Regional Cooperation on Trans-Boundary Waters: Opportunities for South Asian Deltas including Source to Sea Approach

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Introduction

- South Asian Delta formed by the rivers Ganges, Brahmaputra and Meghna Water is one of the largest Deltas in the world.
- Due to inability of the SA countries to agree on a common agenda to develop the delta optimum benefits could not be derived.
- Most contentious issue has been sharing of the water of the trans boundary rivers.

Water provides security for

- Municipal and industrial water supply
- Food (cereals, vegetables, fruits, pulse and oil seeds, fish, meat etc.)
- Ecosystems
- Environment
- Biodiversity
- Navigation
- Health
- Livelihood

The region also suffers from water induced natural disasters like:

- Flood
- River Bank erosion
- Salt water intrusion
- Tidal surge from cyclonic storm
- Water Quality Issues (salinity, pollution from arsenic, industrial effluents and agro-chemical etc.)

Regional Rive Systems

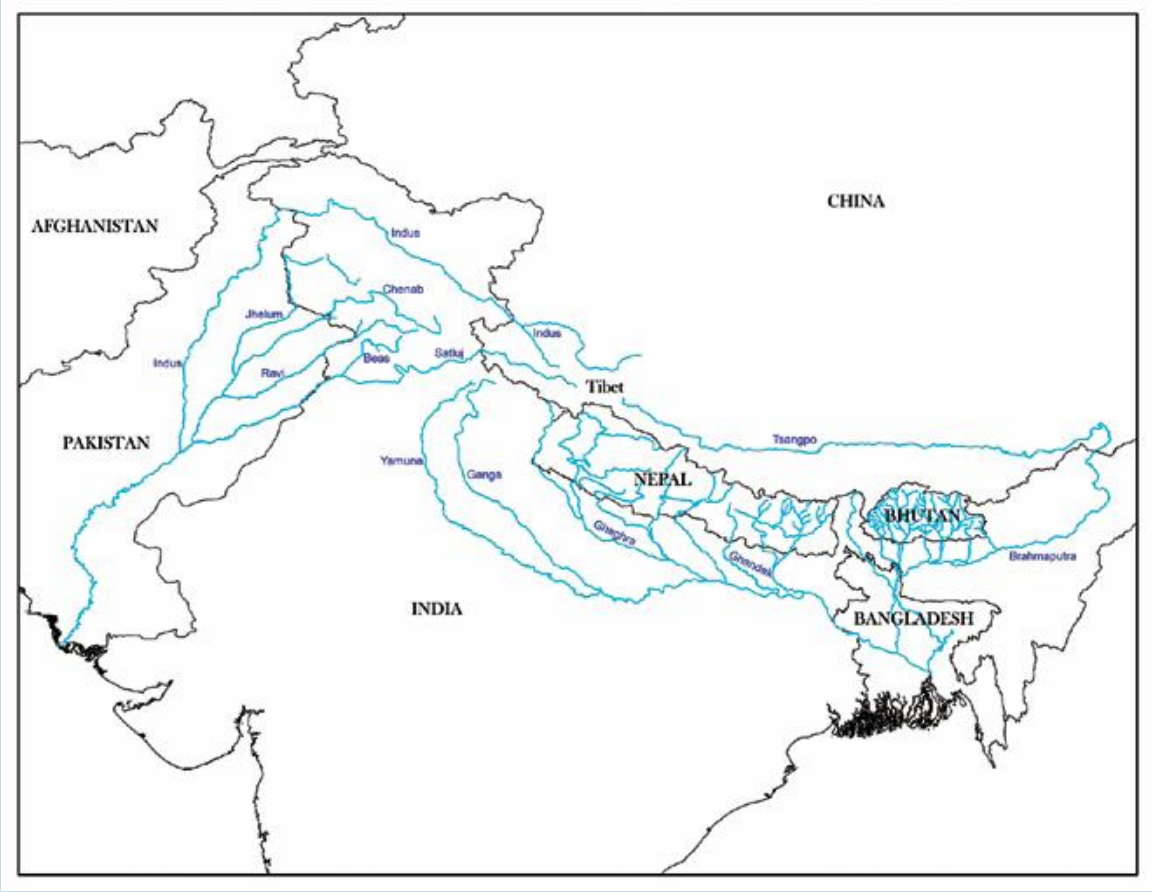
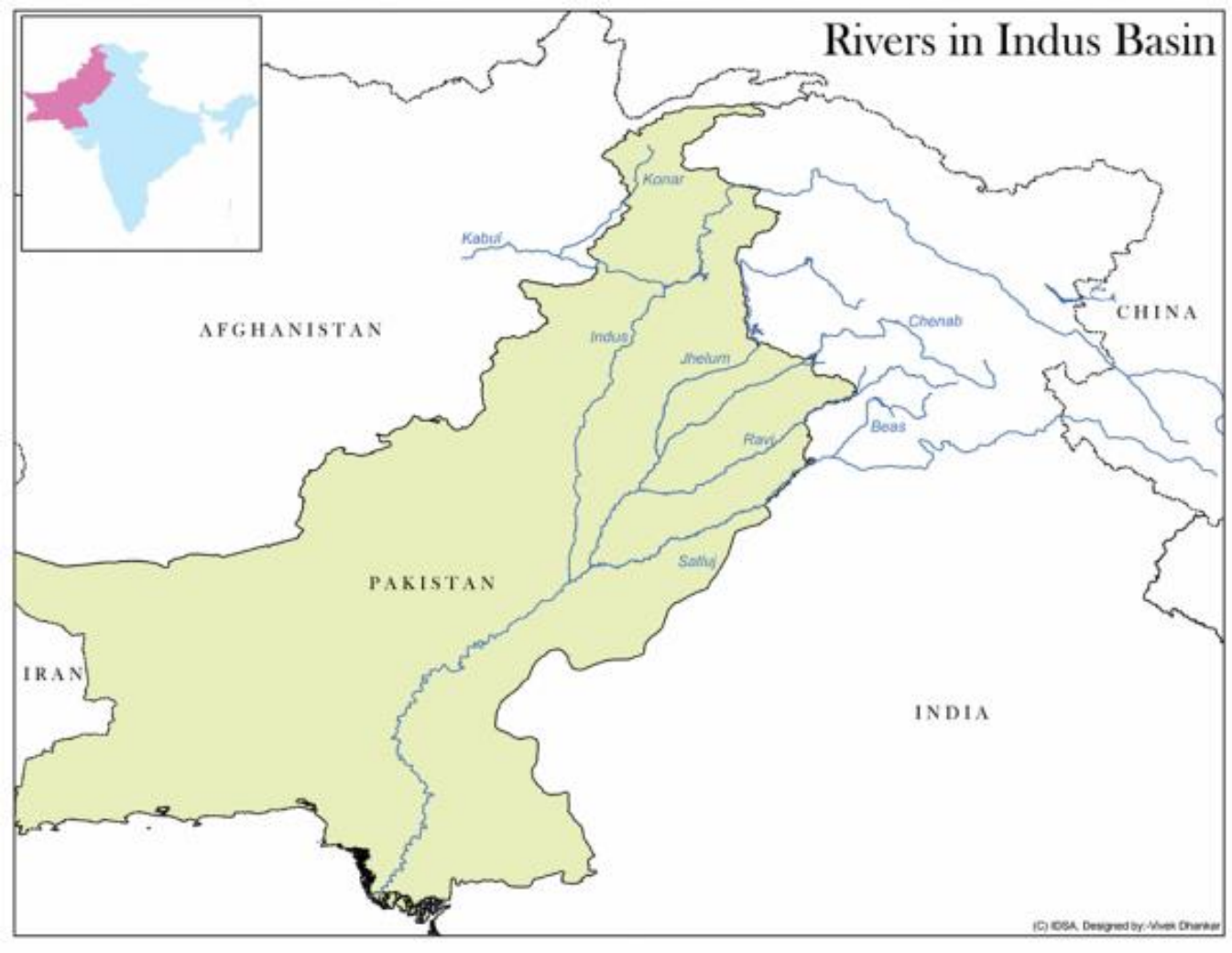


Fig: Trans-boundary rivers in South Asia

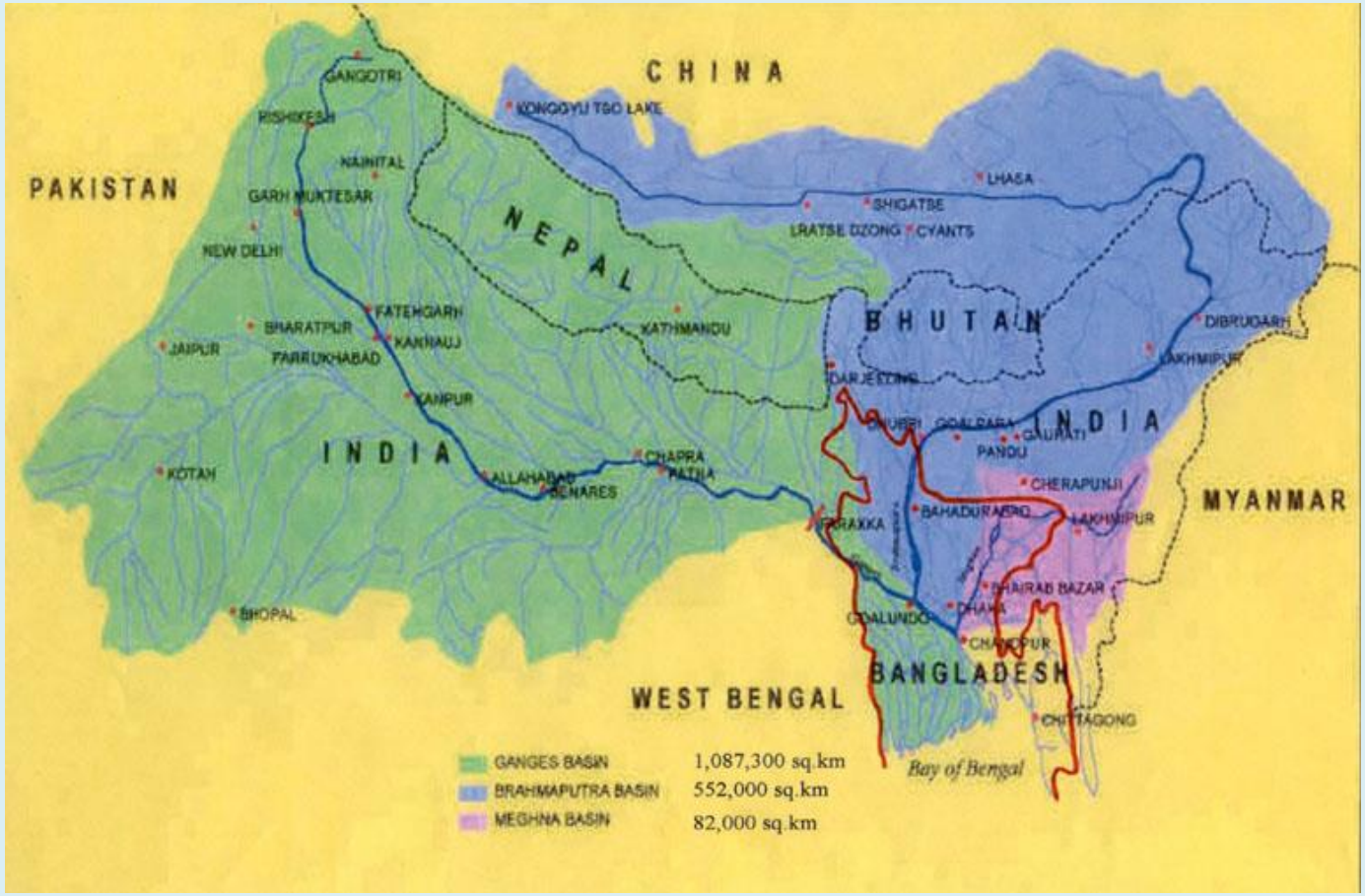
India-Pakistan



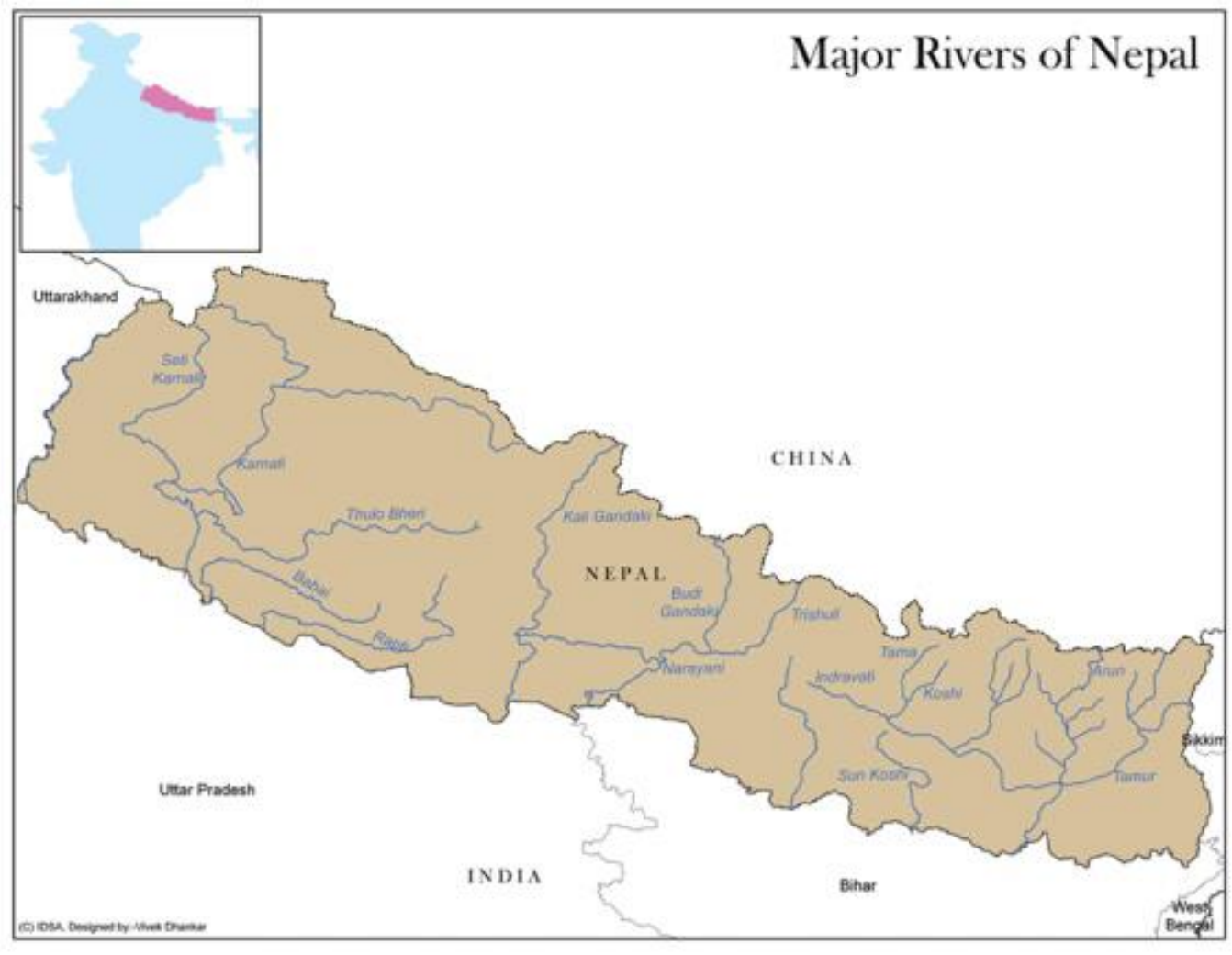
The Indus Treaty

- The Indus Waters Treaty (IWT) was signed in early 1960 between India and Pakistan. The treaty survived two Indo-Pakistani Wars.
- The IWT allocated exclusive use of three eastern rivers (Ravi, Sutlej and Beas) to India and three western rivers (Indus, Jhelum, Chenab) to Pakistan. Pakistan also received one-time financial compensation for the loss of water from the Eastern Rivers.

Bangladesh – India



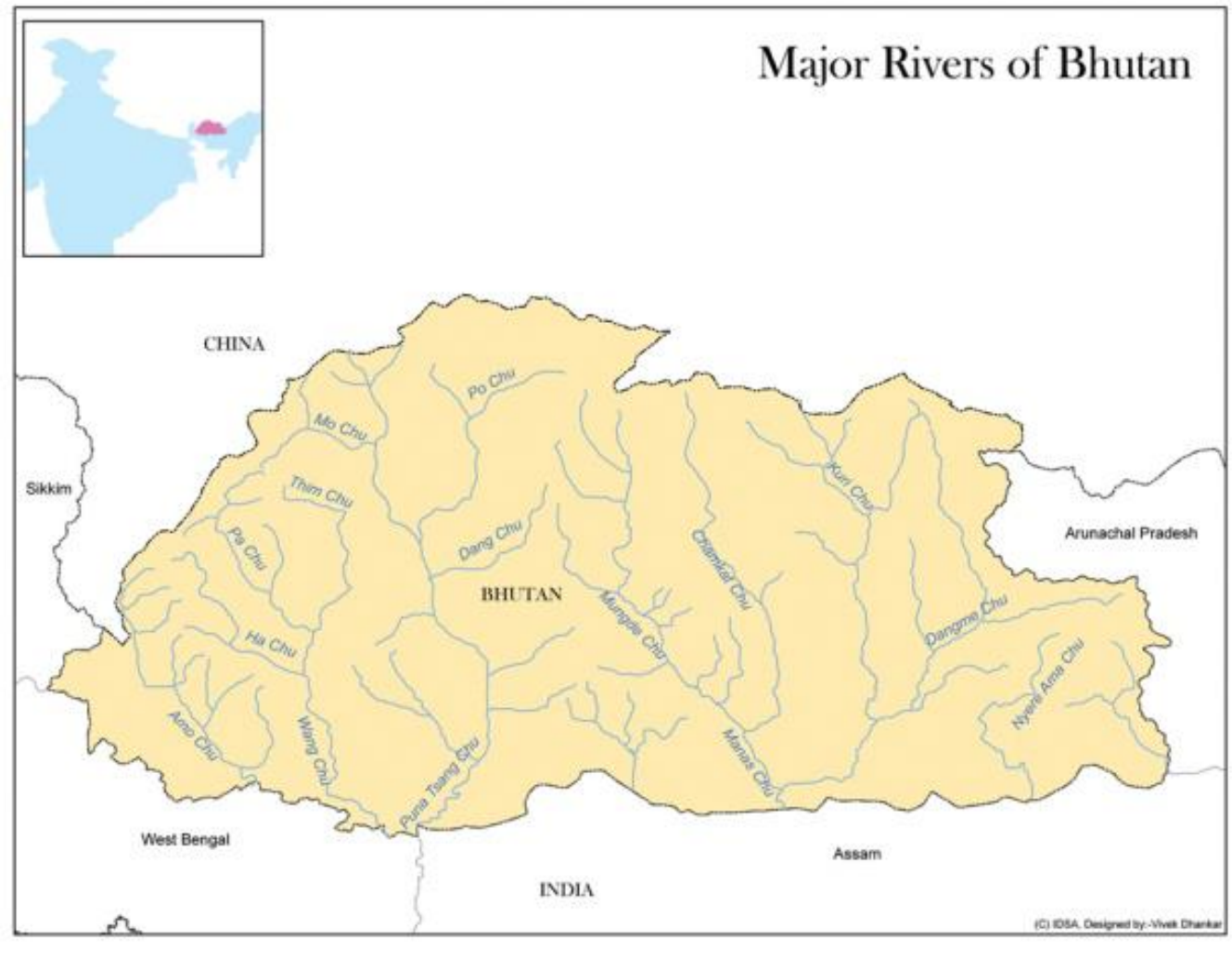
India - Nepal


Major Rivers of Nepal
Uttarakhand
Sati
Karnali
Kamali
Thulo Bheri
Kali Gandaki
Bahai
Rapti
Budi
Gandaki
Trishul
Tama
Indravati
Narayani
Kosi
Arun
Sun Kosi
Tamur
Sikkim
CHINA
NEPAL
Uttar Pradesh
INDIA
Bihar
West
Bengal
(C) IDSA, Designed by :-Vivek Dhankar

Multiple Treaties

- The Sharda treaty (1927), the Kosi treaty (1954, amended in 1966), the Gandak treaty (1959, amended in 1964) and the Tanakpur (1991).
- More recently, the Mahakali treaty of 1996

India and Bhutan



Bhutan-India Water Cooperation

- Agreement signed in 1961 for hydropower development
- Establishment of hydro meteorological and flood forecasting network on rivers common to India and Bhutan

- **Sri Lanka and Maldives being Island nations have no transboundary water issues (Very Lucky).**

Major Areas of Cooperation for Improving Delta Management

- **Flood Control**
  - Sharing real time data for forecasting floods
  - Intervention through infrastructure development like control and regulating structures in the upper riparian countries
- **Prevention of river bank erosion**
  - River training
  - Construction of infrastructures in appropriate location of the riparian countries
  - Proportionate joint investment by riparian countries may be explored.

❖ **Improving navigation**

- Capital dredging of main rivers
- Prevention of shifting of the main channel of the rivers in the dry season through river training
- Ensuring year round adequate draft in the major rivers and their tributaries.

❖ **Management of Silt**

- A large volume of silt is carried by the transboundary rivers to the lower riparian countries especially to Bangladesh. It is estimated that nearly 1.5 billion tons of silt is transported to Bangladesh by rivers and deposited in the river-beds affecting navigation. Silt management can only be done through cooperation of all the riparian countries.

- Eco-System Protection: In Bangladesh, ecosystem of Sundarban, the largest natural mangrove forest in the world and a UNESCO designated world heritage site and home of the internationally famous Royal Bengal Tigers is seriously threatened by Salinity.

- **Prevention of Pollution of Water Resources:**
  - Inter country pollution
  - In-tra country Pollution
  - Arsenic contamination of ground water (India, Bangladesh, Nepal , Pakistan)
  - Blue ‘baby’ syndrome in early 90’s in Sri Lanka; nitrite build up in ground water.

❖Improving food security

- Increasing water productivity of major cereals

Yield and Water Productivity of Rice and Wheat in the Delta

Country	Ave. Yield of RICE (t/ha)	Ave. Yield of Wheat (t/ha)	Water Productivity* kg/m3	
			RICE	WHEAT
Bangladesh	3.50[1]	2.00[1]	0.30	0.34
Pakistan	3.05[1]	2.38[1]	0.25	0.40
India	2.98[1]	2.84[1]	0.25	0.48
Nepal	2.91[2]	1.98[1]	0.24	0.32
Bhutan	2.11[1]	1.14[1]	0.17	0.18
Sri Lanka	3.37[1]	N/A	0.28	N/A
Afganstan	1.79[3]	2.6[4]	0.15	0.44
Maldives	N/A	N/A	N/A	N/A

Source:

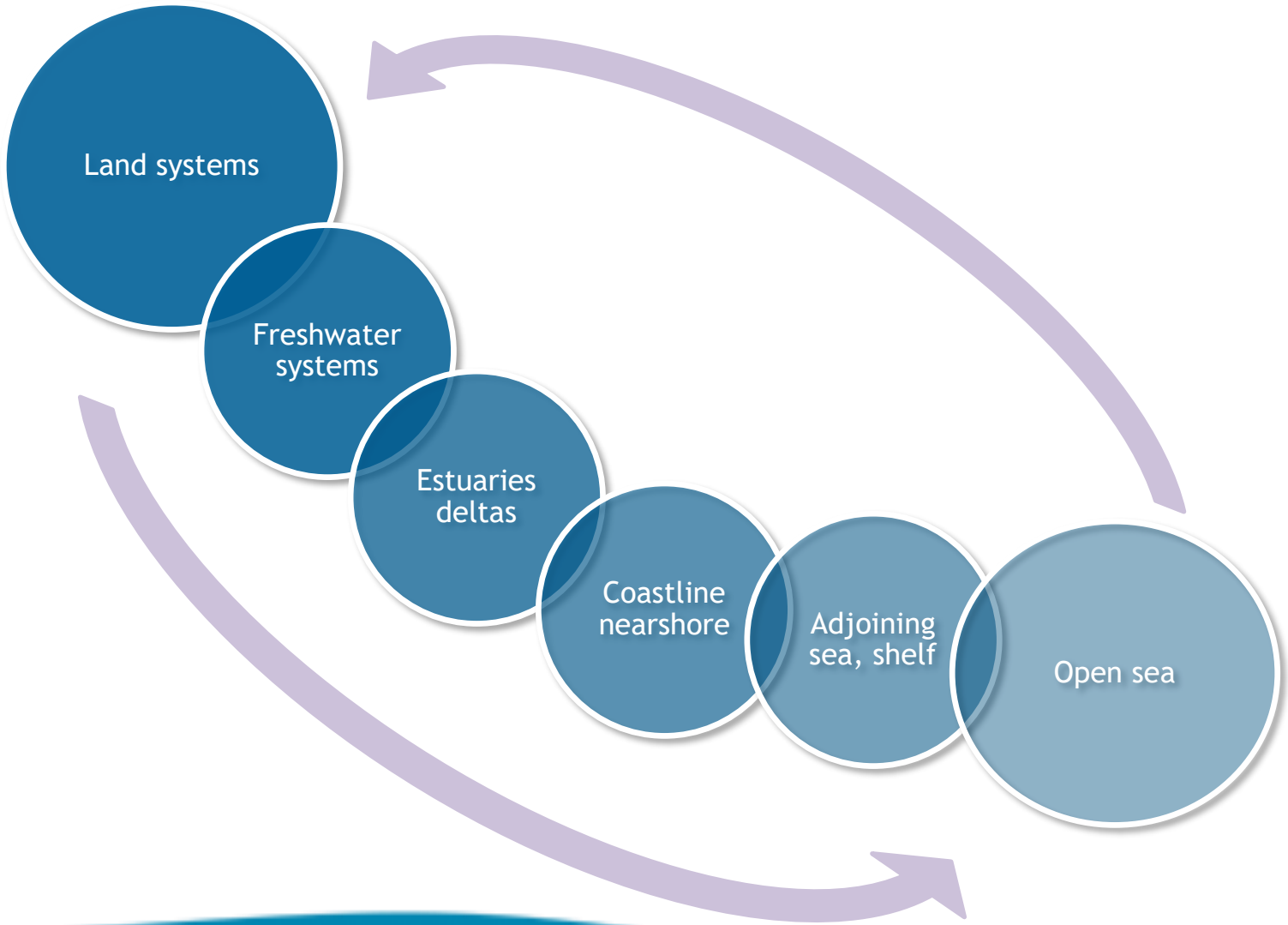
1. Food and Agricultural Organization Statistics (FAOSTA)-2003
2. International Rice Resource institute (IRRI) estimate 2010
3. FAO Rice information-2000
4. The Ministry of Agriculture Irrigation and Livestock, Afgan-2011

*FAO recommend Water Productivity for Rice and Wheat is 1kg/m^3 of H_2O

SOURCE-TO-SEA MANAGEMENT

A governance innovation

S2S PLATFORM



Source-to-sea linkages

Guiding practices for source-to-sea approach

- **Holistic** – includes both upstream and downstream S2S linkages
- **Collaborative** – embeds S2S into existing institutions, established methods and on-going processes
- **Focused** – prioritise flows to address in the project or programme
- **Participatory** – engage stakeholders from different S2S segments, sectors
- **Context-dependent** – responsive to the local situation
- **Results oriented** – achieve intermediate outcomes
- **Adaptive** – learning by doing through pragmatic implementation

Source-to-sea management

The intended outcome of applying the source-to-sea approach and refers to the establishment of governance, operations, practices and finance that increase collaboration and coherence across the source-to-sea system and reduce alteration of key flows (water, pollution, sediment, materials, biota, ecosystem services) resulting in measurable economic, social and environmental improvement across freshwater, coastal, nearshore and marine environments.