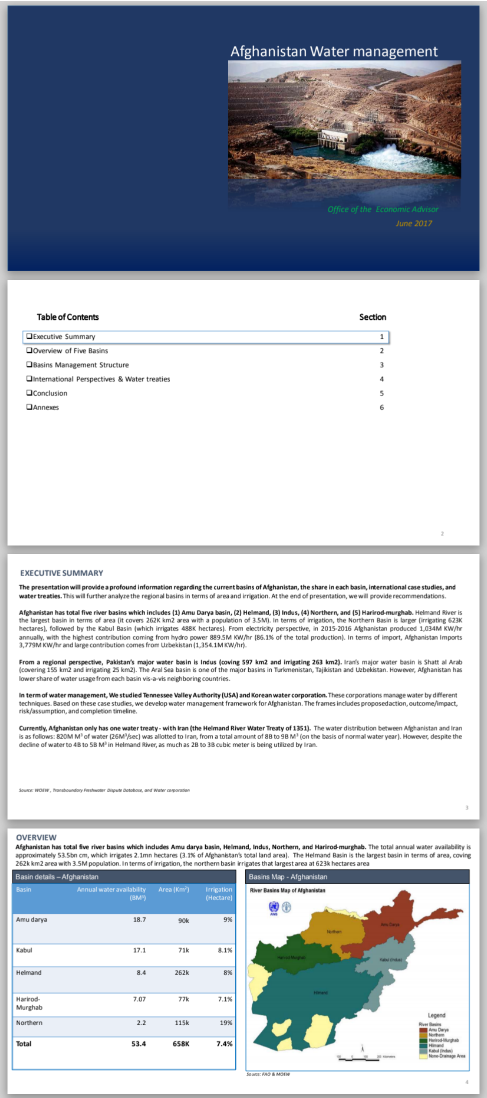

Afghanistan Water management

Office of the Economic Advisor

June 2017

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EXECUTIVE SUMMARY

The presentation will provide a profound information regarding the current basins of Afghanistan, the share in each basin, international case studies, and water treaties. This will further analyze the regional basins in terms of area and irrigation. At the end of presentation, we will provide recommendations.

Afghanistan has total five river basins which includes (1) Amu Darya basin, (2) Helmand, (3) Indus, (4) Northern, and (5) Harirod-murghab. Helmand River is the largest basin in terms of area (it covers 262K km2 area with a population of 3.5M). In terms of irrigation, the Northern Basin is larger (irrigating 623K hectares), followed by the Kabul Basin (which irrigates 488K hectares). From electricity perspective, in 2015-2016 Afghanistan produced 1,034M KW/hr annually, with the highest contribution coming from hydro power 889.5M KW/hr (86.1% of the total production). In terms of import, Afghanistan Imports 3,779M KW/hr and large contribution comes from Uzbekistan (1,354.1M KW/hr).

From a regional perspective, Pakistan's major water basin is Indus (coving 597 km2 and irrigating 263 km2). Iran's major water basin is Shatt al Arab (covering 155 km2 and irrigating 25 km2). The Aral Sea basin is one of the major basins in Turkmenistan, Tajikistan and Uzbekistan. However, Afghanistan has lower share of water usage from each basin vis-a-vis neighboring countries.

In term of water management, We studied Tennessee Valley Authority (USA) and Korean water corporation. These corporations manage water by different techniques. Based on these case studies, we develop water management framework for Afghanistan. The frames includes proposedaction, outcome/impact, risk/assumption, and completion timeline.

Currently, Afghanistan only has one water treaty - with Iran (the Helmand River Water Treaty of 1351). The water distribution between Afghanistan and Iran is as follows: 820M M^3 of water ($26M^3$/sec) was allotted to Iran, from a total amount of 8B to 9B M^3 (on the basis of normal water year). However, despite the decline of water to 4B to 5B M^3 in Helmand River, as much as 2B to 3B cubic meter is being utilized by Iran.

Source: WOEW , Transboundary Freshwater Dispute Database, and Water corporation

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OVERVIEW

Afghanistan has total five river basins which includes Amu darya basin, Helmand, Indus, Northern, and Harirod-murghab. The total annual water availability is approximately 53.5bn cm, which irrigates 2.1mn hectares (3.1% of Afghanistan's total land area). The Helmand Basin is the largest basin in terms of area, coving 262k km2 area with 3.5M population. In terms of irrigation, the northern basin irrigates that largest area at 623k hectares area

Basin details – Afghanistan

Basin	Annual water availability (BM^3)	Area (Km^2)	Irrigation (Hectare)
Amu darya	18.7	90k	9%
Kabul	17.1	71k	8.1%
Helmand	8.4	262k	8%
Harirod-Murghab	7.07	77k	7.1%
Northern	2.2	115k	19%
Total	**53.4**	**658K**	**7.4%**

Basins Map - Afghanistan

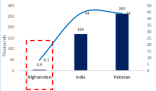
River Basins Map of Afghanistan
AIMS
Northern
Amu Darya
Harirod Murghab
Kabul (Indus)
Hilmand
Legend
River Basins
🟥 Amu Darya
🟧 Northern
🟩 Harirod-Murghab
🟦 Hilmand
⬜ Kabul (Indus)
🟨 None-Drainage Area
100 0 100 200 Kilometers

Source: FAO & MOEW

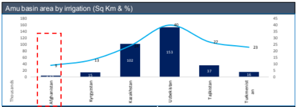
OVERVIEW

The below graphs show the basins area by irrigation in km2 and percentage of each country. Importantly, as compared to regional countries, Afghanistan has lower share of irrigation generated from each basin

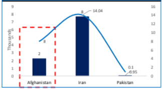
Kabul area by irrigation (Sq Km & %)



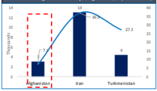
Amu basin area by irrigation (Sq Km & %)



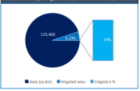
Helmand area by irrigation (Sq Km & %)



Harirod-Murghab area by irrigation (Sq Km & %)



Northern by irrigation (Hectare & %)



Source: FAO & Transboundary Freshwater Dispute Database, and MOEW

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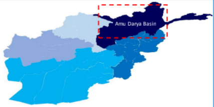
AMU DARYA BASIN: CURRENT STATUS

Amu basin covers 90k km2 area with 4.6 million population in Afghanistan and annual water availabity is 18.7b m3. In terms of irrigation it covers 41k hectare area of total Aral river basin. Total $149.4 million are spent on different development projects. No electricity is generated by the basin.

Amu Darya basin - Map


Amu Darya Basin

Basin Details

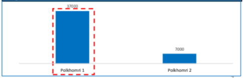
Basin Area	90k Km^2
Annual water availability	18.7 BM^3
Land under irrigation	417k ha
Improvable land area	104k ha
Basin Population	4.6m
Current utilization in the basin	5.8 Bm^3
Average annual rainfall	393mm

**The projects include Canals, siphons, flood breaker, snow gauge, Hydrology stations, Meteorology, and dust laboratory buildings in the River Basin*

Projects – Amu Darya basin

Province	Implemented projects*		Area Under Irrigation (ha)		
	No of Projects	Project Cost (m$)	Before Project	After Project	Improvement
Badakhshan	90	7,108,930	22,268	26,335	4,067
Takhar	123	12,331,184	128,930	139,100	10,170
Dasht Qala	34	11,628,477	29,537	41,047	11,510
Kuduz	117	15,673,409	155,660	180,639	24,979
Baghlan	133	13,912,229	111,298	127,467	16,169
Bamyan	156	14,240,295	9,320	11,501	2,181
Ashkashem	6	161,978	350	400	50
Total	659	**75**	**457,363**	**526,489**	**69,126**

irrigation Dams (ha) – Amu Basin

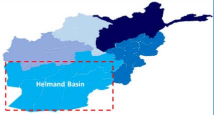


Source: Ministry of Energy and water

HELMAND BASIN: CURRENT STATUS

Helmand basin covers 262k km2 area with 3.5 million population in Afghanistan and annual water availabity is 8.4 bm3. In terms of irrigation it covers 229k hectare area of total Helmand basin. Helmand basin generates 52 Mega watt electricity from kakaji dam.

Helmand basin Map


Helmand Basin

Basin Details

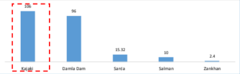
Basin Area	262k Km^2
Annual water availability	8.4 BM^3
Land under irrigation	229k ha
Basin Population	3.5m
Current utilization in the basin	5.3 Bm^3
Average annual rainfall	180 mm

Source: Ministry of Energy and water

Projects – Helmand basin

Province	Completed Projects	Price of the contracts (m$)	Value of endangered houses, mosques, Public Establishment, and road (m$)	Endangered Lands	Endangered families	Area length (m)
Uruzgan	3	291,157	0	0	0	800
Daikundi	1	10,000	0	0	0	230
Nimroz	10	4,776,611	70,000,000	4000	2000	6,300
Helmand	5	523,406	1,300,000	0	5	975
	19	5.6	71.3	4,000	2,005	8,305

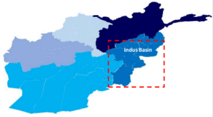
irrigated area by Dams (ha) – Helmand basin (Thousand)



INDUS BASIN (Kabul river): CURRENT STATUS

Indus river covers 71k km2 area with 11.9 million population in Afghanistan and annual water availabity is 17.1b m3. In terms of irrigation it covers 488k hectare area of total Indus river basin. Kabul basin generates 206.6 Mega watt electricity and USD$149.4 million are spent on different development projects .

INDUS BASIN (Kabul river) Map


Indus Basin

Projects – Kabul Basin

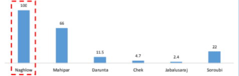
Province	Implemented projects*		Area Under Irrigation (ha)		
	No of Projects	Project price (m$)	Before Project	After Project	Improvement
Kabul	108	13	51,113	57,356	6,243
Nangarhar	312	40.6	115,773	127,359	11,586
Parwan	73	32.7	41,162	65,021	23,859
Panjsher	27	1.5	1,476	2,027	551
Kapisa	31	4.7	28.054	36,311	8,257
Ghazni	17	1.6	8,242	9,405	1,163
Logar	29	4.9	14,050	17,538	3,488
Khost	107	10.7	21,469	27,882	6,413
Noristan	13	2.7	900	1,460	560
Paktika	7	2.4	1,460	2,865	1,405
Paktia	18	0.9	5,784	6,490	706
Wardak	35	4	8,224	9,979	1,755
Laghman	82	18.2	25,416	28,445	3,029
Kunar	68	11.7	25,363	31,645	6,282
Total	**927**	**149.4**	**320,460**	**423,783**	**75,297**

Basin Details

Basin Area	**71239.49 KM²**
Annual water availability	17.1Bm³
Land under irrigation	488,948 ha
Improvable land area	480,000 ha
Basin Population	11.9m
Current utilization in the basin	5.3 Bm³
Average annual rainfall	379mm

**The projects include Canals, siphons, flood breaker, snow gauge, Hydrology stations, Meteorology, and dust laboratory buildings in the Kabul River Basin*

Electricity Production (MW) - Kabul Basin

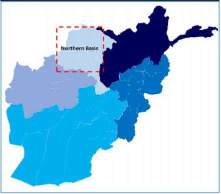


Source: Ministry of Energy and water

NORTHERN BASIN: CURRENT STATUS

Northern basin covers 115k km2 area with 3.8 million population in Afghanistan and annual water availabity is 2.2b m3. In terms of irrigation it covers 623k hectare area of total basin. Total USD$39.9 million are spent on different development projects. No electricity is generated by the basin.

NORTHERN BASIN - Map


Northern Basin

**The projects include Canals, siphons, flood breaker, snow gauge, Hydrology stations, Meteorology, and dust laboratory buildings in the Basin*

Basin Details

Basin Area	**115,400 KM²**
Annual water availability	2.2 Bm³
Land under irrigation	**623**k ha
Improvable land area	480k ha
Basin Population	3.8 m
Average annual rainfall	229mm

Projects – Northern Basin

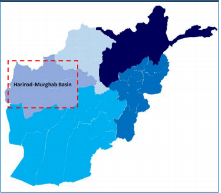
Province	Implemented Projects*		Under Irrigation Area in ha		
	Numbers	Project Cost (m$)	Before Project	After project	Improvement
Balkh	33	10,794,830	291,300	301,665	10,365
Sare Pul	50	5,376,997	17,390	20,934	3,544
Samangan	68	6,186,408	30,554	36,170	5,616
Faryab	96	13,035,876	34,367	40,798	6,431
Jowzjan	29	4,523,091	49,997	54,249	4,252
Total	**276**	**39.9**	**423,608**	**453,816**	**30,208**

Source: Ministry of Energy and water

HARIROD-MURGHAB BASIN: CURRENT STATUS

Harirod-Murghab basin covers 77k km2 area with 3.5 million population in Afghanistan and annual water availabity is 2.5b m3. In terms of irrigation it covers 304k hectare area of total basin. Total USD$65.8 million are spent on different development projects. Harirod-Murghab basin generates 52 Mega watt electricity from Salma dam

NORTHERN BASIN - Map


Harirod-Murghab Basin

**The projects include Canals, siphons, flood breaker, snow gauge, Hydrology stations, Meteorology, and dust laboratory buildings in the Basin*

Basin Details

Basin Area	**77,604 KM²**
Annual water availability	2.53 Bm³
Land under irrigation	**304**k ha
Improvable land area	480k ha
Basin Population	3.5 m
Current water usage	**1.8 Bm³**
Average annual rainfall	221mm

Province	**Implemented Projects***		**Under Irrigation Area in ha**		
	Numbers	**Project Cost (m$)**	**Before Project**	**After project**	**Improvement**
Herat	78	42,514,920	70,629	105,855	35,226
Farah	21	3,011,669	33,839	45,678	11,839
Badghis	45	7,026,341	31,009	39,743	8,734
Ghor	42	13,238,848	18,420	27,256	8,836
Total	186	65.8	153,897	218,532	64,635

Source: Ministry of Energy and water

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MANAGEMENT OF BASINS: UNDERGROUND WATER

MoEW manage both underground water and surface water by conducting two main methods/techniques, Hydrological and metrological techniques. The below tables indicate the underground water management of each basin and its five years plan. We found that some basins do not have hydrologic work activity in term of management in some provinces.

NORTHERN BASIN

Province	Current status	5 years plan
Balkh,	40 wells are monitored monthly 100 geophysical spots have been done	Excavation of 20 wells for monitoring purpose Finding water potential Preparation of hydrological map
Jowzjan	Hydrological exploring activities of Qarakont was done in 1983	Data Collection Creating monitoring system in existing wells
Faryab	Preparation of hydrological map of And khoy by NORPLANE.	Data Collection Creating monitoring system in existing wells
Sare Pul, & Samangan	40 wells are monitored monthly 100 geophysical spots have been done	Data Collection Creating monitoring system in existing wells

HELMAND BASIN

Province	Current Condition	5 year plan
Helmand, Nimroz, Qandahar, Uruzgan, Zabul &Daikundi	No hydrologic work has been done so far	Information collection establishing monitoring system in the existing wells

AMU BASIN

Province	Current Condition	5 year plan
Baghlan	180 Hydrologic exploratory activities have been conducted in Polkhomri	Collection of information. Devising monitoring system in the existing wells
Bamyan, Takhar Badakhshanr	No activity	No plan

Source: Ministry of Energy and water

KABUL BASIN

province	Current status	5 years plan
Kabul	117 wells are under monitoring & Hydrological map has been already prepared.	digging of 30 wells specially for monitoring, quantitative and qualitative monitoring of 117 wells, and building efficient personnel
Logar Paktiya	No activity	Collecting data & Creating monitoring system in existing wells
Paktika, Khost, Ghazni, Wardak, Kapisa & Laghman	No practical activity has been done	No Plan
Nangrahar	Quantitative monitoring of the underground water in 20 wells of Jalal Abad city	Excavation of 15 wells for monitoring purpose, finding water potential Preparing, and hydrological map

HARIROD-MURGHAB BASIN-

Province	Current Condition	5 year plan
Herat	Monitoring of 30 wells in Herat & 10 test wells have been excavated in Shaladya	Excavation of 20 wells for monitoring purpose and Finding water potential. Preparation of hydrological map
Farah, Badghis, & Ghor	No hydrological activities have been done	Data Collection & Creating monitoring system in the existing wells

Note: In underground water, MoEW conducts hydrological work in order to find the quality of water for drinking.

MANAGEMENT OF BASINS: SURFACE WATER

The below tables indicate the surface water management of each basin and its five years plan. We found that all basins do not have alert system in order to tackle the flood in advance.

SURFACE WATER MANAGEMENT SECTION

Activities	Current status					5 years Plan				
	Kabul	Helmand	Northern	Murghab	Amu	Kabul	Helmand	Northern	Murghab	Amu
Data collection of hydrology, meteorology and snow gauge from respective basin	53	21	21	14	49	64	39	24	31	63
Hydrology and meteorology data analysis	53	21	21	14	49	64	39	24	31	63
Installation of required hydrology stations in the basin	41	17	18	14	35	11	34	5	12	12
To survey Afghanistan Glaciers through remote sensing	0	0	0	0	0	1	34	1	1	1
To improve the quality of hydro meteorology data	10	5	6	5	8	64	34	24	21	63
Creation of alert system in respective basin	0	0	0	0	0	20	0	10	2	30

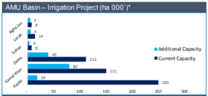
Note: The numbers for each basin indicate the hydrological and meteorology, and alert system stations. These stations are developed to identify the surface water quantity, supply of water, raining & snow quantity, and tackle the flood etc. In each station, MOEW is performing different activities (Current status) related with hydrology and meteorology work. In next 5 years MOEW wants to increase hydrology and Meteorology station increase in each basin. In addition, to install alert system in each basin

Source: Ministry of Energy and water

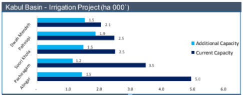
PLANNED DAM & IRRIGATION PROJECTS (5 years Plan) - MANAGEMENT OF BASINS

The below graphs indicate irrigation projects in each basin. In the graphs we show the current and expected capacities of all basins. The current capacity means the dams current irrigation capacity. The additional capacity means, the increment or improvement in current capacity if the investment takes place.

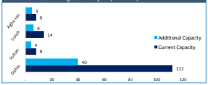
AMU Basin – Irrigation Project (ha 000`)*



Kabul Basin - Irrigation Project (ha 000`)



Helmand Basin - Irrigation Project (ha 000`)**

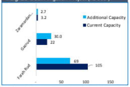


**Two other electricity (MW) projects are also in five years plan: Warsej Dam and Anjaran Dam which produces 54 and 15 MW electricity*

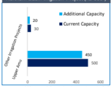
***Kajaki and Kamal produces 100 and 9.5 MW electricity*

Source: Ministry of Energy and water

Murghab Basin-Irrigation Project (ha 000`)



Northern Basin Irrigation Project (ha 000`)



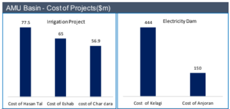
Northern Basin: Upper Amu project also has the capacity to generate 1000MW. Other irrigation projects include Almar, Khesht Pul, Sultan Ibrahim, Shorabah, Shah Abdullah, Dahaneh Darah, and Abkali

Note: In the graphs we showed the major projects in terms of irrigation Besides there are Dams which produce electricity as well.

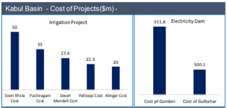
PLANNED PROJECTS COST - 5 YEARS PLAN

The below graphs indicate planned Dams and irrigation projects in each basin. The cost has divided into two parts, irrigation projects cost and electricity dam cost.

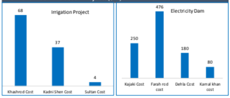
AMU Basin - Cost of Projects($m)



Kabul Basin - Cost of Projects($m) -

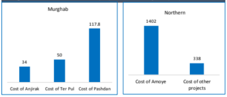


Helmand Basin - Cost of Projects($m)



Source: Ministry of Energy and water

Murghab and Northern basins (Ha) - Cost of Projects($m)

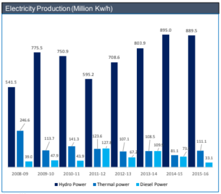


Note: The cost of projects are estimated by MoEW, it might be changed

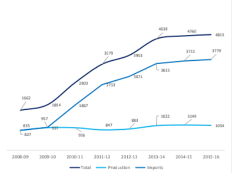
CURRENT ELECTRICITY PRODUCTION - AFGHANISTAN

In 2015-2016 Afghanistan produced 1,034 million kw/h annually and high contribution comes from hydro power 889.5 million kw/h which makes 86.1% of the total production. In terms of import, Afghanistan Imports 3,779 million kw/h and high contribution comes from Uzbekistan which is 1,354.1 million kw/h

Electricity Production (Million Kw/h)



Import versus production– Electricity (Million Kw/h)



Source: CSO

Note: In 2011-2012 the electricity production has declined, we shared this concern with DADS officials and waiting for their response.

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WATER TREATIES – AFG & IRAN

Currently, Afghanistan only has one water treaty with Iran. As per this water treaty of 1,351 regarding Helmand River water distribution between Afghanistan and Iran; around 820Million M^3 of water (26M^3/sec) was allotted for Iran, from a total amount of 8 to 9 Billion M^3 (on the basis of Normal Water Year). However, despite the decline of water to 4 to 5 Billion M^3 in Helmand River, as much as 2 to 3 billion cubic meters is currently being utilized by Iran.

Water Treaties

Month	Average water distribution (meter³/sec) on the basis of 22M³/sec*	Average water distribution on the basis of 4M³/sec**	Average water distribution on the basis of sum of pillar 1 and 2 of this table (26M³)
October	4,23	0,77	5,00
November	10,75	1,98	12,72
December	19,48	3,56	23.04
January	29,35	5,32	34,67
February	66,12	12,04	78,16
March	61,90	11,23	73,13
April	26,30	4,81	31,11
May	7,64	1,39	9,03
June	16,71	3,02	19,73
July	11,61	2,11	13,72
August	7,93	1,44	9,37
September	1,98	0,34	2,32

**It is based on normal water year where Iran has the right to use the mentioned figure (m3/sec) each month according to water treaty.*

***It is bonus water to Iran being a good neighbor according to water treaty*

Source: Directorate of treaties, MoF

WATER TREATIES – REGIONAL OVERVIEW

The below tables indicate information regarding regional countries water's treaties. The water treaty helps countries to identify the right of usage of the water in order to prevent water conflict between the nations. In below tables we took examples of four countries in this regard where the water distribution is divided among the countries based on treaty.

Water treaty – Indus Basin

Categories	Pakistan	India
Water distribution	80%	20%
Water flow	173.63B meter3	73.31B meter3
Basin area	597k (sq km)	383k (sq km)
Irrigation area	262k (sq km)	168k (sq km)
Population	144m	83m
Dams	2	3
Treaty enforcement	1960	196o

Source: Transboundary Freshwater Dispute Database

Water Treaty – Atrak Basin

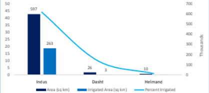
Categories	Iran	Turkmenistan
Water distribution	81%	19%
Water flow	26000 KM2	6000Km2
Basin area	23k (sq km)	10k (sq km)
Irrigation area	5,700(sq km)	200(sq km)
Population	868k	46k
Dams	0	0
Treaty enforcement	1926	1926

Note: In treaty tables, we also included information regarding the current status of the basin.

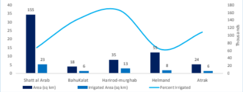
INTERNATIONAL OVERVIEW

From regional perspective, Pakistan's major water basin is Indus which covers 597 km2 and irrigate 263 km2 area. Iran's major water basin is shatt al Arab which covers 155 km2 and irrigate 25 km2 area. The Aral sea basin is one of the major basins in Turkmenistan, Tajikistan and Uzbekistan.

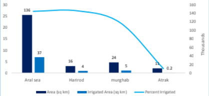
Pakistan's Basins



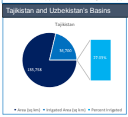
Iran's Basins

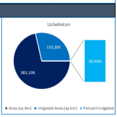


Turkmenistan 's Basins



Tajikistan and Uzbekistan's Basins



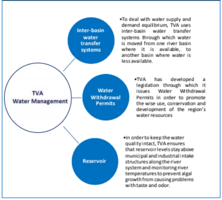


Source: Transboundary Freshwater Dispute Database

WATER MANAGEMENT – INTERNATIONAL OVERVIEW

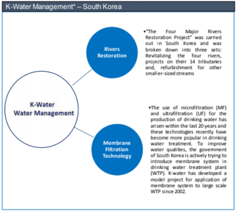
The below diagrams represents Tennessee Valley Authority (UAS) and Korea Water Resources Corporation (South Korea) water management. In this regard TVA undertakes 3 main steps to ensure better water management and K-water takes main two steps for better water management.

Tennessee Water Management - USA


TVA
Water Management
Inter-basin water transfer systems
Water Withdrawal Permits
Reservoir

- To deal with water supply and demand equilibrium, TVA uses inter-basin water transfer systems through which water is moved from one river basin where it is available, to another basin where water is less available.
- TVA has developed a legislation through which it issues Water Withdrawal Permits in order to promote the wise use, conservation and development of the region's water resources
- In order to keep the water quality intact, TVA ensures that reservoir levels stay above municipal and industrial intake structures along the river system and monitoring river temperatures to prevent algal growth from causing problems with taste and odor.

K-Water Management* – South Korea


K-Water
Water Management
Rivers Restoration
Membrane Filtration Technology

- "The Four Major Rivers Restoration Project" was carried out in South Korea and was broken down into three sets: Revitalizing the four rivers, projects on their 14 tributaries and, refurbishment for other smaller-sized streams
- The use of microfiltration (MF) and ultrafiltration (UF) for the production of drinking water has arisen within the last 20 years and these technologies recently have become more popular in drinking water treatment. To improve water qualities, the government of South Korea is actively trying to introduce membrane system in drinking water treatment plant (WTP). K-water has developed a model project for application of membrane system to large scale WTP since 2002.

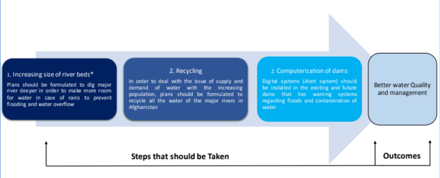
Resources
http://english.kwater.or.kr/eng/ *and* http://english.kwater.or.kr/eng/tech/
https://www.tva.gov/

**In addition to that K Water hosts international conferences on water management in order to encourage research on finding ways to handle efficient water management.*

ACTION PLAN FOR BETTER WATER MANAGEMENT IN AFGHANISTAN

Based on the case studies of these two countries, we came up with the following framework/action plan for better water management in Afghanistan. We developed a framework for this action plan including proposed action, outcome/impact, risk, and time line. Please refer the Annex 1

ACTION PLAN



1. Increasing size of river beds*

Plans should be formulated to dig major river deeper in order to make more room for water in case of rains to prevent flooding and water overflow

2. Recycling

In order to deal with the issue of supply and demand of water with the increasing population, plans should be formulated to recycle all the water of the major rivers in Afghanistan

2. Computerization of dams

Digital systems (Alert system) should be installed in the existing and future dams that has warning systems regarding floods and contamination of water

Better water Quality and management

Steps that should be Taken

Outcomes

**Please refer annex 2*

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❑Overview of Five Basins 2
❑Basins Management Structure 3
❑International Perspectives & Water treaties 4
❑Conclusion 5
❑Annexes 6

CONCLUSION

Based on current analysis, we come up with following conclusion

CONCLUSION

- **Afghanistan has total five river basins which includes Amu darya basin, Helmand, Indus, Northern, and Harirod-murghab.**
- **In terms of area, the Helmand river is wider basin in terms of area which covers 262k km2 area with 3.5 million population.**
- **In terms of irrigation, The Northern basin is wider which irrigates 623k hectare area followed by Kabul basin which irrigates 488k hectare area.**
- **In terms of management, The basins are managed by two sections: (1) Underwater management and surface water management .**
- **MOEW planned various projects in terms of energy, irrigation, Hydrologic , and alert systems. However the MOEW do not have fund or donors to support these projects.**
- **From international perspective, water management/supply, waste management, and energy services are provided and managed by corporations.**
- **In terms of water treaties, currently Afghanistan only has water treaty with Iran.**

Source: Directorate of treaties, MoF,and Transboundary Freshwater Dispute Database.

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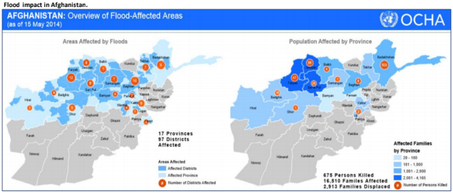
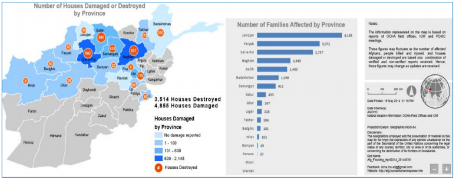
ANNEX-2

Flood impact in Afghanistan.


AFGHANISTAN: Overview of Flood-Affected Areas
(as of 15 May 2014)
OCHA
Areas Affected by Floods
Badakhshan
Balkh
Kunduz
Takhar
Faryab
Jawzjan
Samangan
Baghlan
Sari Pul
Badghis
Hirat
Bamyan
Panjshir
Nuristan
Kapisa
Laghman
Kunar
Parwan
Wardak
Kabul
Logar
Nangarhar
Ghor
Daykundi
Ghazni
Paktya
Khost
Farah
Uruzgan
Zabul
Paktika
Nimroz
Hilmand
Kandahar
17 Provinces
97 Districts
Affected
Areas Affected
Affected Districts
Affected Province
Number of Districts Affected
Population Affected by Province
675 Persons Killed
16,510 Familes Affected
2,913 Families Displaced
Affected Families by Province
20 - 100
101 - 1,000
1,001 - 2,000
2,001 - 4,165
Number of Persons Killed

ANNEX-2.1


Number of Houses Damaged or Destroyed by Province
Badakhshan
Balkh
Jawzjan
Kunduz
Takhar
Faryab
Samangan
Sar-e-Pul
Baghlan
Badghis
Bamyan
Nuristan
Kunar
Hirat
Ghor
Wardak
Nangarhar
Daykundi
Paktya
Ghazni
Uruzgan
Paktika
Farah
Zabul
Nimroz
Hilmand
Kandahar
3,514 Houses Destroyed
4,855 Houses Damaged
Houses Damaged by Province
No damage reported
1 - 100
101 - 600
600 - 2,148
Houses Destroyed
Number of Families Affected by Province
Jawzjan 4,165
Faryab 3,072
Sar-e-Pul 2,737
Baghlan 1,645
Balkh 1,483
Badakhshan 1,056
Samangan 912
Kabul 433
Ghor 247
Logar 228
Takhar 184
Badghis 181
Hirat 102
Bamyan 45
Parwan 20
Khost
Wardak
0 100 200 Km

Notes:

The information represented on the map is based on reports of OCHA field offices, IOM and PDMC meetings.

These figures may fluctuate as the number of affected Afghans, people killed and injured, and houses damaged or destroyed are based ona combination of verified and non-verified reports received. Hence, these figures may change as updates are received.

Date Printed: 16 May 2014 01:19 PM

Data Source(s):
ASCHO
Natural disaster information: OCHA Field Offices and IOM

Projection/Datum: Geographic/WGS-84

Disclaimers:
The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

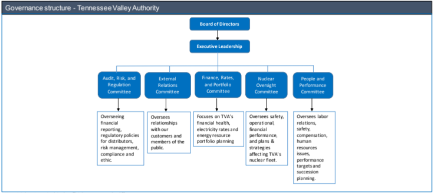
Doc Name:
Afg_Flooding_April2014_20140516

Feedback: ocha.imu.afg@gmail.com
Website: http://afg.humanitarianresponse.info

TENNESSEE (TVA)- INTERNATIONAL OVERVIEW

TVA or the Tennessee Valley Authority is a corporate agency of the United States that provides electricity for business customers and local power distributors serving 9 million people in parts of seven southeastern states. TVA receives no taxpayer funding, deriving virtually all of its revenues from sales of electricity

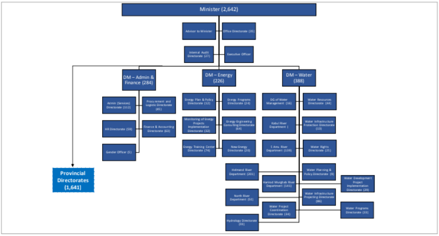
Governance structure - Tennessee Valley Authority


Board of Directors
Executive Leadership
Audit, Risk, and Regulation Committee
External Relations Committee
Finance, Rates, and Portfolio Committee
Nuclear Oversight Committee
People and Performance Committee
Overseeing financial reporting, regulatory policies for distributors, risk management, compliance and ethic.
Oversees relationships with our customers and members of the public.
Focuses on TVA's financial health, electricity rates and energy resource portfolio planning
Oversees safety, operational, financial performance, and plans & strategies affecting TVA's nuclear fleet.
Oversees labor relations, safety, compensation, human resources issues, performance targets and succession planning.

Note: It is how I perceived it, the official structure maybe different

Source: Tennessee Valley Authority

ANNEX#1: MOEW ORGINZATION STRUCTURE

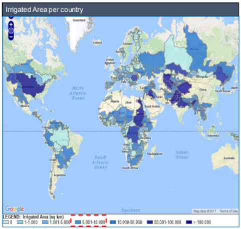

Minister (2,642)
Advisor to Minister
Office Directorate (35)
Internal Audit Directorate (27)
Executive Officer
DM – Admin & Finance (284)
DM – Energy (226)
DM – Water (388)
Admin (Services) Directorate (112)
Procurement and Logistic Directorate (45)
HR Directorate (59)
Finance & Accounting Directorate (63)
Gender Officer (5)
Energy Plan & Policy Directorate (12)
Energy Programs Directorate (24)
Monitoring of Energy Projects Implementation Directorate (32)
Energy-Engineering Consulting Directorate (64)
Energy Training Center Directorate (74)
New-Energy Directorate (20)
DG of Water Management (16)
Water Resources Directorate (44)
Kabul River Department (
Water Infrastructure Protection Directorate (13)
S Amu River Department (139)
Water Rights Directorate (25)
Helmand River Department (201)
Water Planning & Policy Directorate (9)
Harirod Murghab River Department (141)
Water Development Project Implementation Directorate (29)
North River Department (51)
Water Infrastructure Projecting Directorate (86)
Water Project Coordination Directorate (34)
Water Programs Directorate (33)
Hydrology Directorate (55)
Provincial Directorates (1,641)

Source: AOP

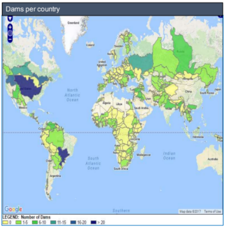
ANNEX#2: IRRGATION AREA BY MAP

The below maps show the irrigation area and number of Dams per country

Irrigated Area per country


Google
Map data ©2017 Terms of Use
LEGEND: Irrigated Area (sq km)
0
1-1,000
1,001-5,000
5,001-10,000
10,000-50,000
50,001-100,000
> 100,000

Dams per country


Google
Map data ©2017 Terms of Use
LEGEND: Number of Dams
0
1-5
6-10
11-15
16-20
> 20

Source: Transboundary Freshwater Dispute Database