3. Success stories and lessons learned on the uptake of technologies

3.1. Success stories

The 12 success stories featured in this publication showcase the effective uptake of climate change adaptation and mitigation technologies in different geographical regions and technology sectors. The success stories were drawn from publications, surveys and assessments of the TEC and the CTCN; presentations at regional technical expert meetings held in Africa, Asia and the Pacific, Latin America and the Caribbean, and Eastern Europe and West Asia in 2018, 2019 and 2020 (UNFCCC 2018a, 2018b, 2018c, 2019a, 2019b, 2020a, 2020b, 2020c, 2020d, 2020e); the CTCN database on technical assistance; and recommendations and submissions from the members of the TEC and the CTCN Advisory Board.

The criteria applied for the initial identification of success stories from the broad range of information sources were that examples had to focus on a specific technology, have led to either initiation or full uptake of the technology and have been in line with the country's NDC. The initial results were consolidated on the basis of the availability and accessibility of information on aspects of the success stories, including the level of technology uptake, financing, gender-responsiveness, and challenges and lessons learned. The final selection was guided by the aim of ensuring balance in geographical region; groups of countries, with priority given to the LDCs and SIDS; technology sector, with efforts made to include a diverse range of technologies; types of approach, for example approaches with a focus on women, Indigenous Peoples' knowledge, the community, the private sector, the government, or rural or urban areas; mitigation versus adaptation technologies; and diversity of implementation partners. For CTCN technical assistance projects, only completed projects were considered and insights from interviews with CTCN regional teams were taken into account regarding the availability of information, level of technology uptake and use of innovative and replicable approaches.

3.1.1. Developing technological tools for adapting to climate change in the coastal zones of Uruguay

Participating countries: Uruguay and Spain

Partners: Ministry of Environment of Uruguay, Spanish Agency for International Development Cooperation (AECID), CTCN, Environmental Hydraulics Foundation (IHCantabria) of Spain, Universidad de la República of Uruguay

Start of technology uptake process: 2015

Climate technology: Climate modelling and vulnerability assessment technology

Contribution to NDC implementation: Formulated, adopted and started the implementation of a NAP for coastal areas, and mapped the coastal vulnerability of the Río de la Plata and the Atlantic Ocean to climate change and climate variability

Further information:
COASTAL-NAP: https://www.gub.uy/ministerio-ambiente/plan-nacional-adaptaci%C3%B3n-zona-costera.
Climate modelling database: https://www.ambiente.gub.uy/oan.

Climate technology: Climate modelling and vulnerability assessment technology was developed to determine the threat of climate variability and climate change to Uruguay's coastal zones and their exposure and sensitivity to it by analysing and evaluating climatic effects on the dynamics of beaches, dunes, coastal erosion and flood risks, and the consequences for the local population, ecosystems, infrastructure and tourism.

Uptake of the climate technology: Along the Río de la Plata, flash floods are caused by a combination of meteorological and hydrological factors. The occurrence of high tides with large atmospherically induced storm waves has raised the mean sea level to 3 m above its normal level, causing the removal of beaches and dunes, damage to coastal infrastructure and risks to navigation. On average, extreme events occur once every 11 months, mainly during summer or autumn.

The identified technical barriers to addressing the impacts of climate variability and climate change on coastal areas include a lack of quality data, a lack of access to data and a lack of standardized criteria, methodologies and tools for assessing climate change risks and for implementing adaptation measures or establishing metrics and procedures for evaluating adaptation processes. Other barriers include poor coordination between the national and local level and insufficient human resources with appropriate expertise.

Faced with this challenge, Uruguay made developing and implementing its COASTAL-NAP a priority in its NDC (submitted in 2017). The NAP was to be based on detailed information on hazards, exposure, sensitivities and adaptive capacities of coupled human and natural systems. Regional information systems for hazards already existed, but their level of detail was insufficient for building national and local plans. Uruguay built on, and learned from, existing global and regional systems to increase the level of detail of its national information systems, which feed directly into decision-making processes for prioritizing adaptation strategies.

Through the participatory processes of co-management of information and knowledge generation via collaboration between international and national researchers, technical and professional staff from the Ministry of Environment, the Ministry of Tourism, the Ministry of Transport and Public Works, local governments, environmental non-governmental organizations, students and citizens, the country managed to collect information and the capacity to meet the needs of analysing climate information and selecting and implementing adaptation measures in coastal areas. The improved national database and information systems for variables associated with marine dynamics (wind, pressure, waves, meteorological tide and sea level), including high temporal resolution information, now also serve as a reference for integrated coastal zone management,

operational oceanography, infrastructure construction, coastal zone risk management, ecosystem resilience-building and tourism management.

Knowledge transfer from international researchers (IHCantabria) to local researchers (Universidad de la República) and government entities was ensured by implementing training strategies for technical and professional staff and decision makers from ministries and local governments. Training was organized in eight modules over seven months, following technical specifications from academic institutions and managing specifications from the inter-institutional working group in charge of preparing the COASTAL-NAP.

Historical databases as well as projections of high-resolution dynamics prepared by local researchers were necessary for local-scale impact quantification. A new analysis was hence designed with data on wind and atmospheric pressure, creating a regional atmospheric model. At the same time, models for wave propagation and current generation were created using topographic data and coastal bathymetric and wind data. The simulations on these models generated databases that were validated with instrumental observations in the country, making it possible to infer changes in dynamics under climate change scenarios. The variability observed in Uruguay's climate was also analysed; temperature and rainfall climate trends were identified on the basis of the projections of climate models for potential changes. Owing to the high resolution of the analysis, the proposed maps could be generated at different scales without losing information or analytical capacity with scaling levels at the national (the whole Uruguayan coast) and local (by municipality and by census district) level. The combination of high-resolution basic information with impact process models and a probabilistic approach contributed to significantly reducing uncertainties, when compared with other national-scale studies, which are usually applied to indicators for characterizing impact and other risk components. The applied methodology enabled the country to identify zones with the highest coastal flood and erosion risks, the most vulnerable natural and socioeconomic subsystems, and the areas with the highest need for adaptation action.

Financing: The development of the COASTAL-NAP was supported by the CTCN[10] with IHCantabria as the implementing partner. Training for developing and implementing the COASTAL-NAP was provided by the Spanish Agency for International Development Cooperation (AECID) through the EUROCLIMA+ programme of the European Commission. This support in turn helped the country to secure a USD 30 million GCF project (2022–2025) on increasing resilience in the cities, communities and ecosystems of Uruguay's coastal areas.

Gender-responsiveness: The technology enabled the assessment of physical vulnerability, from which the potentially affected social groups could be determined. In addition to the general impact on housing, the alteration of coastal space becomes relevant because it serves recreational purposes and as a transit area to essential services, including health, education and employment. A gender-sensitive approach was crucial to analysing the different uses and precisely determining who would be affected so as to define social vulnerability on the basis of a process that integrates the population's needs in accordance with their specific reality. The gender-responsive approach allowed the measurement of inequalities in access to and control of resources and in participation in decision-making in coastal areas.

Contribution to NDC implementation: Coastal areas are listed in Uruguay's NDC as one of the main priorities for implementation and support needs for adaptation measures. The NDC includes two targets, namely to have formulated, adopted and started the implementation of a NAP for coastal areas by 2020 and to have mapped the coastal vulnerability of the Río de la Plata and the Atlantic Ocean to climate change and variability by 2020. The successful uptake of the climate modelling technology has enabled Uruguay to not only develop its COASTAL-NAP but also to enhance its capacity and secure funding for COASTAL-NAP implementation. Therefore, the technology uptake has directly resulted in the achievement of two of the country's key NDC targets on adaptation.

Challenges and lessons learned: Knowledge inclusion and decision-making were defined as the COASTAL-NAP strategies, and actions were focused on iterative mechanisms for consultation and adjustment, which involved four levels of institutional participation. The National Climate Change Response System guided the process and created a working group on adaptation in coastal areas, which was composed of national institutions. Its goal was to integrate emerging national, local and sectoral priorities, and to prepare and validate drafts of the components of the COASTAL-NAP. Subnational governments were consulted and training workshops were held aimed at improving understanding of the vulnerability of Uruguayan coastal zones. For five years (2015–2020), the COASTAL-NAP has maintained various consultation and training strategies for the municipalities along the Río de la Plata and Atlantic Ocean coastal area. The COASTAL-NAP is conceived as a method that acknowledges all concerns related to variability and climate change in relevant decision-making processes. In this regard, it intends to cover all the necessary structures for generating the knowledge that will be applied for strategic planning.

Long-term sustainability, replicability and potential for scaling up: To ensure the long-term sustainability of the uptake of the climate modelling and vulnerability assessment technology, Uruguay developed shared ownership platforms for exchanging information and sharing knowledge among all government levels and with and among academic and civil society networks. These platforms ensure the continuous engagement of stakeholders in the use and further development of the technology.

10 https://www.ctc-n.org/technical-assistance/projects/development-technology-tools-assessment-impacts-vulnerability-and.