



Energy and Climate  
Partnership of the Americas



## **Water and Climate Education Program (WACEP): Short Courses in Climate Risk Management and Water Resources Management**

### **COURSE DESCRIPTION**

The Water and Climate Education Program (WACEP) consists of four courses meant to provide participants with the knowledge and concepts necessary to manage water resources and risk related to climate change and variability. In doing so, the courses will improve local and regional capacity to manage climate-related risk in the water and associated sectors, and will provide participants with the technical expertise to mitigate existing water resource problems and develop sustainable water resource management programs.

### **COURSE 1: Introduction to Water Sustainability and Climate**

Water resources systems provide multiple services and, if managed properly, they can contribute significantly to social well-being and economic growth. However, extreme or unexpected hydroclimatic conditions, such as drought and flood, can adversely affect or even completely interrupt these services. Severe social, economic, and ecological impacts may result when societies are unable to predict, adapt to, or respond to these conditions. In order to understand and plan for the effects of climate variability and change on the water sector, a solid foundation in water resources management and hydroclimatology is imperative.

To that end, this course will explore water sustainability and the role that climate change and variability play in influencing the water sector. More specifically, we will look at reservoir operations, risk estimation, and the implications of climate variability, climate change and a non-stationary climate for the current state of water resources management. The course will include an introduction to the hydrological cycle, hydroclimatology and the water-related societal implications of climate change. We focus on the development and use of hydrologic models for improving water management decision making, preparing for climate-induced impacts, and assessing the impacts of climate changes. Statistical methods for estimating hydrologic risk will also be covered.

On successful completion of this course, the student will:

- Understand general issues of water resources, including water scarcity, water supply and demand, and water sustainability
- Understand the hydrologic cycle and climatic sources of variability and change
- Understand the uncertainties associated with climate change and the implications for the water sector
- Understand the use of hydrologic models

### **COURSE 2: Climate Information and Predictions from Seasons to Decades**

Sectoral practitioners and decision makers, such as water resources managers, urban planners, and disaster risk reduction specialists, are faced with many impacts from climate variability and change. A better understanding of climate in the past and present, and the forecasts that aim to provide information for the future, can inform management, planning, and action. Given the much more probabilistic nature of climate compared to weather, interpretation of available climate information can be difficult. A course on Climate Information and Predictions from Seasons to Decades, fills this knowledge gap and empowers more climate literate professionals across disciplines.

This course provides a practical overview on climate information, including an assessment of past variability and change, and our ability to predict the future. What are the associated patterns of anomalous temperature and precipitation, and what is the ability of dynamical climate models to simulate these features? The course provides an overview of climate prediction on different timescales, with an emphasis on interpretation of probabilistic prediction information and the main source(s) or uncertainty.



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The material is intended to give water resources managers and other decision makers a sense of the relative value of different kinds of information and the cases in which certain types of information can inform decision making. Students should emerge better equipped to use predictions through improved understanding of their basis and guidelines for critical evaluation.

On successful completion of this course, the student will:

- Understand and identify the primary climate phenomena driving variability.
- Interpret climate forecasts across timescales including seasonal-to-interannual predictions, decadal predictions, and climate change projections.
- Understand the sources of uncertainty in climate predictions and projections
- Ask appropriate questions of climate models and associated predictions, in order to establish credibility in the information.

### **COURSE 3: Climate Information for Improved Water Management**

There is a common disconnect between the producers of climate information and the potential users of that information in the water sector. The course will attempt to close this gap by providing a basic understanding of the production of climate information for the water sector, including hydroclimatic climate forecasts on seasonal to interannual timescales and climate change projections. The course will also explore the potential use of that information to inform water resources management and planning decisions. The concept of climate risk management in the water sector will be introduced, and impediments to forecast use, the role of forecast credibility, and trust and risk of forecast use will be covered.

On successful completion of the this course, students will:

- Understand the sources of hydrologic predictability on seasonal to interannual time scales
- Develop a seasonal hydrologic forecast based on climate predictions
- Develop a decision support system for forecast use in a water supply system
- Understand the potential users and impediments to use of forecasts in water supply systems
- Recognize the potential and limitations of climate change projections for assessing impacts in water supply systems
- Understand and apply the concept of climate risk management

### **COURSE 4: Water Planning and Policy for Climate Variability and Change**

Although climate information is only one input in the decision-making process, it can have a significant impact on the water system. Meanwhile, water managers are facing increasing expectations for water systems while also facing the uncertainty associated with climate change. Advances in hydroclimatic science provide rich new opportunities for "climate-smart" water management, and a robust approach to climate risk management includes improved data sets, new management practices, more accurate models, and better forecasts.

This course will build a basic understanding of policy and planning methods as they pertain to water managers in the Caribbean under climate variability and change. Planning processes including modelling approaches, economics, and sustainability issues will be covered, and the potential use of climate information will be integrated throughout the course. Innovative methods for managing climate risk including decision making under uncertainty, real options, and adaptive management will also be covered.

On successful completion of the this course, students will:

- Understand general issues related to water policy
- Be able to conduct a water sector planning process
- Be able to assess risks of climate change to water supply systems
- Understand the principles of climate risk management
- Be able to develop an adaptation plan for the water sectors