

Special Lecture on Water Resources in Afghanistan

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Mr. Chairman,
Distinguished Delegates,
Ladies and Gentlemen,

It is a distinct pleasure for me to be at this important meeting and address such a distinguished gathering. Permit me to congratulate you on the successful organization of this seminar at the university of Tsukuba. Permit me also, to express my words of thanks to you for the invitation, which serves notice that Afghanistan has joined this international seminar and present post-conflict country report on water resources.

Afghanistan is emerging from a dark chapter in its history, transitioning to democracy, peace and stability, taking the road with the objective of reconstruction, leading to self-sufficiency and prosperity.

More than two decades of war and conflicts and the past four years of drought exposed millions of people to extreme hardship. Devastating earthquake, floods and locust infestation was the other prominent dimension of our suffering. It was only after the military and political upheavals that followed events of 11 Sept 2001, made the world acutely aware of the suffering of the Afghan people.

The Transitional Islamic State of Afghanistan is rebuilding this strife-torn nation, the nation that has suffered heavy human and economic losses. We are making all efforts to seize the moment restore peace, build a nation that is fragmented and find unity in that diversity whatever that roots, be they language, religion, ethnic or gender. We have a common goal and a common road, i.e. reconstruction and development of a new Afghanistan that would bring prosperity to its people and stability to the region.

Ladies and Gentlemen,

Prolong civil unrest has created vast physical, human and environmental destruction. We have lost our human and natural resources. Our infrastructure is totally destroyed; we have lost our educated and skilled elites. Our institutional setup, be they public, economic, financial or administrative, are extremely weak. Agriculture sector, which makes the backbone of the country's economy, has suffered serious setback. Continuous drought has resulted in mass displacement of rural communities, particularly Kochis (nomad) and farm communities that are dependent on rangeland and rain-fed agriculture. There are vulnerable Kochis and Internally Displaced Persons (IDPs) who need emergent assistance before winter intervention.

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Over the past six months 1.7 million refugees have returned back to Afghanistan. For those who do return to rural areas, the inputs will need to be provided include: shelter, temporary food supply, seed, fertilizer, agricultural equipment, technical assistance and credit. Lack of social services and means of livelihood in the rural areas are the main factors causing the returnees to join the urban, creating additional demands for employment, housing and other services. Presently majority of returning refugees are reintegrated in Kabul and other major cities, unless urgent action is taken, rapid onset of winter could result in tragic consequences for hundred of Thousands.

Ladies and Gentlemen:

1.1. Afghanistan is a landlocked mountainous country that has an area of about 65 million hectares and the population is estimated at about 23 millions of which about 30 – 35% are living in the urban areas. The country is dominated by the Hindu Kush ranges, which bisects the land area from the northeast to south west and west.

Due to rugged mountainous relief, the climate ranges from arid in the south and south - west to semi - arid in the other parts of the country. The high range of Hindu-Kush and Pamir are moderately humid. Precipitation ranges from less than 100 mm at altitude bellow 1000m to 500 – 800mm above 5000m. Temperature ranges from -20°c to 45°c , however as high as 50°C is also recorded. Evapotranspiration rate is between 5 to 10mm/day. Most of the precipitation occurs between November and May, however limited influence of monsoon reaches the Paktia and Paktika (East) during summer, too. (Table 1)

1.2. There are 11 geographical/ agro-ecological zones (Dupree 1973), six of which (Wakhan, Badakhshan, central mountain, eastern mountains and foot - hills, northern mountains and foot hills, southern mountains and foot - hills) are associated with the Hindukush mountain ranges, however the remaining five zones (northern plains, HRT – Farah lowlands, Helmand valley – Sistan basin, western story and Eastern sandy deserts), cover the desert and plains surrounding the central ranges to the north, south, east and west. (Figure)

Table 1 Precipitation, Temperature and Evapotranspiration

Location	Altitude {m asl}	Precipitation {mm }	Temperature {C}	Annual ETP {mm}	Daily ETP {mm}
Shiberghan	360	214	-2 - +38	1,420	8
Mazar-I Sharif	378	190	-2 - +39	1,530	9
Kunduz	433	349	-2 - +39	1,390	8
Baghlan	510	271	-2 - +37	1,100	6
Jalal abad	580	171	+3 - +41	1,350	7
Farah	660	77	~0 - +42	1,610	8
Lashkargah	780	89	~0 - +42	1,720	8
Maimana	815	372	-2 - +35	1,310	7
Herat	964	241	-3 - +36	1,720	10
Qandahar	1,010	158	~0 - +40	1,790	8
Khost	1,146	448	-1 - +35	1,390	6
Faizabad	1,200	521	-5 - +35	1,020	6
Qadis	1,280	323	-3 - +30	1,240	6
Jabul – Saraj	1,630	499	~0 - +31	1,610	9
Kabul	1,791	303	-7 - +32	1,280	7
Kanizimir	1,905	433	-7 - +31	1,100	6
Ghalmin	2,070	222	-8 - +29	1,100	6
Ghazni	2,183	292	-11 - +31	1,420	7
Lal – Sarjangan	2,800	282	-21 - +25	950	5

1.3. Taking in to account the precipitation as the most decisive parameter, followings are the main climatic zones:

Climatic zones	Precipitation (mm)
Badakhshan	300 – 800
Central and northern mountains	200 - 600
Eastern and southern mountains	100 – 700
Walkhan corridor and Pamir	<100 – 500
North plains	<100 – 400
Western and south western lowlands	<100 – 300

2. Land Cover:

The land cover statistics derived from the 1990/93 dataset FAO project AFG/90/002, published in March 1999 is illustrated in Table 2.

Table 2 Land cover statistics derived from remote sense, 1993 data and government statistics published in 1972.

<u>LAND COVER</u>	<u>AREA (ha)</u>	<u>% OF TOTAL</u>
Urban	29,494	0.05
Orchards	94,217	0.10
Agricultural land (Irrigated)		
Intensive	1,559,654	2.40
Intermittent	1,648,136	2.60
Rain fed	4,517,714	7.00
Range land	29,176,732	45.20
Forests	1,337,582	2.10
Barren land	24,064,016	37.30
Marsh land	417,563	0.60
Water bodies	248,187	0.40
Snow Covered areas	1,436,101	2.30
Total	64,559,396	100%

Comparing the land cover statistics of 1972 and 1993, the followings would be concluded:

- 1) The total area under cultivation reduced from 14% to 12.1% as per followings:
 - a) Irrigated component of the areas under cultivation reduced from 3.5 million ha to 3.2 million ha during 20 years period.
 - b) Rain fed areas in this period dropped from 5.4 million ha to 4.5 million ha.
- 2) Forest cover, including the pistachio forest, declined from 1.9 million ha to 1.3 million ha. Deforestation rate is about 30,000 ha per year. Illegal logging and the demand for fuel wood and extended drought are the main factors contributing to deforestation.
- 3) Rangeland and watershed areas are intensively degraded. Over grazing and cultivation of rangeland by increasing rural communities to mitigate the effects of drought has resulted in widespread degradation, flooding and severe soil erosion.
- 4) To conclude, long – term conflict and extended drought are the principle factors placed the natural resources of Afghanistan in a rather poor shape and caused a degraded environment.

3. Water Resources of Afghanistan

3.1. Since a large part of the high mountains are located in the center of the country that extends to the north – east and south – west, therefore many rivers are originating from these ranges in a radial form to the north, south – east, south – west and west. About 80% of the surface flow originates from the Hindu Kush mountain ranges at altitude above 2000 m. Most of the glaciers are located at the higher altitudes of the same ranges. It is estimated that watersheds related to these mountain ranges receive 4 to 5 times more precipitation of orographic type than any other parts of the country. Most of the precipitation is in the form of snow that upon melting in spring and summer creates perennial and seasonal streams.

3.2. Many hydrologists have studied the river systems of the country and identified 3 to 5 river basins. It is convenient to take the work of V.L. Shultz, who divided Afghanistan into 3 large river basins. Following is the river basins with the estimated water potential at the normal years.

Table 3 Large river basins and estimated mean annual volume (million cu. m)

<u>NAME OF RIVER BASIN</u>	<u>DRAINAGE AREA (Km²)</u>	
	<u>MEAN ANNUAL VOLUME (m,m³)</u>	
Amu Darya Basin	241,000	53,030
Desert Basin	328,000	9,300
Kabul river basin	73,000	21,670
Total	642,000	84,000

3.3. Afghanistan is sharing part of its water resources with the neighboring countries, i.e. Tajikistan, Iran, Pakistan and Turkmenistan. Assuming 34% share of the total annual water flow with the neighboring countries, Afghanistan still would have 55,440-mil. cu.m. surface water flow for its use (2,410 m³ / head / year). This is quite a large amount of fresh water at the normal years that can be used for agriculture and domestic purposes. The quality of surface water is good in the upper and the lower basin throughout the year. Due to intensive degradation of the watershed areas, the sediment discharge is high, particularly during springtime, in all rivers.

3.4. Little is known about the ground water in Afghanistan, because very limited studies have been carried out to make an over all assessment at national level. According to Marvlayarov and Chmyriov, 1976, there are three hydro - geological zones in Afghanistan, namely,

- 1- The northern artesian region.
- 2- The central hydro-geological folder and
- 3- The southern artesian region.

The same source confirm abundance of ground water in the quaternary aquifers a long the major river valleys where the infiltration rate is quite high. The ground water recharge is, thus, higher close to mountains and foothills than flat areas.

3.5. It will be rather difficult to conclude the annual ground water recharge volume, however assuming 15% infiltration of the total annual precipitation, it can be estimated that the annual ground water recharge in the normal years would be amounted to about 20 billion cubic meter. Quality of ground water, depending on the nature of the parent materials through which it percolates, ranges from good to brakish from place to place. Ground water in the low laying areas tends to be saline in its nature.

3.6. No research information is available on the annual use of surface and ground water in Afghanistan, however it is estimated that about 20 billion cu. m. freshwater and over 5 billion cu.m. ground water is used annually for drinking and irrigation purposes. Taking these estimated figures as the indicatives of present use,

then there will be a balance of over 15 and 30 billions cu m. of ground water and fresh water per year, respectively.

4. Present status of water resources:

4.1. Obviously, extended drought has not only caused the reduction of the surface water but severely diminished the capacity of ground water, too. The later reduction is manifested in drastic drop of the level of underground water, particularly in the south and south – west of the country where drought is more severe than any other parts. As a result, many Karezes (underground tunnel) and springs are either dried – up or produce minimum quantity of water.

At present surface flow at different rivers all over the country is reduced from 40% to 65% of the normal year capacity. Following is the status of fresh water in the main river basins:

Table 4 Water flow in the main river basin

<u>RIVER BASIN</u>	<u>ESTIMATED ANNUL VOLUME Billion cub.m</u>
Amu Darya basin	14.10
Desert basin	4.13
Kabul river basin	8.80
Total	27.03

4.2. The above figures indicate that there is an over 50% reduction of fresh water at the country level. As mentioned earlier, at least, one – third of the water resources is flowing down to the neighboring countries, however the remaining is mostly used by traditional methods of irrigation. Taking the irrigated area in 1978, which was estimated to be 2.63 m. ha, approximately 2.3 m. ha or over 90% of the total area, uses traditional schemes developed and built by farmers and operated and maintained according to communal customs and practices. However only 0.33 m. ha is irrigated by modern systems, and perennial rivers. Of the total irrigated areas, about 1.44 m. ha had sufficient water supply to support double cropping. The effect of war and lack of maintenance on the irrigated systems have not been systematically assessed.

4.3. According to FAO, 1997, about 1.7 m.ha required rehabilitation and another 0.68m.ha required improved water management. Modern irrigated schemes built and operated by the state are in need of rehabilitation. These large schemes require infrastructure, rehabilitation, repairs to dams and other major structure and sound water management program.

4.4. Ground water, as part of annual recharge or the non-renewable reserves, could serve as the most important safeguard in times of drought or low water availability. Legal and regulatory approaches require effective public institution and obedience to the rule of law. In developing world, involvement of communities in the

decision making process, ensure sound management of water resources (surface and ground water) at the village /district level.

Under the post conflict environment and continuous drought, many organizations and thousand of individuals are digging tube well and extracting water for domestic use and agriculture purposes. This has resulted in rapid drop of the level of ground water in all parts of the country, particularly south and south - west. While the increase in vulnerability to low rainfall is likely to be continued, such activity can be traced to unsustainable land use practices and further shrinkage of natural resources base. When prolonged drought occurs, asset depletion, low agriculture production, poor health and increased uncertainty could lead to a situation that would be difficult to recover from, even if rainfall returns to normal. This is a serious and possible catastrophic development for Afghanistan if it is not managed properly.

5. Droughts and Surface Water Resource Management and Development:

Since most of the water resources have their origin in the Hindu-kush mountain ranges. Therefore, these areas function as a natural storage of water in the form of snow during winter that is the primary source in the major rivers in spring and summer. The water catchments volume of these areas is estimated to be 150 billion cu. m, while the rest of the country precipitation is estimated to be about 30 billion cu.m.

5.1. The recovery and reconstruction programme for surface water resources management and development includes the following activities:

1. Establishment of hydro-metrological stations that are needed for systematic measurements of stream flow and climate data.
2. Rehabilitation/ reconstruction of the traditional and state built schemes categorized as per following –terms:
 - a. Short -term projects (mostly community based projects)
 - b. Medium-term projects
 - c. Long-term projects
3. Construction of storage reservoir/dams
4. River basin management works
5. Watershed management at micro and macro level (pilot project)
6. Water catchments /water harvesting activities
7. Reforestation and afforestation and green built establishment
8. Flood control and conservation practices
9. Field work to ensure efficient use of water resources. This will include arrangements for improved and sustainable water resources management and development, adoption of irrigation technology, Supplemental irrigation, etc.
10. And last, but not the least institutional capacity building and timely access of farmers to information and water availability.

6. Ground water reserves and Drought Mitigation:

6.1. Ministry of Irrigation Water Resources and Environment is planning to conduct a field survey, particularly in the south and southwest of the country to assess the groundwater capacity and formulate strategies regarding the extraction/application of groundwater. The river basin management authority will approve formal application process. The river basin authority will be monitoring the programme on tube well development and initiate interim licensing or ban drilling tube wells.

7. Environment:

7.1. The natural resource sector has suffered from varying degrees of degradation for over twenty years. A combination of war, civil conflict, exploitation and enforced neglect has led to degraded environment. The recent severe drought highly degraded the forests, rangelands and wildlife. Air and water pollution is becoming a common problem, particularly in the major cities. Desertification is in progress in the south and southwest areas. Unless urgent action is taken, the situation tends to be unrecoverable.

7.2. Protection of environment is essential for sustainable development. Therefore, improvement/protection of environment is one of the major priorities in the process of reconstruction. Afghanistan has already signed decrees on Desertification Biodiversity and Climate Change. We are fully supporting regional cooperation in preservation and development of environment. We believe that environment conservation is a common problem of all, thus, joint efforts ensure its sustainability.

7.3. Ministry of IWRE is planning to undertake the following activities as a first step towards regeneration /protection of the environment in Afghanistan:

1. Environment constitution development
2. Capacity building
3. Regeneration/management of the protected areas
4. Enforcement of laws and regulations leading to protection of environment in the country.
5. Active participation in the regional environment programme
6. Combat desertification
7. Protection of endangered species
8. Environment impact assessment
9. Assessment and control of air and water pollution
10. Natural resource management and development, particularly forests, rangelands and wildlife

8. Conclusion:

8.1. Afghanistan as a strife-torn nation has suffered heavy social and economic losses. Lack of management and development of natural resources has shaped the environment into a difficult condition. Long over use of natural resources by growing population and return of hundreds of thousands of refugees and

continuous drought has further aggravated the situation. Shortage of expertise and capital and weak institutional set-up is the other dimension of our suffering. Rehabilitation/reconstruction of the ruined Afghanistan is a big challenge for us. The Islamic Transitional State of Afghanistan, while firmly stepping towards peace and stability, is organizing a series of reconstruction activities at the national level that lead to prosperity of millions of Afghans and stability of the region.

- 8.2. Sound management and development of natural resources is a pillar for sustainable development. Under present circumstances, while drought is still continuing, management and efficient use of water resources is not only the priority for food security, but also a pre-condition for socio-economic development of the country. To achieve the goal, MIWRE has a wide programme for rehabilitation/reconstruction of the irrigation projects, construction of dams and reservoirs, implementation of watershed management and water harvesting catchments programmes/projects.

9. Protection and Development of Environment

Protection and development of environment is the other challenge that actively contributes to sustainable development. Priority is given to regeneration and protection of the environment. This could be achieved by a true assessment of the environment status and undertaking protective measures to avoid further deterioration. It requires a close coordination of the line departments, a well-organized working plan, institutional capacity and financial support.

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