



# Upper Indus Basin Network

## Country progress report

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## Progress of 6 (TWGs)

### • research topics

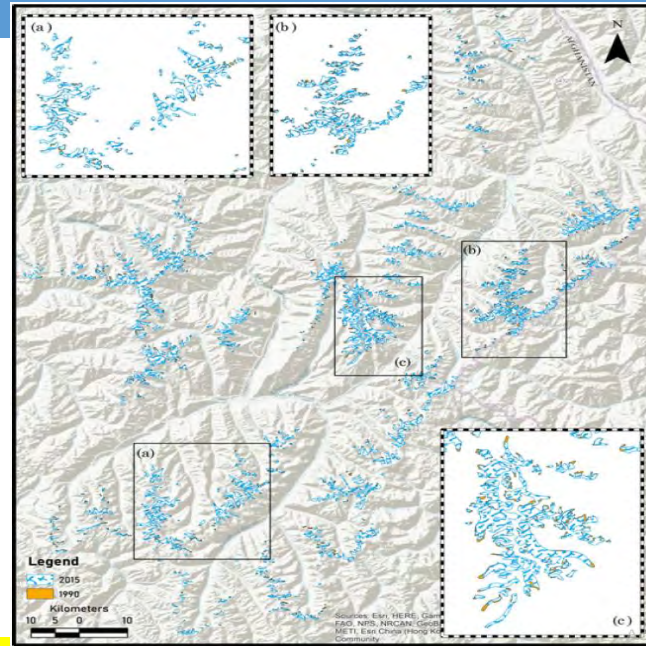
- **current glacier status and elc changes since the late Pleistocene in the Hindu Kush mountains of Afghanistan**
- **Site selection for managed aquifer recharge in the city of Kabul, Afghanistan, using multi-criteria decision analysis and GIS**
- **evaluation of hydrogeoethics approach for sustainable management of groundwater resources in the upper Kabul sub-basin, Afghanistan**
- **nitrate contamination in Kabul province, Afghanistan: reasons behind and conceptual management framework discourse**
- **assessing the water governance practices in Afghanistan: from understanding to functioning**
- **published new book of resources, hydropolitics and water structure of Afghanistan in Persian language**

**Due to political situation in Afghanistan, the UIBN-AC activities stopped for around 5 months and left around 60% of TWGs member a broad the country.**

**Coordination meetings carried out with Technical Working Groups (TWGs) up to 15 August 2021**



# Current glacier status and ELA changes since the Late Pleistocene in the Hindu Kush Mountains of Afghanistan



- Glacier and glacial lake inventory and ELA mapping
- *Elevation and mass changes*
- *Climate data analysis*
- *Accuracy assessment using high-resolution imagery*

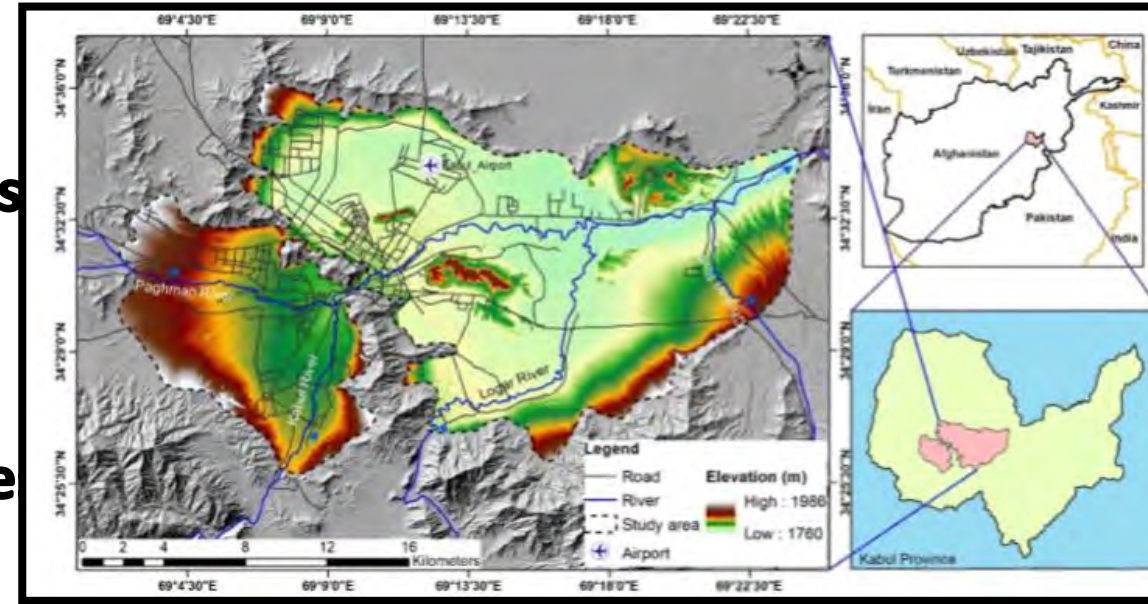
Glacier recession map of the study area from 1990 to 2015 and zoomed in recession of few glacial zones of the Kokcha sub-basin

## Key finding

- **About (15%) of the glaciers area was lost in the Kokcha sub-basin during these 25 years (1990 to 2015) with variable recession rates during different decades**
- **The average mass loss of the glaciers is  $-0.20$  m water equivalent per year as estimated by comparing TanDEM-X DEM (2012) with SRTM DEM (2000) data, and the average estimated change in equilibrium line altitude from the Late Pleistocene to the present is  $722 \pm 145$  m.**
- **The formation of glacial lakes has increased in the basin due to an increase in the mean annual temperature, and the risk of extreme hydrological events is likely in the region**

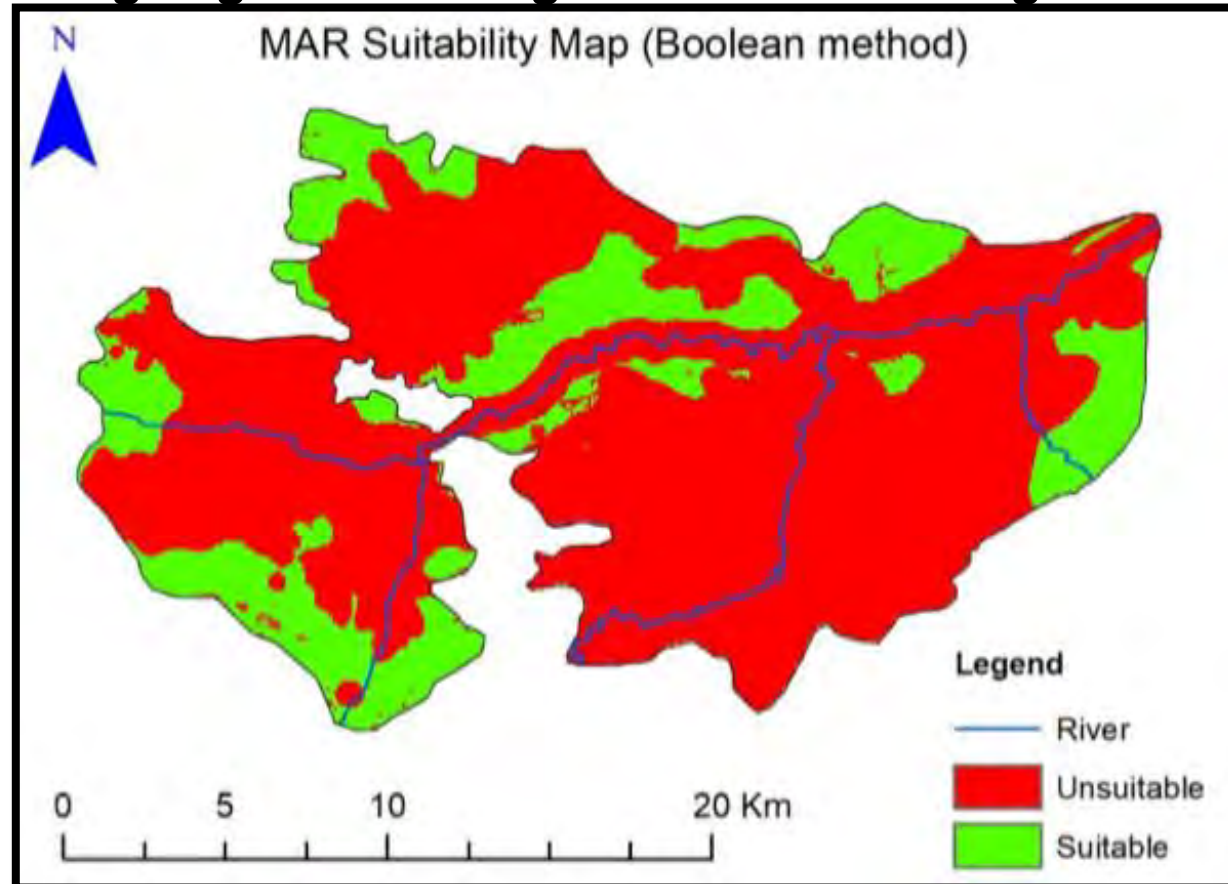
# Site selection for managed aquifer recharge in the city of Kabul, Afghanistan, using multi- criteria decision analysis and GIS

- **Kabul is both the capital city and the largest city in Afghanistan, with a population of 4.5 millions and fifth fastest-growing city in the world**
  - **Rapid population growth and urbanization have created huge pressure on the groundwater resources**
  - **From 2004-2013, water level declined up to 30 m**
  - **Lack of water storage and seasonal variability**
- Kabul is among the world's most water-stressed cities**
- **Most of the previous studies used an integrated GIS-MCDA approach in order to determine the suitable areas for managed aquifer recharge.**



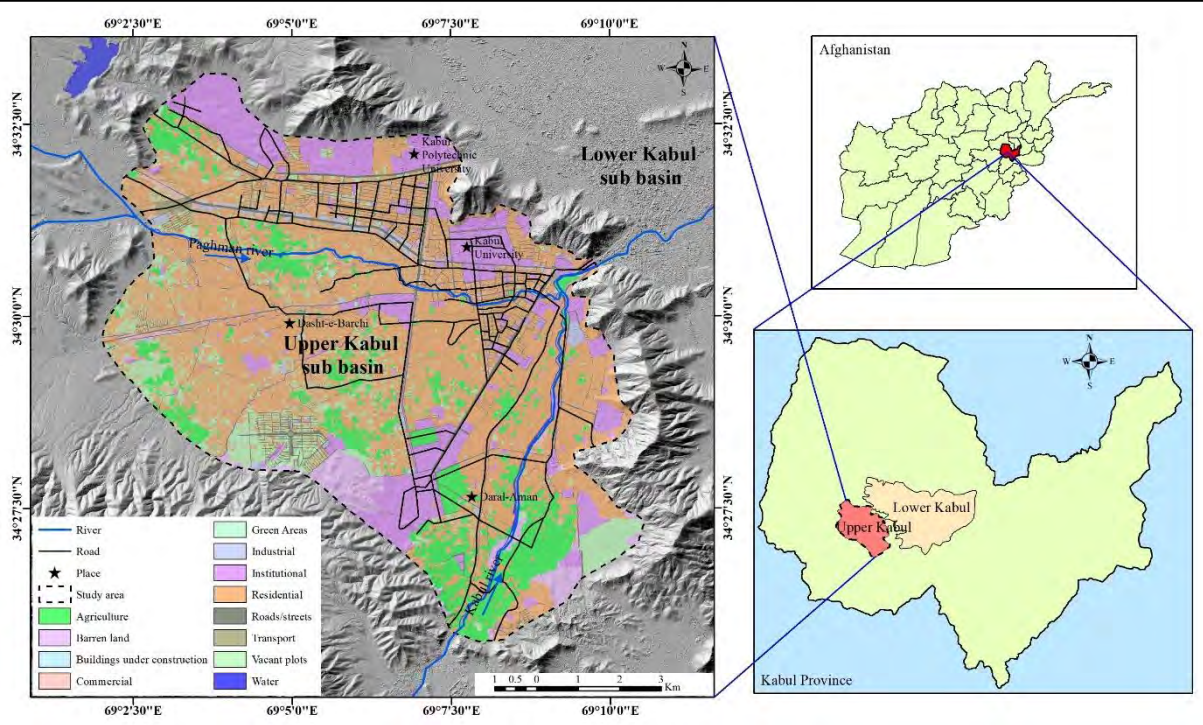
# Finding and results

- Generally, a very suitable area for MAR is located in **the western part** close to the **upstream of Paghman River**.
- Suitable areas for application of MAR are located in the **southwest, western, northern, and central parts** of the study area but the larger portion of suitable areas are in the **western and central parts**.
- This study can be used to gain good knowledge and used in locating the most suitable sites for MAR in an urban area.



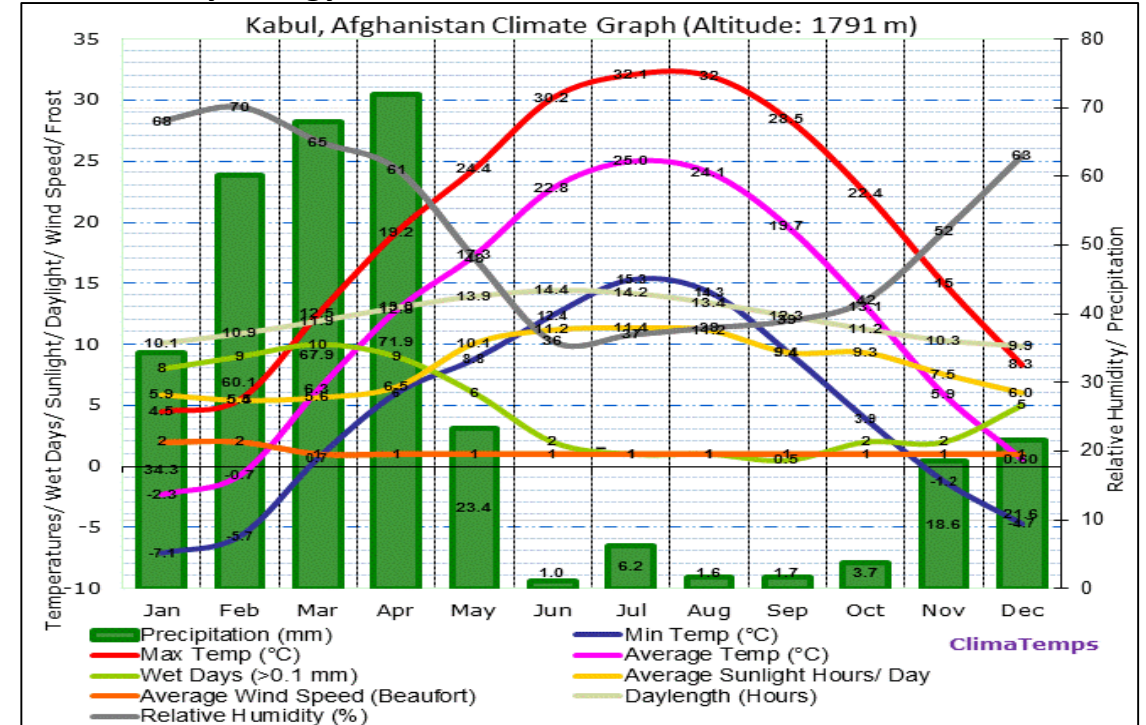
# Evaluation of Hydrogeoethics approach for sustainable management of groundwater resources in the upper Kabul sub-basin, Afghanistan

## Geographical Location



## Hydrology

## Climate



## Results

The mean of geoethical approach in all education categories is about 48.90 which mean that respondents have a fair and respectable level of geoethical approach toward groundwater issues.

The mean of each geoethics criteria including safekeeping, contribution and media role are around 3 which means geoethical approach regarding these criteria is in a moderate level among all respondents

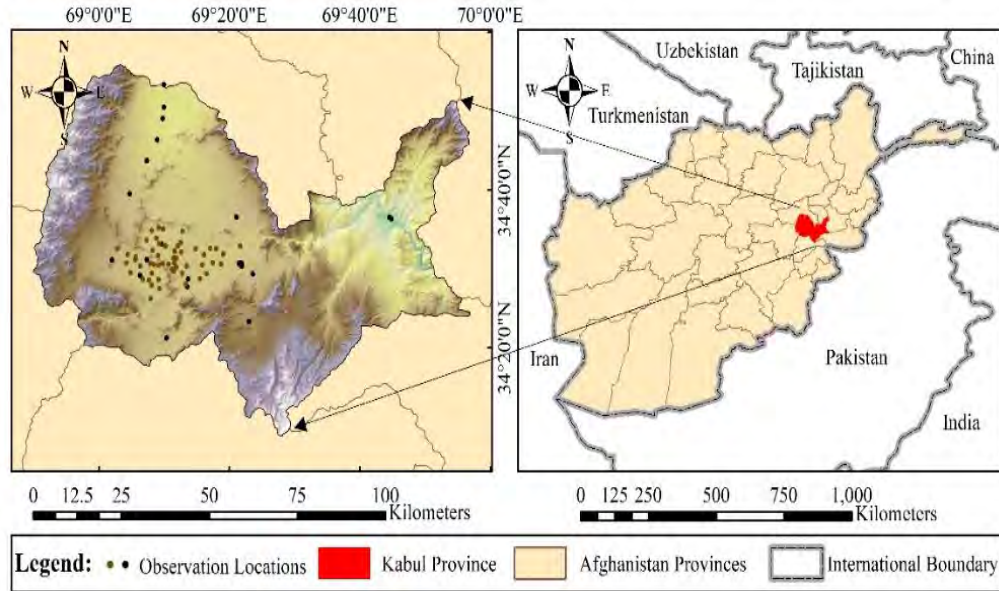
The respondents are extremely worried about groundwater shortage and pollution of groundwater, but they feel medium to high respect and responsibility toward groundwater issues in the study area.

The results show that there is a good awareness of groundwater quality and quantity and general agreement about the importance of geoethical considerations among the responding Afghan hydro-geoscientists.

# Nitrate contamination in Kabul province, Afghanistan: Reasons behind and conceptual management framework discourse

## Results and Discussion

### Study Area



- **Kabul city, the most populated and freshwater-need area of the Kabul province**
- **the confluences of three main rivers, Kabul River, Logar River and Paghman Stream**
- **Almost 80% of inhabitants of Kabul city do not access to healthy drinking water.**
- **Tap water is accessible to the only 20% of the Kabul people**
- **Wastewater production is one of most serious challenge in Kabul**

- **The mean annual precipitation for the 15-years was 322 mm**
- **A direct relation was found in correlation between nitrate concentration and precipitation variation**
- **Based on land use change, the agricultural area is reduced significantly water level has and domestic wastewater can not sink into groundwater**
- **Shallow aquifer is extremely contaminated**
- **Deep aquifer is as high risky as shallow aquifer**



# Assessing the Water Governance Practices in Afghanistan: From Understanding to Functioning

## Results and Discussion

- After (2001), considerable attention was paid to the development of water law
- almost every decade, a new water law was created
- Since 2003, the international donors promoted “good” water governance principles
- In 2009, the Water Law (1991) was revised
- In water law (2020), IWRM was considered in chapter 1 “art 6
- Chapter 4 of water law 2020 is entirely allocated to the creation of strategies, policies and regulations toward cross-sectoral cooperation
- in practice a strong coordination mechanism have not existed between the water sectors yet
- Afghanistan National Water and Environmental Research Center (ANWERC)
- one IWRM master program in Kabul Polytechnic University
- The start time for the data collection is said 1960s within “water books
- The “art 11” of the water law (2020) is about the establishment of national water information bank



# Book of Resources, Hydropolitics and Water Structure of Afghanistan



<http://www.facebook.com/pages/Criminals-of-Afghanistan-War/>

# Contents

- 1-Climate change impact on water Resources.
- 2-Water river basins of Afghanistan
- 3-Groundwater condition of Afghanistan
- 4-Wetland of Afghanistan
- 5-Transboundary water resources of Afg.
- 6-Parallel water structure organizations of Afg.



Progress based on intermediate outcomes of UIBN/till 15 August 2021

- **For effective research, 6 technical groups regularly conducted volunteer research at ANWERC and expanded the research network on 4 river basins of Afghanistan.**
- **For sustainability of AC, Small research grants allocated for scientific research in the 6 thematic areas**
- **More female researchers jointed in technical working groups ( 3 females included in the TWGs)**
- **Top policy and decision makers attended in the quarterly UIBN – AC meetings**
- **Communication was ongoing for capacity building with China and India**
- **Hydro-meteorological observations network extend in mountainous area**
- **Research based curriculum and MSc course established in Afghan academia**

## Future plans for the country chapter

- **AC is willing to conduct research and studies on selected topics ,which identified considering the needs of sectorial ministries of Afghanistan**
- **UIBN-AC will ask other country chapter members for capacity enhancement of Afghan chapter members**
- **Afghan Chapter is interested on bilateral/multilateral scientific and research based cooperation in the UIBN platform in a future**
- **Afghan Chapter member is trying to raise up the awareness of leadership of sectorial ministries regarding international partnership**
- **AC members are trying to satisfy the government to allocate research small grant for sustainability of Technical Working Groups(TWGs) in a future.**
- **Monthly and quarterly meetings will be started again as soon as possible**
- **Afghan Chapter plans to develop more scientific papers on 6 thematic areas and will publish in reliable academic journals in a future**
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Thank you