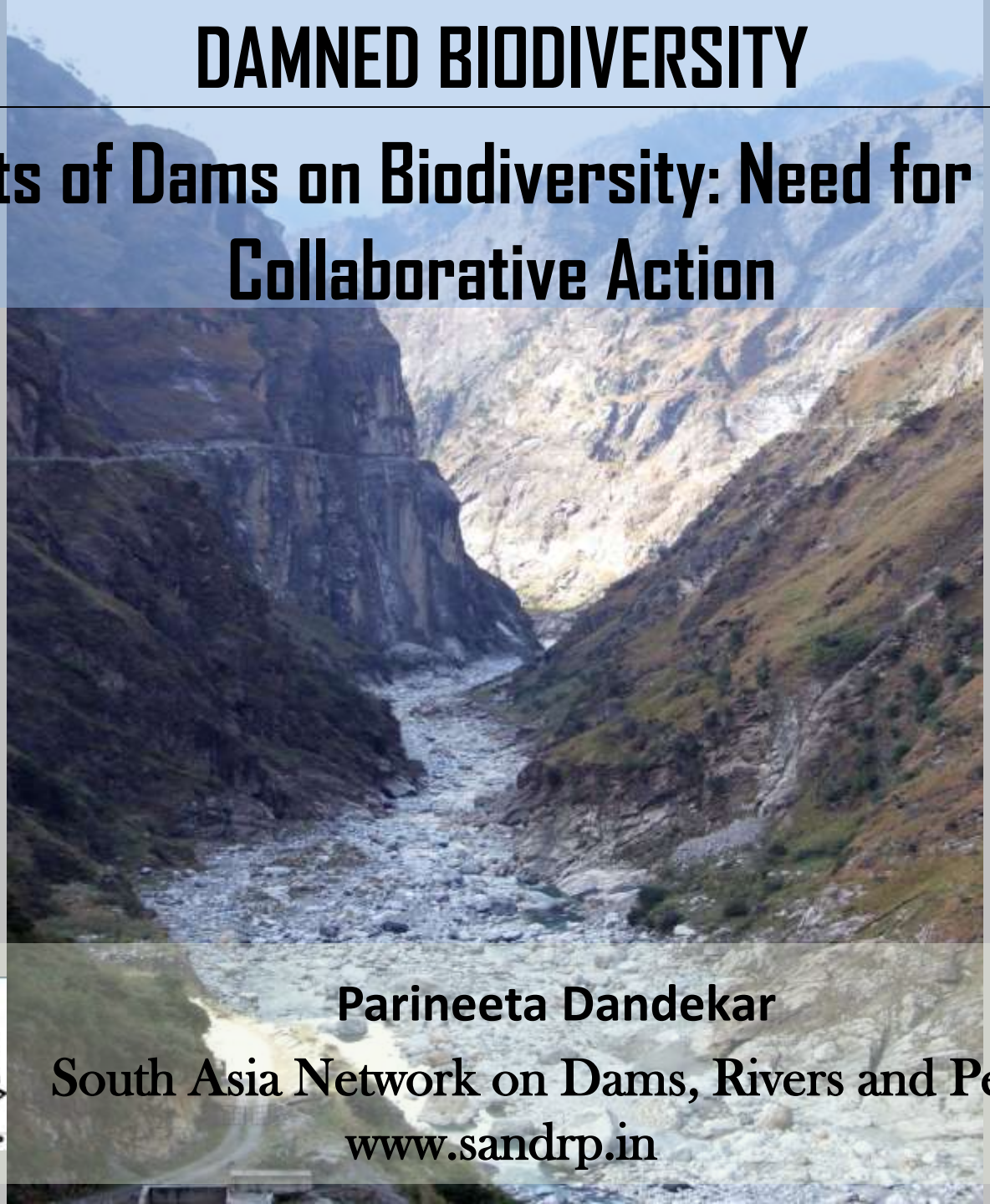
DAMNED BIODIVERSITY

Impacts of Dams on Biodiversity: Need for Urgent Collaborative Action



Parineeta Dandekar

South Asia Network on Dams, Rivers and People

www.sandrp.in

Presented as a part of Plenary Session in

IBC - Indian Biodiversity Congress

SECOND

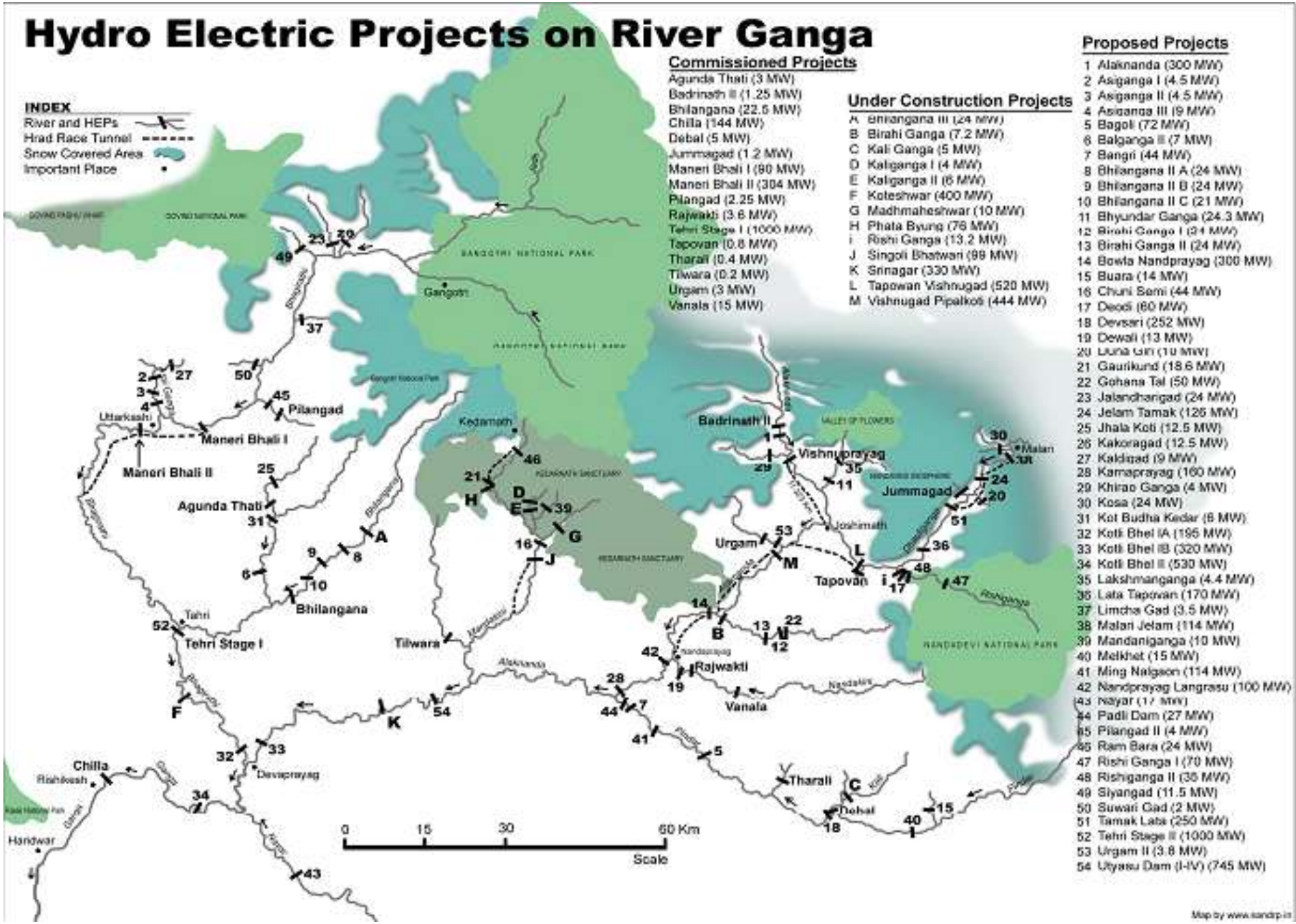
INDIAN BIODIVERSITY CONGRESS

9-12 December 2012, J.N Tata Auditorium, IIS, Bengaluru

Flood of Dams in India

- India, the third largest dam builder in the world with 5193 Large Dams, seems to be on a dam building spree
- Cascades of dams are coming up in some of the most eco sensitive regions: North Eastern States, Sikkim, Uttarakhand, Himachal Pradesh, Jammu and Kashmir and the entire Western Ghats Hotspot
- The entire environmental governance related to dams: Impact Assessments, Sanctioning of Projects, Mitigation Measures, Compliance, monitoring is riddled with serious problems making dams a huge challenge before India's biodiversity
- Objectives:
  - Brief overview :Impacts of upcoming dams on biodiversity
  - Major issues: Governance
  - Expectations from this august gathering

Hydro Electric Projects on River Ganga



Commissioned Projects

Agunda Thati (3 MW)
Badrinath II (1.25 MW)
Bhilangana (22.5 MW)
Chilla (144 MW)
Dehal (5 MW)
Jummagad (1.2 MW)
Maneri Bhali I (90 MW)
Maneri Bhali II (304 MW)
Pilangad (2.25 MW)
Rajwakti (3.6 MW)
Tehri Stage I (1000 MW)
Tapovan (0.6 MW)
Tharali (0.4 MW)
Tilwara (0.2 MW)
Urgam (3 MW)
Vanala (15 MW)

Under Construction Projects

A Bhilangana III (24 MW)
B Birahi Ganga (7.2 MW)
C Kali Ganga (5 MW)
D Kaliganga I (4 MW)
E Kaliganga II (6 MW)
F Koteshwar (400 MW)
G Madhmaheshwar (10 MW)
H Phata Byung (76 MW)
I Rishi Ganga (13.2 MW)
J Singoli Bhatwari (99 MW)
K Srinagar (330 MW)
L Tapovan Vishnugad (520 MW)
M Vishnugad Pipalkoti (444 MW)

Proposed Projects

1 Alaknanda (300 MW)
2 Asiganga I (4.5 MW)
3 Asiganga II (4.5 MW)
4 Asiganga III (9 MW)
5 Bagoli (72 MW)
6 Balganga II (7 MW)
7 Bangri (44 MW)
8 Bhilangana II A (24 MW)
9 Bhilangana II B (24 MW)
10 Bhilangana II C (21 MW)
11 Bhyundar Ganga (24.3 MW)
12 Birahi Ganga I (24 MW)
13 Birahi Ganga II (24 MW)
14 Bowla Nandprayag (300 MW)
15 Buara (14 MW)
16 Chuni Semi (44 MW)
17 Deodi (60 MW)
18 Devseri (252 MW)
19 Dewali (13 MW)
20 Duna Gad (10 MW)
21 Gaurikund (18.6 MW)
22 Gohana Tal (50 MW)
23 Jalandharigad (24 MW)
24 Jelam Tamak (126 MW)
25 Jhala Koti (12.5 MW)
26 Kakoragad (12.5 MW)
27 Kaldigad (9 MW)
28 Kamaprayag (160 MW)
29 Khirao Ganga (4 MW)
30 Kosa (24 MW)
31 Kot Budha Kedar (8 MW)
32 Kotli Bhel IA (195 MW)
33 Kotli Bhel IB (320 MW)
34 Kotli Bhel II (530 MW)
35 Lakshmanganga (4.4 MW)
36 Lata Tapovan (170 MW)
37 Limcha Gad (3.5 MW)
38 Malari Jelam (114 MW)
39 Mandaniganga (10 MW)
40 Melkhet (15 MW)
41 Ming Nalgaon (114 MW)
42 Nandprayag Langrasu (100 MW)
43 Nayar (17 MW)
44 Padli Dam (27 MW)
45 Pilangad II (4 MW)
46 Ram Bara (24 MW)
47 Rishi Ganga I (70 MW)
48 Rishiganga II (35 MW)
49 Siyangad (11.5 MW)
50 Suwari Gad (2 MW)
51 Tamak Lata (250 MW)
52 Tehri Stage II (1000 MW)
53 Urgam II (3.8 MW)
54 Utyasu Dam (I-IV) (745 MW)



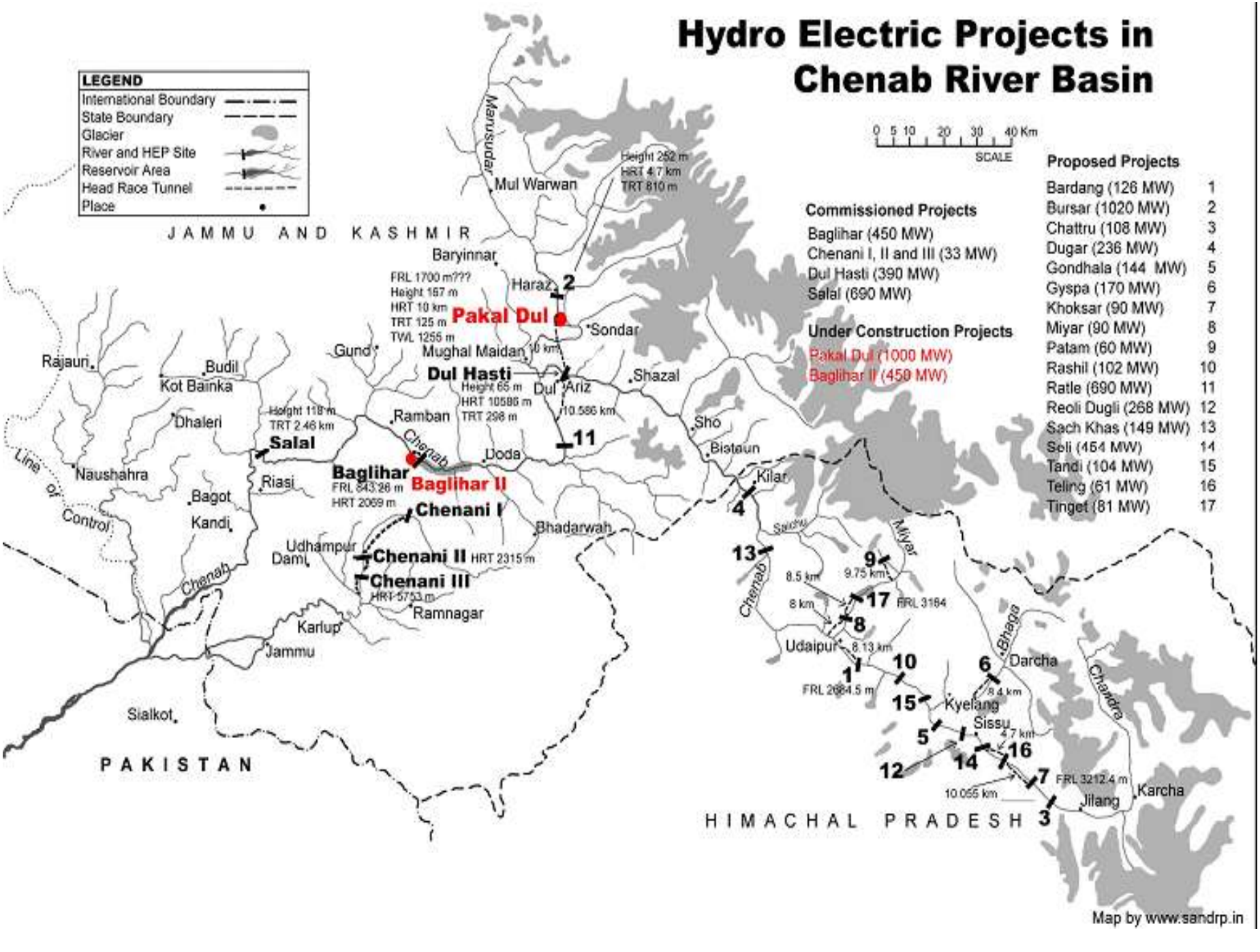
"By 2025, deforestation due to dam building (54000+hecatres) would likely result in extinction of 22 angiosperm and 7 vertebrate taxa projected. We have been cautious with these projections. Our estimates of forest loss from dam building are lower than those projected by the GOI and we have selected the most conservative values"

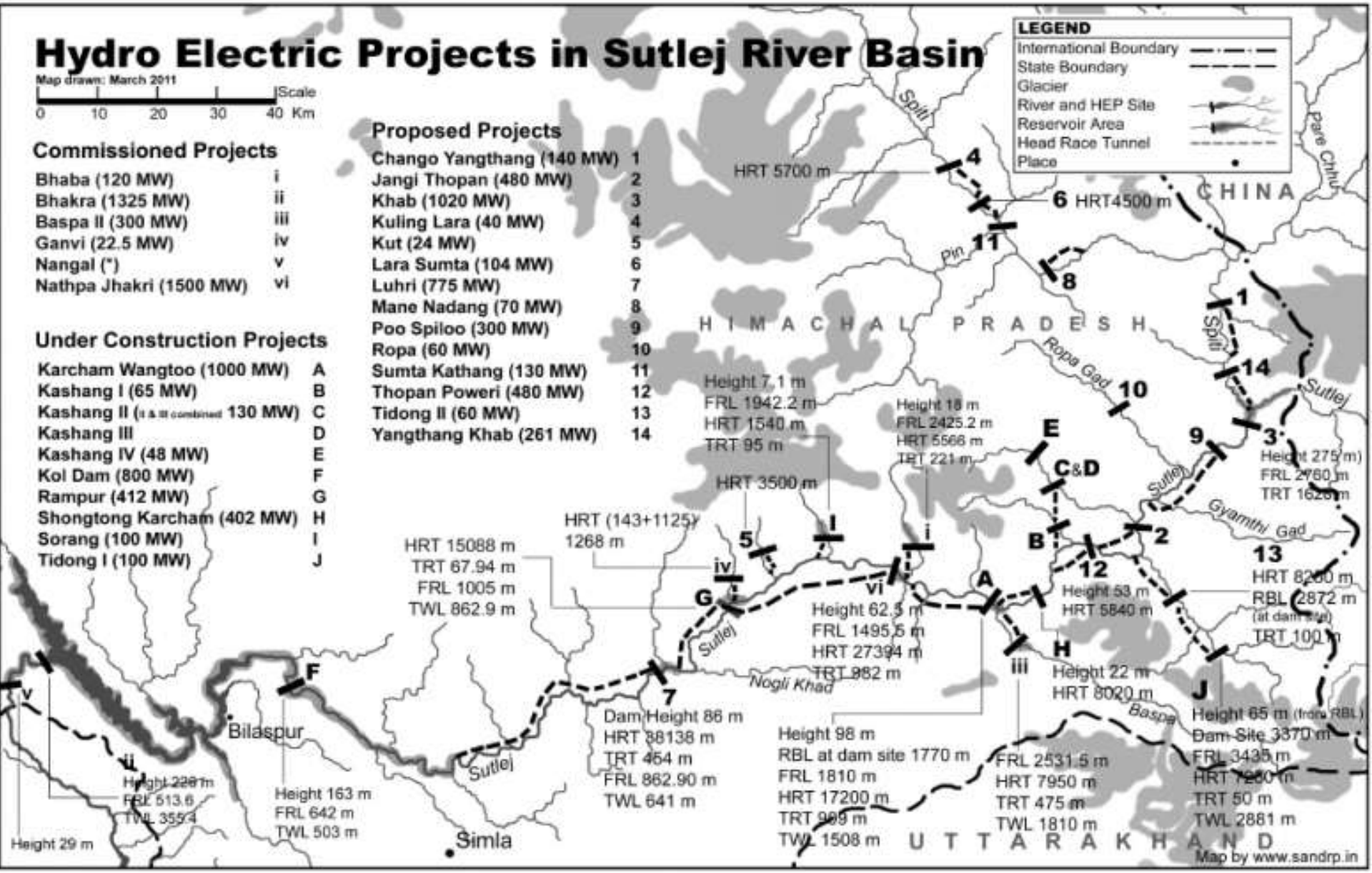
Maharaj and Grumbine, *'Potential Effects of Ongoing and Proposed Hydropower Development on Terrestrial Biological Diversity in the Indian Himalaya'* Conservation Biology May 2012

The study has considered only 269 dams, while the number of dams completed, under construction and planned in Indian Himalayas is 600 +

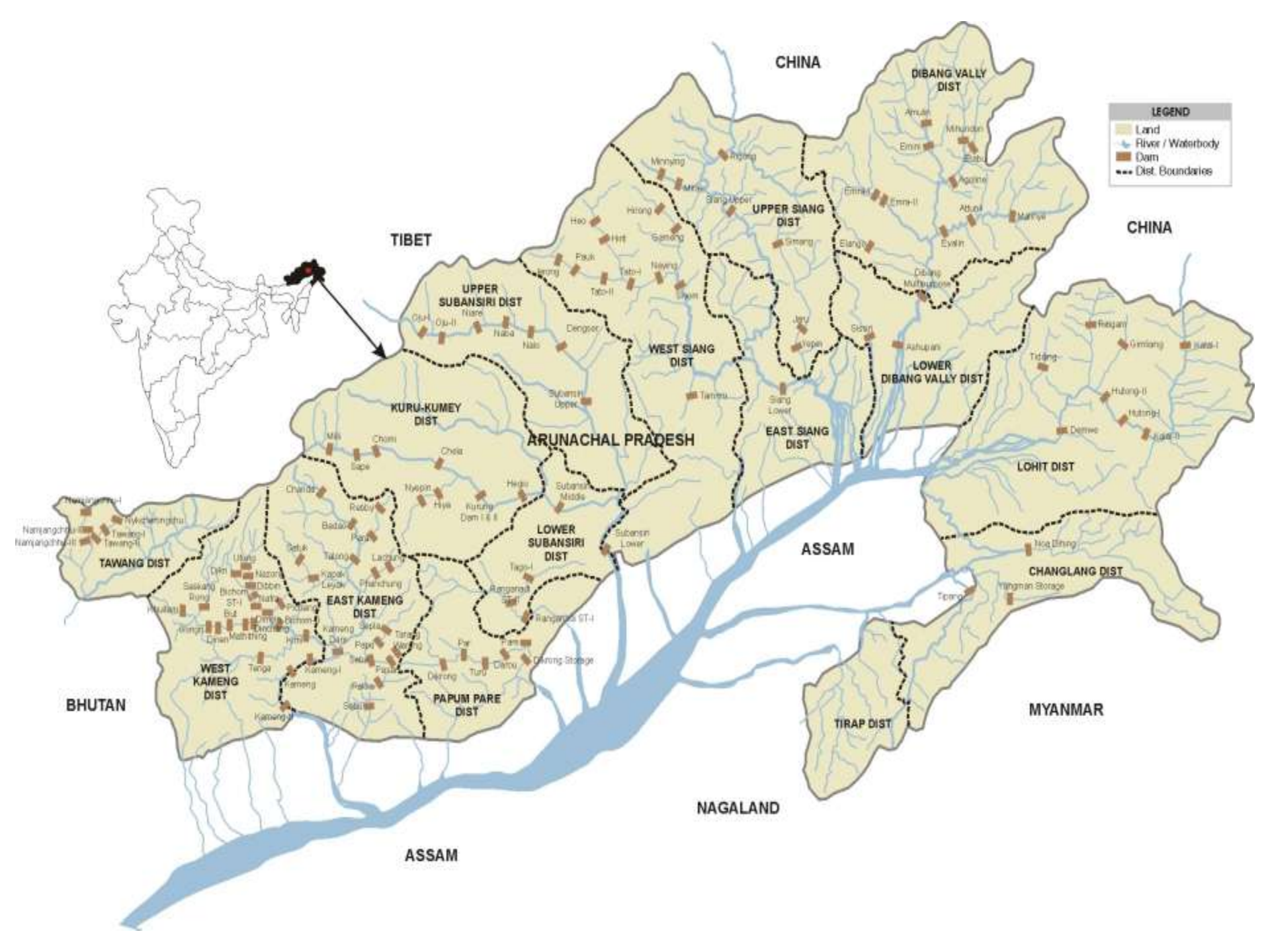


- If all the proposed dams come up, Indian Himalayas will have the highest dam densities in the world.
- 62 times greater than current average global figures; the average of 1 dam for every 32 km of river channel
- Ganga basin would have the highest number of dams (1/18 km of river channel dammed) in the world
- Uttarakhand plans to have more than 300 Hydroelectric Dams (some say 700)
- Report of Wildlife Institute of India on terrestrial and aquatic ecology of Alaknanda and Bhagirathi recommended dropping 24 projects. This recommendation is not accepted.
- Reputed institute like IIT Roorkie has come up with a biased and shoddy report on cumulative impacts of cascade dams
- No consensus about eflows, free flowing river distance between two dams
- Notification for declaring 135 kms of Bhagirathi from Gangotri to Uttarkashi ecosensitive zone not gazetted after 2 years
- Eflows recommended range from 20% average lean season flow to 30% average monsoon flow. Private Proponents also opposing this.
- Project which have been rejected twice by the Forest Advisory Committee like 300 MW Alakanada project are being sanctioned by MoEF without justifications
- Affecting parts of Gangotri National Park, Nandadevi Biosphere Reserve, Valley of Flowers National Park, Kedarnath Sanctuary, Askot Musk Deer Sanctuary
- Fragmenting Brown Bear, Snow Leopard, Musk Deer, migration of Golden Mahseer, Snow Trout, related aquatic biodiversity


Hydro Electric Projects in Chenab River Basin
LEGEND
International Boundary
State Boundary
Glacier
River and HEP Site
Reservoir Area
Head Race Tunnel
Place
0 5 10 20 30 40 Km
SCALE
Commissioned Projects
Baglihar (450 MW)
Chenani I, II and III (33 MW)
Dul Hasti (390 MW)
Salal (690 MW)
Under Construction Projects
Pakal Dul (1000 MW)
Baglihar II (450 MW)
Proposed Projects
Bardang (126 MW) 1
Bursar (1020 MW) 2
Chattru (108 MW) 3
Dugar (236 MW) 4
Gondhala (144 MW) 5
Gyspa (170 MW) 6
Khoksar (90 MW) 7
Miyar (90 MW) 8
Patam (60 MW) 9
Rashil (102 MW) 10
Ratle (690 MW) 11
Reoli Dugli (268 MW) 12
Sach Khas (149 MW) 13
Soli (454 MW) 14
Tandi (104 MW) 15
Teling (61 MW) 16
Tinget (81 MW) 17
JAMMU AND KASHMIR
PAKISTAN
HIMACHAL PRADESH
Line of Control
Marusudar
Mul Warwan
Baryinnar
Haraz
Sondar
Pakal Dul
FRL 1700 m???
Height 167 m
HRT 10 km
TRT 125 m
TWL 1255 m
Height 252 m
HRT 4.7 km
TRT 810 m
Gund
Mughal Maidan
Dul Hasti
Height 65 m
HRT 10586 m
TRT 298 m
Dul
Ariz
10.586 km
Shazal
Sho
Bisotaun
Kilar
Rajauri
Budil
Kot Bainka
Dhaleri
Naushahra
Bagot
Kandi
Riasi
Salal
Height 118 m
TRT 2.46 km
Ramban
Doda
Baglihar
FRL 843.26 m
HRT 2069 m
Baglihar II
Chenani I
Chenani II HRT 2315 m
Chenani III
HRT 5753 m
Udhampur
Dam
Ramnagar
Karlup
Jammu
Sialkot
Bhadarwah
Udaipur
8.5 km
9.75 km
8 km
8.13 km
FRL 2684.5 m
FRL 3184
Darcha
8.4 km
Kyelang
Sissu
4.7 km
10.055 km
FRL 3212.4 m
Jilang
Karcha
Chenab
Miyar
Bhaga
Chandra
Sarchu
Map by www.sandrp.in


Hydro Electric Projects in Sutlej River Basin
Map drawn: March 2011
Scale
0 10 20 30 40 Km
Commissioned Projects
Bhaba (120 MW) i
Bhakra (1325 MW) ii
Baspa II (300 MW) iii
Ganvi (22.5 MW) iv
Nangal (*) v
Nathpa Jhakri (1500 MW) vi
Under Construction Projects
Karcham Wangtoo (1000 MW) A
Kashang I (65 MW) B
Kashang II (I & II combined 130 MW) C
Kashang III D
Kashang IV (48 MW) E
Kol Dam (800 MW) F
Rampur (412 MW) G
Shongtong Karcham (402 MW) H
Sorang (100 MW) I
Tidong I (100 MW) J
Proposed Projects
Chango Yangthang (140 MW) 1
Jangi Thopan (480 MW) 2
Khab (1020 MW) 3
Kuling Lara (40 MW) 4
Kut (24 MW) 5
Lara Sumta (104 MW) 6
Luhri (775 MW) 7
Mane Nadang (70 MW) 8
Poo Spiloo (300 MW) 9
Ropa (60 MW) 10
Sumta Kathang (130 MW) 11
Thopan Poweri (480 MW) 12
Tidong II (60 MW) 13
Yangthang Khab (261 MW) 14
LEGEND
International Boundary
State Boundary
Glacier
River and HEP Site
Reservoir Area
Head Race Tunnel
Place
CHINA
HIMACHAL PRADESH
UTTARAKHAND
Spiti
Pare Chhu
Pin
Ropa Gad
Sutlej
Gyamthi Gad
Nogli Khad
Baspa
Bilaspur
Simla
HRT 5700 m
HRT4500 m
Height 7.1 m
FRL 1942.2 m
HRT 1540 m
TRT 95 m
HRT 3500 m
Height 18 m
FRL 2425.2 m
HRT 5566 m
TRT 221 m
Height 275 m)
FRL 2760 m
TRT 1626 m
HRT (143+1125)
1268 m
HRT 15088 m
TRT 67.94 m
FRL 1005 m
TWL 862.9 m
Height 62.5 m
FRL 1495.5 m
HRT 27394 m
TRT 982 m
Height 53 m
HRT 5840 m
HRT 8260 m
RBL 2872 m
(at dam site)
TRT 100 m
Height 22 m
HRT 8020 m
Height 65 m (from RBL)
Dam Site 3370 m
FRL 3435 m
HRT 7280 m
TRT 50 m
TWL 2881 m
Dam Height 86 m
HRT 38138 m
TRT 454 m
FRL 862.90 m
TWL 641 m
Height 98 m
RBL at dam site 1770 m
FRL 1810 m
HRT 17200 m
TRT 989 m
TWL 1508 m
FRL 2531.5 m
HRT 7950 m
TRT 475 m
TWL 1810 m
Height 228 m
FRL 513.6
TWL 355.4
Height 29 m
Height 163 m
FRL 642 m
TWL 503 m
Map by www.sandrp.in

- Nearly entire Sutlej river is tunneled
- Hosts some of India's biggest Hydroelectric dams including 1000 MW Bhakra, 1000 MW Karcham Wangtoo, 1530 MW Nathpa Jhakri,
- Affecting biodiversity and endangered species like Chilgoza Pine and very rich aquatic biodiversity
- Local water sources drying due to tunneling and blasting
- 775 MW Luhri project, funded by the World Bank despite huge local opposition will be killing the last free flowing stretch of the river with a 50 kms long tunnel
- World Bank has funded many destructive large hydro project in Himachal including 1530 MW Nathpa Jhakri and 412 MW Rampur HEP
- Fisheries Department in Himachal Pradesh has developed a negative list of streams for in situ protection of fish diversity.
- It still gives permission to hydel projects after payment of compensation amount!
- Only answer to destruction of fish diversity is hatcheries and fish farms for which crores of rupees are sanctioned by each dam


CHINA
DIBANG VALLY DIST
LEGEND
Land
River / Waterbody
Dam
Dist. Boundaries
TIBET
UPPER SUBANSIRI DIST
UPPER SIANG DIST
CHINA
WEST SIANG DIST
LOWER DIBANG VALLY DIST
KURU-KUMEY DIST
ARUNACHAL PRADESH
EAST SIANG DIST
LOHIT DIST
LOWER SUBANSIRI DIST
ASSAM
TAWANG DIST
CHANGLANG DIST
EAST KAMENG DIST
WEST KAMENG DIST
PAPUM PARE DIST
BHUTAN
TIRAP DIST
MYANMAR
NAGALAND
ASSAM

Damming the Brahmaputra

- Cascades of Dams are planned on the main tributaries of Dibang, Siang, Lohit, Tawang, Subansiri
- MOUs signed with more than 130 private companies for hydel projects
- Hydrological fluctuations are immense. In case of 1750 MW Lower Demwe Dam on Lohit River near Parshuram Kund, daily fluctuation will be 70 cumecs for 20-22 hrs followed by 1729 cumces for 4-2 hrs leading to consecutive drying and flooding of the river every single day
- Water level fluctuation will be 7-8 feet 100 kms downstream the dam at Dibru Saikhowa National Park affecting the Park and Chapories: Important Bird Areas and Proposed Ramsar Site, habitat of Bengal Florican
- The Standing Committee of National Board of Wildlife had unanimously rejected the proposal siting extremely high impacts of biodiversity.
- However, Union Environment Minister, Chairperson of the NBWL overruled ALL rejections and recommended an environmental clearance to the project as a valentine gift to the developer
- Some scientists had sent submissions about the ecological significance of the region
- Basin Studies of Lohit, Dibang and Siang are of routine bad quality done by consultants with 100% conflict of interest
- More biodiversity studies, evidence, support needed!
- Other projects affecting Tiger Reserves, National Parks and lesser studied biodiversity in the region

Value of Community Conservation

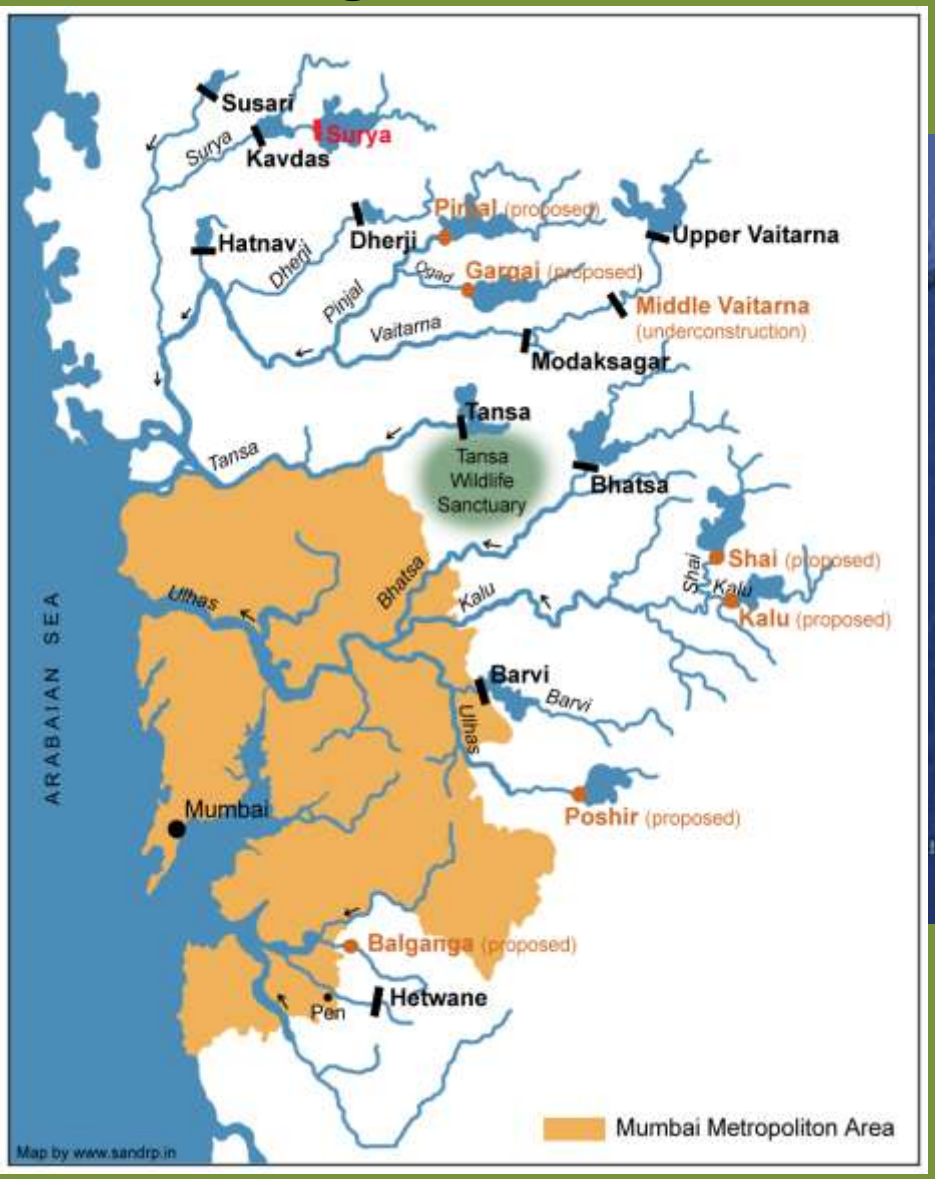
- 780 MW Nyamjangchu Hydel Project in Tawang Region of Arunachal Pradesh is set to submerge one of the last wintering sites of the critically endangered Black necked Crane in India

- The local Monpas tribes rever the Crane as a reincarnation of VI Dalai Lama. They have formed a conservation reserve to protect the bird and have been actively involved in conservation and monitoring. Numbers are steadily going up

- Numerous submissions by these groups and conservation organization have fallen on deaf ears Nyamjangchu has received Environment Clearance in 2012

- Nearly entire Teesta River is tunneled
- Sikkim, the most species rich state in the country would have the highest dam density (4/1000 km2),
- 520 MW Teesta IV will dam the last free flowing part of Teesta in Sikkim

Western Ghats: Maharashtra
Large Dams in ESZ1 do not require even an EIA!

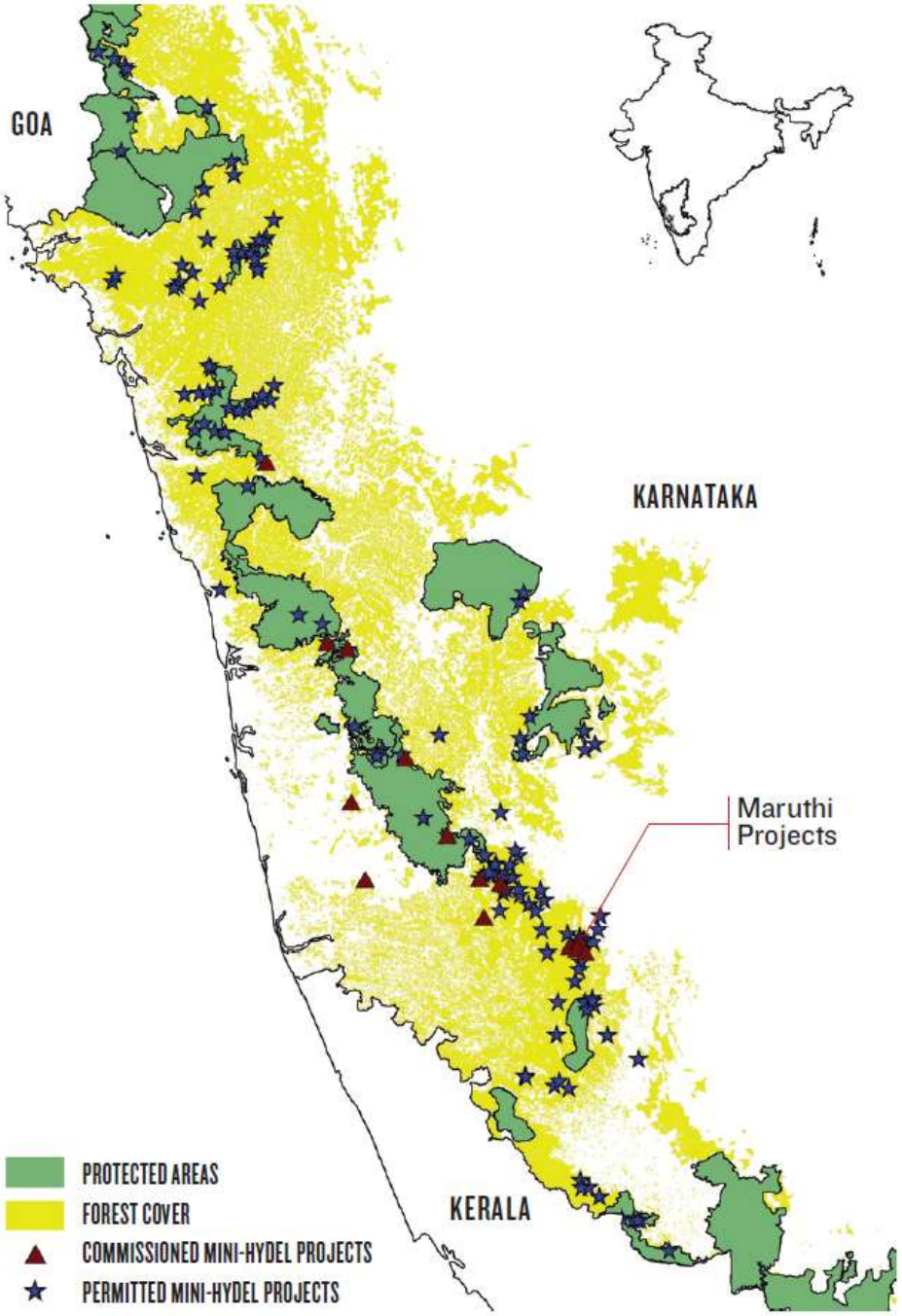


Name of the Dam	District	Live Storage Capacity (MCM)	Total Submergence Area (ha)	Forest Area (ha)	Population Affected
Kalu	Thane	407.99	2100	999	3169
Shai	Thane	348	3040	494 (43000 trees to be cut)	5124
Middle Vaitarna	Thane	172	3473	760 (Over one lakh trees cut)	Eight villages (minimum 1600 people)
Balganga	Raigad	127.76	1240	265	8000
Gargai	Thane	180	900	765	
Pinjal	Thane	425	1900	1188	
Barvi	Thane	338.84	4442.03	513.66 (only for the current stage)	5825
Susari	Thane, Dahanu	67.7	971	144	13 Adivasi Padas of 3 villages (minimum affected population: 5000
Lendi/Khargihill	Thane	420	1558	734	10 Villages 1484 people
Kondhane	Raigad		400	200	2000
Poshir		191			
Shilar					
Gadgadi					
Total		**2678.29**	**14929.03**	**6062.66**	**32202**

- By virtue of being drinking water and industrial water supply dams, 14 dams coming up in Western Ghats of Maharashtra, some in ESZ I are exempt from any environmental governance process, from EIA to Public Hearing.
- More than 7000 hectares of forest land is set to be submerged, but there are no biodiversity studies of the region, barely 100 kms from Mumbai!
- The EIA Notification 2006 also excludes irrigation projects with command area less than 10000 ha, all flood control projects (including embankments) and hydel Projects less than 25 MW from its purview
- There is no scientific, social or logical justification for this.
- This loophole is being exploited to the hilt with huge, unaddressed impacts on biodiversity

Threat from unexpected quarters:
Mini Hydels Projects: Small Dams, Huge Impacts

- MHPs are hydel projects under 25 MW which do not need Environmental Clearance from MoEF: No EIA, No EC, No Public Hearing
- Karnataka Reneable Energy Development Limited (KREDL) is considering 108 projects in Dakshin Kannada, 39 in Kodagu, 59 in Shimoga, 59 in Hassan and 87 in Uttar Kannada Districts!! All of these projects will be set up and operated by private players
- More than 44 projects in Netravathi Basin alone.
- In 2011, High Court ordered a ban on construction of MHPs in Forest areas of Western Ghats following PILs filed by conservationists
- However, several projects are now complete, and work on several projects is on going
- Many examples of fraudulent projects, set up only to exploit 25 MW margin and huge subsidies and preferential tariffs that mini hydel projects enjoy.
- In addition , they also claim UNFCCCs carbon credits!
- For example: Maruthi Gen project in Kageneri and Kanchankumari Reserve Forests in Sakleshpur,Hassan District, two projects of 18.90 MW Hongadahalla (4.18 hectares) and 19 MW Yedakumari (4.20 hectares) were shown as two distinct projects, when they had the same powerhouse and effectively were a same debundled 36 MW Project in the middle of reserve forests in Western Ghats
- Several such examples
- These projects do not disclose details about submergence and rehabilitation till the last minute
- Communities are left literally high and dry
- Many agitations are on going against this project which might surprise outsiders


GOA
KARNATAKA
KERALA
Maruthi Projects
PROTECTED AREAS
FOREST COVER
COMMISSIONED MINI-HYDEL PROJECTS
PERMITTED MINI-HYDEL PROJECTS


SAVE WESTERN GHAT - KARNATAKA

- India is a mega diverse country wrt freshwater fish diversity with nearly 1000 fish species and new ones discovered every passing day
- 6 new species discovered in Kumaradhara River alone in 2012
- 2 in Northern Western Ghats
- All of these threatened by dams

Mini Hydel Projects on Cauvery

- Affecting Mahseer migration, otter habitats, serious threat to elephant habitats
- Most of the projects in Mandya adjacent to Cauvery Wildlife Sanctuary, impinging into reserve forests and corridors.
- Elephant Task Force Report has come down heavily on Forest permissions given to these
- Need to study the impacts on aquatic and terrestrial biodiversity

The Gundia Saga

- **200 MW Gundia Project is planned on biodiversity rich Gundia River, a tributary of Kumaradhara in Dakshin Kannada**
- **Project envisages submergence of 700 hectares land, including 400 hectares Forest Land. Initially the proposal was to submerge 800 + ha. forest land.**
- **A study by IISC, 2010, notes that the Gundia River Basin '**
  - ***harbours nearly 36% plant species, 87% amphibian and 41% fishes endemic to Western Ghats.***
  - ***The presence of four critically endangered and 14 endangered animal species in the region further emphasises the need for conservation of this region on priority as it provides a unique habitat and ecological niche.***
  - ***This study reaffirms hotspot status of Gundia Basin in Central Western Ghats , a repository of biological wealth of rare kind both in its aquatic and terrestrial ecosystems and indicates strongly the need for adoption of holistic eco system management for conservation of particularly the rare and endemic fauna of western Ghats.'***

- **WGEEP report has unanimously rejected Gundia HEP**
- **The Expert Appraisal Committee (EAC) of the MoEF discussed Gundia HEP in its 59th meeting in light o the WGEEP Report and actually recommended clearance to the project based on committee deliberations**
- **These committee deliberations only proved that there is an urgent need to study the region in detail**

- **A number of groups have sent submissions, staged protests against this short sighted project**

Major Problems in addressing issues related to Biodiversity

- Extremely weak institutions: National Biodiversity Authority is yet to prove its promise. Frameworks like CBD are proving to be ineffective
- Environmental governance under MoEF is problematic. No honest EIAs, EMPs and Compliances
  - EIA by WAPCOS to obtain Environment Clearance for the 261 MW RKHPP reports presence of only 8 bird species. Existing literature suggests 228 species. Including Himalayan Monal and Koklass Pheasant
  - EIA for Shangtong Karcham in HP suggested 3 fish species, EAC recorded more than 50 species
  - EIA by KPCL for 200 MW Gundia Project says there are no RET Fish in this region. Recent studies have discovered 6 new species, demands to declare Kumardhara and Gundia as sanctuaries.
  - FAC noted WAPCOS-NEHU Cumulative Impact Studies about 25 Dams on Siyom in Arunachal "The assessment of river basin is purely in terms of hydel power capacity with no reference to the marine and riverine ecosystems, fish and amphibian populations and the linkages with forest and soil cover"

- No one knows where funds for Compensatory Afforestation, Hatcheries, Fish Farms, Biodiversity Parks go

Research gaps

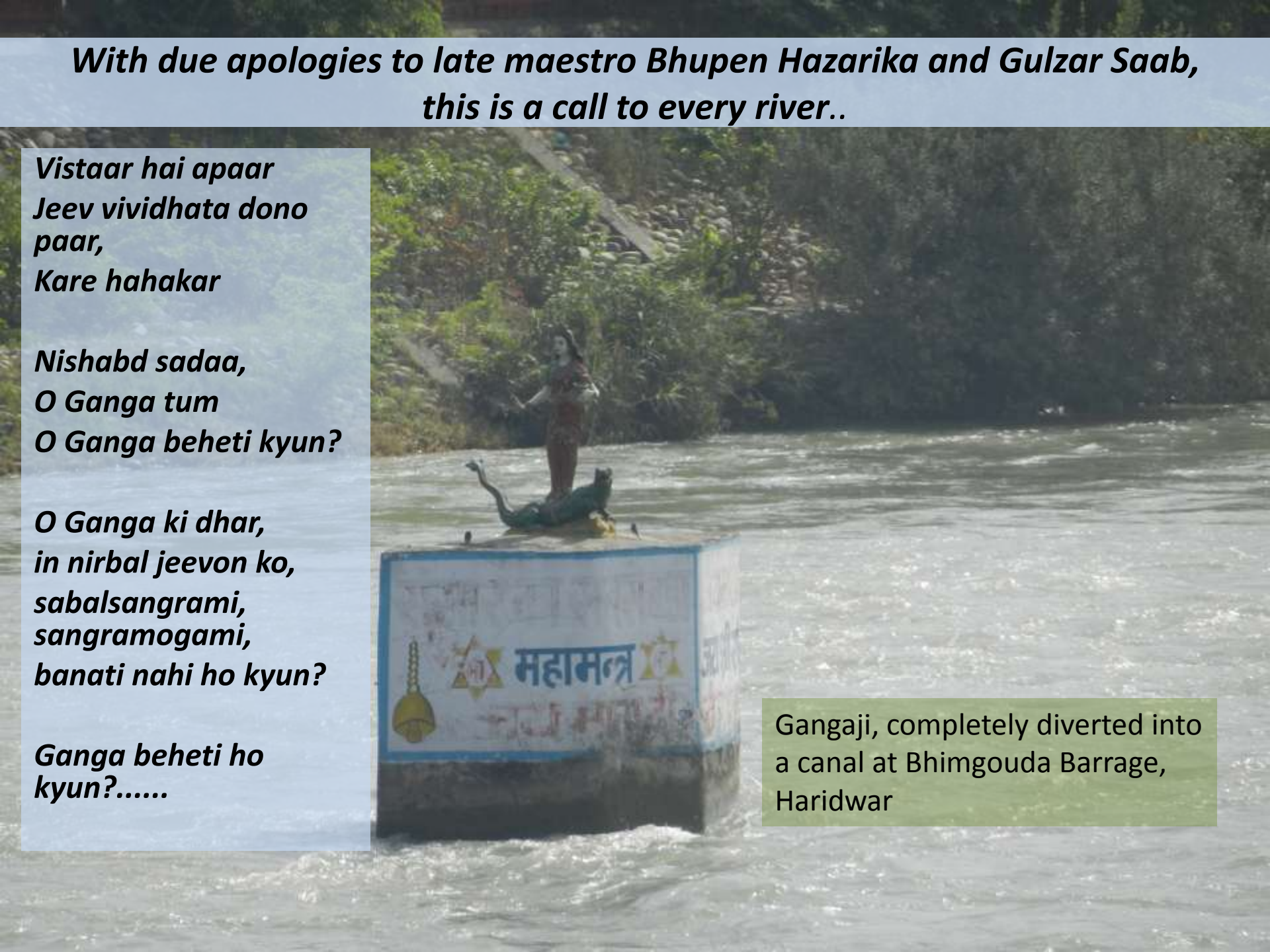
- Honest and holistic Environment Impact Assessments, Cumulative Impact Assessments, Downstream Impact Assessment Basin Studies
- Environmental Flows
- Distance between two dams in a cascade
- Biodiversity Assessments
- Mitigation Measures
- Fish Ladders/ Passes/ Mitigation Measures
- Linking Research with Policy and Environmental Governance

Some Bright Lights

- Increasing involvement of scientists with advocacy and decision making related to ecology. Recent submission on Fisheries supported by numerous scientists
- Forthright reports from institutions like WII
- Teesta CIA saying no projects upstream of Chungthang
- Add Chief Secy report to HC in HP says that there should be at least 5 km of flowing river between projects
- WGEEP rooting for participatory, biodiversity based decision making

Problems are huge, but tomorrow is another day!

With due apologies to late maestro Bhupen Hazarika and Gulzar Saab, this is a call to every river..



Vistaar hai apaar
Jeev vividhata dono paar,
Kare hahakar

Nishabd sadaa,
O Ganga tum
O Ganga beheti kyun?

O Ganga ki dhar,
in nirbal jeevon ko,
sabalsangrami, sangramogami,
banati nahi ho kyun?

Ganga beheti ho kyun?.....

Gangaji, completely diverted into a canal at Bhimgouda Barrage, Haridwar

Thank You!

"The concern for man and his destiny should always be the chief interest of all technical effort. Never forget it amongst diagrams and equations"
- Albert Eistein

South Asia Network on Dams, Rivers and People

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