



Natural capital accounts

National Accounts Wing



Outline of presentation

- Background
- Natural Capital Accounts (NCA) (Introduction)
- Data requirements of NCA
- The case of Pakistan
- Current Status
 - Land Accounts
 - Agriculture
 - Forestry
 - Water
 - Minerals and Energy Resources



Background

- ▶ Pakistan is facing environmental shocks in the shape of heat waves, floods and heavy rains which bring havoc in the country
- ▶ Due to these disasters, per capita Natural Capital Wealth of Pakistan decreased significantly from 5,982 US\$ in 2014 to 2,376 US\$ in 2018 (WB, 2018 and 2021)
- ▶ There is a need at government to have complete database of natural resources within the country. This can be achieved by quantification of natural capital in the shape of Natural Capital Accounts (NCA).
- ▶ To streamline and bring it into the statistical system of the country, Pakistan Bureau of Statistics (PBS) has taken an initial step by creating a dedicated “Natural Capital Accounting (NCA)” section within National Accounts Wing.

Natural Capital Accounts -Introduction



NCA can support delivery of the SDGs by ensuring that natural resources are included in planning and implementation at the national and sub-national levels.

Water accounts – SDG 6

Energy accounts – SDG 7

Fisheries accounts – SDG 14

Land accounts – SDG 15

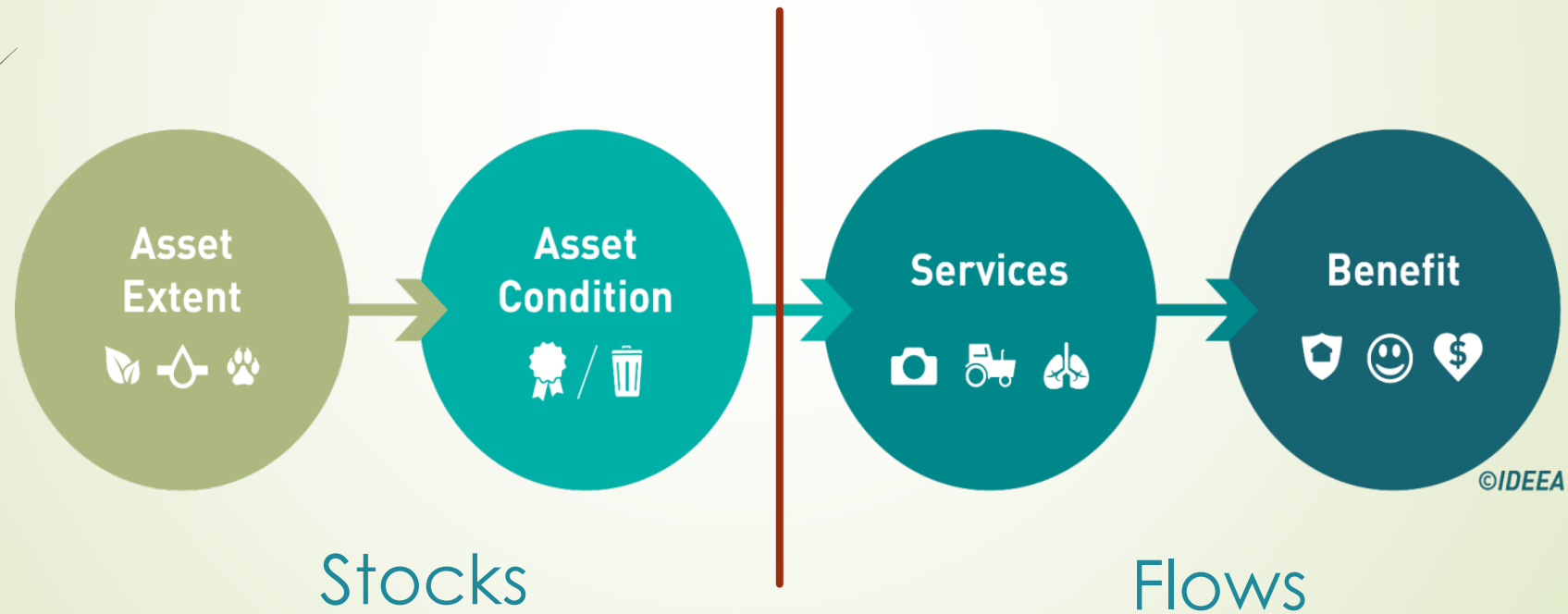
NCA helps policy makers to understand the dependence of economic development on natural resources, both for supplying materials and services as well as for absorbing waste and pollution.

NCA is developed by following System of Environmental Economic Accounting (SEEA) 2012.

SEEA is an invaluable tool for compiling integrated statistics, deriving coherent and comparable indicators and measuring progress towards sustainable development goals

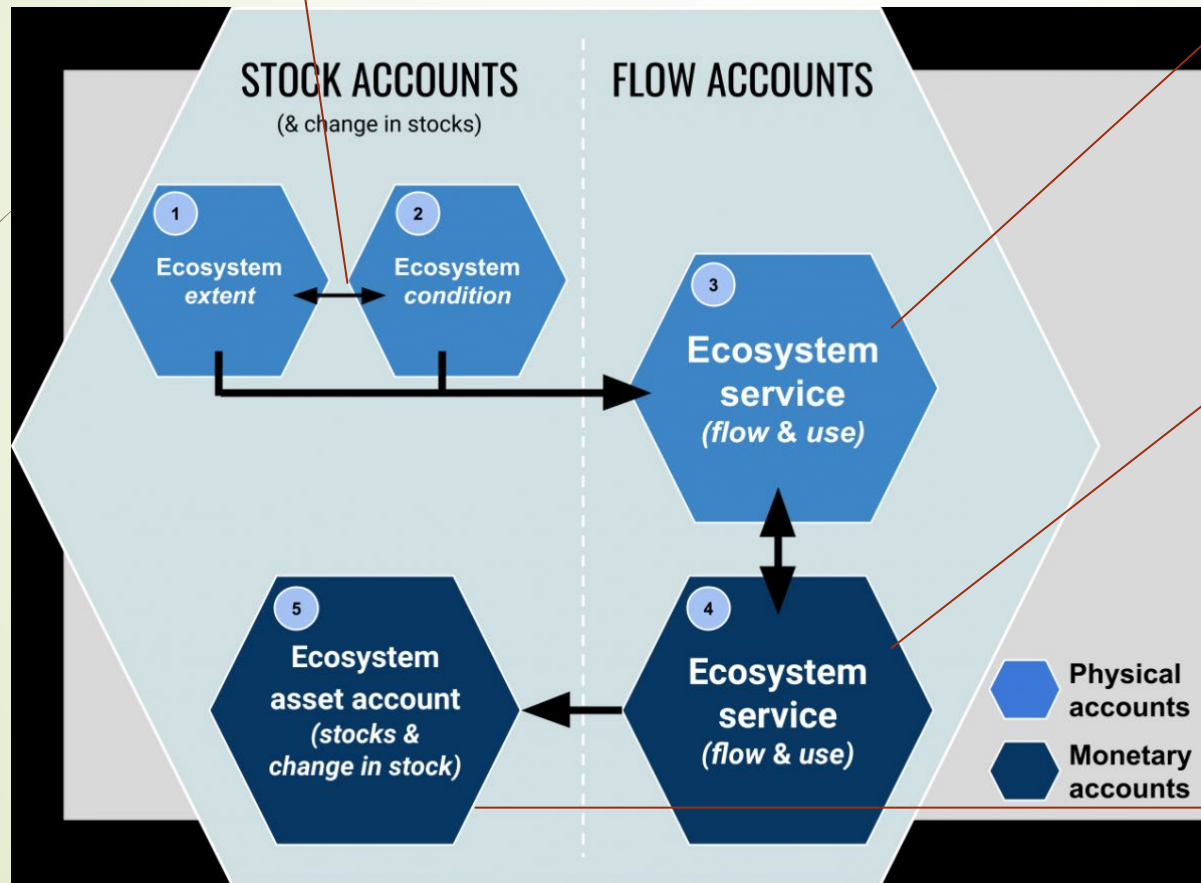
Core Ecosystem Accounting Framework

Starting point for developing NCA: “Four Box model”



Set of Natural Capital Accounts

Links to biodiversity assessment



Mapping and quantifying flows to beneficiaries

Gross ecosystem product (GEP) – the ecosystem contribution

Wealth accounting connections: Value of natural capital

Data Requirements of NCA



Extent / Area

1. Maps of ecosystem types
2. Protected area boundaries



Ecosystem condition

1. Forest data on tree age and density
2. Species data
3. Carbon stock
4. Water quality
5. Pressures (e.g. erosion, invasive species, disease, over harvesting)



Ecosystem services

1. Wood, grazing, medicines
2. Water supply
3. Carbon sequestration and retention
4. Recreation / visitation



Benefits

1. Population data
2. Incomes
3. Health outcomes
4. Non-market environmental values



The Case of Pakistan Current Status

NCA - Pakistan

- ▶ After establishment of NCA section following steps have been taken
 - ▶ Review of literature pertaining to NCA and related case studies of India, China, and Rwanda
 - ▶ Establishment of initial framework for physical asset accounts of four natural resources namely **land, forest, water and minerals**
 - ▶ Land accounts in literature are classified into **land cover** and **land use** accounts, however keeping in view the data availability mixed approach of land cover – land use accounts have been adopted in Pakistan like that of india
 - ▶ Initial work on forest accounts has been initiated
 - ▶ Similarly initial work on water accounts and mineral accounts has also been initiated
 - ▶ Sources of data have been identified

Land Accounts

Sl.	Level-I	Level-II
I.	Built-up	Urban
		Rural
		Mining
II.	Agriculture	Crop land
		Plantation
		Fallow
III.	Forest	Evergreen / Semi-evergreen
		Deciduous
		Forest Plantation
		Scrub Forest
		Swamp / Mangroves
IV.	Grass/ Grazing	Grass/ Grazing
V.	Barren unculturable / Wasteland	Salt Affected Land
		Gullied / Ravinous Land
		Scrub land
		Sandy area
		Barren rocky
VI.	Wetlands / Water Bodies	Inland Wetland
		River / Stream / canals
		Water bodies
VII	Snow and Glacier	Snow

Land Accounts

000 Km²

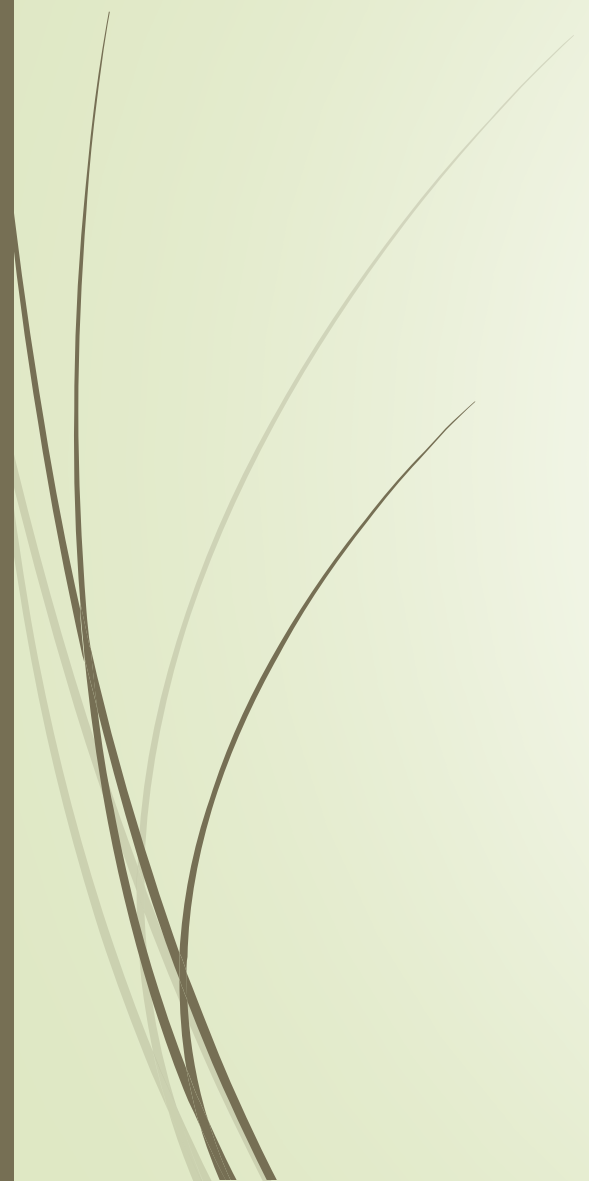
Category	KPK	Baluchistan	Sindh	Punjab	Pakistan
Built-up	1.70	1.29	3.32	6.87	13.18
Cropland	22.16	29.63	62.64	125.09	239.51
Plantation	0.24	0.69	1.25	2.62	4.81
Forest	9.26	3.93	1.15	3.26	17.61
Grass land	17.49	22.44	6.47	20.92	67.32
Barren Land	14.74	287.90	54.78	43.05	400.47
Wet Land	0.71	1.37	11.48	3.57	17.13
Snow and Glaciers	8.26	-	-	-	8.26
Total	74.56	347.25	141.09	205.38	768.28

Source FAO, 2014, 2016, 2017

Physical Asset Accounts Agriculture land Use

(000Sq.Km)

Category	Opening Stock July 2015	Addition to stock	Reduction in stock	Closing stock June 2021	Average Annual Growth Rate (2015-2021)
Cropland	156.47	7.29	6.57	157.20	0.09
Current fallow	71.00	4.86	12.08	63.78	-2.12
Subtotal	227.47	12.15	18.64	220.98	-0.58
Forest	39.98	7.58	1.72	45.85	2.78
Culturable Waste	82.59	1.69	3.19	81.08	-0.37
Subtotal	122.57	9.27	4.91	126.93	0.70
Total	350.04	21.42	23.56	347.91	-0.12



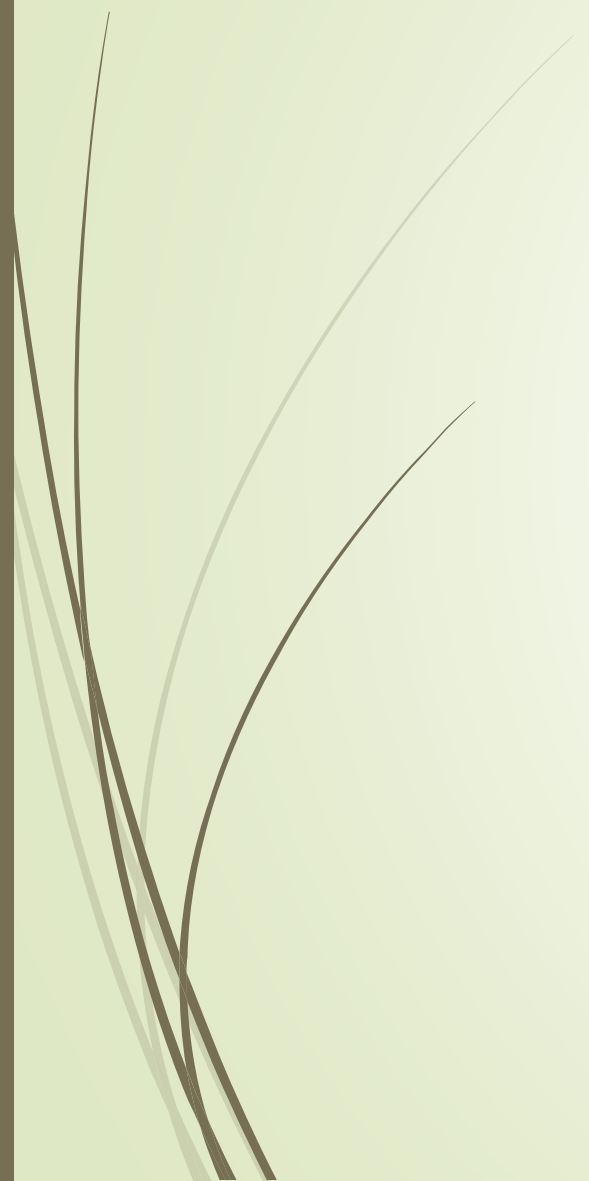
Forest accounts

Detail of Forests in Pakistan (000 Hectares) (By legal status)

Category	Sub-Category	KPK	Punjab	Sindh	Balochistan	GB	AJK	Total
State Forests	Reserved	94	337	405	125	0	567	1528
	Protected	471	220	464	371	74	0	1600
	Un-classed	105	113	13	0	0	0	231
	Resumed	36	2	111	0	0	0	149
Private Forests	Guzara	279	68					347
	Communal	50				279		329
	section 38	8	14	0	0	0		22
	Choas Act				3			3
	Miscellaneous	875	15	0	371	461	0	1722
Total		1918	769	993	870	814	567	5931

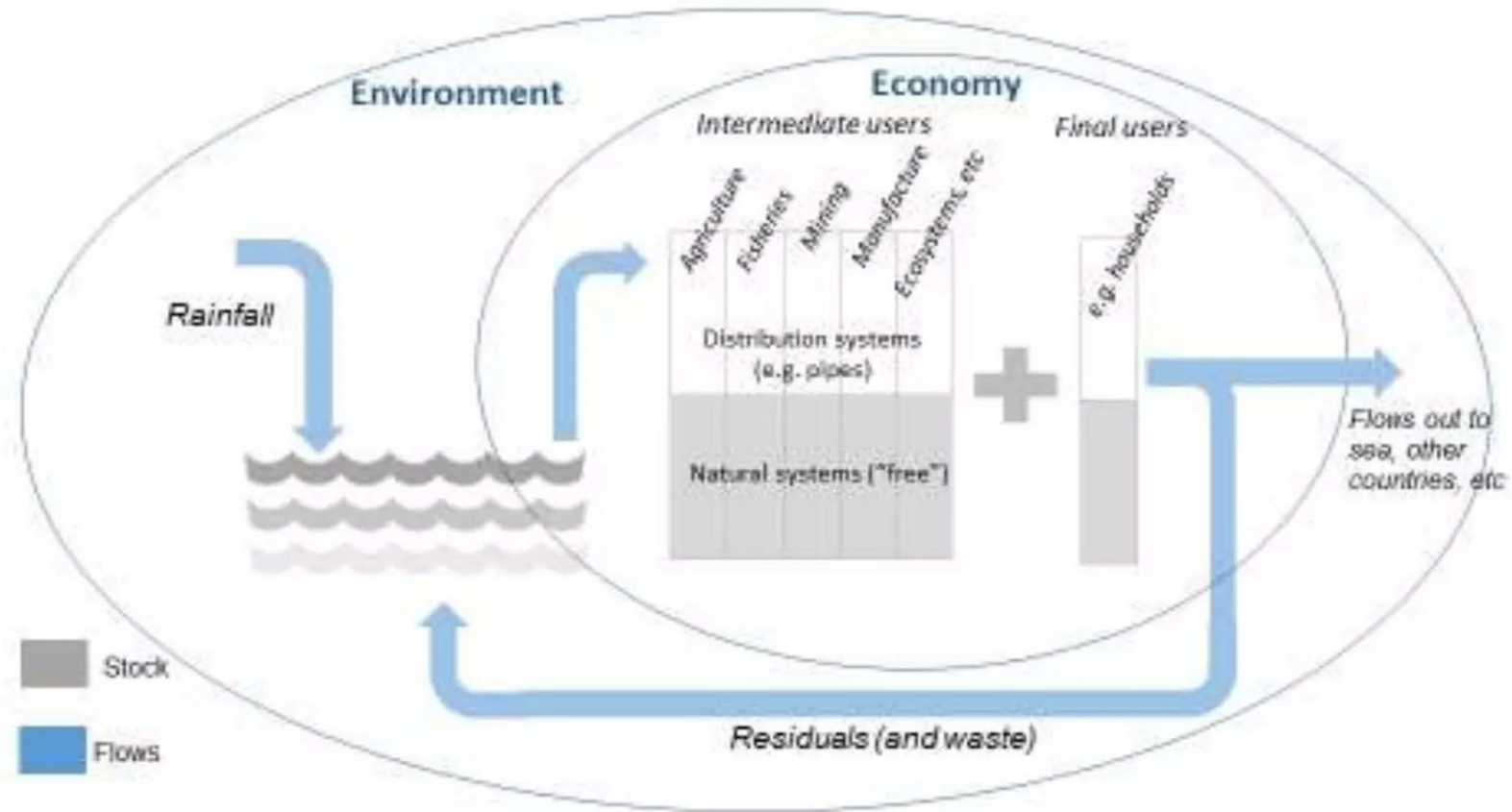
Detail of Forests in Pakistan 2012-13 (000 Hectares) (By vegetation type)

Forest Type	KPK	Punjab	Sindh	Baluchistan	GB	AJK	Total Area	Percentage
Coniferous	760	58	0	125	315	408	1666	36.96
Riverain	0	71	281				352	7.81
Scrub	308	274	1	371	38	9	1001	22.21
Mangrove	0	0	328	2			330	7.32
Mazari Land	24						24	0.53
Irrigated Plantation	0	172	111				283	6.28
Linear Plantation	2	14	0	1	0	0	17	0.38
Miscellaneous	750	84					834	18.50
Total	1,844	673	721	499	353	417	4507	100.00



Water accounts

The Water Accounts framework



Water Accounts

- Water is studied with reference to both its **supply and demand**.
- The supply side of water consists of water availability or resources.
- Water resources are collectively called inland water.
- ***The inland water resources are further classified into surface water and ground water***
- The availability of surface water depends upon hydrology.
- Pakistan comprises three hydrologic units: the Indus Basin, the Kharan Desert system, and the Makran coastal drainage.
- The major source of surface water is the Indus River and its major tributaries

Inland Water Availability - Surface Water

Water Source	Area Million Hectares
Rivers and Streams	3.10
Canals and Drains	0.35
Lakes	0.13
Dams and Reservoirs	0.20
Deltaic Area	0.70
Fish farms and Ponds	0.06
Total	4.53

Source: GOP, 2007; TDAP 2021

Data requirement										
S. No.	Name of District	Values in Kilometers		Values in 000 Hectares						Total Water Bodies
		Rivers & Streams	Canals and Drains	Lakes	Reservoirs	Tanks & Ponds	Fish Farms	Brackish Water	Deltaic Area	

Water Accounts - River Basin

- ▶ River basin or catchment area plays important role in any water related analysis.
- ▶ River Catchment area refers to the geographical area of land where all the precipitation falling within that area is collected and drains into river.
- ▶ **Pakistan can be divided into three main basins, the Indus Basin, the closed basin of the Kharan desert and the Makran coastal basin.**
- ▶ Indus Basin is the largest basin in Pakistan. The area of the Basin is 566,000 km² and spread over four provinces of Pakistan.

Water Accounts River Basin (PHEDKP.GOV.PK)

Name of the river (KPK)	Catchment area (Km ²)	Average annual flow MAF
Swat River	14,000	3.54
Panjkora	13,000	2.6
Kabul River	66,000	19
Siran River	1,255	0.47
Kuram	4,552	1.52
Tochi	4,938	
Gomal Zam	8,651	2.47
Tank Zam	2,357	
Sheikh Haider Zam	453	
Chodwan Zam	921	
Draban Zam	1,096	
Total	117,223	

Data requirement

S. No.	Name of River Basin	Total Catchment Area	District wise Drainage Area	Average Water resource potential	Utilizable Surface Water Resources
		Square Kilometer	Square Kilometer	Million Acre Feet	Million Acre Feet

Water Storage Capacity 2018

S. No.	Name of the Dam	Height Feet	Storage Capacity (MAF)	Location	Year of completion
1	Tarbela Dam	148	7.61	Haripur (KPK)	1974
2	Mangla Dam	147	9.13	Mirpur (AJK)	1970
3	Khanpur Dam	51	0.13	Haripur (KPK)	1985
4	Warsak Dam	76	0.16	Peshawar (KPK)	1960
5	Simly Dam	277	0.03	Islamabad	1982
6	Darwat Dam	43	0.01	Hyderabad (Sindh)	
7	Mirani Dam	127	0.37	Turbat (Balochistan)	2008
8	Hub Dam	154	0.66	Lasbela (Balochistan)	1979
9	Satpara Dam	39	0.11	Skardu (GB)	2013
Total			18.22		
Under Construction (WAPDA)					
10	Nai Gaj Dam	194	0.16	Dadu (Sindh)	2024
11	Diamir Basha Dam	892	8.10	Chilas (GB)	2029
Grand Total			26.48	<i>Source: GOP 2021</i>	

Water Storage Capacity 2018 Cont...

S.No	Name of Province	Completed		Ongoing	Proposed	Total (No.)	Storage capacity MAF
		Total Dams	Large Dams				Completed
1	Punjab	59	59	9	2	70	0.26
2	Sindh	26	2	3	5	34	0.04
3	Khyber Pakhtunkhwa	41	36	6	13	60	0.53
4	Balochsitan	332	191	31	65	428	0.23
	Sub-Total	458	288	49	85	592	1.06
	WAPDA Mega Dam	9	9	7	12	28	18.22
	Grand Total	467	297	56	97	620	19.28

Source: GOP_2018

Data Requirements						
S. No.	Name of Dam	Area	Status		Storage Capacity	District
		Square KM	Completed (Year)	Under construction	000 Acre Feet	

Water Accounts -Flow of Water and Status

- Precipitation and rainfall are heavily dependent on weather conditions. However, geographical distribution play important role in precipitation and rainfall incidence.
- Monsoon precipitation is the lifeline of Pakistan's water resources which falls in summer from July to September.
- It not only caters the peak power supply demands but also fulfills the water demands of field crops and used meet the requirements of low flow periods.

Water Accounts - Flow Of Water And Status

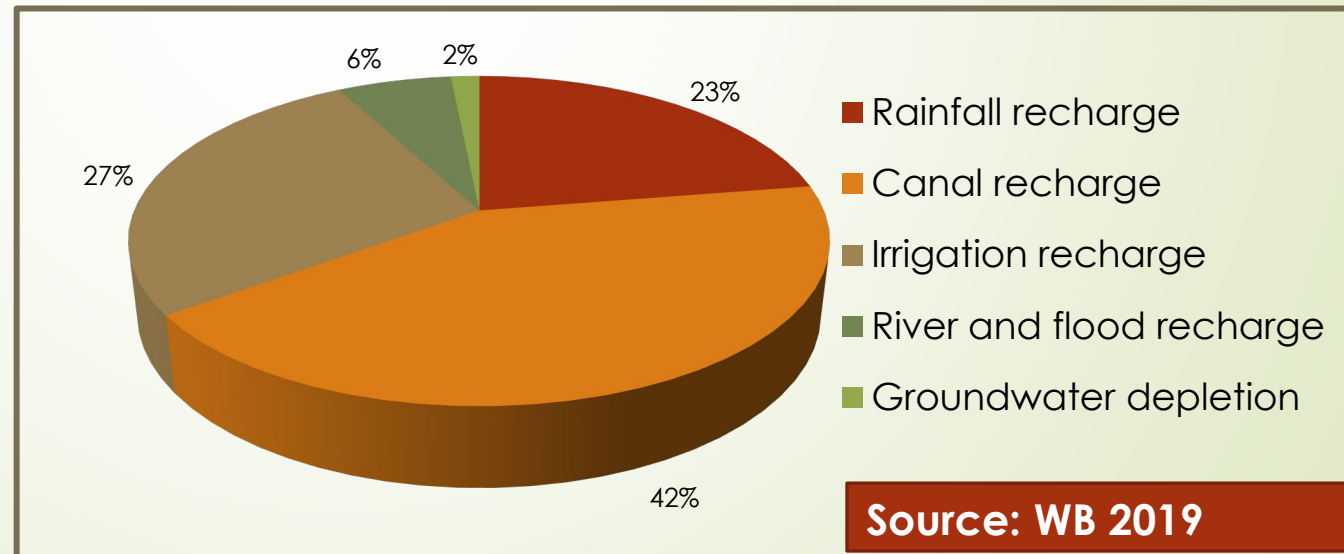
Annual Area Weighted Rainfall and departure			
Year	Actual (mm)	Normal (mm)	Departure (%)
2019	379.1	312.3	21.4
2020	409.3	297.6	37.5
2021	242.3	297.6	-18.6
2022	526.9	297.6	77.0

Source: PMD 2019, 2020, 2021, 2022

Data Requirements											
S. No	District	Pre-Monsoon March-Mid June		Monsoon Mid June-Mid September		Post- Monsoon Mid September- October		Winter November - February		Annual	
		Actual	Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual	Normal

Water Accounts - Groundwater

- ▶ Groundwater is available in two distinct zones known as unsaturated zone and saturated zone.
- ▶ The top of the saturated zone is called the water table. The water in unsaturated zone is called the aquifer and this is the body which is recharged by different sources.



Water Accounts - Groundwater

- Abstraction of groundwater to sustainable level depends upon the depth of water level.
- There is no data base for ground water table depths in case of Pakistan. However, different research studies indicated water table depths.

Water Table Range		Classified as
Meter	Feet	
0 – 1.5	0 – 5	Waterlogged
1.5 – 3	5 – 10	Likely to be Waterlogged
3 – 6	10 – 20	Normal
6 – 9	20 – 30	
9 – 13	30 – 43	Likely to be Depleted
13 – 18	43 – 59	Depleted
> 18	> 59	Highly Depleted

Water Accounts - Groundwater

S.No.	WTD Ranges (m)	Punjab		KPK	
		Area (000 Hectares)	Area (%)	Area (000 Hectares)	Area (%)
1	0-1.50	786.02	6.55	61.33	3.04
2	1.50-3.0	1,926.47	16.05	345.63	17.12
3	3.0-6.0	3,823.12	31.86	354.74	17.57
4	6.0-9.0	2,265.54	18.88	204.46	10.13
5	9.0-13.0	1,423.05	11.86	442.31	21.91
6	13.0-18.0	1,597.54	13.31	265.87	13.17
7	>18	178.37	1.49	344.60	17.07
	Total	12,000.11	100.00	2,018.93	100.00

Source: Saeed et al, 2014

Data Requirements			
Name of District	Water Table Depth Range		
		3. meters	3-9 meters



Way Forward

- Meetings with Provincial Crop Reporting Services Departments.
- Meetings with Provincial Forest Departments.
- Meetings with Provincial Irrigation Departments.
- Meetings with Provincial Mines and Mineral Departments.
- Meetings with Provincial Urban Units.
- Meetings with Indus River System Authority (IRSA).
- Meeting with Pakistan Meteorological Department.
- Meeting with Water and Power Development Authority (WAPDA).
- Interaction with donor agencies for technical assistance.



Thanks