

Indus Basin and Murray Darling Basin

Geography, Hydrology, Development Approach, Services

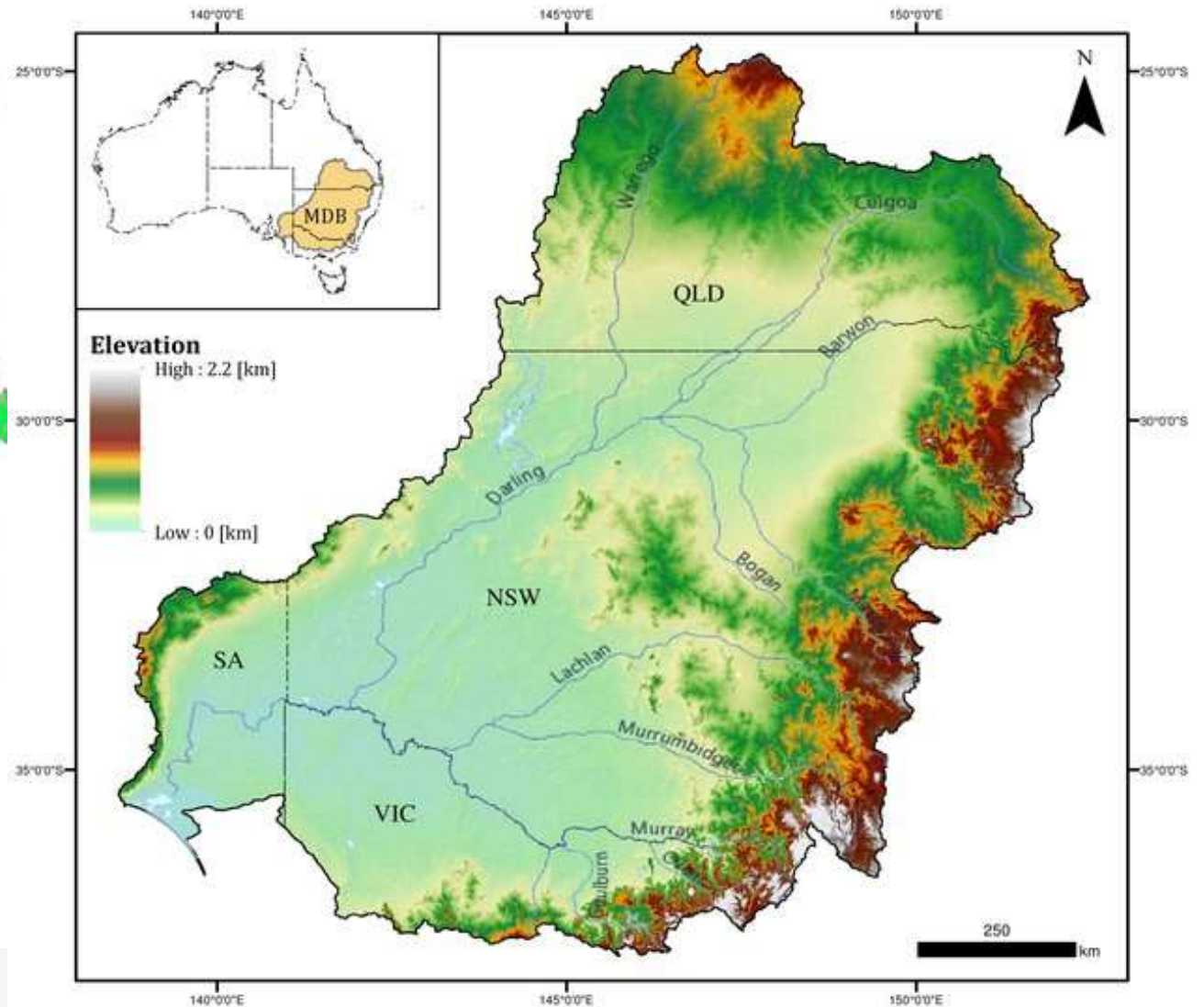
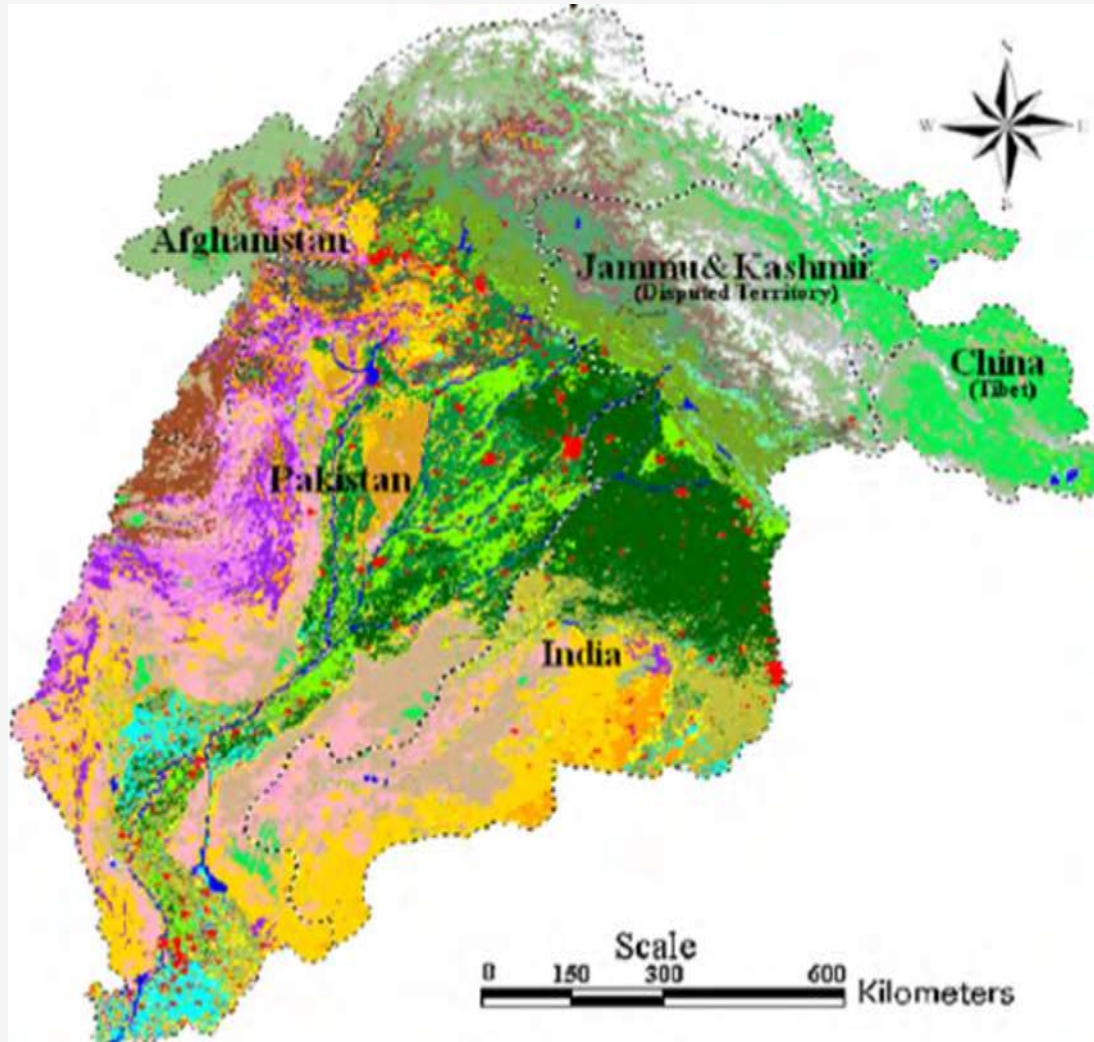
Not so Similar!

Dr. Zaigham Habib

Three factors characterising nature of water resources and role of a Basin

- Hydrology and Geographical Location
- Economic and Social dependence of the Communities and Nations
- Water sharing and distribution Principles & Procedures

Indus and Murray Darling – Geography and National Context

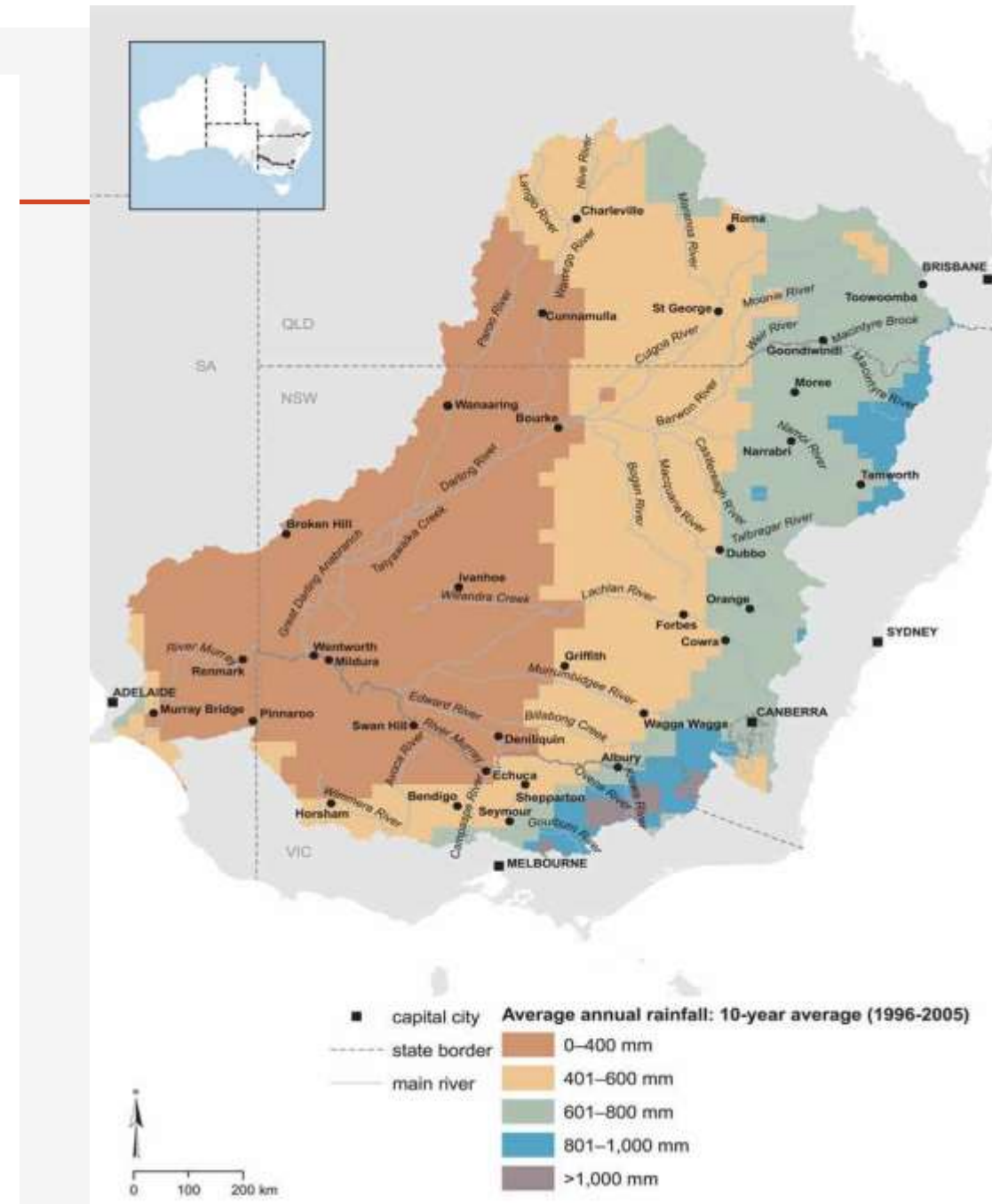
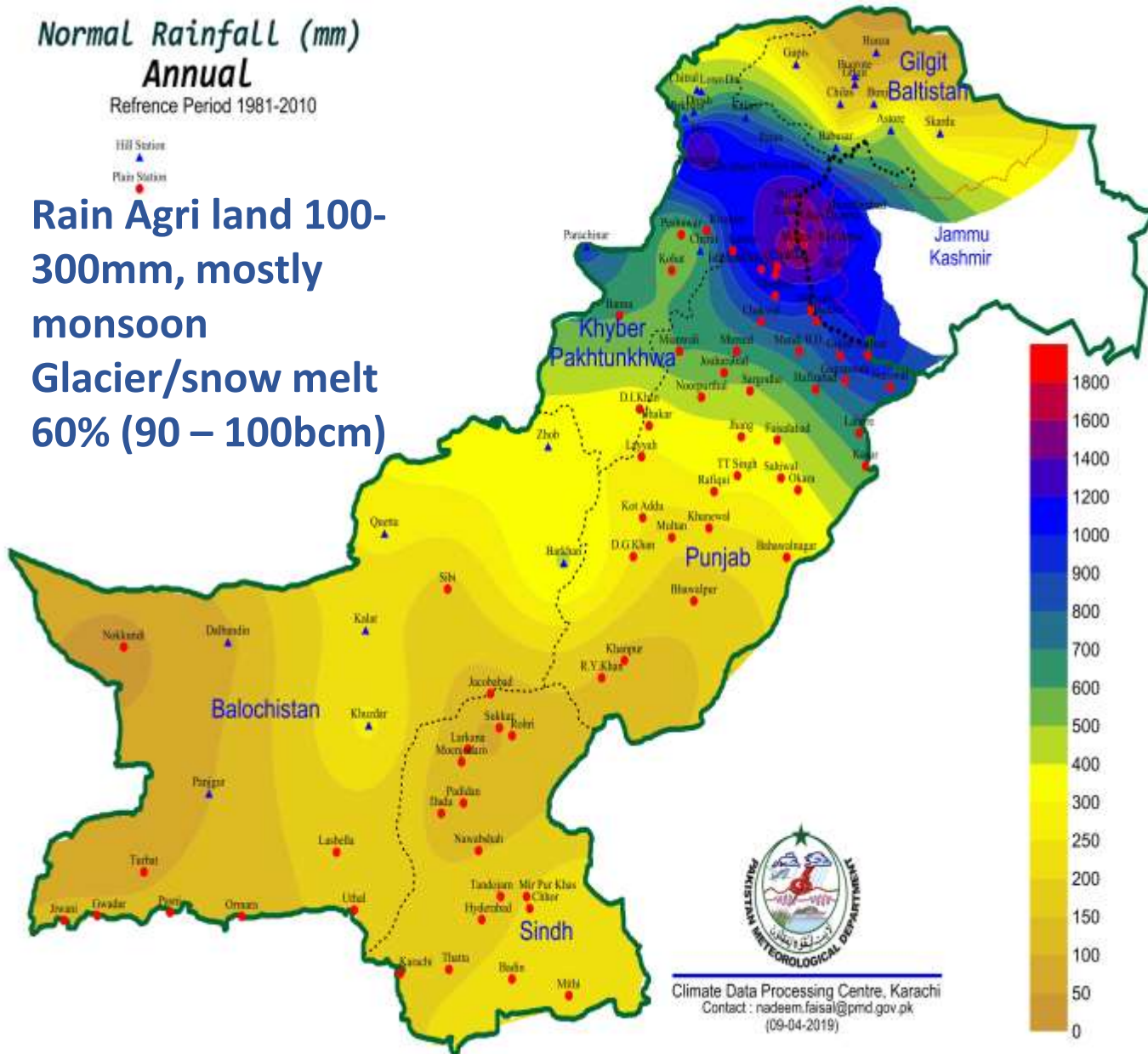


Normal Rainfall (mm) Annual

Reference Period 1981-2010

Hill Station
Plain Station

- Rain Agri land 100-300mm, mostly monsoon
- Glacier/snow melt 60% (90 – 100bcm)



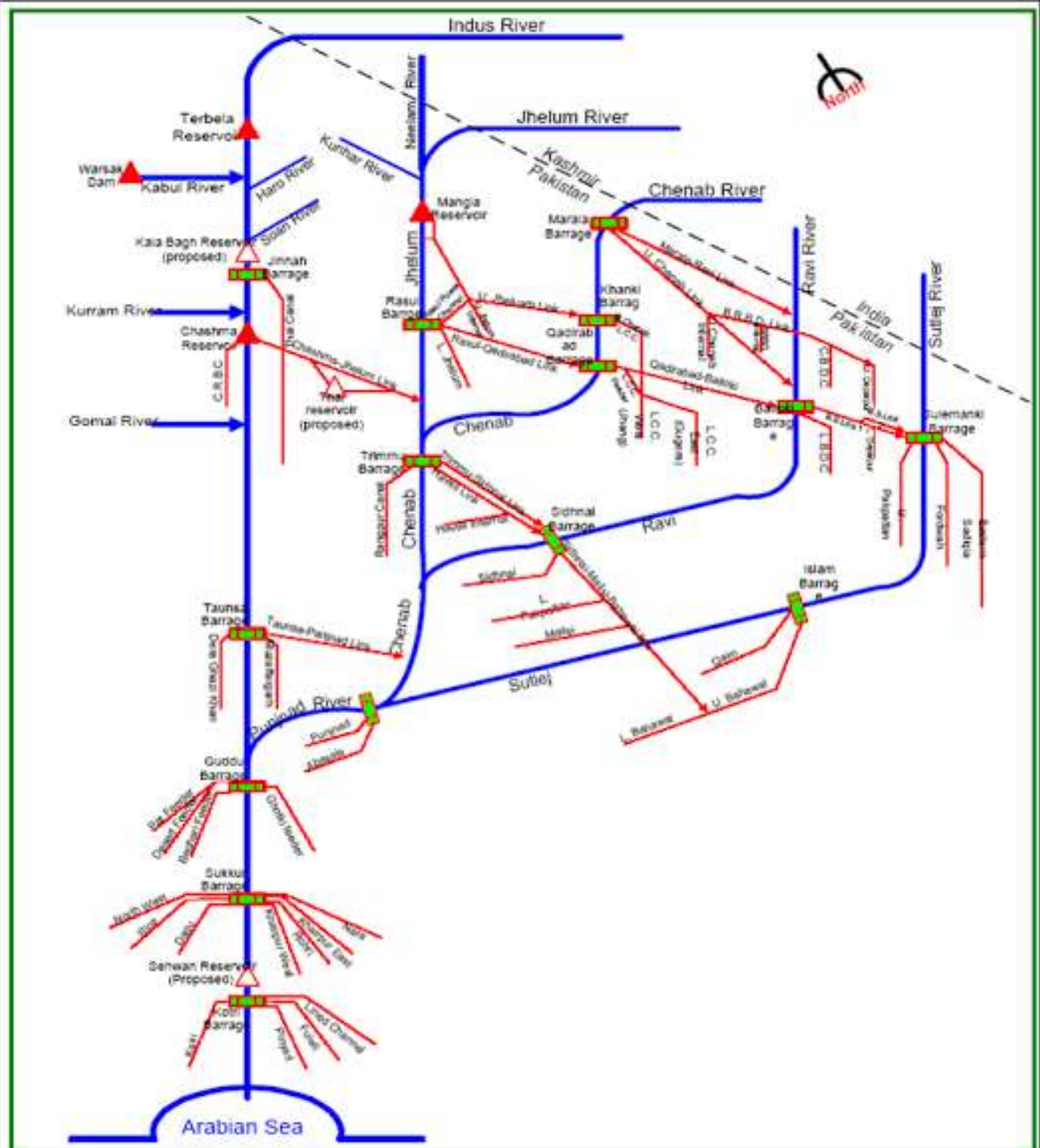
Indus Basin Rivers and water distribution System

Annual Avg. Flow : 182 bcm
Direct diversions : 135 bcm
Storage : 13 bcm
Outflow to sea : 40 bcm

Large water distribution network developed as run of the canal systems. Inter-river links transfer water from large to the small rivers, after IWT 1960, from Western to Eastern Rivers

Two upstream reservoirs linked to the whole network downstream

Efficiency underestimated



Murray Darling Rivers and Dams

Key Infrastructure

Annual Avg. Flow: 24 bcm

Storage : 16 – 35 bcm

Diversions : 11.5 bcm

Outflow to sea : 5 bcm

Water supply systems developed as storage supported entities

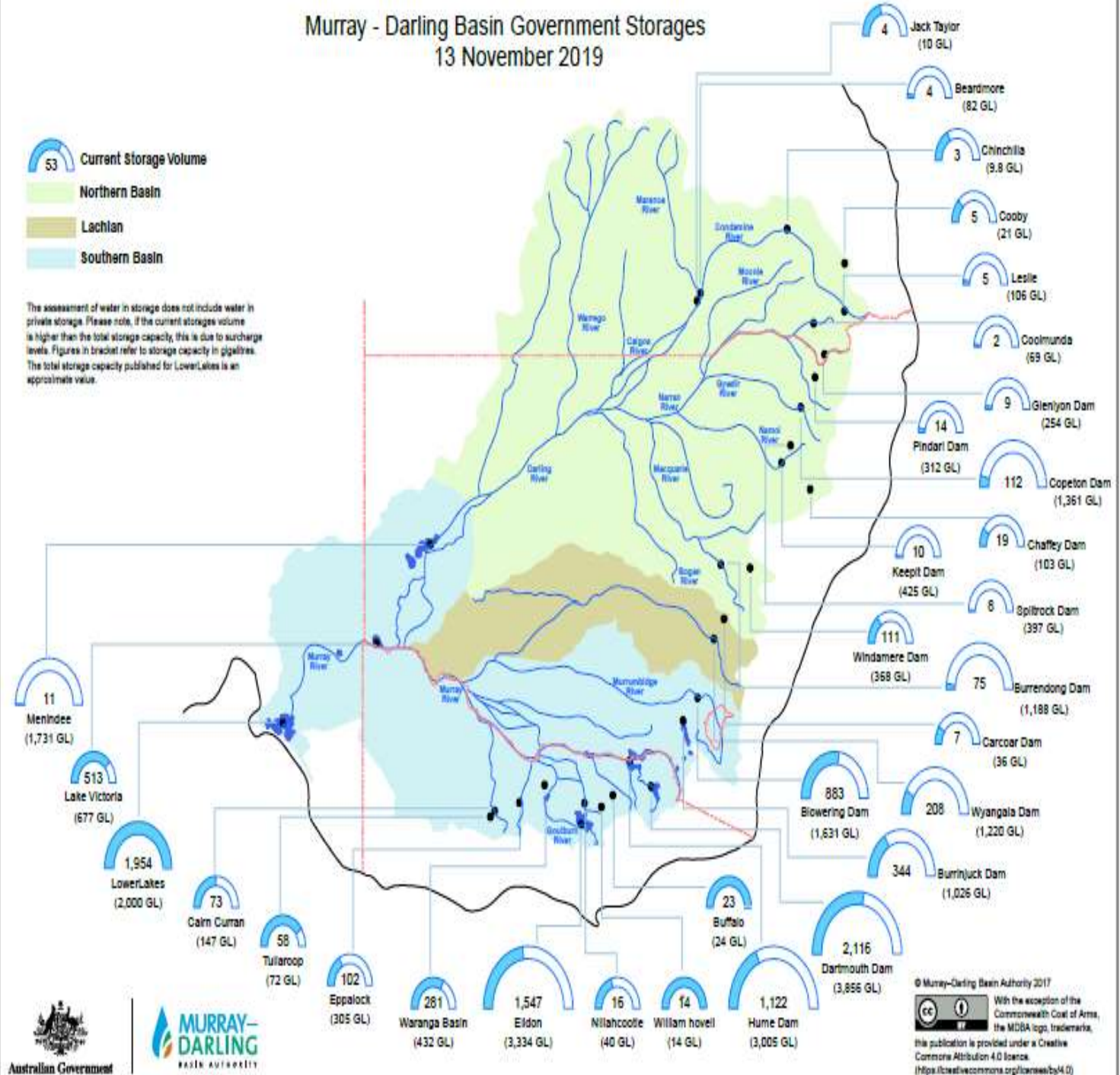
About 30 Storage bodies

Barrages near the river Mouth to reduce sea water inflow

Other than agriculture water uses quantified & mostly entitled

Water recovery a main initiative – gap between water supply and consumption

Murray - Darling Basin Government Storages
13 November 2019



Comparative Facts of Two Basins

Indus Basin Pakistan

Drainage Area	:	1.23 km ²
Elevation	:	4,255 m (13,960 ft)
Glacier/snow	:	90 – 100 bcm
Flood Frequency	:	20 years
Drought freq.	:	30 years
Groundwater use	:	>100 % in fresh zone
Population	:	220 million in Pakistan
Irrigated Area	:	18 m ha
Forest Area	:	4.2 m ha Pakistan
GDP contribution	:	24% of the National GDP

Murray Darling Basin

Drainage Area	:	1.06 million km ²
Elevation	:	2120 m
Flood Frequency	:	local, annual
Drought freq.	:	17 years
Groundwater use	:	50 % of Potential
Population	:	2 million
Irrigated Area	:	1.47 m ha
Forest Area	:	< 1 m ha, mostly coastal
GDP contribution	:	10% ? of the National GDP

Water Sharing, Entitlements and Allocations

Water Sharing in Indus Basin

- Watershed shared by 4 countries, 22% uses outside Pakistan
- A hierarchy of water division:
 - a. IWT 1960 with India – division of rivers
 - b. WAA 1991 – provincial quantitative shares
 - c. Fixed farm entitlements delivered through flow rate, time & supply responsive regulation
- Entitlements adjust to availability through regulation procedures
- Uses outside Agri-sector underestimated, exponentially increasing – more than 15%
- ***Existing environmental uses not estimated***

Water Sharing in Murray Darling Basin

- Murray Darling Basin shares water among 3 states and capital territory
- Each state has its own entitlements and licensing process. But, the water delivery agency follows the same rules
- The States have to use some of their entitlement to run the rivers.
- Three large water use sectors, agriculture, domestic and industrial
- Environmental uses are estimated
- Groundwater use a strong component of water recovery

Experience of Reforms and New Approaches

- New Management Interventions: Perceptions to road maps, bigger group of stakeholders, replacement of old systems/processes – evolutionary or partial, whose responsibility?
- Sustainability, cost benefits
- Good science and technology versus regional & community preferences
- More complex politics
- Governance and role of Institutes

Thanking You