



*Islamic Republic of Afghanistan*

*Ministry of Energy and Water*

# WATER RESOURCES IN PANJ-AMU & HARIROD- MURGHAB RIVER BASINS

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- **Population**

- Total estimated population is more than 25 millions.
- More than 80 percent of the population are directly dependent on Agriculture.
- About 3 million afghans are still refugees in Pakistan and Iran and other countries.
- Additional 800,000 people have been displaced by recent years of drought and floods.

- **Climate**

- Afghanistan's climate is continental, though the presence of Mountains causes many local variations,
- The climate is not so favorable for rainfall agriculture without supplementary irrigation.
- In the winter, temperature low and rainfall occurs in the form of snow.
- During summer temperatures are high and precipitation is virtually nil.
- Snow stored in the Hindu-Kush Mountains during winter, is melting in the late spring providing irrigation water in early summer.
- Total average annual rainfall is estimated 250 millimeters per year and varies in different parts of the country from 1200 mm in the higher altitudes of the northeast, to 60 mm in the southeast.
- Annual distribution of rainfall shows a picture of an essentially Afghanistan is arid country.

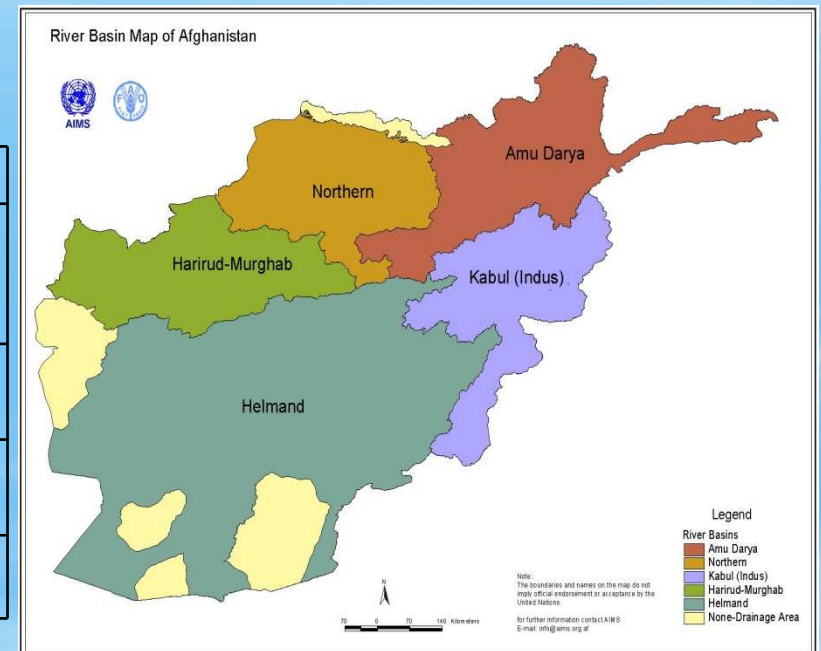
# Analysis of Current Conditions

## Water Resources

Afghanistan has a relatively good volume of water recourse more than 80 percent of the country's water resources come from snow melt in Hindu kush.

Table I : Estimated surface and Ground water recourses bcm / year

Type of water Resource s	Total runoff (bcm )	Present situation				
		Used bcm				Un used
		Total	agricult ure	Life stock	Water supply	
Surface water	57	20	19.78	0.1	0.14	37
Ground water	18	3	2.78	-	0.21	15
<b>Total</b>	<b>75</b>	<b>23</b>	<b>22.57</b>	<b>0.1</b>	<b>0.35</b>	<b>52</b>



### Five major river basin

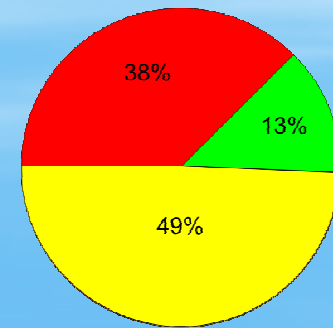
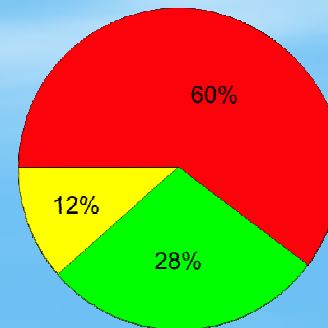
Panj-Amu Darya River Basin

Northern River Basin

Harirud-Murghab Basin

Helmand River Basin

Kabul-River Basin



# Drinking water supply

No access to potable water

urban areas 70%

rural areas 80%

Efficiency water supply systems approx 50%

Damaged or distraction of water supply systems

lack of maintenance

Shortage of electricity

Pollution of surface & groundwater

Poor sanitation,

bad garbage disposal

# Irrigation

- Over 80% of the population of Afghanistan, specially panj-Amu and Harirud-Murghab River Basin are busy on agriculture.
- But just 12% of 65 million hectares of land is an arable land.
- The total agriculture arable land is 8 million ha.
- Out of that 3.3 million ha of land cultivated in 1980
- About 90% irrigation systems are traditional .
- The efficiency of irrigation network is between 25-30%.
- Due to the last war and several drought about 1.8 million ha is under cultivation. And the remaining of shortage of water.

# **REGION RELATED ISSUES**

## **Land degradation along Panj and Amu Darya River basins**

- Annual floods take fertile soil from Afghan fields
- land degradation in left bank of Amu darya river, due to unilateral protection by neighboring countries in navigation to the right bank of rivers
- Afghanistan embankment vulnerable
- 30 years of war no investment in protection activities
- River need floodplains for peakflows: should that remain on Afghan side with all the damage every year?

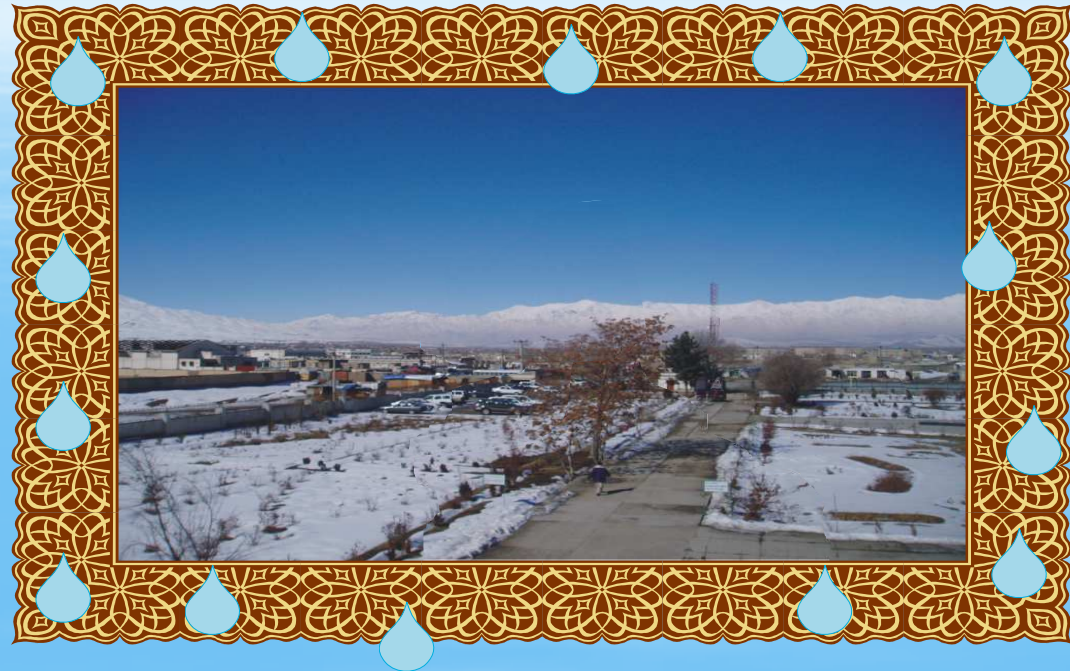
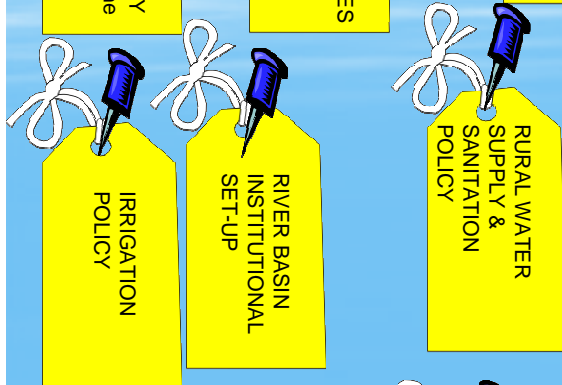
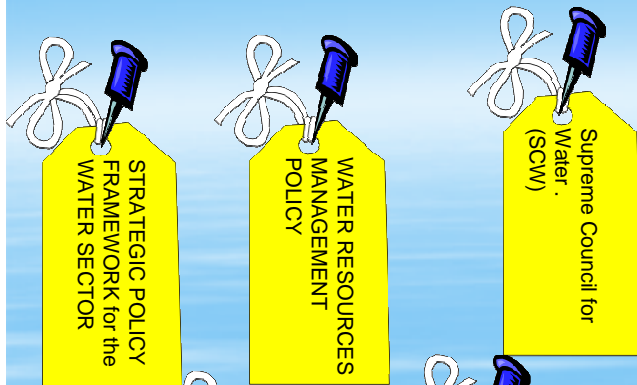
### **Desertification along Amu Darya**

- Dried-up silt deposits from floods    source of sand dunes
- Water logging resistant vegetation used by people
- 30 years of war no investment in protection activities



# Present status of policies, strategies and legislation

## Picture of achievements



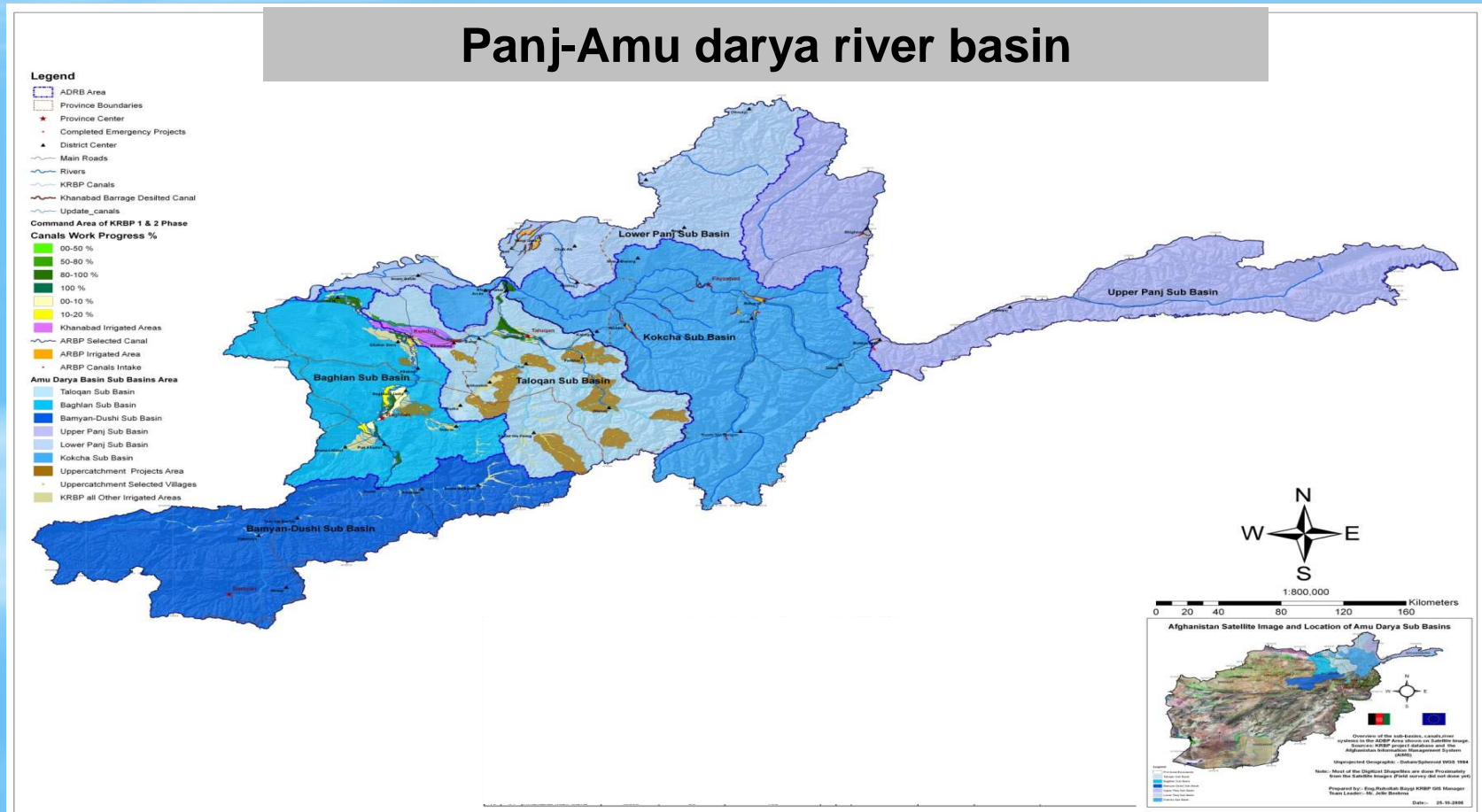
Amendment  
Water Law



Regulations

# Panj-Amu River Basin

- Amu darya is the largest river in the central Asia with total length of 2400km, and 91500 square km in Afghanistan.
- Total runoff is estimated 80.22 bcm.
- Finally this river terminates at the Aral sea.
- Along the main water course the northern portions of the Amu darya in Afghanistan are referred to As wakhan river, pamir river and panj river.
- The pamir river flows along the border between Tajikistan and Afghanistan.
- The wakhan river originate from Chakmatin lake to the pamir river
- The panj river combine from the confluence of the gunt and pamir river to the confluence the Kokcha





## Total runoff average of water generation and use

Table (1) average water generation and use in Amu darya river basin

Country	Contribution of Amu darya km <sup>3</sup> /year	Percent of Total	Irrigated land (million ha)	Water allocation	Percent of total used
Afghanistan	24**	30%	1.2	-	-
Tajikistan	49.0	61%	0.5	9.5	15.4
Uzbekistan	4.8	6%	2.3	29.6	48.2
Turkmenistan	0.82	1%	1.7	22	35.8
kyrgyzistan	1.6	2%	0.1	0.4	0.6
<b>Total</b>	<b>80.22</b>	<b>100%</b>	<b>5.8</b>	<b>61.5</b>	<b>100%</b>

\*based on soviet and central Asian treaties that exclude Afghanistan

\*\*Estimated for Afghanistan vary

Afghanistan currently used less than 12% the total volume of water in Panj-Amu River basin

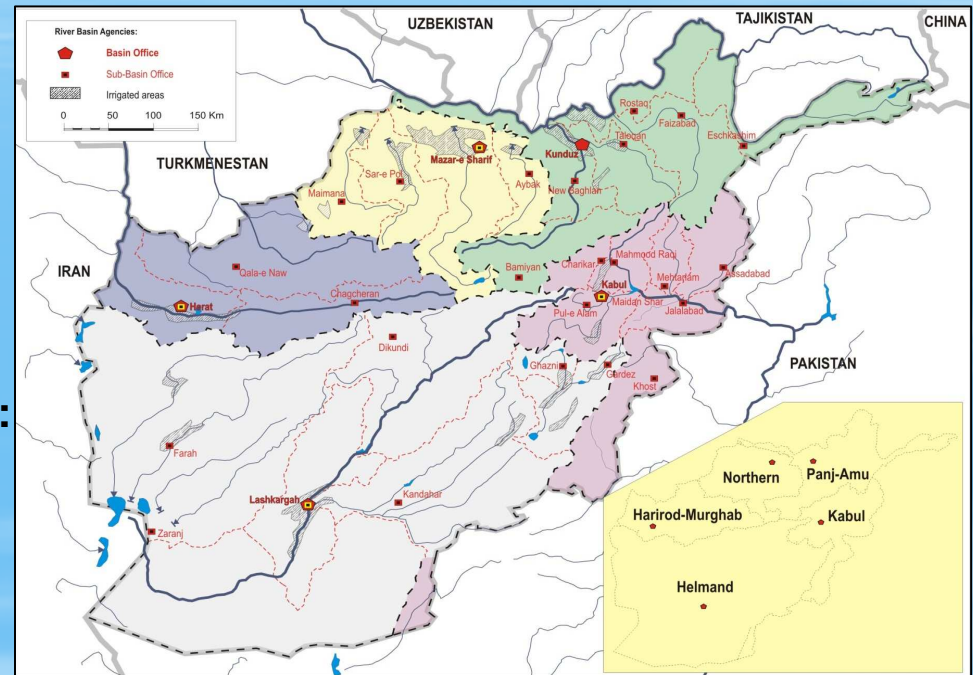
# Harrirud and Murghab River Basin

- Murghab river flows from Afghanistan, directly in to qaraqum desert of Turkmenistan.
- Afghanistan can only use a limited amount of water in murghab river.
- Total annually runoff :1.48bcm
- length of the river :443Km

**The Major right bank tributaries are :**

- Murghab khard River
- Sor soy River
- Tagabi – Alam River
- Chichktu River
- In the major left bank tributaries are :
- Guldar River
- Barghar River
- Jawand River
- Abi-Panda River
- Bum River

- These three main rivers of Afghanistan joint in Turkemenistan with murghab River.
- Gulrom River, khash River, kushan River.

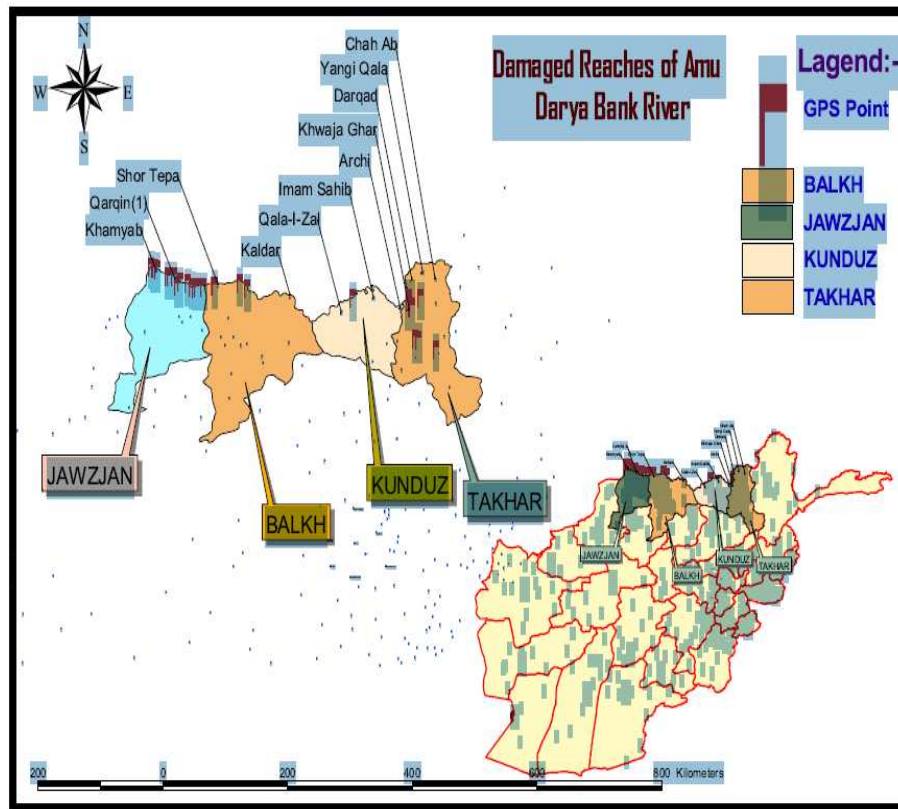


## Harirud river basin

- Harirud river is one of the important river in Afghanistan.
- Harirud river has not only economical role in Herat province, but it has also a big political value.
- Because this river forms political boundary between Afghanistan and Iran.
- Total length : 880 km
- Drainage area : 39300 km<sup>2</sup>
- Tributaries : Lahal River, sarJangal River, karkoch River and afghan River.
- Harirud river is a seasonal River which has not permanent water flow.
- Recently several drought has created negative impact on water flows.
- In period of normal year, amount of water flow not enough for drinking water, agriculture water, etc...
- But during the flood occur amount of water flows to Iran, but with out usage in Iran, finally absorbed the desert of Turkmenistan.
- Total irrigable land : 100000 ha.
- Out of that only 40% of (40000ha) of water irrigated and the remaining is shortage of water.

## Problems of panj-Amu and Harrirud-Murghab River Basin

- Damages or destruction of irrigation and water supply infrastructure.
- Suspension, number of multh-purpose project on transboundry water which were planned before war (upper kokcha, lower kokcha, upper Amu, kilagai, warsaj etc...)
- Shortage of access to hydro meteorological data.
- Lack of international agreement with Afghanistan in the downstream countries on transboundry waters.
- Land degradation in left bank of Amu river, caused to unilateral protection by the neighboring countries.
- Desertification in left bank of Amu river.
- Destruction of negative impact by flood are : 12000 ha, agriculture land, 2000 ha guardian, displaced people, 100000, damaged houses,10000
- Shortage of infrastructure such as ,proper water reservoirs to control and manage river flow . Resulting in frequent flood occurrences damage the river banks .



## Qalizal area





# Qali zal Area







1 8 2007

## Imam sahib Area









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## Amu darya destruction in Jawzjan province

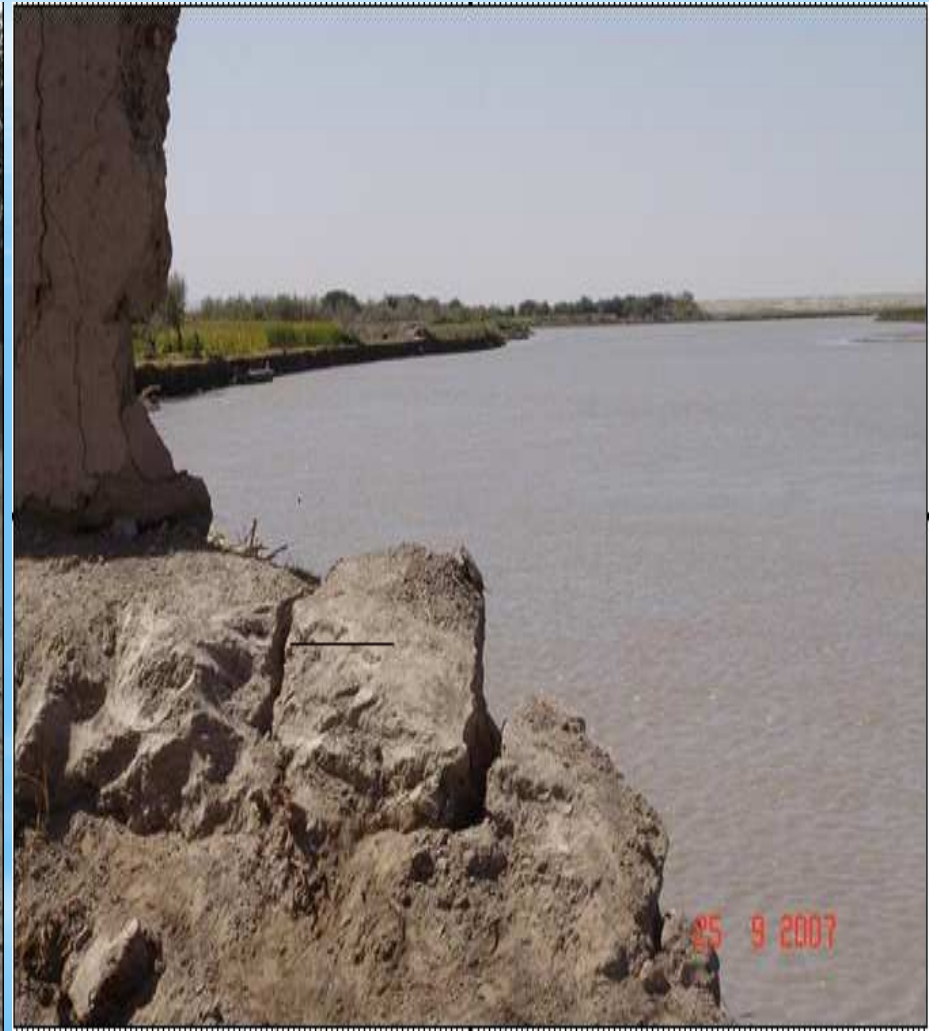








## Amu darya destruction in Balkh



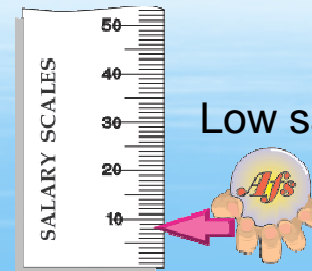




## Measures on key priorities

1. Proper use of (IWRM) through implementation of the river basin approach in the country.

### Barriers in development of IWRM and River Basin Management



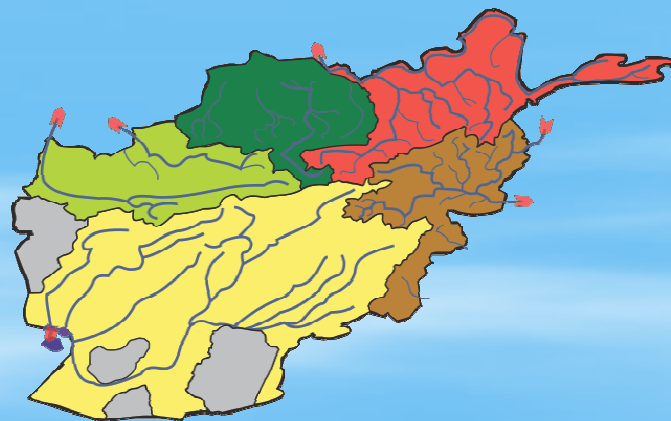
Low salary scales

Limited knowledge capacity



Rehabilitation of irrigation infrastructure

River bank protection

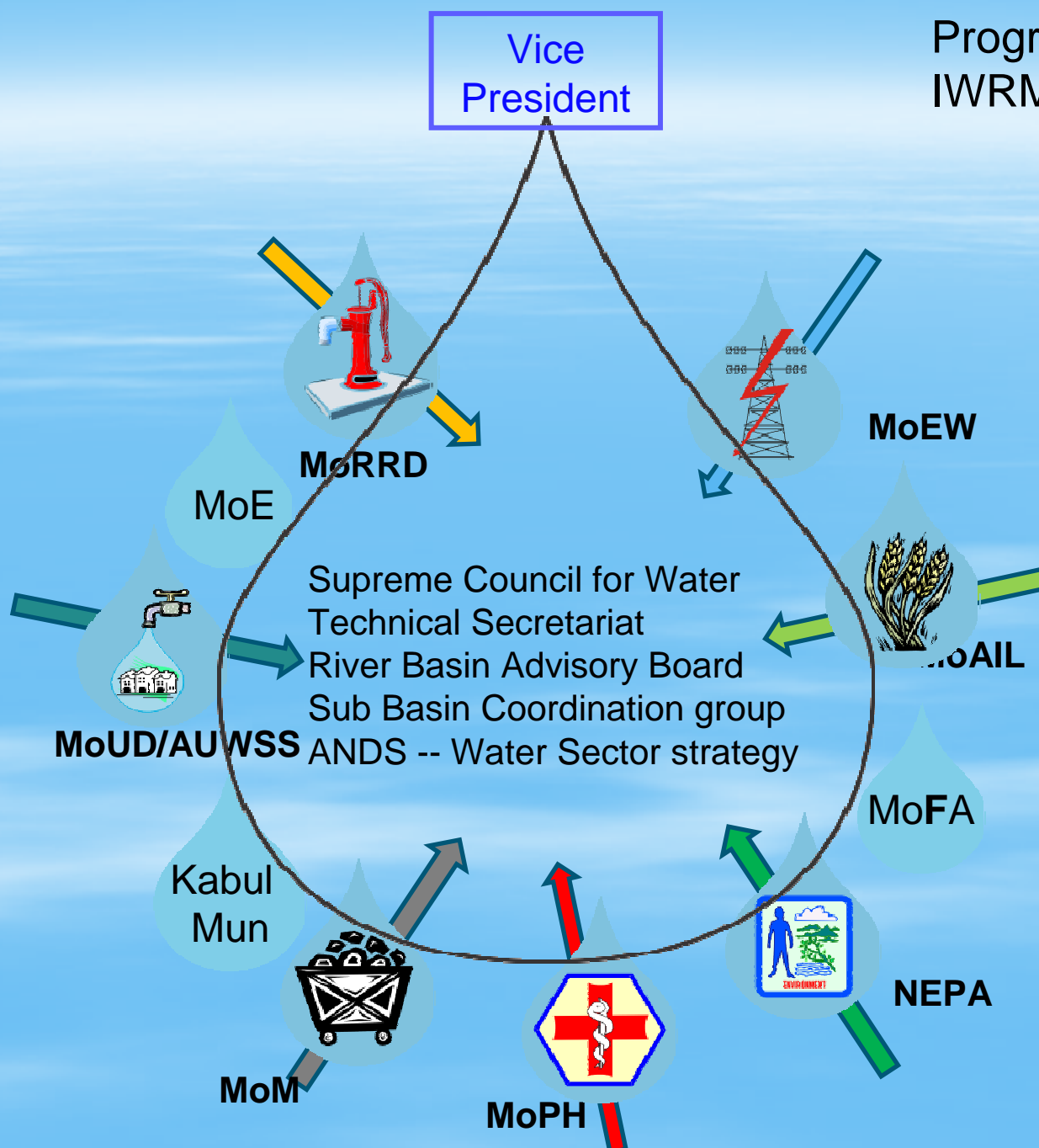
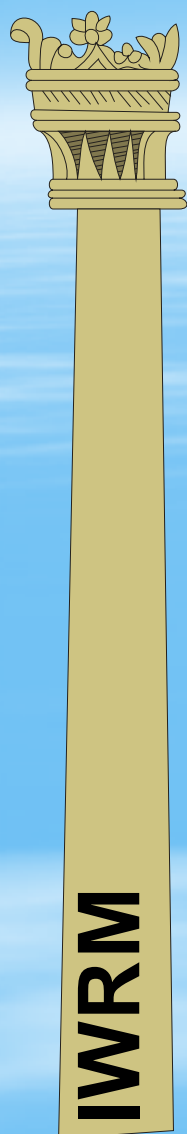


Transboundary Water Issues

Limited investment in big water structures (national water WRD program)

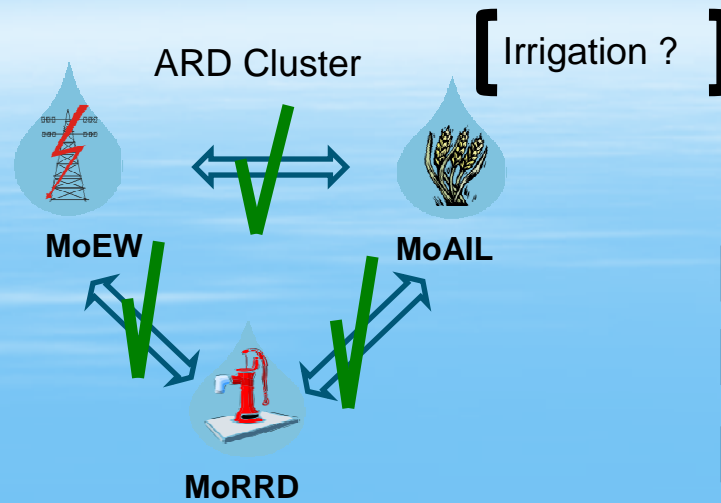
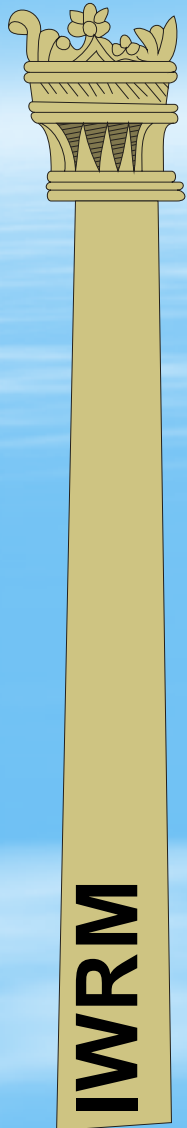
IWRM





Progress towards  
IWRM

## More Progress



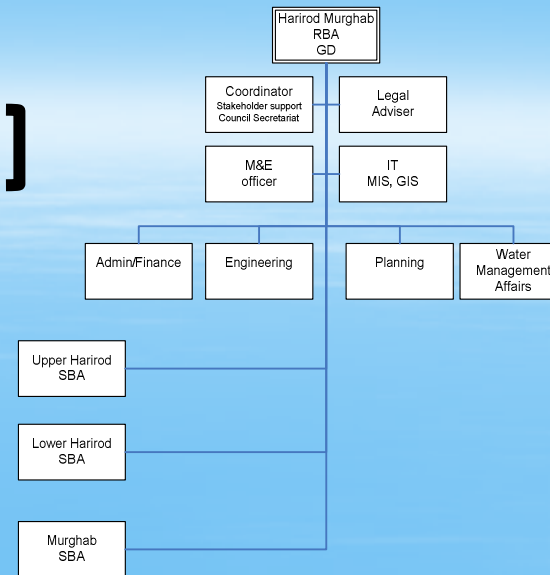
Integrated programs  
in river basins

Combined drafting of Regulations



Establishment of WUAs

Right of way/ area protection



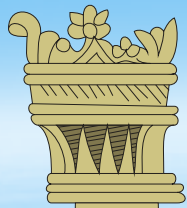
Establishment of River Basin and Sub Basin Agencies with  
new salary scales

National water resources development plan has  
started.

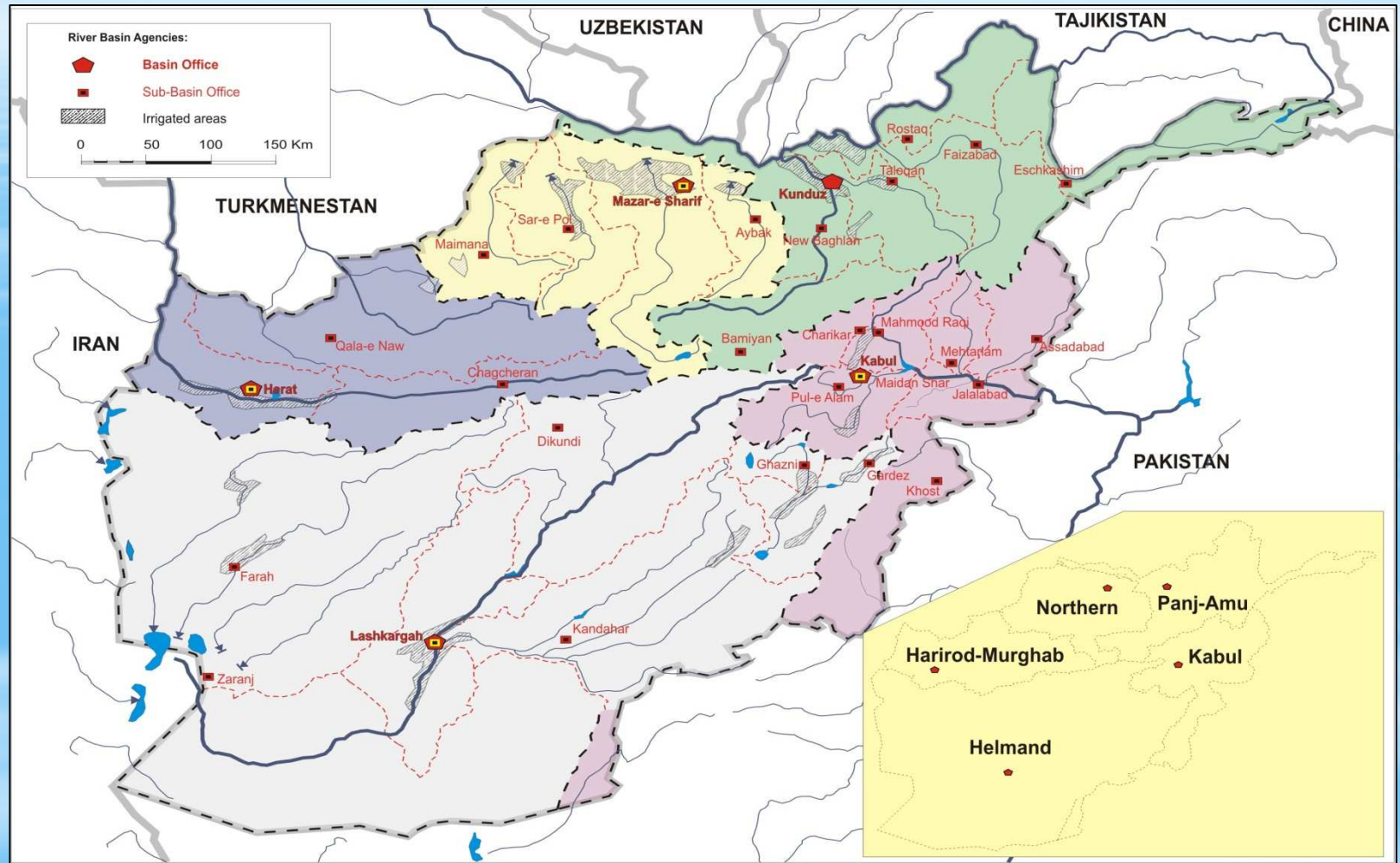
Rehabilitation of irrigation infrastructures have started

Preparations for establishment of Water User  
Associations.

- EU- Panj Amu River Basin program
- ADB – Western Basin Dev. Program
- CIDA – Arghandab Integrated Dev. Program



# River Basin Approach





2. Priority is given to the projects that (national WRD plan):

- Reduce the chances of damage by drought and floods.
- Create job opportunities
- Increase the irrigation and power supply
- Access to safe drinking water.

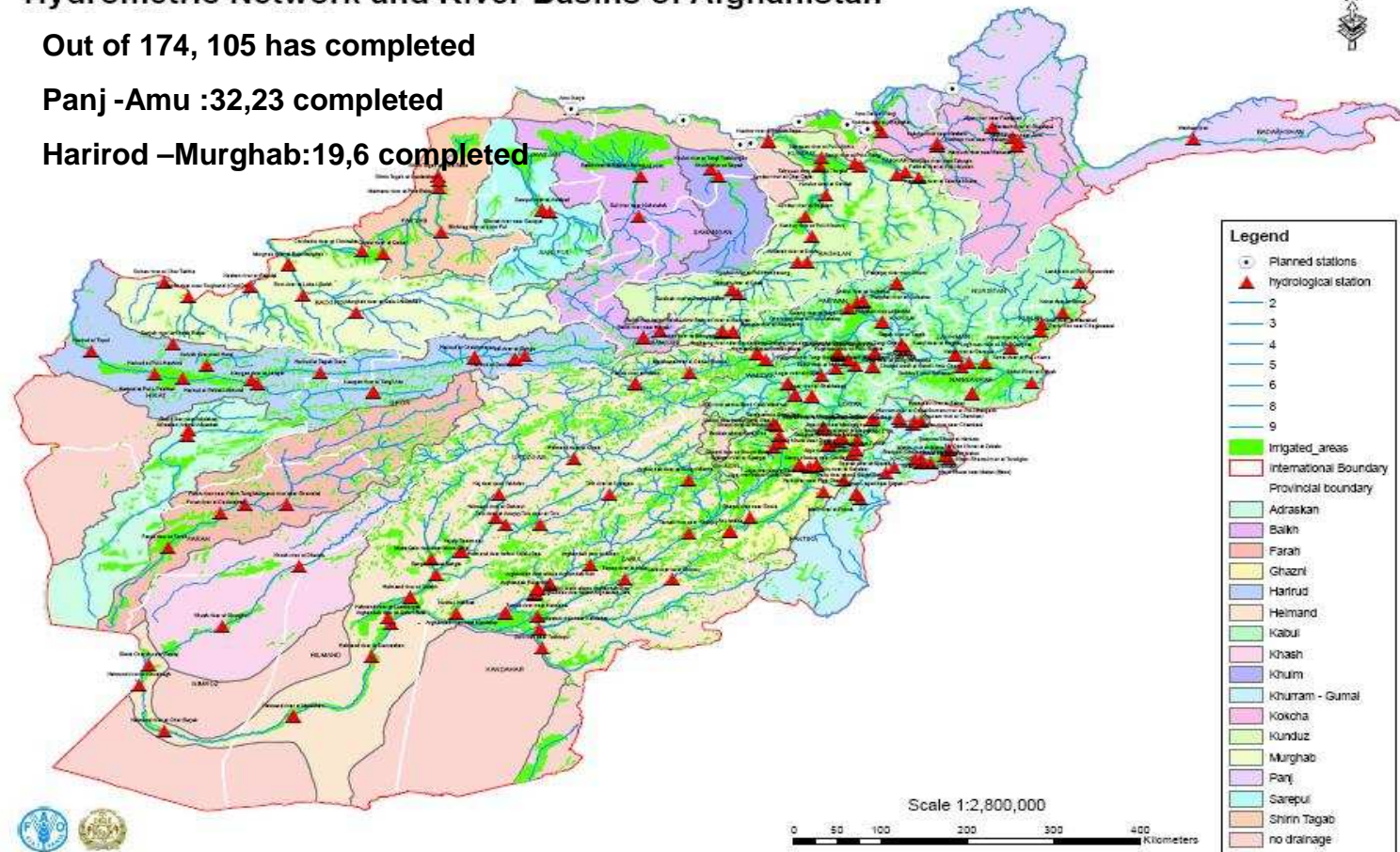
3. A special priority will be given for rehabilitation of hydrometric network(fig.2)

### Hydrometric Network and River Basins of Afghanistan

Out of 174, 105 has completed

Panj-Amu :32,23 completed

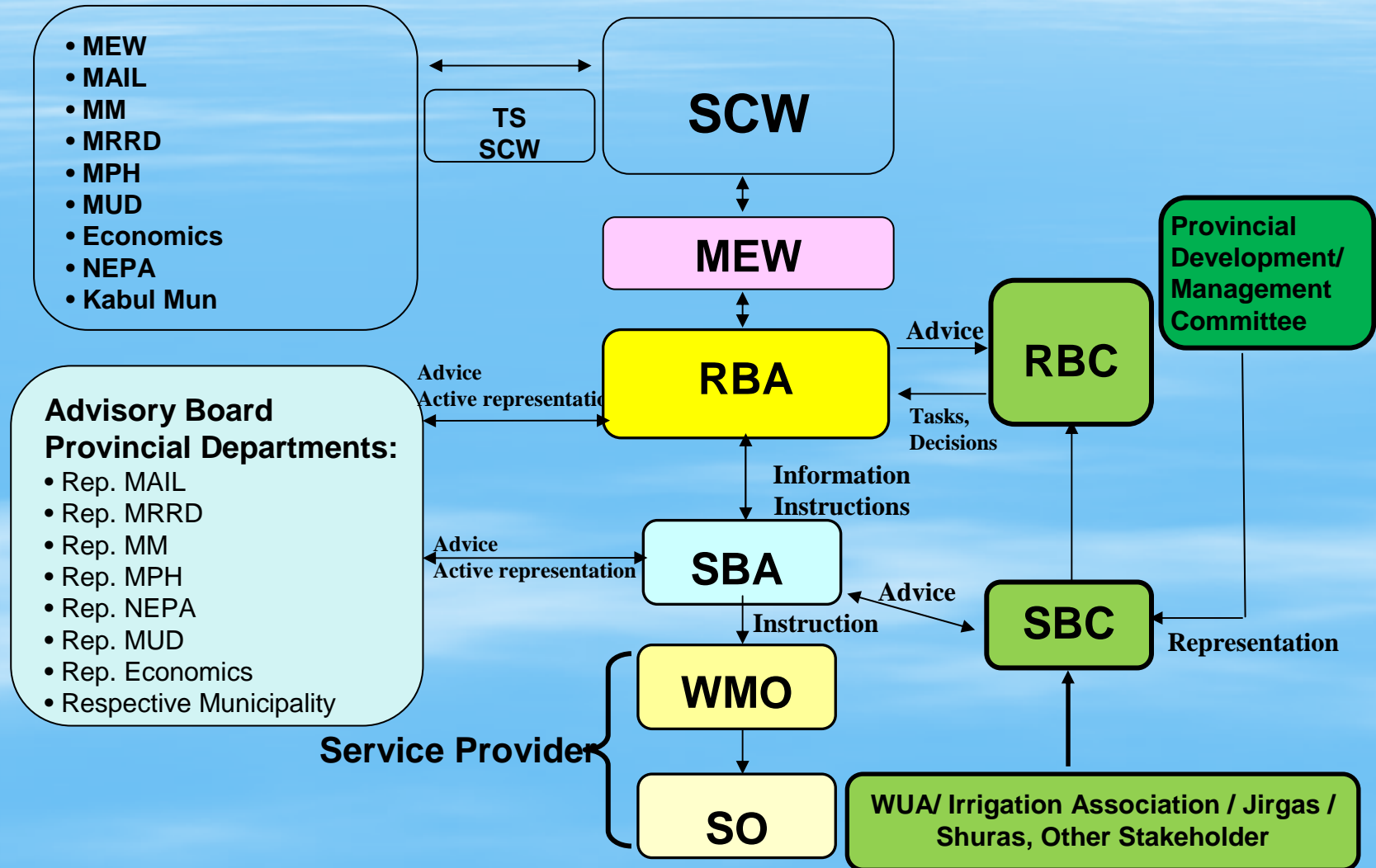
Harirod –Murghab:19,6 completed





4. Establish river basin and sub basin agencies and basins and sub basins councils for involvement of all stakeholders in the whole process of water management (fig.3)

General River Basin Institutional set-up



## 5.Coordinating role of supreme council for water management (fig.4).

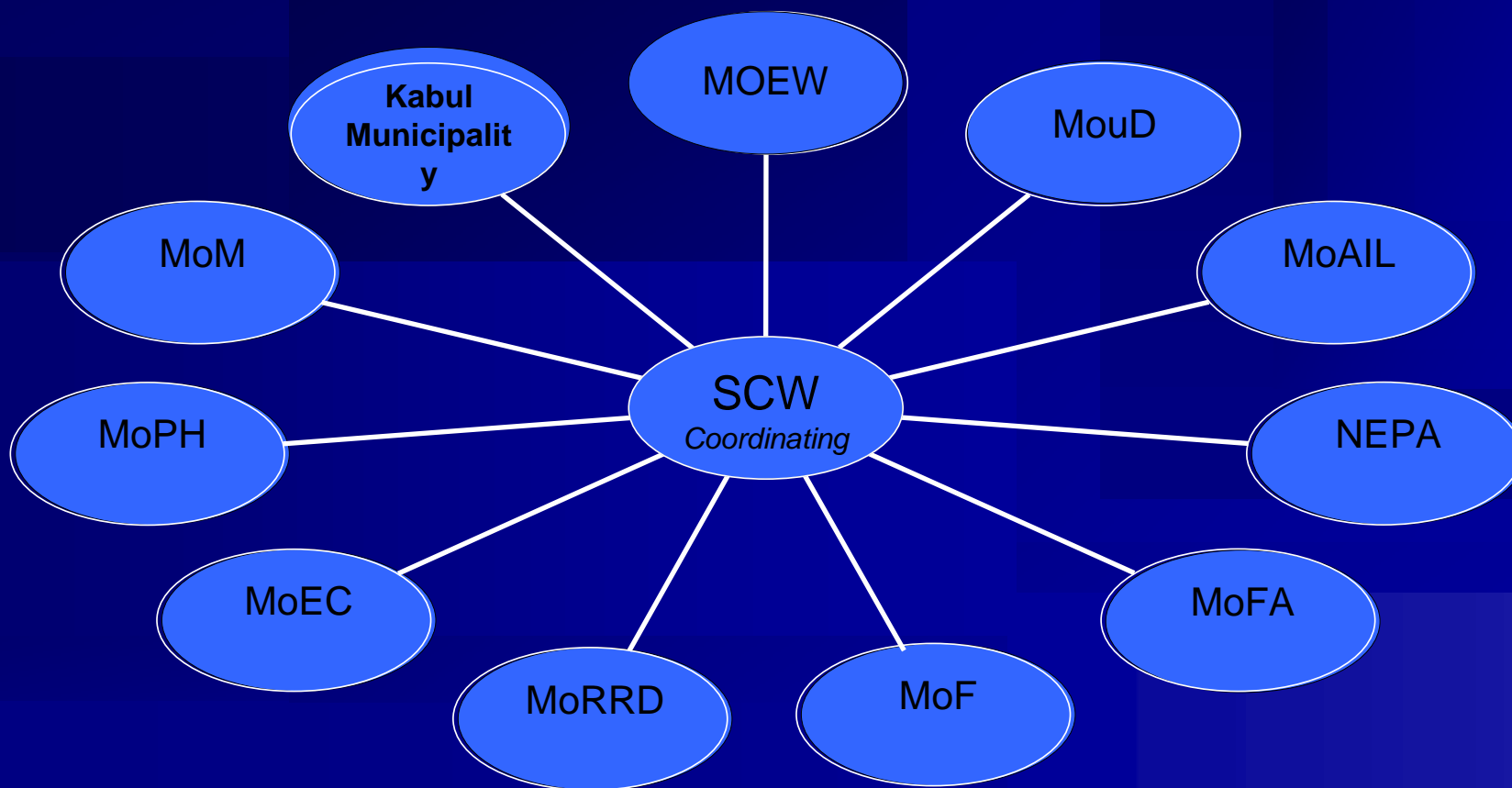
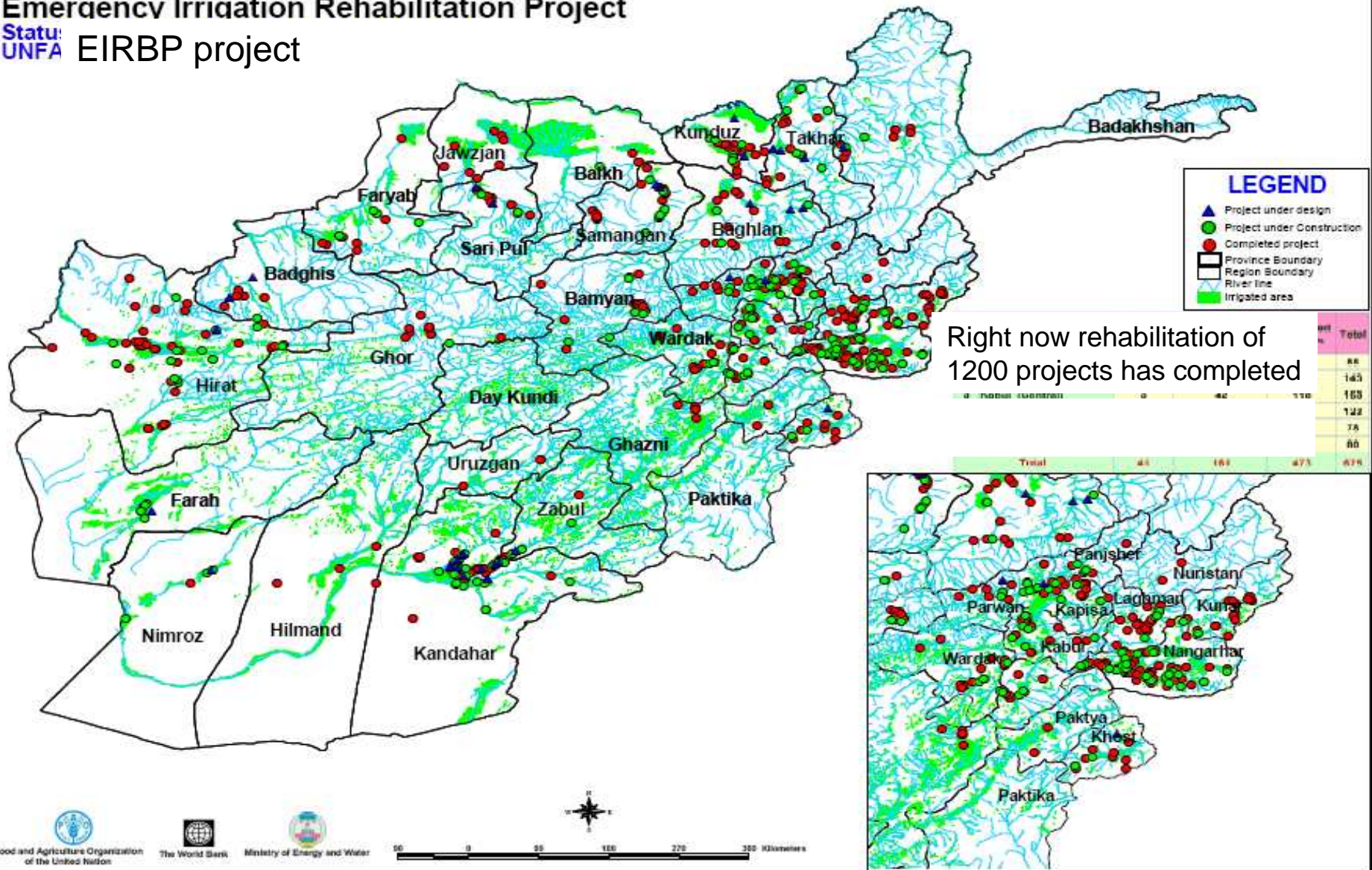


Fig. 4

## 6. Implementation of national program on improvement and rehabilitation of irrigation infrastructures. And national program on River bank protection.

### Emergency Irrigation Rehabilitation Project

Status: UNFA EIRBP project





## Major challenges

- Establishment of RBA, SBA and RBC, SBC and WUAs and 5 major river basin of Afghanistan.
- To develop Regulations for the implementation of new water role.
- Establishment and operation of hydrometeorological network.
- To prepare a national water master plan in the river basins.
- To implement national water resources development plan.
- To develop a comprehensive national strategy for drought in flood mitigation.
- To implement the national river bank protection.
- Traditional irrigation infrastructure needs to be converted to modern irrigation systems.
- Opening dialogue for transboundary issues.
- Creation of political will for support.

# Conclusion

- Water and power development by IWRM in Afghanistan is the first priority For the government.
- Over the next 20 years, the water sector in Afghanistan will play a vital role In the success of other economic development goals.
- Management and development of the water sector are aimed at improving The quality of life of the current and future population of Afghanistan, Especially in Panj-Amu and Harrirud Murghab River basins through:
  - Sustainable and effective use of water resources .
  - Ensuring access to safe and clean drinking water and sanitation;
  - Reductions in poverty and unemployment through increasing agricultural Productions, power generation, and flood control;
  - Ensuring access to water, energy to cities in rural areas.
  - Ensuring water access national industrial and other economic sectors;
  - Giving priority to investment in storage dams and other water resources Infrastructures;
  - Protecting the environment from further damage and destruction and Restoring biodiversity.

- According to the developed policies of Afghanistan ,our country respects international laws and conventions for Tran boundary water and is willing that based on these laws should use fairly from this water for economical and social development and environmental protection
- In any case in terms of Tran boundary water ,policy of Afghanistan is the policy of understanding with downstream countries and believes that in mutual use of the Tran boundary water the interest of each other should be considered.
- Afghanistan is now getting ready to deal with Tran boundary water issues and makes efforts for any dialogue understanding with neighboring countries in the not faraway future to result in signing up to international agreement since we believe that dialogue and understanding and international agreement to be the only effective solution regarding Tran boundary water.