

## TC Document

### I. Basic Information for TC

▪ Country/Region:	REGIONAL
▪ TC Name:	Development of Public Investment Profiles for Disaster Risk Reduction
▪ TC Number:	RG-T4103
▪ Team Leader/Members:	Hori, Tsuneki (CSD/RND) Team Leader; Chakalall, Yuri (CSD/RND); Chavez, Elizabeth (CSD/RND); Ciano, Julia (CSD/RND); Ericka Morales Franco (CSD/RND); Guerrero Compean, Roberto (CSD/RND); Lacambra Ayuso, Sergio (CSD/RND); Mendoza Benavente, Horacio (LEG/SGO); Restrepo, Lisa Sofia (CSD/RND); Suarez Vazquez, Gines (CSD/RND); Valle Porrua, Yolanda (CSD/RND)
▪ Taxonomy:	Research and Dissemination
▪ Operation Supported by the TC:	.
▪ Date of TC Abstract authorization:	18 May 2022.
▪ Beneficiary:	IDB and members countries
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	OC SDP Window 2 - Sustainability(W2A)
▪ IDB Funding Requested:	US\$500,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	30 months
▪ Required start date:	August 16, 2022
▪ Types of consultants:	Firms and individuals
▪ Prepared by Unit:	CSD/RND-Env, Rural Dev & Disaster Risk
▪ Unit of Disbursement Responsibility:	CSD/RND-Env, Rural Dev & Disaster Risk
▪ TC included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	N/A
▪ Alignment to the Update to the Institutional Strategy 2020-2023:	Productivity and innovation; Institutional capacity and rule of law

### II. Objectives and Justification of the TC

- 2.1 This TC aims to quantitatively evaluate the benefits of public investment in disaster risk reduction (i.e., investments and actions to be taken in advance to ensure that socio-economic activities can continue without economic losses and human impact even in the occurrence of a hazard event). Specifically, the TC will conduct quantitative, science, and simulation-based assessments to determine where, what kind, and how the scale of public investments in disaster risk reduction should deliver efficient benefits. The findings from this TC will be used as a reference for IDB member countries in developing their financial strategies for disaster risk management (DRM) and in proposing (or formulating) concrete public investment projects to implement such strategies.
- 2.2 The impact of natural disasters in Latin America and the Caribbean (LAC) countries (e.g., number of victims and economic loss) continues to increase. For example,

according to the International Disasters Database (EM-DAT, 2022)<sup>1</sup>, the total economic losses due to major disasters in the LAC region from 2010 to 2019 were recorded at approximately US\$200 billion. This amount is equivalent to more than double the total economic losses in the preceding decade (about US\$95 billion). Recent disasters are characterized not only by the frequency of “conventional” hazard-events such as floods, earthquakes, and hurricanes but also by the diversification of hazards, including droughts, forest fires, and the effects of coastal erosion. In addition, there is a solid scientific recognition that climate change will exacerbate the impacts of these hazards<sup>2</sup>.

- 2.3 The IDB supports its member countries in disaster risk reduction under the Bank’s Disaster Risk Management Policy (OP-704) adopted in 2007<sup>3</sup>. The policy, which employs an approach that focuses more on ex-ante (or proactive) measures/actions than ex-post (or reactive), includes a comprehensive risk analysis to identify the type and scale of potential future impacts affecting development investments, and prevention and mitigation measures to address structural and non-structural sources of vulnerability. The IDB has developed several technical diagnostic/study tools to achieve this approach and provide valuable support to the member countries. These include: (i) the IGOPP<sup>4</sup>, which diagnoses the current condition of disaster risk management public policy & governance at the country level, (ii) the RMI<sup>5</sup> and other series of DRM indicators, which assesses the progress (or performances) of the countries’ disaster risk management implementation, (iii) the Disaster Risk Profile<sup>6</sup>, which quantitatively estimates the potential economic losses and human impacts caused by future (or probable) hazard events, and (iv) the Public Investment Profile for Disaster Risk Reduction (hereafter, the Public Investment Profile), which is the central subject of this TC.
- 2.4 The Public Investment Profile aims to quantitatively assess the effectiveness of public investment in reducing damage and loss from future disasters, based on the principles of cost-benefit analysis at the national or local level: where, which, and how the scale of the risk reduction-related public investment would be economically profitable. To meet this aim, the Public Investment Profile includes three specific models<sup>7</sup> that address the following questions: (i) Which combination of multiple disaster risk reduction options would maximize the impact of public investments, and to which priority/vulnerability areas would these investments be undertaken; (ii) what proportion of the budget should be allocated to the two phases of DRM - pre-disaster investment and post-disaster emergency response/rehabilitation/reconstruction, to

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<sup>1</sup> <https://public.emdat.be/>. Note that this database is the most used worldwide for referencing past significant disaster experiences.

<sup>2</sup>IPCC (2022). Climate change 2022: impacts, adaptation, and vulnerability. Link: <https://www.ipcc.ch/report/ar6/wg2/>

<sup>3</sup> Available for reference here: <https://www.iadb.org/en/about-us/sector-policies-and-sector-framework-documents>

<sup>4</sup> Index of Governance and Public Policy in Disaster Risk Management. See for details: <https://riskmonitor.iadb.org/en>

<sup>5</sup> Risk Management Index. See the link above for details.

<sup>6</sup> Several study reports are already available. Specifically, they can be found at <https://publications.iadb.org/en> using the keywords "Risk Profile" or "Perfil de Riesgo".

<sup>7</sup> For the study framework of models (i) and (ii), see the following Technical Note: <https://publications.iadb.org/en/public-investment-profile-disaster-risk-reduction-macro-economic-study>. For the study framework for model (iii), see the Barbados Study Report: <https://publications.iadb.org/en/public-investment-profile-climate-risk-reduction-barbados-macroeconomic-cost-benefit-analysis>

maximize the effectiveness of the public budget; and (iii) How effective are public investments in risk reduction measures in contributing to long-term gross domestic product (GDP) growth. It is important to emphasize that these three models, which provide reference data on the scale of finance needed to achieve disaster risk reduction, are the only IDB efforts in Latin America and the Caribbean (LAC) region and can be the most advanced studies of this type in the world.

- 2.5 Specifically, these three models within the Public Investment Profile framework have been developed mainly through the two regional TC projects (RG-T2434 - implemented from 2013 to 2017; and RG-T3369 – implemented from 2018 to 2021)<sup>8</sup>. Concrete study results include:
- Under the specific model describe on 2.4 (i): Bolivia (for floodings<sup>9</sup> and forest fires<sup>10</sup>), Ecuador (landslides)<sup>11</sup>, Barbados (coastal erosion)<sup>12</sup>;
  - (ii): Honduras (floodings), Peru (earthquake and floodings)<sup>13</sup>, Bolivia (floodings), Bahamas (hurricane storms);
  - (iii): Barbados (coastal erosion)<sup>14</sup>, Bahamas (hurricane storms).
- 2.6 As a result of improvements based on the experiences accumulated from the studies conducted over the past ten years, its deliverables have recently begun to be used effectively in the member countries' development process<sup>15</sup>. For example, in Ecuador, the results of the study were used as a reference during the design phase of a loan project<sup>16</sup>. In Barbados, the Policy Based Loan (PBL)<sup>17</sup> also used the results of this study as a reference model for strengthening and reforming its integrated

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<sup>8</sup> See <https://www.iadb.org/en/project/RG-T2434> and <https://www.iadb.org/en/project/RG-T3369>

<sup>9</sup> Available at: <https://publications.iadb.org/en/economics-investment-flood-risk-reduction-developing-countries-application-rocha-river-basin>

<sup>10</sup> Preparing for public release as Technical Note IDB-TN-02509: "Estimación de potenciales daños y pérdidas por incendios forestales para fomentar una reducción del riesgo para Bolivia".

<sup>11</sup> Available at: <https://publications.iadb.org/es/analisis-de-la-inversion-publica-para-la-reduccion-de-riesgo-de-desastres-evaluacion-del-riesgo-de>

<sup>12</sup> Available at: <https://publications.iadb.org/en/public-investment-profile-disaster-risk-reduction-beach-erosion-and-risk-mitigation-model-barbados>

<sup>13</sup> Available at: <https://publications.iadb.org/es/analisis-de-inversion-publica-para-la-reduccion-del-riesgo-de-desastres-del-peru>

<sup>14</sup> Available at: <https://publications.iadb.org/en/public-investment-profile-climate-risk-reduction-barbados-macroeconomic-cost-benefit-analysis>

<sup>15</sup> Conceptually, many stakeholders already seem to agree on the need for hazard risk (or disaster risk) to be incorporated into development planning. However, at the level of development practice, this has been done only qualitatively. One of the reasons is that a simple quantitative methodology has not been established that everyone can understand (in other words, the numerical models and metrics to establish it are sometimes difficult to understand). Therefore, the project team has tried to make the study's results appear with simple qualitative parameters in recent years. For example, suppose country A has a once-in-a-century chance of being hit by a hurricane. In that case, the study uses simple quantitative parameters such as how much damage (or economic loss) is expected, how much public investment budget would be required to reduce it by, say, 10%, how cost-effective would that be, and what percentage contribution would the investment make to GDP growth. This is one of the reasons why the study's outputs are beginning to be used effectively in the development process in some countries. In other words, simple qualitative reference data would facilitate consensus among stakeholders in investment and development decision-making, including high-level public sector management persons, financial institutions, and engineers.

<sup>16</sup> RG-L1132: Border Integration Project - Axis Road No. 4 Bellavista-Zumba-La Balza Zamora-Chinchipe Province (<https://www.iadb.org/en/project/RG-L1132>)

<sup>17</sup> BA-L1052: Sustainable Development Policy Program II (<https://www.iadb.org/en/project/BA-L1052>)

coastal management public policy. The Bahamas PBL<sup>18</sup> will also refer to the study results as part of its approach to strengthening disaster risk governance. Additionally, efforts are underway in several countries to review their financial strategies for disaster risk management with reference to these study outputs. In recent years, the results of the studies have been widely disseminated through seminars and other events and have received positive feedback from participants<sup>19</sup>. Moreover, from a technical point of view, the study can serve as a valuable reference for the LAC region and beyond, as the risk reduction models e.g., forest fires and coastal erosion used in previous studies are among the most advanced in the world.

2.7 **Challenges.** This TC will take an approach that will continue to provide member countries with the added value of the studies described above. Beyond that, however, the following challenges remain to be improved further to enhance the quality and scope of the Public Investment Profile and better respond to the development needs of the IDB member countries:

- **Nature-based solutions.** Examples include reducing storm surge risk in coastal areas by e.g., using mangrove forests and reducing landslide risk on mountainous roads by reforestation. Nature-based solutions can also lead to climate change mitigation actions (e.g., CO2 absorption measures) and are increasingly in demand in the LAC region as new investment/policy options. These solutions, though, have not been able to fully quantify their effects to date because of the complexity of their economic impact models compared to conventional infrastructure<sup>20</sup>. However, the relevant experiences and literature have increased in the LAC region in recent years, thus, further implementation in the Public Investment Profile will be possible. Therefore, this TC will capture this and provide innovations to the member countries to mainstream Nature-based Solutions as an option for development planning and disaster risk reduction.
- **Addressing additional hazards/risks not dealt with in previous models.** Some of the recent hazards/risks emerging in recent years, such as droughts affecting agriculture and climate (e.g., hurricanes) events in marine areas affecting blue economy-related activities, have not been addressed in the Public Investment Profile. However, these can be adequately addressed within the framework of the TC Public Investment Profile by using existing data and available literature as references. This TC will address these new hazard elements as needed.
- **Economic value of ecosystem services** refers to the economic value of ecosystem services generated, e.g., in forest or marine areas. In the context of this project, it means, for example, the financial loss of ecosystem services that forest fires cause in a forested area or that hurricanes cause in marine areas. These have not been adequately incorporated into the study exercises to date.

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<sup>18</sup> BH-L1056: Strengthening Disaster Risk Management Governance in The Bahamas. The request for this project has been officially received from the Bahamian government. At this stage, the project is still in the early stages of formulation before the Eligibility Review Meeting (ERM).

<sup>19</sup> For example, a model of this study and several case studies were presented to the public at *the Caribbean Urban Forum* on June 17, 2022, and at *WEBINAR - How can we promote more resilient social infrastructure projects?* on July 12, 2022.

<sup>20</sup> E.g., the need to incorporate the time required for forests and mangroves to grow into their investment effects.

However, these needs seem to be increasing within the LAC region. In this case, experience on these topics gradually accumulates within the IDB<sup>21</sup>. Therefore, this TC will refer to these and incorporate them into the study as needed.

- **Creating a tool to ensure uniformity in the quality of studies to be developed in the future.** Previous studies have only specified and built upon conceptual frameworks and written mathematical formulas. Until now, this approach has not been a problem because the number of case studies has been limited (i.e., it was not a problem even if only a few developers could understand the formulas). However, this method may cause a risk that the quality of each case study will vary in the future. Therefore, a more detailed technical specification (or computer-based calculation tool to embody the specification) would be required to standardize and control the quality of various studies to be developed in the future. In other words, it is necessary to create a mechanism in which all study performers (e.g., the member countries' engineers or contracted consultants) can conduct studies with the same quality by using this as a study implementation tool (e.g., computer program source code) that is open to the public.

- 2.8 **Justification and strategy for this TC.** The main outputs expected from this project are the study methodology, which will be specified in detail (or mounted as a computer-based program source code), and the case studies using it. The expected results based on these outputs are concrete policy dialogues between the IDB and member countries on the promotion of DRM public investments and the realization of investment project development plans. The project incorporates dialogue meetings and workshops into its activities to achieve this expected result. The expected impact of this project is that the economic and human effects of eventual disasters (including climate events) in IDB member countries will be reduced. Furthermore, economic growth will be stable and not affected by disaster events, thus achieving hazard-resilient socio-economic activities. This strategic approach implements the principles of the IDB's Disaster Management Policy (OP-704). For these reasons, this TC is justified.
- 2.9 **Alignment with the Institutional Strategy 2020-2023.** The TC will develop innovative study tools and case studies in terms of referencing scientific and objective data to promote the implementation of public policies for disaster risk reduction. In this regard, the TC is aligned with the priority focus of the Institutional Strategy 2020-2023: "Productivity and Innovation". Similarly, the TC is also aligned with the strategy's "Institutional capacity and rule of law" in that it provides a process for referencing objective public policy decision-making process. Climate change and climate change risks are one of the main subjects of this TC. Therefore, the TC is aligned with the Strategy's "Climate Change and Environmental Sustainability". Finally, this TC is in line with Vision 2025 (and institutional strategy): climate change and environmental sustainability.
- 2.10 **Alignment with OC SDP Window 2 - Sustainability(W2A):** This TC will take the approach of developing reference studies for integrating disaster risk reduction into development instruments (e.g., public development strategies and plans). The

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<sup>21</sup> This includes, for example, the project BH-L1043 (Climate Resilient Coastal Management and Infrastructure Program: <https://www.iadb.org/en/project/BH-L1043>), which uses a model for calculating the economic value of coastal natural resources using.

disaster risks include those caused by climate change, such as hurricanes, coastal erosion, droughts, and forest fires. In this sense, the TC will contribute to the achievement of a sustainable socio-economy that is resilient to environmental changes caused by climate change. Therefore, this TC is consistent with two of the six priority areas of the OC SDP Window 2 (The Ordinary Capital Strategic Development Program, GN-2819-14): climate change and environmental sustainability; and sustainable and resilient infrastructure.

- 2.11 **Alignment to the Country Strategy:** As mentioned previously, the focus of this TC is on disaster risk reduction. The countries to be targeted for implementation of this TC will be determined based on the criteria in Paragraph 3.2. The TC will be implemented in countries where the focus of this TC is included in the country strategy.

### III. Description of activities/components and budget

- 3.1 The TC will be implemented through the following two components, building on all the frameworks described in the previous paragraphs.
- 3.2 **Component I: Country-level studies.** This component will implement country-level studies based on the study framework defined in the previous paragraphs. First, as mentioned above, a detailed study specification and a study tool (e.g., computer program source code) to implement the specification will be developed. Then, the country-specific studies developed in this TC will be conducted using these tools. Participation in this study is open to all 26 countries, but the actual implementation is expected to be limited to four (4) countries due to budgetary constraints<sup>22</sup>. Therefore, selecting target countries will be done carefully and strategically, considering the intentions and advice from the COF, CSD front office, and VPC. In particular, will be prioritized when a condition is identified that makes it difficult for a member country to deal with an emerging risk/hazard, as described in section 2.5. Whether all (i) through (iii) of the studies mentioned above model will be applied as country-specific studies or selectively will be determined on a case-by-case basis, considering each country's intentions and needs. The final output of this component will be the study reports. However, it is essential to properly communicate key findings through the study to the target countries. In some cases, the study process (or sector dialogues that occur throughout the study process) may involve multiple organizations in the target country. In addition, technical staff and high-level decision-makers in the target country will be invited to the study process.
- 3.3 **Component 2: Dissemination.** The outputs/findings of the study will be disseminated to the IDB member countries using two communication tools: (i) Technical Notes on the Bank's Knowledge Web Portal and (ii) the Bank's DRM

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<sup>22</sup> The first and most basic criterion is to target those countries that are vulnerable to disaster risk and do not have well-developed public policies and governance to address this vulnerability. The IDB's web-based database, RiskMonitor (<https://riskmonitor.iadb.org/en/home>), is used as an objective data source for selecting such countries. Within these target countries, the country office and project team will work together (e.g., through sector dialogues) to identify the needs of the government to improve its disaster risk management capacity or to promote the implementation of measures such as infrastructure development to reduce disaster risk. Furthermore, among such countries, those that are strategically interested in working with the IDB in the same areas will be identified and prioritized for implementation of this study. Also, this TC will be implemented in the member countries where disaster risk reduction is included in the country strategy.

Knowledge Repository - Risk Monitor<sup>23</sup>. In addition, this component will conduct outreach workshops in the study countries to disseminate the project results to national stakeholders, including finance ministers, public planning agencies, and DRM authorities. It is envisioned that these workshops will be conducted in person but could also be conducted online depending on the health care situation or the willingness of the target countries.

3.4 **Request letters.** Prior to the commencement of any study activities financed by this TC in a borrowing member country, the Bank will obtain the corresponding request letter from the official liaison entity of the Bank in the respective country.

3.5 **Expected outputs.** The expected outputs of this TC are the following:

- a. **Component I:** (i) Detailed study specifications and computer-based program source code<sup>24</sup>; (ii) results of a minimum of four (4) country studies and (iii) sector dialogues with the target countries throughout the study process.
- b. **Component II:** (i) preparation of (minimum) four Technical Notes based on study results, (ii) disclosure of information as appropriate through Risk Monitor, and (iii) outreach workshops to target countries at the end of the study.

3.6 **Budget:** The total amount of funding required is five hundred thousand US dollars (US\$500,000) through OC SDP Window 2 - Sustainability (W2A). No counterpart funding is envisaged:

Budget				
Activity/Component	Description	IDB/Fund Funding	Counterpart Funding	Total Funding
<b>Component I: Country-level studies</b>	a) Detailed study specifications and open source: US\$80,000 b) Country studies (minimum four): US\$80,000 x 4 = US\$320,000 c) Peer-reviews for quality control: US\$12,500 x 4 = US\$50,000 d) Sector dialogues (Meeting expenses): US\$1,000 x 4 = US\$4,000	<b>454,000</b>	<b>0</b>	<b>454,000</b>
<b>Component II: Dissemination</b>	a) Updating Risk Monitor: US\$22,000 b) National workshops: US\$6,000 x 4 = US\$24,000	<b>46,000</b>	<b>0</b>	<b>46,000</b>
<b>TOTAL</b>		<b>500,000</b>	<b>0</b>	<b>500,000</b>

<sup>23</sup> RiskMonitor is an IT platform for publishing the methodology and results of all previous studies conducted by the IDB, mainly related to disaster risk management. See: <https://riskmonitor.iadb.org/en/home>.

<sup>24</sup> A "detailed study specification" is a detailed, document-based description of the study methodology (e.g., calculation formulas), and open source (code)" refers to a document that describes all the computer programs (e.g., using the C language) to automate the study methodology.



#### **IV. Executing agency and execution structure**

- 4.1 The Public Investment Profile is an IDB-owned study that combines both engineering and economic perspectives. To keep its quality high and to improve it through further refinements, the IDB should be ultimately responsible for this project's execution. In practice, this TC will be implemented by the Rural Development, Natural Resources and Disaster Risk Management Division (CSD/RND) of the IDB. This rationale for Bank execution is consistent with the justification provided in paragraph 1.1 of Annex II of Document OP-619. The CSD/RND will be responsible for the overall implementation of activities related to this TC, in close coordination with the selected country. The CSD/RND will also work closely with the Country Offices (COFs) as a means of strengthening trust and partnership among country officials, COFs, and the CSD/RND.
- 4.2 All activities to be executed under this TC have been included in the Procurement Plan (see Annex IV) and will be contracted in accordance with Bank policies as follows: (a) AM-650 for individual consultants, (b) GN-2765-4 and Guidelines OP-1155-4 for Consulting Firms for services of an intellectual nature and; (c) GN-2303-28 for logistics and other related services. There are no preconditions for the first disbursement.

#### **V. Project risk and issues**

- 5.1 The main risk is the extent to which the target country can achieve a proactive ownership of this IDB-led study. No matter how high the quality of the study, if it is not used in the development plan/process of the target country government, the significance of the TC will be diminished. In this sense, as mentioned above, the IDB as executing agency will ask the target countries to submit a request letter in advance to officially express their interest in the study. In addition, sector dialogues with government agencies in the target countries will take place during the study (through Component 1). This sector dialogues will be organized to the extent possible on the need for public investment loan projects for disaster risk reduction in the future, based on the findings of the study. Dissemination workshops will also be held after the study (through Component 2).

#### **VI. Environmental and Social Strategy**

- 6.1 This TC is not intended to finance pre-feasibility or feasibility studies of specific investment projects or environmental and social studies associated with them. Therefore, this TC does not meet the applicability requirements of the Bank Environmental and Social Policy Framework (ESPF).

#### **Required Annexes:**

[Results Matrix - RG-T4103](#)

[Terms of Reference - RG-T4103](#)

[Procurement Plan - RG-T4103](#)

- Gender and Diversity Checklist