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Impact of Climate Change and Variability on Afghanistan Water Resources: A case Study of Kabul and Amu Darya River basins

**PEER Kabul River Forum
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Significance of the research's topic for Afghanistan

- Afghanistan is among the most vulnerable countries to effect of the climate change
- Despite climate change mentioned regularly as a problem for Afghanistan development, there has not been global or local interest to mainstream climate adaptation in existing programs and projects
- There is really low level of awareness about climate change within academia, civil societies and even within the Afghan government
- Take this research opportunity to facilitate discussion on climate change in academia and water sector institutions
- Addressing the limited capacity and knowledge about the topic
- Upgrade the local universities' teaching curriculum to make more relevant to recent challenges in Afghanistan
- Make the academic environment more dynamic by creating research unit in university and creating scientific journal



Scientific Objectives

- To recover the gap of observed climate data to create a dataset combining historical climate and hydrologic data from Afghan stations and information from the University of East Anglia's Climate Research Unit.
- To project the future climate change of the Kabul river basin and Amu Darya river basin
- To compare reconstructions of surface measurements with remotely sensed data of snow cover and snow water equivalent derived by U.S. partner Prof. Jeff Dozier to cover the period from 2000 to the present.
- Capacity building in two local university




Development Objectives

- To provide datasets for Afghanistan water-related projects and programs, particularly in transboundary water resource management
- Introduce students to climate change analysis and to create a easily accessible knowledge base for research groups with similar interests working with the similar restrictions.
- To improve Afghanistan's ability to analyze, synthesize, and present information essential for planning and decision making.
- Conduct capacity building with students, stakeholders, educational institutions



Project Duration

- Project has started in Dec. 2015 and be continued till Dec. 2017
- 



Progress and Results

- Meteorology data has been collected from relevant institutions/MEW and MAIL for 12 stations located in two river basins
- The collected data processed for quality check and converting to proper required format
- The work on data gap fillings of 12 stations in both basin has been completed from 1970 to 2012, using supplementary sources such as Climate Research Unit (CRU)
- The future projection of climate change on Kabul River basin has been modeled
- The capacity building with local universities has been going on with the cooperation of government institutions

CLIMATE CHANGE AND AFGHANISTAN RIVER BASINS

USAID-PEER 4-047: IMPACT OF CLIMATE CHANGE, VARIABILITY AND LAND USE CHANGE ON AFGHANISTAN'S WATER RESOURCES: A CASE STUDY OF KABUL AND AMU DARYA RIVER BASINS

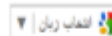
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PROJECT INTRODUCTION

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September 18, 2015

This blog has been created to supplement project 4-047 of the United States Agency for International Development (USAID) -Partnerships for enhanced engagement in research (PEER) program.



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This two year **Partnerships for Enhanced Engagement in Research**

(PEER) project titled "*Impact of climate change and variability and land use change on Afghanistan's water resources: a case study of Kabul River Basin and Amu Darya River Basins*" is established under the aegis of Ibn-e-Sina University (Afghanistan), Bamiyan University (Afghanistan), University of California, Santa Barbara (U.S. Partner) and independent consultant in India. The project is designed to develop capacity among students, academics, engineers, as well as stakeholders in Afghanistan. To understand the potential impacts of climate change, variability and land use patterns this project will take a multi-objective approach towards the end result, keeping integrated management of water resources as a keystone.

The project objectives are:

- To recover the gap of observed climate data to create a dataset combining historical climate and hydrologic data from Afghan stations and information from the University of East Anglia's Climate Research Unit.
- To compare reconstructions of surface measurements with remotely sensed data of snow cover and snow water equivalent derived by U.S. partner Prof. Jeff Dozier to cover the period from 2000 to the present.
- As there exist sparse data with gaps and limited studies in the selected basins, the reconstructions will be analysed to attest for reliability in methodology.

CLIMATE CHANGE AND AFGHANISTAN RIVER BASINS

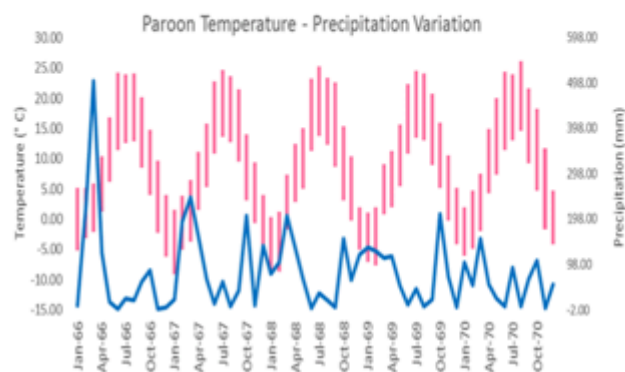
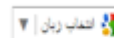
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PAROON (KABUL RB): RECOVERED DATA (1961-2012)

December 21, 2016

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Ensemble GCMs Climate Change Projections for Kabul River Basin, Afghanistan under Representative Concentration Pathways

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Abstract

The aim of study is to project the future climate of the Kabul River Basin of Afghanistan under the recent IPCC AR5 data set. The SimCLIM model was applied for climate modeling. A multi- model ensemble was used for best representation of future climate under the selected RCP4.5 and 8.5 pathways with time span of 2021-2040 (2030s), 2051-2070 (2060s) and 2081-2100 (2090s) with respect to baseline of 1961-2010. The output of multi-model ensemble climate modeling illustrated a considerable change in temperature and precipitation of the basin. The potential seasonal change of Tmax under RCP 4.5 and 8.5 pathways demonstrated peak rise in the winter season and lowest increases in the summer months, the change not exceed from 4.49°C in winter and 3.96°C in the summer by end of the century. In addition, under both pathways RCP4.5 and 8.5 the future Tmin depicted high rise at winter and lowest increase at the spring months, under the high emission scenario RCP8.5 the Tmin projected to increase by 4.53°C and 3.49°C at winter and spring respectively by the end of this century. However, the overall multi-model ensemble results of future

Projected facilitation for site visit and practical training







Data Sharing and Dissemination

► Needs

- Government's support in conducting joint transboundary research, and sharing data and information
- Initiation for technical cooperation between countries over shared basin
- International organization role as facilitator and median

► Challenges

- Lack of mechanism over sharing flow among government institutions
- There is a problem associated with data availability and accuracy, and thus confidence
- Poor relations among trans boundary water institutions – poor data and information sharing between these agencies



Thank You