



PARTNERSHIP FOR MARKET
READINESS – COSTA RICA PROGRAM

 **Program Activity Brief**

**THE NATIONAL CLIMATE
CHANGE METRICS SYSTEM
(SINAMECC)**

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I. COSTA RICA'S NATIONAL CLIMATE CHANGE METRICS SYSTEM (SINAMECC)

Costa Rica's National Climate Change Metrics System (*Sistema Nacional de Métrica de Cambio Climático*, SINAMECC) is Costa Rica's official platform to coordinate climate information in the country. The system serves to track progress of national climate change policy, enable data-driven decision making, and facilitate reporting under national and international commitments. Figure 1 below shows a brief timeline of the development of SINAMECC in Costa Rica.



Figure 1. Brief Timeline of the Development of SINAMECC

Officially established in 2018 after years of conceptual work, SINAMECC operates as a sub-module of the National Environmental Information System (*Sistema Nacional de Información Ambiental*, SINIA) and is linked to the National Statistics System (*Sistema Estadístico Nacional*, SEN). The coordination, operation, and execution of SINAMECC are under the responsibility of the Climate Change Directorate (*Dirección de Cambio Climático*, DCC) at the Ministry of Environment and Energy (MINAE), as per the Executive Decree No. 41127-MINAE. Two of the main goals of SINAMECC are to:

- **Monitor Costa Rica's progress in achieving its climate goals** as well as the implementation of climate policies, plans and actions in order to increase transparency, generate open access to information, and facilitate compliance with international and national reporting commitments.
- **Facilitate data-based decision** making by having data available to inform the evaluation of policies, plans and actions, increase their positive impact, and improve the generation and implementation of future policies.

In order to monitor climate change and related activities in an integral way, SINAMECC is built around four modules: mitigation, adaptation, climate finance, and sustainable development (see Figure 2).

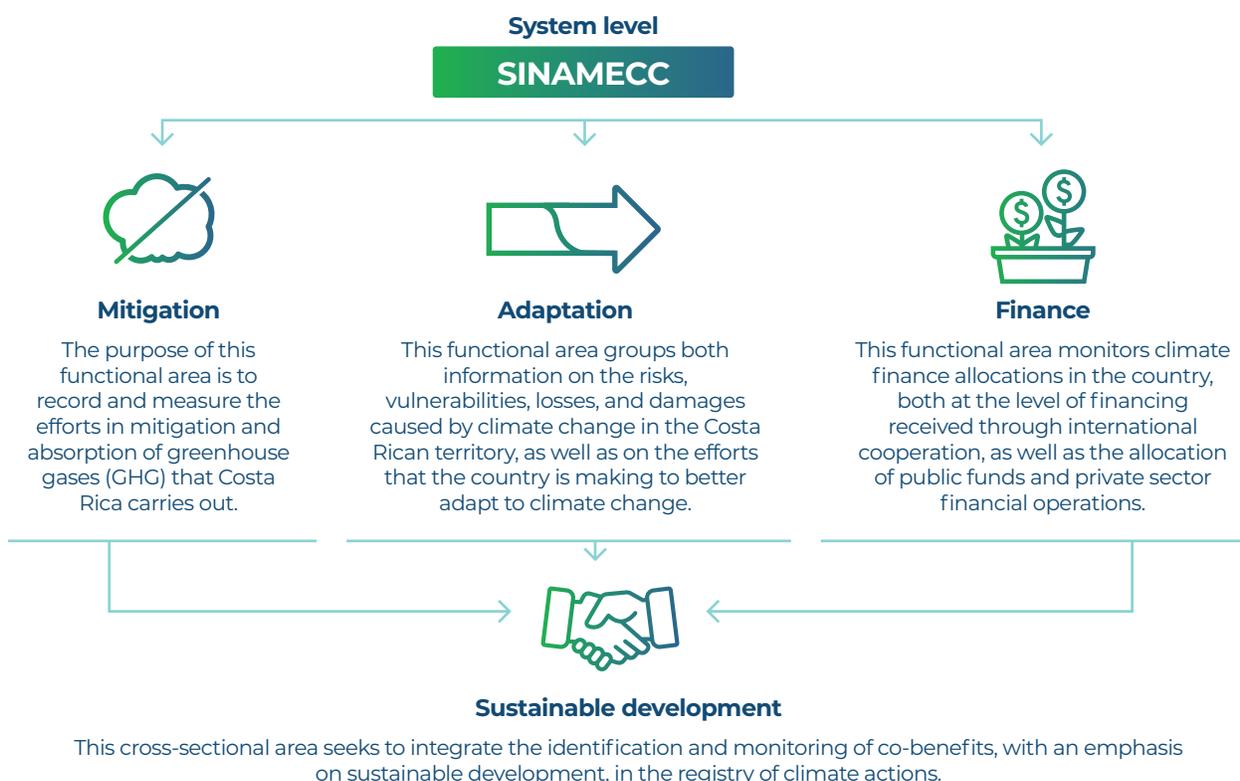


Figure 2. Four Modules of SINAMECC

Each module focuses on one key aspect of climate action that SINAMECC tracks:

- **Mitigation:** The purpose of this functional area is to record and measure the efforts in mitigation and absorption of greenhouse gases (GHG) that Costa Rica carries out.
- **Adaptation:** This functional area groups both information on the risks, vulnerabilities, losses, and damages caused by climate change in the Costa Rican territory, as well as on the efforts that the country is making to better adapt to climate change.
- **Finance:** This functional area monitors climate finance allocations in the country, both at the level of financing received through international cooperation, as well as the allocation of public funds and private sector financial operations.
- **Sustainable Development:** This cross-sectional area seeks to integrate the identification and monitoring of co-benefits, with an emphasis on sustainable development, in the registry of climate actions.

From its initial conceptual design, SINAMECC's creation served national priorities while also providing an important infrastructure to comply with international commitments. A flexible, versatile, and ambitious

system, SINAMECC can serve a variety of specific needs. For instance, its mitigation module serves as a Monitoring, Reporting, Verification, and Registry (MRV&R) backbone of the carbon pricing and related transparency infrastructure, including potential links to Articles 6 and 13 of the Paris Agreement¹. It can also help Costa Rica improve its implementation of the National Decarbonization Plan. Additionally, SINAMECC automates reporting obligations for participants in the National Carbon Neutrality Program (*Programa País Carbono Neutralidad, PPCN*) and can generate reporting that fulfills Costa Rica's international commitments.

Costa Rica's Efforts to Organize Climate Data

From an internal perspective, the system was born of the need for an information system to measure progress in meeting the country's climate goals as reflected in official policy documents, such as the Nationally Determined Contribution (NDC), the National Decarbonization Plan, and the National Adaptation Policy (these latter two replaced the 2009 National Climate Change Strategy).

Before the creation of SINAMECC, the government of Costa Rica understood that its existing climate information systems were scattered, not harmonized, and, in many cases, lacking funding to harmonize or scale at the national level. For instance, the country's National Greenhouse Gas Inventory (*Inventario Nacional de Gases de Efecto Invernadero, INGEI*), the most stable of these systems, had produced four inventories, but had limited national resources and its operations relied on grants from the Global Environmental Fund. It also did not have regular mechanisms to share information to other public and private entities.

In the international context, the reporting commitments that Costa Rica and other developing countries faced changed drastically after the Paris Agreement was signed in 2015 and ratified in record time in 2016.

The Paris Agreement created the Enhanced Transparency Framework for Action and Support, which requires developing countries to declare a national inventory of gases' greenhouse effect, following the methodologies, guidelines, and good practices of the Intergovernmental Panel on Climate Change (IPCC), as well as additional information to learn about progress towards compliance with the NDC.

As a result of these internal and external factors, MINAE had decided that the creation of SINAMECC was a priority and requested support from the Partnership for Market Readiness- Costa Rica (PMR-CR) to provide technical input into the development of its first module.

SINAMECC Mitigation Module

As a first step towards the creation of SINAMECC, the DCC defined a general strategy, which prioritized the construction of the SINAMECC mitigation module. The functional areas of adaptation, co-benefits, and climate finance would be built upon the foundation set by the mitigation module. This was decided this way for several key considerations:

- **On a national level, mitigation was an area where there was more progress in the country (mainly through the national inventory of greenhouse gases as well as other mitigation actions and international cooperation projects then underway) and greater international standardization in metric instruments. Furthermore, most of the international reporting requirements under the United Nations Framework Convention on Climate Change (UNFCCC) are related to mitigation.**
- **SINAMECC was also a crucial step towards Costa Rica's ambition of having a robust domestic carbon market (or an Offsetting Mechanism, as it was later transformed to be) and a modern set of carbon pricing instruments. As is the case for many countries, the first step toward implementing an ecosystem of market-based instruments is to create local capacities, such as measuring, reporting, and verification systems to create a central registry of carbon emissions.**

¹ Article 6 deals with carbon markets and other non-market collaborative approaches. Article 13 deals with rules on transparency.

For climate change mitigation, SINAMECC was expected to have two main functions in line with the overall objectives:

- **Track total GHG emissions by sources and removals by sinks through an economy-wide transparency system based on the National GHG Inventory to measure and report Costa Rica's progress in implementing climate change policy to the international community, and**
- **Monitor the progress of climate change-related actions to facilitate data-driven decision making as well as facilitate national reporting and transparency efforts.**

Building upon work developed by other programs, mainly the German Agency for International Cooperation (GIZ), the PMR-CR technical team supported the Costa Rican government in the creation of a conceptual and functional design and testing of a digital platform of SINAMECC's mitigation module.

Once finalized, implemented, and deployed by MINAE, this module was intended to support the MRV&R of emissions by sources and removals by sinks, as well as emission reductions from the implementation of national climate change policy, including tracking mitigation actions, their implementation, and overall progress towards the achievement of Costa Rica's NDC.

SINAMECC Platform Development

For the design and testing of the digital platform, the mitigation module of SINAMECC followed a Minimum Viable Product (MVP) approach. This approach required the development of a minimum version of the software that could be quickly launched with a limited group of early adopters. The version was developed with only the necessary features to quickly test, improve and innovate around its concept.

As this MVP focused on testing the greatest possible number of features suggested by the Costa Rican authorities, while making it accessible and usable for key stakeholders, a process of testing with stakeholders was favored. This testing of the digital platform included:

- **A phase of core design and beta-testing: The MVP was tested with key stakeholders in order to gather feedback to inform future iterations of the system, while performing the necessary iterations to implement key features of the system in a user-friendly interface.**
- **The creation of technical guidance documents: As the platform was going to be operated by the DCC and interacted with by a variety of stakeholders, there was a need for protocols, user manuals, and a plan for improvement and maintenance of the proposed digital platform.**
- **A phase of capacity building and dissemination: This focused on building capacity in the operation of the digital platform in key stakeholders, including supporting an open-source community to continue improving the platform.**

Before the creation of SINAMECC's mitigation module, a series of conceptual and methodological steps were taken by the DCC with support from other partners and which provided the foundation for the creation of the MVP. This includes, among others, the conceptual note, the compilation of a list of mitigation actions, a 'dashboard' containing key indicators for climate change mitigation, and a set of guidelines for the design of the mitigation actions registry and how they harmonize with other key elements, among those the National GHG Inventory.

This base and the knowledge gleaned from the testing iterations was developed with support from the PMR-CR and provided the basis for implementation by the Government of Costa Rica.

SINAMECC Conceptual Underpinnings

SINAMECC guiding principles explain methodological decisions behind the platform's design.

Open source and replicability. SINAMECC is conceived as an open-source, open-data platform to maximize transparency of climate action in Costa Rica. By making the source code of the system freely available, the inner workings of the system are also completely transparent and so it can be adapted and adopted by other parties who may find it useful. SINAMECC has been designed as a system that can be replicated and used by other developing countries and other organizations as a tool to improve their capacities to monitor climate actions and report to the UNFCCC.

Open data and transparency. Transparency systems capture a large amount of data from countries' economic and development sectors. They also capture fairly exhaustive information on climate change, integrating information from many ministries, government agencies, and even the private sector that can be valuable to support other processes, both government-led and by research institutions and civil society. Therefore, the system is anchored in the concept of open data and has an open data platform to make available the information. Except for cases where special confidentiality considerations apply, all data and source code in SINAMECC is publicly available in a manner that is easily accessible by all interested national stakeholders.

Practice community. SINAMECC has an opportunity to create a space that promotes articulation and exchange between countries, enhancing regional collaboration in climate transparency, exchanging knowledge, standardizing processes, and understanding around the construction of international reports. It can also lead to the development of an open-source community around the source code, which can be harnessed as part of the necessary continuous efforts to maintain and improve the system. Furthermore, by using open-source code/software, it enables in-house, continuous improvement, and reduces long-term costs.

Key Features of the SINAMECC Platform

The SINAMECC mitigation module (SINAMECC-M) platform has made progress in the following areas under development and implementation:

- **Mitigation Action Tracking.**
 - **The registry of mitigation actions is a mechanism to report mitigation actions in SINAMECC, following the system's own guidelines, with the goal of monitoring its progress and ideally aligning it with data from the National GHG Inventory.**
 - **Calculation engine: there is a document in Google Sheets that connects the calculation spreadsheets for the National GHG Inventory with the IPCC sheets and systematizes the input of activity data and emission factors into the calculations.**
- **Costa Rican Offsetting Mechanism (MCCR):** There is a base registration form for this purpose, although it needs to be updated and aligned with the MCCR's operating regulations.
- **Data for reports:** The system can upload data through web services and through the capture of documents in specific formats, for example in Excel format, or, through forms.
 - **Documentation on Github:** The documentation for SINAMECC source code is ready, but the government is waiting for the confirmation of the type of license recommended in order to be able to share it on Github.

- **Costa Rica’s National Carbon Neutrality Program (PPCN):** Development of the PPCN registry includes a mechanism to register and track documentation and progress within the PPCN program in SINAMECC, in order to automatize and simplify the reporting process for participating organizations and communities.
- **Dashboard/reports.**
 - **Open data platform:** there is a Junar-based platform, which can publish data and its visualizations in an open and transparent way. SINAMECC’s open data portal can be accessed at: <http://sinamecc.opendata.junar.com/home>
 - **User management:** The system can create users for the mitigation actions, the PPCN registry, data capture, and the general administrators’ modules.
- **Public website:** There is an accessible portal where users can upload documents as well as give general observations about the system and receive tickets about system failures.

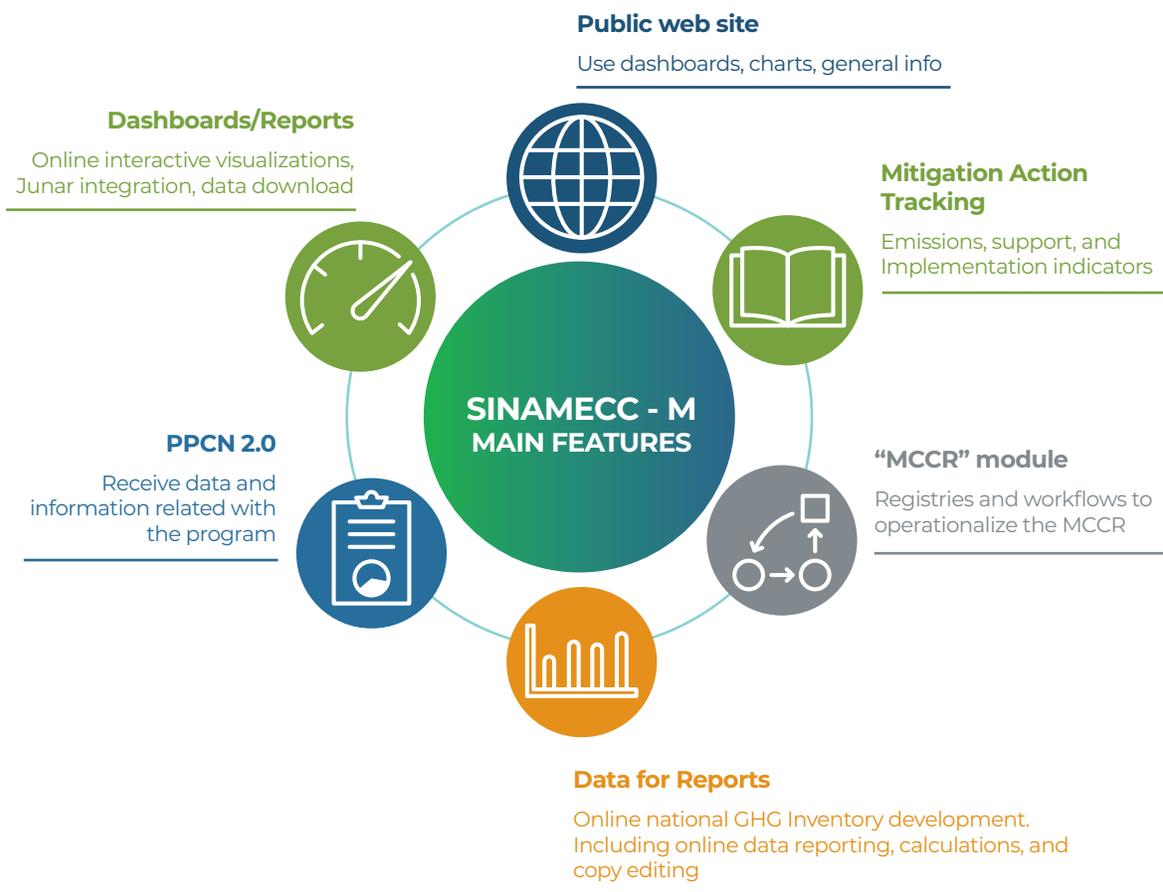


Figure 3. The Main Features of the SINAMECC-M Platform

Implementing and Improving SINAMECC

In April 2018, the Costa Rican government officialized SINAMECC with Executive Decree No. 41127- MINAE, which took conceptual and technical inputs from several supporting partners, including the PMR-CR program. SINAMECC was created with a legal backbone, a series of institutional arrangements, and an online data platform to access information. Image 1 shows the first iteration of this platform, launched in 2019 and still in operation in 2020. The system is changing its appearance with PMR support.

This first operational platform was presented to the public at an event during the Pre-Conference of the Parties to the UNFCCC (PreCOP25) in October 2019. Once created, SINAMECC's platform became an operational part of the National Environmental Information System (SINIA), operated by the National Center for Geo-Environmental Information (*Centro Nacional de Información Geo-Ambiental, CENIGA*).

SINAMECC's reporting site can be accessed at: <http://dev.sinamecc.go.cr/login>

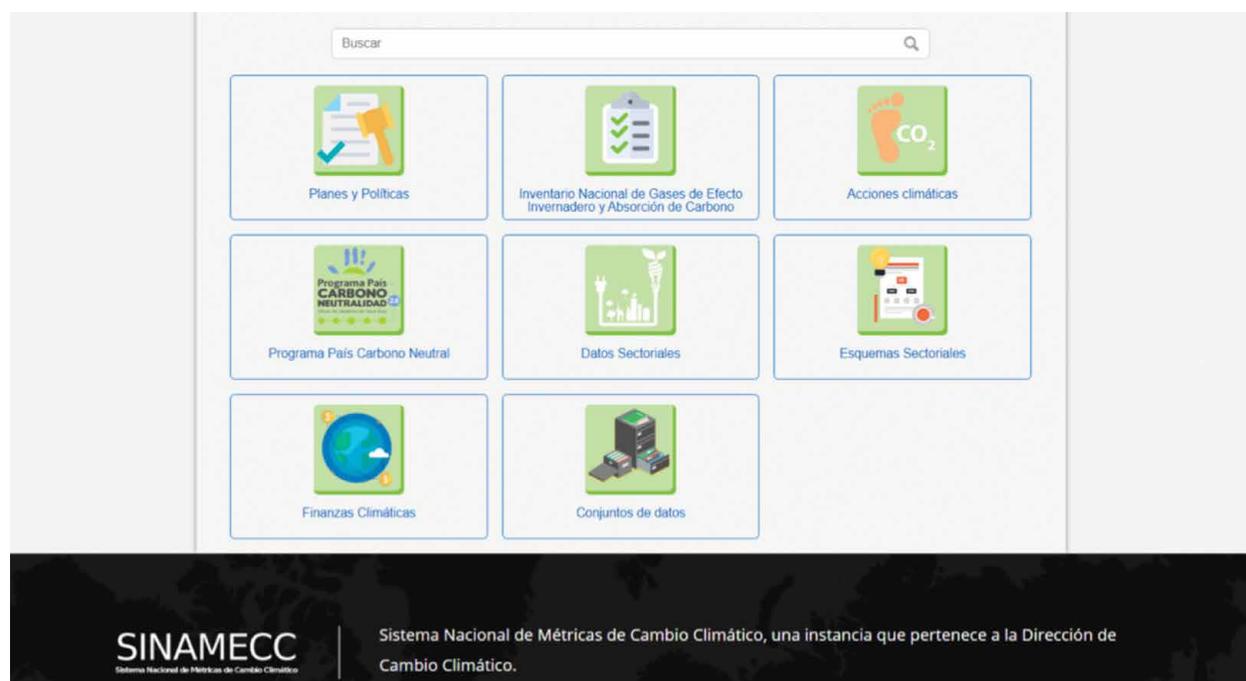


Image 1. Overall Configuration of Available Information in the SINAMECC Open Data Platform (as of October 2020)

As a “system of systems”, SINAMECC captures and displays data from different sources, including ministries, other public entities, and even private organizations (as part of PPCN and other sources). Image 2 shows a sample of datasets in SINAMECC, including the National GHG Inventory and Costa Rica's energy matrix.

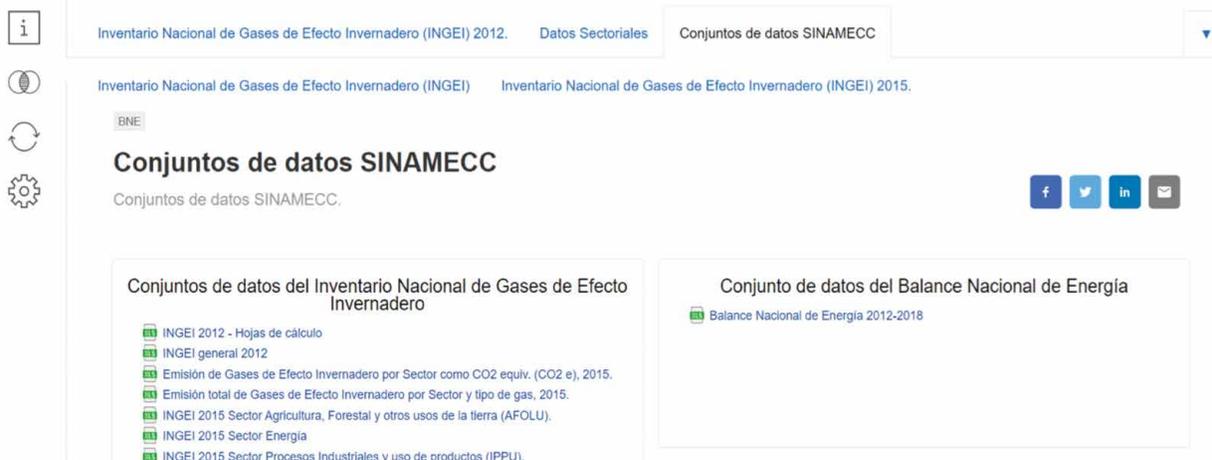


Image 2. Sample of Datasets Available in the SINAMECC Open Data Platform

SINAMECC is a platform with a permanent improvement cycle. Following the creation of its first mitigation module, the Costa Rican government began the process of optimizing this module and expanding it to create the additional adaptation, finance, and co-benefits modules. In this process, a variety of partners are supporting the Costa Rican government with technical input and financial backing.

It should be noted that Costa Rica is already collaborating with other PMR and non-PMR countries in the concept development and implementation of their own national climate change metrics systems, including through the PMR Technical Work Program (a regional knowledge exchange with Panama) and a collaboration agreement signed with the Initiative for Climate Action Transparency (ICAT) to promote SINAMECC and provide ICAT support for its implementation in ICAT countries.

The improvement of SINAMECC includes a user experience and system replication guide. This process also coordinates with the development of a system update and an interoperability analysis so that SINAMECC 2.0 is an inter-operable tool with other government systems.

SINAMECC has included a strong component of capacity building, testing, and training with key stakeholders. This includes work with national practitioners and experts (for instance, technical experts from the Meteorological Institute, local universities, and open data activists). SINAMECC's team has also worked with civil servants to improve their reporting capacities.

As part of this effort to engage a wider audience, SINAMECC embarked on a process to create its own brand and improve its public website (<http://www.sinamecc.go.cr/>), which was still in a Minimum Viable Product version. With support from the PMR-CR program, SINAMECC designed a new public website aimed at facilitating outreach among key stakeholders. The final version will be ready for implementation by the DCC in late 2020. Image 3 shows a sample of that new site.



Image 3. The New Public SINAMECC Website (final version to be ready in late 2020)

The team also conducted a series of workshops and hackathons in an effort to promote the use and reuse of data and to strengthen the community associated with SINAMECC and climate change, both nationally and internationally. This included participation in major local events such as the Open Data Day 2020 and international climate conferences².

SINAMECC Integration with Costa Rica’s NDC and Long-Term Strategy

Since its creation, SINAMECC has been conceived as a mechanism to track the progress of key national climate policies, such as the NDC and the country’s National Decarbonization Plan, which serves as Costa Rica’s Long-Term Strategy under the Paris Agreement. As a result of this, and following a request from the Costa Rican government, the PMR began in 2019 a process that sought to optimize the system so that SINAMECC 2.0 functions as the metrics tool for the National Decarbonization Plan and the NDC. This process builds on the previous work performed with the support of the PMR and others.

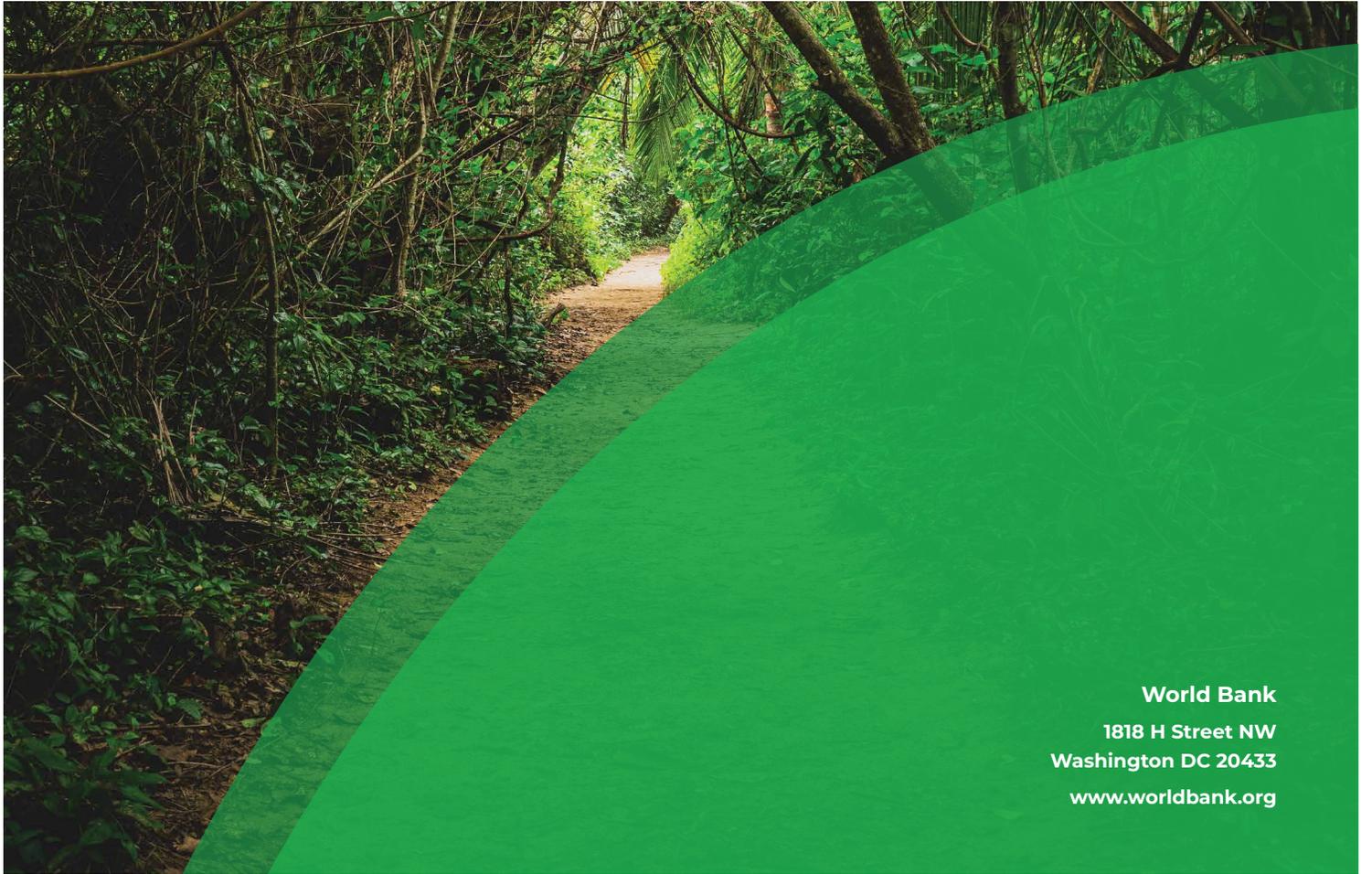
This work includes creating a list of mitigation actions in both plans and creating processes to report them. As most are not directly under the DCC or MINAE, it will also involve a process of capacity building and training. By 2022, Costa Rica plans to have the National Decarbonization Plan monitoring system fully integrated into SINAMECC.

Furthermore, and as part of the Plan’s cross-cutting strategy of Transparency, Metrics, and Open Data Strategy, the country will consolidate its reporting via SINAMECC. This will guarantee a supply of open and updated data on the country’s performance against the decarbonization agenda and enable forward-looking modeling to support decision making.

² During the Conference of the Parties to the UNFCCC (COP25), the PMR technical team supported communication efforts to promote SINAMECC as an innovative and data-driven climate instrument to international audiences.

Looking Ahead

With support from the PMR, Costa Rica created a first working version of SINAMECC's platform. Looking ahead, the potential for SINAMECC within Costa Rica's climate data ecosystem is vast. The institutional, legal, and technological arrangements needed to channel a wider stream of climate information through the System (including the National GHG Inventory, data on local and international climate finance, and adaptation and vulnerability efforts) are pending. SINAMECC should also serve as the official reporting mechanism of Costa Rica's obligations under the UNFCCC. The Costa Rican government is considering modifications to the decree that created SINAMECC in order to reflect these aspirations. Furthermore, following the successful implementation of SINAMECC in Costa Rica, PMR and the Costa Rican government are engaging other nations in the region to replicate it.



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