



Training Report on Basic R Programming for Climate Finance and Data Analysis

Project Information

Project Title: Strengthening Capacities and Enhancing Climate Data and Services in Bhutan to Scale Up Climate Financing from Multiple Sources

Funding Source: Green Climate Fund (GCF) Readiness and Preparatory Support Programme

Project Code: BTN-RS-006

Training Title: Basic R Programming for Data Analysis and Visualization

Training Dates: 28 February, 7 March, 21 March, and 28 March 2026

Venue: Thimphu, Bhutan

Facilitator: Mr. Dechen Wangdi

Participating Agencies:

- Department of Macro-fiscal and Development Finance (DMDF), Ministry of Finance
 - Royal Monetary Authority (RMA)
 - Department of Treasury and Accounts (DTA)
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1. Background

As part of the Green Climate Fund (GCF) Readiness Project, “*Strengthening Capacities and Enhancing Climate Data and Services in Bhutan to Scale Up Climate Financing from Multiple Sources*,” a four-day training-cum-workshop on Basic R Programming was conducted for officials from the Department of Macro-fiscal and Development Finance (DMDF), Royal Monetary Authority (RMA), and Department of Treasury and Accounts (DTA).

The training was organized in recognition of the growing importance of data-driven decision-making in climate finance, macro-fiscal management, public financial management, and economic policy analysis. Strengthening analytical capacities within key institutions is critical for enhancing Bhutan's ability to access, manage, monitor, and report climate finance from multiple sources, including international climate funds.

R is a powerful, free, and open-source statistical programming language widely used globally for data analysis, visualization, and reproducible research. The training aimed to equip participants with foundational skills in R programming to improve data management, analytical efficiency, and evidence-based policymaking.

2. Objectives of the Training

The overall objective of the training was to strengthen the technical capacities of government officials involved in climate finance, macro-fiscal analysis, and public financial management through practical exposure to R programming.

Specific objectives included:

- Introducing participants to the R programming environment and basic programming concepts;
 - Building skills in importing, cleaning, validating, and managing datasets;
 - Enhancing participants' ability to perform descriptive and introductory statistical analyses;
 - Developing competencies in data visualization and presentation of analytical outputs;
 - Promoting reproducible and efficient analytical workflows as an alternative to manual Excel-based processes; and
 - Supporting institutional capacity development for climate finance tracking, analysis, and reporting.
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3. Participants

The training brought together approximately 40 participants from the Department of Macro-fiscal and Development Finance, including interns, as well as officials from the Royal Monetary Authority and the Department of Treasury and Accounts.

The diverse participation facilitated cross-institutional learning and fostered collaboration among agencies involved in fiscal policy, climate finance, economic analysis, and financial sector oversight.

4. Training Methodology

The training adopted a highly practical and hands-on approach. Each session combined theoretical concepts with guided exercises, allowing participants to immediately apply newly acquired skills using real datasets and examples.

Participants worked directly in the R environment to practice data importation, transformation, analysis, and visualization techniques. Interactive discussions and troubleshooting sessions enabled participants to gain confidence in applying R to their day-to-day analytical work.

5. Training Content

Day 1: Introduction to R and Data Management

Date: 28 February 2026

The first session introduced participants to the R programming environment and fundamental programming concepts. Participants installed and configured R packages, learned to set working directories, and imported datasets into R.

Topics covered included:

- Introduction to R and its applications in finance and policy analysis;
- R syntax and programming fundamentals;
- Variables and data types;
- Character strings and string manipulation;
- Creating and managing vectors;
- Data frames and dataset structures;
- Data validation and cleaning techniques; and
- Handling missing values and removing NA observations.

Hands-on exercises focused on importing datasets, creating data objects, manipulating strings, and cleaning data for analysis.

Day 2: Data Transformation and File Management

Date: 7 March 2026

The second session focused on data transformation techniques frequently used in analytical and reporting work.

Topics covered included:

- Importing CSV and Excel datasets;
- Data restructuring and transformation;
- Converting wide-format data into long-format data;
- Converting long-format data into wide-format data;
- Arranging and sorting datasets;
- Filtering observations; and
- Exporting processed datasets.

Practical exercises enabled participants to work with different data structures and apply transformation techniques to improve data usability and reporting efficiency.

Day 3: Descriptive Analysis and Tidyverse Packages

Date: 21 March 2026

The third session introduced participants to descriptive statistical analysis using R and the tidyverse ecosystem.

Topics covered included:

- Date and time formatting;
- Time-series data management;
- Vector-based analysis;
- Descriptive statistics;
- Summary functions;
- Data frame analysis;
- Advanced descriptive statistical techniques; and
- Use of tidyverse packages for data manipulation and analysis.

Participants conducted descriptive analyses on sample datasets and generated summary statistics relevant to macroeconomic and financial data.

Day 4: Data Visualization and Capstone Project

Date: 28 March 2026

The final session focused on effective communication of analytical findings through data visualization.

Topics covered included:

- Plot formatting and margins;
- Bar charts and pie charts;
- Error bar visualizations;
- Line plots and trend analysis;
- Dot plots and comparative visualizations;
- Histograms and density plots;
- Axis customization;
- Introduction to three-dimensional plots; and
- Capstone project integrating concepts learned throughout the training.

Participants developed visual outputs and analytical dashboards using datasets relevant to their work areas.

6. Key Outcomes

The training successfully enhanced participants' understanding of R programming and strengthened foundational analytical skills required for evidence-based policymaking and climate finance management.

Key outcomes achieved include:

- Improved knowledge of statistical programming and data management techniques;
- Enhanced capacity to clean, transform, and analyze datasets efficiently;
- Increased ability to produce high-quality visualizations and analytical outputs;
- Greater awareness of reproducible analytical workflows;
- Strengthened institutional readiness to manage large datasets associated with climate finance tracking and reporting; and
- Improved collaboration among government agencies involved in macro-fiscal management and climate finance.

Participants demonstrated increased confidence in applying R to routine analytical tasks and expressed strong interest in pursuing intermediate and advanced training modules in the future.

7. Relevance to the GCF Readiness Project

The training directly contributed to the objectives of the GCF Readiness Project by strengthening national capacities for climate-related data management, analysis, and reporting.

Effective climate finance mobilization requires robust analytical capabilities to identify financing needs, monitor financial flows, assess investment impacts, and support evidence-based policy decisions. By equipping officials with modern analytical tools and techniques, the training enhances Bhutan's institutional capacity to access, manage, and leverage climate finance from multiple sources.

Furthermore, the skills acquired through the training support the development of stronger climate finance tracking systems and improved data-driven planning processes, thereby contributing to the long-term sustainability of Bhutan's climate finance architecture.

8. Conclusion and Way Forward

The Basic R Programming Training successfully introduced participants to modern data analysis tools and strengthened analytical capacities across key government institutions. The training represents an important step toward modernizing data management practices and fostering evidence-based decision-making in climate finance and macro-fiscal policy.

Building on the success of this initiative, future capacity-building efforts may include intermediate and advanced R programming courses, climate finance data analytics, econometric modelling, time-series forecasting, and climate-related financial risk analysis.

Continued investment in analytical skills development will further strengthen Bhutan's ability to mobilize, manage, and monitor climate finance while supporting national climate and development objectives.

