



## Understanding and Using the Climate Data for Adaptation and Resilience Typology (DART)

### Introduction

The nonprofit [Center for Open Data Enterprise](#) (CODE) has developed the [Climate Data for Adaptation and Resilience Typology \(DART\)](#) to facilitate the use of global and local data for climate action worldwide. The Climate DART is part of a collaborative project led by [PARIS21](#), which promotes the better use and development of statistics throughout low- and middle-income countries, including [Open Data Watch](#), a nonprofit that works at the intersection of open data and official statistics. The project is supported by a grant from the Hewlett Foundation. A high level overview of the DART and its uses can be [found here](#).

PARIS21 is taking a [Climate Change Data Ecosystem](#) (CCDE) approach to help governments address the climate crisis using data from the local to the international level. A CCDE approach can help close data gaps and increase collaboration to support national governments in governing their data systems, applying resources, building capacity, and creating a culture to monitor and use data for climate risk assessment, adaptation, and resilience.

The Climate DART is intended for use by a wide range of audiences interested in climate change risk assessment, adaptation, and resilience including: staff of National Statistical Offices (NSOs), environmental ministries, and executive offices; local governments; academics; non-governmental organizations and community-based organizations; and the private sector.

Among other uses, the Climate DART can:

- Help NSOs identify data requirements, methods for collection and reporting, and gaps,
- Make it easier for local governments to support national efforts by collecting, using, and reporting high-priority data,
- Give academics a starting point to design research on identified data gaps and limitations, and
- Inform international donors and development partners' project planning and identification of priority development areas.

The Climate DART identifies data resources and data types needed for climate **risk assessment, adaptation, and resilience** based on accepted global models and practices. The [United Nations Framework Convention on Climate Change \(UNFCCC\)](#) has standardized requirements for reporting on national data inventories that include risk assessment, adaptation, and resilience as well as mitigation. These and other global requirements and benchmarks

make it clear how data is needed to assess risks and drive informed policy to adapt and build resilience to the impacts of climate change.

Small Island Developing States, Least Developed Countries, and other developing nations often have particular challenges collecting climate change data and coordinating across organizations to access, share, and use it. **The Climate DART is a resource for national and subnational governments and their stakeholders to understand the most important focus areas and relevant factors for climate data and identify, improve, and use data in their own CCDE.** It is specifically focused on climate risk assessment, adaptation, and resilience and does not currently include data for climate mitigation.

To build the Climate DART, CODE reviewed a number of international frameworks, most notably the United Nations Statistical Division (UNSD) [Global Set of Climate Change Statistics and Indicators](#), which was developed in close collaboration with the UNFCCC. The Global Set incorporates internationally accepted frameworks, standards and guidelines including:

1. [IPCC](#): the Intergovernmental Panel on Climate Change 2006 guidelines,
2. [FDES](#): the Framework for the Development of Environment Statistics and its Manual on the Basic Set of Environment Statistics (BSES),
3. [SDG](#): Sustainable Development Goals indicators metadata,
4. [Sendai](#): Sendai Framework for Disaster Risk Reduction,
5. [UN-ECE](#): the Conference of European Statisticians set of core climate change-related indicators metadata,
6. [IRES](#): the International Recommendations for Energy Statistics,
7. [SEEA-CF](#): the System of Environmental-Economic Accounting Central Framework,
8. [SEEA-EA](#): the System of Environmental-Economic Accounting–Ecosystem Accounting.

In addition to the Global Set and its incorporated frameworks, CODE also reviewed a number of other climate change adaptation and resilience frameworks including the [OpenDRI Index](#) by United Nations Office for Disaster Risk Reduction, the [Climate Resilience Framework](#) by ISET International, and international and national level frameworks and case studies presented by the [United Nations Climate Change unit](#).

The Climate DART is designed to combine and simplify these frameworks into a more manageable document that prioritizes focus areas, drivers, and sample factors contributing to climate **risk assessment, adaptation, and resilience**. Climate DART helps stakeholders understand their relevant data needs and identify data gaps. It can also help answer core questions for local governments and their partners around the world, including:

- What are the global data reporting and collection requirements related to climate change?
- What global data sources are available for climate adaptation and resilience?
- How do other countries/communities collect and report relevant data?
- What kind of data is required to conduct climate risk assessment and support disaster preparedness activities?

- How can data be collected using various collection methodologies in case the data does not exist at the local level?

## Using the Climate DART Tool

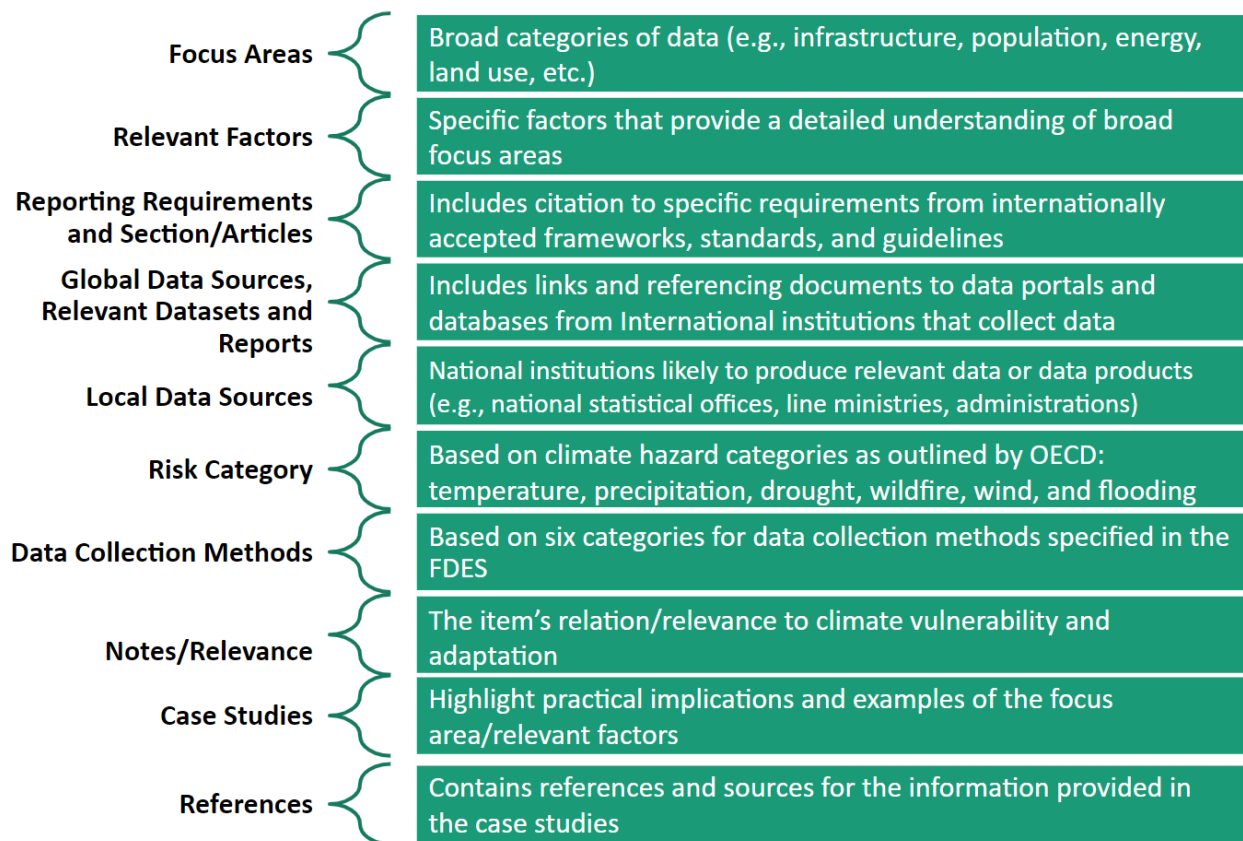
The Climate DART is now publicly available via [Airtable](#), a platform that presents information and resources in a consolidated and organized way. You can access the Climate DART [here](#). It contains three primary tables, which you can access through navigation tabs at the top of the Airtable.

**First Table: Instructions.** This table provides information on the tool, background about its development, and information on how to use the resource and provide feedback. There is additional information about the functions and controls for Climate DART and how you can use them. Here is a summary of the information available in the Airtable.

Function	Description
<b>Grid View</b>	The grid view closely resembles a spreadsheet, with records and fields organized into rows and columns. This view provides information arranged in a tabular format with additional controls for user interaction.
<b>Gallery View</b>	The gallery view displays records in a more visually appealing way than the grid view, making it easier to quickly scan and identify information. Each record appears as an individual card and every field can be viewed by expanding each card.
<b>Export Data</b>	You can export data in a CSV file format and open the downloaded file in Microsoft Excel by doing the following:  1) Go to the table and the view you want to export 2) Click on the view name button below the table name and select Download as CSV 3) The CSV file will download automatically.
<b>Filter Data</b>	You can filter out records from a view by doing the following:  1) Go to the table and the view you want to filter. 2) Click on the Filter option button next to the Hide Fields option button in the toolbar. 3) A menu will appear to enter the condition for applying filters. 4) You can use individual filters, or group multiple filter conditions for advanced filtering of data.
<b>Group Data</b>	You can group records together based on one or more fields by doing the following:  1) Go to the table and the view you want to group.

	<p>2) Click on the Group option button next to the Filter option button in the toolbar.</p> <p>3) A menu will appear allowing you to group based on fields. You can select any field to view the data grouped by that field.</p>
<b>Search Data</b>	<p>You can filter the records using a search term and see a filtered set of relevant records by doing the following:</p> <ol style="list-style-type: none"> <li>1) Go to the table and the view you want to search from.</li> <li>2) Click on the Search icon on the top right corner of the toolbar.</li> <li>3) This will open a Find in View search bar.</li> <li>4) Type in the specific search item.</li> </ol>
<b>Expand Records</b>	<p>You can expand any record in the Climate DART to view complete information including the hidden fields within the Grid View by doing the following:</p> <ol style="list-style-type: none"> <li>1) Go to the table and the view you want to expand.</li> <li>2) Click on the Expand Record icon next to the Focus Areas column.</li> <li>3) The details for each row will open in a pop-up window when you click this icon.</li> </ol>
<b>Share Feedback</b>	<p>You can send suggestions, recommendations, or other feedback to make the Climate DART more useful by writing to <a href="mailto:contact@odenterprise.org">contact@odenterprise.org</a>. CODE welcomes feedback including, but not limited to, additional case studies, use cases, data sets, and examples of how the Climate DART is being used by different stakeholders.</p> <p>Once a submission is received, the CODE team will review and incorporate useful feedback into the typology for future users.</p>

**Second Table: Climate DART.** This table is the actual Climate DART tool. It is arranged by *focus areas* with relevance to climate adaptation and resilience (see below). In Grid View, each row represents a specific *relevant factor* for a given focus area. For each relevant factor, there is supporting information in the columns for Reporting Requirements, Global Data Sources and their Relevant Datasets and Reports, Local Data Sources, Risk Category, Data Collection Methods, Notes/Relevance, Case Studies, and References. The following figure shows the components of the Climate DART table:



The *Focus Areas* are broad categories of data that contribute to climate risk assessment, adaptation, and resilience. The Focus areas represent a prioritized list of data categories such as Infrastructure, Population, Weather and Climate Monitoring, Land and Agriculture, and similar data categories that have direct impact on managing climate change.

The *Relevant Factors* in the Climate DART table identify specific areas of interest within each focus area. For example, the Focus Area of Weather and Climate Monitoring includes Sea Level Rise as a Relevant Factor. The DART identifies these Relevant Factors without specifying metrics or indicators for measuring them. So while Sea Level is identified as a factor, the DART does not require, say, calculating “projected sea level rise by 2050 in centimeters” or some similar metric as an indicator of risk. In that way, the Climate DART allows local governments and their partners to determine which measures and metrics are most relevant to them. A companion project to the Climate DART - the Open Climate Data Inventory, being developed by the nonprofit [Open Data Watch](#) - identifies many of the most important numerical indicators in common use.

The Climate DART table describes three types of data for each Relevant Factor: data needed for *reporting requirements* under international agreements, *global data sources* that can be valuable (particularly for risk assessment), and *local data sources* that are needed for local risk assessment and adaptation and resilience planning. The DART provides links to commonly

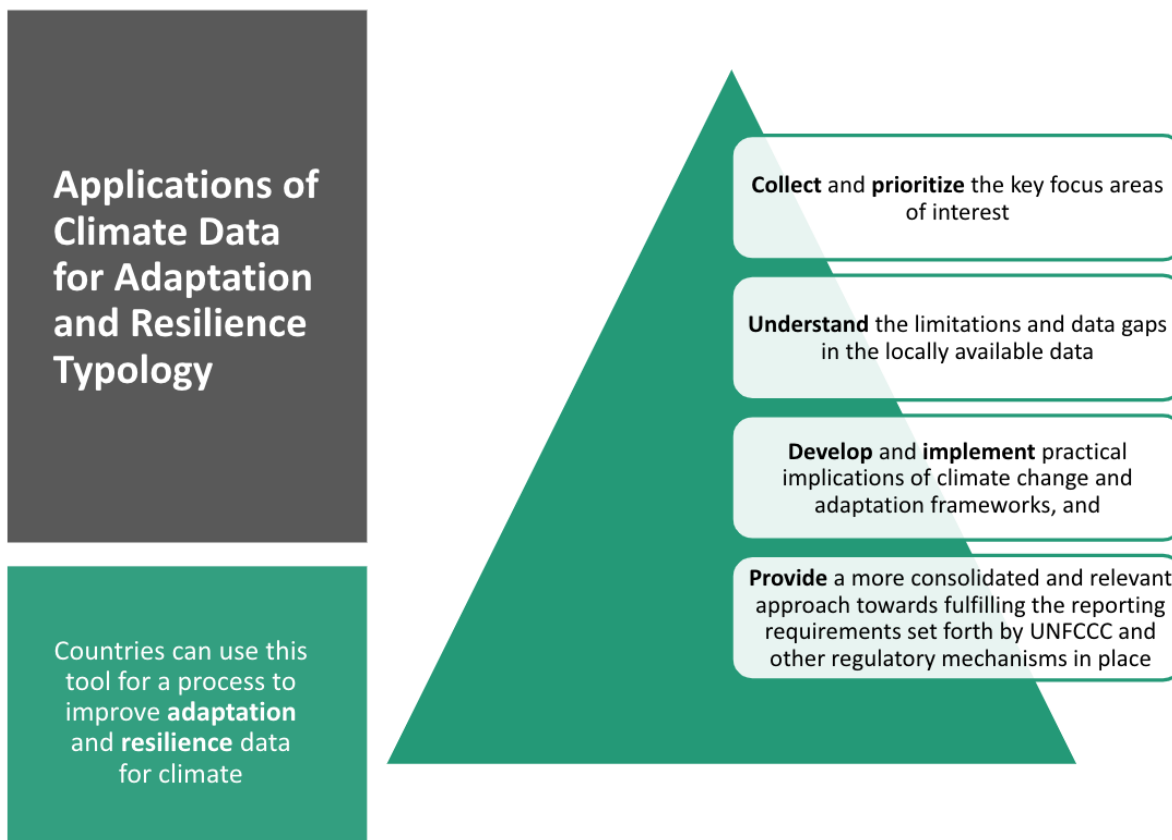
used global data sources where those are relevant. Since local data is different all over the world, the DART does not link to specific local data sets, but describes the *types of data* needed for climate risk assessment, adaptation, and resilience at a local level. In more detail:

- *Reporting Requirements* are the international reporting frameworks that require countries to report on each Relevant Factor. For Freshwater Resources/Water Use, for example, countries are required to report data under the Paris Agreement, the UN's Framework for the Development of Environment Statistics, and the UN Sustainable Development Goals. The accompanying column, *Section/Article*, shows where the specific requirements for data on that factor can be found.
- *Global Data Sources* are sources of information that include helpful data on relevant factors worldwide. For Freshwater Use, for example, the UNSD Environmental Indicators are a useful resource. The accompanying column, *Relevant Datasets and Reports*, shows where the data of interest can be found or provides links to relevant documents and reports.
- *Local Data Sources* are the types of local data that national and subnational governments may have, or may need to develop, for insight on the Relevant Factor. For Freshwater Use, for example, these may include a country's National Statistical Office, Ministry of Water Resources, and Ministry of Environment. Since these data sources vary from place to place, however, the table cannot guide users to specific data sources: Each location has to develop and use those sources independently.

**Third Table: References.** This table provides direct links to the major frameworks that have been developed for international reporting requirements (e.g. the Paris Agreement); organizations that provide global guidance on climate issues and data (e.g. UNFCCC); and global climate-related data sources (e.g. World Bank Open Data). These frameworks, organizations, and resources are cross-referenced to the abbreviations used in the Reporting Requirements and Global Data Source columns of the Climate DART table itself.

### **Examples of the Climate DART in Action**

The pyramid below shows how the Climate DART is designed to be used by governments and their partners in different countries, in a process that goes from data collection through planning, implementation, and reporting. This approach will help inform a pilot project in Senegal led by PARIS21, which will build on the Climate DART and other work to test out an assessment for country-level CCDEs.



The Stakeholders Matrix in the Appendix shows in detail the wide variety of ways that the Climate DART can be used. For example:

**National Governments can use the Climate DART to...**

- Identify and prioritize data requirements for climate risk assessment, adaptation, and resilience in coordination with national adaptation programs and plans

**Local Governments can use the Climate DART to...**

- Support national authorities in collecting, using, and reporting prioritized data

**National Statistical Offices can use the Climate DART to...**

- Identify data requirements, specific methods for collection and reporting, and data gaps and limitations for climate adaptation and resilience

**Research Centers and Universities can use the Climate DART to...**

- Design research on identified data gaps and limitations to support national and regional adaptation plans and policies

**Local NGOs can use the Climate DART to...**

- Understand important data for climate resilience and adaptation and identify its availability in their area

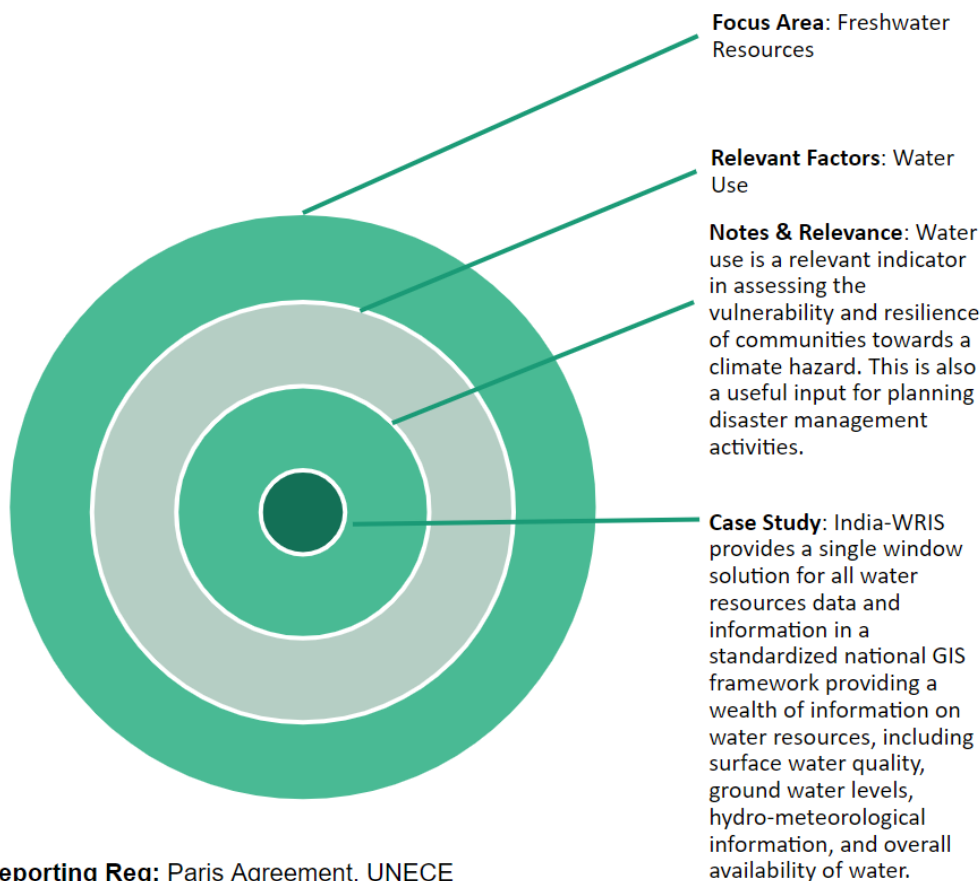
**Local Communities can use the Climate DART to...**

- Understand important data for climate resilience and adaptation that may impact their residents

**Development Partners and International Donors can use the Climate DART to...**

- Inform project planning, identify priority development areas, learn about country experiences through use cases, and more.

While the Stakeholders Matrix shows a variety of use cases for applying the Climate DART, the Case Studies presented in the Climate DART itself give examples of the ways that data has already been used to solve local climate challenges. The diagram below shows how the Climate DART presents information on one particular case study: The development of the [India Water Resources Information System \(WRIS\)](#) as a national level GIS framework to provide information on water resources. The Climate DART presents this case study in the context of a focus area (Freshwater Resources), a relevant factor (Water Use), and notes about the use of this type of data. The Climate DART’s case studies are meant to be used as examples to help organizations in other countries envision new kinds of data use in similar areas.



**Reporting Req:** Paris Agreement, UNECE

**Global Source:** UNSD Environmental Indicators

**Local Source:** NSO, Ministry of Water, Ministry of Environment

## About CODE

CODE is an independent 501(c)3 nonprofit organization based in Washington, D.C. CODE’s mission is to maximize the value of open and shared data for the public good, by working with government agencies, businesses, nonprofits, and researchers who are both data providers and



data users. Since it was founded in January 2015, CODE has held dozens of Open Data Roundtables and workshops with the White House and Federal agencies on topics including the environment, Federal data strategy, and health and healthcare. Internationally, CODE has collaborated with the World Bank, the UN Statistics Division, PARIS21, the International Development Research Centre, and a number of national governments. In addition to working with government agencies in the U.S. and internationally, CODE partners with private sector companies, foundations, and other nonprofit organizations to fulfill its mission.

**Acknowledgments**

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**Appendix: Climate DART Stakeholders Matrix**

This appendix identifies potential stakeholders/users of the Climate DART and provides information on their specific interests and uses they may find for the tool. These stakeholders may use this tool to prioritize key focus areas for adaptation and resilience, to better understand data needs and requirements, and to identify limitations and gaps in their current data. Climate DART can also be used to understand the practical implications of climate change and develop adaptation frameworks, and provide a more consolidated and relevant approach to fulfilling reporting requirements set by UNFCCC and other regulatory groups. CODE has identified these stakeholders by reviewing literature and research on the climate adaptation process<sup>1</sup>.

Stakeholder Group	Interests and Roles	Can Use Climate DART To..
National government ministries (e.g., agriculture, health, environment, education), early warning systems, and disaster prevention institutions	<ul style="list-style-type: none"> <li>● Comply with international agreements and participate in international negotiations on regional programs</li> <li>● Implement sectoral policies, programs and plans</li> <li>● Build capacity and develop effective mechanisms to solve local problems</li> </ul>	<ul style="list-style-type: none"> <li>● Identify and prioritize data requirements for climate risk assessment, adaptation, and resilience in coordination with national adaptation programs and plans</li> <li>● Identify relevant factors and their global/local data sources Identify Reporting Requirements and relevant articles or</li> </ul>

<sup>1</sup> [Engaging Stakeholders in the Adaptation Process \(Cecilia Conde; Kate Lonsdale\) - United Nations Framework Convention on Climate Change \(UNFCCC\)](#)

Stakeholder Group	Interests and Roles	Can Use Climate DART To..
	<ul style="list-style-type: none"> <li>● Reduce the risk of local, climate-related damage</li> </ul>	<p>sections for compliance purposes</p> <ul style="list-style-type: none"> <li>● Enhance data collection and reporting capabilities at the national/local level</li> <li>Improve data collection and reporting techniques to better manage and handle climate related disasters and crisis situations</li> </ul>
National Statistical Offices (NSOs)	<ul style="list-style-type: none"> <li>● Collect, compile and release official statistics that are produced and published at national and subnational levels</li> <li>● Provide information to the general public, government, and the business community in the economic, demographic, social and environmental fields</li> </ul>	<ul style="list-style-type: none"> <li>● Identify data requirements and specific methods for collection and reporting</li> <li>● Identify data gaps and limitations for climate adaptation and resilience</li> <li>● Inform stakeholders of data requirements and data gaps</li> </ul>
Local Governments	<ul style="list-style-type: none"> <li>● Solve local problems</li> <li>● Develop local capacity</li> <li>● Finance local plans and programmes</li> <li>● Strengthen local institutions</li> <li>● Prevent local climate damage and disasters</li> </ul>	<ul style="list-style-type: none"> <li>● Support national authorities in collecting, using, and reporting prioritized data</li> <li>● Understand important data for climate resilience and adaptation</li> <li>● Find case studies as inspiration when developing local capacity for climate adaptation and resilience</li> </ul>
National/regional research centers and universities	<ul style="list-style-type: none"> <li>● Contribute to solving national and regional climate problems affecting vulnerable human systems and ecosystems</li> <li>● Build permanent national and regional capacity for addressing climate change</li> </ul>	<ul style="list-style-type: none"> <li>● Design research to address data gaps and limitations to support national and regional adaptation plans and policies</li> <li>● Identify data gaps and limitations for national/local context</li> <li>● Design, develop, and</li> </ul>

Stakeholder Group	Interests and Roles	Can Use Climate DART To..
	<ul style="list-style-type: none"> <li>Develop national and regional approaches to address climate change with a developing country perspective</li> </ul>	<p>propose approaches to address climate change challenges</p>
Local environmental/development NGOs	<ul style="list-style-type: none"> <li>Work with local stakeholders to take action to fulfill local needs</li> <li>Finance local development programs and projects</li> <li>Develop capacity (e.g., technical, financial, human, institutional)</li> <li>Strengthen local institutions</li> </ul>	<ul style="list-style-type: none"> <li>Understand important data for climate resilience and adaptation and identify its availability in their area</li> <li>Develop capacity to support national and local governments in collecting and reporting prioritized data identified by Climate DART</li> <li>Identify potential data gaps to be filled in through citizen-generated data</li> </ul>
Local communities/people affected by climate risks and damages	<ul style="list-style-type: none"> <li>Preserve and improve health, education and housing</li> <li>Preserve and improve land and aquatic productivity</li> <li>Decrease local vulnerability to climate risks</li> <li>Preserve and improve adaptive capacity for coping with climatic risks</li> </ul>	<ul style="list-style-type: none"> <li>Understand important data for climate resilience and adaptation that may impact their residents</li> <li>Review their government's current data collection against what exists in the Climate DART</li> <li>Understand how local needs are linked to the global climate change agenda and international commitments</li> </ul>
Development partners and international donors	<ul style="list-style-type: none"> <li>Design development programs and projects</li> <li>Generate funding opportunities and redirect funding for projects accordingly</li> <li>Execute and implement development projects</li> </ul>	<ul style="list-style-type: none"> <li>Use Climate DART to inform project planning, identify priority development areas, learn about country experiences through use cases, etc.</li> </ul>