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# منابع آبی افغانستان تحت اثر تغییر اقلیم

# *Afghanistan Water Resources Under Impact of Climate Change*

## *Challenges and Opportunities*

***13th Oct 2019***


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- C.C in the Context of Afghanistan
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- Changes in Agriculture Patterns
- Changes in Snow and Glaciers
- Changes in River Runoff
- Changes in Natural Hazards Frequency
- Solutions and Opportunities
- Climate Finance

# What is Climate Change?

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**What is Weather?**

**What is Climate?**

**What is Climate Change?**

"A change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC, 2009).

**What are the challenges?**

- Changes in Temperature
- Glacier melting
- Early snow melting
- Sea level rise
- Increases of Extreme events (Floods, Droughts, Hurricanes , Heat waves,…)


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# Why Climate is Changing

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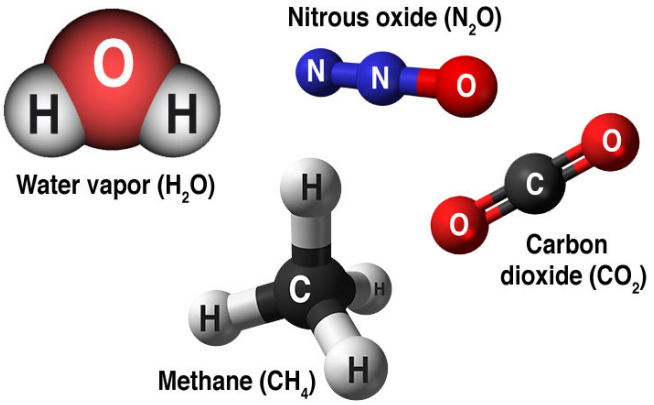



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# Global Changes

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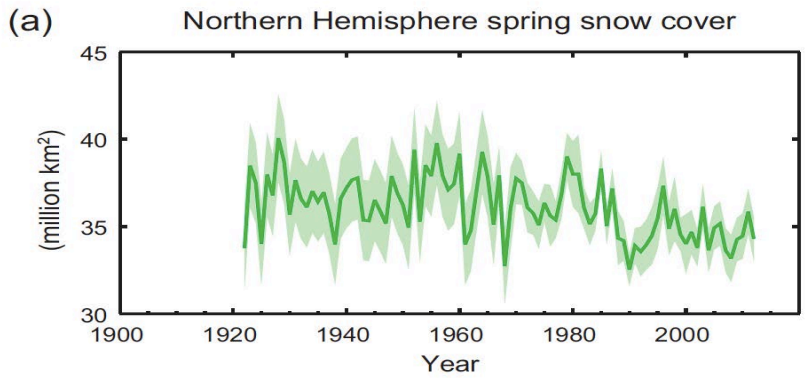


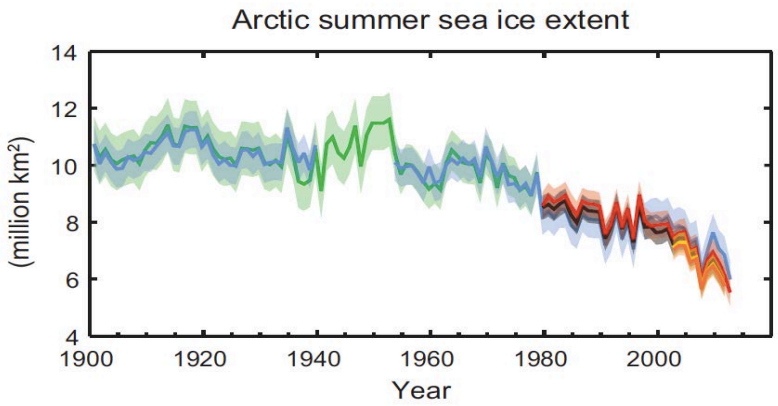


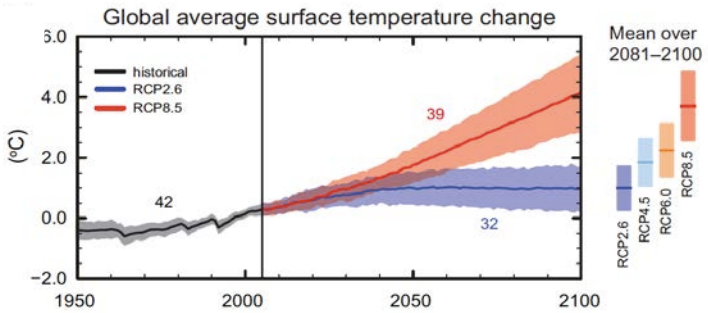


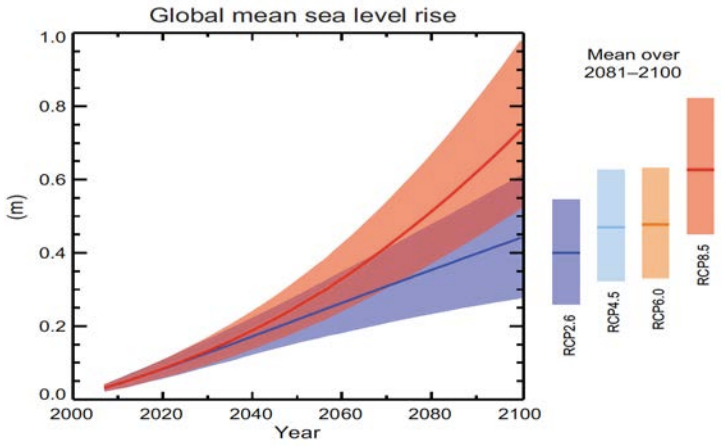



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# Global Changes

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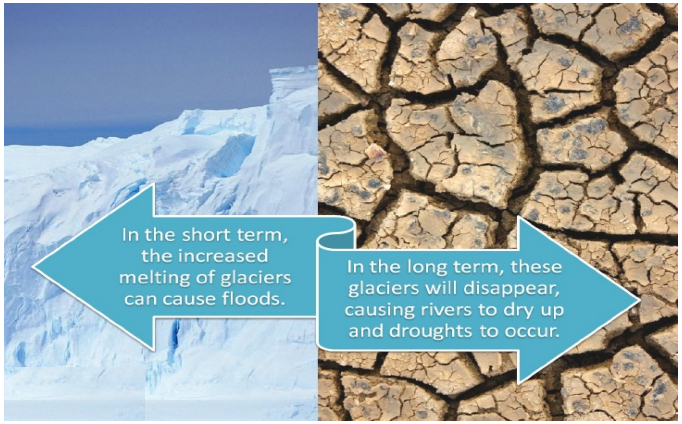


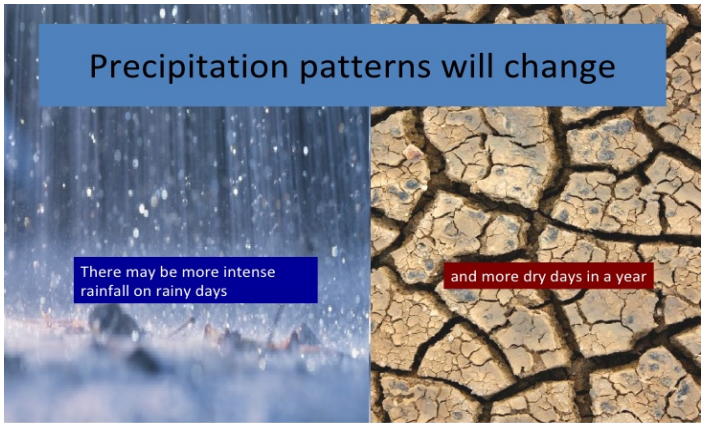

## Conflicts involving water

The scarcity of water has given rise to many conflicts between nations and states.

This can lead to rioting, causing...

- Loss of life
- Loss to public goods
- Loss to the economy


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# Climate Change in the Context of Afghanistan

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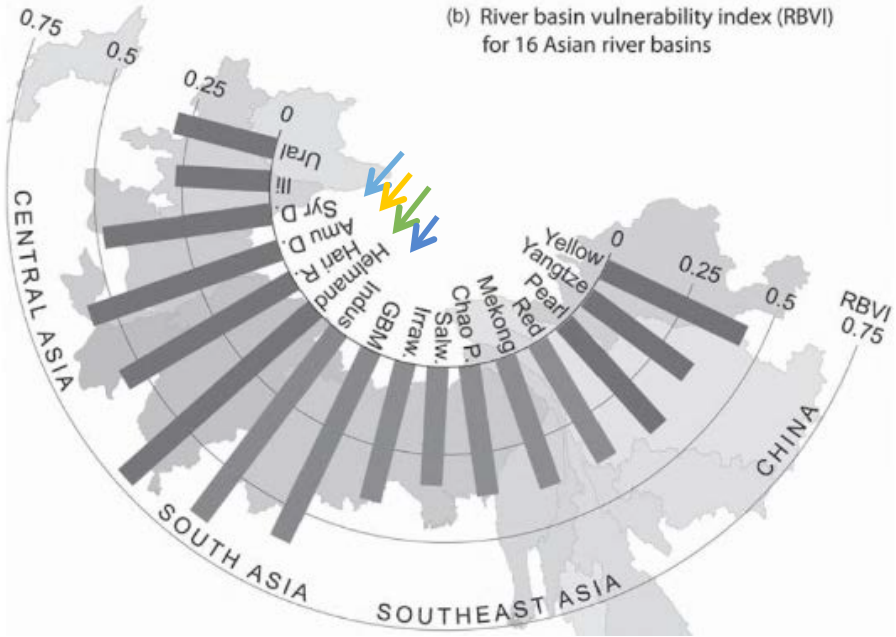
- Afghanistan river systems are already the most stressed systems in Asia and Climate change is expected to impact its snow based hydrology and hence the water availability.

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# Changes in Climate

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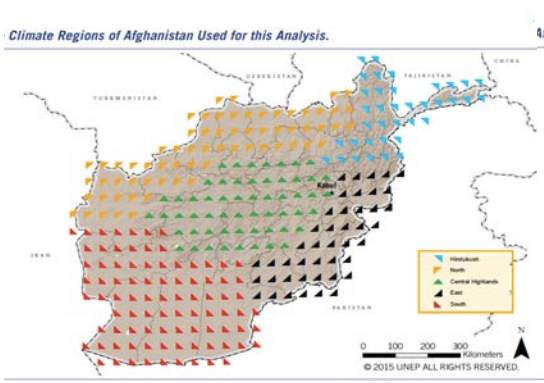


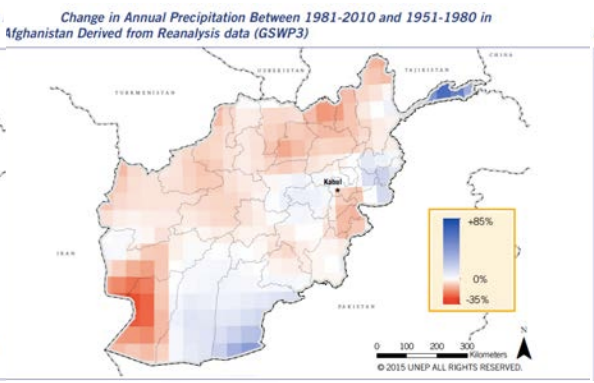


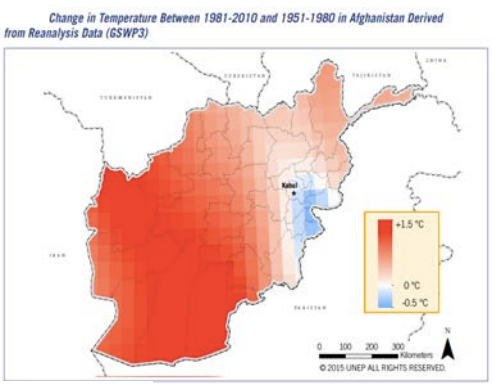


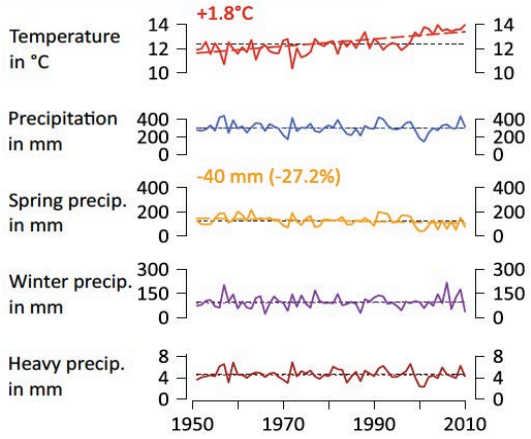


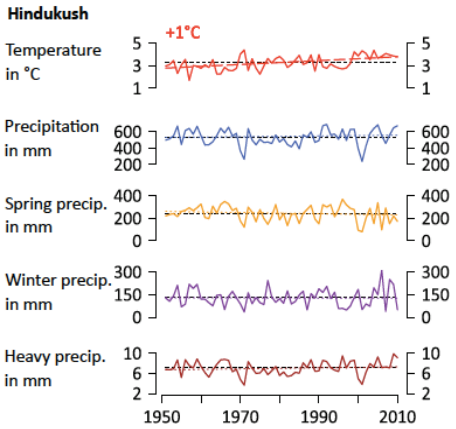



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Data source: Afghanistan and finally the dataset from the Global Soil Wetness Project Phase 3 (GSWP3) has been selected due to its performance over Afghanistan and its temporal coverage of the period from 1950 until 2010.

# Changes in Agriculture Patterns

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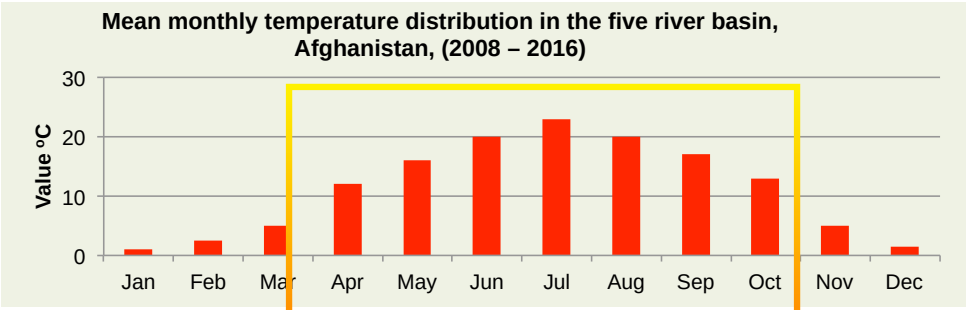
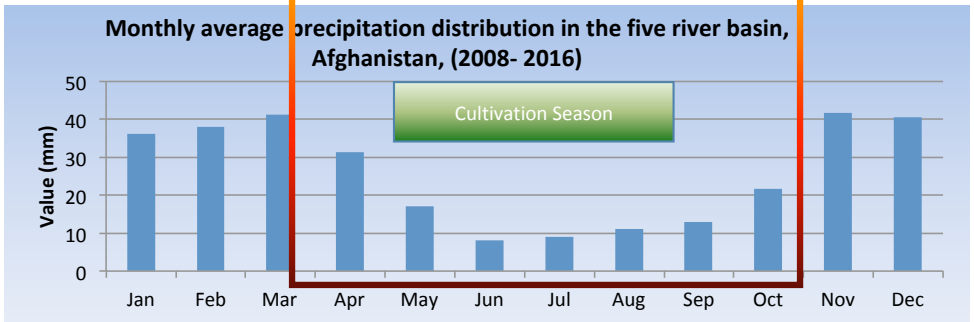
- In Afghanistan mostly the wet months (November-March) do not coincide with the agriculture active season (March-October) as in India or Pakistan





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# Changes in Agriculture Patterns

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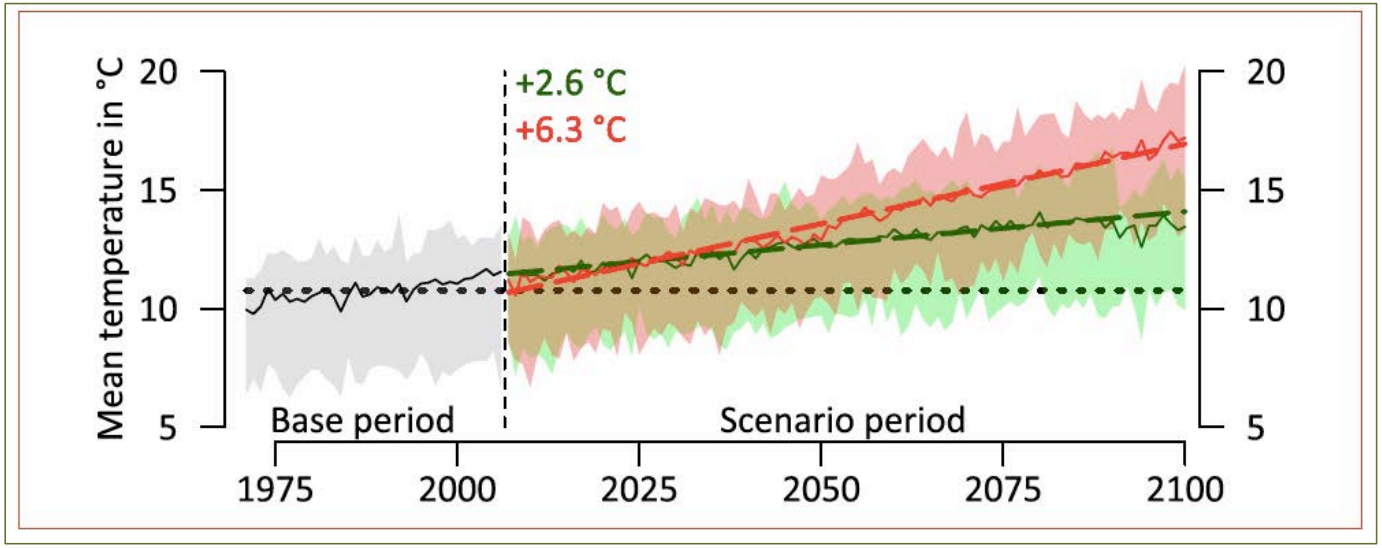
- In (1975 – 2000) Wheat and Barely crops for optimal growth in the upper Kabul required 340 mm irrigation under mean temperature of 10.5 C°. But currently the same corps in the same location for their optimal growth require 510 mm, because mean temperature increase from 10.5 to 12.5 C° in 2015.





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# Changes in Snow and Glaciers

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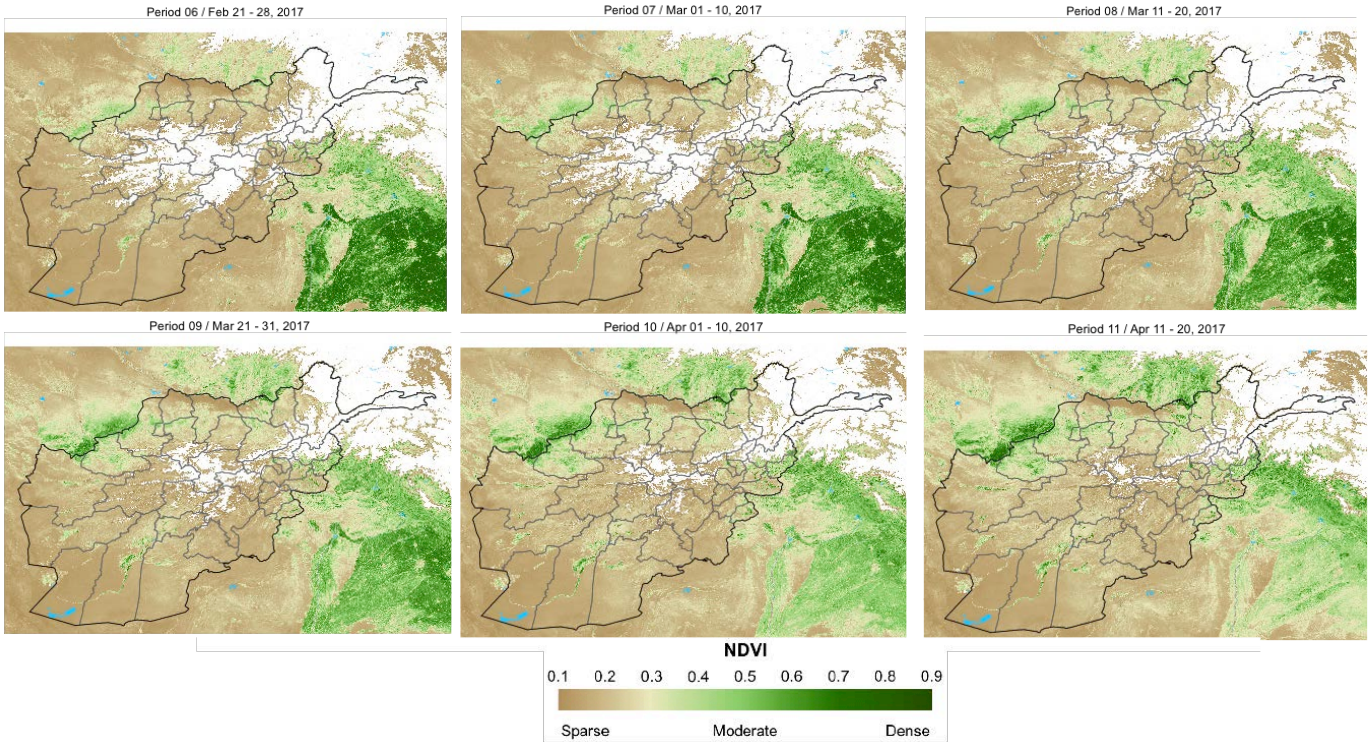


Map Produced by USGS/EROS

USGS NASA USAID FEWS NET


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# Changes in Snow and Glaciers

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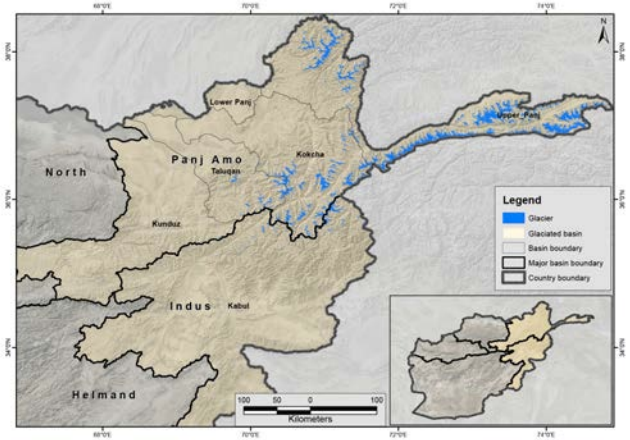
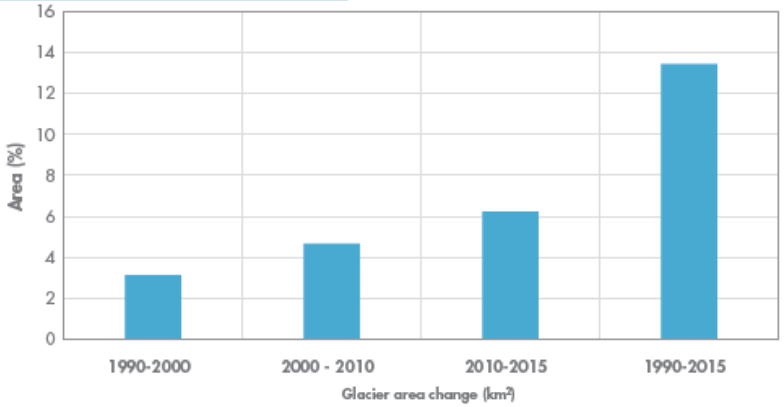
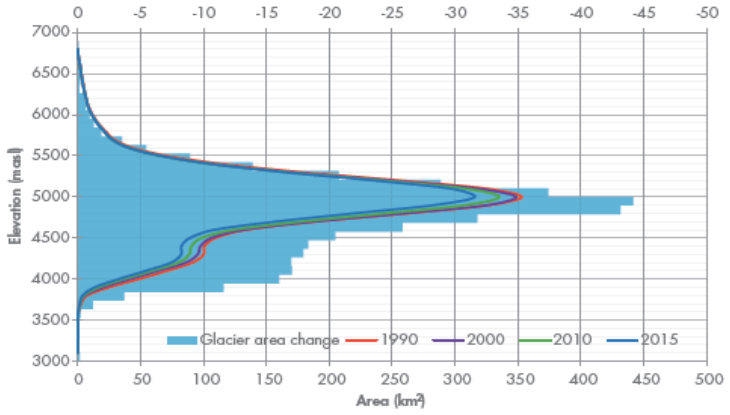
- Over 25 years (1990–2015), Afghanistan lost **394 km2** (13.4%) of its total glacier area,
  - with 3.1% lost between 1990 and 2000,
  - and 7.7% between 2000 and 2010
  - Between 2010 and 2015, 6.25% of glacier area was lost (ICIMOD, MEW, 2018)





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# Changes in River Runoff

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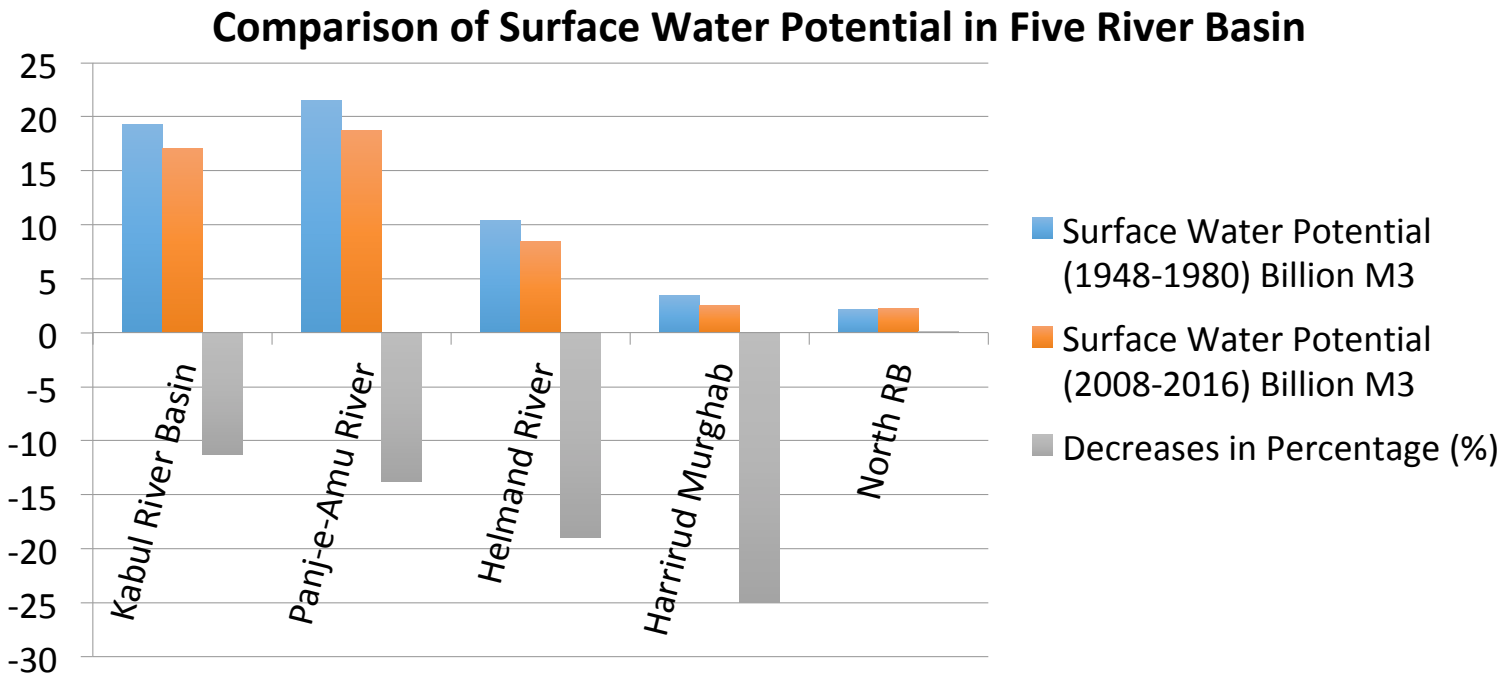



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# Changes in River Runoff

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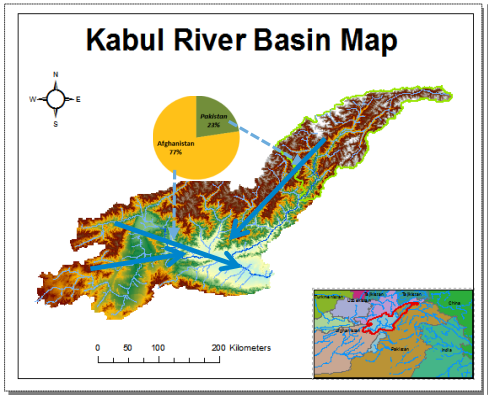


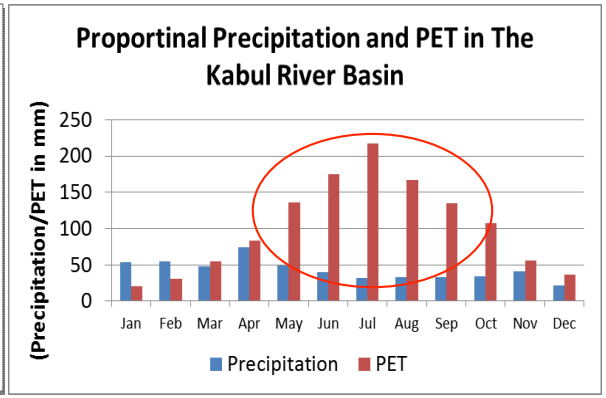


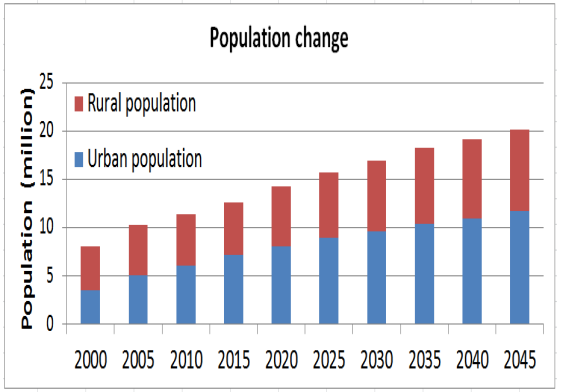


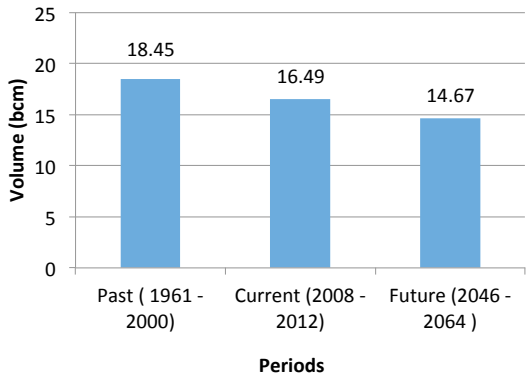


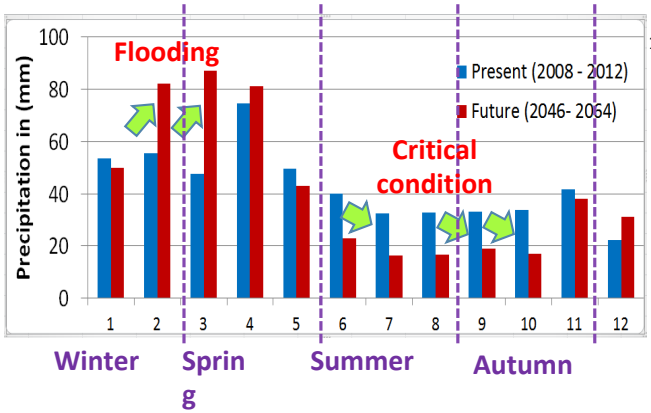


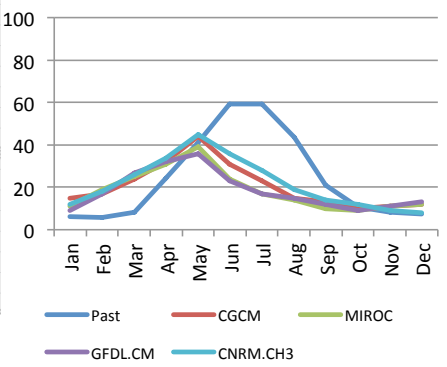



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# Changes in Natural Hazards Frequency

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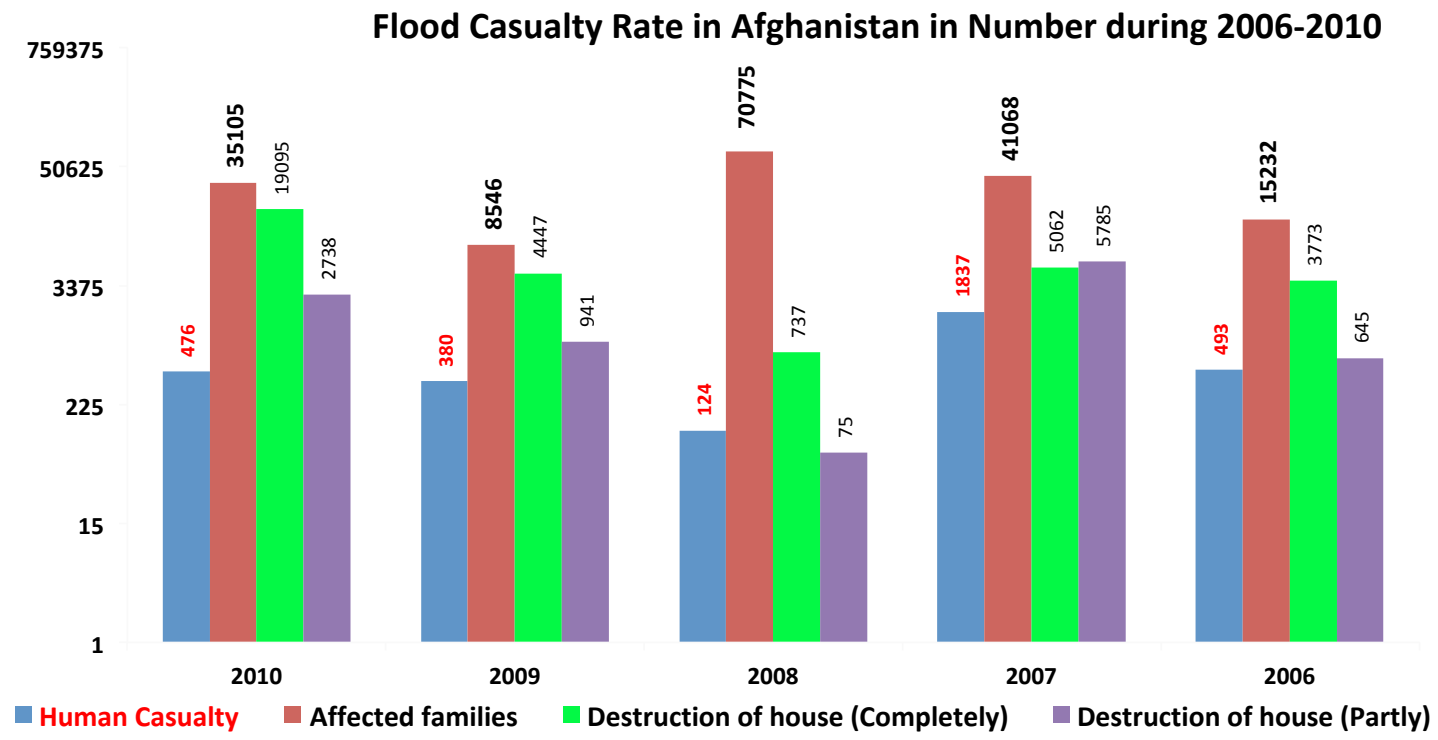



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# Changes in Natural Hazards Frequency

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Flash floods around Kabul & eastern provinces, have resulted in 150 deaths in central Afghanistan.
August 2013

Flash floods have left over 100 deaths in northern and western Afghanistan.
April 2014


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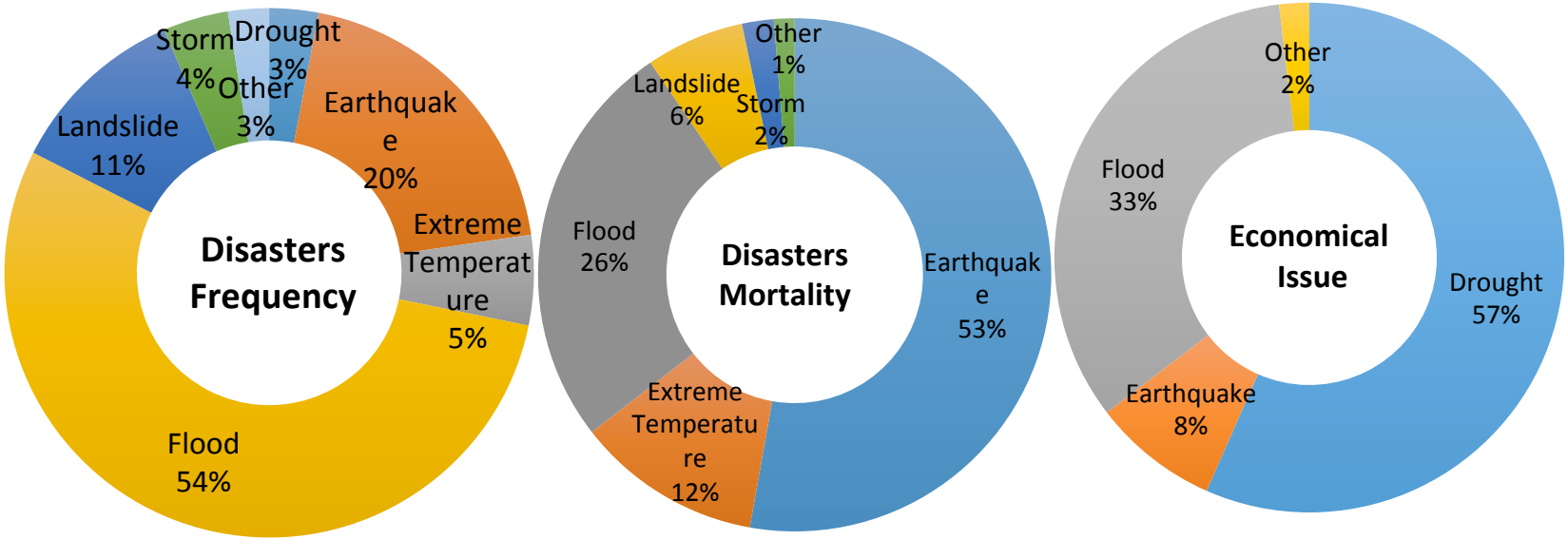
# Changes in Natural Hazards Frequency





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Source: Internationally Reported Losses 1990 - 2014 EMDAT

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# *Solutions and Opportunities*

# Water-harvesting & Watershed Management

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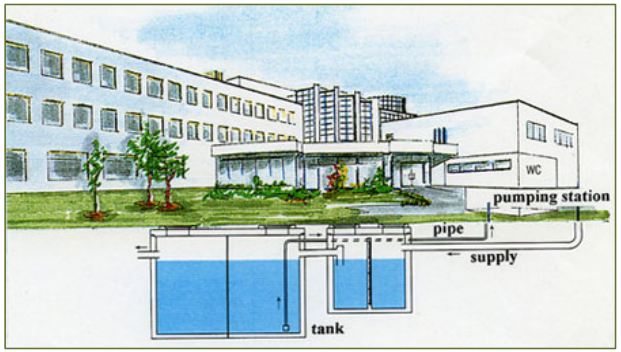


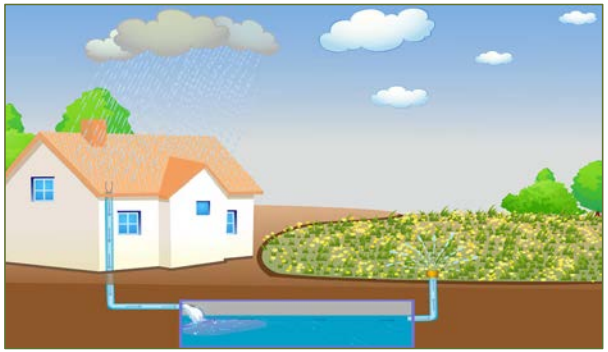

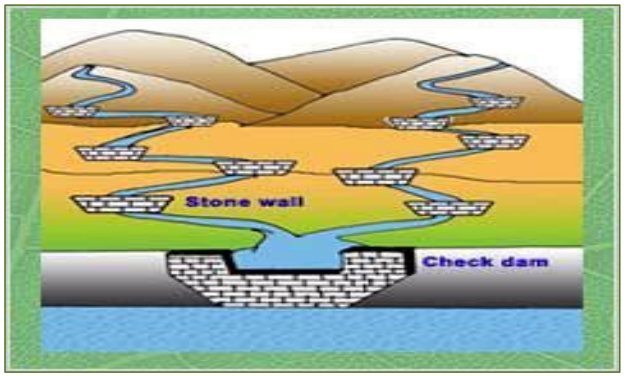


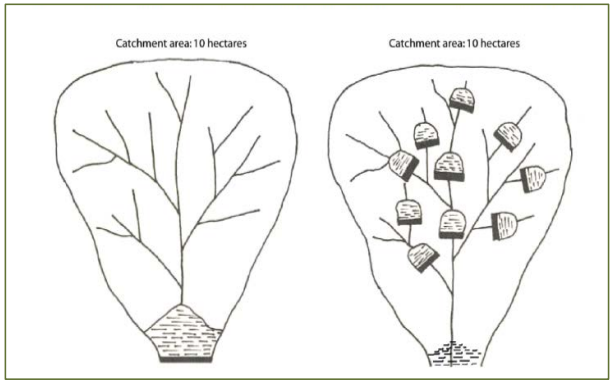



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# Water-harvesting & Watershed Management

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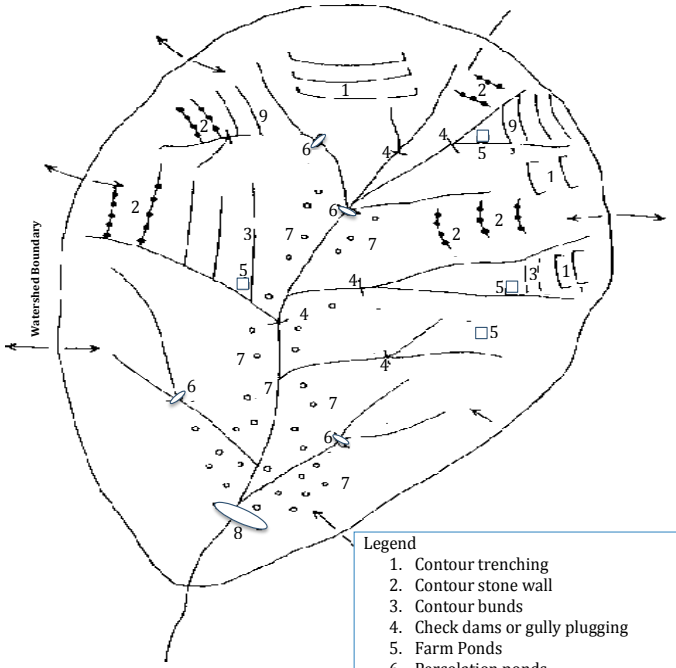
Its Practice Effectively Divides Into:

- Domestic RWH
- RWH for Agriculture
- Erosion Control
- Flood Control
- Aquifer Replenishment.





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# *A Success Story of Comprehensive Watershed Development Program Maharashtra State*

# Comprehensive Watershed Development Program
# Maharashtra State

**Ideal Village Hiware Bazar Tal - Nagar; District- Maharashtra State**

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- Average rainfall 350-400 mm
- Heavy soil erosion
- fuel wood unavailability
- Rain-fed farming
- Limited seasonal agriculture
- Farmers migrate for work
- Areas frequently suffers from droughts
- Drinking water scarcity
- Fodder unavailability
- Frequent migration to urban areas for employment

**Social Problems**

- Unemployment
- Migration, Frustration Of Villagers
- Increase In Crime

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# *STRATEGIES FOR EFFECTING CHANGE*

## Goal: Ground Water Recharge and Crop Management

# Comprehensive Watershed Development Program
# Maharashtra State

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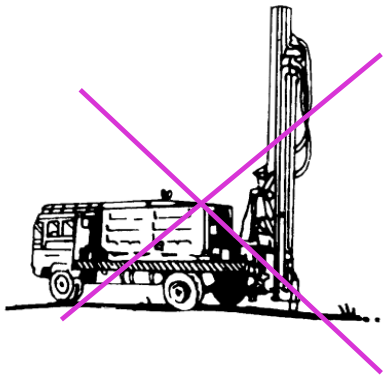
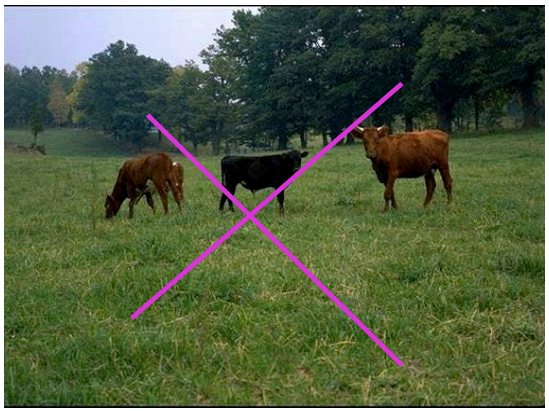
**Bandages**

- **Water intensive crop cultivation (banana & sugarcane)**
- **Selling of land to outsiders**
- **Bore wells for irrigation purpose (Only for drinking water)**
- **Feeling of ownership village natural resources**



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# Comprehensive Watershed Development Program
# Maharashtra State

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## Principles Social Discipline

Interested villages are required to observe the 7 Principles of social discipline in totality. They are...

1. Family Planning,
2. Ban on Alcohol,
3. Ban on Tree Cutting,
4. Ban on Free Grazing,
5. Voluntary Donation of Labor,
6. Ban on Open Defecation,
7. Ban on Bore-well for Irrigation.

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Solutions and Opportunities
Climate Finance

# Comprehensive Watershed Development Program
# Maharashtra State

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## Before

What is Climate Change

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## After

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## Artificial Aquifer Blast

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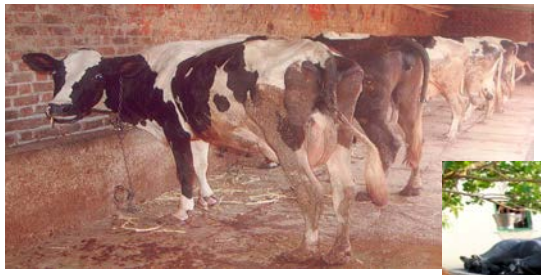
## REDUCTION IN SOIL EROSION



## Grass Cutting

## Grass Transportation

## Bio-Gas Plant

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## Impact of The Program

- ❑ Rise in Water-table (70-80 ft. To 20-25 ft.)
- ❑ Change in cropping pattern (jawar & bajara (sorghum and millets) to onion, potato, horticulture, vegetables and floriculture )
- ❑ Increase in cropping intensity
- ❑ Increase in fodder availability (From 1500 mt. To 6000 mt. )
- ❑ Increase in milk production (From 300 lit. To 3500 lit./ Day)


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**Maharashtra State Rural Transformation Mission**

**1000 Ideal Village Project of Govt. of Maharashtra.**

Actor Aamir Khan's Paani Foundation expanded the work of watershed development along the lines of Hiwre Bazar to 7000 villages.

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## AWARDS

Amazing Indian Award By Prime Minister of India

International Water Management Award

National Groundwater Management Award

National Productivity Award

Dalit Mitra Award

Vasantrao Naik Krishi Ratna

SantGadageBabaGramSwacchata

SantTukaramVangram Award

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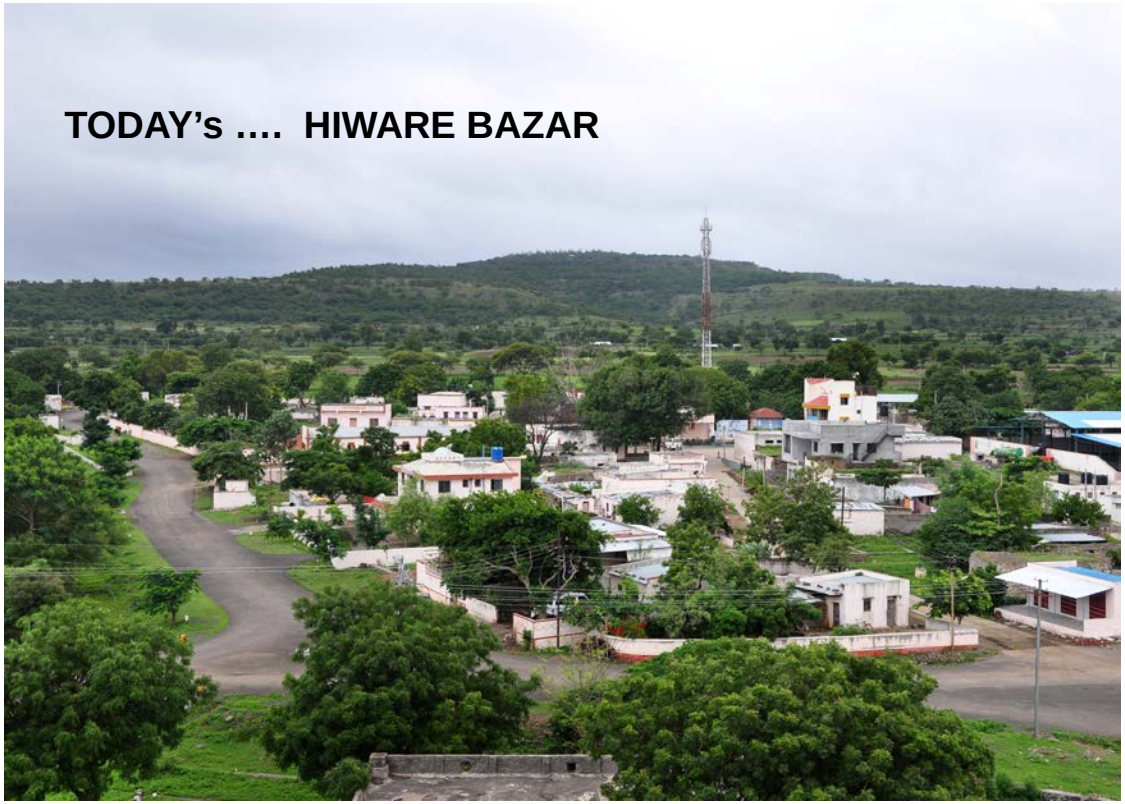


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**One Educated Individual Can Change**
**A Home**

**One Educated Home Can Change**
**A Village**

**And One Educated Village Can Transform**
**A Nation**


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# Climate Finance

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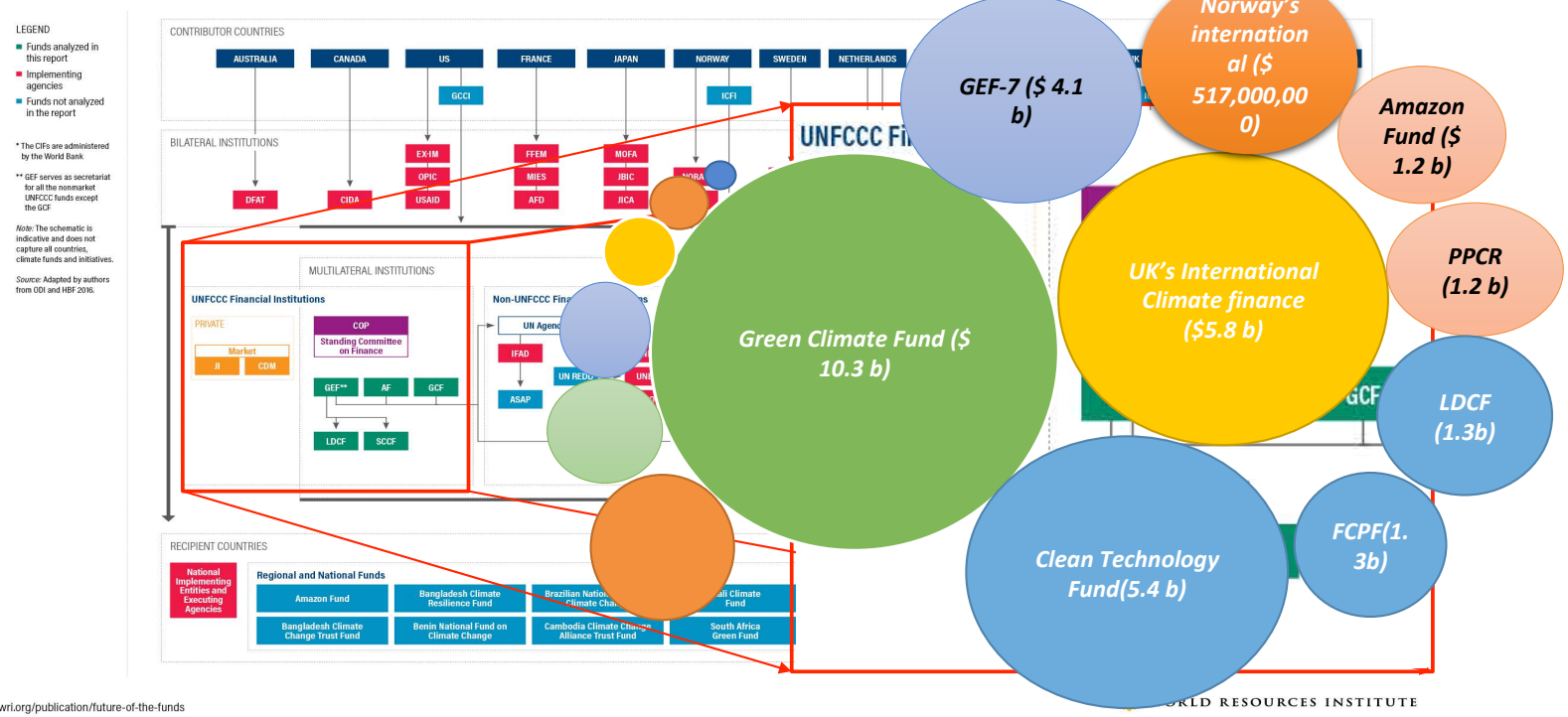
Global Architecture of Climate Finance




www.wri.org/publication/future-of-the-funds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# Last Message

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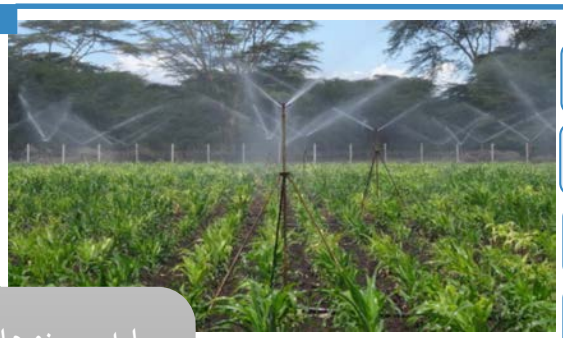
تغییر اقلیم مرز نمی شناسد

افغانستان آسیب پذیر ترین کشور در مقابل تغییر اقلیم

راه حل وجود دارد

وجه مالی موجود است

بیاید پروژه ها را ایجاد و با تغییر اقلیم مبازره نمایم



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# *Thank you*