



Faculty of Engineering
Department of Information Engineering

**Using GIS for water resources
Development in Kabul River Basin
Afghanistan**

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Introduction to Kabul River Basin

- The Kabul River Basin is located in South-East of Afghanistan
- Total area *76908(Km²)* has been covered by the Basin
- In total there are *127* districts in the Kabul Basin.
- Kabul RB has *35%* population density of the country.
- *59%* of the population of the basin is rural and lives outside Kabul.
- Rain-fed agriculture is only approximately *3.6 %* of the total cultivated area in the basin.
- Irrigated area is almost 150,000h in the basin.
- The climate- cold in winter & hot in summer.

Figure 3.2: Main River Basins of Afghanistan



Source: Ministry of Energy and Water, 2011

Geo-Databases (GDB) in ArcGIS

Geo-databases

- KB_Raster
- Layers
- MetaData
- KB_Kabul_Basin.gdb
- KB_National.gdb
- KB_Pakistan_Support.gdb
- KB_Panj-Amu_Basin.gdb
- KB_Regional.gdb

Hierarchical data structure

Dataset

- Administrative
- Geology
- HydroGeology
- Hydrology
- Infrastructure
- Land
- Soil
- Support
- Topography
- Water_Infrastructure

Features

- Hydrological_Station
- Lakes
- Main_River
- Main_Rivers_and_Streams
- River_Basins
- Rivers_Classified
- Watersheds

National GDB

Hydrology Dataset

Contents KB

- ▶ Spatial data
 - National datasets (province..)
 - By Basin (Kabul, Panj-Amu, Northern, Helmand, Hari-Rud basins)
 - Regional data sets (South-Asia)
 - Local datasets (by sub-basin, etc..)

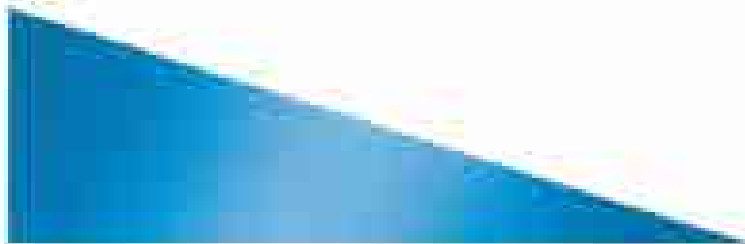
- ▶ Time series data (temporal data)
 - Hydrological data records (historical and current)
 - Climate records
 - Population statistics

- ▶ Attribute data
 - Agriculture, population, water use, groundwater etc..
 - Data on dams and other river infrastructure

- ▶ Publications

GIS Processing

1. Delineation of basin & Sub-basin delineation from DEM
2. River delineation, classification, codification and naming
3. Estimation of irrigated area from recent Landsat imagery
4. Data digitization from scanned paper maps
5. Thematic mapping
6. Hydrological analysis
7. Development of the KB
8. Development of the Geodatabase
9. Mapping



Map Listing Kabul Basin

A. Kabul Basin

Base Maps

- 1 River System base map
- 2 River infrastructure and irrigation
- 3 Topography/Elevation
- 4 Administrative units
- 5 Basin Administration and Management
- 6 Regional Setting (Indus Basin)

Modelling-related Maps

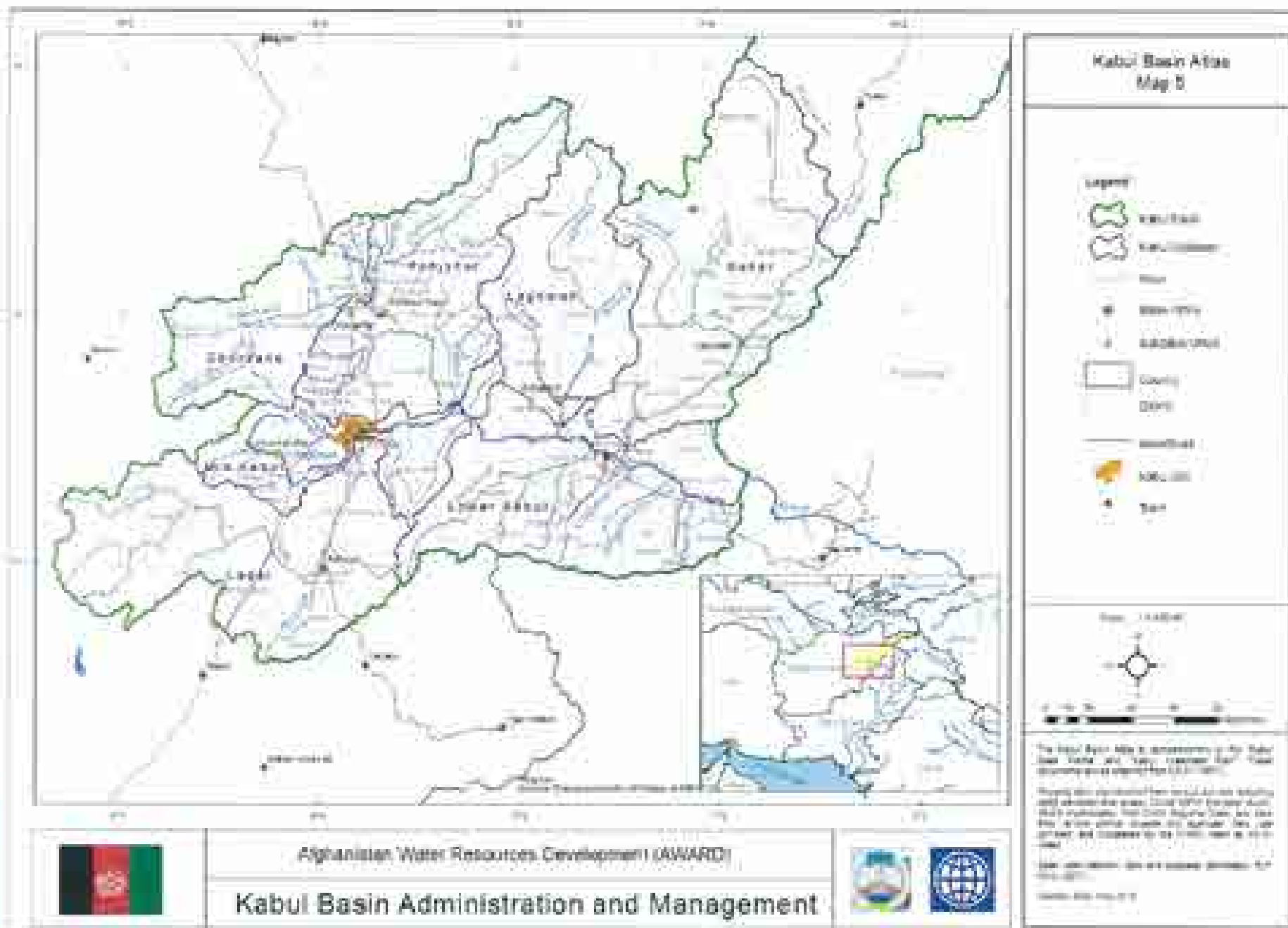
- 7 Subbasins - Lower Kabul & Kunar
- 8 Subbasins - Mid-Kabul and Logar
- 9 Subbasins - Upper Kabul
- 10 River Schematics: Lower Kabul and Kunar
- 11 River Schematics: Mid-Kabul and Logar
- 12 River Schematics: Ghorband and Panjsher

Thematic Maps

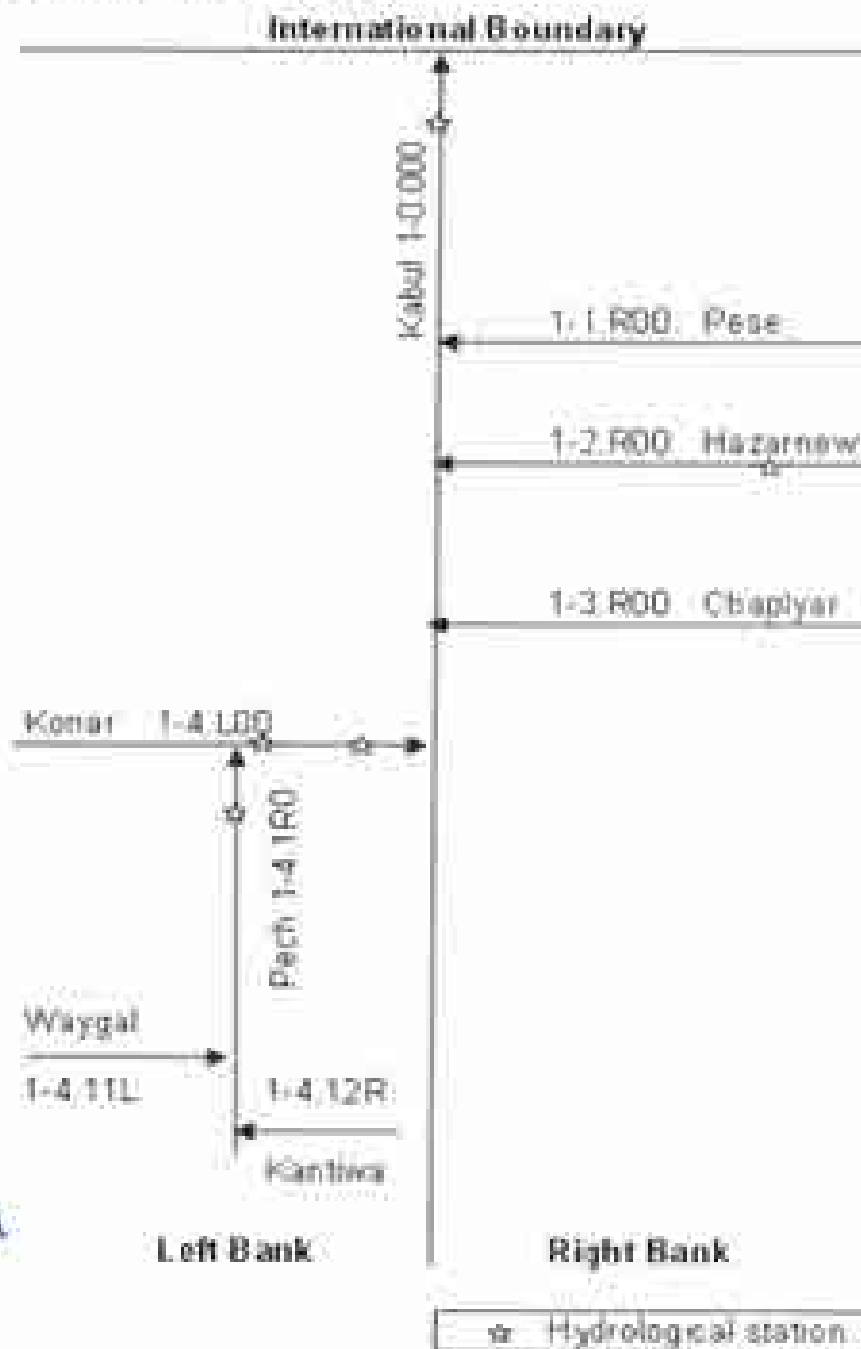
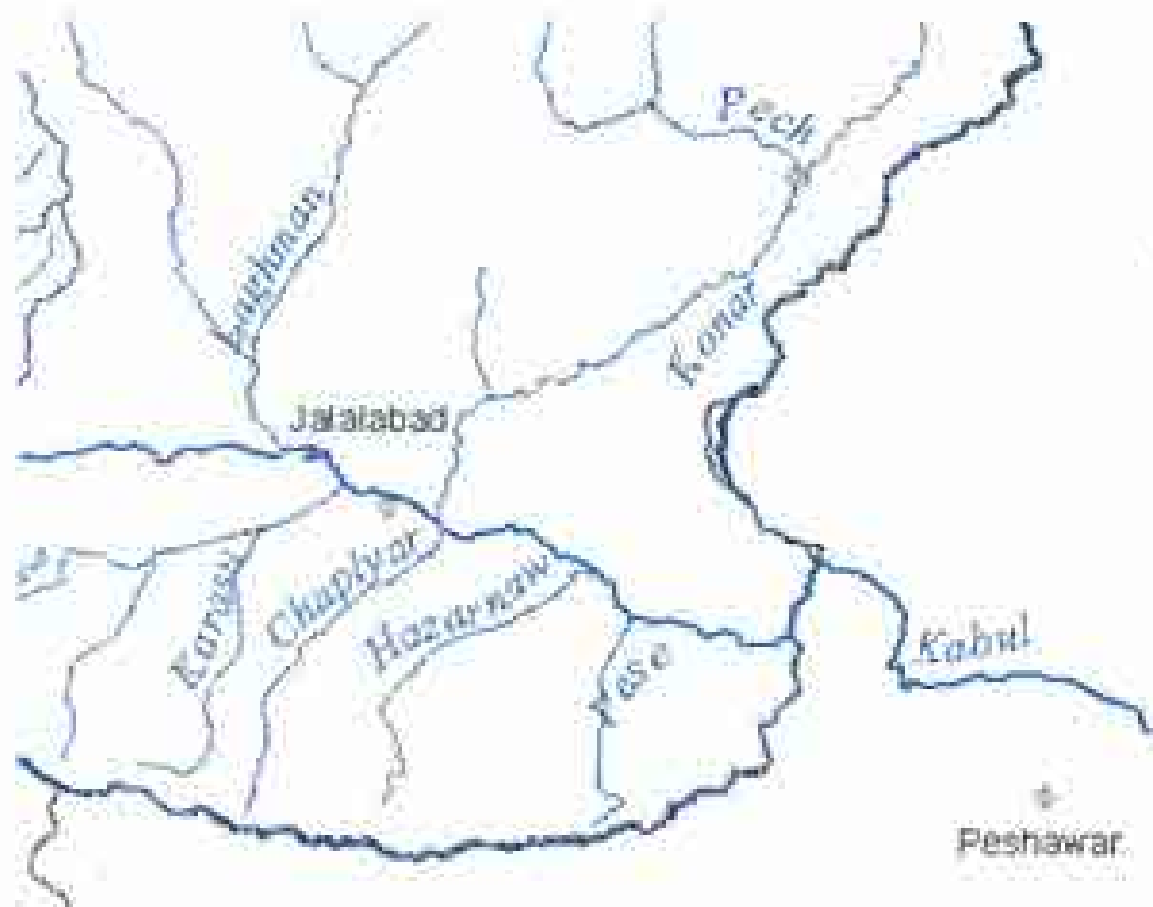
- 13 Precipitation/Temperature Regime
- 14 Snow Coverage
- 15 Population and Population concentration
- 16 Soil taxonomy (USDA)
- 17 Land use and land cover
- 18 Terrestrial Eco-regions
- 19 Geology
- 20 Geological Faults



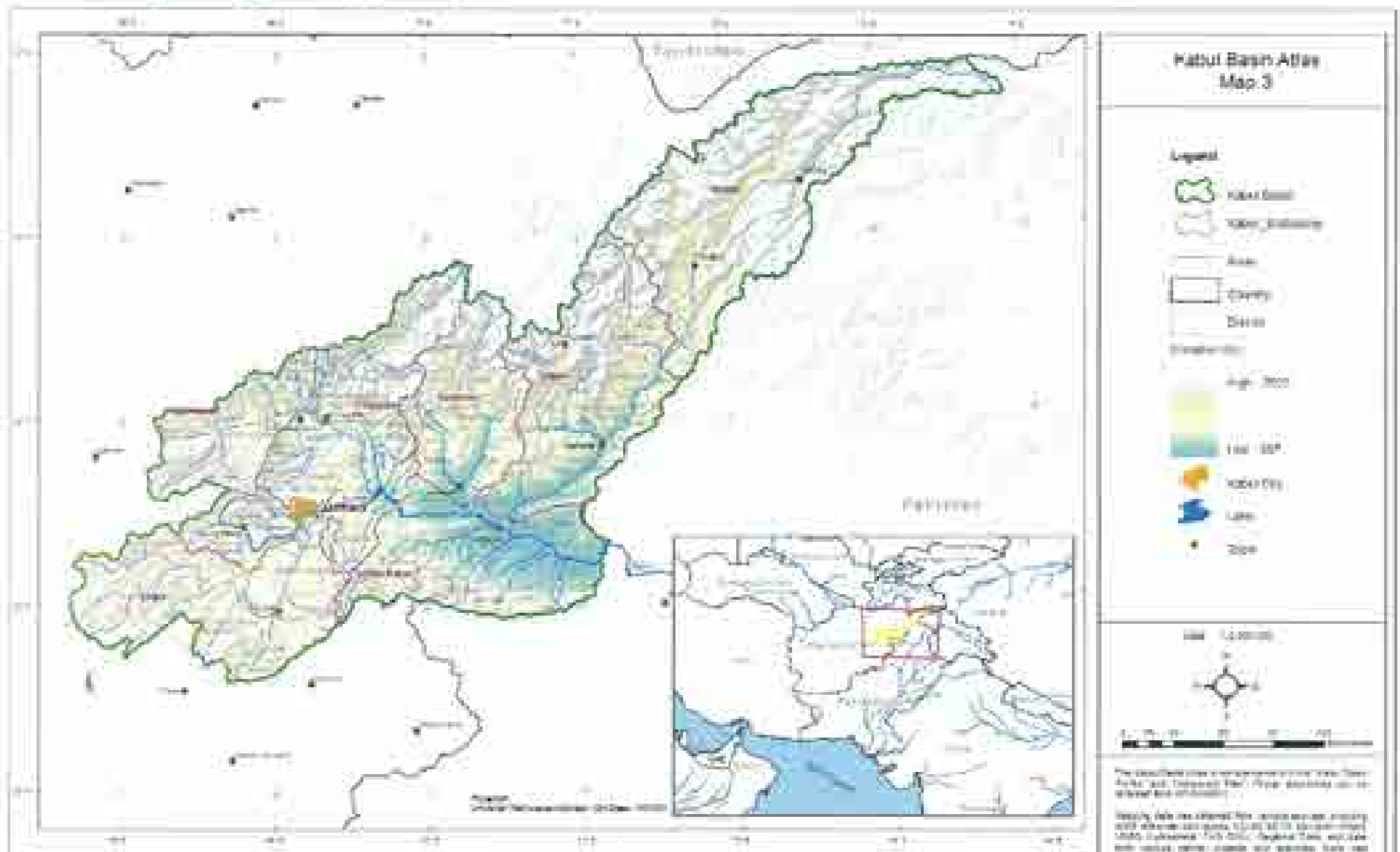
Kabul Basin Administrative units



River Classification and Codification



Topography of Kabul Basin

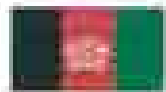


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Kabul Basin Topography / Elevation



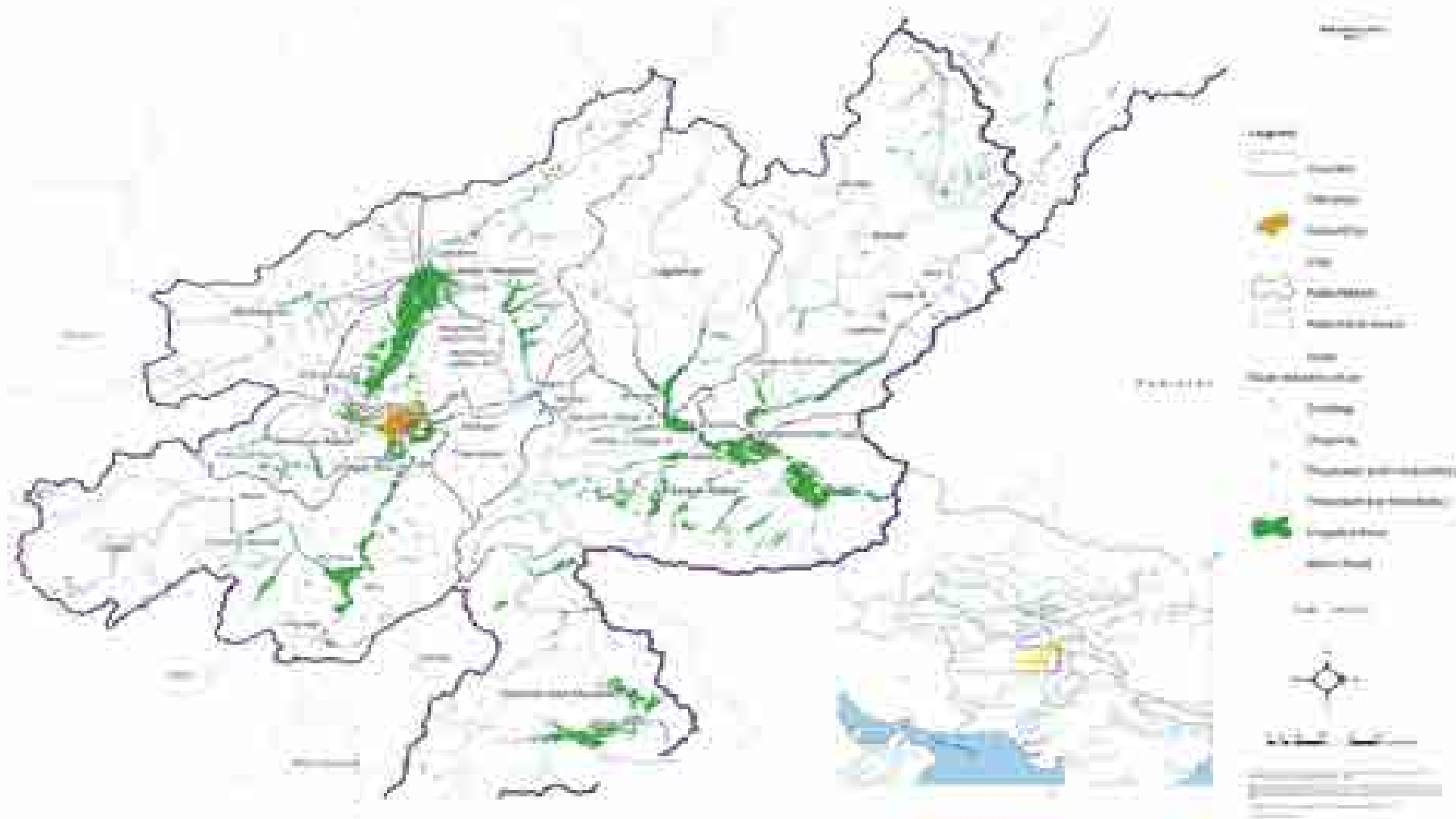
Water infrastructure & Potential dams sites



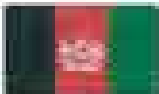
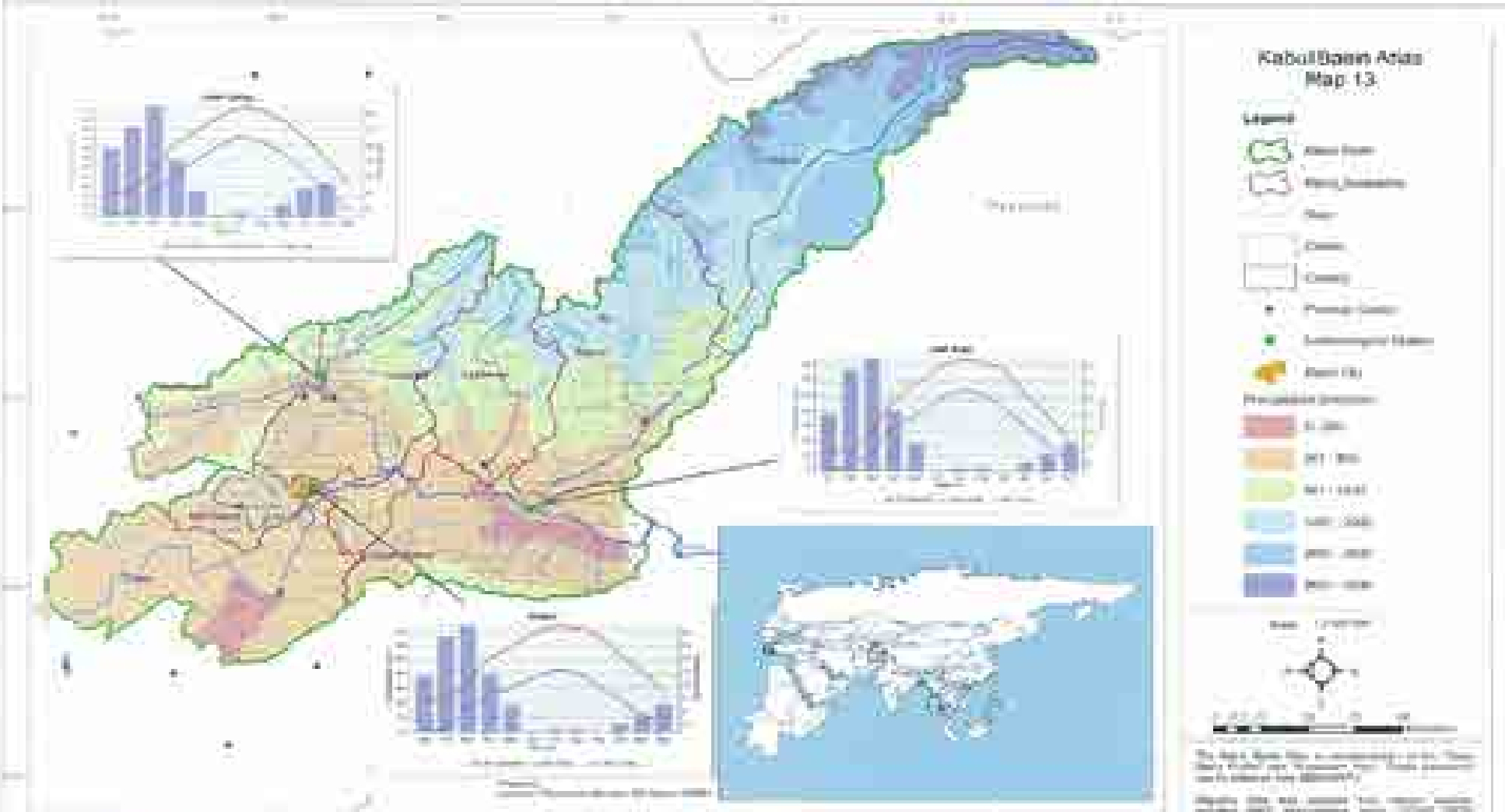
وزارت نیرو و آب و محیط زیست
مجلس شورای اسلامی و وزارت نیرو و محیط زیست



Kabul RB Infrastructure & Irrigation



Kabul Basin Precipitation & Temperature

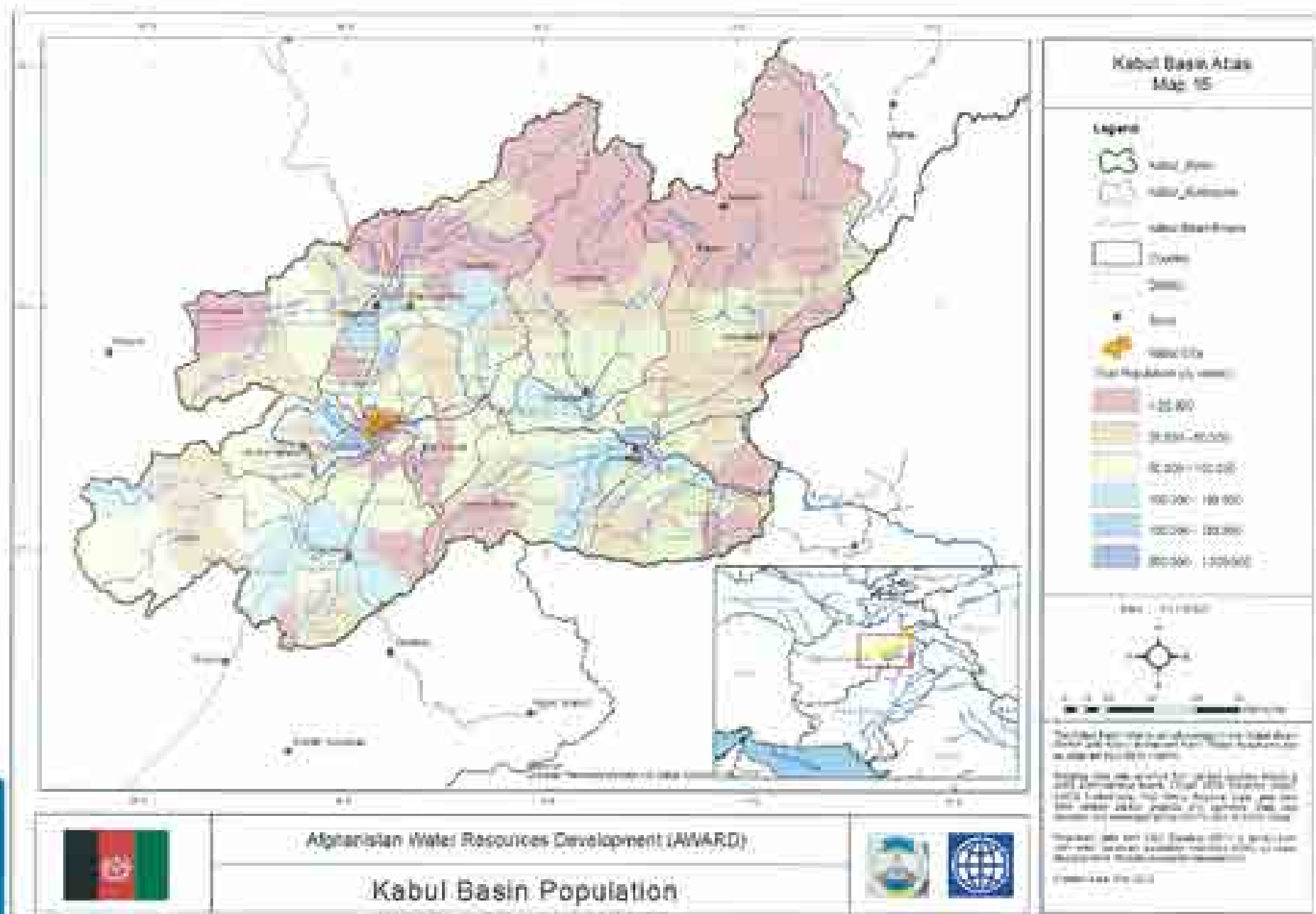


Afghanistan Water Resources Development (AWARD)

Kabul Basin - Precipitation and Temperature



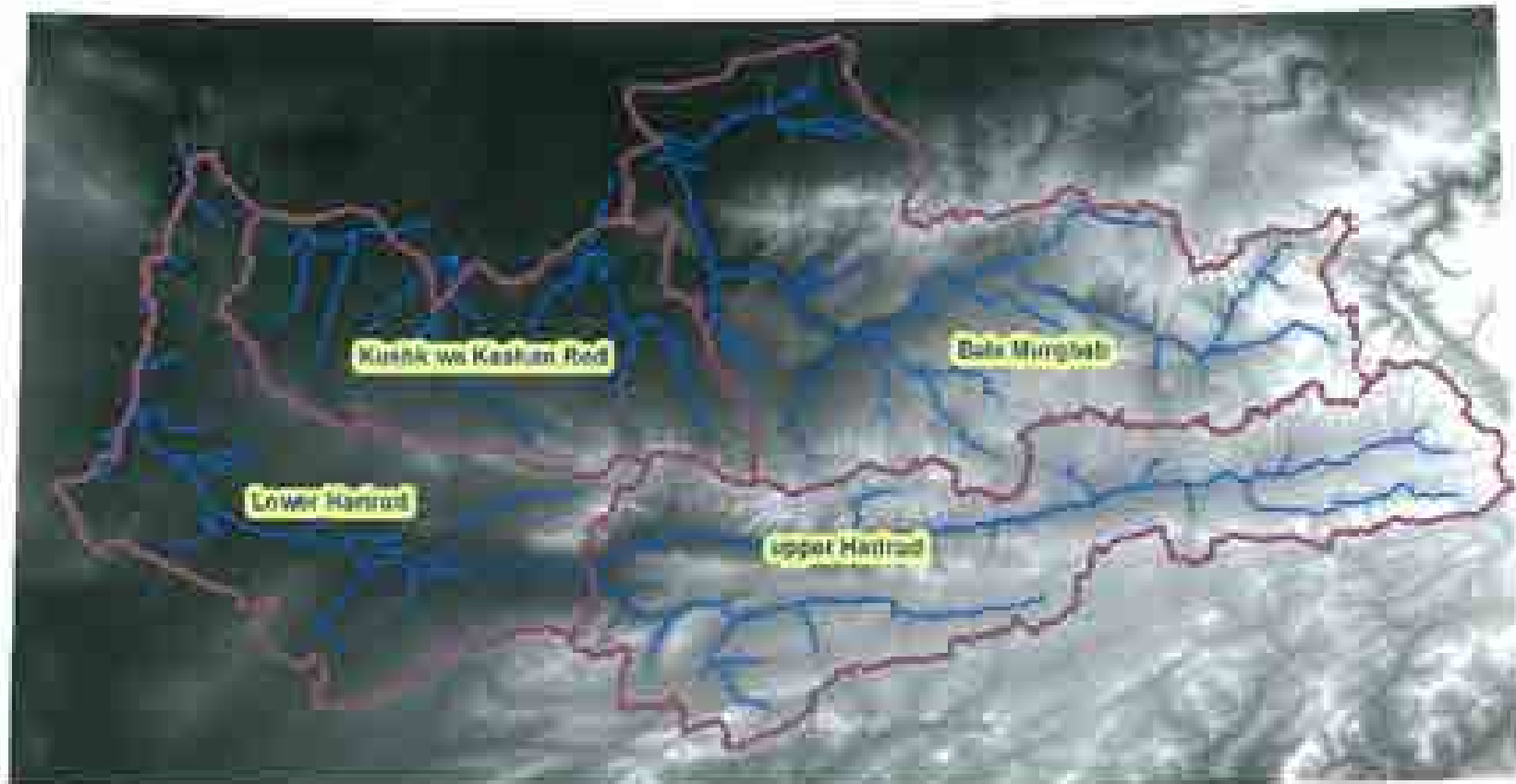
Kabul Basin Population



Harirud, Northern and panjAmu River basins



Harirud River Basin/Sub-Basin



Harirud RB system



Harirud Basin Atlas
Map-3



Scale: 1:500,000

Map prepared by: AWARD

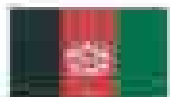
Map projection: UTM

Map datum: WGS 84

Map scale: 1:500,000

Map date: 2010

Map status: Final

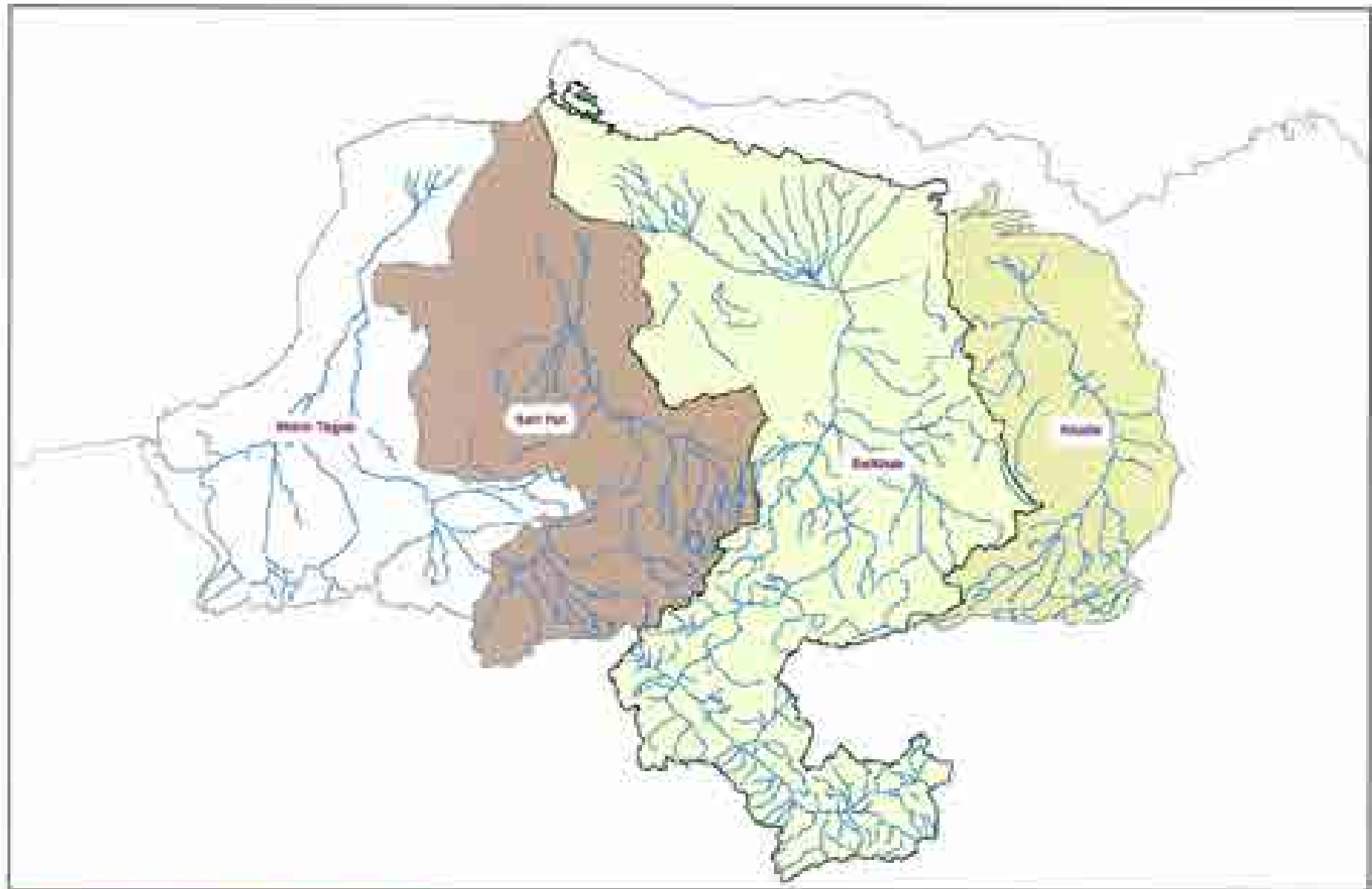


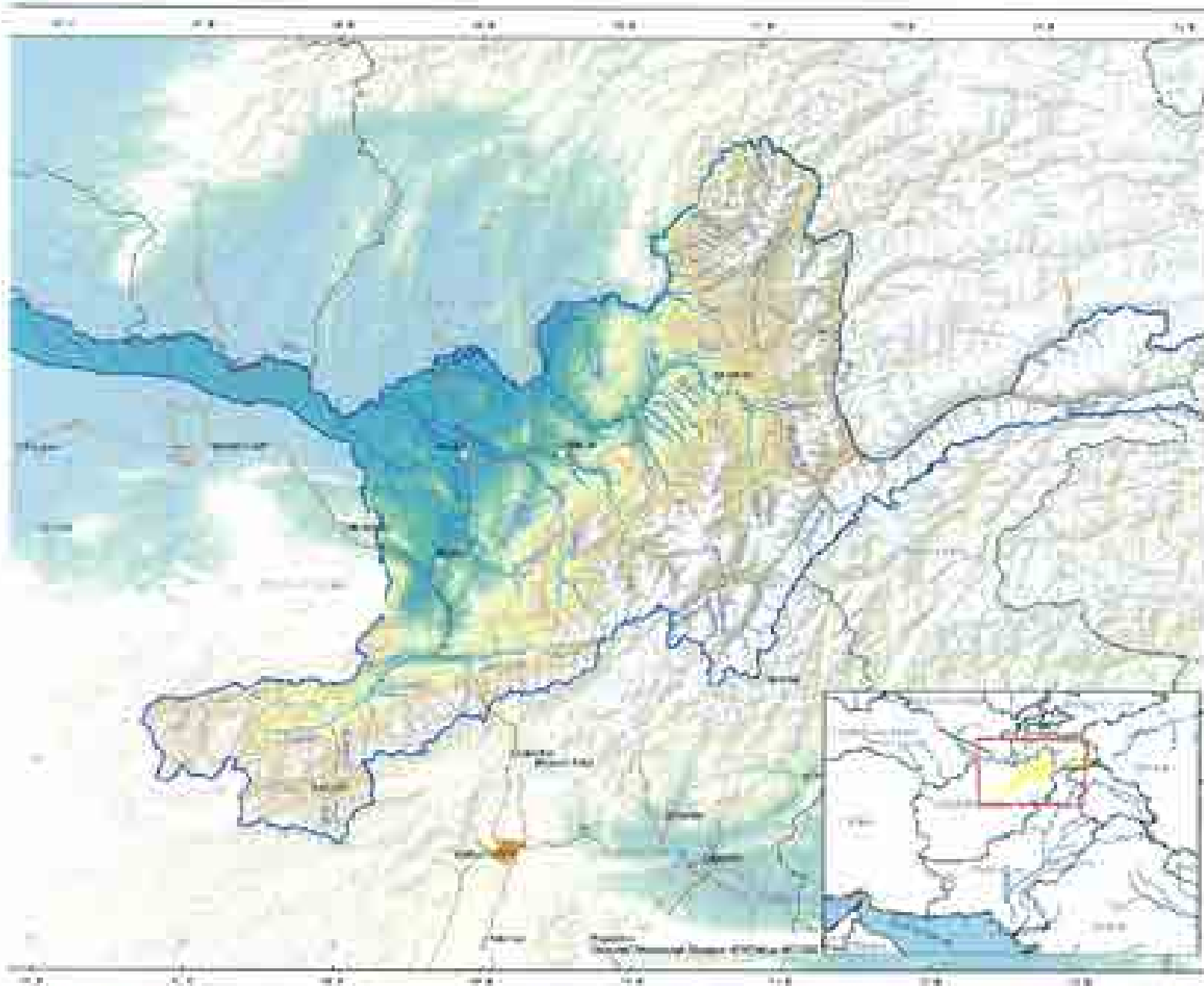
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Harirud Basin River System - Base Map



Delineated Northern RB & sub basins from Digital Elevation Model (DEM)



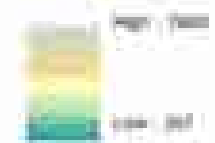


Panj-Amu Basin Atlas
Map 3

Legend

- Panj-Amu Basin
- River
- Province
- Capital City
- Town
- Main Road

Elevation (m)



Scale: 1:1000,000



The Panj-Amu Basin Atlas is a contribution to the Panj-Amu Basin Project and represents significant work. These materials can be obtained from UNEP/WHO.

Maping this area required both satellite imagery and ground-based data. UNEP/WHO is grateful to the Government of Tajikistan for its cooperation and support. UNEP/WHO is grateful to the Government of Tajikistan for its cooperation and support.

Executive Board of UNEP/WHO, Session 2000
Tashkent, Tajikistan, April 2002



Afghanistan Water Resources Development (AWARD)

Panj-Amu Basin Topography/Elevation



ありがとうございます

