of the Republic (Uruguay). Faculty of Sciences.

<sup>21</sup> IH-CANTABRIA 2019. Proyecciones de cambio climático del oleaje y residuo del nivel del mar en Uruguay. Proyecciones regionales del nivel medio del mar en Uruguay. Desarrollo de herramientas tecnológicas para evaluar los impactos, vulnerabilidad y adaptación al cambio climático en la zona costera de Uruguay. Product developed in the framework of the NAP COSTAS, MVOTMA-CTCN-AECID, 36 pp.

<sup>22</sup> Resolution 774/996 of the Departmental Government of San José.

(Área Protegida con Recursos Manejados Humedales de Santa Lucía)<sup>23</sup>, which protects the watershed that provides drinking water to more than half of the country's population. At the mouth of the Solís Chico stream, the determination of natural rural land in the PLOT, with the identification in the same Plan of the coastal strip and the dune system, as well as the mouth of the Solís Chico stream with the associated marshes converge as areas of ecosystemic value relevant for conservation. Specifically, the crayfish beds associated with the Solís Chico stream are recognized as relevant ecosystems and specific protection measures are established at the departmental level<sup>24</sup>. At the Maldonado department site, there is an initiative by a local neighborhood organization to protect small watercourses and vegetated areas that are considered biological corridors and to generate an urban nature reserve in Playa Hermosa, although none of the measures have been implemented. The selected stretches of beach in the department of Rocha are included within the Bañados del Este Biosphere Reserve<sup>25</sup> and to the west the Laguna de Rocha National Protected Area<sup>26</sup> is located adjacently.

**Figure 3.** Map of ecosystems in the prioritized sites.



#### d) Coastal governance

37. This section describes the key governmental and non-governmental actors for the project and preliminarily identifies those that should be considered to improve governance at the coastal level.
38. **Key governmental actors:** There are three levels of government in Uruguay: the national government, departmental governments represented by the departmental intendancies as the executive and local councils as the legislative, and local municipalities. The governors' offices are responsible for coastal zone management. The levels of coordination with the municipalities for the implementation of actions in the territories are variable. The municipalities depend on higher levels of government for their budget allocation and the granting of permits by the intendancies for the implementation of actions in the coastal zone, which often limits their capacity for action.

<sup>23</sup> <https://www.gub.uy/ministerio-ambiente/politicas-y-gestion/area-prottegida-recursos-manejados-humedales-santa-lucia-canelones-montevideo>

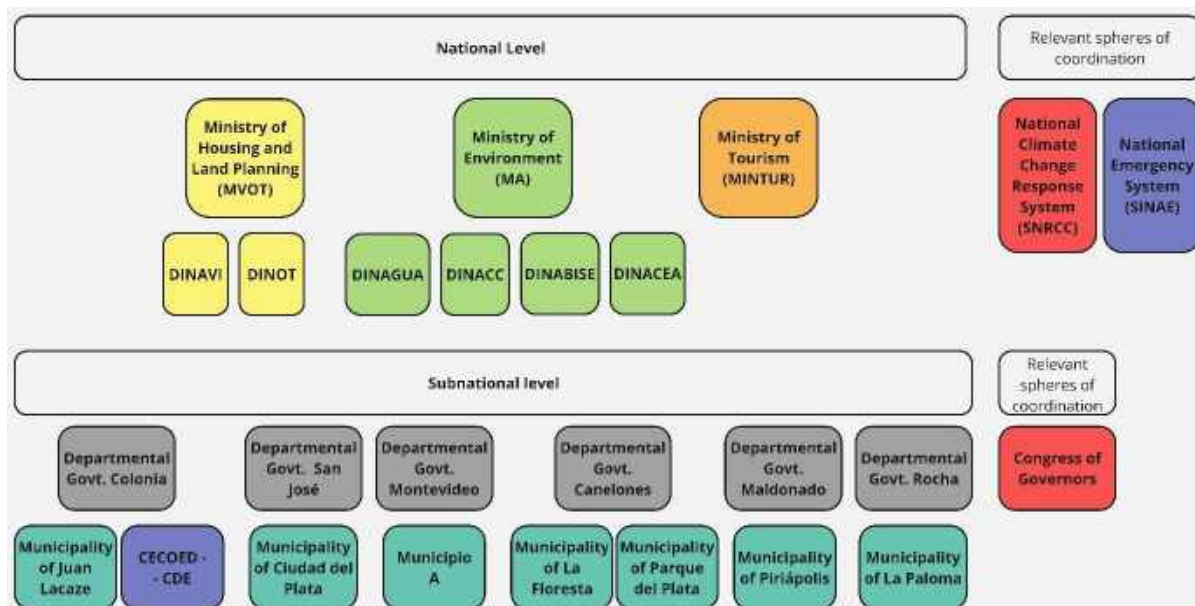
<sup>24</sup> Decree 0013/17 Local Plan Guidelines Costa de Oro and Resolution 20/07827 of the Mayor of Canelones, respectively.

<sup>25</sup> <https://www.probides.org.uy/reserva-biosfera.php>

<sup>26</sup> <https://www.gub.uy/ministerio-ambiente/politicas-y-gestion/paisaje-prottegido-laguna-rocha-rocha>



**Figure 4.** Key governmental actors for coastal management of climate change issues, relevant for the project.



*Caption: DINAVI (Dirección Nacional de Vivienda): National Housing Directorate; DINOT (Dirección Nacional de Ordenamiento Territorial): National Land Management Directorate; DINAGUA (Dirección Nacional de Aguas): National Water Directorate; DINACC (Dirección Nacional de Cambio Climático): National Climate Change Directorate; DINABISE (Dirección Nacional de Biodiversidad y Servicios Ecosistémicos): National Biodiversity and Ecosystem Services Directorate; DINACEA (Dirección Nacional de Calidad y Evaluación Ambiental): National Directorate of Environmental Quality and Evaluation; DNH: National Hydrographic Directorate; CECOED (Centro Coordinador de Emergencias Departamentales): Departmental Emergency Coordination Center. CDE (Comité Departamental de Emergencia): Departmental Emergency Committee.*

39. The National Climate Change Response System (*Sistema Nacional de Respuesta al Cambio Climático* in Spanish, SNRCC) was created in 2009 to work on climate change at the national level. This is a horizontal interinstitutional system with the participation of multiple ministries and the Congress of Governors (*Congreso de Intendentes*) (which brings together the governors of all the departments). The SNRCC is chaired by the Ministry of Environment through its DINACC. Within the framework of the SNRCC, a specific working group called “Adaptation in the Coastal Zone (*Adaptación en la Zona Costera*)” was created, coordinated by DINACC, and composed of DINABISE (DINACEA), DINAGUA (MA), DINOT (MVOT), MINTUR, University of the Republic (UDELAR) and the Spatial Data Infrastructure (*Infraestructura de Datos Espaciales*, IDEuy, decentralized body depending of the national Presidency), which integrated and guided the work within the framework of the NAP Costas.
40. For coastal management carried out by the municipalities and the departmental governments, the Ministry of Environment (*Ministerio de Ambiente*, MA) is both the technical reference for supporting the design of coastal and rainfall drainage measures (through DINAGUA, DINACC and DINABISE), as well as responsible for the control and the granting of permits for activities, construction or works in the coastal defense strip (through DINACEA). In planning and land management measures, this technical support is also provided by the Ministry of Housing and Land Planning (*Ministerio de Vivienda y Ordenamiento Territorial*) through DINOT and in urban rehabilitation through DINAVI.
41. In the integrated risk management and response to emergencies and disasters – in many cases related to floods, although not exclusively – inter-institutional coordination at the national level is carried out within the framework of the SINAE. At the departmental level, the existing spheres dependent on or linked to the SINAE are the CDE and CECOED, made up of representatives of the departmental governments and the municipalities, depend on this institution.
42. At the national level, Uruguay has Early Warning Systems (EWS) to reduce the impact of floods in the Uruguay River, Río Negro (regulated basins), and in the basins of the Yi River (Durazno), Cuareim (Artigas), and Santa Lucía (this is a preliminary EWS). The systems installed are developed from an end-to-end point of view by DINAGUA and following the four recommended components: 1. Flood risk awareness, 2. Detection, monitoring and forecasting, 3. Dissemination and communication, and 4. Preparation and response. The Delft-FEWS tool, an open data management platform that functions as a flood forecasting and warning system, has been incorporated for these river basins. So far, no EWS has been developed in Uruguay to mitigate the risk of coastal flooding.

43. DINAGUA also makes flood risk maps of cities and estimates and characterizes the population in flood-prone areas, which is defined as the population exposed to a 100-year return period flood event. This information is updated annually with the publication of the National Atlas of Floods and Urban Storm Drainage.
44. For the implementation of the Gender Action Plan, the gender directorates in each department are key actors. At the national level, the Gender and Climate Change Action Plan (*Plan de Acción en Género y Cambio Climático*, PAG-CC Uy) articulates with the National Gender Council (*Consejo Nacional de Género*). Since 2018, there is the Gender and Climate Change Working Group (*Grupo de Trabajo de Género y Cambio Climático*), formed by representatives of the gender mechanisms of the agencies that are part of the National Climate Change Response System (SNRCC). Since 2019, there is a National Gender and Climate Change Strategy (*Estrategia Nacional de Género y Cambio Climático*, ENGCC), which established the approach and methodology to integrate the gender perspective in key instruments of climate change policy, such as the NDCs and their Monitoring, Reporting and Verification system; the National Adaptation Plans; the National Greenhouse Gas Inventory (*Inventario Nacional de Gases Efecto Invernadero*) and the Green Climate Fund Country Program.
45. In the consultations with the departmental governments (see section H), needs for institutional strengthening in risk prevention, gender and generations mainstreaming, management of environmental and social safeguards, and monitoring of the impact or effectiveness of adaptation measures were identified.
46. The need to work on planning instruments: To strengthen the bases for climate action on the coast, it is essential to work on the regulation of the National Coastal Space Directive (*Directriz Nacional del Espacio Costero*, DNEC). This guideline has the status of a Law (19772)<sup>27</sup> and its regulation is a commitment assumed by Uruguay in the Second NDC<sup>28</sup>. The most appropriate format and technical criteria for the application of the different articles have not yet been defined, nor what their application implies in terms of management by the Ministry of the Environment. On the other hand, although most of the Land Use Plans (PLOT) have incorporated the consideration of climate change, there is no uniformity in the criteria and in general they are not sufficiently concrete in terms of effective measures to be implemented in the framework of the NAP Costas.
47. **Key non-governmental actors**: At the local level, people living along the coast have organized themselves both to implement conservation and restoration actions and to make their demands known to the competent institutions. Some of the civil society organizations active in the prioritized sites are *Vecinos por la playa* in Playa del Cerro (Montevideo), *Liga de Fomento de La Floresta* (Canelones), *Organización vecinal Playa Verde* (Maldonado) and *Acción Vecinal de La Paloma* (Rocha). Section H lists the organizations that were consulted for the elaboration of this proposal. Some of these organizations are also part of the Unión Grupos de la Costa network, made up of 47 non-governmental organizations from the six coastal departments. This network has expressed that institutional and private interventions in the coastal zone degrade the quality and size of natural coastal ecosystems, affecting their resilience.
48. The participation of social organizations is provided for in Uruguayan regulations for multiple specific instances of consultation such as the preparation of land use planning instruments, the creation of protected areas and the approval of environmental authorizations for projects that are expected to have significant impacts. There are also permanent participation areas where social organizations converge with governmental institutions and academia, such as the protected areas advisory commissions, watershed commissions and fishing councils. Specifically in the sites where this project will be developed, local organizations participate permanently in the Specific Advisory Commission of the Santa Lucía Wetlands Protected Area (*Comisión Asesora Específica del Área Protegida Humedales de Santa Lucía*) and the Laguna del Cisne Basin Commission (*Comisión de Cuenca de la Laguna del Cisne*), in the framework of which a specific working group was created to address the problems of the Solís Chico stream. Participation in these areas, however, is not binding.
49. Other ways in which the organizations are participating in coastal management are by coordinating with the departmental governments and municipalities for the definition of actions when these institutions enable communication routes, as well as participating voluntarily in the implementation of actions, for example, in the restoration of the coastal dunes and revegetation.

#### e) Climatic context on the Uruguayan coast

##### **Observed climate**

50. Uruguay is the only South American country that is completely within the temperate zone, presenting tropical and extratropical climate characteristics. It is under the strong influence of the South Atlantic High-Pressure

<sup>27</sup> Law No. 19772 - Regulación del Ordenamiento Territorial y Desarrollo Sostenible del Espacio Costero del Océano Atlántico y del Río de la Plata: <https://www.impo.com.uy/bases/leyes/19772-2019>

<sup>28</sup> Action No. 35. By 2030, Law 19.772 referring to the National Guideline for Territorial Planning and Sustainable Development of the Coastal Space of the Atlantic Ocean and Río de la Plata will have been regulated.

System, which controls winds and precipitation within the national territory<sup>29</sup>.

51. **Temperature:** The average annual temperature in Uruguay is 17.5°C, ranging from about 20°C in the northeast to about 16°C on the Atlantic coast. This **average temperature has increased by about 0.8°C over the last 65 years** (comparing the decades 1961-1980 and 1995-2015), with greater warming in the eastern region throughout all seasons<sup>30</sup>.
52. During the last decade, there have been significant changes in sea surface temperature (La Plata River and Exclusive Economic Zone, Atlantic Ocean shelf). Based on the linear model (NOAA OI. V2<sup>31</sup>), from 1982 to 2018, **sea surface temperature increased 0.46°C each decade**<sup>32</sup>. The confluence of the Brazil and Falkland currents (37°-38° S) controls the mean conditions and variability of this oceanic region, while there is a south-north gradient in sea surface temperature with cold waters off Buenos Aires and warm waters off southern Brazil.
53. **Precipitation:** Regarding mean precipitation, **an increase in the order of 10-20% has been observed during the spring, summer and autumn seasons (1961-2017)** in most of the country, with greater changes in the eastern region concentrating in the autumn (50 mm). Although the results are not conclusive due to their high variability, they seem to indicate an increase in short duration extreme rainfall. The quarterly wind climatology in Uruguay is determined by the position of the semi-permanent South Atlantic anticyclone. The trend of surface winds in the Atlantic Ocean basin has shown a southward shift of easterly and westerly winds that is mainly attributed to ozone depletion<sup>33</sup>. In Uruguay, these **changes have modified the seasonal pattern of winds in coastal areas**<sup>34</sup>.
54. **Sea level:** On a national scale, several studies<sup>35</sup> have estimated **sea level rise** in Montevideo at 11 cm, of which 2-3 cm correspond to the last three decades. The variation is even greater in the rest of the tide stations along the Uruguayan coast (La Paloma, Punta del Este, Colonia).

#### Projected climate

55. Barreiro et al. (2019)<sup>36</sup> used ten models to best represent the climate of Uruguay; each was run for the SSP245, SSP370 and SSP585 scenarios for two-time horizons: short term (2020-2044) and long term (2075-2099).
56. **Temperature:** When comparing the observed and simulated evolution of the mean annual temperature in Uruguay for the period 1961-2014 with the projections for the end of the 21st century, an **almost linear increase in the mean annual temperature can be observed**.
57. **Precipitation:** Uruguay's **total annual precipitation** shows **high variability** over the year, ranging from -5 to 10% for the short-term horizon and -7 to 35% for the long-term horizon. Future projections show a **gradual positive trend with an increasing occurrence of extreme events**. The interannual phenomenon with the greatest impact on rainfall in Uruguay is ENSO. The CMIP5 model shows that **extreme events associated with ENSO tend to increase in frequency** as global temperature increases. In addition, extreme events related to La Niña could become more frequent, especially three-month drought events over a short-term horizon.
58. **Sea level:** The projected average sea level rise for the RCP8.5 scenario is 80 cm by the end of the century.

#### Observed impacts

59. It is estimated that 191 km of Río de la Plata coast (from Nueva Palmira to Punta del Este) present some type of **coastal erosion** process, manifested in active cliffs, ravines, headlands, and platforms; all these geographic features represent 42% of the Uruguayan coast<sup>37,38</sup>. In addition, 32% of the Atlantic coast (Punta del Este – Barra del Chuy, 74 km) is subject to erosion, particularly during extreme events such as storms caused by wind and wave action<sup>39</sup>.

<sup>29</sup> Barreiro, M., F. Arizmendi, & R. Trinchín (2019b). Variabilidad observada del clima en Uruguay. Product carried out in the framework of the Plan Nacional de Adaptación Costera and the Plan Nacional de Adaptación en Ciudades, MVOTMA – Faculty of Sciences Agreement, 52 pp. Funded by UNDP URU/18/002 and AECID-ARAUCILIMA 2016.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Cited in NAP Costas as Ortega 2019, pers.comm.

<sup>33</sup> Barreiro, M., F. Arizmendi, R. Trinchín, Y. Montesino Y, & R. Santana (2020), Variabilidad de vientos regionales y relación con lluvias en Montevideo y nivel del mar en la costa. Agreement MVOTMA - Faculty of Sciences, 30 pp. Funded by projects PNUD-URU/16/G 34 and AECID-ARAUCILIMA 2016.

<sup>34</sup> Ibid.

<sup>35</sup> FCien (2009), Escenarios climáticos futuros y del nivel del mar, basado en los modelos climáticos globales y efecto de los vientos y caudal sobre las fluctuaciones del nivel del mar. Report N° II: Information on the results of outputs 3, 6 and 8 of the FCien Convention - Project URU/07/G32, Montevideo June 2009.

<sup>36</sup> Barreiro, M., F. Arizmendi, & R. Trinchín (2019). Variabilidad observada del clima en Uruguay. Product carried out in the framework of the Plan Nacional de Adaptación Costera and the Plan Nacional de Adaptación en Ciudades, MVOTMA - Faculty of Science Agreement, 52 pp.

<sup>37</sup> Goso Aguilar, C.A., & R. Muzio (2006). Geología de la costa uruguaya y sus recursos minerales asociados. In: Menafrá R, Rodríguez-Gallego L, Scarabino F & Conde D (eds). Bases para la conservación y el manejo de la costa uruguaya. VIDA SILVESTRE URUGUAY, Montevideo. Pp: 9-19.

<sup>38</sup> Goso Aguilar, C., V. Mesa, & M. C. Alvez (2011), Sinopsis geológico-ambiental de la costa platense y atlántica de Uruguay. In: Problemática costera en Provincia de Buenos Aires, Uruguay y Río Grande del Sur. p.: 59-76. Eds: Marcomini S and López R. Publisher: Croquis, Buenos Aires.

<sup>39</sup> Ibid.

60. Sea level rise (1.1 mm per year-1)<sup>40</sup>, a deficit in the sediment balance and the consequences of some coastal engineering works during the 1970s and 1980s would be the main causes of coastal erosion processes in Uruguay. In relation to coastal cliffs, shoreline retreat ranges between 0.5 and 1.1 m per year-1. In some cases, the effects of storms and increased rainfall combine, resulting in events with a high energetic concentration of waves and fluvial outflows that end up eroding unconsolidated materials.
61. Along the coasts of Río de la Plata and the Atlantic Ocean, **flash floods** are caused by a combination of meteorological and hydrological effects. The occurrence of high tides with large atmospherically induced storm surges has raised the sea level to three meters above its normal level, causing the loss of beaches and dunes, damage to coastal infrastructure and limitations to maritime transportation. In terms of **ecosystem** risk in the event of flooding, the area currently affected is about 500 ha of ecosystems considered vulnerable.

### Projected impacts

62. Climate variability and change will exacerbate the impact of current threats in the coastal zone, either by magnifying current sources of stress or by direct habitat destruction and species loss<sup>41</sup>.
63. **Sea level rise** (RCP8.5 = 80 cm by the end of the century) and the **possibility of stronger storms** pose an increasing threat to **coastal cities, residential communities, infrastructure, beaches, wetlands and other ecosystems**. The number of people affected increases in relation to the return periods of extreme events (RP5 several hundred; RP500 several thousand). The currently expected annual damage from **erosion** is approximately USD \$45.5 million, a value that will increase by approximately 25% by the end of the 21st century. Also, by the end of the 21st century, the damage caused by **structural coastal erosion from mean sea level rise** may be as significant or even more significant than the annual coastal erosion caused by extreme events in the six coastal departments. In Montevideo, **coastal retreat** of 1.7 m is expected for every centimeter of sea level rise<sup>42</sup>. In any scenario, the greatest damage is observed in residential property, corresponding to 50% of the damage affecting all built assets. Services is the next most affected category.

**Figure 5.** TR100 horizon 2100 RCP8.5 flood curves for two of the sites most threatened by coastal flooding: Juan Lacaze in the department of Colonia (left) and Playa Penino in the department of San José (right)<sup>43</sup>.



64. It is worth noting that for a time horizon to 2050 and in a pessimistic scenario (RCP 8.5), the **coastline in all Uruguayan beaches will recede  $\leq 5$  m.**; while at the end of the 21st century and for an average increase in mean sea level, a great differentiation is observed in the different stretches of coastline, especially in the fine sand and shallower beaches where the value can vary between 5 and 20 m. **From the perspective of the recreational services** provided by the country's 205 beaches, it was observed that at least 20 of them will be significantly affected, including the impacts that will be caused to the resident population and the internal and receptive tourism of these coastal resorts.
65. **Ecosystem** risk in the event of flooding shows an increase in impact of 17% by 2050 and 40% by the 2100 horizon.
66. Each of these impacts is described in more detail in the following sections. The following figure summarizes the

<sup>40</sup> Nagy, G., M. Gómez-Erache and V. Fernández (2007). El aumento del nivel del mar en la costa uruguaya del Río de la Plata: Tendencias, vulnerabilidades y medidas de adaptación. Medio Ambiente y Urbanización. Cambio Climático Vulnerabilidad y Adaptación en Ciudades de América Latina, IIED- AL 67: 77-93.

<sup>41</sup> Gómez-Erache, M. (2013), Condiciones de referencia para la implementación del monitoreo nacional del Río de la Plata y su Frente Marítimo. UNDP-GEF RLA/99/G31. 65 pp.

<sup>42</sup> Gutiérrez, O., D. Panario D, G.J. Nagy, M. Bidegain, C. Montes (2016), Climate teleconnections and indicators of coastal systems response. Ocean & Coastal Management, Volume 122: 64-76.

<sup>43</sup> The quantification of the local-scale impact of sea level rise projections in Uruguay was performed by IH-CANTABRIA using historical sea level databases (IMFIA 2018), as well as high-resolution risk dynamics projections. The methodology is described in the document "Desarrollo de herramientas tecnológicas para evaluar los impactos, vulnerabilidad y adaptación al cambio climático en la zona costera de Uruguay" (IH-Cantabria, 2019).

main climate hazards and impacts and aims to visually show those main hazards and impacts expected on a diverse coast like the Uruguayan.

**Figure 6.** Main hazards and impacts on the Uruguayan coastline.



**Impacts on the population**

67. According to DINAGUA data, almost 100,000 people and more than 34,000 homes are in flood-prone areas in the country, with Juan Lacaze being one of the areas with the highest percentage of flood-prone population

(3,167 people, 51.7% women – representing almost 25% of its population). In order of importance, of the prioritized sites, the population most exposed to coastal flooding after Juan Lacaze are the neighborhoods Cerro with 853 people (52.4% women) and Autódromo and Penino with 823 (50% women).

68. The impacts of coastal flooding and erosion have a series of effects on the quality of life of the coastal population and socioeconomic repercussions associated with the loss of coastal habitats: loss of natural resources, damage to coastal infrastructure, decline in tourism and recreational and transportation activities, and even risk to human lives and property.
69. Occasionally, floods directly damage the quality of life, homes, and workplaces of the people closest to the coast. According to projections made by IH Cantabria (2019), the number of people affected increases in relation to the return periods of the extreme events considered (RP5 several hundred; RP500 several thousands). Future projections for 2100 show that the number of potentially affected people is higher in the RCP8.5 scenario, increasing by 300% in relation to the current state.
70. On the other hand, coastal erosion and rising sea levels are causing the loss of beaches, which has a direct impact on those who depend on the tourism industry based on the “sun and sand” concept, also on those who make use of the coast as a public space for recreation and maintenance of social ties throughout the year (especially women and children)<sup>44</sup>. Many resort towns depend heavily on this economic activity, and any downturn in the tourism sector can have significant and negative consequences for the economy, threatening many jobs. Finally, saline intrusion also affects the supply of drinking water in coastal communities, which has serious implications for the health of their inhabitants.

### **Impacts on ecosystems**

71. Rising sea levels and storm surges accentuate the erosion of gullies and erode sandy beaches, generating a loss of both the width and slope of the beach and the associated vegetation that sustains the structure of the coastal dune chain. The study conducted by IH Cantabria (2019) for Uruguay estimates for the 2100 horizon an average eroded area in the RCP4.5 scenario associated with the setbacks with return period 25 and 50 years of 1,156 and 1,232 hectares. This eroded area is greater in the RCP8.5 scenario, with values of 1,475 and 1,619 hectares.
72. The discontinuities that occur in the structure of the coastal dune chain imply, on the one hand, the transport of sand out of the coastal system, generating a sediment deficit<sup>45</sup>. On the other hand, they increase the risk to other ecosystems located behind the ridge, since these discontinuities allow the sea to enter the territory, flooding the ecosystems with salt water (as well as human infrastructures) that were previously protected by the ridge.
73. In turn, the increase in precipitations implies an increase in rainfall runoff, which, given the current degree of soil impermeability and the degradation (or elimination) of ecosystems that fulfill the function of buffering, such as wetlands, reaches the coastal dunes, breaks them (generating discontinuities such as those mentioned above) and discharges onto the beaches. This increase in rainfall discharges to the beaches, in turn, causes an increase in the water table, humidifying the beaches<sup>42</sup> and decreasing the ability to recover after extreme events and affects the macrobenthic community that inhabits this area<sup>46</sup>. Broadly speaking, these freshwater discharges alter the coastal biological communities (associated with sandy or rocky substrates) adapted to higher salinity levels.
74. The increase in rainfall also implies an increase in the flows discharging into natural watercourses, which generates migrations of the mouths and affects ecosystems and human infrastructure in these new areas reached by the water.
75. Ecosystem degradation, in turn, affects the species that depend on them. In particular, species with specific habitat requirements are those that will be most strongly impacted. For Uruguay, there are precedents for assessing the impacts on terrestrial vertebrate species<sup>47</sup>. In general terms, the studies have analyzed the geographical distribution of species, changes in their phenology, susceptibility to eggs or early stages, changes

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<sup>44</sup> Dirección Nacional de Cambio Climático, Ministerio de Ambiente de Uruguay (2022). Recomendaciones de género en la adaptación costera Talleres en sitios pilotos: La Paloma, Piriápolis, Atlántida, Playa del Cerro y Kiyú. Report prepared by M. Guchín, in the framework of the Plan Nacional de Adaptación al cambio Climático en la Zona Costera.

<sup>45</sup> Goso Aguilar, C., Mesa, V. & Alvez, M.C. (2011). Sinopsis geológico-ambiental de la costa platense y atlántica de Uruguay. In: López, R.A. & Marcomini, S.C. Problemática de los ambientes costeros, Sur de Brasil, Uruguay y Argentina. Buenos Aires: Croquis. Pp. 59-76.

<sup>46</sup> Limongi, P. (2017). La macrofauna bentónica como indicadora de integridad ecológica en una playa oceánica de uso turístico: playa El Rivero, Punta del Diablo, Uruguay. Graduate thesis, University of the Republic (Uruguay). Faculty of Sciences

<sup>47</sup> Ríos, M., Cortes, G., Laufer, G., Pereira-Garbero, R., Bergós L. & Soutullo, A. (2012). Impactos proyectados del cambio climático en Uruguay sobre los vertebrados terrestres. IIBCE, MEC. Unpublished. 39 pp.

Toranza, C. (2011). Riqueza de anfibios de Uruguay: determinantes ambientales y posibles efectos del cambio climático. Master's thesis University of the Republic (Uruguay). Faculty of Sciences - PEDECIBA.

Vaz Canosa, P. (2022). Evaluando la vulnerabilidad al cambio climático de los anfibios y reptiles nativos de Uruguay. Master's thesis. University of the Republic (Uruguay). Faculty of Sciences - PEDECIBA.

in the sex ratio of offspring, reduction in body size, susceptibility to UV radiation, susceptibility to diseases and invasive exotic species, tolerance to fire and the effects of habitat and microhabitat degradation.

76. Changes in climatic conditions converge with other non-climatic threats to ecosystems to form what has been called the *triple whammy*<sup>48</sup>, which includes impacts associated with increased urbanization and industrialization, increased use of resources such as water, space and food from the sea, and increased susceptibility (or sensitivity) and decreased resilience and resistance of ecosystems to the effects of climate change<sup>49</sup>.

#### **Impacts on infrastructure at prioritized sites**

77. The impact of climate change on infrastructure at the national level was studied by the NAP Costas<sup>50</sup>, concluding that in any of the scenarios it is clear that, in the face of flooding, the greatest damage is suffered by residential assets followed by services, and that climate change will have effects on the coastal zone such as strong disruptions in urban agglomerations, effects on land-based infrastructures (ports, roads, retaining docks, coastal wadis) and erosion of the coastline, causing beaches to recede, affecting livelihoods and coastal populations<sup>51</sup>.
78. In the pilot sites, the most relevant effects on infrastructure vary according to the type of hazard: in Juan Lacaze (Colonia) and Playa Penino and Barrio Autódromo (San José) the main impact is flooding in homes and buildings, caused both by extreme rainfall events and by strong winds, with areas identified as medium risk and high risk<sup>52</sup>.
79. In Juan Lacaze most of the area is at medium risk, especially in front of the coast and under the influence of the Cañada Blanco upstream of the route 54 bridge, where there are also three blocks at high risk. Currently, drainage systems with sluice valves are operating in these areas and the departmental government is planning to expand the culvert bridge to be built in 2024.
80. In San José, existing buildings in the area are mostly single-story, with a high dispersion in the cadastral parcels<sup>53</sup> and irregular population outside the parcels. In both cases, the greatest impact of climate change will be related to flooding: the Autódromo neighborhood is at high risk of flooding, while the Penino neighborhood has areas with medium and low risk.
81. In Montevideo, the main infrastructure risk is associated with beach loss. Structural retreat on the beach was estimated for 2100 RCP 8.5 to be between 30.72 and 42.26 meters (from an average erodible width of 45 meters)<sup>54</sup>. The loss of beach would expose the rambla and the houses adjacent to it to extreme southeast events.
82. In the case of Canelones, in the mouth of the Solís Chico stream, the sedimentary dynamics have shown significant changes in the last decade. On the one hand, there is erosion in the east (La Floresta) where there are long-standing houses located in a collapse danger zone, and on the other hand, the shifting of the stream bar to the west (Parque del Plata) causes loss of beachfront, sand encroachment on houses, large dunes in the roads and clogging of rainwater discharges. The main impact is on homes and access roads. It should be noted that the rainwater drains contribute to erosion on the La Floresta margin, with discharges into the ravine.
83. The prioritized site in Maldonado, the beach arches between Zanja Honda stream and Tarariras stream, does not yet have a flooding risk map: it is currently under development. Its main problems are related to the exposure of houses to flooding in the vicinity of nearby watercourses (there are 3 streams between Zanja Honda stream and Tarariras stream). The beach arches are susceptible to erosion in almost the entire area, with the exception of some areas of the Playa Verde arch, there is a main road adjacent to the coast that separates it from the houses, and sometimes it is invaded by sand, before the retreat of the coast will be more exposed to damage by extreme events, as well as the houses.
84. In the prioritized site La Paloma (Rocha) the infrastructure is affected by flooding in the first line of buildings closest to the coast and by the structural retreat of the beach that causes exposure of the promenade and buildings to storms. In the eastern beach arc of La Aguada, the retreat linked to the SLR in the year 2050 is between 12.14 and 16.62 meters, while in the year 2100 (RCP8.5), the cell would be completely eroded<sup>55</sup>. Currently, given the proximity of the Rambla Costanera to the coast, it is regularly invaded by dunes, while the

<sup>48</sup> Defeo, O. & Elliott, M. (2020). The "triple whammy" of coasts under threat - Why we should be worried. Mar. Pollut. Bull. 111832.

<sup>49</sup> Orlando Chifflet, L. (2021). Efecto de la urbanización y el cambio climático en los ecosistemas de playas arenosas. PhD thesis. University of the Republic (Uruguay). Faculty of Sciences - PEDECIBA.

<sup>50</sup> NAP COSTAS EVALUACIÓN DE IMPACTOS OCASIONADOS POR EL CAMBIO CLIMÁTICO EN LA COSTA DE URUGUAY Instituto de Hidráulica Ambiental (IH), University of Cantabria, Spain.

<sup>51</sup> Atlas de riesgos e impactos en la costa, User's Manual IH Cantabria

<sup>52</sup> Source: Mapa de riesgo de inundaciones 2021 Juan Lacaze. Plan de Ordenamiento territorial y Desarrollo Sostenible de Ciudad del Plata, map N°12 Zona Litoral, Barrios Penino and Autódromo, detail of sectors at risk of flooding.

<sup>53</sup> Source: Pilot case Playa Pascual, project "Desarrollo de herramientas tecnológicas para la evaluación de los impactos, la vulnerabilidad y la adaptación al cambio climático en la zona costera de Uruguay". IH Cantabria, MVOTMA, CTCN, 2019.

<sup>54</sup> Source: Pilot cases. Playa del Cerro (Montevideo), project "Desarrollo de herramientas tecnológicas para la evaluación de los impactos, la vulnerabilidad y la adaptación al cambio climático en la zona costera de Uruguay". IH Cantabria, MVOTMA, CTCN, 2019.

<sup>55</sup> Source: Pilot cases. La Aguada Beach (Rocha).

west beach arc has a greater distance between the beach and Villa Mayor Avenue. In both cases, drainage is an aggravating factor in the loss of beach.

#### f) Non-climatic drivers

85. Among the non-climatic factors in the dynamics of each of the prioritized sites, one of the most relevant is the **change in land use**, which in general implies the impermeabilization of areas due to urban growth, which in turn represents a limit to the recirculation of sand by wind action and reduces the contribution of sediments from natural watercourses.
86. The presence of **buildings and rigid structures** on the coast is a constant in practically all the study sites, not only because of buildings but also because of roads very close to the coast that sometimes invade dune spaces and present a limit to sand recirculation. This is the case of Route 1 in San José, which influences by generating a barrier to natural drainage. Within the water, other modifications on the coast with greater or lesser impact depending on the case are the construction of **gray infrastructure**, such as breakwaters, which have a direct influence on current patterns as is the case of the breakwaters in La Floresta (Canelones) – 8 breakwaters built between 1970 and 1980 to the east of the mouth of the Solís Chico stream –, the Juan Lacaze Marina (Colonia), the Port of La Paloma (Rocha) and the Port of Montevideo.
87. Towards the end of the 19th century, forestation with **exotic tree species** began in Maldonado to fix the dunes to prevent the flow of sand towards cities and crops. This model was extended to the other departments of the country<sup>56</sup>. These implanted forests altered the sediment dynamics of the beaches, although in many cases they have also acquired a cultural value for the population, as is the case in Juan Lacaze and Parque del Plata (mouth of the Solís Chico stream). More recently, dune fixation has occurred due to the implantation (intentional or not) of **exotic herbaceous vegetation** with invasive behavior, mainly *Carpobrotus edulis* and *Cynodon dactylon*<sup>57</sup>.
88. **Urbanization** itself has also advanced over these areas of previously mobile dunes with herbaceous vegetation, replacing the natural ecosystem and making the soil impermeable, with consequences on the increase of surface rainfall runoff that finally discharges onto the beaches. This is observed in the selected sites in the departments of Colonia, Montevideo, Canelones, Maldonado and Rocha. In addition to this, land is filled for construction (for leveling or elevation of land), often directly over wetlands, drying them out and blocking natural drainage<sup>58</sup>. In addition, many coastal localities do not have adequate sanitation, which entails contamination risks for the ecosystems and the population. There are diagnoses in this regarding the case of La Paloma<sup>59</sup>. Likewise, the increase in the **influx of people** to the beach areas generates impacts on flora and fauna, as well as on the coastal dunes if pedestrian passage is not carried out in an orderly manner. This process is observed all along the country's coast. Although there is a prohibition in this respect, in many cases **motorized vehicles** access the beach area, aggravating the impact on these ecosystems. Urbanization in these areas, in turn, limits the capacity of coastal geofoms to adapt to rising sea levels, preventing their migration towards the territory<sup>60</sup>.
89. At the mouths of watercourses on sandy beaches, there is **lateral migration** that occurs due to natural conditions, but in many cases, it has deepened due to **anthropic modifications** both in the basin and on the margins of the mouth<sup>61</sup>, as observed at the mouth of the Solís Chico stream. The aggravation of lateral migration affects both the ecosystems located near the banks and the human infrastructure built in these areas. Faced with this problem, in some cases sections of the watercourse or its mouth have tended to be channelized, which in turn generates impacts due to the alteration of the natural migration dynamics<sup>62</sup>.
90. The dynamics of natural drainage is modified by **drainage pipes** that concentrate flows at single points of rainfall discharge on the coast and with normally higher velocities given the material of the pipes, eroding the surrounding beach area, as in the case of Playa del Cerro (Montevideo) and Playa La Aguada (Rocha).
91. Deficiencies in urban planning and in the implementation of public policies have led to the **urbanization of flood-prone areas** in some cases in a planned manner, as is the case of Juan Lacaze (Colonia) and Barrio

<sup>56</sup> Alonso-Paz, E. & Bassagoda, M.J. (2006). Flora y vegetación de la costa platense y atlántica uruguaya. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. & Conde, D. (Eds.). Bases para la conservación y el manejo de la costa uruguaya. Vida Silvestre Uruguay, Montevideo. Pp. 71-88.

<sup>57</sup> <https://www.gub.uy/ministerio-ambiente/comunicacion/publicaciones/lista-especies-exoticas-invasoras-uruguay>

<sup>58</sup> Gadino, I., Brazeiro, A., Panario, D., Roche, I. & Gutiérrez, O. (2012). El modelo actual de desarrollo turístico al oeste del Balneario La Paloma, Rocha, Uruguay. Tendencias, riesgos y propuestas. *Sustentabilidade em Debate - Brasília*, 3(2), 21-40.

<sup>59</sup> Kruk, C., Dobroyan, M., González, L., Segura, A.M., Balado, I., Trabal, N., De León, F., Martínez, G., Rodríguez, A., Piccini, C., Chalar, G. & Verrastro, N. (2018). Calidad de agua y salud ecosistémica en playas recreativas de la Paloma, Rocha. *Revista Trama*, 9(9), 1-10.

<sup>60</sup> Roy, P. S., Cowell, P. J., Ferland, M. A. & Thom, B. G. (1994). Wave-dominated coasts. In: Carter, R.W.G. & Woodroffe, C.D. (Eds.). Coastal evolution: Late Quaternary shoreline morphodynamics. Cambridge: UK. Pp: 121-186.

<sup>61</sup> Gutiérrez, O. & Panario, D. (2005). Calidad de agua y salud ecosistémica en playas recreativas de la Paloma, Rocha. *Revista Trama*, 9(9), 1-10. *Xeográfica*, 5, 107-126.

Texeira, L., Chreties, C., Solari, S. & López, G. (2012). Estudio de la desembocadura del arroyo Solís Chico. Final report. MTOP (DNH) - Udelar (Fing-IMFIA) Agreement. Fernández, G. (2011). Evolución del arroyo Valizas periodo: 1943-2006: Laguna de Castillos – Rocha – Uruguay. Master's thesis, University of the Republic (Uruguay). Faculty of Sciences.

<sup>62</sup> Gutiérrez, O. (2010). Dinámica sedimentaria en la costa uruguaya: evolución y tendencias de playas urbanas en el marco del cambio global. Master's thesis, University of the Republic (Uruguay). Faculty of Sciences.



Autódromo and Penino (San José), in some places aggravated by **settlements** of people with socioeconomic vulnerability. The risks already present in these localities are increased by climate change, requiring adaptation measures according to the level of risk. Given the high dependence on tourism as a source of income, the loss of beaches has direct consequences on the livelihoods of the local population.

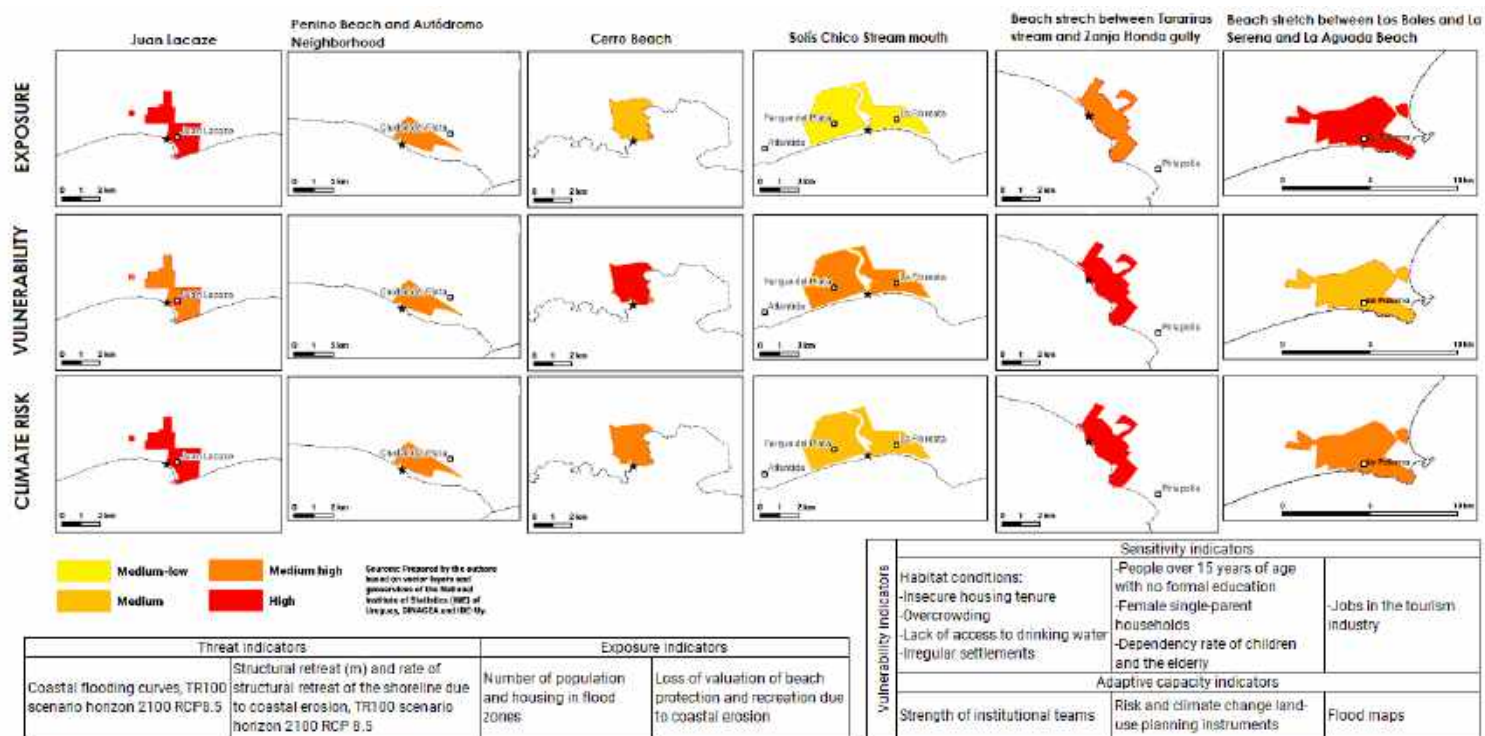
92. In general terms, **poor urban management practices** are an aggravating factor to local conditions; the presence of **solid urban waste** in gullies hinders the proper functioning of drainage and can cause flooding in low return period events; the construction of **private landfills** modifies the natural dynamics of watercourses and coastlines, among others.

**g) Risk to the population linked to the prioritized sites**

93. The Exposure, Vulnerability and Climate Risk maps developed as part of the Vulnerability Analysis that accompanied the formulation of this proposal (Figure 7) show the vulnerability of the resident population of the pilot sites to flood and coastal erosion hazards. The Climate Risk Index is the result of the analysis of the hazards, exposure, sensitivity and adaptive capacities (shown in the lower part of the same figure) of the resident population in the face of climate change.

94. Juan Lacaze, Playa Verde, Playa Hermosa and Playa Grande are the localities with the highest risk to climate change, since they had high levels of exposure to flooding in the case of Colonia and coastal erosion in Maldonado, but also high levels of vulnerability since they had high sensitivity and medium adaptive capacities. Then follow in a medium-high risk level: Cerro, Penino and Autódromo neighborhoods and the towns of La Paloma and La Aguada. San José has high exposure to floods and high sensitivity, but also high adaptive capacities since it has a flood risk map and an updated Local Plan. Montevideo, although it has medium exposure to flooding and erosion also has medium sensitivity and low adaptive capacities. Finally, Rocha has high exposure to coastal erosion but low sensitivity and adaptive capacities since it does not have a flood map. Finally, the localities of La Floresta and Parque del Plata represent a medium level of risk to climate change due to their low exposure to erosion and flooding in this analysis despite having medium sensitivity and low adaptive capacities.

**Figure 7.** Exposure, vulnerability and climate risk of the population linked to the prioritized sites.

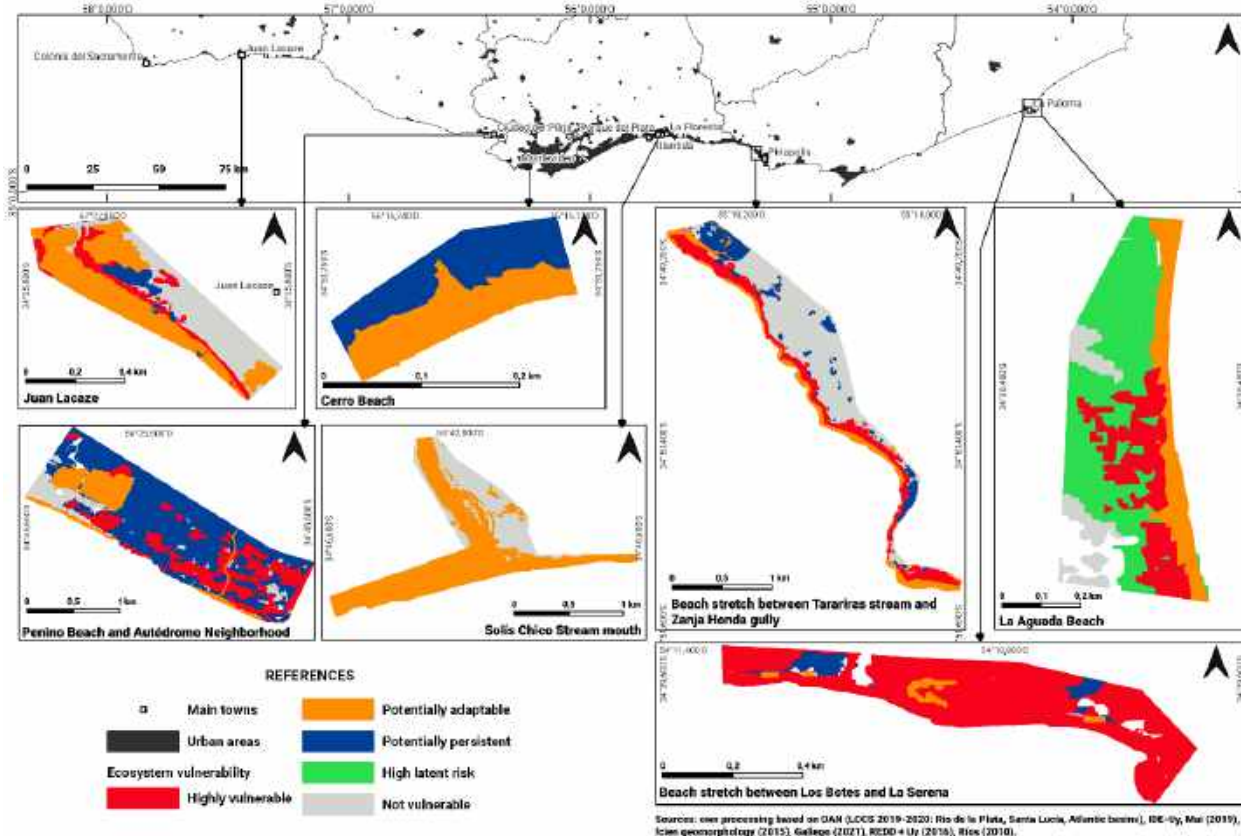


**h) Ecosystem risks linked to prioritized sites**

95. Figure 8 shows the climate change vulnerability map of the ecosystems of each of the prioritized sites, which was constructed in the framework of the ecosystem vulnerability study that was part of the formulation of this concept note. Vulnerability is the result of the analysis of exposure to sea level rise, risk of pluvial flooding and erosion, the presence of non-climatic hazards as aggravating factors for the condition of the ecosystems and the adaptive capacities. The vulnerability categories correspond to: **1. Highly Vulnerable Ecosystems:** in

aggravated condition, with low adaptive capacity and exposed to climate change (red color); 2. Adaptive Potential: ecosystems in aggravated and exposed condition, but highly adaptable (orange color); 3. Persistent Potential: ecosystems exposed and with low adaptive capacity, but their condition is not aggravated by other non-climatic threats (blue color); 4. Latent High Risk: ecosystems with low adaptive capacity and in aggravated condition but not exposed to climatic threats (green color).

**Figure 8.** Exposure, vulnerability and climate risk of the ecosystems linked to the sites prioritized by the project.



96. In the case of Juan Lacaze, the exposed area is so large that none of the ecosystems has the adaptive capacity to avoid flooding. A similar situation, although less unfavorable due to the lower degree of urbanization, occurs in Playa Penino and Autódromo. In Playa del Cerro, the ecosystems have been strongly transformed and reduced in their diversity. At the mouth of the Solís Chico stream, the information available on flood curves due to sea level rise is limited and therefore the exposure of ecosystems is underestimated. At the same time, the multiplicity of actions planned by the departmental government of Canelones means that the adaptive capacity of the ecosystems is good in all cases. In the stretch of beach in the department of Maldonado, the condition of the ecosystems is affected by urbanization and its associated management in the upper zone of the basin, especially in this case due to the steep slopes that reach the coastal zone. In the case of La Paloma, the stretch between Los Botes beach and La Serena beach is the one with the highest concentration of ecosystems with the highest vulnerability, especially aggravated by the lack of adequate rainwater drainage in the urban area.

### i) Barriers to adaptation

97. The main barriers to promoting changes toward a more resilient coast are:

- **Limited technical criteria shared among the different levels of government in the mainstreaming of climate change in planning instruments:** The Second Nationally Determined Contribution (NDC) indicates that adaptation planning at the national level stimulates adaptation planning at the departmental level. The maturity of adaptation planning instruments varies among subnational governments. In this sense, different technical criteria and degrees of development are observed in the consideration and prioritization of the most appropriate adaptation measures or the standards to be followed for the design and implementation of certain measures. Advancing in these criteria requires technical studies, as well as

the articulation and facilitation of discussion spaces to achieve inter-level governmental and multidisciplinary agreements on the most appropriate standards. To address this barrier, the project will seek to support the regulation of the national coastal space guideline, advancing in the definition of shared criteria at the national level and developing technical guidelines that contribute to unify definitions and provide technical standards to identify and design adaptation measures in a more appropriate manner.

- **Limited data quality, access to data and tools for monitoring and recording climate change impacts:** Recording systems, metrics and procedures to process and analyze data and evaluate adaptation processes, results and effectiveness of the measures being implemented at the country level have limitations. Currently, Uruguay has made progress in installing cameras and equipment to monitor impact variables on the coast, has developed historical databases and high-resolution dynamic projections that allowed progress in quantifying the impact on a local scale, and has improved information systems on variables associated with marine dynamics. However, there is still no national system of metrics or platforms to combine the information collected, analyze it, process it and measure the effectiveness of the different actions implemented and promote decision-making in integrated coastal management based on evidence.
- **Limited financing:** As the Second NDC identifies, most coastal adaptation measures do not present, at least in the short term, economic benefits or profitability that would encourage the private sector to finance them. In addition, the assets to be affected to reduce vulnerability are mostly public goods (beaches, boardwalks, coastal infrastructure). In this context, state financing – which is limited – is essential to implement the necessary measures, as well as the development of innovative financial incentives to involve households with repayment capacity in the co-financing and implementation of adaptation measures in the coastal zone. To this end, the project promotes the use of financing for the implementation of the necessary adaptation measures to benefit the most vulnerable coastal ecosystems and population. This includes the development of a concessional financial mechanism – revolving fund – to promote the adoption of adaptation measures in vulnerable homes and buildings to cope with the impacts of flooding. Similarly, to advance in the adaptation of the entire Uruguayan coast, it is necessary to promote financial instruments that can promote concessional financing through loans to the government to comply with the necessary measures prioritized in the NAP Costas.
- **Limited awareness and knowledge of key aspects of coastal adaptation by key actors:** Although progress has been made in training and raising awareness among **departmental governments, municipalities and the population** about the observed and expected impacts of climate change on the coast of Uruguay, there is still a clear need to continue and deepen this process. Limitations still present include different degrees of knowledge and criteria in the design and implementation of adaptation measures, limited awareness at the local and national level in other areas of government – not related to coastal management –. In addition, there is limited knowledge and capacity of departmental governments in the prevention stage of coastal flood impacts on people, in the management of ecosystem or livelihood impacts, as well as in the management of environmental and social safeguards, gender and generations mainstreaming, and the monitoring of the impacts and effectiveness of the implemented measures. At the level of political decision-makers, adequate communication strategies are required to ensure that evidence of the best adaptation measures for the observed and expected impacts of climate change are adopted in current decision-making, considering the return period, and thus allowing current decisions to reduce the vulnerability of the coast and to be maintained in the future. At the local level, there are varying levels of knowledge about the best adaptation measures by the population, who observe and suffer from climate impacts.
- **Limited identification of good practices:** Lessons learned from the NAP Costas processes highlight the importance of instances of dissemination of learning and sharing of good adaptation practices among those involved in integrated coastal management, attending to the different degrees of maturity in the implementation of these measures and experiences. The Project will seek to identify good practices, disseminate them and generate spaces for the exchange of knowledge, as well as collective learning to promote a virtuous circle that allows scaling up coastal climate action.

## **Project/Programme Objectives:**

### General Objective:

98. In compliance with the provision of the NAP Costas, the project aims to increase the adaptive capacity of the population and the resilience of coastal ecosystems to the risks of flooding and coastal erosion caused by sea level rise and an increase in the frequency and intensity of extreme events.

### Specific objectives:

99. Strengthen coastal planning based on evidence of climate change impacts.

100. Reinforce green and hybrid infrastructure at prioritized coastal sites to increase the resilience of the population and coastal ecosystems to flooding and coastal erosion impacts.
101. Build the capacities and knowledge of coastal actors and promote their involvement in climate action.

### Project/Programme Components and Financing:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (USD \$)
1. Strengthening evidence-based coastal planning considering climate change	Output 1.1 Planning instruments with mainstreamed CC Output 1.2 Improved systems for recording and monitoring CC impacts Output 1.3 Early Warning System installed	Strengthening evidence-based coastal planning considering CC Reduced exposure to climate hazards (flooding and erosion)	2,200,000
2. Reinforced green and hybrid infrastructure to increase coastal resilience	Output 2.1 Coastal ecosystems conserved and restored. Output 2.2 Improved and sustainable drainage and stormwater systems Output 2.3 Flood-protected housing and commercial buildings	Reduction of coastal erosion Reduction of coastal flooding Preserved recreation and care spaces	5,700,000
3. Stakeholders build capacity, understand climate risks and engage in climate action	Output 3.1 Decision makers, technicians and population sensitized and involved with climate change. Output 3.2 Improved knowledge management.	Local population sensitized and capable of responding to flooding and implement practices to prevent coastal erosion. Strengthened institutional capacities to reduce flood and coastal erosion induced risks	500,000
6. Project/Programme Execution cost			818,000
7. Total Project/Programme Cost			9,218,000
8. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			782,000
<b>Amount of Financing Requested</b>			<b>10,000,000</b>

### Projected Calendar:

*Indicate the dates of the following milestones for the proposed project/programme*

Milestones	Expected Dates
Start of Project/Programme Implementation	September 2024
Mid-term Review (if planned)	September 2026
Project/Programme Closing	August 2028
Terminal Evaluation	June 2028

## PART II: PROJECT / PROGRAM JUSTIFICATION

- A. Describe the project/programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

The measures proposed in this project respond to an analysis based on studies and diagnoses carried out during the implementation of the NAP Costas process, complementary analyses of the prioritized sites, and the needs expressed by the national government, local governments and representatives of the local population who were consulted during the formulation process. Figure 9 lists the adaptation measures proposed in the project. This is followed by a description of the project's components and activities. Two of the proposed activities - Activity 2.3.1 - revolving fund - and Activity 2.1.1 – sand nourishment - have been classified as Unidentified Sub Projects - USPs. More detail is provided in the description of these activities.

**Figure 9.** Adaptation measures proposed by the project.

Component 1 – Strengthening evidence-based coastal planning considering climate change	Component 2 - Reinforced green and hybrid infrastructure to increase coastal resilience	Component 3 - Stakeholders build capacity, understand climate risks, and engage in climate action
<p><b>Output 1.1 Planning instruments with mainstreamed climate change</b>            Activity 1.1.1 Mainstreaming climate change into planning instruments            Activity 1.1.2 Development of technical guides to provide guidelines for concrete adaptation measures</p> <p><b>Output 1.2 Improved systems for recording and monitoring climate change impacts</b>            Activity 1.2.1 Strengthen systems for recording and monitoring climate change impacts.</p> <p><b>Output 1.3 Early Warning System for coastal floods installed</b>            Activity 1.3.1 Development of people-centered, end-to-end coastal flood risk EWS</p>	<p><b>Output 2.1 Coastal ecosystems conserved and restored</b>            Activity 2.1.1 Sand replenishment            Activity 2.1.2 Recovery of the dune ridge structure            Activity 2.1.3 Conservation and regeneration of vegetation            Activity 2.1.4 Management of beach entrance and uses            Activity 2.1.5 Restoration of coastal wetlands</p> <p><b>Output 2.2. Improved and sustainable drainage and stormwater systems</b>            Activity 2.2.1 Readjustment of stormwater discharges on the beach  <b>Activity 2.2.2</b> Bioretention and rainwater harvesting  <b>Activity 2.2.3</b> Drainage ditches and stilling ponds-non-return valves  <b>Activity 2.2.4</b> Flood parks  <b>Activity 2.2.5</b> Establishment of hydrobiological protection in watercourses</p> <p><b>Output 2.3 Flood-proofed housing and buildings</b>  <b>Activity 2.3.1</b> Implementation of a financial mechanism to promote adaptation in housing and other buildings in medium flood risk areas</p>	<p><b>Output 3.1 Decision-makers, technicians and population sensitized and involved in climate change</b>            Activity 3.1.1 Communication strategy            Activity 3.1.2 Awareness raising - involving youth and communicators in adaptation measures            Activity 3.1.3 Awareness raising for the local population            Activity 3.1.4 Sensitization for high-level policy makers            Activity 3.1.5 Sensitization and capacity building for local technicians            Activity 3.1.6 Sensitization for MSMEs / productive sectors</p> <p><b>Output 3.2 Improved knowledge management</b>            Activity 3.2.1 Identification of good practices and lessons learned            Activity 3.2.2 Knowledge management exchanges between departmental governments</p>

## **Component 1 – Strengthening evidence-based coastal planning considering climate change**

### **Output 1.1 Planning instruments with mainstreamed climate change**

The activities of this Output will be carried out with special consideration of the advances and approaches of the binational project on the Uruguay River, which is working on the inclusion of the climate change perspective in planning instruments (Output 1 of this project).

#### **Activity 1.1.1 Mainstreaming climate change into planning instruments**

102. The purpose of this activity is to support the process for the regulation of the National Coastal Space Directive (DNEC) through the generation of technical inputs. This guideline has the status of Law (19772)<sup>63</sup> and its regulation is a commitment assumed by Uruguay in the Second NDC<sup>64</sup>. To regulate it, it is necessary to advance in the definition of technical criteria in the different articles of the law, and to evaluate what its application implies in terms of management by the Ministry of the Environment.
103. Regarding technical work, the need for definitions is particularly relevant for articles 5, 6, 7 (letters “e” and “d”) and 10 of the Law, which deal respectively with the identification, characterization and consideration of **coastal ecosystems**, the identification and delimitation of **vulnerable components** for their due protection, and the extension of the **coastal defense strip**<sup>65</sup> up to the limit of the defined area, for the vulnerable components indicated in article 6, when they cover surfaces larger than the referred coastal defense strip and are located within the scope of application of the law.
104. Defining the criteria for each of these concepts will provide concrete guidelines for the national and departmental governments to characterize the environments, to establish the requirements for environmental impact studies and strategic environmental assessment, and to consider the additional workload that this will imply for the various enforcement authorities. Ultimately, this work will serve to increase the protection of

<sup>63</sup> Law No. 19772 – Regulación del Ordenamiento Territorial y Desarrollo Sostenible del Espacio Costero del Océano Atlántico y del Río de la Plata: <https://www.impo.com.uy/bases/leyes/19772-2019>

<sup>64</sup> Action No. 35. By 2030, Law 19.772 referring to the Directriz Nacional de Ordenamiento Territorial y Desarrollo Sostenible del Espacio Costero del Océano Atlántico y del Río de la Plata will have been regulated.

<sup>65</sup> Defined by Article 153 of the Código de Aguas, Decree-Law No. 14,859 of December 15, 1978, as amended by Article 193 of Law No. 15.903 of November 10, 1987.

ecosystems and their services and make them more resilient to climate change.

105. The planned stages are: 1) Construction of ecosystem maps and survey of vulnerable components; 2) Analysis by specialists of the change in criteria brought about by the new Directive and its impacts in terms of management and additional workload for the enforcement authorities; 3) Validation process with groups of experts and local managers; 4) Generation of operational guides and guidelines for the application of the law; and 5) Preparation of recommendations for policy makers and their dissemination.
106. Gender and vulnerable groups responsive actions: All these tasks will consider the gender and generational approach, making it operational in the guidelines and recommendations for the national and departmental governments. As part of the foreseen stages, both the departmental gender directorates and key informants with knowledge on the subject will be convened. The operational guides and guidelines, as well as their dissemination, will be elaborated with inclusive language. The validation process will be planned and implemented based on gender equality criterion to guarantee that all voices are represented and heard. Recommendations for policy makers will consider any gender and intergenerational considerations for implementation.
107. Location: The entire coastal area of the country.
108. Beneficiary population: The country's coastal population and ecosystems. Based on reviewed statistics, around 50% of coastal population in Uruguay are women.
109. Institutions responsible/actors involved: Ministry of Environment, MVOT/DINOT, expert groups, departmental governments.

**Activity 1.1.2** Development of technical guides to provide guidelines for concrete adaptation measures.

110. This activity will work to produce guidelines and standards for implementing adaptation measures on the coast, in order to facilitate Land Use Plans (PLOT) to standardize criteria and be sufficiently concrete for the effective implementation of such measures. A concrete example of the need to advance in these guidelines is the infrastructure sector, which needs technical guidelines for construction and zoning with climate change considerations. Other examples of guidelines could be those for the management of landscaping in private properties and public green spaces, regulating pruning, irrigation and fertilization.
111. This activity will contribute to the achievement of the objectives of the country's 2nd NDC related to deepening the adequate incorporation of adaptation to climate change and variability in planning instruments (see more details on alignment with the NDCs in section D).
112. Gender and vulnerable groups responsive actions: guidelines and standards will be designed with a mainstreaming gender approach and with specific generational considerations. PLOT may be revised to update and incorporate a gender and generational approach, as required. Sector technical guidelines will include gender chapters to reflect specifically how to mainstream gender in its application. Departmental gender directorates and key informants with knowledge on the subject will be convened. Guidelines and standards produced under this activity, and their dissemination, will be elaborated with inclusive language.
113. Location: The entire coastal area of the country.
114. Beneficiary population: The country's coastal population and ecosystems. Based on reviewed statistics, around 50% of coastal population in Uruguay are women.
115. Institutions responsible/actors involved: Ministry of Environment, expert groups, departmental governments. MVOT, DINOT.

## **Output 1.2 Improved systems for recording and monitoring climate change impacts**

**Activity 1.2.1** Strengthen systems for recording and monitoring climate change impacts.

116. This activity proposes to develop and implement a system to monitor the effectiveness of adaptation measures, accompanied by capacity building activities to carry it forward and ensure its sustainability over time.
117. The system will be channeled by the Ministry of Environment through the National Climate Change Response System (SNRCC) and will feed the National Emergency System (*Sistema Nacional de Emergencias*, SINAE), to be incorporated as risks in coastal areas.
118. The design and establishment of the system will involve not only the national government but also local governments, universities, and civil society to ensure effective, territory-based monitoring. All these stakeholders will have access to a *dashboard* to facilitate collaboration on coastal adaptation and will be able to share information and records of impacts. The collection, compilation and analysis of this information will contribute, among other benefits, to the climate change loss and damage assessment that is being developed at the national level together with the National Directorate of Emergencies (*Dirección Nacional de Emergencias*)

of SINAIE. Special consideration will be given to the progress of the binational project on the Uruguay River, which is designing and implementing methodological guidelines for assessing impacts, damages, and losses (Output 2 of the project).

119. Gender and vulnerable groups responsive actions: During the formulation stage of the full proposal, the technical details and technological needs will be discussed in depth with key stakeholders, as well as the specific actions needed to ensure that women and people of different generations participate in accessing the system, also the necessary guidelines for recording and monitoring the impacts of climate change on these populations in particular. Technical teams in charge of the system will identify, include, and monitor specific indicators for monitoring disaggregated impacts of adaptation measures in women, children, youth and elderly. Capacity building activities will target women and youth differentially if needed, to guarantee that they build necessary knowledge to participate in territory-based monitoring and access to the *dashboard*. The collection, compilation and analysis of information will be disaggregated.
120. Location: The entire coastal area of the country.
121. Beneficiary population: The country's coastal population and ecosystems. Based on reviewed statistics, around 50% of coastal population in Uruguay are women.
122. Institutions responsible/actors involved: Ministry of Environment, SNRCC, SINAIE, local governments, civil society organizations.

### **Output 1.3 Early Warning System for coastal floods installed.**

#### **Activity 1.3.1** Development of people-centered, *end-to-end* coastal flood risk EWS

123. It is proposed to advance in the development of an EWS to mitigate or reduce the impacts of coastal flooding for Juan Lacaze that will be a pilot experience for the country, developing the four components and allowing the experience to be analyzed for scaling up and replication to other coastal areas. To this end, the project will finance equipment, technical assistance, training, digital infrastructure and software necessary to achieve: 1) Knowledge of coastal flood risks, including climate change impacts; 2) Detection, monitoring and impact-based forecasting: based on the models already generated in the country, work will be done to move towards impact-based forecasts, key to communicating risks to the population, including the roles, protocols and necessary articulation among the actors involved; 3) Dissemination and communication: support will be provided for the development of a communication strategy and the implementation of the most appropriate means of communication to communicate risks to the population; 4) Preparedness and response: work will be carried out with the local population and key stakeholders in the territory to prepare contingency plans, including simulation exercises, fine-tuning and adjustments based on the socialization of the plans with the population.
124. During the full proposal development stage, work will be carried out with DINAGUA, INUMET, the CECOEDs and CDE linked to the SINAIE, and the IMFIA, to identify the specific needs to carry out the EWS implementation pilot test. It will also coordinate with the binational project on the Uruguay River, one of the objectives of which is to consolidate a flood EWS (Output 5 of the project). In addition, given that there is a history of work in the development of a real-time operational forecast of different metocean conditions in the territorial waters of Río de la Plata and its Maritime Front, called PronUy\_RPFM by the IMFIA, which allows forecasting the movement of the waters of Río de la Plata or the Maritime Front. This development is operational and freely available (<https://www.fing.edu.uy/imfia/pronostico-marea/>), so its scaling and use for EWS purposes will be analyzed during the full proposal development stage.
125. Gender and vulnerable groups responsive actions: People-based EWS will have a specific consideration on the means of dissemination and communication channels that reach out especially to women and youth, based on the information available on single-parent households in the intervention zones, especially those headed by women. A specific gender analysis in the local area may be considered to understand in depth gender dynamics that need to be considered to have a gender responsive EWS. Trainings and capacity building activities on gender and EWS will be part of this output, target both the local population and the local authorities. Contingency plans and simulation exercises will be designed considering a gender mainstreaming approach and differentiated needs of women, children, youth, and elderly.
126. Location: Juan Lacaze.
127. Beneficiary population: It is tentatively estimated that it could benefit the population exposed to flooding in the municipality (3,167 people), although this analysis will be further developed during the full proposal stage. As mentioned above, women representation in this location is 51.7%.
128. Institutions responsible/actors involved: DINAGUA, INUMET, CECOED, SINAIE, IMFIA, department of Colonia, municipality of Juan Lacaze, local population, neighborhood organizations.

**Component 2 – Reinforced green and hybrid infrastructure to increase coastal resilience.**

129. Each of the prioritized sites (“pilot sites”) will have one or more measures related to ecosystem conservation and restoration (Output 2.1) and storm drainage improvement (Output 2.2). Then, for all departments, the revolving fund mechanism for investments in housing and building protection in medium flood risk areas will be applied (Output 2.3):

- Colonia, Juan Lacaze: It will include a flood park on the banks of the Blanco creek and the recovery of coastal wetlands in areas surrounding the Blanco creek.
- San José, Playa Penino and Barrio Autódromo: There will be a flood park. On the coast, measures are planned for regeneration and strengthening of vegetation and access management, along with improvements to the drainage system, such as 2 lamination ponds, widening of ditches, installation of non-return valves in the sites defined in the project and discharges with dissipator.
- Montevideo, Playa del Cerro: The main proposal is to remove the grass and develop the filling of the beach with sand, accompanying the measure with revegetation and adequacy of the large drainage that crosses the beach, relocating its discharge and ensuring an attenuation space on the existing road island.
- Canelones, Mouth of Solís Chico stream: La Floresta – Costa del Plata: Action fronts on both sides of the mouth of the Solís Chico stream are contemplated. Improvements to the storm drainage system in both La Floresta and Parque del Plata, the restoration of the dune ridge on the La Floresta margin (near the mouth) and the stabilization of the dune ridge in Parque del Plata through vegetation and management of access to and uses of the beach. The recovery of coastal wetlands is also contemplated.
- Maldonado, Beach arch from Tarariras stream to Zanja Honda stream: The recovery of the dune ridge, recovery of vegetation and management of access and uses of the beach are envisioned. The incorporation of hydrobiological protection is also contemplated.
- Rocha, La Paloma, Arcos de Playa South and East: This sector includes the adequacy of rainwater discharges on the beach, bioretention, coastal wetlands, rainwater capture, lamination ponds and reconditioning of parking lots. On the coast, dune recovery and revegetation will be considered.

130. The table below schematically presents the interventions to be carried out at each site. It is important to note that the project proposes the integration of multifaceted measures, strategically bundled for implementation at each site.

**Table 2.** Component 2 interventions planned at each site.

Site	Conserved and restored coastal ecosystems					Improved and sustainable drainage and stormwater systems				
	Sand replenishment	Recovery of dune ridge structure	Vegetation conservation and regeneration	Management of beach entrance and uses	Coastal wetlands recovery	Readjustment of storm water discharges on the beach	Bioretention and rainwater harvesting	Drainage ditches and stilling ponds-non-return valves	Flood parks	Hydrobiological safeguards / upstream interventions
Colony					✓			✓	✓	
San Jose			✓	✓	✓	✓		✓	✓	
Montevideo	✓	✓	✓	✓		✓		✓		
Canelones		✓	✓	✓	✓	✓		✓		
Maldonado		✓	✓	✓		✓				✓
Rocha	✓	✓	✓	✓	✓	✓	✓	✓		

**Output 2.1 Coastal ecosystems conserved and restored.**

**Activity 2.1.1 Sand replenishment**

131. The main purpose is to guarantee an adequate width in the dry sand, therefore, a positioning of the coastline that guarantees protection against storm events, safeguarding from possible damage to infrastructure, and in turn allows the improvement in the conditions of use and recreation of the beach.

132. Beach fill involves the transport of fill material from an offshore (or land) source to the placement site and can be done with sufficient volumes to achieve an equilibrium profile on the beach or be accompanied by stabilization works to reduce the mobility of sediments on the bottom. The cost depends largely on the source of the sand,



the volume is estimated in order to ensure stable beach conditions in the long term<sup>66</sup> considering as acceptable 25 years of useful life, and taking into account the uncertainties associated with all marine engineering works estimated between 10 and 20%<sup>67</sup>.

133. The beaches where sand replenishment is considered possible are El Cerro and Playas Sur and Este de la Paloma. In both cases the measure is due to the fact that the rise in sea level produces a redistribution of the sand from emerged to submerged and modifies the position of the coastline. In the case of Cerro beach, the selection of the measure is also based on the impossibility of the beach to recover sand naturally.
134. The Ministry of Environment is conducting a study on this type of measures in Playa del Cerro<sup>68</sup> and Playa Sur and Este in La Paloma. In both cases it is necessary to accompany the works with sand source studies and detailed engineering. At the time of preparing this Concept Note, partial results of the projects were not yet available. The conclusions of these studies are expected to be included in the Full Proposal.
135. A general methodology that could be followed in this process would include: A) Assessment and design: Detailed evaluation of the beach to determine the extent and magnitude of fill required (characterization of current and future erosion and flood hazards, sea level rise scenarios, characterization of maritime climate and rainfall discharge, coastal erosion, characterization of beach profile and coastal transport, among other factors.). B) Sand acquisition: Identification and evaluation of suitable sources of sand compatible with the characteristics of the beach (grain size and composition). One possibility outlined by the departmental government of Montevideo is to conduct geophysical studies and characterization surveys of strata on the seabed to confirm that it is a viable source of sand, as they have preliminarily estimated that the measure would have a much lower impact and cost compared to land-based sources of sand. Environmental, logistical and cost-efficiency aspects will be analyzed (see further details in Section II-C). C) Site preparation: Clearing the beach of debris or other unwanted materials. Placement of barriers to prevent sediment dispersal during the process. D) Sand reclamation: Sand is extracted from the selected source (initially intended seabed source) using appropriate methods, such as dredging and pumping. The sand is transported through pipelines. In case of opting for land-based sand sources the methodology would be excavation and trucking. E) Sand spreading: Once the sand arrives at the fill site, it is spread evenly over the beach using specific equipment and techniques. This may include the use of dredges to spread the sand in the water and then allow the waves to carry it onto the beach, or the use of machinery to spread it directly onto the beach and then level it. F) Stabilization works: If considered necessary in the design, the work must be accompanied by stabilization works with the purpose of reducing the mobility of sediments on the bottom such as exempt dikes, breakwaters or artificial reefs.
136. As a result of the work, the recovery of the beach width will allow a larger area for current use and enjoyment, as well as a greater buffer against extreme storms, mitigating the effect of erosion due to rising sea levels and the exposure of infrastructure (roads and houses) adjacent to the beach. This measure will be complemented by the rest of the package of measures that will increase the sustainability of the beach recovery in the long term.
137. Gender and vulnerable groups responsive actions: the development of the sand replenishment work will be gender sensitive, so that the intervention on the selected beaches does not affect the daily lives of women, young people, and elderly. Specific criteria may be included in tender documents for the contracting of public works companies.
138. Location: Playa del Cerro, Montevideo, and arches of Playa Sur and Este in La Paloma.
139. Beneficiary population: Local population of municipality A, 207,911 inhabitants<sup>69</sup> (52.4% are women), tourists and visitors to the beach during the summer season in ideal conditions (833 people per day).
140. Stakeholders involved in the future implementation of the measure: Departmental governments of Montevideo and Rocha, Ministry of Environment.
141. Categorized as USP: Although the size and location of the measure are known, the source of the sand extraction (sea / land) is not, and thus the environmental and social risk of sand extraction is not known. This activity requires an EIA, which will be reflected in the ESMP to be developed at the Full Proposal stage. Uruguay has experience and knowledge of previous extractions in nearby areas.

#### **Activity 2.1.2 Recovery of the dune ridge structure**

142. This activity consists of the installation of “barrier” devices between 50 cm and 100 cm wide and high, capable of reducing the wind speed and allowing the sand that is transported to be deposited, collaborating in the

<sup>66</sup> Ingeniería Civil magazine. Official organ of the Colegio de Ingenieros Civiles de México. I No. 495, July 2010.

<sup>67</sup> Recomendaciones para obras marítimas (ROM) Puertos del estado, Ministerio de Fomento de España.

<sup>68</sup> “Contratación De Empresa Consultora Para El Diseño De Las Medidas De Adaptación Del Proyecto Playa Del Cerro - Playa Kiyú” en el marco del Diálogo País Uruguay-Euroclima+, con desarrollo entre noviembre 2022 y septiembre 2023.

<sup>69</sup> 2011 Census

reconstruction of the coastal dune ridge as a continuous structure. These devices are called sand fences.

143. For its construction, plant materials will be used, preferably fresh pruning with abundant volume and foliage, of exotic tree species from the coastal zone itself. Priority is given to the use of plant material since, when decomposing, it serves as a substrate and nutrient to facilitate the subsequent growth of the herbaceous psamophilous vegetation that gives stability to the dune ridge and that is part of the next phase of the regeneration process of the coastal dune ridge (Activity 2.1.3). In turn, the use of plant material (pruning) from exotic species to give structure to the fences contributes to the reduction of the density of these species. Preference will be given to pruning of *Acacia longifolia*, an invasive species widely distributed along the Uruguayan coast that meets the leafiness requirements necessary for the construction of these devices. Special care will be taken to prune outside the seed-bearing season to avoid the propagation of these species, although to date there is no known history of this species thriving from its use in catch fences. The use of this species for building the fences contributes to its reduction and further limits its expansion.
144. In cases where there are pedestrian entry points in the area where the sand fences are installed, they will be interrupted to allow passage. However, this interruption will not continue the pedestrian entrance linearly, but will slightly deviate it to avoid the possible generation of a wind tunnel that generates sand transport out of the system. Therefore, an “S” entrance will be generated instead of a straight entrance.
145. The pruning could be provided by the departmental intendancies or municipalities as appropriate. Both the Ministry of Environment and most of the municipalities have vast experience in the use of these devices.
146. They will be installed outside the summer season, between the months of May and September, to avoid interfering with tourist activities and steering clear of the time when the plant species used has seeds, so as not to favor its propagation.
147. For this measure to be effective, i.e., for the structure and functioning of the coastal dune ridge to be recomposed and for it to fulfill its function of buffering extreme events, it is essential to give it continuity through revegetation of the forming dune, a measure foreseen in activity 2.1.3.
148. Gender and vulnerable groups responsive actions: works will be gender sensitive, so that the intervention on the selected beaches does not affect the daily lives of women, young people, and elderly. Specific criteria may be included in tender documents for the contracting of public works companies. The design of the “S” entrance will consider people with disabilities and reduced mobility, making the necessary facilities and adaptations. It should be safe for children and pregnant women. The installation of vegetation associated with this activity should assess how it may affect the safe circulation of women in these spaces.
149. Location: Beach area in Playa del Cerro (Montevideo), Parque del Plata and La Floresta (Canelones), Playa Grande, Playa Hermosa and Playa Verde (Maldonado), stretch of beach between Zanja Honda and La Serena and La Aguada (Rocha).
150. Beneficiary population: Permanent inhabitants of each locality, tourists, and beach visitors. According to the trends illustrated by local population statistics, in each of the localities the female population is approximately 50%. Directly, 51.3 hectares of beach area will be recovered. Indirectly, the area behind the dunes will be protected from flooding and the effects of waves.
151. Institutions responsible/actors involved: Departmental governments, municipalities, Ministry of Environment, and potential contracted company.

### **Activity 2.1.3 Conservation and regeneration of vegetation**

152. This activity consists, on the one hand, of planting native herbaceous psammophilous species to address three different situations: i) Stabilize the existing coastal dunes or those that will be generated by sand fences with activities 2.1.1 and 2.1.2, ii) Stabilize the slope in the case of dunes on the margins of streets (this measure applies particularly to Parque del Plata, Canelones), and iii) Increase the density of vegetation behind the coastal dunes (this action applies particularly to Playa Penino, San José). The incorporation of vegetation will in turn favor the conditions for the settlement of fauna.
153. In each case, the appropriate species to be planted will be evaluated, considering the species present in nearby areas that are in good condition. Since *Hydrocotyle bonariensis*, *Senecio crassiflorus* and *Panicum racemosum* are associated with the mobile dunes along the Uruguayan coast – accompanied in each region by a different set of other herbaceous species –, these species will be initially considered. In the case of Playa Penino the species to be used will be hydrophilic species, given the environment to be restored.
154. This measure is essential to ensure the effectiveness of activities 2.1.1 and 2.1.2, given that if there is no vegetation, the structure of the coastal dune ridge will not be preserved.
155. Likewise, exotic herbaceous vegetation that has advanced spontaneously or implanted on the mobile dune areas, affecting their natural dynamics and replacing native vegetation, will be removed. The strategies for the

removal of this vegetation will take special care not to affect the native vegetation present in the area and to avoid the regrowth of the exotic species.

156. Gender and vulnerable groups responsive actions: Special attention will be paid to the height of vegetation in public spaces, as it may contribute to spaces perceived as “unsafe” by women who use coastal spaces for both economic and recreational activities. Specific criteria may be included in tender documents for the contracting of public works companies.
157. Location: Beach area in Playa Penino (San José), Playa del Cerro (Montevideo), Parque del Plata and La Floresta (Canelones), Playa Grande, Playa Hermosa and Playa Verde (Maldonado), stretch of beach between Zanja Honda and La Serena and La Aguada (Rocha).
158. Beneficiary population: Permanent inhabitants of each locality, tourists and beach visitors. According to the trends illustrated by local population statistics, in each of the localities the female population is approximately 50%. Some 63 hectares will be directly recovered. Indirectly, the land behind the revegetated area will be benefited, which will be protected from flooding and the effects of waves.
159. Institutions responsible/actors involved: Departmental governments, municipalities, Ministry of the Environment, and contracted company.

#### **Activity 2.1.4 Management of beach entrance and uses (elevated walkways, signage, parking)**

160. A series of actions aimed at organizing pedestrian and vehicular circulation and reducing the impact of traffic on fragile areas, in particular the coastal dunes, are proposed here. On the one hand, elevated pedestrian accesses will be installed on the dune ridge to concentrate pedestrian traffic in specific areas, avoiding the impact of trampling on the vegetation of the ridge and facilitating access to the beach area for people with mobility difficulties. They will be designed with environmentally appropriate criteria, using light materials that are not chemically treated and maintaining a height that does not affect the circulation of sediments. The design will also follow universal accessibility criteria, including specific conditions for the blind and people with reduced mobility.
161. The exact points of installation of the pedestrian entrances will be defined jointly with the neighborhood commissions of each site, to incorporate as a criterion the current use of the beaches (the points with the highest concentration of entrances).
162. In addition, at some of the sites, vehicular parking spaces will be created in association with the entry points that have pedestrian walkways. The parking spaces will be properly delimited, and materials will be used that both provide resistance and allow infiltration into the soil. They will be generated on public land outside the beach area and the departmental governments or the municipalities, as appropriate, will manage the designation of personnel responsible for security in cases where it is necessary. In the case of existing parking lots, but in inadequate conditions (as is the case in the stretch of beach between Los Botes and La Serena in La Paloma, Rocha), they will be redesigned following the criteria established here.
163. These measures will be accompanied by signage that includes information on coastal space preservation measures (no vehicle traffic in prohibited areas and pedestrian passage through designated areas) as well as information on the values present in the area (including the environments present). The design of the signage will be agreed with the neighborhood commissions of each site, ensuring that the message conveyed is adapted to each locality.
164. Gender and vulnerable groups responsive actions: Walkways and parking spaces will have adequate signage to inform and sensitize the population about primary care services in the area (medical emergencies, attention to cases of gender violence, etc.). Specific parking spaces for Persons with Disabilities and reduced mobility will be created. If new lighting is installed, criteria will be considered to contribute to the safety of women using these spaces, without losing sight of environmental considerations. The consultation and participation spaces to be considered for the involvement of neighborhood commissions will consider gender and generation criteria, and signage will be designed with inclusive language (gender and for the blind).
165. Location: Pedestrian accesses will be installed in the coastal area of Playa Penino and Autódromo neighborhood (San José), Playa del Cerro (Montevideo), Parque del Plata (west bank of Solís Chico stream, Canelones), Playa Hermosa (Maldonado) and the stretch between Los Botes beach and La Serena (La Paloma, Rocha). Parking lots will be installed at Playa Penino and Barrio Autódromo (San José), Parque del Plata and La Floresta (Canelones) and will be reconditioned on the stretch of beach between Los Botes and La Serena (La Paloma, Rocha). According to the trends illustrated by local population statistics, in each of the localities the female population is approximately 50%. Signage will be installed at all sites.
166. Beneficiary population: Permanent inhabitants of each locality, tourists and visitors to the beach, street vendors.

167. Institutions responsible/actors involved: Departmental governments, municipalities, Ministry of Environment, neighborhood commissions, potential contractors.

**Activity 2.1.5** Restoration of coastal wetlands (saline and freshwater wetlands)

168. The activity consists of the recovery of the surface and structure of coastal wetlands, restoring their ecological functioning and their role as part of a Sustainable Drainage System.

169. The recovery of the wetland surface implies the regulation of land use in flood areas and the prohibition of changes in topography that affect drainage in the wetland basin.

170. The recovery of the structure includes the conservation of bioengineering species (such as the crayfish species *Neohelice granulata* and *Uca uruguayensis* in wetlands associated with the Solís Chico stream), the regulation of vegetation extraction for economic purposes (for example, the extraction of reeds); it may also involve revegetation with native species and the extraction of exotic plant species.

171. Gender and vulnerable groups responsive actions: Criteria will be considered to promote the participation of women and vulnerable groups in the restoration actions.

172. Location: pilot sites Colonia, San José, Canelones, Maldonado, and Rocha.

173. Beneficiary population: permanent inhabitants of each locality. According to the trends illustrated by local population statistics, in each of the localities the female population is approximately 50%. In surface about 150 hectares will be benefited in direct form. Indirectly, the entire coastline will benefit from the buffering of rainwater discharges from the wetlands, as well as the visiting population and tourists who use the beaches.

174. Institutions responsible/actors involved: Departmental governments, municipalities, neighborhood organizations, and the Ministry of the Environment.

**Output 2.2. Improved and sustainable drainage and stormwater systems**

**Activity 2.2.1** Readjustment of stormwater discharges on the beach

175. The objective of this activity is to mitigate erosion caused by rainfall discharges on the coast

176. When the discharge of a storm drainage system takes place in the coastal strip, it is necessary to have an energy dissipating structure at the point of discharge, which acts by removing energy from the flow before it runs off the surface into the receiving body, in order to prevent erosion of this area.

177. The type of discharge depends on the flow conducted and its surroundings. Generally, by guaranteeing conditions of more rapid evacuation of upstream flow, the flows and velocities of the discharges on the coast increase, making it even more necessary to adapt them to mitigate erosive processes.

178. In each of the localities it is foreseen:

- i. In Playa Penino and Barrio Autódromo, San José, it is planned to adapt the two existing discharges, which already have a project prepared by engineers at the request of the Ministry of Environment.
- ii. In the case of the Playa del Cerro in Montevideo, the relocation of the existing storm drainage system to the west side of the beach is being considered. The study should be included in the activity.
- iii. In the case of the rainwater discharges located on the La Floresta slope (an area at risk of landslides), Canelones, the planned modifications are due to take pressure off the slope, which may involve relocating them (requires an engineering project).
- iv. On the beach arch between Zanja Honda stream and Tarariras stream in Maldonado, there are 5 stream discharges and several minor discharges, each of which must have an engineering project.
- v. As part of the activity in the east and south beach arches of La Paloma in Rocha, the definition of type discharges on the coast that can be replicated is contemplated.

179. Gender and vulnerable groups responsive actions: specific criteria may be included in tender documents for the contracting of public works companies.

180. Location: San José, Montevideo, Canelones, Maldonado and Rocha.

181. Beneficiary population: Local population of each municipality, tourists and beach visitors. According to the trends illustrated by local population statistics, in each of the localities the female population is approximately 50%.

182. Institutions responsible/actors involved: departmental governments, municipalities and Ministry of Environment.

**Activity 2.2.2** Bioretention and rainwater harvesting

183. The objective of this activity is to minimize the impact of stormwater on the coast. This translates into preventing

increases in peak flows (and therefore velocities) and the total volume of runoff reaching the beach.

184. Improvements in the drainage system should have an integral approach to the system where the stages of runoff capture in the input, buffering-conveyance and discharge areas can be differentiated. Therefore, upstream measures also contribute to strengthening coastal areas in the event of high intensity rainfall events and in the daily operation of the drainage system<sup>70</sup>.
185. Bioretention and rainwater harvesting have been chosen as source control measures depending on the availability of land to be defined in the project. Bioretention consists of depressions in the soil containing vegetation in a soil mixture designed on a gravel storage layer. They allow infiltration, storage and evaporation of both direct rainfall and runoff from upstream. It contains (from top to bottom): vegetation layer, stagnation area, organic layer and planting soil mixture, sand layer, geotextile, and storage layer. Rainwater harvesting (feasible especially in public buildings since it intervenes directly on the structure) consists of rain barrels of approximately 1,000 liters for the accumulation of rainwater runoff on roofs and its subsequent reuse for irrigation. The expected result of the implementation is the reduction of the peak water flow that ends up in the water discharges on the beach, reducing erosion due to rainfall on the beach. Likewise, the contribution of water to the coastal basin is reduced by using the water collected for other uses.
186. Gender and vulnerable groups responsive actions: specific criteria may be included in tender documents for the contracting of public works companies.
187. Location: Catchment basins to the beach arches of La Paloma, Rocha. Rainwater harvesting in private and public properties.
188. Beneficiary population: All beach users (residents and tourists), fishermen and residents, 5,000 inhabitants of La Paloma (50.7% of women inhabitants in La Paloma). Floating population: 50,000 tourists per year in the department.
189. Institutions responsible/actors involved: Departmental government of Rocha, municipality of La Paloma and Ministry of Environment.

#### **Activity 2.2.3 Drainage ditches and stilling ponds-non-return valves**

190. This activity will promote the design and installation of sustainable drainage devices, with the objective of reducing the risk of flooding and mitigating the environmental impact caused by the modification of the natural conditions of the watershed and the change in the flow balance.
191. Control structures within the drainage system are generally used for full or partial retention of storm flow<sup>71</sup>.
192. In flow buffering and conveyance, retention structures such as buffer gaps can be implemented, infiltration and retention can also be favored by means of grass swales with accumulators, and in appropriate cases where reverse flow events are combined, the use of non-return valves can also be implemented to prevent the re-entry of flow to a certain area.
193. Design aspects of buffer gaps: Their purpose is to reduce instantaneous flows over the networks. They are useful in properties with a large surface area, with an important proportion of green spaces. They can contribute to irrigation, they allow maintaining a volume of water below the volume required for buffering for a specific use or activity. Care should be taken to ensure the safety of children and avoid mosquito breeding.
194. Design aspects of drainage ditches: Ditches consist of open channels located parallel to the street axis between the shoulder and the sidewalk, into which the blocks and streets drain in a distributed manner. Although their purpose is conduction, significant increases in their section and control elements allow them to have an accumulation function.
195. Design aspects of non-return valves: they allow water to flow from the building's internal network or a sewerage system to the general collector but prevent it from flowing in the opposite direction. They prevent flooding in areas of critical elevation with respect to the flood level. Their location must be defined at the design level.
196. Flow damping can prevent flooding in periods of minor returns and attenuate peak flows in events of greater intensity. In all cases they require an evaluation of the drainage system and available space for installation.
197. Gender and vulnerable groups responsive actions: specific criteria may be included in tender documents for the contracting of public works companies. Drainage ditches include the necessary protection for the care of children, persons with reduced mobility and the elderly, as well as the installation of the necessary signage indicating the location of the ditches. The necessary maintenance to prevent the proliferation of mosquitoes and other insects is also included.
198. Location: Prioritized sites in Colonia, San José, Montevideo, Canelones, and Rocha (according to engineering

<sup>70</sup> Source: Manual de diseño de sistemas de aguas pluviales urbanas, Version 1.0, MVOTMA/DINASA, October 2009.

<sup>71</sup> Source: Manual de diseño de sistemas de aguas pluviales urbanas, Version 1.0, MVOTMA/DINASA, October 2009. (Ibid).

project definition).

199. Beneficiary population: Inhabitants of the project areas, where female population is approximately 50%, according to the trends illustrated by local population statistics.
200. Institutions responsible/actors involved: Departmental governments of Colonia, San José, Montevideo, Canelones and Rocha, and municipalities of each site, and Ministry of Environment.

#### **Activity 2.2.4 Flood parks**

201. The objective of this measure is to reduce the flow and velocity of water runoff, mitigating the effects of flooding, while at the same time fulfilling a recreational function and promoting the public use of flood-prone areas, avoiding the possibility of housing being installed in areas at high risk of flooding.
202. Flood parks are green spaces with herbaceous, shrub and/or tree vegetation; adjacent to water bodies/areas at risk of flooding, with infrastructure adapted to periods of flooding; a possibility of habitat improvement measures for fauna to facilitate succession processes of plant species. They allow the reduction of runoff flows by increasing infiltration into the ground and reducing runoff velocity through friction with vegetation and by reducing flows. A recreation area, carbon sink, landscape value, temperature regulation, biological corridors, stress reduction and contribution to the psychological wellbeing of the population will be generated, as well as an improvement of air quality.
203. Both in Juan Lacaze and Playa Penino/Barrio Autódromo the design should be developed in conjunction with the beginning of the implementation of the measure. In the case of Juan Lacaze (Colonia), the municipality together with the UDELAR-North University is developing a project to consult the users about their preferences for the park facilities, and given that it is feasible, the adaptation of the ground levels will be included in the project. In the case of San José, it has the additional advantage of acting as a deterrent to the occupation of the area.
204. Gender and vulnerable groups responsive actions: as part of the complete proposal, gender and generations guidelines can be incorporated in the installation of flood parks based on universal and equitable criteria for public space. In addition, gender and generational criteria can be considered in the park signage, in the installation of lighting, in the design of specific spaces within the park, etc. Recreation facilities within the park will have to be adapted to the needs of people with disabilities and reduced mobility, including pregnant women and/or caregivers, the elderly, and children. Participation and consultation with the local community can be included to understand their interests and needs, with special involvement of women's and youth groups. specific criteria may be included in tender documents for the contracting of public works companies.
205. Location: Linear park on the banks of the white ravine, Juan Lacaze, Colonia and flood park in the coastal area of Playa Penino and Barrio Autódromo.
206. Beneficiary population: Direct: Inhabitants of the municipality of Juan Lacaze and the Autódromo and Penino neighborhoods, where women represent 51.7% and 50.8% of population respectively. Indirect: visitors to the parks, with special attention to women, children, youth, elderly, disabilities and reduced mobility.
207. Institutions responsible/actors involved: Departmental governments of Colonia and San José, Municipalities of Juan Lacaze and Ciudad del Plata and the Ministry of Environment.

#### **Activity 2.2.5 Establishment of hydrobiological protection in watercourses**

208. This activity consists of the incorporation in land use planning instruments of the figure of hydrobiological guardianship<sup>72</sup> for the protection of 1st to 3rd degree watercourses. The protection includes watercourses and their contiguous area. In these protected areas uses that modify native ecosystems will be restricted and ecosystem restoration measures will be implemented (particularly forest restoration). Guidelines will also be generated for the management of landscaping in private properties and public green spaces within the protected area, regulating felling, pruning, irrigation, and fertilization.
209. Priority will be given to the headwaters of the basin (specifically in the case of Playa Verde, Maldonado) and the middle basin of the watercourses to be protected.
210. This activity is aimed at reducing rainwater runoff to beach areas and protecting watercourses and their margins as biological corridors.
211. The areas in which to implement each type of measure will be identified and an evaluation will be made as to whether the incorporation of hydrobiological protection will be carried out within the Local Land Management Plan that is being prepared for the Piriápolis area or whether it would be more effective to integrate it into another

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<sup>72</sup> Hydrobiological guardianship is a land use planning figure, applied to a territorial space associated with a natural element or to the "management of an environmentally sensitive process, from the perspective of water and biodiversity. Taken from the Local Land Management and Sustainable Development Plan of Juan Lacaze and its Microregion, including Colonia Cosmopolita and Paraje Minuano (art. 11).

land management instrument.

212. Gender and vulnerable groups responsive actions: specific criteria may be included in tender documents for the contracting of public works companies. Ecosystem restoration and guidelines for the management of landscaping will include specific sections about how to mainstream gender and how to include and safeguard specific needs and opportunities to include women and youth in ecosystem restoration.
213. Location: Headwaters and middle basin related to Playa Verde (Maldonado).
214. Beneficiary population: Permanent residents of Playa Verde, where women represent 48.7% of population, tourists and visitors to the beach.
215. Institutions responsible/actors involved: Departmental government of Maldonado, municipality of Piriápolis, Playa Verde Neighborhood Organization (*Organización vecinal Playa Verde*).

### **Output 2.3 Flood-proofed housing and buildings**

**Activity 2.3.1** Implementation of a financial mechanism to promote adaptation in housing and other buildings in medium flood risk areas.

216. This activity proposes the creation of a revolving fund mechanism for populations vulnerable to climate change in areas at medium risk of flooding, whose homes are consolidated and not susceptible to future relocation, to strengthen their homes and commercial premises.
217. The National Housing Directorate (DINAVI) of the Ministry of Housing and Land Management would technically manage this revolving fund, which could be associated with the existing Urban Rehabilitation Program. DINAVI would sign agreements with the departmental governments or update the existing ones. The financial administration would be in the hands of CND, the executing entity.
218. Some of the elements that could be eligible are locks or flood gates, waterproofing of walls, storm valves, non-return valves; adaptation of electrical installations, accessibility measures for people with disabilities or reduced mobility, mechanisms to lift furniture and other valuables to upper floors. Conclusions of the NAP Ciudades technical studies on these solutions will be considered. However, the type of investments and the maximum number of credits will be defined at a later stage.
219. Gender and vulnerable groups responsive actions: beneficiaries will be prioritized considering the diversity in the composition of the population of the area and their ability to meet their payment commitments, considering gender, generational and disability criteria, with special attention to single-parent households headed by women, among others, ensuring that benefits are distributed equitably and that access for the most vulnerable is guaranteed. All the eligibility criteria will be reflected in the operating manual that will be developed at project start.
220. The project takes the experience and lessons learned from the implementation of the revolving fund for adaptation of housing and commercial buildings in the departmental government of Paysandú, which is currently being implemented within the framework of the binational project financed by the Adaptation Fund "Adaptation to climate change in cities and vulnerable coastal ecosystems of the Uruguay River" (*Adaptación al cambio climático en ciudades y ecosistemas costeros vulnerables del Río Uruguay*). During the consultation process, discussions were held with CND and the departmental government of Paysandú; some of the main lessons learned from the conception of this project are related to the need to start by raising awareness among the exposed populations and the potential target population and to have a technical team, composed of at least one architect and one social worker to mobilize the revolving fund, who can work in the territory and review each of the loans requested.
221. Thus, the steps to be followed for the implementation of this fund are a) Survey of vulnerable and exposed areas; b) Preparation of the operations manual; c) Consultation on the operating regulations with the population; d) Sensitization workshop; e) Door-to-door campaign, pre-registration through the web and technical visits; f) Granting of credits; and g) Monitoring of the execution of the measures.
222. Location: Neighborhoods at medium risk of flooding in the six coastal departments.
223. Beneficiary population: The preparation of the Full Proposal will allow estimating the number of households to be reached during the project implementation period (4 years). It is expected that after the end of the project the fund will continue to sustain and rotate for more households during the following years, as part of DINAVI's programs (see more in Section II-J). Specific quotes will be defined to guarantee and promote access to funds under this mechanism (for example, 30% of beneficiaries are single-parent households headed by women).
224. Institutions responsible/actors involved: Departmental governments, municipalities, DINAVI.
225. Categorized as USP: Although the typology of beneficiaries, the typology of measures and the broad areas

where this funding window will be implemented (medium-high risk areas as per flood risk maps) are known, the exhaustive list of measures cannot be provided yet.

### **Component 3 – Stakeholders build capacity, understand climate risks, and engage in climate action.**

226. The proposal is to increase the technical capacities and awareness of the local population, government institutions and the productive sectors, ensuring an increase in awareness and an exchange of knowledge on the impacts of climate change on the coast and adaptation measures, and to promote mechanisms for advocacy and collective action to promote the implementation of adaptation measures and their sustainability and replication.

#### **Output 3.1 Decision-makers, technicians and population sensitized and involved in climate change**

##### **Activity 3.1.1** Communication strategy

227. As a first step, the support of specialized professionals will be sought to elaborate a Communication Strategy with a gender and generations perspective, and how to implement the Strategy with an inclusive approach, that will conclude with an action plan where the different audiences are identified and for them different communication actions. Some of them will be general and others specific for young people, general population, politicians, technicians and SMEs. This plan will define the most appropriate communication materials to be used.

##### **Activity 3.1.2** Awareness raising - involving youth and communicators in adaptation measures.

228. Through this activity, the project will seek to work with local youth and communicators to raise awareness about climate change, its expected impacts on the coast, the importance of adaptation measures and their monitoring, as well as to survey the pre-existing knowledge among them that can contribute to the project, while incorporating the gender and generational perspective and other social and environmental issues.

229. The project will build on DINACC's experience with the "Youth Climate Action" (*Acción Climática Joven*) initiative, which is already working specifically on empowering youth in climate action. Continuous learning, action-oriented and experiential educational approaches will be considered, including immersive field-based and non-formal educational experiences, to connect youth to coastal environments and adaptation measures. In addition, meetings of youth involved with climate action on the coast will be encouraged, inviting them to propose innovative initiatives for adaptation, pilots of which could be funded by the project.

230. There will be work with youth and youth associations, to deploy different communication actions that will actively incorporate the gender responsive actions.

##### **Activity 3.1.3** Awareness raising for the local population,

231. This activity will seek to provide information, practical knowledge, and tools to increase interest and promote active engagement in climate action among the local population and local communication professionals. Through the adoption of a behavioral change approach, the project will translate the most relevant information on climate change, adaptation measures, lessons learned and learning resources into understandable, gender-sensitive language and generations. It will actively involve the media, such as local radio and television stations, and will take advantage of the potential of social networks to spread the message. Activities with communicators will include breakfasts and workshops where information will be shared about the project, about good practices on how to communicate climate change with a gender perspective, in order to create a first direct link to later have a continuity of work during the implementation of the project and that they consider it in their coverage. Specific activities with the population may include dissemination events, workshops, and other knowledge products that, as well as and in coordination with Activity 3.1.1, can be disseminated in different media.

##### **Activity 3.1.4** Sensitization for high-level policy makers

232. This activity will seek to raise awareness among high-level policy makers, from governors to ministers and parliament, on the threats and impacts of climate change, the necessary adaptation measures, and the tools to implement them, with specific consideration of how to also involve the gender and generational perspective.

233. Some of the instances to seek to participate with are:

- Meetings at the ministerial level: short informative meetings will be proposed representatives from different ministries and agencies (Ministries of Housing, Transportation, Economy, National Directorate of Hydrography, SINA, etc.) are invited to attend. The key is to facilitate their access to the available information and that they are aware that there are technical personnel available and working effectively on concrete climate change adaptation measures on the coast. In addition, it will be critical to make them



understand how the measures that are implemented contribute to compliance with the 2nd NDC.

- Congress of Governors (Congreso de Intendentes): Interventions will be proposed at these meetings of Departmental Governors that take place periodically. In these interventions, it will be proposed to analyze the barriers to the implementation of adaptation measures, what are the technical and financial tools available in the country, how resources are being used to provide solutions, and which are the most suitable and effective adaptation actions.

#### **Activity 3.1.5** Sensitization and capacity building for local technicians

234. As explained in the context section, there are important differences in criteria on how to implement certain measures or how to carry out certain maintenance tasks that promote adaptation. For example, while some technicians in the municipalities know that the presence of vegetation in certain sites helps to dampen flooding, the people who carry out the maintenance of these sites (e.g., machinists who maintain gullies) assume that the presence of vegetation is associated with dirt and end up removing it. Another example of a difference in criteria is related to the use of exotic vegetation, when native vegetation can be much more resilient and needs less irrigation (and, therefore, there would be less water running offshore contributing to erosion).
235. This activity will carry out awareness-raising and capacity-building activities with technicians from the departmental governments (projects, environment, development, land-use planning) to provide them with practical tools that will enable them to incorporate adaptation into their daily management in the territory. In addition, work will be carried out with municipal staff (technicians, work crews, companies subcontracted by the departmental governments) on Ecosystem-based Adaptation measures and agreements will be reached on maintenance criteria and good practices for the implementation of ecosystem restoration measures, rainfall, and drainage. These activities will be designed considering an inclusive approach about Adaptation and Ecosystem-based Adaptation, as an opportunity to include gender and generations perspective in awareness-raising and capacity building target technicians.

#### **Activity 3.1.6** Sensitization for MSMEs / productive sectors

236. It is important for SMEs in the tourism sector and other productive sectors to be aware of the threats of climate change on the coast and how its impacts may affect future economic activities there. The project will work with this type of actors in awareness-raising activities, access to information and the search for innovative solutions to diversify their activities, especially with those that are particularly dependent on beach tourism or are located in areas that are expected to suffer greater impacts in the future related to erosion and flooding exacerbated by climate change. As women have a key role in the tourism sector, they will be specially targeted in these activities, and if necessary specific topics of their interests may be included.

### **Output 3.2 Improved knowledge management**

#### **Activity 3.2.1** Identification of good practices and lessons learned.

237. The project will promote the identification and dissemination of learning that will be identified through a previously defined methodology. Some of the activities to be included are:
- Case studies on adaptation measures successfully implemented by the project. Special emphasis will be placed on cases of Ecosystem-based Adaptation and new methodologies that consider ecosystems in adaptation measures. These may start to be built and disseminated in the second half of the project.
  - Identification of challenges during implementation and the lessons learned from them to promote a process of reflection among the parties involved in the project.
  - Conduct annual reflection workshops with a variety of stakeholders, including national, departmental and local government personnel, academia, and civil society organizations, to jointly assess project progress and opportunities for improvement.
  - Preparation of communication products such as videos and fact sheets with key learnings to disseminate to the entire Uruguayan coastal governance arc.
  - The Gender Action Plan as part of the Full Proposal will identify how many case studies, lessons learned and communication products about gender and social inclusion will be produced. Annual workshops will include special sessions to discuss and exchange about gender and social inclusion during project implementation.

#### **Activity 3.2.2** Knowledge management exchanges between departmental governments

238. There are not many moments that favor exchange and learning both internally and between departmental governments according to the consultations and interviews conducted with representatives of the intendancies. The arrival of a project such as this one will seek to create these spaces to generate cohesion among the teams

of the departmental governments around strategies and best practices for adaptation to climate change on the coast, through workshops and meetings.

**B. Describe how the project/programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project/programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.**

**Economic benefits of the project**

239. The project will provide tangible economic benefits for the vulnerable population of the pilot sites in the Uruguayan coastal zone. These benefits include more stable incomes, preservation of employment, asset protection and savings for both the population and the local government in terms of reduced exposure to flooding and associated costs.
240. Comp. 1, through institutional and policy improvements (Output 1.1), the climate information monitoring system (Output 1.2), and the Flood Early Warning System (Output 1.3) will enable better prevention, mitigation, planning and more effective management of climate risks, resulting in reduced exposure and economic costs for both the public and private sectors associated with climate impacts.
241. Comp. 2 with the increased resilience of coastal zones (Output 2.1) will stabilize and even increase the population's income by avoiding losses in tourism and navigation activities due to the loss of beach due to coastal erosion and sea level rise. The improvement of the rainwater drainage systems that discharge onto the beach and the rainwater retention infrastructure (Output 2.1) will also contribute to the proper conservation of the beach and an increase in tourist activity. In turn, the improvement of housing and commercial buildings against flooding (Output 2.3) will protect the vulnerable population, reducing their exposure and the economic costs associated with the loss of goods and property. Furthermore, all these measures will also benefit the most vulnerable neighborhoods prone to pluvial and sea level rise flooding by generating indirect economic benefits by avoiding emergency response costs in extreme events, while also reducing the likelihood that they will require social assistance from the government.
242. Comp. 3 will build capacity among stakeholders (Output 3.1) and develop communication and outreach strategies (Output 3.2) that will reduce economic impacts by educating on how to prevent flooding and act during emergencies and how to properly care for and preserve beaches, reducing the cost of climate change hazards on livelihoods, infrastructure and the general population.

**Environmental benefits of the project**

243. Comp. 1 will provide environmental benefits at the national level because it will help identify and protect vulnerable ecosystems and components, both in land-use planning instruments and in projects carried out in the coastal defense strip, facilitating their corresponding environmental assessments (SEA, AAP, EIA) and providing the necessary resources for the implementation of guidelines and plans by the national government and departmental governments. This result is important for future actions to foresee and/or avoid specific negative environmental impacts.
244. Likewise, the climate information recording and monitoring system (1.2) and the Early Warning System (1.3) will be key results for more effective management of climate risks to the local ecosystem.
245. Comp. 2 will promote investments in green and hybrid infrastructure to restore and conserve coastal ecosystems, improve drainage, and protect homes and buildings. Each of the prioritized sites will feature one or more measures related to ecosystem conservation and restoration and storm drainage improvement, which will provide direct and indirect environmental benefits related to increased ecosystem integrity, structure, and biodiversity.
246. Ecosystems: Several of the sites prioritized in the project have some degree of protection or are located near areas of conservation value, for example: Bañados del Este Biosphere Reserve (*Reserva de Biosfera Bañados del Este*)<sup>73</sup> in Rocha or the departmental-level Playa Penino Nature Reserve (*Reserva Natural Playa Penino*) in San José<sup>74</sup>. In all cases, they will indirectly benefit from the reduction of pressure on natural resources and ecosystem services under the corresponding regulations and in line with the Local Land Management and Sustainable Development Plans, together with environmental organizations and species conservation plans that work at the local level.

<sup>73</sup> Programa de Conservación de la Biodiversidad y Desarrollo Sustentable en los Humedales del Este: <https://www.probides.org.uy/reserva-biosfera.php>

<sup>74</sup> Resolution 774/996 of the municipality of San José.

247. Comp. 2 activities, focused on improving the drainage system and promoting the implementation of sustainable urban drainage systems, will have a positive impact on the environmental sanitation of the beach. By improving stormwater quality, a healthier environment for beach users will be achieved. In addition, the reduction of the constant discharge of water will help keep the sand dry, thus avoiding the invasion of grasses and the presence of rodents and flies.
248. Comp. 3 will raise awareness and build the capacities of the different coastal stakeholders to ensure that they are sensitized on the risks and adaptation measures and become actively involved in climate action, for example, by participating in the installation and monitoring of sand fences, dune revegetation campaigns, awareness-raising events and the exchange of experiences between beaches with similar problems, collaboration in the preparation of educational material for dissemination, installation of posters and signage. In all these instances, environmental considerations will be included.
249. The Environmental and Social Management Plan will ensure that the project complies with the Fund's Environmental and Social Policy.

### **Social benefits of the project**

250. The project's actions have important social benefits for the population since, on the one hand, they aim to recover and conserve the beaches as democratic spaces, and on the other hand, they are aimed at the conservation of the beaches as spaces for public use, to increase their resilience in the face of floods and current and future extreme events, accompanying the actions with awareness raising and strengthening of the local population for climate action. Beaches are accessible to everyone, regardless of social class, age, or gender, all year round. There are close links between the inhabitants of the departments and their visitors; they are spaces for leisure, sports, recreation, meeting, and care, often used by women with children.
251. On the other hand, the very prioritization of pilot sites has taken into account criteria of socioeconomic and ecosystem vulnerability. The targeted beaches are not exclusive enclaves, but rather spaces that offer inclusive access and are utilized daily by individuals with low- and middle-income levels.
252. The social benefits of the project reach both the inhabitants of the areas closest to the coast – direct beneficiary population – and those who move to the beaches for economic, recreational or cultural activities throughout the year, with greater affluence in summer due to tourist activity (internal and external tourism). As mentioned before, the project will increase the resilience of the beaches, which will contribute to sustaining the economic activities in the long term.
253. The results of Comp. 1 Outputs 1.2 and 1.3) will have benefits for the population of the country's entire coastal zone and flooding sites, climate information recording and monitoring system and Early Warning System (EWS) with a people-centered approach, for better anticipation of extreme events and floods, and more effective management of climate risks, resulting in a reduction of the population's exposure to climate impacts.
254. Activity 2.2.4 of Comp. 2 contemplates the redevelopment of flood zones with recreational parks, adding value to new spaces of environmental and cultural interest and at the same time preventing the highly vulnerable population from settling in flood-prone areas in the future.
255. Activity 2.3.1 will promote investments with clear benefits for improving the quality of life and increasing the resilience of the population by protecting homes and buildings from flooding, through revolving funds that will provide the affected population of high and medium vulnerability with economic resources to improve their homes to withstand flood. In this sole activity to be carried out on private property, paramount importance will be accorded to ensuring that vulnerable groups are granted preferential access -see prioritization of beneficiaries in the activity description- thereby ensuring the equitable distribution of the advantages conferred by this mechanism.
256. Comp. 3 proposes to increase the technical capacities and awareness of the local population, government institutions and the productive sectors, ensuring an increase in awareness and an exchange of knowledge on the impacts of climate change on the coast and the adaptation measures applicable in the project, and to promote advocacy and collective action mechanisms to endorse the implementation of adaptation measures and their sustainability and replication by the local population in awareness-raising activities.
257. It was possible to learn directly that the population, together with the educational institutions, is generally organized and attentive to the needs of improving their beaches in dialogue with local governments during the field visits and the meetings held for the elaboration of this concept note. To achieve the results of Component 3 throughout the project, the Project will work with all interested parties, taking advantage of local knowledge and the road already traveled in search of improved knowledge management (Output 3.2).

### **Gender Analysis**

#### **Gender baseline**

258. Education: According to data from the ECH 2019, in the departments where the project will intervene, women have on average more years of education than men, including tertiary education. Similarly, illiteracy rates are also lower for women.
259. Female participation in the labor market: For Uruguay in 2021<sup>75</sup> the activity rate was 61.8%, among the female population it was equal to 55%, while for males it was 69.1%; this gender gap is even more marked in the departments of Colonia, Rocha and San José, where the lowest female activity rates are found (52.9%, 50.6% and 48.9% respectively). The rest of the departments present a female activity rate that is above the country's average, with Maldonado having the highest rate at 59.1%. In turn, the gender gap for this indicator is more significant among people without tertiary level education for all departments equally. Regarding the employment rate, it was 56% in Uruguay in 2021, while males were more employed than females (63.7% vs. 49%), a trend that is reflected in all coastal departments, with the exception of Colonia and San José where the gaps are larger, with a difference of more than 19 points. On the other hand, the female employment rate is higher than the male rate in the branches of education, social services and those related to human health and domestic service in private households, employment sectors that are typically feminized. The same situation arises when looking at unemployment data by sex, which in Uruguay disadvantages women, who by 2021 represented 11% of unemployed people, against 7.9% of unemployed men; the total for the entire population was 9.3%. In the coastal departments these differences are replicated, with special attention to the case of San José and Colonia where the difference reaches between 6 and 7 points to the detriment of women (11% and 13.5% female unemployment, respectively).
260. Female participation in the tourism activity: according to data from the ECH 2019<sup>76</sup>, female employment in the tourism sector represents 44% of the total, especially in activities related to Accommodation, Restaurants, Travel Agencies and Cultural Services, sectors whose female labor force exceeds 50%. On the other hand, the tourism sectors related to Transportation, Leisure Services and Miscellaneous Tourism Services employ mostly men (83% and 64%, respectively). In the case of the departments of Rocha, Canelones, and Maldonado, more than 50% of the tourism jobs mentioned as the first activity are occupied by women. And in the case of Montevideo, 21,625 women were registered as working in tourism, making it the department with the most female jobs in Uruguay. When analyzing the data by age range, women up to 29 years of age have their first occupation in tourism in a higher percentage than in the economy (30% in tourism and 22% in the total economy), being employed mainly in restaurants (38%) and Travel Agencies (32%). In the case of men up to 30 years of age, their first occupation in tourism is 27% (and in the total economy, 24%).
261. Access to information technologies: Access to and use of ICTs is higher for women than for men in the departments where the project will intervene. This information, added to the education data, positions women better to design climate information management interventions (early warning systems).
262. Women's political participation: According to data collected by the Observatorio Territorio Uruguay, in 2020 only 2 of the 19 departments were governed by women: Montevideo and San José. Although the proportion is slightly higher when analyzing gender parity in municipal bodies, the data show that the local political scene is still dominated by men, at least in positions of higher authority. In the 125 municipalities of Uruguay, only 19 were led by women as of 2020. In the coastal departments, the case of Rocha stands out, where there are no women governors, and conversely the case of Canelones, which is the coastal department that has more women governors in relation to the rest. When looking in detail at the data on municipal authorities, the gender gap remains in favor of men, since no department exceeds the figure of 38% of female municipal authorities, highlighting once again the case of Rocha, also that of Colonia, with the lowest participation of women in municipal positions (25.8% in both cases).
263. The NAP Ciudades and the NAP Costas integrate the gender perspective in the identification of key indicators and carry out a process of institutional strengthening in gender for management and decision-making. The participation of communities in risk identification is a priority in the NAP Costas, from which local perception workshops on climate change risks were developed.
264. As expressed in the guidelines of Uruguay's Gender and Climate Change Strategy (*Estrategia de Género y Cambio Climático de Uruguay*)<sup>77</sup>, which have been reflected in the NAP Costas, and in the country's 2nd NDC, climate change has **different impacts on people and on the territories where they live and develop their activities**, with women being in a situation of greater vulnerability when their socioeconomic, cultural and political characteristics are analyzed. In addition to the general impact on housing, the alteration of coastal space is also relevant because it serves for recreational purposes and as a transit zone to essential services, including

<sup>75</sup> Data based on ECH 2021 from INE, Anuario Estadístico Nacional 2022.

<sup>76</sup> Data systematized in Itmark, S. y Larruina, K. (2021). Empleo turístico y empleo total en Uruguay a 2019, con incorporación de perspectiva de género (Serie Documentos de Trabajo; n° 06/21). Montevideo: Universidad de la República. Facultad de Ciencias Económicas y de Administración, Instituto de Estadística. <https://www.colibri.udelar.edu.uy/jspui/handle/20.500.12008/1051>

<sup>77</sup> "Estrategia de Género y Cambio Climático. Hacia un Plan de Acción 2020-2025." (SNRCC, Uruguay, 2019)

health, education, and access to employment. At the same time, they possess specific knowledge that places them in a differential position when it comes to designing climate change adaptation measures, but which, due to the structures of decision-making spaces, are not incorporated and are not taken into account.

### **Gender benefits of the project**

265. This project, through its Gender Action Plan to be developed during the preparation of the full proposal, will not only seek to ensure that coastal adaptation measures respond to the specific needs of women in their territories, but will also seek to generate and strengthen specific capacities in both local institutions and the population, in order to have more and better tools to recognize and quantify those gender inequalities that need to be addressed as part of a comprehensive coastal adaptation policy. As part of knowledge management activities, the Gender Action Plan will include how many case studies, lessons learned and communication products about gender and social inclusion will be produced. Likewise, annual workshops will include special sessions to discuss and exchange about gender and social inclusion during project implementation (Comp. 3).
266. As part of the activities of Comp. 1, the project will integrate a comprehensive gender perspective (also considering the generational approach) in coastal planning instruments through the disaggregation of population data by sex, and the generation and prioritization of local gender and age indicators for decision-making in coastal adaptation. The expected result is that not only the departmental gender directorates will have better information to design their policies, but also that local and national institutions will have more elements to mainstream the gender and generations approach in their interventions on the coast. People-based early warning systems will have a specific consideration on the means of dissemination and communication channels that reach out especially to women and youth, based on the information available on single-parent households in the intervention zones, especially those headed by women. Access to information, knowledge and technology is a key dimension of climate change resilience<sup>78</sup>.
267. The activities planned for Comp. 2 will not only result in improved infrastructure that is resilient to the effects of climate change but will also have specific benefits on the lives of women who circulate and work on the beaches, as well as on people with reduced mobility, and on how children make use of the public space. The consultation processes with the population<sup>79</sup> carried out within the framework of the NAP Costas compile the importance of the beach not only as a place for recreation but also for building community and social bonds. In particular, it is crucial for women that beaches are also a safe space, both for circulation and for the development of economic activities linked to beach tourism (street vending, seasonal tourist services, etc.). Coastal infrastructure will take into account the importance of appropriate lighting that contributes to the safety of women where required – although always observing the minimum environmental impact on the beach ecosystem –, the installation of signage with information on access to public services (including local and national offices for the prevention of gender-based violence), and the installation of ramps and appropriate access for people with reduced mobility, children and pregnant women. In addition, the financial mechanisms proposed for housing and commercial buildings to cope with floods (Activity 2.3) should be designed with specific considerations for women to have access to and implement these funds, contributing both to their adaptive capacity and to their economic and financial autonomy (housing and businesses run by women).

### **C. Describe or provide an analysis of the cost-effectiveness of the proposed project/programme.**

268. **A comprehensive strategy:** This project stands out as a pioneering initiative within the country, marking the inception of adaptation activities grounded in detailed studies, comprehensive modeling of future climate scenarios, and thorough analyses of both socioeconomic and ecosystem vulnerabilities. What distinguishes this effort compared with previous experiences is its integration of multifaceted measures, strategically bundled for implementation at singular sites.
269. Through the support of the project to establish evidence-based monitoring, evaluation, and learning mechanisms, a wealth of insights will be generated. These invaluable learnings will serve as a foundation for future funding, facilitating the upscaling and replication of these experiences (see also Section II-J).
270. The Project has included activities in its three components that positively reinforce each other to ensure their sustainability and successful implementation together. A series of **selection criteria** have been followed to ensure **cost-effectiveness**. Initially, the NAP Costas team prioritized all activities by analyzing their capacity to meet the established objectives, as well as the Global Adaptation Goal of the Paris Agreement. The necessary

<sup>78</sup> In this regard, the document "Perspectiva de género en la adaptación costera al Cambio Climático. Plan Nacional de Adaptación Costera de Uruguay" (Marrero, L., n/d) cites that among the different vulnerabilities faced by single-parent households, the greater workload has repercussions on time poverty, which is more accentuated in those households headed by women. This has consequences not only on the economic but also on the physical autonomy of women, conditioning their capacity to respond to extreme events.

<sup>79</sup> "Recomendaciones de género en la adaptación costera. Talleres en sitios pilotos: La Paloma, Piriápolis, Atlántida, Playa del Cerro y Kiyú. Plan Nacional de Adaptación al cambio Climático en la Zona Costera" (Guchin, M., August 2022).

measures were then analyzed according to their short- and long-term results, environmental impact, social impact, other associated co-benefits and the initial maintenance budget and compared to potential adaptation alternatives. The main document used for cost-effective alternatives assessment was the “Technologies for Climate Change Adaptation. Coastal Erosion and Flooding (Linham, Nicholls, 2010)”. However, the analysis of alternatives was also based on national and international experiences.

271. The activities under **Components 1 and 3**, which include strengthening governance, climate information system enhancement, implementing an early warning system, capacity building and awareness campaigns, entail low investment with proven long-term effectiveness and sustainability of actions, as well as benefits that would be justified under all future scenarios (typically **no-regret options**). They address key issues related to the effects of global changes that are already being experienced in the coastal area. They also help to address social and cultural behaviors that tend to neglect vulnerable groups such as women and different generations, and to understand the importance of emergency responses that can prevent the loss of lives, homes and workplaces.
272. The activities carried out in **Component 2**, which focus on the **conservation and restoration of coastal ecosystems**, were selected according to the ecosystem needs of each site:
273. Activity 2.1.2 carries out a soft infrastructure measure such as catch fences with plant material for the **recovery of the structure of the dune ridge**, which allows stopping erosive processes and protects the structures and ecosystems located behind. This measure does not generate negative effects derived from its installation<sup>80</sup>, they are easy to implement and low cost. **Its effectiveness has been proven in different points of the Uruguayan coastal zone** (Kiyú<sup>81</sup>, Jaureguiberry and Punta del Diablo<sup>82</sup>) and it is a technology promoted both institutionally and by social organizations. Alternative technologies to capture sand could be the construction of breakwaters or free-standing dikes, which are hard works with a larger cost that also entail construction impact, are not easily removed and have undesirable environmental impacts. Fixing the location of the shore in a naturally dynamic system can generate return currents that imply a loss of sand around the structure (national experience: Impacts of breakwater in Cufre creek<sup>83</sup>).
274. Activity 2.1.3, the **conservation and regeneration of vegetation** is essential for the stabilization of the coastal dune ridge and its natural recomposition after wave events<sup>84</sup>. Planting is carried out to ensure the presence of vegetation in areas where it cannot disperse naturally from nearby areas or at a faster rate than would occur naturally. Native herbaceous species appropriate for each area will be used (national experience: Punta del Diablo<sup>85</sup>). Alternatively, this activity could not be carried out and the natural dispersal of vegetation could take place, but this may take too long or in some areas there may be no vegetation to disperse. The activity also eliminates exotic species (grass -*Cynodon dactylon*- in Playa del Cerro, lion's claw -*Carpobrotus edulis*- in Maldonado), thus eliminating a source of beach degradation that accelerates erosion, with non-chemical or mechanical methods that are more environmentally friendly compared to herbicides.
275. Activity 2.1.1, **sand replenishment** is proposed to be carried out at sites such as Playa del Cerro and Playa La Aguada that do not have the necessary conditions (beach width, wind transport, presence of dry sand<sup>86</sup>) to rely solely on the dune restoration as proposed in activity 2.1.2. The cost will depend largely on the source of the sand (in Montevideo there are already 2 sources that have been used in port works), the volume is estimated to ensure stable beach conditions in the long term considering also acceptable 25 years of useful life, and taking into account the associated uncertainties with all maritime engineering works [between 10 and 20% potential occurrence of extreme events] (international experience in nearby coasts: Mar del Plata<sup>87</sup>). The closed bay characteristic of Playa del Cerro indicates that there are natural structures that mimic the stabilization works commonly used as complementary to this measure. Not carrying out this activity implies that the coastal ecosystem cannot be restored, only rehabilitated (SER, 2004), which is not enough to guarantee protection against erosion and coastal flooding or habitat conditions for fauna and flora.
276. The monitoring needs of these 3 activities will be covered by activity 1.2.1 to ensure follow-up and maintenance

<sup>80</sup> Vega et al., 2007. Manual de restauración de dunas costeras. Ministerio de Medio Ambiente. Dirección General de Costas, Gobierno de España.

<sup>81</sup> Kiyú is located in the department of San José. "As a result of the fencing, beach profiles between 2013 and 2018 showed **an increase in average height (≥1 m) and volume (≥46 %) of sand, a well-developed high water level berm, and more massive vegetation**. Consequently, none of the six storm surges, including 2012-like surges that have occurred since implementation, have put coastal infrastructure at risk." Ocean and Coastal Management, Challenges to climate change adaptation in coastal small towns: Examples from Ghana, Uruguay, Finland, Denmark, and Alaska, 2021)

<sup>82</sup> Audiovisual record of national institutional experiences: Jaureguiberry (Canelones) (<https://www.youtube.com/watch?v=6EvjAgNk1v0&t=73s>), Punta del Diablo (Rocha) (<https://www.youtube.com/watch?v=QemxLYFhCso>)

<sup>83</sup> Panario & Gutiérrez, 2006; Gutiérrez & Panario, 2019

<sup>84</sup> Vega et al., 2007. Manual de restauración de dunas costeras. Ministerio de Medio Ambiente. Dirección General de Costas, Gobierno de España.

<sup>85</sup> Audiovisual record of national institutional experiences: Punta del Diablo, Rocha: <https://www.youtube.com/watch?v=QemxLYFhCso>. The experience involved the planting of 2000 specimens of herbaceous vegetation on 2 stretches of the resort's coastline: [https://www.gub.uy/ministerio-ambiente/sites/ministerio-ambiente/files/documentos/noticias/MVOTMA\\_Punta\\_del\\_Diablo\\_taller\\_Nap\\_Costas\\_final.pdf](https://www.gub.uy/ministerio-ambiente/sites/ministerio-ambiente/files/documentos/noticias/MVOTMA_Punta_del_Diablo_taller_Nap_Costas_final.pdf)

<sup>86</sup> <https://www.jandenu.com/projects/taurus-project-uruguay>

<sup>87</sup> Beach Filling Experience in Mar Del Plata Argentina (1998): <https://www.0223.com.ar/nota/2021-9-23-17-44-0-como-fue-el-ultimo-refulado-que-le-permitio-a-mar-del-plata-ganar-100-metros-de-playa>

needs and thus their sustainability over time.

277. Activity 2.1.4, **implementation of elevated walkways** for pedestrian access and parking. This measure allows universal access to the beach in an orderly manner and prevents degradation of the dune ridge by trampling (Canelones national experience<sup>88</sup>), helping to ensure the effectiveness of the ecosystem recovery actions implemented. They will be designed in accordance with appropriate environmental criteria and universal accessibility, in addition to having the necessary signage to inform and raise awareness among the population. An alternative technology to the pedestrian walkways would be the demarcation of the access zone without the construction of an elevated platform, this achieves the concentration of the impact in a single point, but does not solve the affectation of trampling, generating sand leakage paths from the beach to the territory. As an alternative to the parking lots, fencing along the entire road parallel to the coast could be considered to prevent vehicles from entering. However, this does not prevent pedestrian entry through multiple points along the coast and the fence is frequently vandalized. To avoid the latter, concrete fencing has been experimented with instead of wood, but this option implies a landscape impact and thus has been ruled out.
278. Regarding **stormwater management activities**, also pertaining to Component 2, the following adaptation activities have been prioritized, according to the need of each site:
279. Activity 2.2.1, the identified **drainage** problems will be addressed through small hybrid retrofitting works at the drainage discharge points on the beaches of the pilot sites. This measure involves the elimination of a source of beach degradation that accelerates erosion, necessary to ensure the restoration of the coastal system. The intervention is differentiated according to the need of each site, but these have been chosen in the face of the alternative of not making improvements or carrying out major conventional drainage works that entail greater construction impact and costs.
280. Activities 2.2.2 and 2.2.3, the **construction of bioretention basins and accumulator ditches** and the **installation of non-return valves** represent a relatively small investment upstream and can maximize the benefits by preventing beach erosion and flooding in identified areas by reducing stormwater runoff into the drainage system (Montevideo national experience<sup>89</sup>). Together with activity 2.2.1, these SUDs seek to mimic as closely as possible the natural drainage of a site and remove pollutants from runoff, their design slows the rate at which surface water drains and filters pollutants, contributes to natural landscaping and is less costly to maintain than conventional drains.
281. **Without these protection and accommodation measures** (IPCC CZMS, 1990), the protection service provided by the dune and beach system against erosion and coastal flooding would be lost and removal measures such as the relocation of threatened populations or the withdrawal of development in exposed areas would have to be taken, which have a high social cost and are not desirable.
282. In turn, **if we take as a benefit the non-loss of value** of the beaches provided by their protection and recreation services, a study carried out by IH Cantabria (2019)<sup>90</sup> yields a total value of US\$53,863,946 for the beach stretches of the 6 pilot sites, **5 times more than the sum of the investment in the total project**.
283. Finally, through Component 2, **coastal flood** hazards are addressed through:
284. Activity 2.2.4, **construction of flood parks**, is a preventive measure that reduces the flow and speed of water runoff mitigating the effects of flooding, which in turn fulfill a recreational function and promotes the public use of flood-prone areas, avoiding the possibility of housing being installed in areas with high flood risk and the subsequent need to relocate this threatened population.
285. Activity 2.3 will carry out the **reinforcement of housing and commercial buildings** to make them flood resistant by implementing a revolving fund as a financial instrument. This adaptation solution, also low-investment, brings significant benefits by avoiding the loss of assets and economic disruption caused by flooding in homes and businesses, being a preventive solution unlike alternatives such as home insurance that kick in once losses and damages have already been caused. In addition, the selected instrument is based on existing mechanisms that are currently being implemented in Uruguay, specifically in Paysandú in the framework of the binational project funded by the AF, thus taking advantage of the experience and lessons learned.
286. The measures proposed in Component 2 have a proactive and preventive approach, which **helps to avoid increased losses and economic costs compared to current reactive measures, such as evacuation, subsidies to people affected by flooding, and annual maintenance of coastal infrastructure**. In addition, they are **supported by successful studies and experiences** carried out in different stretches of beach on the

<sup>88</sup> <https://www.imcanelones.gub.uy/es/noticias/canelones-inauguro-bajada-accesible-en-marindia>

<sup>89</sup> <https://montevideo.gub.uy/noticias/medio-ambiente-y-sostenibilidad/la-importancia-de-los-jardines-de-lluvia-en-montevideo>

<sup>90</sup> Determines the loss of economic value of beaches due to coastal erosion according to the TR100 scenario horizon 2100 RCP8.5. It considered two services provided by the beaches: the flood protection value and the recreational value. The flood protection value provided by beaches is determined by the amount of assets (residential, industrial, service, governmental) in the area immediately adjacent to the beach (up to 300 meters).

Uruguayan coast as mentioned above.

287. Finally, it worth mentioning that the project seeks to leverage the human and technical resources of the **public sector** to carry out the activities, using and strengthening existing structures, while ensuring the integration of climate change and adaptation solutions. This contributes to sustainability and ensures that climate change aspects are considered in future interventions.
288. It also provides for the **participation and training** of the local community, especially in dune restoration and revegetation measures, which will contribute to the maintenance and long-term sustainability of these actions and ensures complementarity with other projects and programs run by public institutions that promote community participation, training and communication strategies based on local practices, culture, and social norms. This makes it possible to effectively promote behavioral change and ensure greater acceptance and commitment from the local community in the implementation of the proposed measures.
289. The project will further delve into cost-effectiveness analysis and provide quantitative estimates at the FP stage.

**D. Describe how the project/programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national adaptation plan (NAP), national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.**

290. This project contributes to the implementation of the country's climate change policies and strategies. The **National Climate Change Policy (Política Nacional de Cambio Climático, PNCC)**, created in 2016, is a strategic document with measures up to the 2050 horizon that was conceived as the country's short-, medium- and long-term action guidelines for adaptation and mitigation of the challenges posed by climate change. The strategies and lines of action of the PNCC, the National Policy for Integrated Risk Management (PNGIR) and the preparation of the **National Adaptation Plan for Coastal Areas (NAP-COSTAS)** – which provides the framework for the preparation of this proposal – are examples of the political and inter-institutional priority given to the progress of climate action and the Implementation in Uruguay of Sustainable Development Goal number 13 of the United Nations.
291. The NCCP was the framework for the preparation of the **First Nationally Determined Contribution (NDC)** under the Paris Agreement. In December 2022, the government of Uruguay submitted its **Second Nationally Determined Contribution (NDC2)** to the United Nations Framework Convention on Climate Change (UNFCCC). In the First NDC, Uruguay had set the following objectives, which were reflected in the NAP Costas: 1) Incorporate an adaptation perspective in the development and implementation of the coastal zone policy framework; 2) Strengthen capacities at the national, departmental and municipal levels related to climate risk management and adaptation in coastal ecosystems through the training of human resources and the financing of specific actions, as appropriate in terms of budgetary competencies at the respective levels of government; and 3) Promote the preservation of coastal natural spaces and processes threatened by climate change and variability.
292. This project contributes to the implementation of the following **adaptation measures recommended by the NAP COSTAS:**

Removal of hard and/or soft coastal structures to restore the system and move towards natural functioning (Comp. 2).	Develop recommendations for highly vulnerable areas to avoid future hard infrastructure interventions without prior studies incorporating climate change scenarios (Comp. 1).
Introduce into the design of new coastal infrastructure the effect of climate change on the lifetime of the project (Comp. 2).	Restoration and conservation of coastal psammophilous forests associated with dune and wetland systems in the coastal zone (Comp. 2).
Incorporation of nature-based solutions (Comp. 2).	Incorporation of Sustainable Urban Drainage Systems (SuDS) (Comp. 2).
Artificial sand recharge by filling in coastal banks in highly vulnerable stretches (Comp. 2).	Identification, assessment and monitoring of impacts caused by extreme hydroclimatic events (Comp. 1).
Capacity building and awareness raising (Comp. 3).	Early warning and response systems (Comp. 1).
Improving climate change impact monitoring systems (Comp. 1).	Improvement of regional and local plans (Comp. 1).

293. The project will contribute to several of the **adaptation measures proposed by NDC2**. Indirectly, it contributes to measures #1, 2, 3, 7, 10, 11 and 32, and directly, it contributes to the following:



- No. 14. Improvement of processes for recording and evaluating the impacts of adverse weather-related events in order to quantify and estimate losses and damages in the tourism sector, improving databases and sources of information.
- No. 21 and 26. To deepen the adequate incorporation of adaptation to climate change and variability in land use planning instruments, urban planning and management, urban landscape, building regulations under a climate risk framework and incorporating the ecosystem-based adaptation approach.
- No. 27. By 2030, a public-private financing instrument will be implemented to improve climate resilience in new and/or existing buildings and urban infrastructure, including an ecosystem-based adaptation approach.
- No. 35. By 2030, Law 19.772 referring to the National Guideline for Territorial Planning and Sustainable Development of the Coastal Space of the Atlantic Ocean and Río de la Plata (*Directriz Nacional de Ordenamiento Territorial y Desarrollo Sostenible del Espacio Costero del Océano Atlántico y del Río de la Plata*) will have been regulated.
- No. 38. Promote the conservation and reduction of the vulnerability of the coastal zone threatened by climate change and variability through ecosystem-based adaptation measures.
- No. 40. Implement a system for monitoring the coastal dynamics of Río de la Plata and the Atlantic Ocean.

**E. Describe how the project/programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.**

294. The accredited entity and the executing entities will ensure compliance with all laws, policies and regulations of the Government of Uruguay. The project will comply with all applicable national regulations regarding environmental management, labor relations, health and safety, public health, and protection of the coast and bodies of water. It will comply with all relevant government policies and adhere to all building and construction standards. It will also comply with CAF safeguards and the Adaptation Fund's environmental and social and gender policies. The Environmental and Social Management Plan and Gender Action Plan will be developed during the full proposal development stage.

295. To ensure compliance with regulations and technical standards for dune restoration activities, beach fills, and other interventions in the ecosystems, the project will be supervised by the Department of Coastal and Marine Management (DGCM) of DINABISE. The Environmental Directorates of the departmental governments will also supervise compliance in the areas in which they are involved. For drainage issues, the supervision of DINAGUA and the Works Directorates of the municipalities will be provided. In any case, the Project, through the Project Management Unit (PMU) and the Technical Committee that will be defined during the preparation stage of the Full Proposal, will ensure that all project activities comply with the regulations and follow the appropriate steps for the authorization of the works or any necessary permits.

296. The project design is being carried forward with the environmental authorities, as well as with local governments and the Academia, and will continue at all stages of the project to ensure that all unidentified subprojects and activities (USPs) comply with the relevant laws and technical standards. In addition to the virtual and face-to-face consultations that have taken place during the concept note stage, exchanges with key stakeholders will continue during the Full Proposal preparation stage and the technical studies that are being prepared will be analyzed to ensure a high quality of the project design. (See more details in Section II.I).

**National laws that must be complied with in all types of project activities:**

<p>Environmental and climate change laws:</p> <ul style="list-style-type: none"> <li>- General Environmental Protection Law (No. 17,283, December 28, 2000): Establishes the principles of environmental policy and environmental management instruments (EIA, SNAP, among others). Its Regulatory Decree (No. 222/019) approves the National Environmental Plan for Sustainable Development.</li> <li>- National Climate Change Policy to 2050 (November 3, 2017).</li> <li>- Environmental Impact Assessment Law No. 16466.</li> <li>- Law for the Creation and Management of the National System of Natural Protected Areas (No. 17,234 of February 22, 2000), and its Regulatory Decree (No. 52 of 2005).</li> <li>- National Water Policy Law (No. 18.610, October 2, 2009).</li> <li>- Land Management and Sustainable Development Law (No. 18,308 of June 18, 2008) and its Regulatory Decrees (No. 523/009, No. 221/2009).</li> <li>- National Guidelines for the Territorial Planning and</li> </ul>	<p>Laws and strategies with an impact on women's rights:</p> <ul style="list-style-type: none"> <li>- Law 19,555 on the equal participation of both sexes in the integration of national, departmental and leadership elective bodies of political parties (2017).</li> <li>- Law 19.353 "National Integrated Care System" (2015).</li> <li>- Law 18.651 on the comprehensive protection of persons with disabilities (2010).</li> <li>- Law 19.580 Violence against women based on gender (2018).</li> <li>- National Strategy for Gender Equality 2030 (2018).</li> <li>- National Strategy on Gender and Climate Change (2019)</li> <li>- Gender and Climate Change Action Plan 2020-2025 (2021)</li> </ul> <p>Law approving the Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement) (Law No. 19,773 of July 17, 2019).</p> <p>State Contracting and Procurement Law (Law No. 18.446)</p>
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<p>Sustainable Development of the Coastal Space of the Atlantic Ocean and the Río de la Plata (Law No. 19,772 of July 17, 2019).</p> <ul style="list-style-type: none"> <li>- Water Code (Decree-Law 14.859 of December 15, 1978)</li> </ul>	
<p><b>Labor rights laws:</b></p> <ul style="list-style-type: none"> <li>- In Uruguay there are twenty laws regulating labor law, the main ones being: Sickness Insurance, Labor Credit Guarantee Fund, Labor Promotion for Persons with Disabilities, Unemployment Insurance, Supplementary Annual Wage or Aguinaldo, Leave Regime, Aliquots or incidences in dismissal, Wages, Occupational Accidents and Occupational Diseases Maternity, Overtime, Weekly Rest, Vacation Wage, among others.</li> <li>- Employment Promotion Law No. 19,973, Decree No. 308/021</li> </ul>	<p><b>Worker health and safety laws:</b></p> <ul style="list-style-type: none"> <li>- Law No. 5.032 of 07/21/914 establishes the obligation of employers to take safety measures to prevent accidents at work and determines their civil liability in case of accidents.</li> <li>- Approval of the International Conventions on Safety, Hygiene and Health at Work, N° 148, N° 155 and 161 of the ILO, Law N° 15.965 of June 28, 1988.</li> <li>- Ratification of the International Labor Organization (ILO) Convention No. 155 of 1981 on prevention of and protection against risks arising from occupational activities (Decree No. 291/007 of 08/13/007).</li> </ul>
<p><b>Laws or regulations related to children:</b></p> <ul style="list-style-type: none"> <li>- Childhood and Adolescence Code, approved by Law No. 17.823</li> <li>- Child labor (under the age of fifteen) is prohibited in Uruguay; the Instituto de Niño y Adolescente (INAU) grants exceptional work permits for adolescents (over the age of fifteen).</li> <li>- Committee for the Eradication of Child Labor (CETI).</li> </ul> <p>Latin America and the Caribbean Regional Initiative against Child Labor.</p>	

### Regulations and technical standards by type of intervention

Comp.	Types of intervention	Applicable regulations and national technical standards
1	Strengthening, development of regulations, participatory processes	National Guidelines for Land Management and Sustainable Development of the Coastal Space of the Atlantic Ocean and the Río de la Plata (Law No. 19,772 of July 17, 2019) – Water Code (Decree-Law 14,859 of December 15, 1978) – Land Management and Sustainable Development Law (Law No. 18,308). Guidelines for the approval process of the Strategic Environmental Assessment of Land Use Planning and Sustainable Development Instruments.
	Installation and operation of monitoring and EWS systems	Water Code (Decree-Law 14,859 of December 15, 1978) – Occupational Safety and Health Law (Law No. 19,196) – National Policy for Integrated Risk Management of Emergencies and Disasters in Uruguay (2020).
2	Restoration and conservation of coastal ecosystems	Environmental Impact Assessment Law (No. 16,466 of January 19, 1994) and its Regulatory Decree (No. 349/005) – Water Code (Decree-Law 14,859 of December 15, 1978) – Article 452 of Law No. 16.736 of January 5, 1996 (in the wording given by Article 171 of Law No. 19,535 of 2017) regulates the entry of vehicles into the coastal defense strip – Building Code (Decree No. 619/988) – Occupational Safety and Health Law (Law No. 19,196) -- UNIT 200:2021 Accessibility for people to the physical environment - General design criteria and requirements for an accessible built environment - Fact Sheet No. 6. Recovery and conservation of the coastal dune ecosystem - Guidelines for strengthening biodiversity conservation criteria in the EIA process - Guidance on interpretation of environmental information for the development of Ecosystem-based Adaptation measures in urban settings – Aggregates extraction in coastal strip: Law No. 15.903 of November 10, 1987: article 193; Environment Law: Law No. 16,466 of January 19, 1994; Investment Promotion Law: Law No. 16.906 of January 7, 1998; Land Management Law: Law No. 18,308 of June 18, 2008; Large Scale Mining Law: Law No. 19,126 of September 11, 2013. Mining Police and Safety Regulations: Decree No. 1230/946 of September 30, 1946 -- Underwater aggregate extraction permits: Decree No. 502/987 of September 2, 1987; General rules on plans and sketches: Service Order No. 1/972.
	Improvement of drainage systems	Building Code (Decree No. 619/988) – Environmental Impact Assessment Law (No. 16,466 of January 19, 1994) and its Regulatory Decree (No. 349/005) – Water Code (Decree-Law No. 14,859 of December 15, 1978) – Occupational Safety and Health Law (Law No. 19,196) - Urban Stormwater Systems Design Manual, Ministry of Housing, Land Use Planning and Environment
	Protection of homes and buildings at risk of flooding	Building Code (Decree No. 619/988) – Social Interest Housing Law (Law No. 18.795) – Occupational Safety and Health Law (Law No. 19.196)
3	Training, education, sensitization	Law approving the Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement) (Law No. 19,773 of July 17, 2019) – National Gender and Climate Change Strategy (2019).

### F. Describe if there is duplication of project/programme with other funding sources, if any.

297. The Uruguayan coastal zone is a high priority for the country, for which several studies are being developed and the government is planning various investments. Therefore, the development of this concept note has taken

care to carefully identify existing or planned initiatives, always coordinating with the Ministry of Environment and CAF, Development Bank of Latin America, and addressing the issue throughout bilateral meetings with various stakeholders (see section H).

298. The information base used for this proposal are the products made under the **National Coastal Adaptation Plan**, process led by the MA within whose studies the project supported by AECID-CTCN “Development of technological tools to assess impacts, vulnerability and adaptation to climate change in the coastal zone of Uruguay (*Desarrollo de herramientas tecnológicas para evaluar los impactos, vulnerabilidad y adaptación al cambio climático en la zona costera de Uruguay*)” was carried out. After the resulting assessment of the most exposed and vulnerable sites to climate change, the Ministry of Environment is **ordering the funding requests** in a way that seeks synergies among all the identified projects.
299. This project capitalizes on the experience of formulating and implementing the **binational project “Adaptation to climate change in cities and vulnerable coastal ecosystems of the Uruguay River (*Adaptación al cambio climático en ciudades y ecosistemas costeros vulnerables del Río Uruguay*)”** financed by the Adaptation Fund. The Ministry of Environment teams leading the formulation of this proposal are the same that formulated and currently supervise the implementation of the project. In addition, the same executing entity, CND, is proposed for the implementation of this project. CND has been participating in the consultation process and has shared its lessons learned. A good example of this work has been the analysis of the path taken to date by the Paysandú revolving fund, which the present project replicates and scales up for the protection of homes and buildings in the six coastal departments.
300. The articulation with DINAVI of the **Ministry of Housing and Land Management** is also an example of synergy, since the project will use the existing mechanisms of this directorate (Urban Rehabilitation Program [*Programa de Rehabilitación Urbana*])<sup>91</sup>, which will technically manage the revolving fund for housing protection.
301. The Ministry of Environment, the departmental governments and social organizations have worked on **dune restoration and revegetation**, as well as on the installation of geotubes and geotextiles as **coastal defense** measures. Some of them are listed below:
- In Playa del Cerro, the departmental government of Montevideo has hired a consulting firm to carry out a draft of proposals for strategies and viable technological options for the restoration and conservation of the coast. At the time of writing this concept note, partial results were not yet available, but it is expected that the conclusions of this study will be included in the full proposal.
  - Recently, the departmental government of Canelones generated an “Ecological Restoration Plan (*Plan de restauración ecológica*)” for the department, which provides for restoration measures in the coastal zone. The present project accompanies the proposals of the departmental government, providing resources for the work in one of the vulnerable areas of the coast.
  - In turn, at the mouth of the Solís Chico stream, the departmental government of Canelones signed an agreement with the Faculty of Engineering of the UDELAR - IMFIA in August 2022 for 15 months (so the results are expected in October 2023), in order to develop an “Integrated Management Plan of the mouth of the Solís Chico and the beaches of La Floresta – Parque del Plata (Plan De Manejo Integrado de la desembocadura del Solís Chico y las playas de La Floresta – Parque del Plata)”. The results of this agreement are not yet available, but they will be considered for the measures to be implemented in the area. Since the focus of the study is on the sedimentary dynamics of the stream, the proposed drainage improvement measures will be complementary to it.
  - At Los Botes and Anaconda beaches, in La Paloma, the municipality has implemented actions to reduce flooding. This measure of sand desiccation has been implemented in a palliative way. The present project proposes to address the problem from its drivers and strengthening the system to prevent permanent flooding.
  - In Maldonado, this year the departmental government carried out a removal of structures in Playa Grande. It was an old abandoned and at high risk of collapse, which also modified the coastal structure. The Environmental Directorate (*Dirección de Medio Ambiente*) must recover the dune area and ensure that all current environmental regulations are complied with, so this project will work on this recovering ecosystem. They also plan to demolish a structure on the sand at Playa Hermosa.
302. As for projects dealing with the **improvement of drainage and rainwater systems**, the following are included:
- The departmental government of Montevideo has implemented sustainable drainage measures including,

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<sup>91</sup> Program 521 for urban housing rehabilitation and consolidation is a programmatic area of the Planning and Budget Office of the Presidency of the Republic and is implemented through agreements between the Ministry of Housing and the subnational governments. It focuses on renovating, expanding, and improving existing housing through micro-credits, territorial projects, urban rehabilitation agreements, and the enhancement of basic evolutionary nuclei (NBE).

since 2018, the installation of rain gardens in different neighborhoods of the city. This is a measure that the intendance has continued to implement, which is indicative of its positive results. This background allows taking lessons learned in the design, criteria for the choice of installation sites, possible conflicting aspects and costs involved in the implementation of these devices.

- In the department of San José, in the town of Ciudad del Plata, close to the pilot sites of this project, there are also drainage design experiences financed by the Office of Planning and Budget (*Oficina de Planeamiento y Presupuesto*, OPP), although they are exclusively gray infrastructure.
- In the department of Rocha, in the town of Punta del Diablo, a diagnosis was made of the behavior of the micro-watersheds associated with the southern end of Playa Grande and El Rivero, a preliminary analysis of the erosive capacity of the discharge to the beach of these micro-watersheds and the development of proposals for corrective measures<sup>92</sup>. The proposals elaborated point to the design of a Sustainable Drainage System. Although the implementation of the proposed measures did not materialize, both the Ministry of the Environment and the departmental government of Rocha have the capacity generated from this experience to replicate it in other sites.
- Likewise, in La Paloma, the departmental government has developed the executive project for the implementation of macro drainage works in the main avenue Anaconda and in the Aguada<sup>93</sup>. It is planned to consider this project, in order to complement the proposed measures and evaluate the planned discharges to ensure a typology that prevents coastal erosion.
- In Juan Lacaze there is a culvert replacement project (widening the section) on Route No. 54, to be executed by the departmental government of Colonia, financed by the World Bank, which will improve drainage conditions in Cañada Blanco and modify flooding conditions upstream of the existing culvert. Construction is expected to be completed in 2024, so the proposed measures include updating the risk map in the area with the situation after the work is completed.

303. In addition, in Playa del Cerro, Montevideo, the Ministry of Environment has contracted a consulting firm for the **detailed design of adaptation measures** to be implemented there<sup>94</sup>. At the time of writing this concept note, partial results were not yet available, but it is expected that the conclusions of this study will be included in the full proposal.

304. The project will build on DINACC's experience with the “**Acción Climática Joven**” initiative, which is already working to build local networks for the involvement of the population and youth in particular.

305. For the development of the **pilot EWS for coastal flood risk** for Juan Lacaze, the project will seek to complement and deepen IMFIA's work in the development of a real-time operational forecasting system for different metoceanic conditions in the territorial waters of the Río de la Plata and its Maritime Front called **PronUy\_RPFM**.<sup>95</sup> Likewise, the work done and lessons learned with FEWS-Uy and the EWS for flood risk already in operation in the country will be used as a basis.

306. The project does not overlap with the following GEF-funded projects, either because they address very different issues, such as pollution or maritime transport, or because they do not coincide geographically (e.g., GEF #2095 in border areas between Argentina, Bolivia, Brazil, Paraguay and Uruguay; or GEF# 10550 on the border with Brazil, outside the project's area of influence): **GEF# 10035 (CAF)**: Preparing the Ground for the Implementation of the La Plata Basin Strategic Action Program; **GEF# 3519 (UNDP)**: Reducing and Preventing Land-based Pollution in the Rio de la Plata/Maritime Front through Implementation of the FrePlata Strategic Action Programme. **GEF #2095 (UNEP)**: Sustainable Management of the Water Resources of the la Plata Basin with Respect to the Effects of Climate Variability and Change. **GEF #613 (UNDP)**: Environmental Protection of the Rio de la Plata and Its Maritime Front: Pollution Prevention and Control and Habitat. **GEF# 10550 (FAO)**: Binational and integrated water resources management in the Merín Lagoon Basin and Coastal Lagoons. In any case, the project will seek to learn from these projects in terms of ecosystem management, sustainable water resource management and public awareness.

## **G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.**

<sup>92</sup> Work carried out by the consulting firm ISTEAC within the framework of the project “Fortalecer las capacidades de Uruguay para la adaptación al cambio climático en la zona costera” executed by the Ministry of Housing, Land Management and Environment (now Ministry of Environment) and financed by the Spanish Agency of International Cooperation for Development (AECID) through the EUROCLIMA Program.

<sup>93</sup> PROYECTO EJECUTIVO DE INGENIERÍA DE INFRAESTRUCTURA VIAL Y PLUVIAL DEL BARRIO PARQUE. LA PALOMA- DEPARTAMENTO ROCHA-URUGUAY. FONADEP URU/16/002-02, with own resources of the departmental government and the nation. The total estimated cost of the project is USD \$2,000,000. The departmental government plans to execute USD \$500,000 in 2023.

<sup>94</sup> “CONTRATACIÓN DE EMPRESA CONSULTORA PARA EL DISEÑO DE LAS MEDIDAS DE ADAPTACIÓN DEL PROYECTO PLAYA DEL CERRO – PLAYA KIYÚ” within the framework of the Uruguay-Euroclima+ Country Dialogue, to be carried out between November 2022 and September 2023.

<sup>95</sup> The forecast is freely available and can be consulted at the following link: <https://www.fing.edu.uy/imfia/pronostico-marea/index.html>.

307. As part of the activities of Component 1, the project will seek to support the strengthening of a system for recording and analyzing the effectiveness of adaptation measures, to develop metrics, capture and combine data from various sources of information, process and analyze them, allowing their visualization by different stakeholders to understand the effect of adaptation measures, and record the results achieved in terms of reducing the vulnerability of ecosystems and the population to the impacts of erosion and coastal flooding.
308. The project also has a specific subcomponent aimed at identifying good practices and lessons learned, promoting the dissemination of knowledge and peer learning. Within this framework, case studies will be carried out based on the implementation experiences of the concrete adaptation measures of the project, and will seek to learn about the process, identifying implementation challenges and lessons learned. Departments and municipalities with different degrees of knowledge and maturity in the design and implementation of measures to reduce the impacts of coastal erosion and flooding will be involved in the execution of the activities. Within this framework, during the previous participatory processes such as the development of the NAP Costas and the NAP Costas working group, the importance and value of peer learning and sharing of implementation experiences among participants was emphasized.
309. The lessons learned from the project will in turn be used to inform the training and awareness raising activities included in Component 3. This component will promote various awareness raising events, trainings and workshops to disseminate best practices and sensitize a broad group of target audiences, including the local community, policy makers, local and national government technicians, adaptation implementation teams, youth and community-based groups. In addition, consultancies are planned to identify the best strategies for engagement and information dissemination according to the types of audience/stakeholders to be involved to ensure effective outreach to the key stakeholders to be sensitized and involved in coastal climate action.
310. Finally, the project will have a monitoring and evaluation system that will allow monitoring the implementation and results of the measures executed by this project, as well as instances of evaluation of the achievements at mid-term and at the end of the project.
311. It is expected that all the inputs generated in the various activities, monitoring, training and evaluation activities will be compiled and disseminated through various knowledge products appropriate for each target audience. The project will ensure the use of all that is generated and the joint reflection to guarantee reflection processes and promote a learning culture that allows improving coastal climate action. To this end, through Activity 3.2.1, it is planned to identify and prepare different communication products such as videos, fact sheets with key project information, infographics, podcasts, and to identify events where it is relevant to share experiences. It is also planned to hold annual reflection workshops with all stakeholders involved at national, departmental and local levels, including academia and grassroots civil society organizations, to reflect on the evidence and processes implemented, best practices, challenges and share the lessons learned from the project.

**H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.**

312. The formulation of this project has been led by the Ministry of Environment - the National Designated Authority to the Adaptation Fund - and CAF, Development Bank of Latin America.
313. As background, it is important to highlight that, although the formulation of this proposal began in February 2023, Uruguay has been carrying out a highly participatory process on the coast, within the framework of the implementation of the National Adaptation Plan (NAP Costas), during the last 3 years. During this process, the Ministry of Environment has maintained constant communication with departmental governments and other stakeholders in the territory. Both the definitions of the components and contents of the NAP-Coasts and the creation of knowledge have been developed through inter-institutional coordination concentrated in the SNRCC with iterative mechanisms for consultation and adjustment. Particularly noteworthy is the work carried out for the elaboration of gender recommendations to be integrated into coastal adaptation measures in NAP pilot sites. Convened by the gender directorates of the departmental governments, with the support of Inmujeres/Mides territorial referents, the 5 workshops were held during 2022. With the participation of 61 people (80% women), recommendations were obtained regarding infrastructure, mobility, nature-based solutions and capacity building with a gender perspective. These have been taken into consideration by this project.
314. As part of the formulation of this concept note, four main consultations were held between February and June 2023: 1) Initial workshops with the national and departmental governments; 2) Weekly meetings with government stakeholders; 3) Origination mission with field visits, which included interviews with representatives of the local population and a workshop and validation with departmental governments and academia; 4) Additional virtual bilateral consultations with civil society, departmental and municipal governments; 5) A specific

meeting with departmental gender focal points. Table 3 lists all the stakeholders that were consulted throughout the above-mentioned instances. In total, 95 people (59% women) were consulted during this stage, including 27 from the national government (78% women), 49 from local governments (53% women) and 19 representatives of associations and local population (47% women).

**Table 3.** Stakeholders consulted during the concept note preparation stage.

Ministry of Environment	<ul style="list-style-type: none"> <li>• DINACC – National Directorate of Climate Change (<i>Dirección Nacional de Cambio Climático</i>)</li> <li>• Coastal and Marine Management Department (<i>Departamento de Gestión Costera y Marina</i>)</li> <li>• Sustainable Development Promotion Division (<i>División de Promoción del Desarrollo Sostenible</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• DINAGUA – National Water Directorate (<i>Dirección Nacional de Aguas</i>)</li> <li>• DINABISE – National Directorate for Biodiversity and Coastal Space (<i>Dirección Nacional de Biodiversidad y Espacio Costero</i>)</li> <li>• DINACEA – National Directorate for Environmental Quality and Assessment (<i>Dirección Nacional de Calidad y Evaluación Ambiental</i>)</li> </ul>
Ministry of Housing and Land Planning	<ul style="list-style-type: none"> <li>• DINAVI – National Housing Directorate (<i>Dirección Nacional de Vivienda</i>)</li> </ul>	
Departmental governments	<ul style="list-style-type: none"> <li>• Departmental government of Colonia</li> <li>• Departmental government of San José</li> <li>• Departmental government of Montevideo</li> </ul>	<ul style="list-style-type: none"> <li>• Departmental government of Canelones</li> <li>• Departmental government of Maldonado</li> <li>• Departmental government of Rocha</li> </ul>
Municipal governments	<ul style="list-style-type: none"> <li>• Municipality of La Paloma</li> <li>• Municipality of Juan Lacaze</li> <li>• Municipality of Parque del Plata</li> </ul>	<ul style="list-style-type: none"> <li>• Municipality of La Floresta</li> <li>• Municipality of Atlántida</li> <li>• Municipality of Montevideo</li> </ul>
Academy	<ul style="list-style-type: none"> <li>• IMFIA – Institute of Fluid Mechanics and Environmental Engineering (<i>Instituto de Mecánica de Fluidos e Ingeniería Ambiental</i>)</li> </ul>	
Representatives of the local population	<ul style="list-style-type: none"> <li>• <u>San José</u>: Tierra de Humedales Foundation</li> <li>• <u>Montevideo</u>: Vecinos y vecinas; Centro Cultural Oeste; Organización Vecinxs por la Playa.</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Canelones</u>: Ecoparque; Comisión de vecinos/as de Laguna del Cisne; Liga de Fomento La Floresta.</li> <li>• <u>Maldonado</u>: Playa Verde Neighborhood Organization</li> </ul>
Executing entity	CND (Binational Project Executing Entity - Argentina-Uruguay Binational Project Coordinator)	

315. With all these actors, it was possible to validate the threats and impacts of coastal erosion and flooding exacerbated by climate change, as well as the non-climatic issues found in each department. Institutional strengthening needs were identified, concluding that work on risk prevention, gender mainstreaming, management of environmental and social safeguards and monitoring the impacts of adaptation measures are essential. All the possibilities in terms of adaptation measures were also discussed, always favoring an ecosystem-based adaptation approach. Some of the issues discussed with representatives of the local population provided a better understanding of the impacts of urbanization, dependence on tourism as a means of livelihood and source of local income, bad practices related to waste and sanitation, beach access and the effectiveness of beach restoration and drainage improvement measures carried out in the past. Thanks to these numerous joint analyses between the technical teams and the reality of the territory, the measures included in this concept note were defined.

316. In the development stage of the Full Proposal, progress will be made in the discussions with the entities and organizations mentioned in the previous paragraph and will be extended to other stakeholders to delve into technical and budgetary details of the prioritized measures. Also, stakeholders from the CSOs, NGOs and the tourism sector will be consulted about the potential impacts, including the potential influence of the regulations of beach access and entrances. Also, during the next stage, the Environmental and Social Management Plan will be developed, which will include a Stakeholder Consultation Plan aligned with the provisions of the Environmental and Social Policy of the Adaptation Fund. Consultations will also be carried out with organizations and agencies with competence in gender issues in order to validate the activities and design the Gender Action Plan that orients the activities to the specific needs identified in terms of gender.

**I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.**

317. In formulating this proposal, careful consideration has been given to the non-duplication and complementarity of the project with other sources of funding, as described in section F. Special attention has been given to planned investments in the coastal zone, identifying activities that are complementary to the country's efforts and planning. In addition, it has been ensured that project activities can generate adaptation results independently. It is important to note that none of the proposed activities are dependent on additional investments from other sources or stakeholders. These activities are focused on specific groups and areas in order to ensure verification of adaptation results.

318. The following are the scenarios with and without project for each project component.

*Component 1. Strengthening evidence-based coastal planning considering climate change*

319. Baseline: Although planning instruments have been incorporating the climate change perspective, most have not included guidelines for the effective adoption of concrete adaptation measures. This occurs both in the case of national regulations (Coastal Space Guidelines), as well as at the departmental level (Local Land Management Plans). On the other hand, although the Ministry of Environment has made progress in the installation of cameras and other types of equipment for monitoring variables on the coast, there are still important limitations in the systems for monitoring and recording climate change impacts of the adaptation measures that are implemented (there is no capacity to make assessments and records on various impacts with or without climate change), and the existing systems (e.g. SINAIE) are not capable of incorporating climate risk in their analyses. Nor is there a robust record of the behavior of hydrometeorological variables covering the national territory. Finally, there is currently no early warning system for coastal zones.

320. With AF funds: The project will help accelerate the definition of criteria and standards necessary for the effective implementation of climate change adaptation aspects of planning instruments. It will collaborate in developing impact monitoring and early warning systems.

*Component 2. Reinforced green and hybrid infrastructure to increase coastal resilience*

321. Baseline: There is a marked lack of funding to invest in adaptation measures for the population, infrastructure and ecosystems in the face of coastal erosion and flooding.

322. With AF funds: The project will help improve drainage infrastructure, coastal ecosystems, and homes and buildings against flooding and coastal erosion.

*Component 3. Stakeholders build capacity, understand climate risks and engage in climate action*

323. Baseline: There is a lack of a comprehensive understanding of climate change and its risks and of adaptation measures among most of the actors that have an impact on the coastal territory, from high-level politicians to the inhabitants living near the beaches. In addition, there are few instances of knowledge sharing. There is also a lack of tools for active involvement in climate action.

324. With AF funds: These barriers will be overcome through awareness raising, capacity building, identification of best practices and knowledge sharing. Advocacy and collective action will be promoted to foster the implementation of adaptation measures and their sustainability and replication.

## **J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.**

325. The project design incorporates several elements to ensure the continuity of the actions and benefits of the intervention once it is completed. In order to achieve adequate sustainability and replicability, it seeks to ensure the support of the local population, institutions and policies in relation to efficient adaptation to the increasing impacts of coastal erosion and flooding. Some of the key elements that will contribute to this purpose are:

- **Awareness raising and capacity building of** the entire range of coastal stakeholders, from the government to the local population and SMEs. Good ownership will lead to behavioral changes and the possibility of continuing to implement similar actions after the project ends.
- **Commitment to maintain the works:** This has been requested from the departmental government and will be embodied in signed agreements prior to the disbursement of funds. These agreements will regulate the responsibilities of each party and will guarantee long-term operation.
- **Working with government institutions:** The fact that the project is led and implemented by public institutions is also a guarantee of ownership and sustainability in the long term.
- **Participatory processes:** Which have been highly relevant throughout the NAP Costas process, have been deepened for the formulation of this proposal, and will be maintained during project implementation. The participation of the various stakeholders in the design and implementation of

activities deepens the appropriation and relationship of people with the coastal environment and adaptation measures.

- **Sand nourishment and other coastal restoration measures:** Local beach morphology is being carefully assessed and used to inform the restoration measures and where beach nourishment will withstand future sea levels. The studies of adaptation alternatives for beaches currently undertaken by the Universidad de la República, IMFIA, Facultad de Ingeniería, include the following assessments: characterization of maritime climate and rainfall discharges to beaches; analysis of historical shoreline evolution; estimation of current sediment balance; characterization of current erosion and flooding hazards; projection of shoreline evolution considering sea level rise; characterization of future erosion and flooding hazards; analysis of alternatives. The project expects these studies to be finalized to feed into the Full Proposal. The sustainability approach lies also on the combination of a whole set of measures: not only beach nourishment will be carried out by itself in the site, but also a variety of measures such as dune structure recovery, restoration with native species, management of beach access and uses, readjustment of storm water discharges on the beach, etc. The convergence of these interventions holds the key to ensuring a robust and long-lasting investment outcome.
- **Revolving fund:** Its long-term viability is grounded in its strategic uptake by DINAVI's Urban Rehabilitation Program [Programa de Rehabilitación Urbana], a proven mechanism within the Ministry of Housing and Land Management. DINAVI will technically manage the revolving fund to reinforce houses and other buildings. In developing this line, DINAVI will gain the experience of promoting investments focused on flood risk adaptation. The assumption is that, if it works successfully, DINAVI will continue it over time as such, or will pass on to inform existing lines so that they adopt this type of criteria and measures. A track record of 12 years attests to DINAVI's adaptability, making them a dependable driver of sustained progress, regardless of shifting political landscapes.
- **Evidence-based monitoring, evaluation and learning:** Through the support of the project to establish evidence-based monitoring, evaluation, and learning mechanisms, a wealth of insights will be generated. These invaluable learnings will serve as a foundation for future funding, facilitating the upscaling and replication of these experiences.

**K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project/programme.**

326. The following is a preliminary analysis of project impacts and risks according to the AF Environmental and Social Principles in compliance with the Fund's Environmental and Social Policy. A detailed impact assessment and mitigation plan will be developed for the full proposal. Overall, this project has been classified as a **Category B** project in accordance with the AF Policy, as the potential impacts are few, small scale and not extremely widespread, reversible or easily mitigated. None of the unidentified activities or subprojects (USP) are expected to cause negative environmental or social impacts or aggravate existing conditions, provided that they are designed and implemented following the procedures and mitigation measures that will be incorporated into the ESMP during the development of the Full Proposal.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks - further assessment and management required for compliance
<i>Compliance with the Law</i>	Additional evaluation required	This is a fundamental principle that applies to all projects. Some interventions included in Component 2 require specific environmental authorizations or administrative permits. To this end, the processing of permits, registrations, licenses, etc. must be initiated during the preparation of the full proposal.
<i>Access and Equity</i>	Additional evaluation required	As the mechanism for identifying beneficiaries is not defined in the concept note phase, a mechanism will be developed during the full proposal stage to ensure the participation of marginalized and vulnerable groups, stakeholders, and local authorities.
<i>Marginalized and Vulnerable Groups</i>	Additional evaluation required	The main vulnerable groups in the Project implementation area have been identified (see Context section). The full proposal will include the necessary consultations and analyses to ensure the inclusion of vulnerable groups and their universal access to the project's benefits.



<i>Human Rights</i>	No additional evaluation required	This is a fundamental principle that applies to all projects. Although Uruguay has signed the Declaration of Human Rights, at the time of writing there is no protocol on how it will be monitored during project implementation. This should be defined in the ESMP during the design of the full proposal.
<i>Gender Equality and Women's Empowerment</i>	Additional evaluation required	The project has designed activities with a gender perspective. However, the Gender Evaluation and the Gender Action Plan have yet to be prepared. Some aspects, such as the ethnic-racial approach to analyze the situation of Afro-descendant women, need to be studied in greater depth.
<i>Core Labor Rights</i>	No additional evaluation required	This is a fundamental principle that applies to all projects. Some Component 2 interventions may require the hiring of specific operational contractors who must comply with labor laws and International Labor Organization (ILO) regulations. All the requirements will be included in the ESMP.
<i>Indigenous Peoples</i>	No additional evaluation required	In the influence area, there are no territorially established indigenous communities. There are individuals who acknowledge their ancestral connections to indigenous heritage, who seamlessly coexist and participate in all activities alongside the general population.
<i>Involuntary Resettlement</i>	No additional evaluation required	The Project does not include activities that could result in involuntary resettlement. None of the activities presented will have a risk of relocation of people. Nor will they cause the displacement of economic activities.
<i>Protection of Natural Habitats</i>	Additional evaluation required	Project objectives include reducing the vulnerability of coastal ecosystems (restoration and conservation) inside and outside Natural Protected Areas. Project activities within protected areas must consider specific regulations and must be evaluated by the competent authorities. AF's ESP and national environmental impact assessments are applied (in addition to the CAF safeguards) to ensure that marine ecosystems are not negatively impacted by any sand dredging activities. To be further assessed in the full proposal.
<i>Conservation of Biological Diversity</i>	Additional evaluation required	Project interventions will consider the coastal ecosystem vulnerability approach for the design of ecosystem-based adaptation strategies.
<i>Climate Change</i>	No additional evaluation required	Project activities are not expected to target GHG-generating sectors. Where civil works are required, it is recognized that the movement of vehicles may increase emissions, but this impact is not considered to be significant.
<i>Pollution Prevention and Resource Efficiency</i>	Additional evaluation required	Risk of designing and implementing the project in a manner that does not comply with applicable international standards to maximize energy efficiency and minimize material and resource use, waste production, and pollutant release.
<i>Public Health</i>	Additional evaluation required	Sanitation, rehabilitation of storm drains that reach the beaches.
<i>Physical and Cultural Heritage</i>	Additional evaluation required	Risk of a project designed and implemented in a manner that may cause damage or harm to any cultural site. The project will protect cultural sites that are at risk from erosion and flooding. However, since the measures are not designed in detail at the time of the concept note, this is an aspect that will need to be further analyzed at the next stage.
<i>Lands and Soil Conservation</i>	Additional evaluation required	The Project has been designed to strengthen ecosystems and improve drainage to prevent the progression of erosion and flooding on the coast of Uruguay. Therefore, the very nature of the project itself contributes positively to land and soil conservation. However, further analysis will be required to ensure that none of the activities would be detrimental.

## PART III: IMPLEMENTATION ARRANGEMENTS

### A. Demonstrate how the project/programme aligns with the Results Framework of the Adaptation Fund

Project Objective(s) <sup>1</sup>	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD \$)
Strengthen evidence-based coastal planning considering climate change.	National and local government institutions use the information generated by the project (technical guidelines, early warning, analysis of effectiveness of measures) for decision making.	<b>Outcome 1:</b> Reduced exposure to climate related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	USD \$2,200,000
Reduced exposure to climate hazards (flooding and erosion)	Early Warning Systems, CC impact recording and monitoring systems installed and operational.	<b>Output 1.1:</b> Risk and vulnerability assessments conducted and updated	1.2 No. of early warning systems (by scale) and no. of beneficiaries covered and scale)	
Strengthen green and hybrid infrastructure at prioritized coastal sites to increase the resilience of coastal populations and ecosystems to flooding and coastal erosion impacts.	Hectares of coastal ecosystems conserved and restored. Preserved recreation and care spaces	<b>Outcome 5:</b> Increased ecosystem resilience in response to climate change and variability-induced variability.	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	USD \$5,700,000
Reduction of coastal erosion and flooding	Number of physical and natural assets strengthened to withstand the impacts of climate-related hazards.	<b>Output 5:</b> Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability.	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	
Build the capacity and knowledge of coastal stakeholders and promote their involvement in climate action.	Coastal stakeholders with increased awareness and participation in climate action.	<b>Outcome 3:</b> Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	USD \$500,000
Local population sensitized and capable of responding to flooding and implementing practices to prevent coastal erosion.	Improved knowledge management	<b>Output 3.2:</b> Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning.	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	

## PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

**A. Record of endorsement on behalf of the government<sup>2</sup>** *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Natalie Pareja National Director of Climate Change Ministry of Environment	Date: July 11 <sup>th</sup> , 2023
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**B. Implementing Entity certification** *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

<p style="text-align: center;">I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (.....list here.....) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>

<sup>6</sup> Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

<i>Name &amp; Signature</i>	
Implementing Entity Coordinator	
Date: <i>(Month, Day, Year)</i>	Tel. and email:
Project Contact Person:	
Tel. And Email:	

## A. Implementing entity certification

I certify that this Concept Note proposal “**Increasing socio-ecological resilience in the Uruguayan coastal zone and strengthening the adaptive capacity of its infrastructure: REACC COSTAS**” has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project.

DocuSigned by:



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**Martha Castillo**

*Biodiversity And Climate Technical Advisory Division*  
Implementing Entity Coordinator

Date: (July, 12, 2023)

Tel. and email: mcastillo@caf.com

<sup>6</sup> Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Project Contact Person: Carolina Cortes

Tel. And Email: +593987883698 / acortes@caf.com

DocuSigned by:



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Ministerio  
de Ambiente

Montevideo, July 11<sup>th</sup>, 2023

**Letter of Endorsement by Government**  
Government of Uruguay, Ministry of Environment

To: The Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat  
Email: Secretariat@Adaptation-Fund.org  
Fax: 202 522 3240/5

**Subject: Endorsement Concept Note for the Project " Increasing socio-ecological resilience in the Uruguayan coastal zone and strengthening the adaptive capacity of its infrastructure: REACC COSTAS", Uruguay.**

In my capacity as the designated authority for the Adaptation Fund in Uruguay, I confirm that the above national Concept Note Proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Uruguay.

Sincerely,

Ms. Natalie Pareja  
National Director of Climate Change  
Ministry of Environment