



# **Whither Wetland Conservation?**

## **A View from Developing Countries**

**Brij Gopal**

*Centre for Inland Waters in South Asia, Jaipur, India*



**1970 – UNESCO-IBP Meeting on Macrophytes  
Tulcea (Romania) in Danube delta**

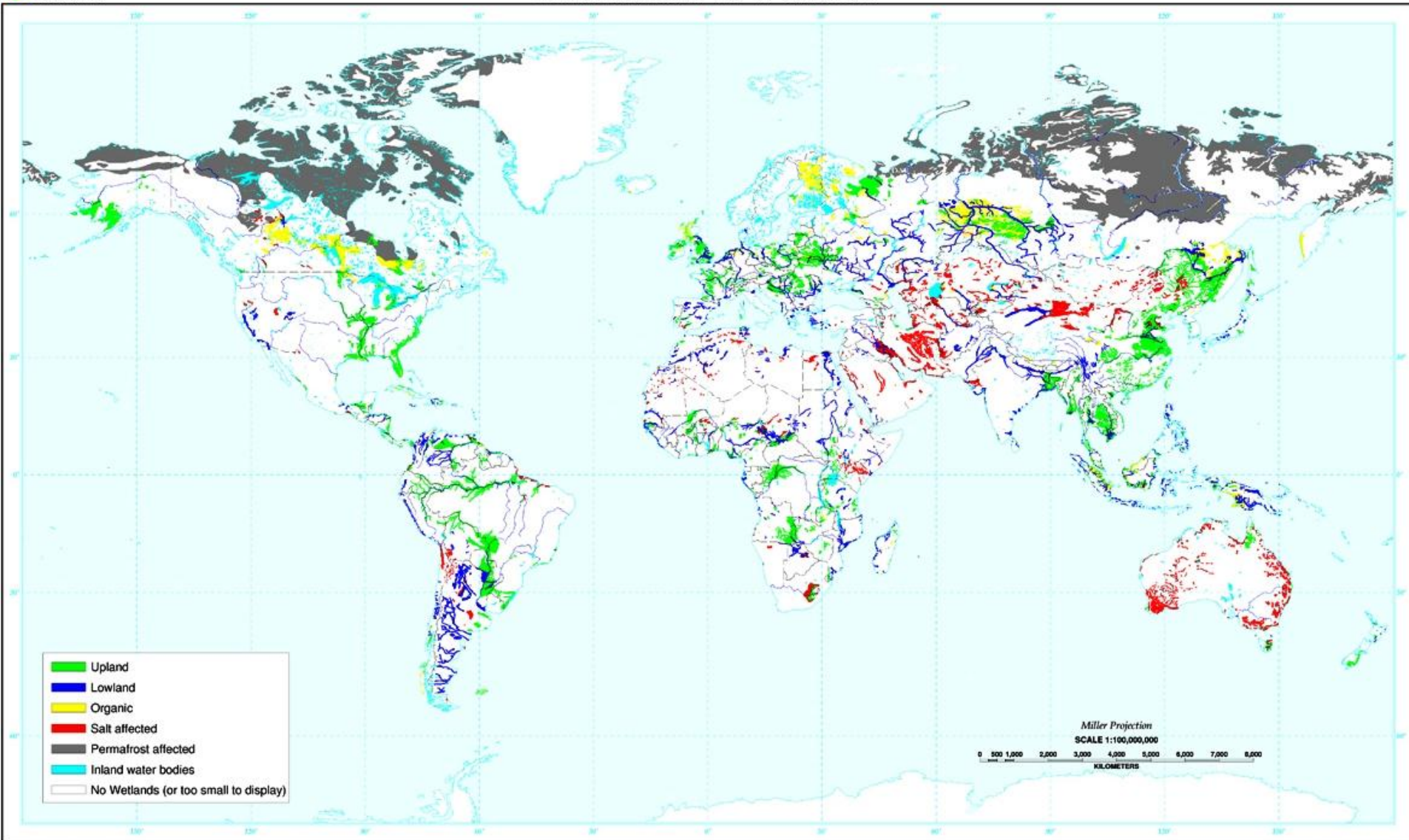
**Jan Kvet proposed a definition of wetlands  
based on Macrophytes and Hydrology**

**Conservation was discussed emphasising**

- Impact of exotic weeds*
- role of littoral vegetation in erosion control*
- restoration of shoreline vegetation*
- effects of pollution on plant communities*

**Much later, I learned about the  
USFWS Circular 39 of 1956**

# Distribution of Wetlands



# Wetlands in Asia

Temperate to Tropical Climate Regimes

Monsoonal climate with Himalaya's dominant influence

Seven major rivers originate in the Himalaya

About two-thirds of Asia is arid/semi-arid

Wetlands range from  
High altitude marshes

Mountain peatlands

Floodplain marshes

Shallow lakes

Riparian swamps

Mangroves

Peat swamps

Salt marshes

Human-modified and

Human-Made Wetlands

All are human managed



# Historical Wetland Conservation

**Humans have used wetlands since historical times throughout the world. Human dependence on wetlands has been greatest in the tropical and subtropical regions.**

**In Asia wetlands have been an integral part of the socio-cultural ethos of human societies.**



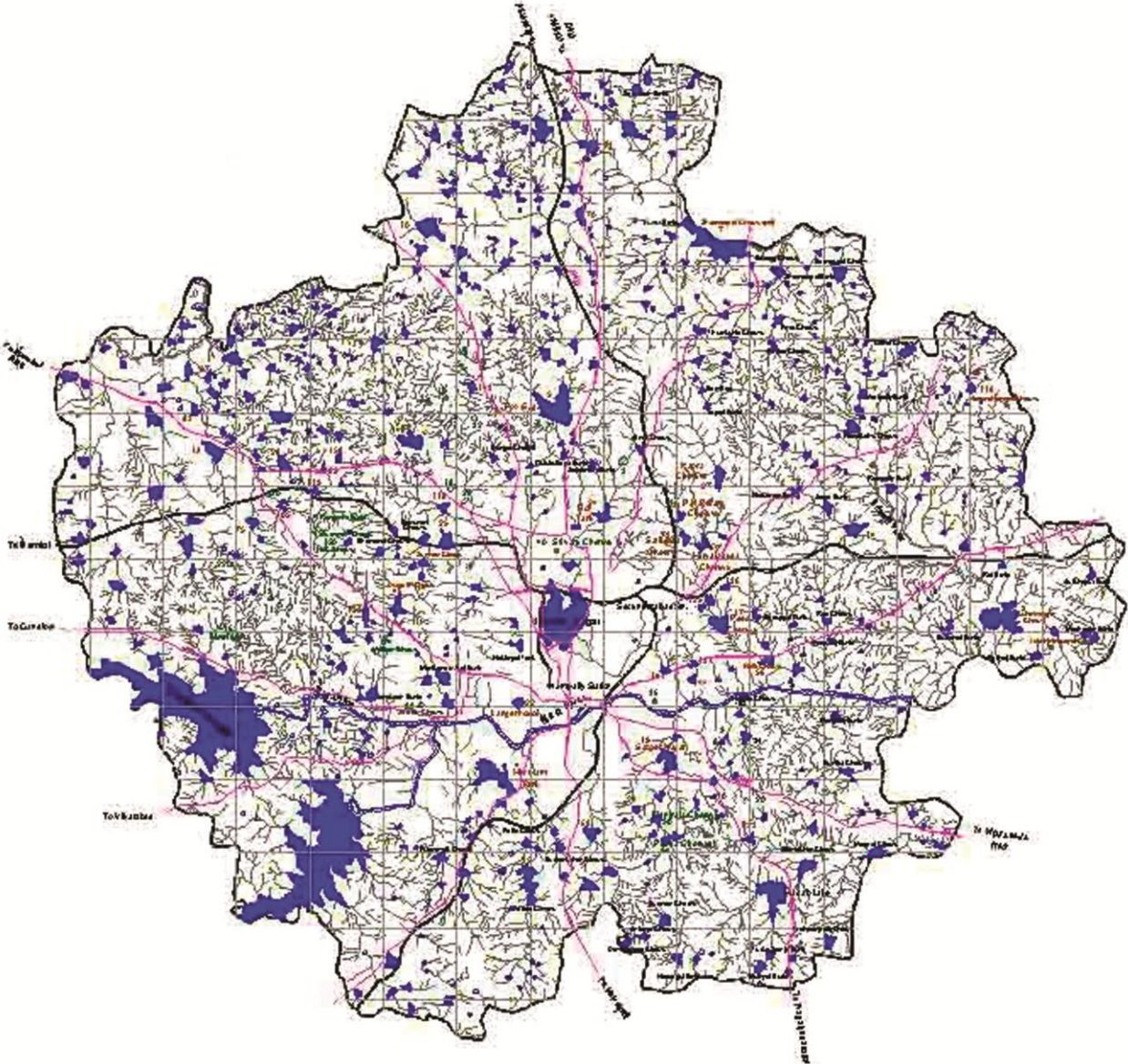
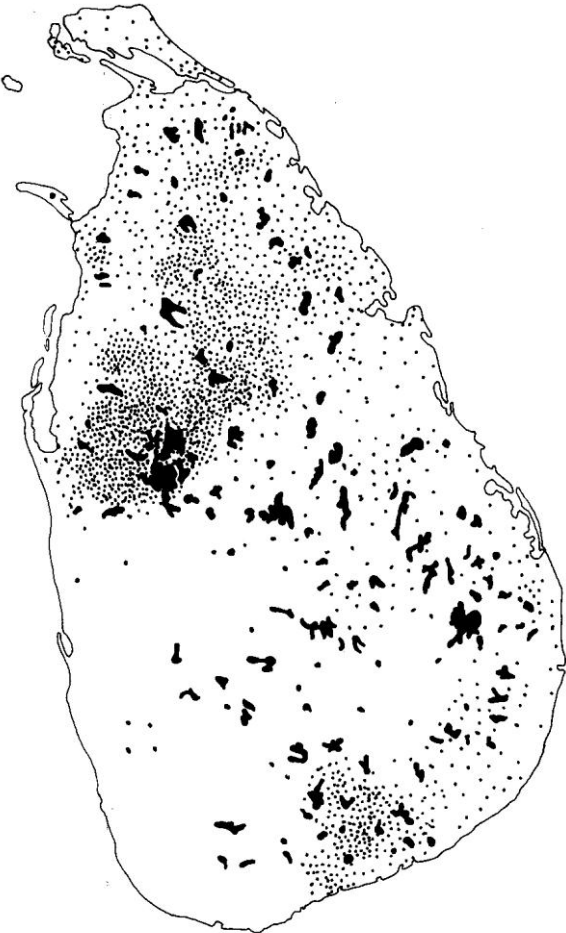
# Historical Wetland Conservation

For centuries, local communities managed wetlands for subsistence and livelihoods. In many countries, people lived in wetlands.

While the concern for wetlands was raised for the conservation of the waterfowl in Europe and North America only about a century ago, wetlands were created for waterfowl in India as early as 10<sup>th</sup> century AD

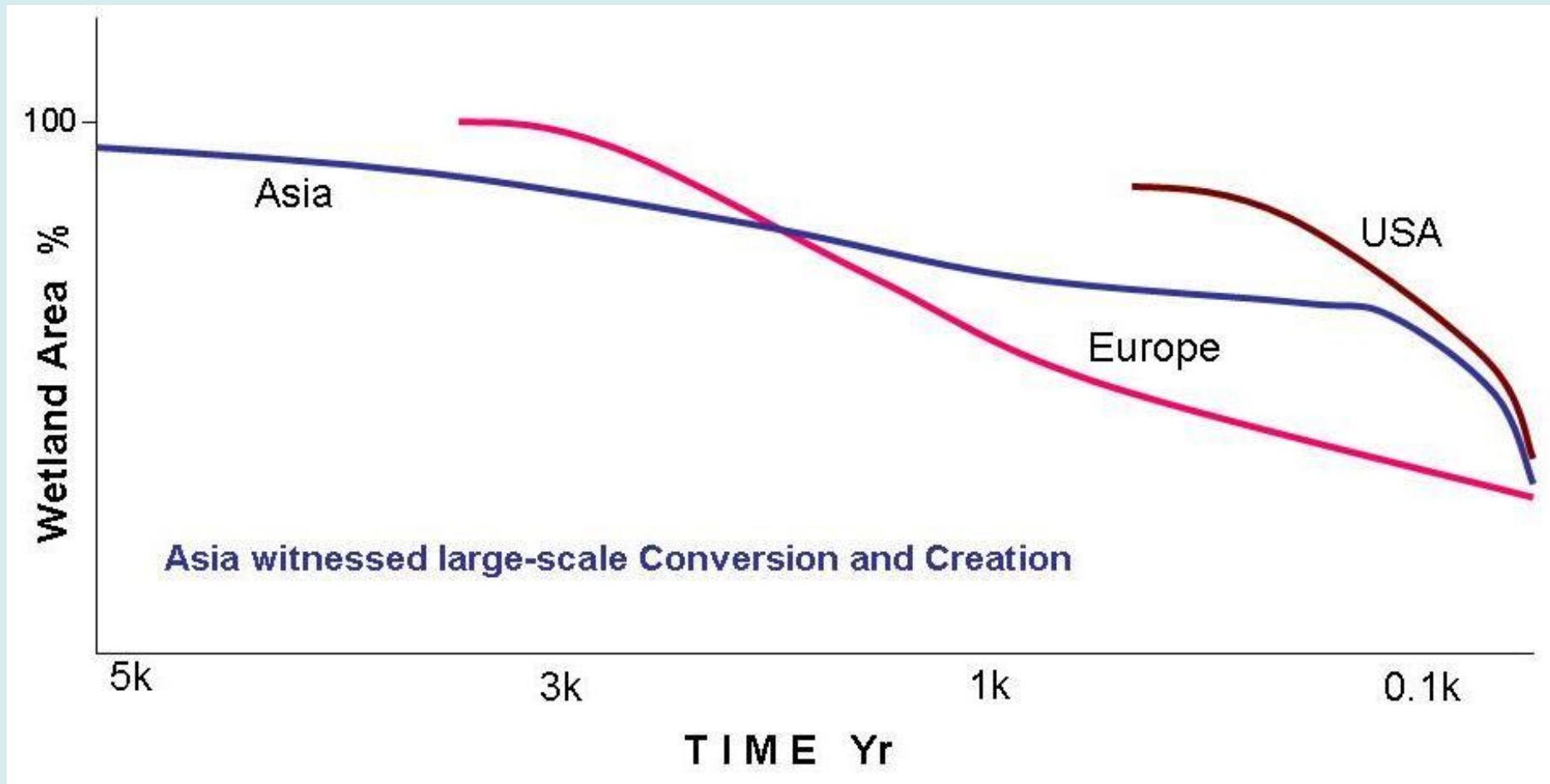


# More wetlands were created than converted.



# When did Wetland Loss & Degradation Start?

Wetlands were seen as Wastelands and Nuisance to human health beginning with the colonisation of Asia and Africa. Introduction of technology allowed for rapid reclamation and drainage of wetlands.





# Moving with Time: Conservation Today

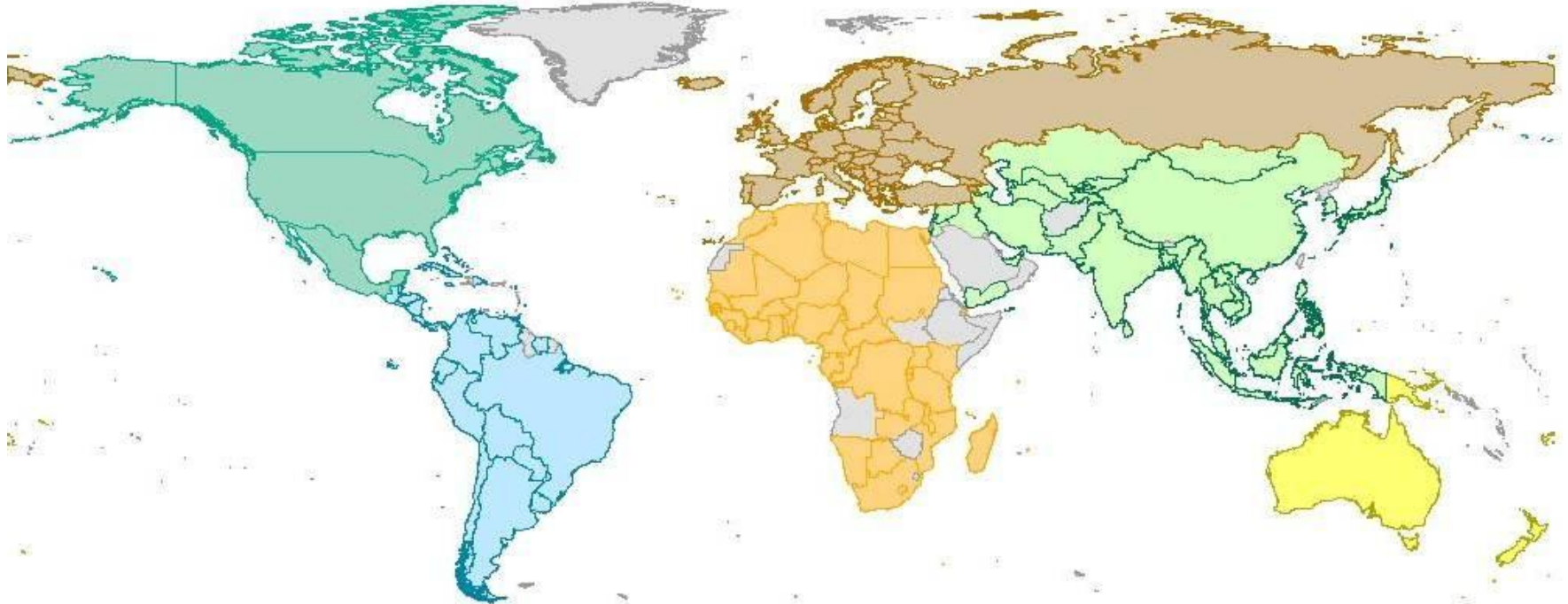
**Developing Countries Slowly Re-Discover the Value of Wetlands and join the Global Conservation Efforts under the Ramsar Convention**

**Until 1980: only Iran, Pakistan, Jordan, Senegal, Morocco**

**1981-1990: 25 countries 1991-2000: 60 countries 2001-2010: 38 countries**

**Today, practically all developing countries are Parties to the Convention.**

**Bhutan is the latest (161) to join on 7 May 2012**



# Does Joining the Convention help Wetland Conservation

Ramsar Convention is NOT a Regulatory Measure



# Number and Area of Ramsar Sites in Selected Countries

Country	Sites	Total area, ha
Bahrain	2	6,810
Bangladesh	2	611,200
China	37	3,168,535
India	25	677,131
Indonesia	5	964,600
Iran	24	1,486,438
Iraq	1	137,700
Israel	2	366
Lao PDR	2	14,760
Malaysia	6	134,158
Myanmar	1	256
Nepal	9	34,455
Pakistan	19	1,343,627
Papua New Guinea	2	594,924
Philippines	4	132,032
Sri Lanka	5	19,011
Thailand	11	372,800
U A Emirates	2	13,020
Viet Nam	3	35,807
Yemen	1	?

**Extent of  
wetlands in  
selected  
Countries**

Country	Number	Area, km <sup>2</sup>	Total Land area, km <sup>2</sup>	% wetland area
<b>Bangladesh</b>	<b>12</b>	<b>67700</b>	<b>147570</b>	<b>45.87</b>
<b>Bhutan</b>	<b>5</b>	<b>85</b>	<b>38816</b>	<b>0.2</b>
<b>Brunei</b>	<b>3</b>	<b>1380</b>	<b>5765</b>	<b>23.94</b>
<b>Cambodia</b>	<b>4</b>	<b>36500</b>	<b>181035</b>	<b>20.16</b>
<b>China</b>	<b>198</b>	<b>163203</b>	<b>9326410</b>	<b>1.75</b>
<b>India</b>	<b>93</b>	<b>54700</b> <b>(152606)*</b>	<b>3287263</b>	<b>1.66</b> <b>(4.64)</b>
<b>Indonesia</b>	<b>137</b>	<b>87800</b>	<b>1919440</b>	<b>4.57</b>
<b>Japan</b>	<b>85</b>	<b>4750</b>	<b>377944</b>	<b>1.26</b>
<b>Laos</b>	<b>3</b>	<b>2220</b>	<b>236800</b>	<b>0.94</b>
<b>Malaysia</b>	<b>37</b>	<b>31200</b>	<b>329847</b>	<b>9.46</b>
<b>Myanmar</b>	<b>18</b>	<b>54900</b>	<b>657740</b>	<b>8.35</b>
<b>Nepal</b>	<b>17</b>	<b>356</b>	<b>147181</b>	<b>0.24</b>
<b>Pakistan</b>	<b>48</b>	<b>8580</b>	<b>796095</b>	<b>1.08</b>
<b>Philippines</b>	<b>63</b>	<b>12903</b>	<b>299764</b>	<b>4.30</b>
<b>Singapore</b>	<b>7</b>	<b>2.2</b>	<b>694</b>	<b>0.32</b>
<b>Sri Lanka</b>	<b>41</b>	<b>2740</b>	<b>65610</b>	<b>4.18</b>
<b>Thailand</b>	<b>42</b>	<b>25100</b>	<b>511770</b>	<b>4.90</b>
<b>Vietnam</b>	<b>25</b>	<b>58100</b>	<b>331698</b>	<b>17.52</b>
<b>Middle East **</b>		<b>74348</b>	<b>5874168</b>	<b>1.27</b>

<b>Wetland Type</b>	<b>Area in 1950</b>	<b>Area in 2000</b>	<b>Area loss</b>	<b>Area loss (%)</b>
	<b>(10<sup>3</sup> km<sup>2</sup> )</b>	<b>(10<sup>3</sup> km<sup>2</sup> )</b>	<b>(10<sup>3</sup> km<sup>2</sup> )</b>	
<b>Freshwater swamps</b>	<b>178</b>	<b>137</b>	<b>41</b>	<b>23.0</b>
<b>Lakes</b>	<b>143</b>	<b>120</b>	<b>23</b>	<b>16.1</b>
<b>Rivers</b>	<b>95</b>	<b>82</b>	<b>13</b>	<b>15.3</b>
<b>Coastal wetlands</b>	<b>43</b>	<b>21</b>	<b>22</b>	<b>51.2</b>
<b>Total</b>	<b>459</b>	<b>360</b>	<b>99</b>	<b>21.6</b>

### **Loss of natural wetlands in China over the last 50 years (An 2007)**

**China: out of 360,000 sq km – 31,000 sq km designated  
99,000 sq km lost in past 50 yr**

**India: out of 152,600 sq km - 6,770 sq km designated  
Loss not known**

# Wetland Inventories and Typology

Do we know about the Distribution and Kinds of Wetlands?

Few countries have a comprehensive wetland inventory that also accounts for the biodiversity, functions and ecological character.

There is hardly little, often isolated, effort to develop indigenous wetland science that is needed for understanding the functioning of wetlands and their responses to anthropogenic disturbances under local conditions.



# Which Wetlands to Conserve?

The distinction between the natural, man-modified and man-made wetlands has been so blurred that it is impossible to set objectives and formulate strategies for conservation.

Floodplains vs Reservoirs (Irrigation, Hydropower)

Marshes vs Paddy fields vs Fish ponds

Backwaters vs Paddy fields;

Mangroves vs Shrimp Farms



# National Policies on Wetlands

**Ramsar Convention states:**

*3.1 The Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory.*

*4.1 Each Contracting Party shall promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands, whether they are included in the List or not, and provide adequately for their wardening.*

**Even Ramsar sites are not well managed; Many enter the Montreaux Record.**

**Only a handful of developing countries have developed specific policies aimed at protecting and conserving wetlands, and even the existing policies and laws are not fully and properly implemented.**

**Thus, Conservation in most countries is largely symbolic as a few iconic wetlands receive some attention.**



# **Understanding Causes of Wetland Loss and Degradation**

## **Over-exploitation of Resources**

**(little known about thresholds)**

**Stressed resources appear over-exploited**

**Wise Use: Subsistence vs Commercial use**

## **Conversion for Economic Returns**

**Role of Trade, Industry, Cash Crops and Globalisation  
is ignored and under-estimated**

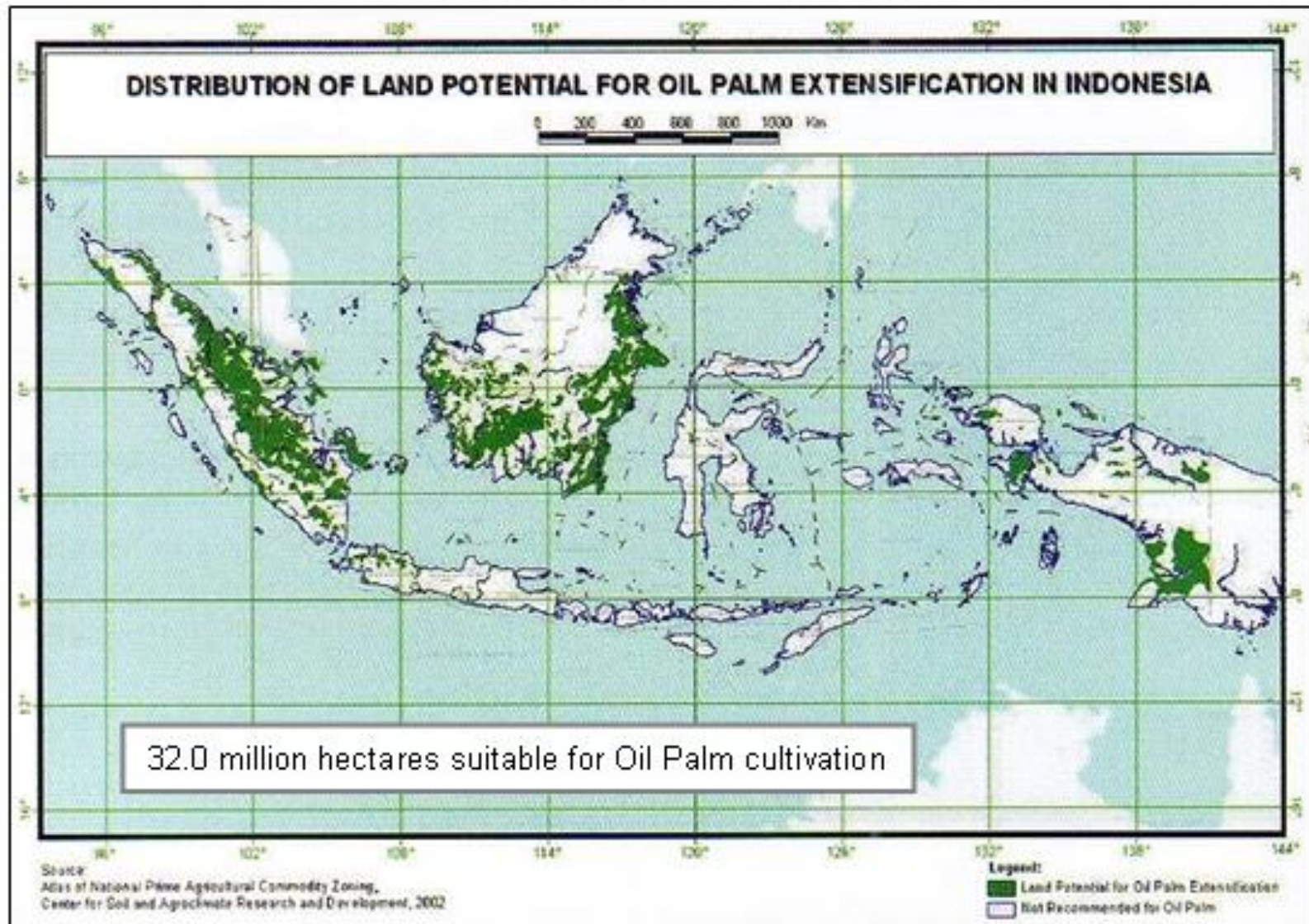


Peat Swamp

Oil Palm



## INDONESIA: Map of Suitable Palm Expansion Areas



Source: Center for Soil and Agroclimate Research and Development, Indonesia 2002

**USDA/FAS 2009: Perhaps the best chance for limiting edible oil prices for consumers in much of the developing world is for continued strong expansion of the Indonesian palm sector.**



# Understanding Causes of Wetland Loss and Degradation

**Pollution: Discharge of domestic wastes**

**Limits of waste Assimilation by wetlands are not understood  
Many wetlands are overloaded and already hypereutrophic**

**All wetlands cannot be turned into “East Kolkata wetlands”**

# Understanding Causes of Wetland Loss and Degradation

## Exotic Invasive Species

Threats to Biodiversity OR New Resources



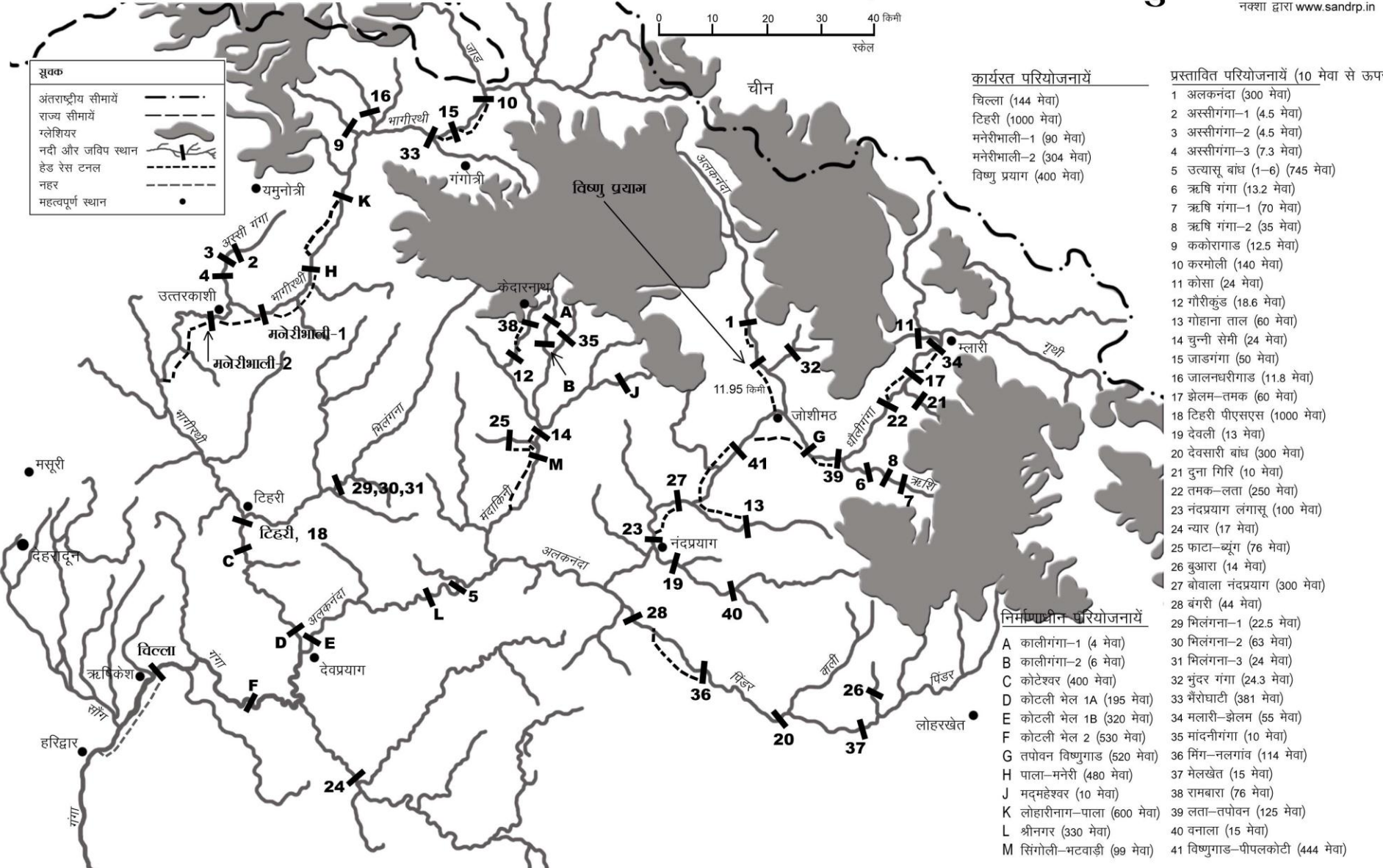
# Hydrological Alteration

## उत्तराखंड में गंगा नदी घाटी में जल विद्युत परियोजनायें

नक्शा द्वारा www.sandrp.in

0 10 20 30 40 किमी  
स्केल

सूचक	
अंतरराष्ट्रीय सीमायें	— · — ·
राज्य सीमायें	— — — —
ग्लेशियर	
नदी और जलवि स्थान	
हेड रेस टनल	— · — · — ·
नहर	— — — —
महत्वपूर्ण स्थान	•



### कार्यरत परियोजनायें

- विल्ला (144 मेवा)
- टिहरी (1000 मेवा)
- मनेरीभाली-1 (90 मेवा)
- मनेरीभाली-2 (304 मेवा)
- विष्णु प्रयाग (400 मेवा)

### प्रस्तावित परियोजनायें (10 मेवा से ऊपर)

- 1 अलकनंदा (300 मेवा)
- 2 अस्सीगंगा-1 (4.5 मेवा)
- 3 अस्सीगंगा-2 (4.5 मेवा)
- 4 अस्सीगंगा-3 (7.3 मेवा)
- 5 उत्थासू बांध (1-6) (745 मेवा)
- 6 ऋषि गंगा (13.2 मेवा)
- 7 ऋषि गंगा-1 (70 मेवा)
- 8 ऋषि गंगा-2 (35 मेवा)
- 9 ककोरागाड (12.5 मेवा)
- 10 करमोली (140 मेवा)
- 11 कोसा (24 मेवा)
- 12 गौरीकुंड (18.6 मेवा)
- 13 गोहाना ताल (60 मेवा)
- 14 चुन्नी सेमी (24 मेवा)
- 15 जाडगंगा (50 मेवा)
- 16 जालनधरीगाड (11.8 मेवा)
- 17 झेलम-तमक (60 मेवा)
- 18 टिहरी पीएसएस (1000 मेवा)
- 19 देवली (13 मेवा)
- 20 देवसारी बांध (300 मेवा)
- 21 दुना गिरि (10 मेवा)
- 22 तमक-लता (250 मेवा)
- 23 नंदप्रयाग लंगसू (100 मेवा)
- 24 न्यार (17 मेवा)
- 25 फाटा-ब्यूंग (76 मेवा)
- 26 बुआरा (14 मेवा)
- 27 बोवाला नंदप्रयाग (300 मेवा)
- 28 बंगरी (44 मेवा)

### निर्माणाधीन परियोजनायें

- 29 भिलंगना-1 (22.5 मेवा)
- 30 भिलंगना-2 (63 मेवा)
- 31 भिलंगना-3 (24 मेवा)
- 32 मुंदर गंगा (24.3 मेवा)
- 33 कोटली भेल 1A (195 मेवा)
- 34 कोटली भेल 1B (320 मेवा)
- 35 मलारी-झेलम (55 मेवा)
- 36 मांदनीगंगा (10 मेवा)
- 37 सिंगोली-भटवाड़ी (99 मेवा)
- 38 मंदमहेश्वर (10 मेवा)
- 39 लता-तपोवन (125 मेवा)
- 40 श्रीनगर (330 मेवा)
- 41 विष्णुगाड-पीपलकोटी (444 मेवा)

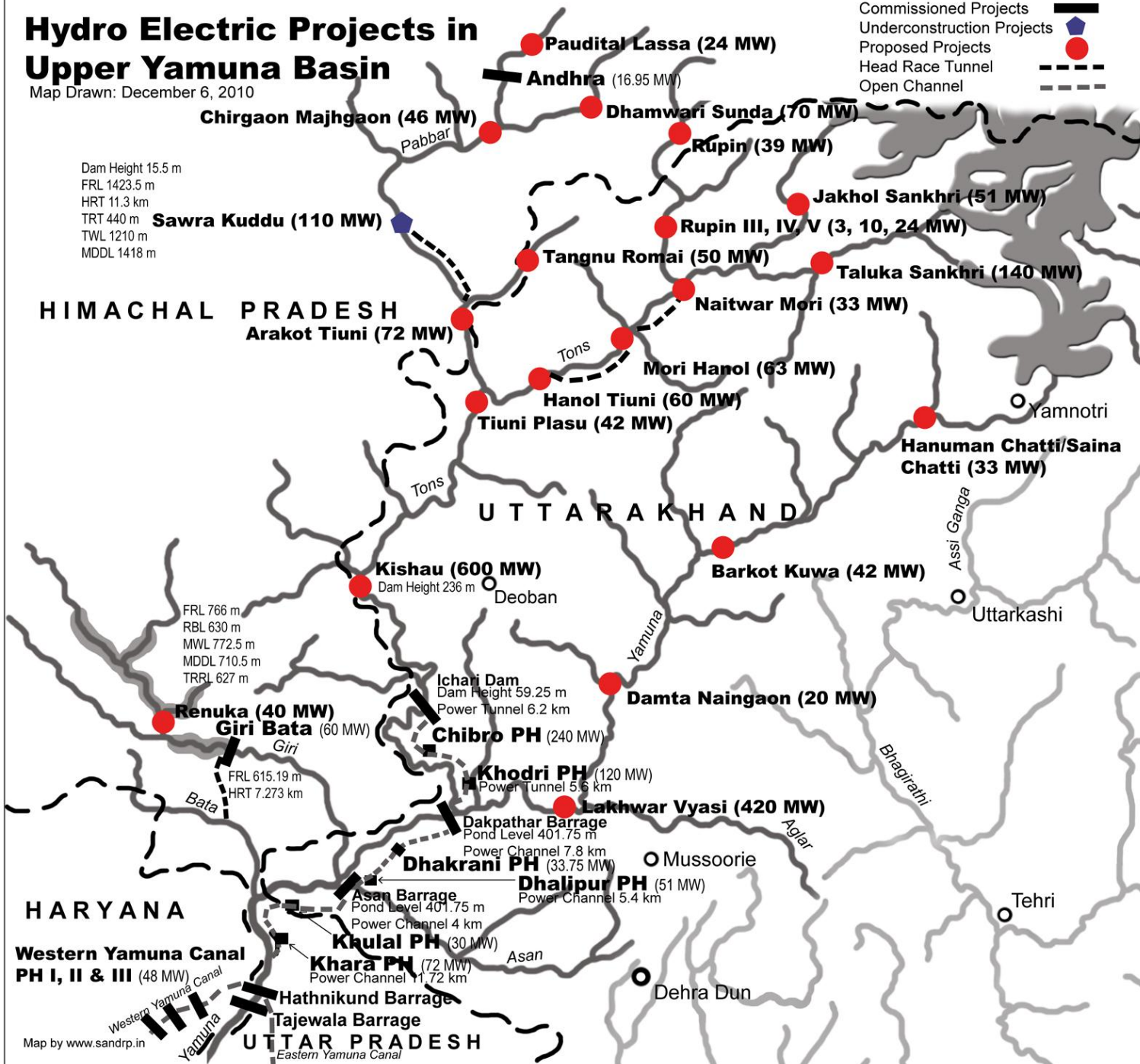
- A कालीगंगा-1 (4 मेवा)
- B कालीगंगा-2 (6 मेवा)
- C कोटेश्वर (400 मेवा)
- D कोटली भेल 2 (530 मेवा)
- E कोटली भेल 1 (381 मेवा)
- F कोटली भेल 2 (530 मेवा)
- G तपोवन विष्णुगाड (520 मेवा)
- H पाला-मनेरी (480 मेवा)
- J मद्रमहेश्वर (10 मेवा)
- K लोहारीनाग-पाला (600 मेवा)
- L श्रीनगर (330 मेवा)
- M सिंगोली-भटवाड़ी (99 मेवा)

# Hydro Electric Projects in Upper Yamuna Basin

Map Drawn: December 6, 2010

- Commissioned Projects 
- Underconstruction Projects 
- Proposed Projects 
- Head Race Tunnel 
- Open Channel 

Dam Height 15.5 m  
 FRL 1423.5 m  
 HRT 11.3 km  
 TRT 440 m  
 TWL 1210 m  
 MDDL 1418 m



HARYANA

Western Yamuna Canal  
**PH I, II & III (48 MW)**

Map by [www.sandrp.in](http://www.sandrp.in)

UTTAR PRADESH

Eastern Yamuna Canal

# **Ecosystem Services & Valuation**

**Is Wetland Conversion compatible with Conservation?**

**Which Ecosystem Services are more valuable?**

**And for whom? Local Community or Outside Community?**

**For example:**

**Coastal Wetlands vs Inland Freshwater Wetlands**

**{Morris & Camino 2011; UK National Ecosystem Assessment}**

**Gujarat coastal wetlands (tidal marshes) were considered of less value converted to freshwater by checking tidal influx**

**Floodplains vs Reservoirs? How to evaluate?**



## Samdhiala bandhara, Mahuva, Bhavnagar



# Finally, The Climate Change

**Growing discussion on the Likely impacts of Climate Change:  
Increasing temperature; accelerated glacier melting  
Increased Variability in Precipitation  
and Sea Level Rise**

Hydrological Changes that will occur after 30 or 50 years  
may be brought about within next 5 years

# **Wetland Conservation has a Long Way to go.**

**It requires**

**Capacity Building at Local Levels,  
Assessment of Functions and Values of Natural and  
Human-modified Wetlands,  
Well defined goals and objectives,  
Appropriate National Policies and Laws,**

**and above all,**

**Efficient management of the freshwater resources for  
meeting both human and environmental needs  
and adaptive responses to the incremental threats from  
climate change.**



**Thank You All**