

CONSERVATION & TRANSPORTATION  
OF  
FRESH WATER  
ALONG THE COASTAL REGION OF  
**INDIA**

(TWO way Flow to assist Better Flood Control)  
( INITIAL INFRASTRUCTRE COST & MINIMAL TRANSPORTATION COST )

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# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## PERENNIAL RIVERS

(Glacier Fed flows 365 days)

GANGES & BRAHMAPUTRA

## MAJOR PENINSULAR RIVERS

(Monsoon Fed – Seasonal)

**East Flowing:**

Mahanadi

Godavari

Krishna

Cauvery

**West Flowing:**

Narmada

Tapti

MONSOON

**South West**

&

**North East**



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## AVERAGE RAINFALL

In a year

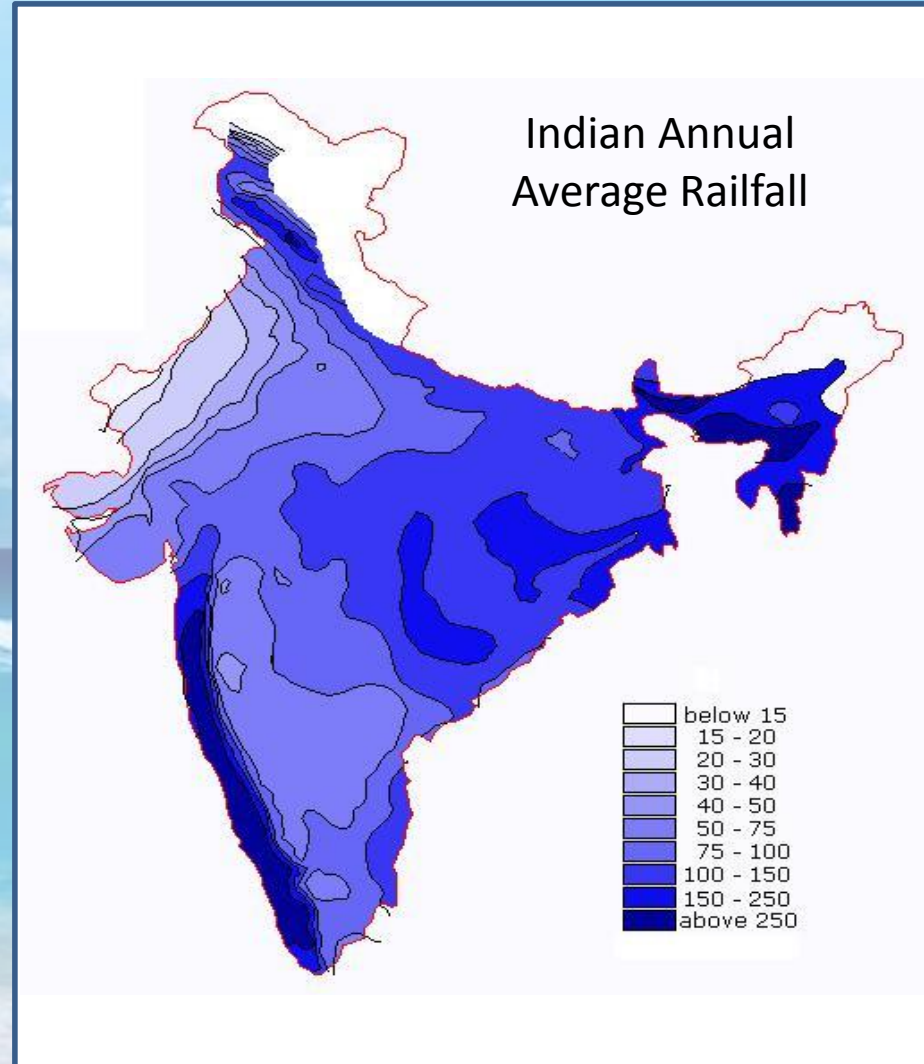
Observation

Heavy rainfall in

South West Coastal Region

&

North Eastern States





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## CONVENTIONAL METHOD

### Linking by Open Cut Canals

From Indo Gangetic Plains to South India (Cauvery)

#### Advantages:

**Assists** in Limited Flood Control

**Assists** in Ground water recharge

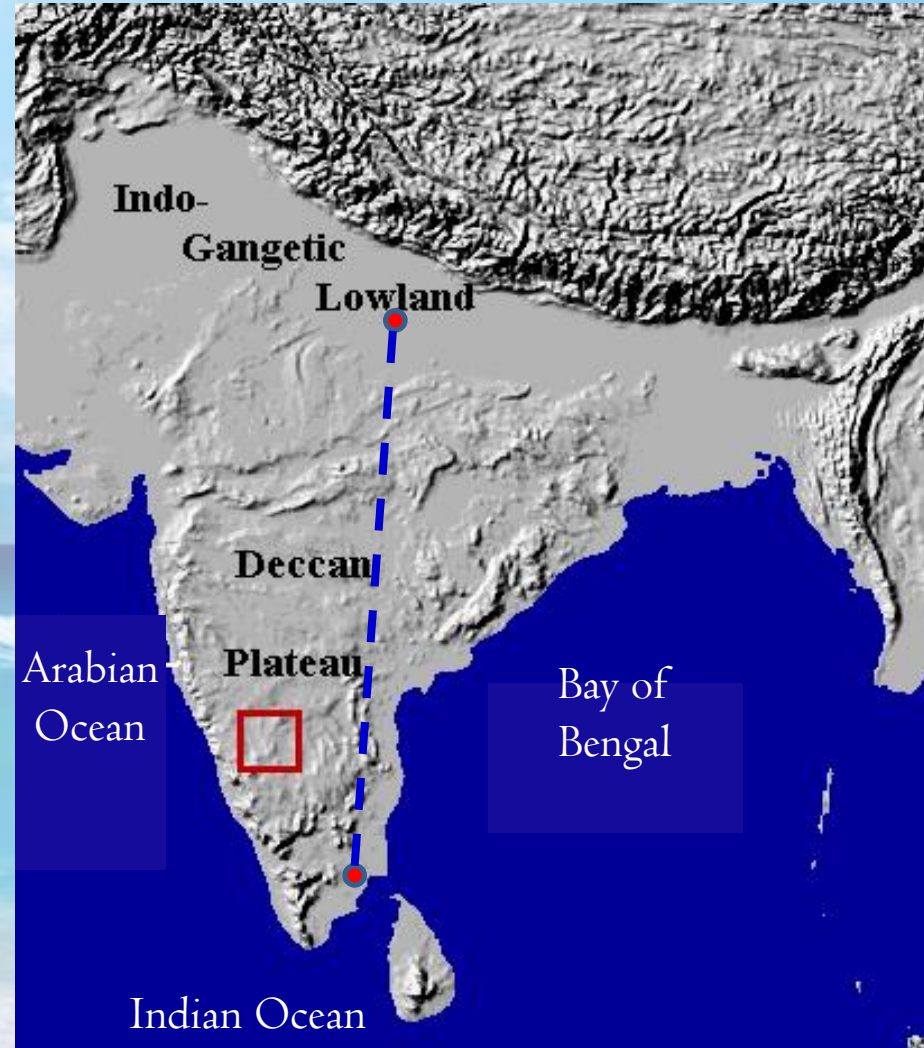
**Additional** Land for Cultivation

**Additional** Surface Transportation

**Additional** Drinking water

**Generation** of Power down hill

Benefits **few** states



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## CONVENTIONAL METHOD

### Linking by Open Cut Canals

Indo Gangetic Plains to South India (Cauvery)

#### Disadvantages:

**Acquisition** of Land

Paying **Compensation**

**Relocation** of habitats

**Inundation** of wild life sanctuary

Evaporation **Loss**

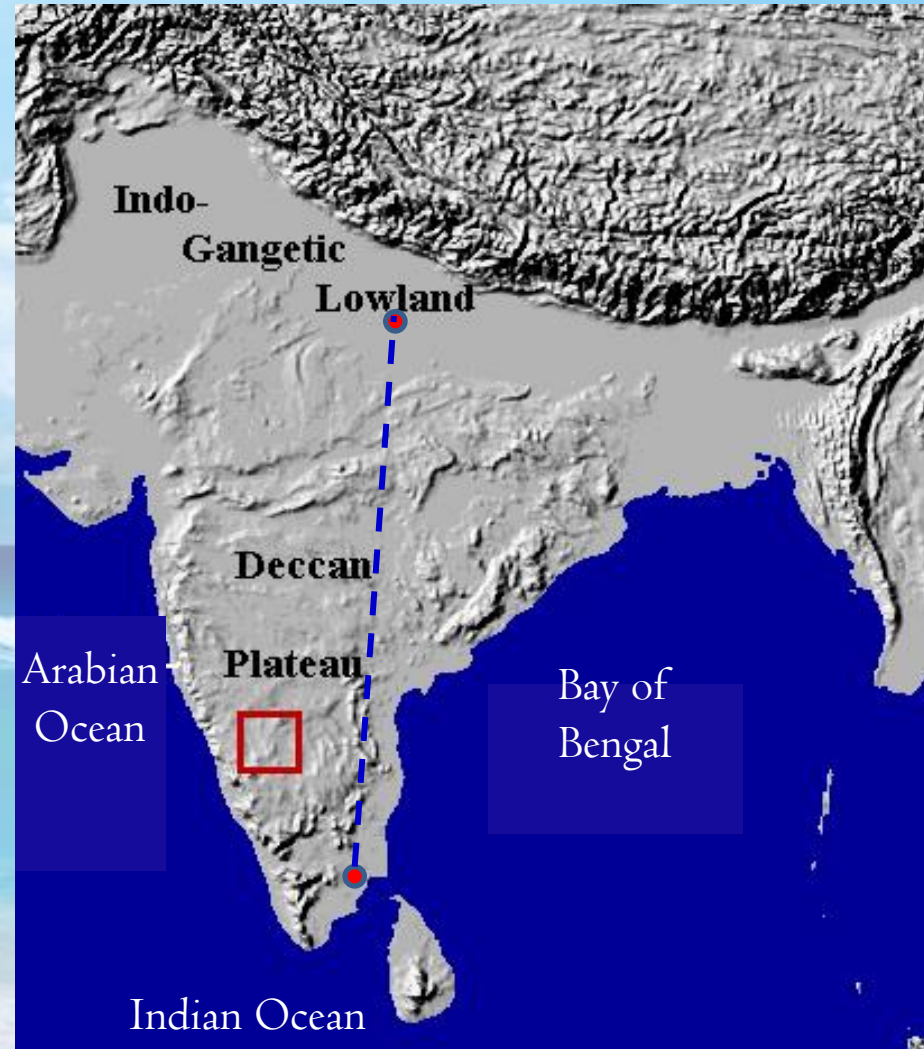
Seepage **Loss**

**Extensive Usage** of Electricity

**New** Transmission lines & Sub stations

Flows only **ONE** way

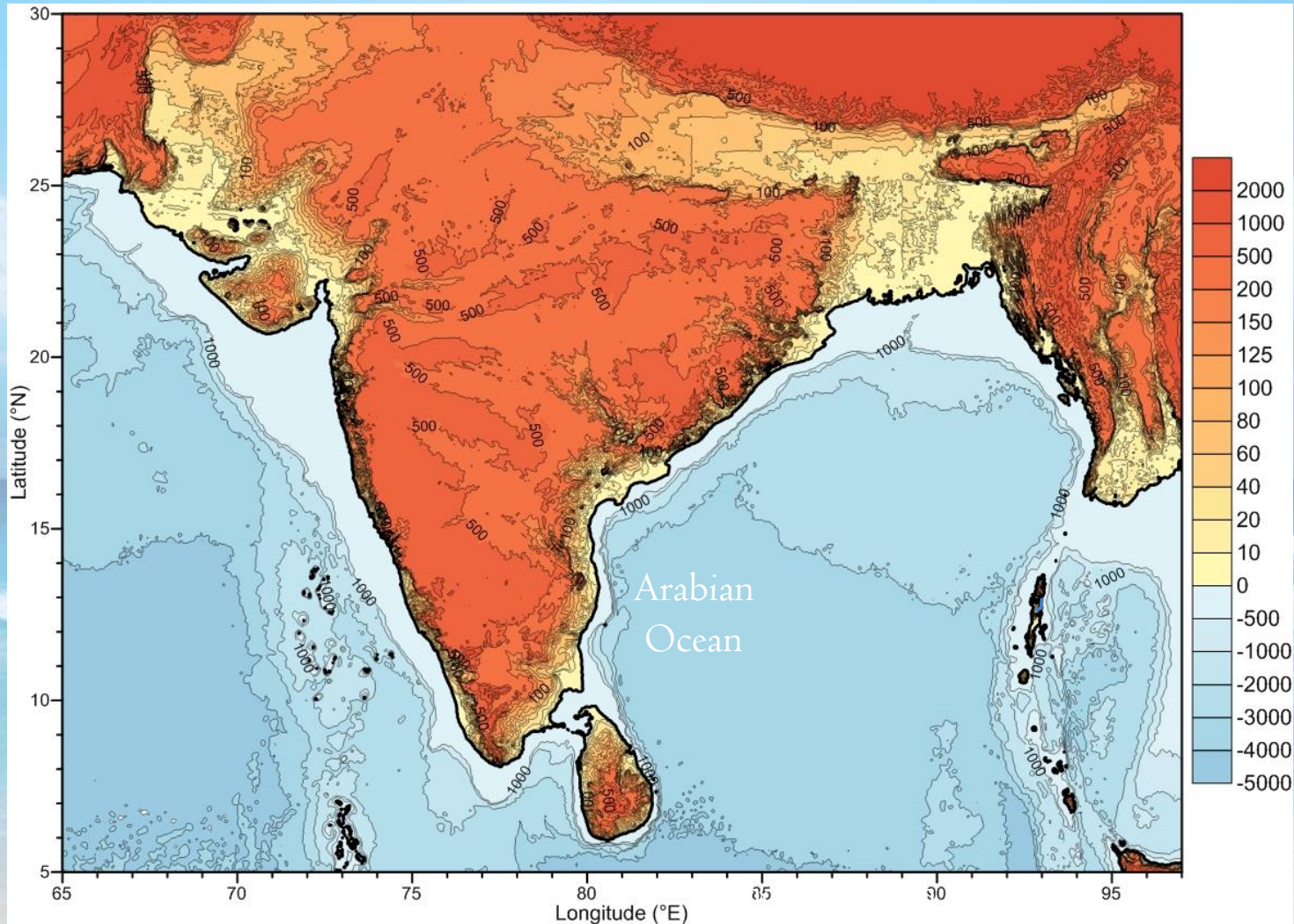
**IMPLEMENTATION TIME**





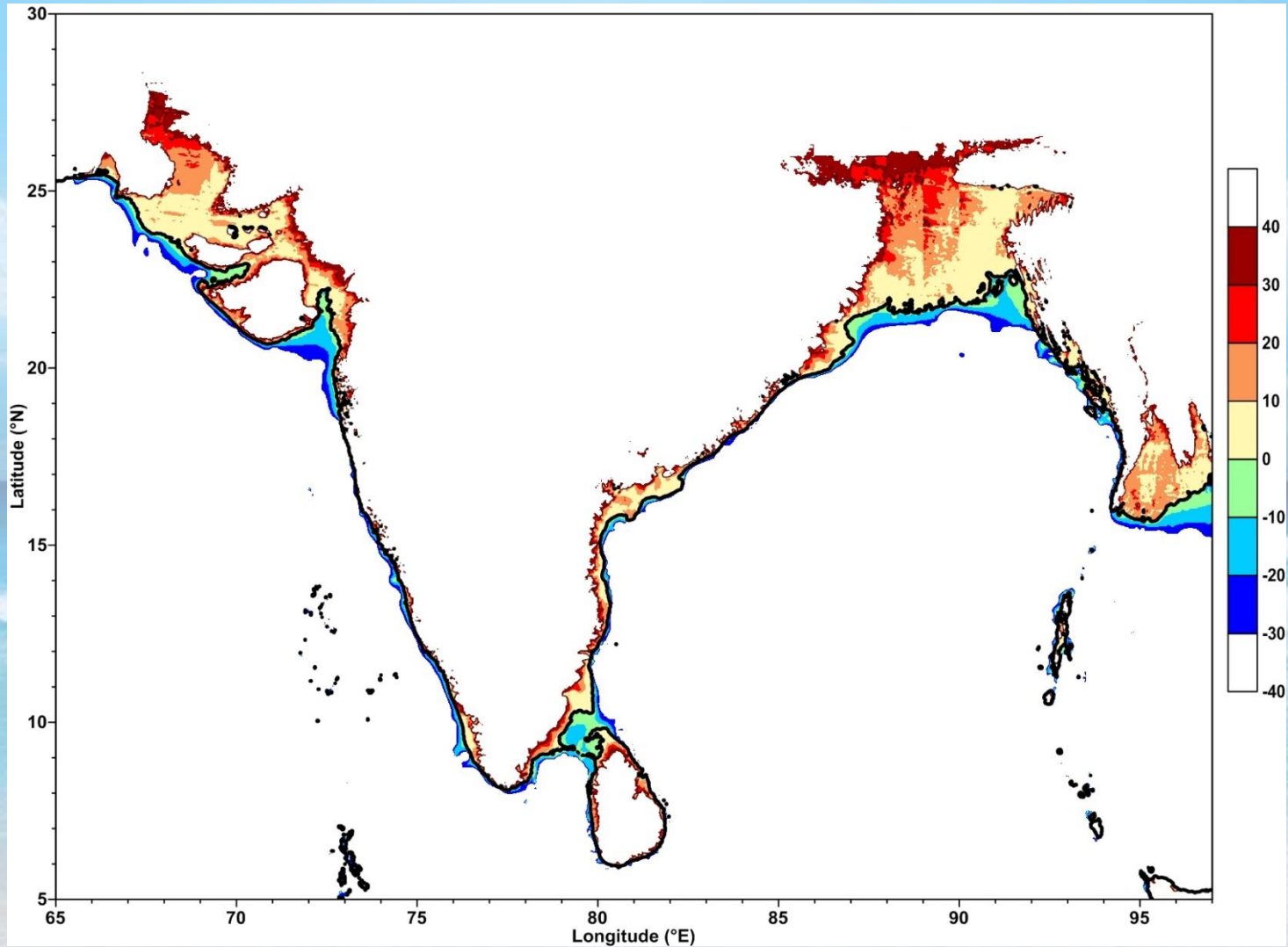
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## TOPOGRAPHY MAP OF INDIA



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

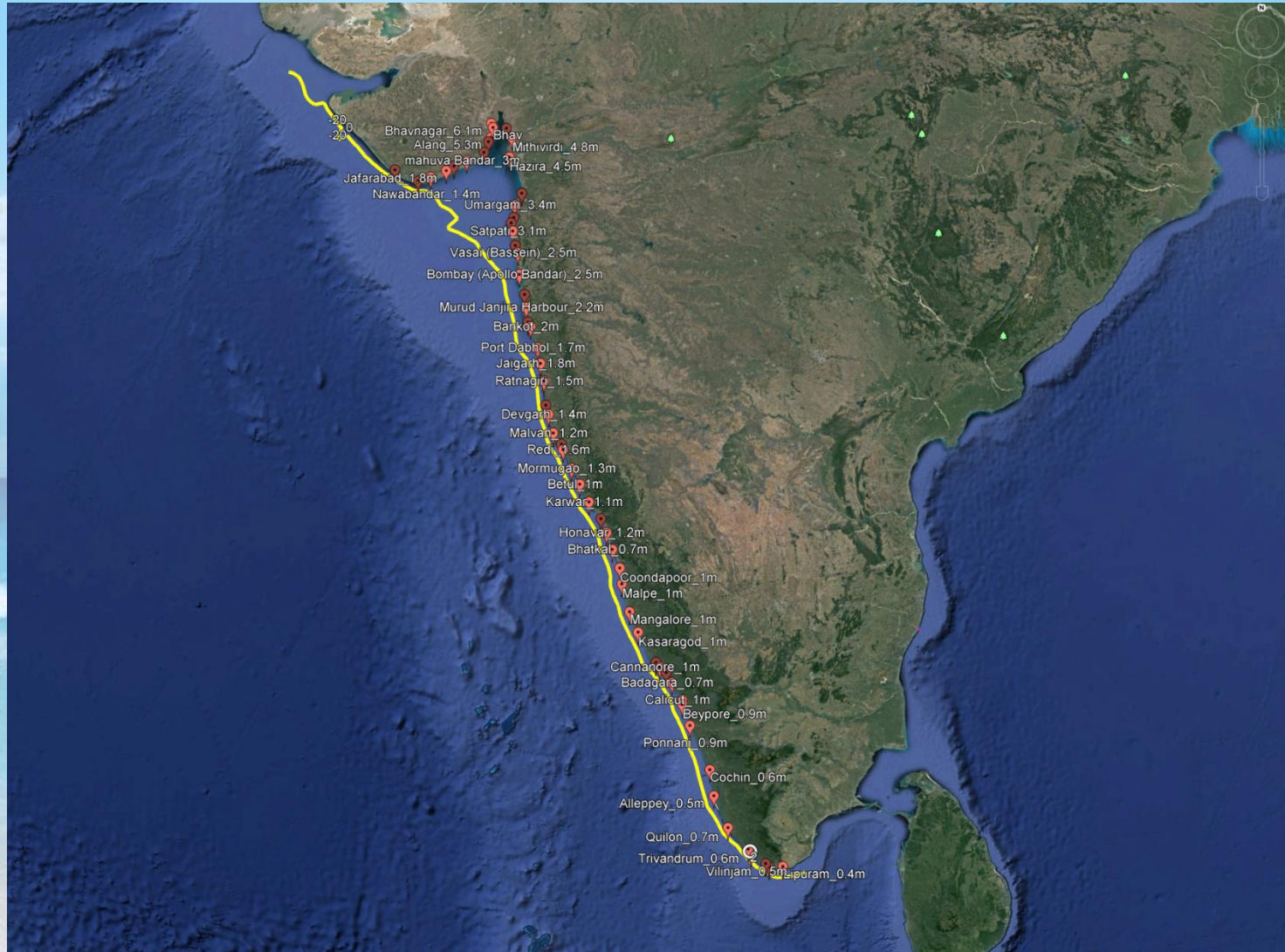
## SEA LEVEL - MAP OF INDIA





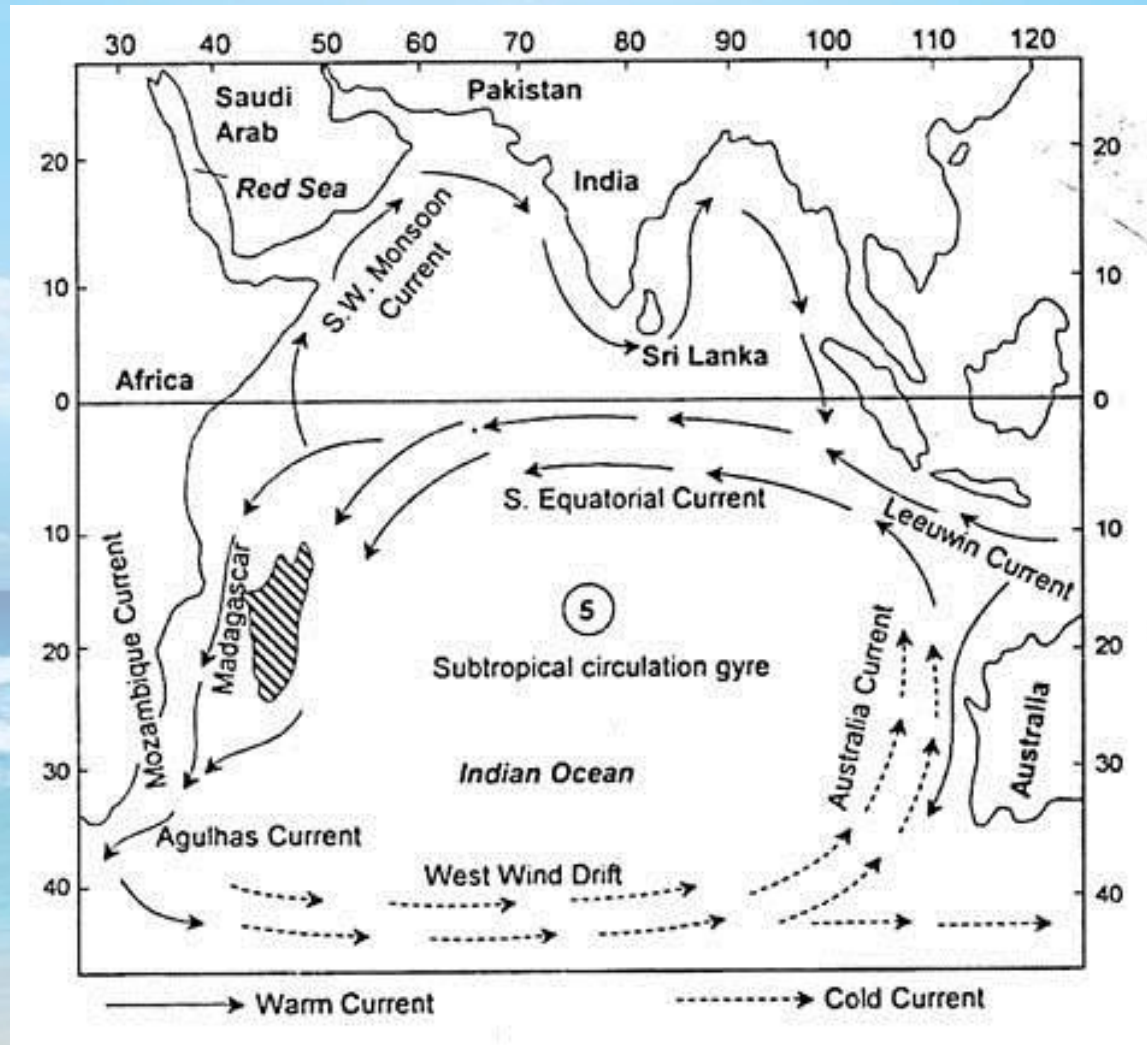
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## SEA LEVEL - MAP OF INDIA





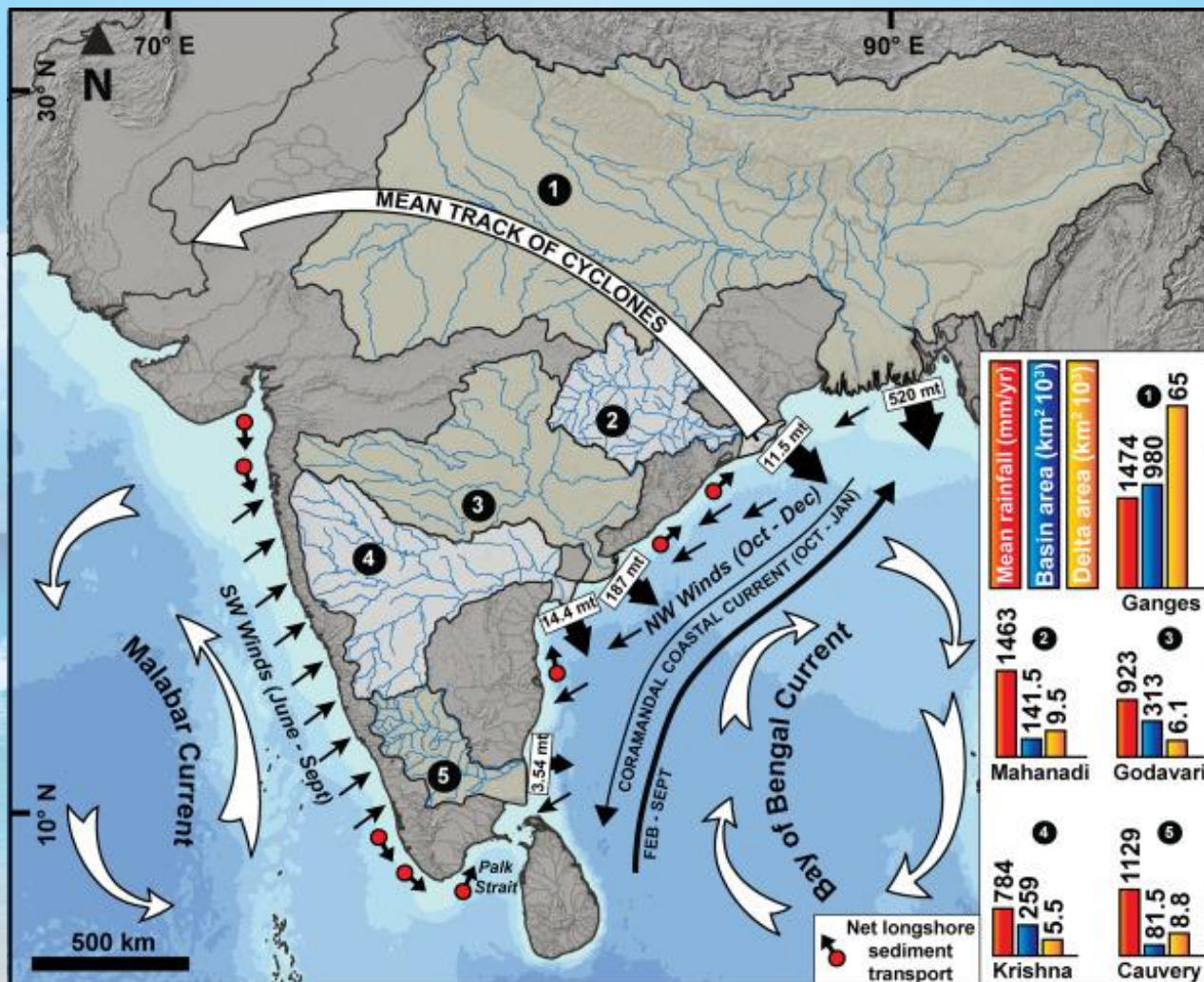
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow



Indian Ocean

**Currents of Indian Ocean**

# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow



Currents of Bay of Bengal & Arabian Sea



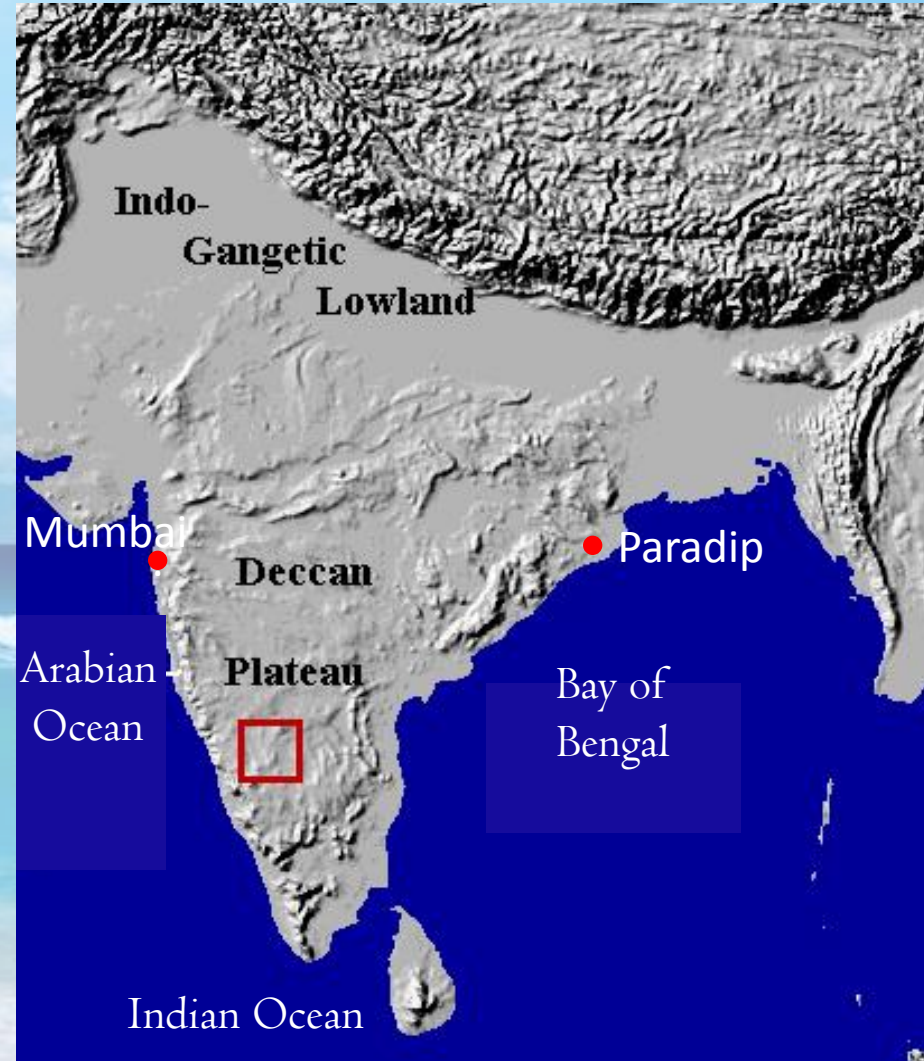
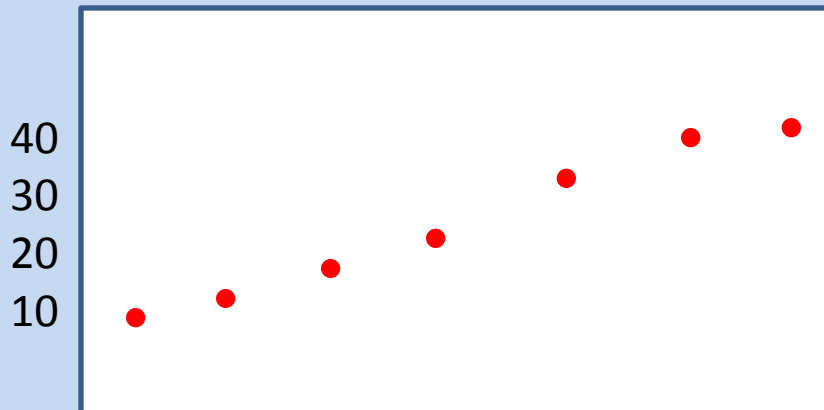
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## SEA LEVEL BETWEEN

PARADIP & MUMBAI  
APPROXIMATELY 30 Cms.

Sea Level (in Cm)

Mumbai  
Marmagoa  
Mangalore  
Cochin  
Vishakhapatnam  
Chennai  
Paradip





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

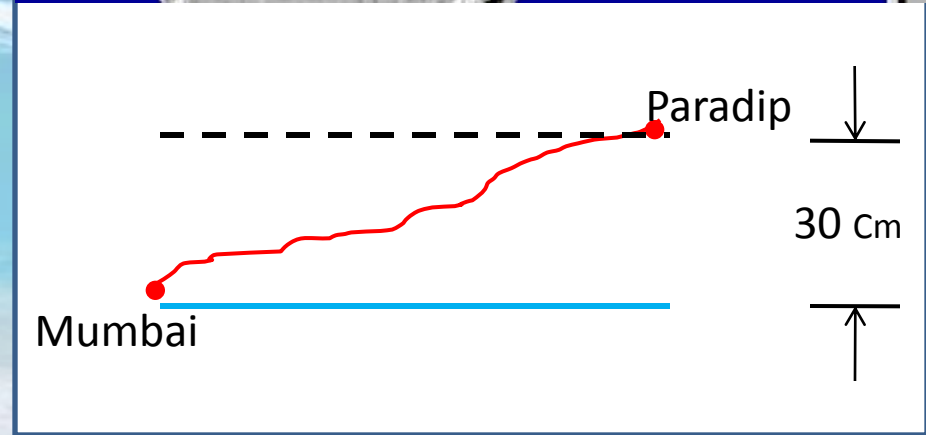
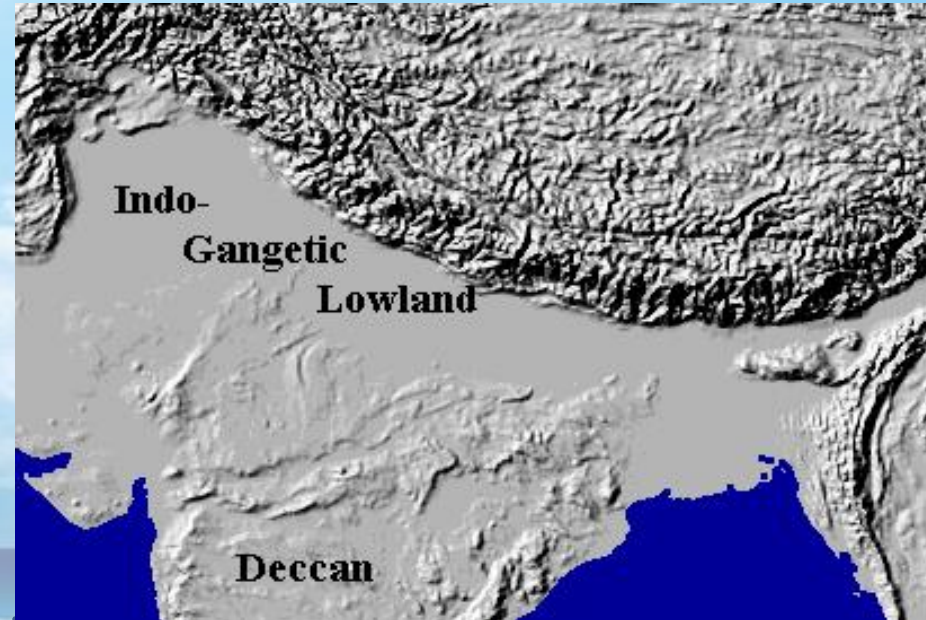
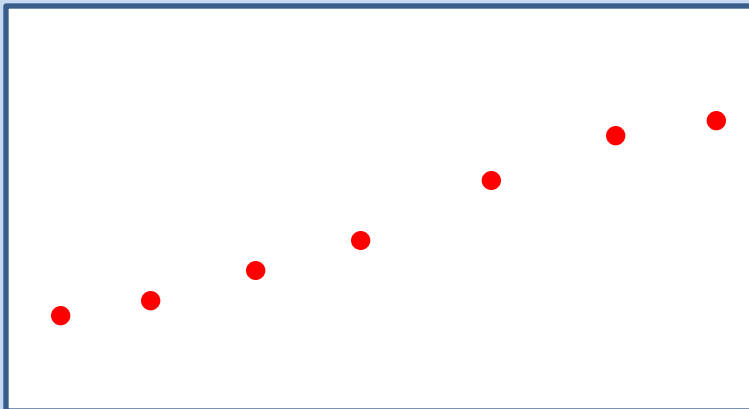
## SEA LEVEL BETWEEN

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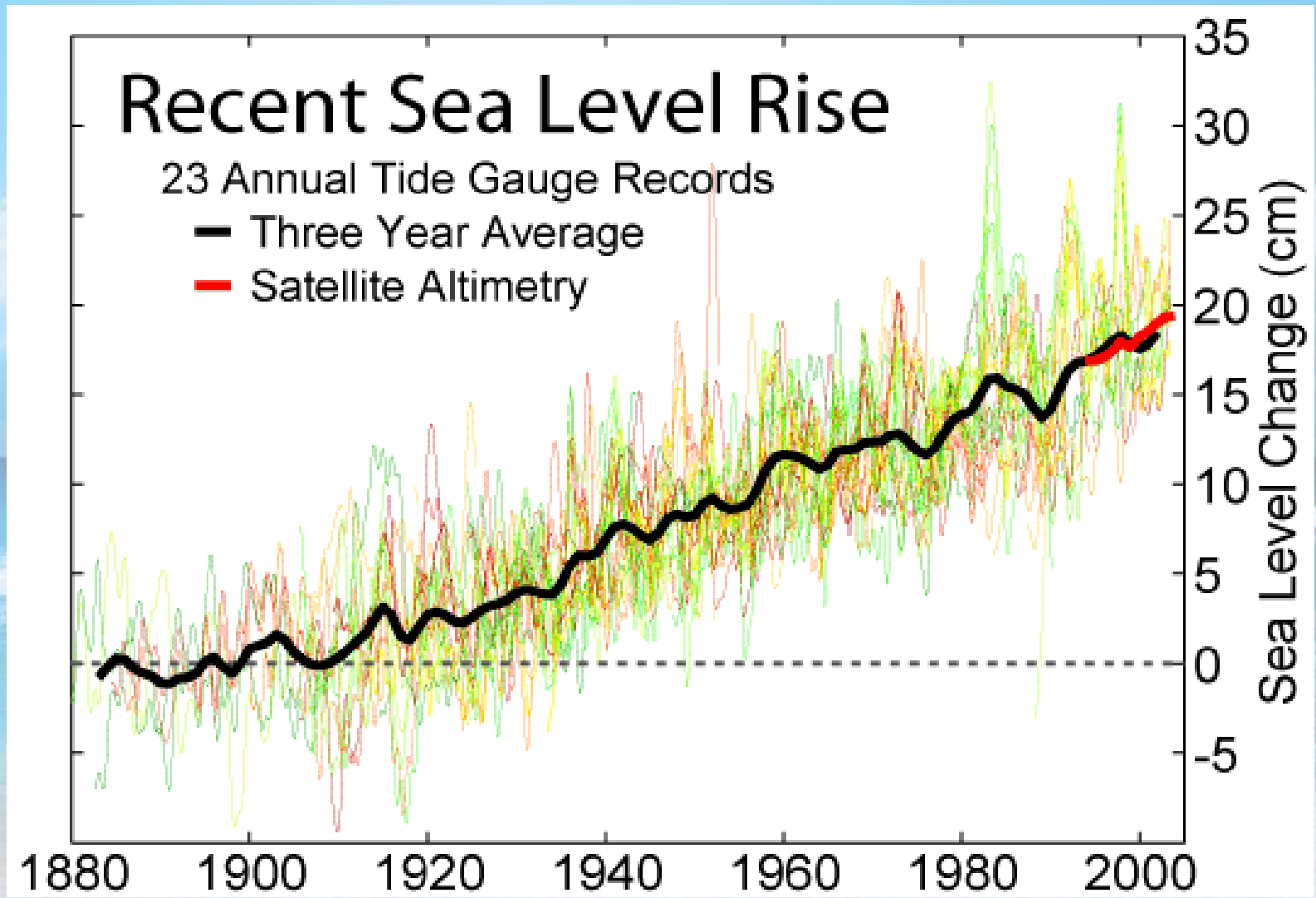
Sea Level (in Cm)

Mumbai  
Marmagoa  
Mangalore  
Cochin  
Vishakhapatnam  
Chennai  
Paradip

40  
30  
20  
10

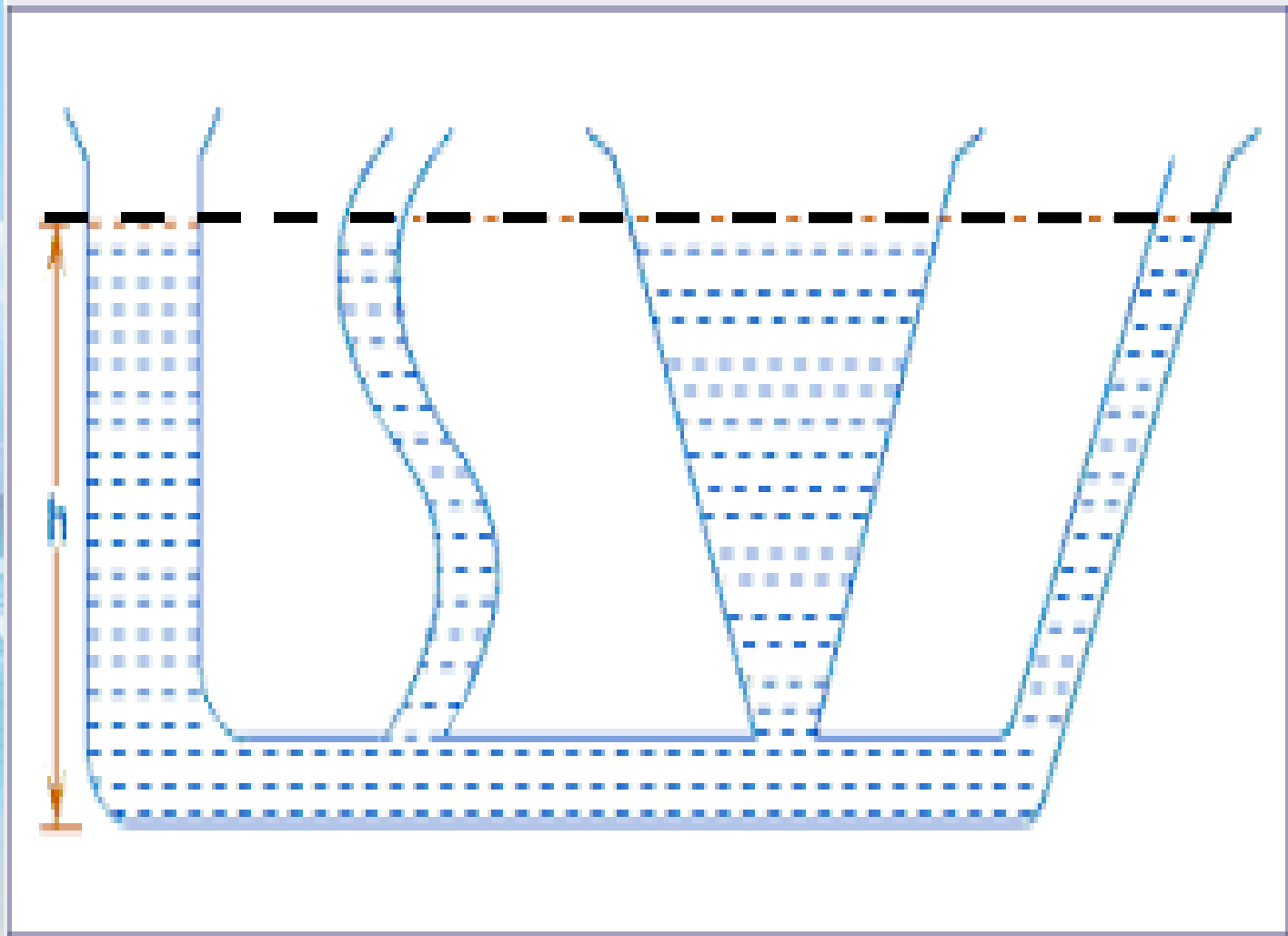


# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

**LIQUIDS  
seek their own  
level**





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## INNOVATIVE METHOD

### Linking by **GARLAND of TANKS**

Bengal to Gujarat via Kanyakumari

#### Advantages:

**NO** Acquisition of Land

**NO** Compensation

**NO** Relocation of habitats

**MINIMUM** Evaporation Loss

**MINIMUM** Seepage Loss

**MINIMUM** Usage of Electricity

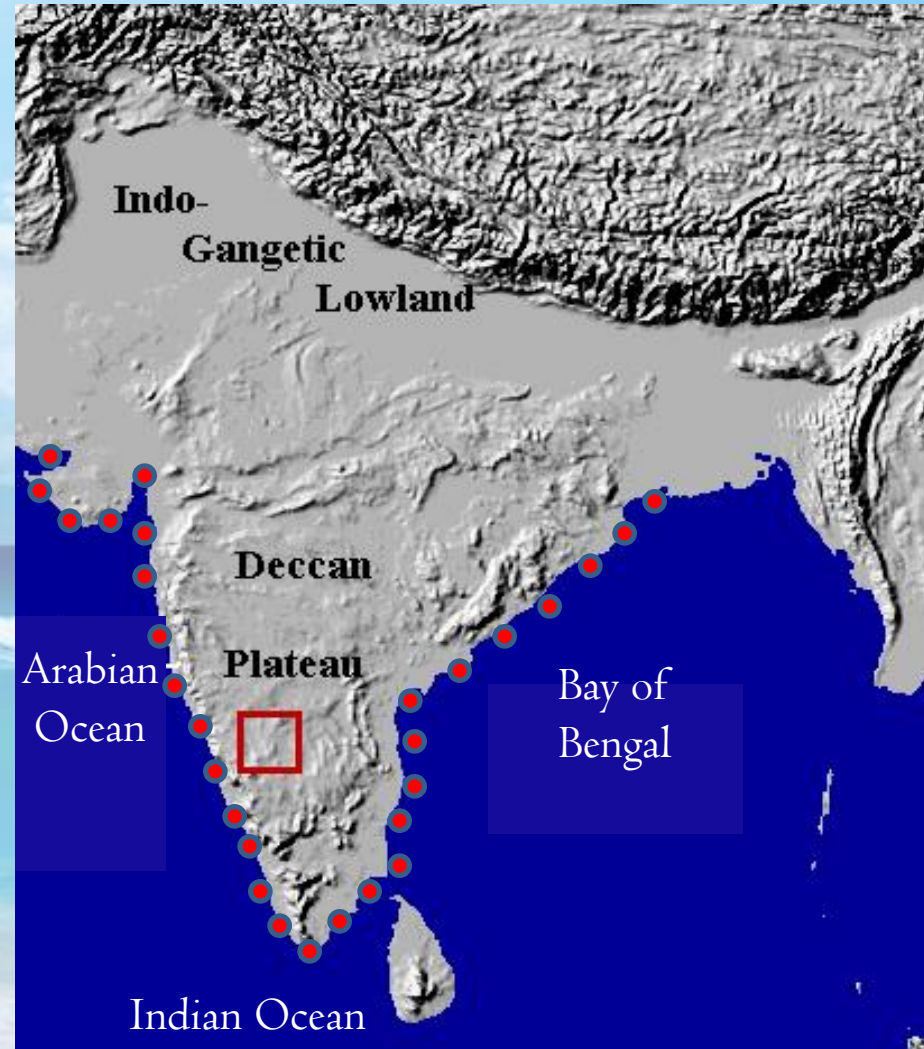
**MINIMUM** Transmission lines

Flows **TWO** way – **BETTER FLOOD CONTROL**

**SHORT TIME IMPLEMENTATION**

**BENEFITS NINE STATES & ONE UT.**

**ADDITIONAL WATER FOR IRRIGATION &  
DRINKING – 365 DAYS**



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

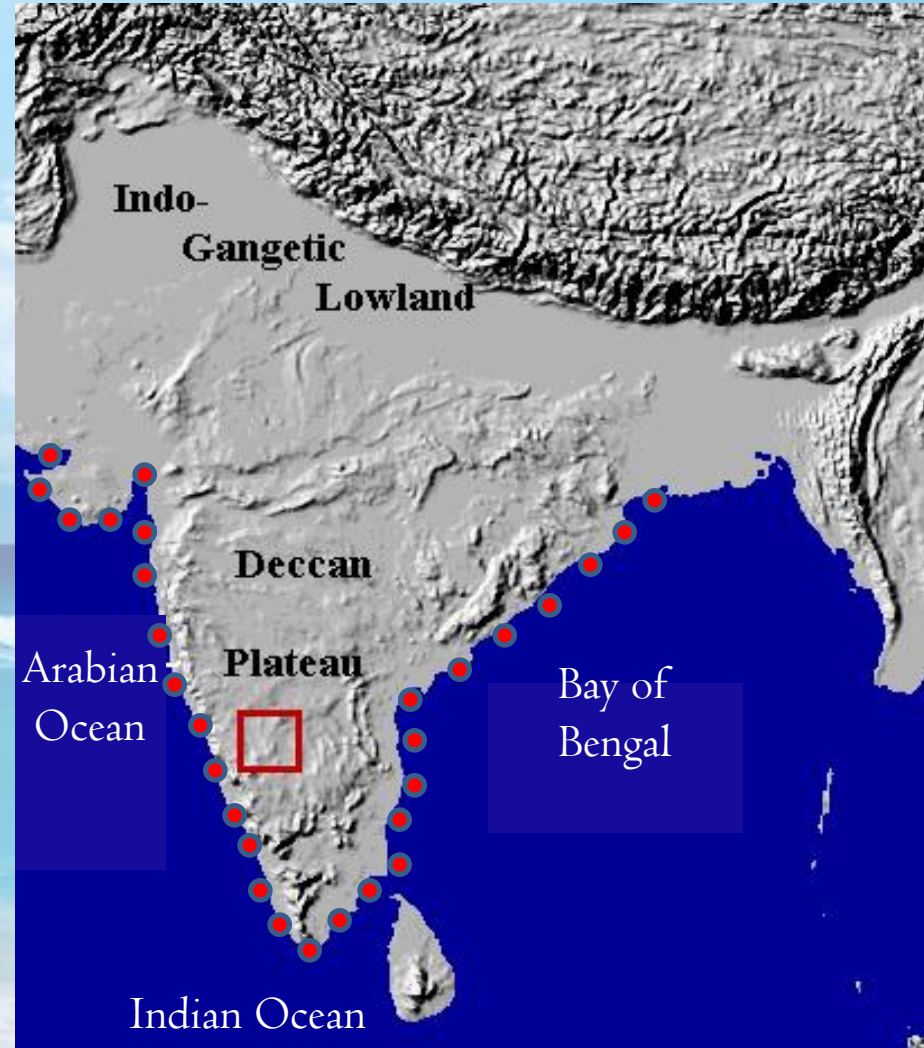
## INNOVATIVE METHOD

### Linking by Garland of TANKS

Bengal to Gujarat via Kanyakumari

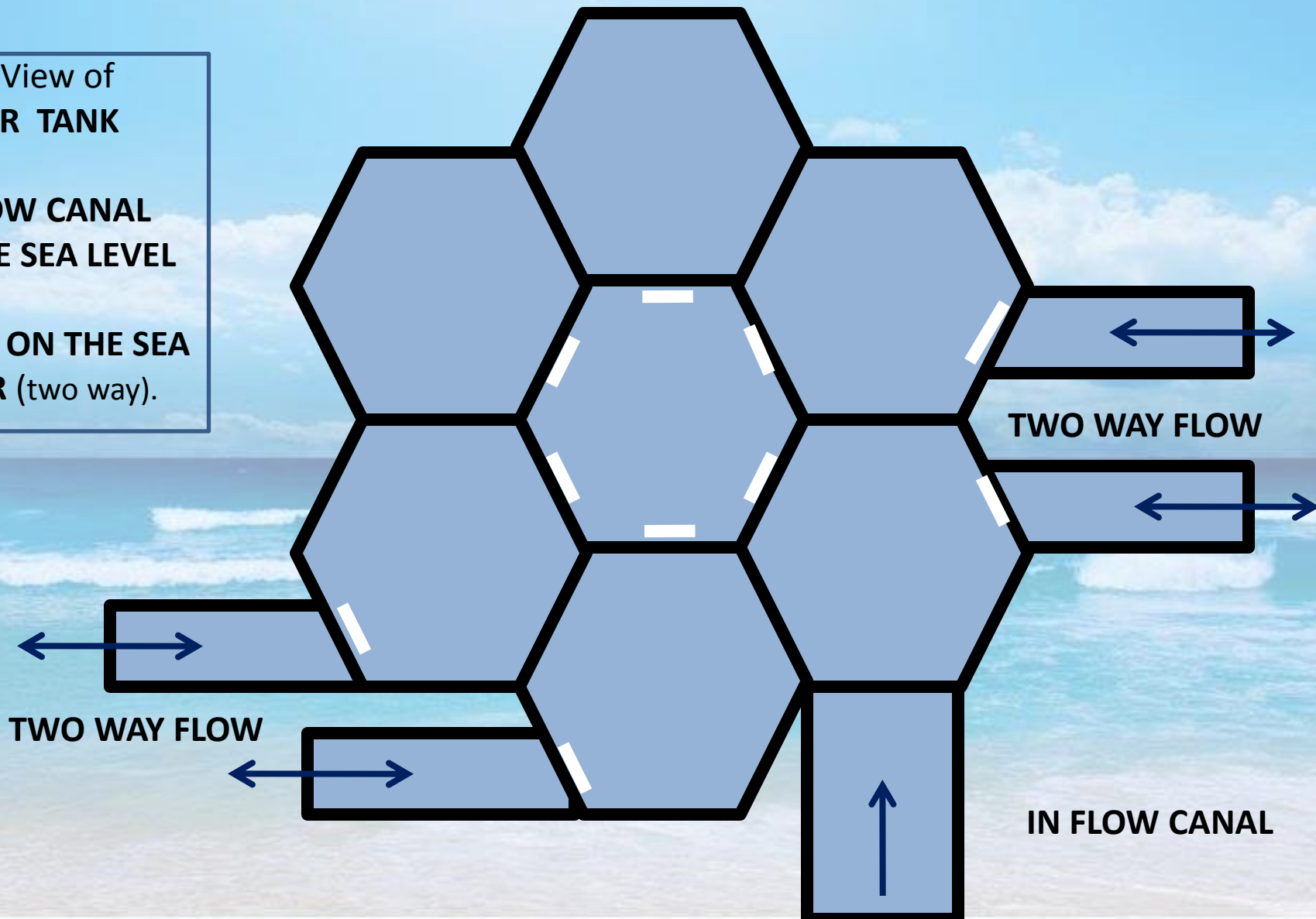
#### Disadvantages:

**Does** not provide Surface Transport  
(Waterway)



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

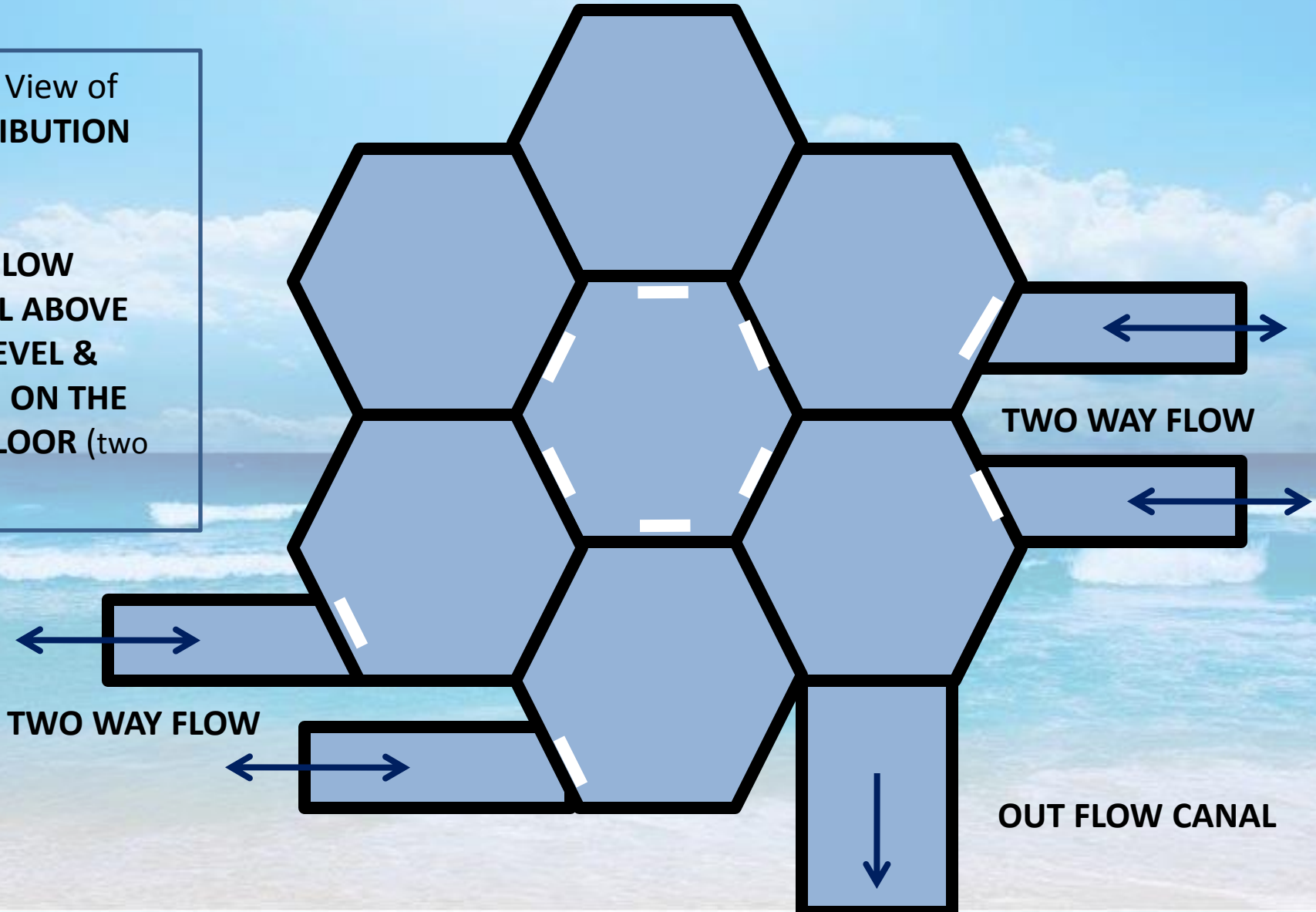
Aerial View of  
**FEEDER TANK**  
With  
**IN FLOW CANAL**  
**ABOVE SEA LEVEL**  
&  
**PIPES ON THE SEA  
FLOOR (two way).**





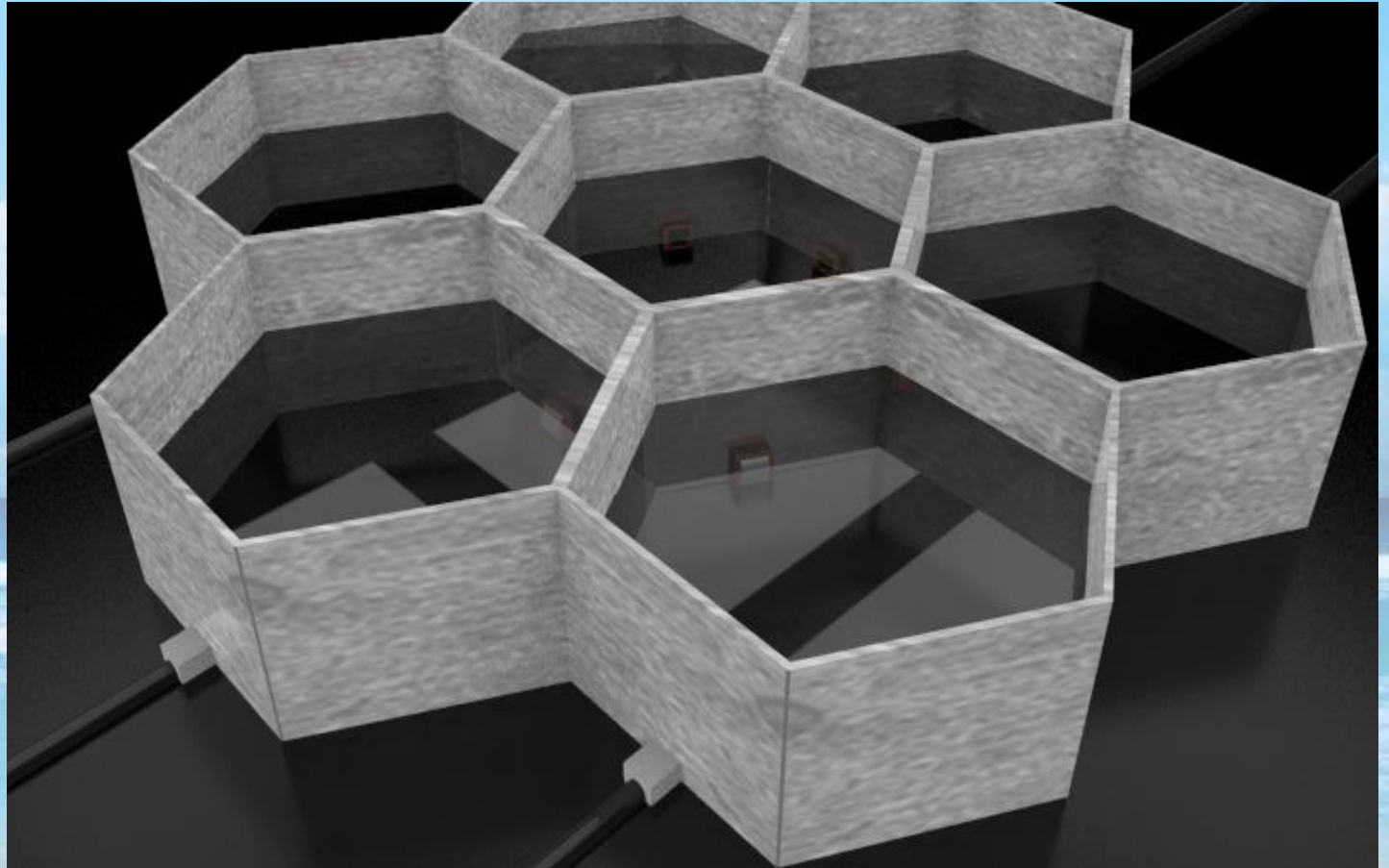
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Aerial View of  
**DISTRIBUTION  
TANK**  
With  
**OUT FLOW  
CANAL ABOVE  
SEA LEVEL &  
PIPES ON THE  
SEA FLOOR (two  
way).**



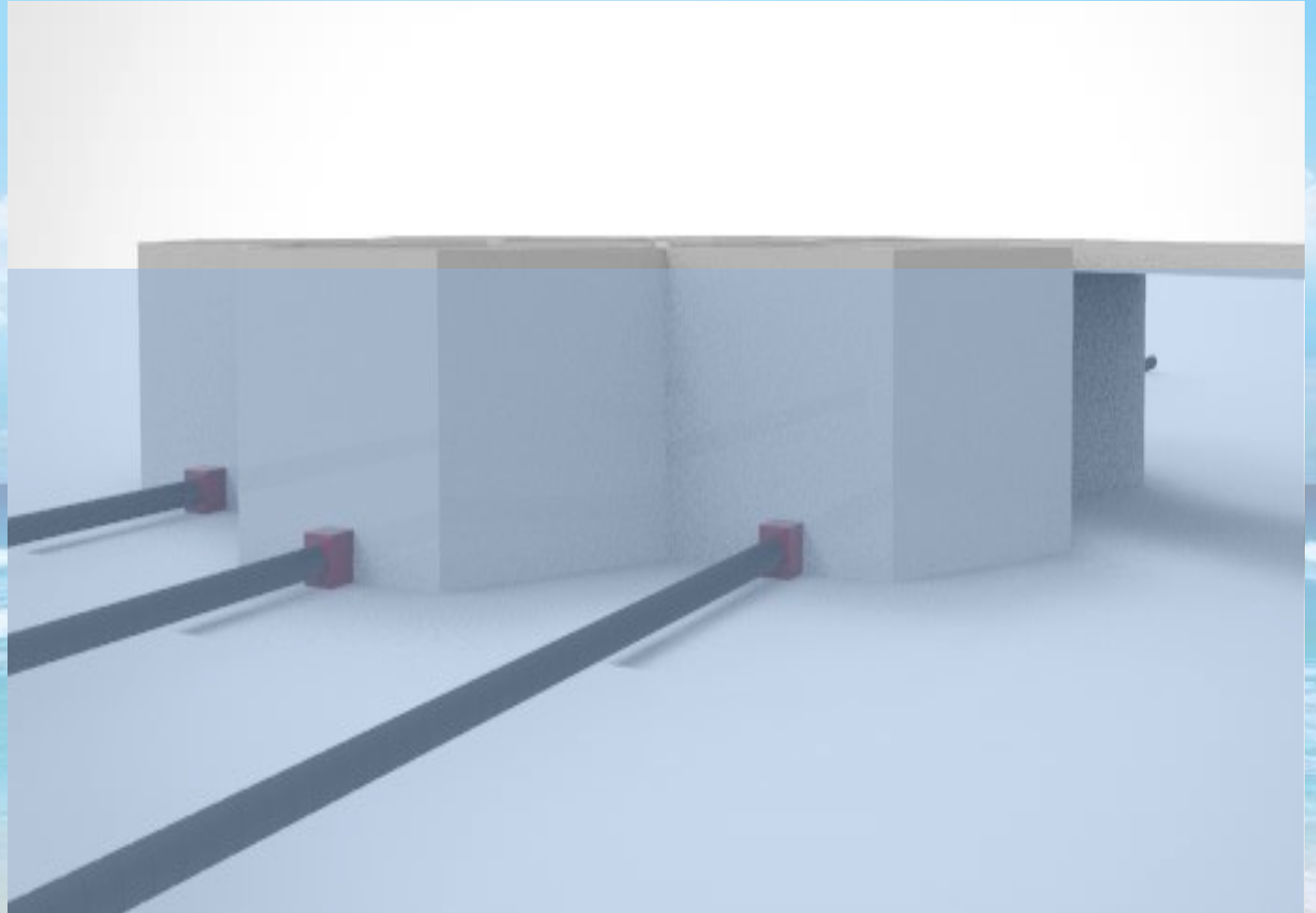
# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Artist's View of  
**Cellular TANKS**  
with **PIPES ON**  
**THE SEA**  
**FLOOR**



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

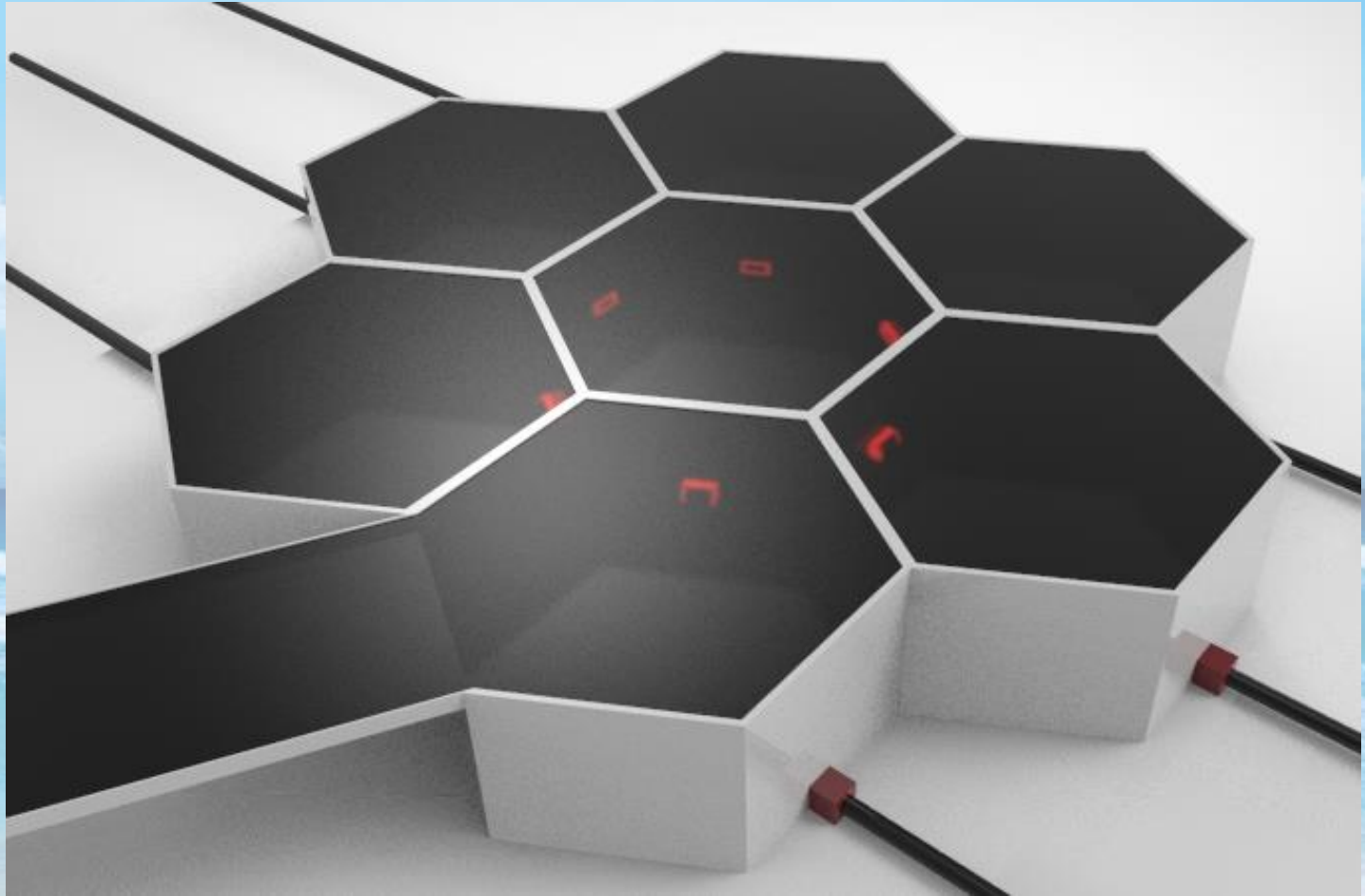
Artist's View of  
**Cellular TANKS**  
with **PIPES** on  
sea floor &  
**INFLOW /**  
**OUTFLOW**  
**CANAL**  
(two way)





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

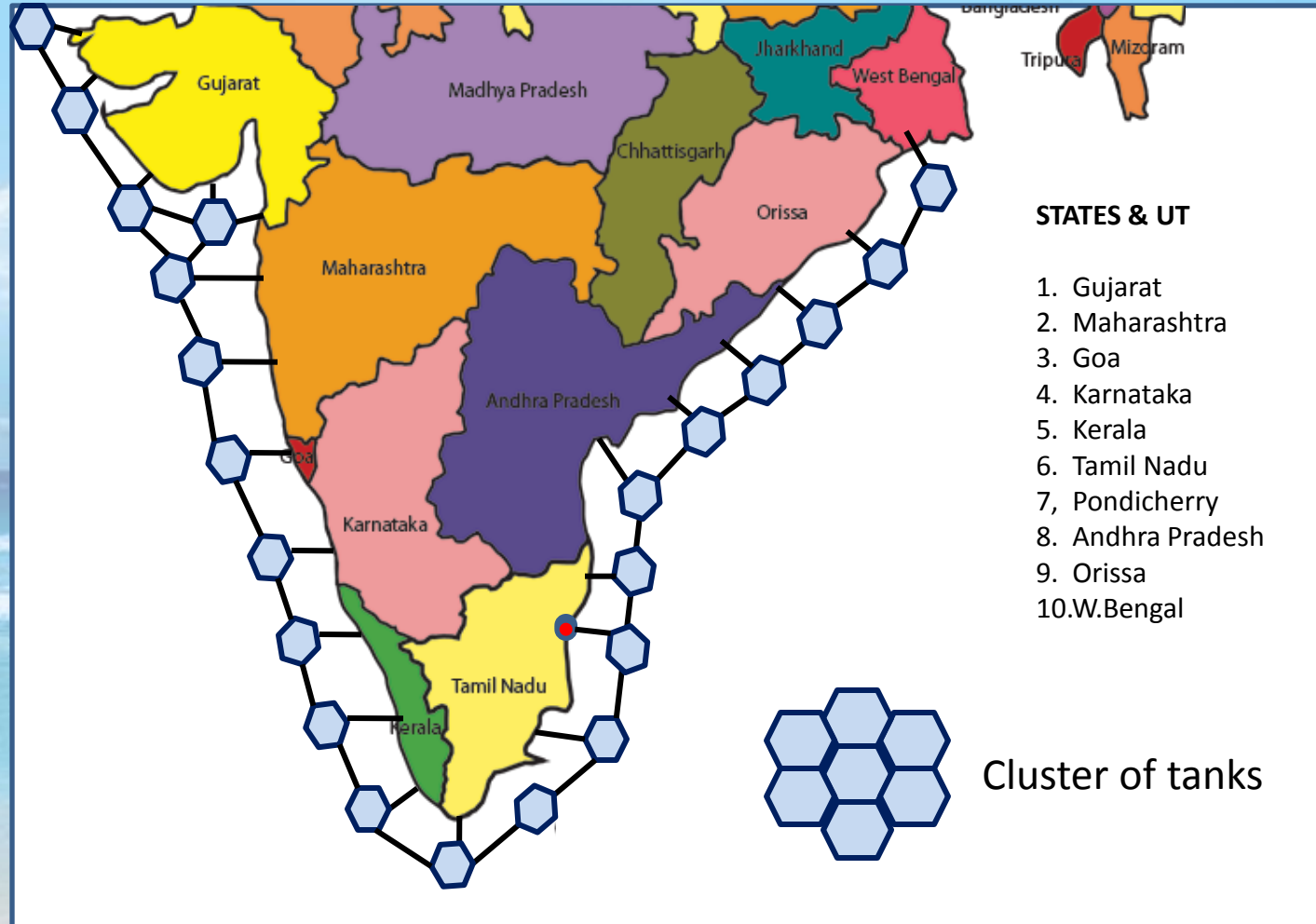
Artist's View of  
**Cellular TANKS**  
with **PIPES**  
and **INFLOW /**  
**OUTFLOW**  
**CANAL**  
(two way)



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## CONCEPTUALISATION OF TANKS

Flow of water from  
**RESERVOIRS**  
&  
**PIPES**  
**TWO WAY**  
Benefiting NINE States  
& ONE Union Territory

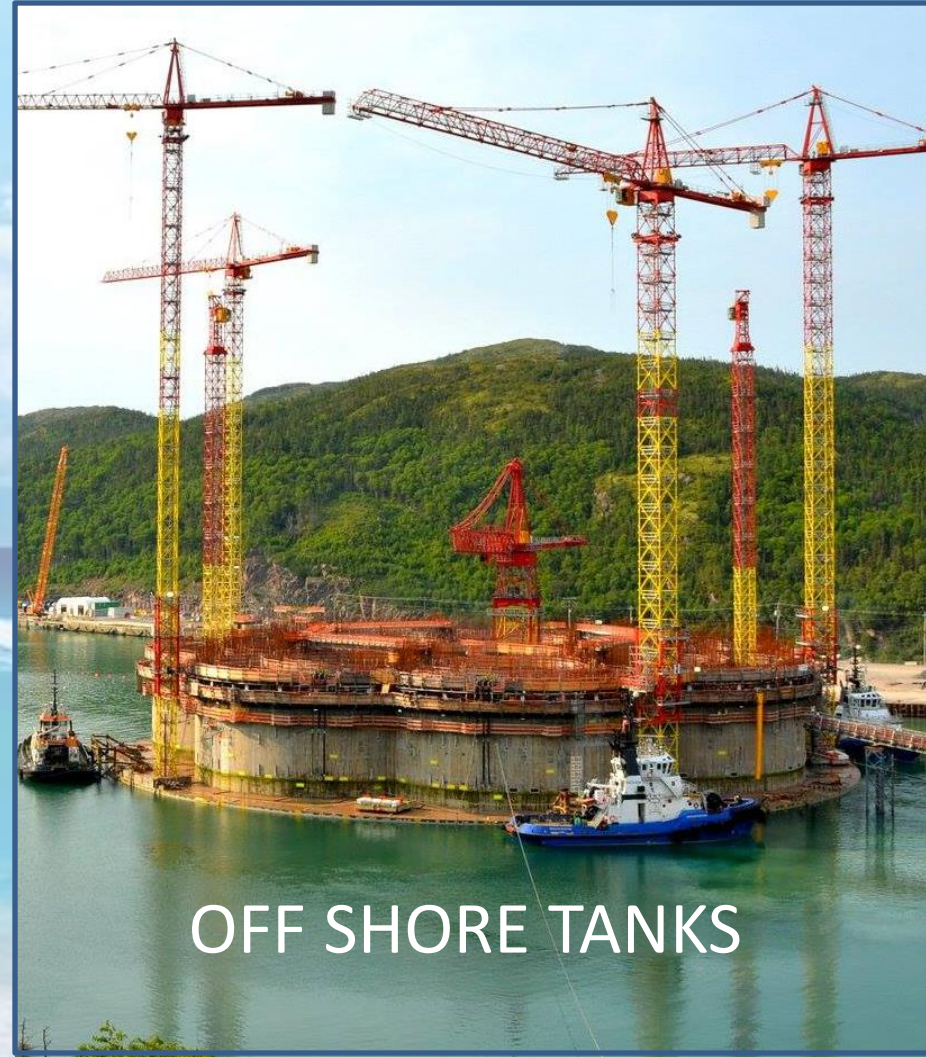
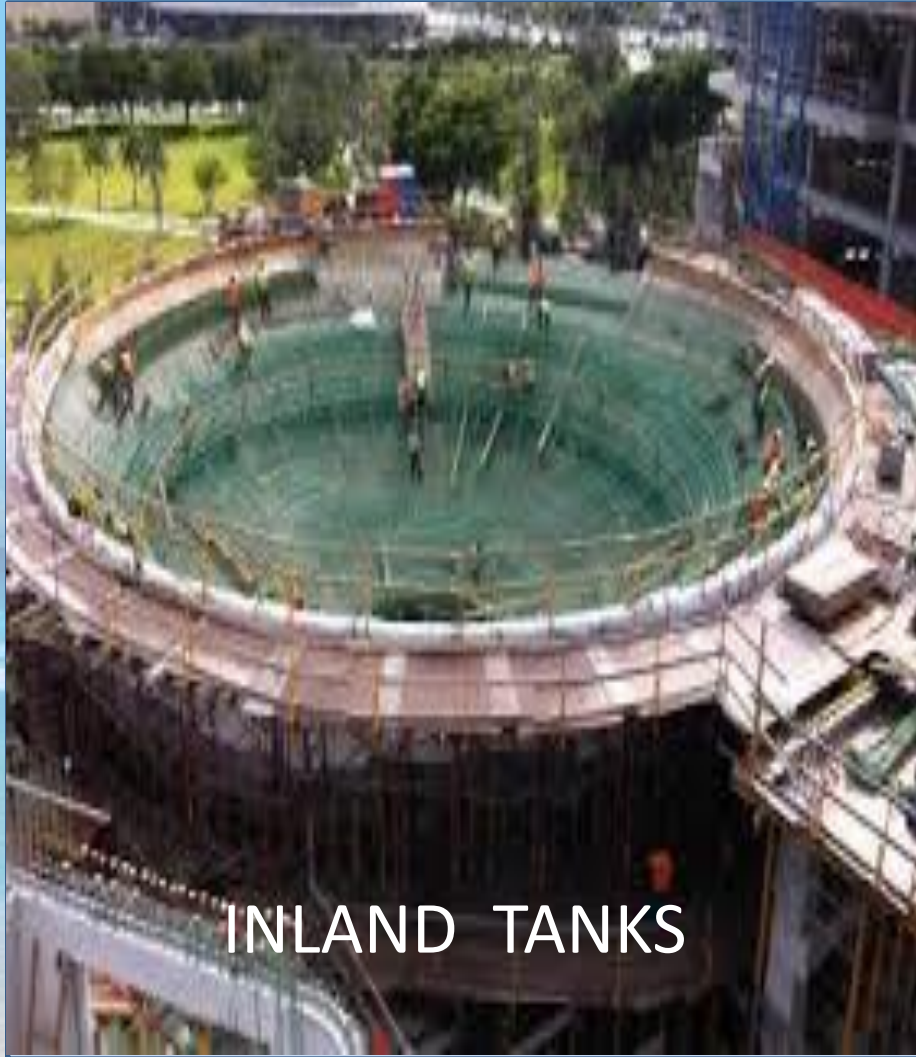


CONSERVATION & TRANSPORTATION OF FRESH WATER  
ALONG THE COASTAL REGION OF INDIA – Two way Flow

Mega Projects executed  
on  
Land & Sea



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## Storage Silos

for wheat storage

**Height (each)** 52 m

**Internal diameter** 7 m

**Wall thickness** 25 cm

**Capacity in Tons** 1,350

**Construction Time** 8 Months

**High concrete surface**





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

JAPAN

Tokyo's

Major Tourist Attraction

50 Meters  
Below Ground Level  
Extends 6.3 Km





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## SILOS 5 #

Height 65m

Diameter 32m

Below Surface 50m

1,00,000 CuM (each)

## TANKS

Height 25m

Length 177m

Width 78m

3,50,000 CuM



G Cans – Japan's Underground drainage system – 2.6 B \$

Connected to 78 10MW pumps that can pump up to 200 CuM of water per second



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

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Height 65m

Diameter 32m

Below Surface 50m

1,00,000 CuM (each)

## TANKS

Height 25m

Length 177m

Width 78m

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G Cans – Japan's Underground drainage system – 1993 -1996

Connected to 78 - 10MW pumps that can pump up to 200 Cum of water per second  
(53,000 Gallons per second)



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## SILOS 5 #

Height 65m

Diameter  $\phi$  32m

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1,00,000 CuM (each)

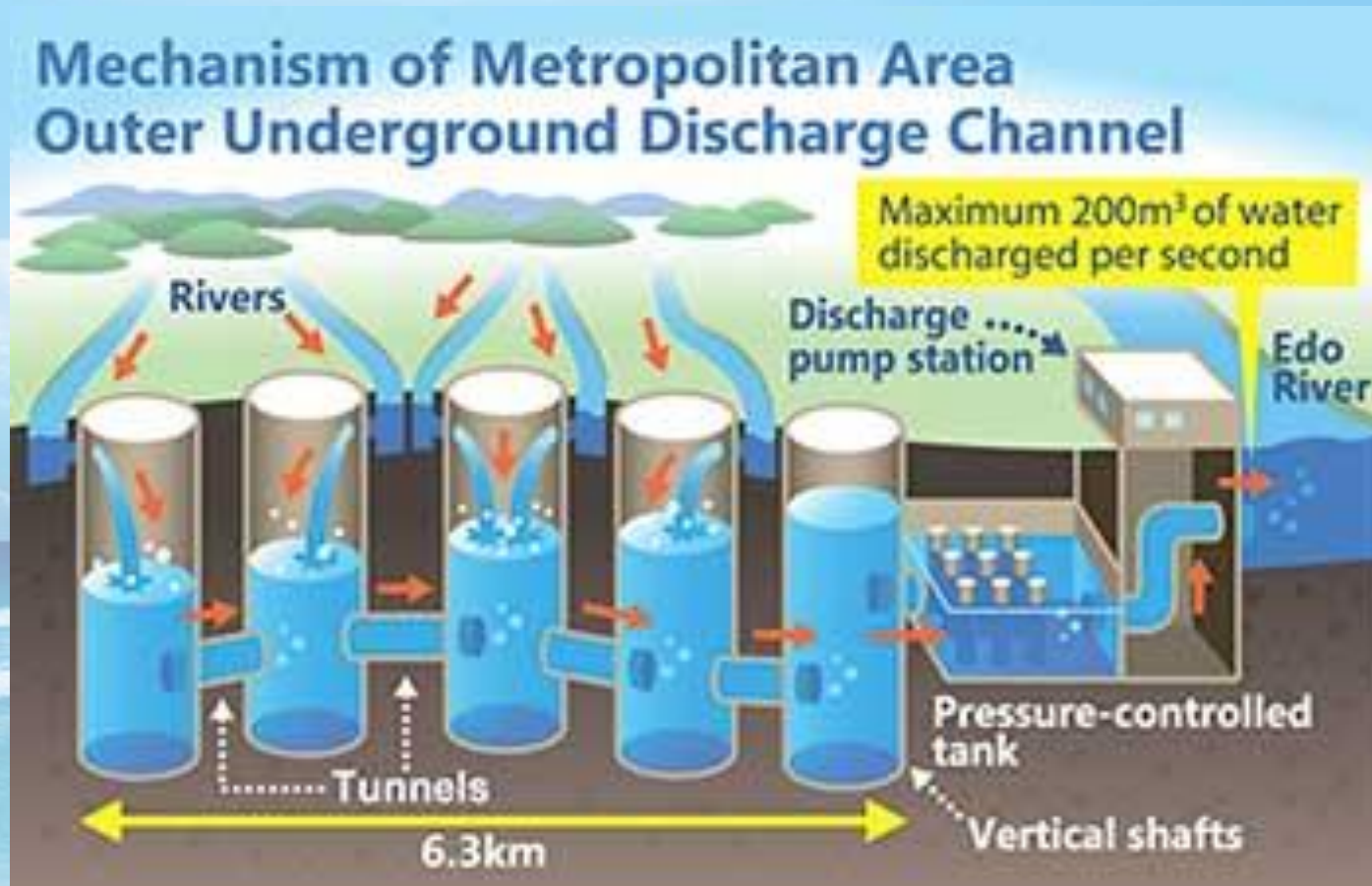
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# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Design of  
Under sea tunnel  
In English Channel

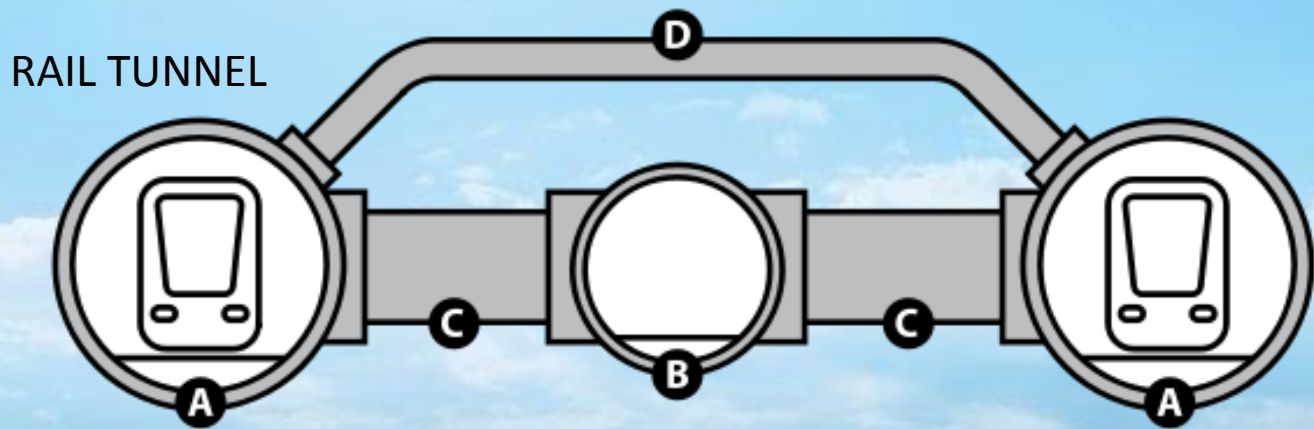
Two 25 feet Dia tubes  
For trains and  
One 16 feet Dia  
Service Tunnel  
300 feet below sea level



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Cross Sectional View  
Under Sea Rail links

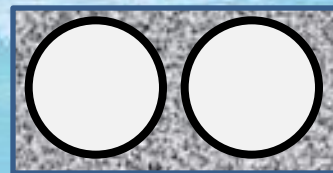
- A. Main Rail Tunnel
  - B. Service Tunnel
  - C. Cross Passenger Link
  - D. Piston Relief Ducts
- Main Tunnel 24 Feet Dia



Suggested Pipe line  
For Transportation  
Of Fresh Water  
Along the Coast of  
India

10 Feet Dia Pipes

PROPOSED WATER  
PIPES



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Comparison

## Working Depth and Pressure

Suggested Pipes at 100 feet Below Sea Level - Pressure @ 3.9 atm

Chunnel at 250 feet Below Sea Level - Pressure @ 8.4 atm

Seiken at 790 feet Below Sea Level - Pressure @ 24.8 atm



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Under Sea Rail Links

Existing Under Sea Rail Links

Euro Chunnel – Connecting France and England

Seiken Tunnel – Connecting Honshu and Hokkaido

Proposed Under Sea Rail Links

Japan and South Korea

China and United States of America

# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

Under Sea Rail Links

## Existing Under Sea Rail Links

	Depth	Total Length Under the Sea	Year	Cost
Euro Chunnel -	250 Ft	50.50 Km	1994	14 .0 B \$
Seiken Tunnel -	790 Ft	53.85 Km	1988	03.6 B \$

## Proposed Under Sea Rail Links

Japan and South Korea  
China and United States of America

# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

## WORLD'S

TOP TEN TUNNELS

IN EXISTANCE

## UNDER SEA TUNNELS IN EXISTANCE

1.	SEIKAN TUNNEL	53.9 Km	1998	JAPAN
2.	CHUNNEL TUNNEL	37.9 Km	1994	ENGLAND / FRANCE
3.	TOKYO BAY TUNNEL	15.0 Km	1997	JAPAN
4.	BOMLAFJORD TUNNEL	7.8 Km	1980	NORWAY
5.	EIKSUND TUNNEL	7.7 Km	2007	NORWAY
6.	N. CAPE TUNNEL	6.8 Km	1999	NORWAY
7.	SEVERN TUNNEL	3.6 Km	1886	UNITED KINGDOM
8.	VARDO TUNNEL	2.9 Km	1982	NORWAY
9.	SYDNEY TUNNEL	2.8 Km	1992	AUSTRALIA
10.	THAMES TUNNEL	0.4 Km	1843	UNITED KINGDOM



# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow

**Table top  
demo  
given at  
IIT - Rookee**





# CONSERVATION & TRANSPORTATION OF FRESH WATER ALONG THE COASTAL REGION OF INDIA – Two way Flow



## PROOF OF CONCEPT – NEW HORIZON COLLEGE OF ENGINEERING



CONSERVATION & TRANSPORTATION  
OF  
FRESH WATER  
ALONG THE COASTAL REGION OF  
**INDIA**

(TWO way Flow to assist Better Flood Control)  
( INITIAL INFRASTRUCTRE COST & MINIMAL TRANSPORTATION COST )

**THANK YOU**

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