Asia Pacific Network for Global Change Research

CBA2012-03NMY-Rasul

"Impact of Climate Change on Glacier Melting and Water Cycle Variability in Asian River Basins"

By

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Rationale

Asian high mountains are water towers of Asia supplying water, food and livelihood to more than 1.6 billion people directly.

Due to global warming the recession of glaciers has been accelerated and water flows have become highly variable.

Study of the warming trend, melting process of snow/ice and resultant availability of water deemed necessary

Project Detail

Title of Project: **Impact of Climate Change on Glacier Melting and Water Cycle Variability in Asian River Basins**

Project Duration: 2 years

Relationship to AWCI: Selected basins are among 18 demonstration basins of GEOSS AWCI

Participating Countries: Japan, Pakistan, Nepal, Bhutan, Mongolia, India and Uzbekistan

Project Partners

❖**Overall Supervision of Prof. Toshio Koike University of Tokyo,**

❖ **Project Leader: Ghulam Rasul, Pakistan Meteorological Department**

❖**Co-Leaders: Bashir Ahmad, Water Resources Institute,**

❖**Co-Leaders: Ichirow Kaihotsu, Hiroshima University,**

Collaborators:
❖**Gombo Davaa Institute of Meteorology and Hydrology, Mongolia,**

❖**Karma Chhophel Hydro-met Services of Bhutan,**

❖**Shiv Sharma Dept. of Water Induced Disaster Prevention, Nepal,**

❖**Sergey Myagkov Hydromet Research Institute of Uzbekistan,**

❖**Srikantha Herath United Nation University , Japan**

❖**Rakesh Kumar , Hydrological and Glacier Data Analysis in India**

Main Objectives

 1. To improve the Climate Change Assessment and downscaling techniques followed in member countries

2. Building the capacity of member countries for the finer temporal and spatial Climate projections for glacierized mountains of Asia.

3. Assessment of Glacier melt and Hydrological regime shift in the light of Climate Change scenarios

4. Assessment of Water Cycle variability and development of drought early warning system

5. Training of professionals for application of WEB-DHM-S

Data

- In-Situ Data from National Meteorological and Hydrological Services

- High elevation Automatic Weather Stations and glaciers field measurement Data

- Reanalysis Data Sets e.g. NCEP, JRA, CRU

- Secondary Data Sets from published research stuff

- Satellite Data e.g. JAXA, NOAA on soil moisture, snow cover, vegetation and inundation extent

Methodology

- Using output of GCMs, future projections of temperature and precipitation will be developed by employing a RCM
- By statistical analysis, flood/drought climatology will be developed including water cycle variability and vulnerability.
- WEB-DHM-S will be used to assess the available water resources from snow cover, glaciers and rainfall.
- Numerical Model products on an extended time-scale combined with WEB-DHM output will be used to evaluate hydrological and agricultural drought.
- Training courses will be organized to teach the needed techniques

Dr. Arif Mahmood
Director General PMD

Expected Outcomes

- Training course(s) for professionals on application of WEB-DHM-S and other necessary techniques;
- Future Projections of temperature and precipitation using GCM output for participating countries on basin scale;
- Flood/Drought Climatology and climate variability and identification of drought vulnerable areas;
- Using Drought Early Warning System;

and

- Project report at the conclusion and publications.

Financial Detail

Funding from APN: US$ 80,000

Funding from Univ of Tokyo: US$ 50,000

Total Budget of the Project: US$130,000

Timeline

Project Activities	Year (2012/13) June 2012 to May 2013											
	1	2	3	4	5	6	7	8	9	10	11	12
Ground-based & satellite data analysis and building up monitoring/ research network	■	■	■	■								
Climate change projections for selected Asian River Basins				■	■	■	■					
APN CAPaBLE project co-leaders and AWCI drought WG meeting (Japan)					■							
Climate Change and Drought Climatology Maps							■	■				
Workshop on status of climate in glacierized basins and future projections (Thai land)								■				
Preparation for training course									■	■		
Training course and APN CAPaBLE project co-leaders meeting in (Nepal)								■				
Calibration/Application of WEB-DHM-S by National Teams											■	■

Timeline

Project Activities	Year (2013/14) June 2013 to May 2014											
	1	2	3	4	5	6	7	8	9	10	11	12
Calibration/Application of WEB-DHM-S by National Teams	■	■	■	■	■							
APN CAPaBLE & AWCI/GEOSS Workshop on Results/Progress (Japan)					■							
Implementation of Drought Early Warning System							■	■	■			
APN CAPaBLE & AWCI/GEOSS meeting for sharing results (Lao)									■			
Publication of Results											■	
Training of young scientists (Pakistan)											■	
Final Report												■

Meetings and Training Workshops

- September-October, 2012 Kick Start Meeting of Project Partners in Tokyo, Japan

- January 2013 Workshop on Status of Climate in Glacierized Basins and Future Projections in Chiang Mai, Thailand

- March, 2013 AWCI Working Groups Meeting, in Tokyo, Japan

- October-November, 2012 APN CAPaBLE & AWCI Workshop (??????)

- February-March, 2014 Sharing Results (??????)

- April 2014, Training of Young Scientists in Islamabad Pakistan

Summary

Accelerated glacier melting and large scale variability of weather patterns have made river flows highly variable involving frequent droughts and floods. GEOSS/AWCI has a databank where 18 Asian countries share in-situ data to develop an integrated approach for effective use of satellite, in-situ, reanalysis data and numerical model output. Through this Project, drought related products are shared and capacity building focusing on preparation of dry/wet climatology, indices, utility of numerical weather prediction, drought advisories for planners and policy makers and an interface between users and service providers will be persuaded. Training of young scientists for sustained continuity is a top priority.