नेपाल विकास अनुसन्धान प्रतिष्ठान
Nepal Development Research Institute
NDRI

ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

Building Capacities for Climate Resilient Water Resources Development under Climate Uncertainty

Dissemination Workshop

Workshop Report

March 2024

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Dissemination Workshop

Nepal Development Research Institute (NDRI), in collaboration with Tribhuvan University (TU), organized a dissemination workshop on March 15, 2024 (Friday) as part of the Asia-Pacific Network (APN) funded project titled "Building Capacities for Climate-Resilient Water Resources Development under Climate Uncertainty." The workshop aimed to disseminate the project's findings, highlight key activities conducted throughout the project duration, and promote Climate Risk Assessment (CRA) at the national level.

The workshop had notable participation from various governmental entities, including the Water and Energy Commission Secretariat (WECS), the Department of Electricity Development (DoED), and the Department of Water Resources and Irrigation (DWRI). Academic and research institutions were also well represented, with attendees from the Institute of Engineering (IOE), Tribhuvan University (TU), Practical Action Nepal, Hydro Lab, and Jalsrot Vikas Sanstha (JVS). Additionally, notable associations such as the Independent Power Producers Association Nepal (IPPAN), Small Earth Nepal (SEN), and the Society of Hydrologists and Meteorologists (SOHAM) enriched the discussions with their valuable insights and expertise.

1.1 Opening Session

In the opening session, Dr. Krishna Pahari, President of NDRI, welcomed the participants and provided an overview of NDRI. Dr. Shankar Shrestha, Executive Director of NDRI, elaborated on the project's scope and activities. This included an overview of the Weather Generator and Climate Change Scenario Generator for Climate Risk Assessment (WECCS-Gen) tool development, the capacity-building workshop, and ongoing case studies on various disciplines related to water resources such as hydropower, irrigation, water supply, and hydrology. These case studies were selected from a pool of applicants who submitted their concept notes following the capacity-building workshop in CRA. On behalf of SEN, Mr. Bharat Dhungana, Program Development Assistant at SEN, highlighted the STEM Workshop led by Dr. Juan F. Arratia, (Fullbright Specialist) carried out as a collaborative effort to empower undergraduate and recent graduate students to enhance their research and presentation skills, under the APN-funded project.

1.2 Technical Session

In the Technical Session, Dr. Divas B. Basnyat, Water and Climate Program (WCP) Lead at NDRI, delved into CRA and its practical applications. He provided a brief overview of Representative Concentration Pathways (RCPs), explaining the projected future changes in greenhouse gases as outlined in the IPCC Fifth Assessment Report. Additionally, he discussed Shared Socioeconomic Pathways (SSPs) and their significance in understanding future climate scenarios. Furthermore, he delved into climate models

such as General Circulation Models (GCMs) and Regional Climate Models (RCMs), highlighting their usage and importance in climate research and prediction. He talked about the difference between the top-down approach and the bottom-up approach and their significance. He highlighted the challenges associated with traditional top-down approaches in impact assessment and delved into vulnerability assessment using a bottom-up approach. He provided an explanation of climate change analysis and its applications in hydropower and stress test using hydropower and financial (cost-benefit) analysis models. He drew some examples from an ongoing project at NDRI. His presentation underscored four key messages regarding the climate risks associated with hydropower projects, alongside strategies for risk management and mitigation measures to address these challenges effectively.

Following this, Mr. Dibesh Shrestha, the Lead Resource Person of the project, NDRI, introduced the WECCS-Gen tool and the background behind its inception. He highlighted that it stemmed from the recognition that climate change scenarios development must extend beyond GCMs and then began the development of this tool. He explained further the difference between top-down and bottom-up approaches. He added that GCM data used in hydrological models for top-down climate risk assessments are of coarser resolution, so they need an intermediate process i.e. bias correction and downscaling, He emphasized that the downscaling tool has been integrated into the WECCS-Gen tool.

He added that the climate stress test is an important step in the bottom-up approach. WECCS-Gen aids in climate risk assessment through both a top-down approach and a bottom-up approach. The data obtained from these approaches are fed into the hydrological model, which generates river flow data. This data is then utilized in the energy model, and the resulting output feeds into the economic model. This is the process through which CRA is performed. He briefly highlighted the basic terminologies needed while familiarizing oneself with the tool. He explained the basic concepts used in the WECCS-Gen tool. He concluded the technical session by providing a step-by-step demonstration of the WECCS-Gen tool for both top-down and bottom-up approaches and showcasing its various use cases to the participants.

1.3 Discussion Session

During the discussion, the resource persons answered queries related to the WECCS-Gen tool's functionalities. The participants also thanked and congratulated NDRI for developing the WECCS-Gen tool.

One of the participants highlighted the need to develop a mechanism for sharing data from hydrological modeling and analysis projects to water resources projects, such as hydropower. They proposed that this process could be streamlined by entrusting the Department of Hydrology and Meteorology (DHM) with the responsibility, as they oversee hydrological and meteorological data management in Nepal. Some of the participants

emphasized the significance of integrating CRA into policy frameworks and the utilization of tools such as the WECCS-Gen tool for making informed decisions with regard to climate change. Some participants shared their experience with a tool developed by the UK Centre for Ecology & Hydrology (UKCEH) under the initiative of the DHM, Nepal. However, they noted that despite its initial development, the tool did not gain widespread adoption and failed to adapt and update over time. They suggested that the WECCS-Gen tool developed by NDRI should be widely promoted in Nepal to ensure its success. They added that while various tools have been developed, their practical application has only recently begun to gain traction.

Additionally, Dr. Divas B. Basnyat, brought forward NDRI's plan to introduce the WECCS-Gen tool and other similar tools to the DOED into their design guidelines, noting the limited recognition of climate-related considerations in current frameworks and practices. He added that there can be potential collaborations with various relevant government and consulting organizations as well as educational institutions to enhance the WECCS-Gen tool and CRA initiatives further. Participants also highlighted that collaborating with such organizations would increase the acceptability of the WECCS-Gen tool and facilitate its incorporation into policy frameworks. A participant emphasized the potential of the CRA tools to be integrated into community practices. They pointed out that the Local Disaster and Climate Resilience Framework (LDCRF) Guidelines currently lack a focus on CRA aspects. They suggested that if these guidelines were to recommend the use of tools like the WECCS-Gen tool, it could significantly promote its application at the local level.

Overall, the session concluded with an intensive discussion on the following:

- Current understanding, practices, and capacity in CRA for water resources in Nepal,
- The application of tools of top-down (GCM-based) and bottom-up (Vulnerability-based) approaches, and
- Prospects for future collaboration and opportunities.

In conclusion, Dr. Basnyat summarized the key suggestions and recommendations provided by the participants, which are outlined as follows:

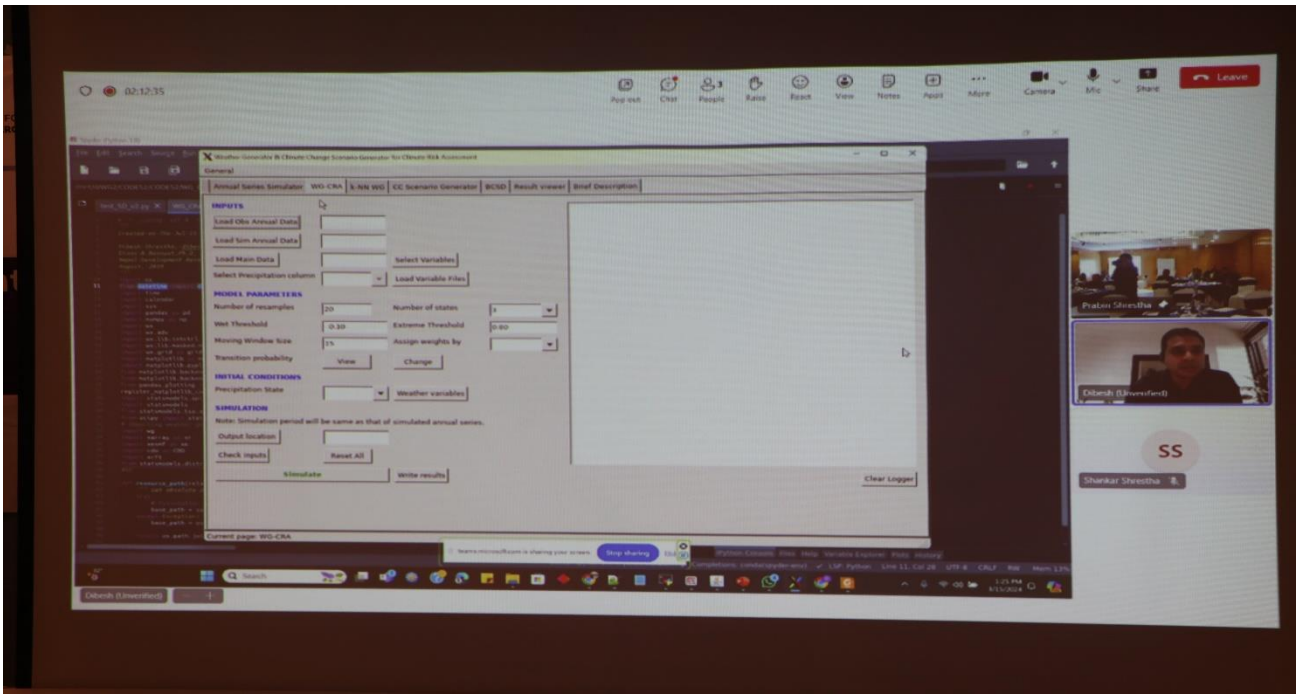
- Establishing a mechanism for sharing hydrological analysis data with hydropower projects is crucial.
- Policy-level guidance with regard to climate change is essential to standardize impact analysis of water resource-related projects like hydropower and irrigation.
- Policy interventions are needed for integrating CRA into policy frameworks.
- Widespread dissemination and promotion of developed CRA tools are necessary to ensure their acceptability and sustainability.

- Capacity building and training programs in CRA should be organized for practitioners and relevant consulting firms/organizations time and again.
- Engagement of academic institutions, including students, with the tool is important.
- Exploring dimensions such as community practice is recommended.

1.4 Closing Session

In the closing session, Dr. Shankar Shrestha extended his gratitude to all participants, acknowledging the active and valuable participation of notable organizations throughout the workshop. He also appreciated the participants' keen interest in an extended dissemination workshop in CRA and establishing a communication network for future collaborations with NDRI. In his closing remarks, he reiterated the importance of sustaining CRA initiatives, underscoring the commitment to ongoing efforts.

Glimpses of the Workshop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Prabin Shrestha
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Lalitpur, Nepal
Fulbright Specialist
Dr. Juan F. Arratia
• Research Professor and Mentor
• Principal Investigator of the Model Institutions for Excellence (MIE) Project
• Founder and President of Scientific Caribbean Foundation, San Juan, Puerto Rico, USA
• Recipient of 2007's Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring


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Glimpses of the Discussion Session