



Mapping Groundwater Resilience to Climate Change and Human Development in Asian cities

Project Description

“Mapping groundwater resilience to climate change and human development in Asian cities” is the three-year project funded by Asia Pacific Network for Global Change Research (APN) and implemented by Asian Institute of Technology (AIT). The collaborators are: Institute for Global Environmental Strategies (IGES), Japan, Department of Groundwater Resources (DGR), Thailand, Division of Water Resources Planning and Investigation for the South of Vietnam, Vietnam, International Waterlogging and Salinity Research Institute, Pakistan and Center of Research for Environment Energy and Water (CREEW), Nepal.

The project aims to assess the current and future climate, quantify changes in both climatic and human development, analyze resiliency of groundwater systems to changes, and then formulate adaptation strategies to reduce the vulnerability of groundwater resources in four Asian cities (Bangkok, Ho Chi Minh City, Kathmandu and Lahore) through a collaborative efforts of scientists, policy-makers and relevant stakeholders. Through e-conferences and regional workshops, communication among policy makers, scientist, and local stakeholders (water users) will be enhanced and the assessment results will be useful for groundwater management under climate change and human development scenarios. The project and its activities complement to at least first three goals (i.e., Support regional cooperation; Enhance capabilities in science-based decision-making; and Strengthen interactions among scientists and policy makers) outlined in the APN’s Fourth strategic Plan (2015-2020). Similarly, the project encompasses three of the APN’s research agenda (2015-2020): Climate change and variability; Resource utilization and pathways for sustainable development; and Risk reduction and resilience.

Keywords: Groundwater, Climate Change, Human Development, Resiliency, Asian Cities

Objectives of Project

The aim of the project is to improve understanding of the impacts of climate change and human development on groundwater resources and local demand. The project will develop policy recommendations for sustainable groundwater development and management that will support adaptation and build resilience. There are four key objectives:

1. To develop framework for the assessment of resiliency of groundwater to climate change and human development in urban environment.
2. To assess the impact of climate change and human development on groundwater recharge and quality of four Asian cities.
3. To map resiliency of groundwater of four Asian cities to climate change and human development.



4. To develop evidence-based guidance on assessing how groundwater can support adaptation and build resilience to climate change.

Project Team



Dr. Sangam Shrestha (PI)



Dr. Binaya Raj Shivakoti



Dr. Bui Tran Vuong



Dr. Muhammad Basharat



Dr. Oranuj Lorphenstri



Dr. Rabin Malla



Dr. Mohana Sundaram
Shanmugam



Mr. Sanjiv Neupane



Mr. Suwas Ghimire

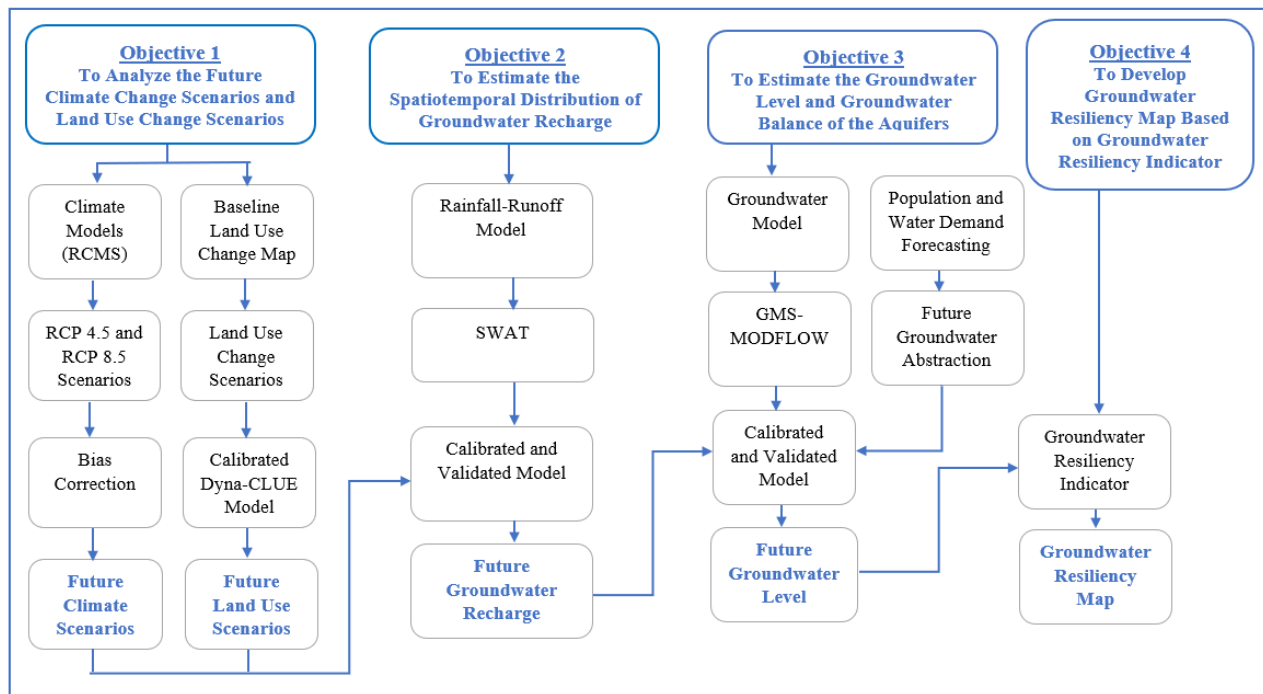


Ms. Usha Ghimire



Ms. Supaluck Luchutawachee (Kom)

Project Methodology



- **About Asia-Pacific Network for Global Change Research (APN)**

The Asia-Pacific Network for Global Change Research (APN) is a network of 22 Member Country governments that promotes global change research in the region, increases developing country involvement in that research, and strengthens interactions between the science community and policy makers. The APN defines “global change” as the set of natural and human-induced processes in the Earth’s physical, biological and social systems that, when aggregated, are significant at a global scale. The APN works to enable developing countries in the Asia-Pacific region to participate increasingly in regional cooperative research, and to benefit fully from such research. It strives to assure that the research results contribute to the development of science-



based adaptation strategies, policy- and decision-making processes, and developing scientific capacity to address these important issues. Recognizing the interactive role of regional processes in the overall Earth system, the APN also aims to link the initiatives it sponsors with related projects conducted in other regions and under the aegis of global-scale programs.

- **About Asian Institute of Technology (AIT)**

The Asian Institute of Technology (AIT) promotes technological change and sustainable development in the Asian-Pacific region through higher education, research, and outreach. Established in Bangkok in 1959, AIT has become a leading regional postgraduate institution and is actively working with public and private sector partners throughout the region and with some of the top universities in the world. AIT focuses on advanced technology, engineering, environment and resources, and management studies. AIT's rigorous academic, research and outreach programs taught in English prepare graduates for professional success and leadership roles. The mission of AIT in the context of the emerging environment is "to develop highly qualified and committed professionals who will play a leading role in the sustainable development of the region and its integration into the global economy".

- **About Institute for Global Environmental Strategies (IGES)**

The Institute for Global Environmental Strategies (IGES) was established in March 1998 under an initiative of the Japanese government and with the support of Kanagawa Prefecture based on the "Charter for the Establishment of the Institute for Global Environmental Strategies". The aim of the Institute is to achieve a new paradigm for civilization and conduct innovative policy development and strategic research for environmental measures, reflecting the results of research into political decisions for realizing sustainable development both in the Asia-Pacific region and globally. IGES made the transition to a Public Interest Incorporated Foundation in April 2012.

According to the Charter for the Establishment of the IGES, the Institute will tackle fundamental challenges to human society, which exists thanks to the bounty of the global environment, and to redefine the values and value systems of our present societies that have resulted in the global environmental crisis, in order to create new ways of conducting activities and a new paradigm for civilization. Based on the principles of this new paradigm, new social and economic systems will be built, so that a new era of the global environment can begin. IGES also recognizes that the realization of sustainable development in the Asia-Pacific region is a vital issue for the international community, as the region is home to more than half of the world's population and is experiencing rapid economic growth. Thus, the region plays a critical role in the protection of the global environment. By recognizing these crucial issues, IGES will promote research cooperation with international organizations, governments, local governments, research institutions, business sectors, non-governmental organizations (NGO) and citizens. As well as conducting research, the Institute will share its research results and also host international conferences and study workshops.



- **About Department of Groundwater Resources (DGR)**

Department of Groundwater Resources (DGR), Thailand is the department under Ministry of Environment and Natural Resources which is responsible to initiate policies, laws, regulations, standards as well as, developing an integrated groundwater resources management plan in groundwater region and basin; to explore, assess, develop, conserve, restore and control groundwater resources, as development of groundwater information technology in order to enhance sustainable groundwater resources management by using a people participation approach and to develop groundwater resources organization, human resources and technologies, well as implementation of technology transfer to public and private sectors for integrated and sustainable groundwater resources management.

- **About Division of Water Resources Planning and Investigation for the South of Vietnam (DWRPIS)**

Division of Water Resources Planning and Investigation for the South of Vietnam (DWRPIS) was established upon Decree No.152/HĐBT dated on 10 Dec 1981 of Council of Ministers with the name "Hydrogeological Division 8" (Division 8) and its main field of activity are:

- Planning, investigation, reconnaissance, exploration and exploitation of water resources (including thermal water, mineral water and mineral mud).
- Design and implementation of soil investigation, soil base and foundation reinforcement.
- Formulation and implementation of projects for asking exploitation licenses of water and mineral resources.
- Groundwater exploitation drilling.
- Construction of production wells, drinking water and waste water treatment systems, industrial and domestic water supply systems.
- Environmental geological and geothermal investigation, environmental impact assessment.
- Groundwater monitoring.
- Geophysical investigation, application of nuclear techniques to water resources investigation and assessment of water source pollution.
- Mechanical services and special equipment, material supply.
- Mapping and GIS technology services, topographical and cadastral survey on various scales.
- Establishment of topographical, water resources, geological, engineering geological and environmental geological databases.
- Consultancy on designing and supervising for fields of water resources, geology, engineering geology, environmental geology and geodesy.
- Implementation of scientific and technological research projects. Technology application and transfer.

- **About International Waterlogging and Salinity Research Institute (IWASRI)**

International Waterlogging and Salinity Research Institute (IWASRI) was established in 1986 as a Research Institute. The mandate of IWASRI is to conduct research on waterlogging and salinity,



groundwater, surface water and environment issues by developing economically feasible solutions and to disseminate these solutions to the researchers and other end users in the form of reports, technical papers, farmer days and workshops, etc. Quarterly IWASRI Newsletter is also a part of dissemination of research activities to Research and Development Institutions as well as to farmer's community. Moreover, IWASRI coordinates with other institutes and manages supervision of its allied organizations namely Mona Reclamation Experimental Project (MREP), Bhalwal, Lower Indus Water Management and Reclamation Research Project (LIM), Hyderabad, International Sedimentation Research Institute, Pakistan (ISRIP) and SCARPs Monitoring Organization (SMO), Lahore.

- **About Center of Research for Environment Energy and Water (CREEW)**

CREEW is a non-profit, scientific research-oriented and development-based organization established in 2008. It has been mainly involved in research projects (groundwater and water resources, water and sanitation and treatment, climate change), research grant and fellowship programs, capacity building of mid-career professionals, and dissemination of scientific research findings. The prioritized research at CREEW include but are not limited to Groundwater; Hydrology and Water Resources; Solid Waste and Waste Water; Climate Change Impacts and Adaptation; Renewable Energy; and Public Health and Sanitation.