INDIA'S TRYST WITH

THE BIG DAMS

The Performance on and future perspectives of Large Dams

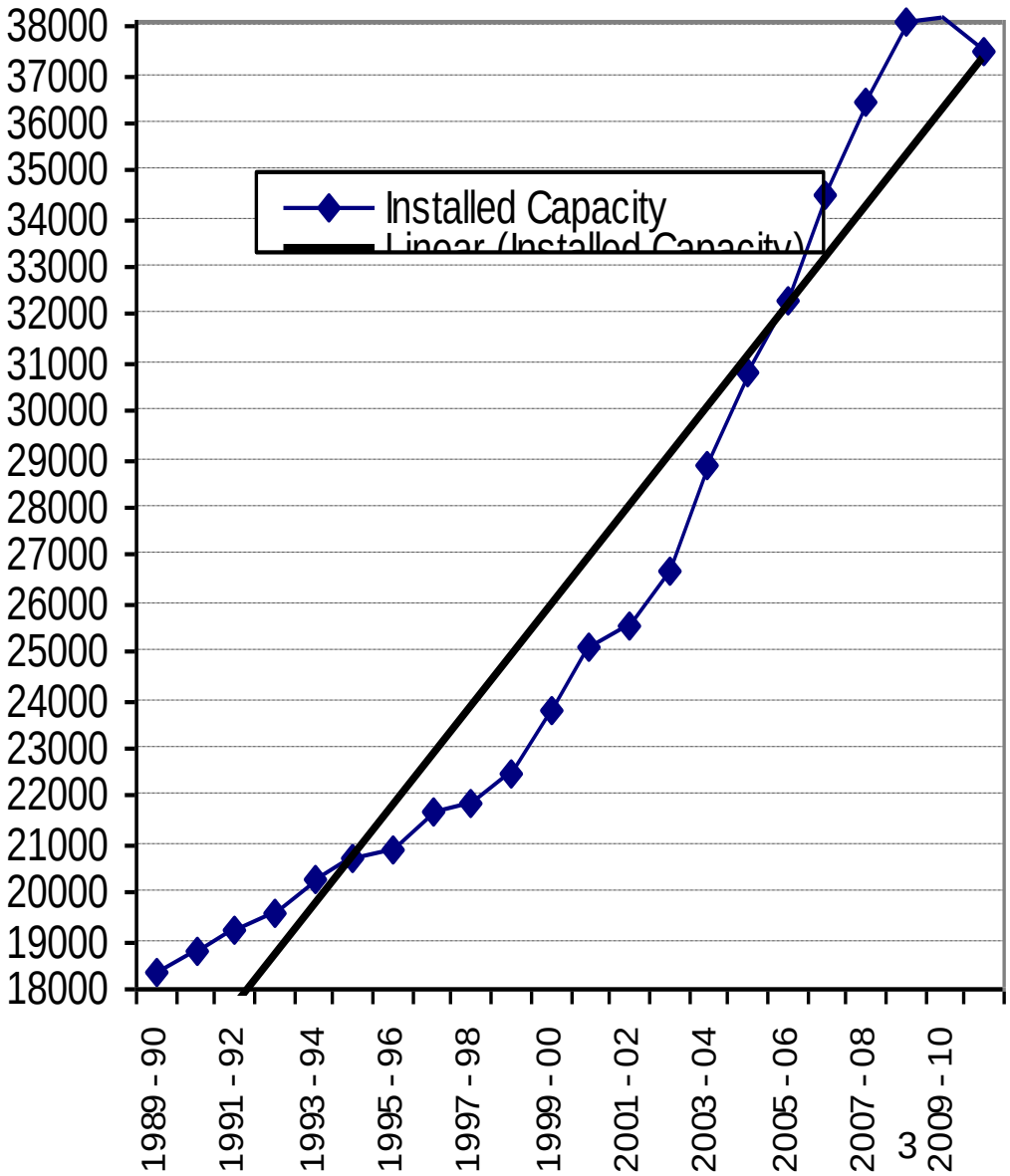
In the River Basin Context

The Dam domination in India's WRD

- 346 large dams in 1950: 5000+ now
- 66-80% of water sector budget goes for big projects – also in the 11th Five Year plan **(2007-12)**
- To the exclusion of Rainfed farmers, local water systems or groundwater recharging or repair and maintenance of created infrastructure, future generations
- As if people and ecosystems do not matter
- New ways are being attempted to push big projects: ILR, food security, flood control, AIBP, National Projects, advocacy to increase storage capacities, clean (hydro) energy, climate change, China bogey
- No credible assessment of performance of large dams

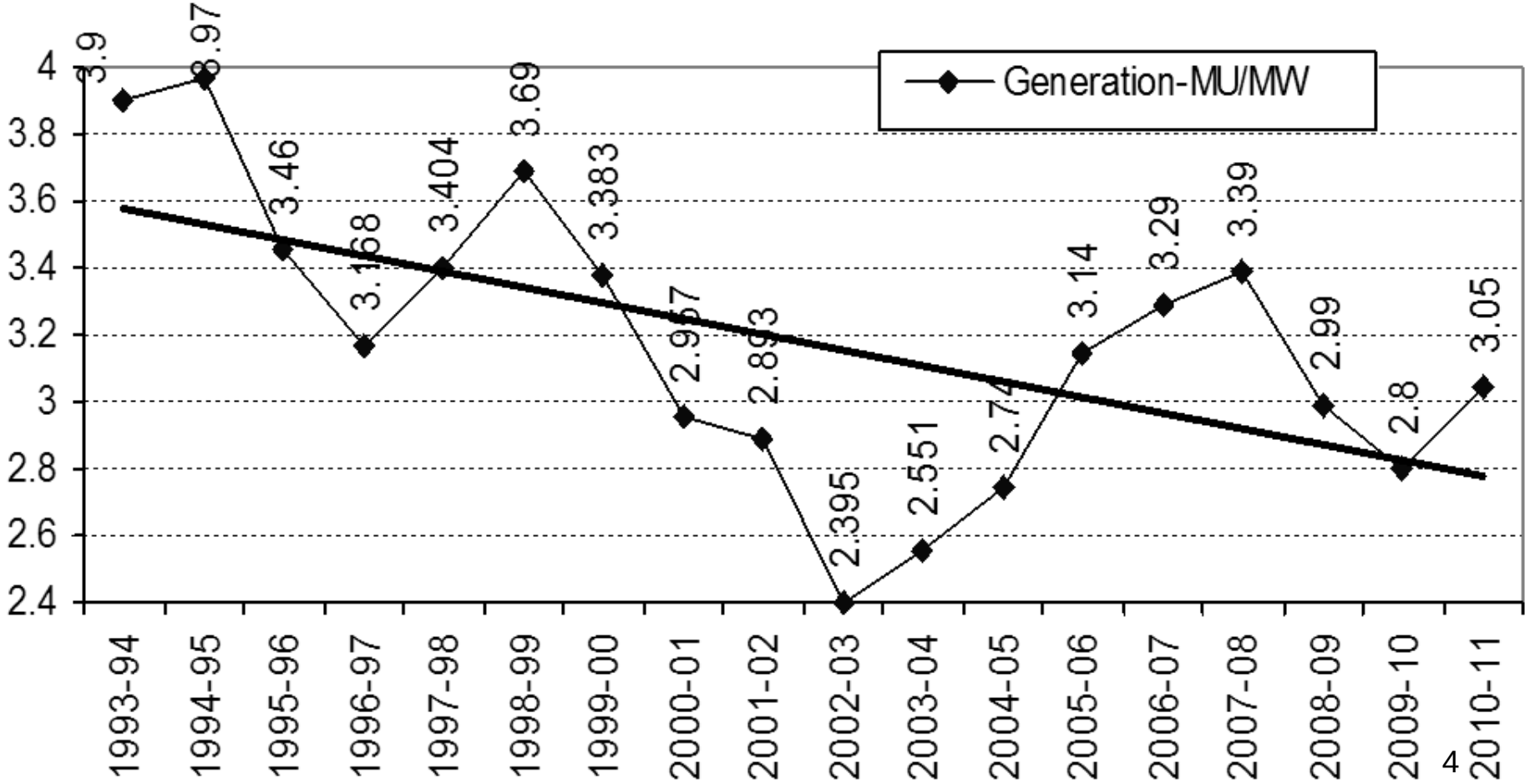
Advocacy for large hydro

- There is strong push for large hydro projects today, as if large hydro projects are good in themselves.
- In fact installed capacity of large hydro has increased at a compound growth rate of 4.35% per annum during 1991-2005, HIGHER than all other power sub-sectors.
- There is little attempt for credible assessment of performance of large hydro. How have they performed?



Diminishing Returns from Large Hydro

- As can be seen from the chart here, the Million Units power energy generated from large hydro projects has been almost continuously falling over the last sixteen years.
- The fall from 1994-5 to 2010-11 is huge 23.2%.
- There are many reasons for this: unviable projects, over development, optimistic assumptions, siltation, inadequate R&M, ROR projects, etc.



Hydro is big money…

- Hydropower is big industry: Rs 37088 crores revenue from sale of hydropower in 2007-08 even if we assume only Rs 3.0 per unit, growing @ 30.6% over previous year
- 11th plan hopes to invest Rs 21300 crores each year on big hydro – generation component alone at Rs 7 crore per MW – power sector investment rate in 11th plan.
- Increased private and international interest, since state is happy to take all the risks at public cost

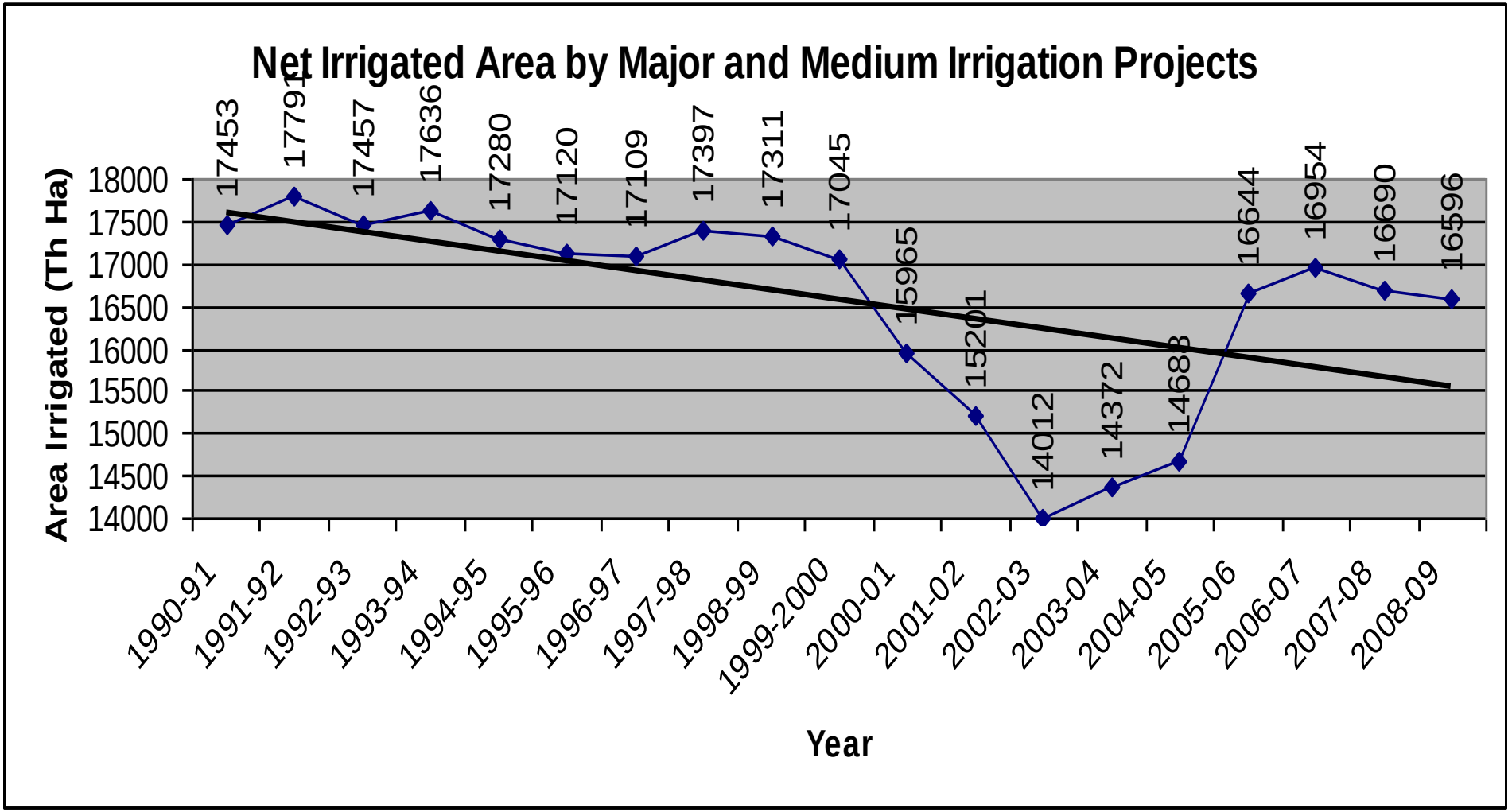
89% of projects generate at below design capacity

- When a project is given techno-economic clearance, it is based on promise that it will generate certain units of power at design level (at 90% dependability level)
- Our analysis of all the hydropower projects of India show that 89% of the projects generate at BELOW the design capacity.
- In fact 50% of the under-performing projects generate at below the 50% of design energy.
- And yet no questions are asked, no accountability fixed, in fact such an analysis is not even done.
- This means that a lot of the projects that are being set up now are UNVIABLE projects.

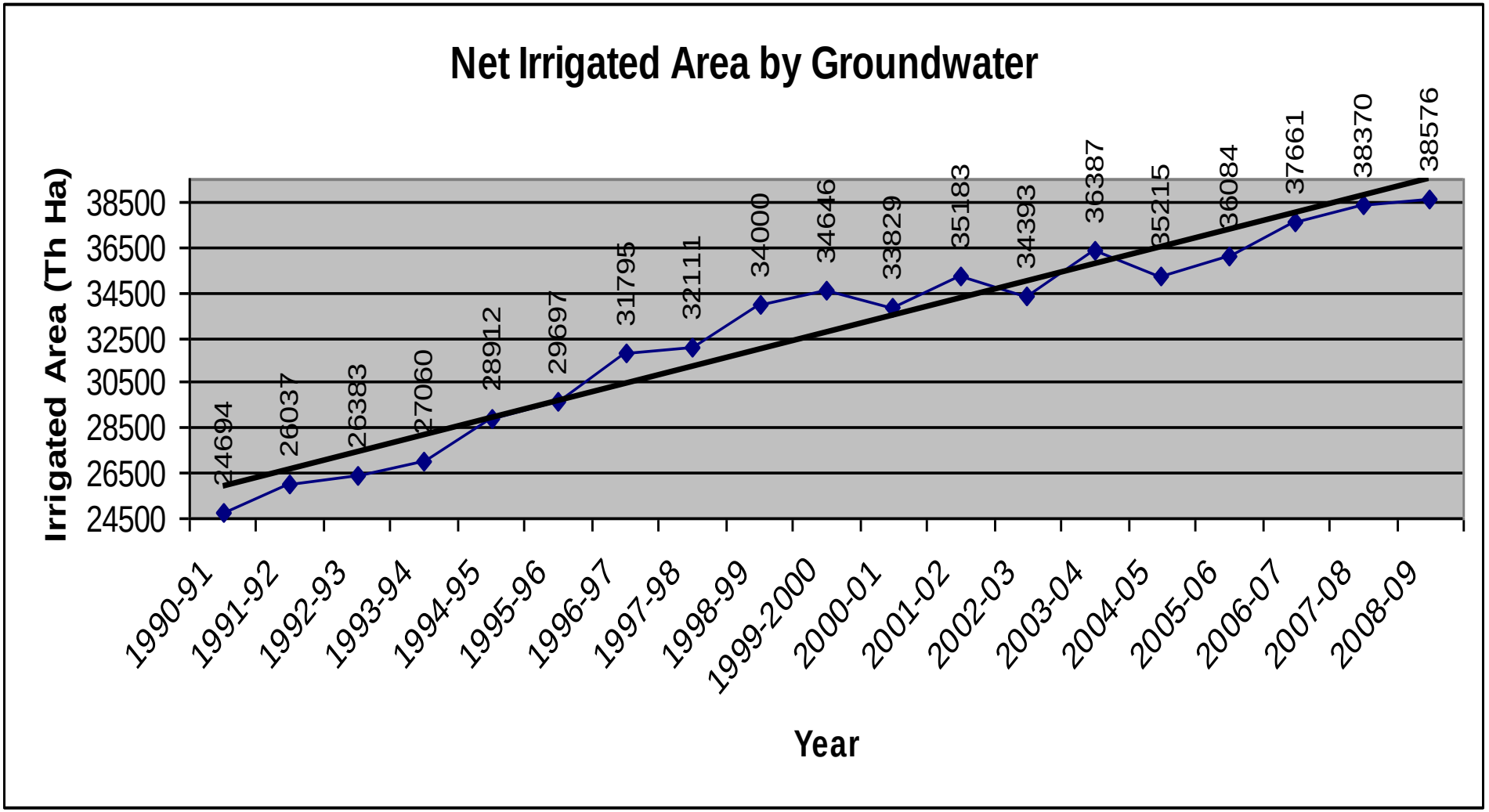
Are HEPs providing peaking power?

- One of the most important justifications put forward for taking up hydro projects is that it can provide peaking power, unlike the coal and nuclear power projects.
- An important question here is, how much of the power generated by Hydro projects is available during peaking hours? Unfortunately, such an analysis is not being done currently. This is shocking since, this means that we do not even know if the hydro projects are doing what they are doing what they have been built for.
- We are unable to do such an analysis since it requires a lot of data which is not easily available.
- However, anecdotal evidence suggests that indeed a large number of hydro projects are performing as base load stations when they can provide peaking power.
- For example, the Central Electricity Regulatory Commission has noted that projects like Nathpa Jhakri (1500 MW) and Tehri (1000 MW), that were not generating peaking power when they could.
- The peaking power generation capacity of Giri Bata Hydro project is being destroyed by putting up the Renuka dam for supplying water to Delhi.
- A large number of ROR hydro projects cannot even claim to be in a position to generate peaking power, since they are so situated along the river that the downstream projects often get water only during off peak hours. This would very much be the case in Sutlej, Ravi, Beas, Chenab, Bhagirathi, Alaknanda and Teesta basins.

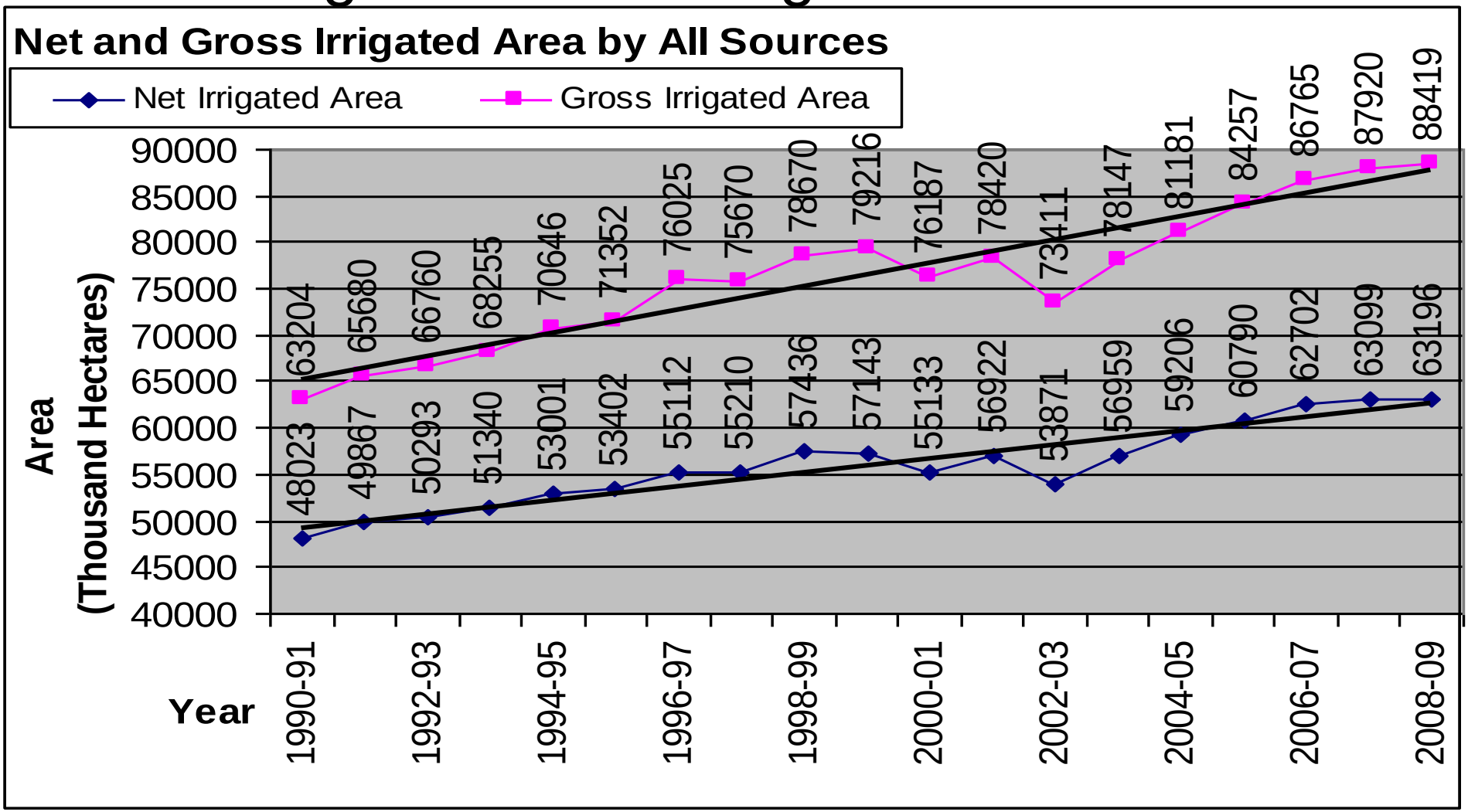
In 17 years between 1991-92 to 2008-09, after spending over Rs 180000 crores on big irrigation projects, there is decline of over 1.1 M ha in canal irrigated areas



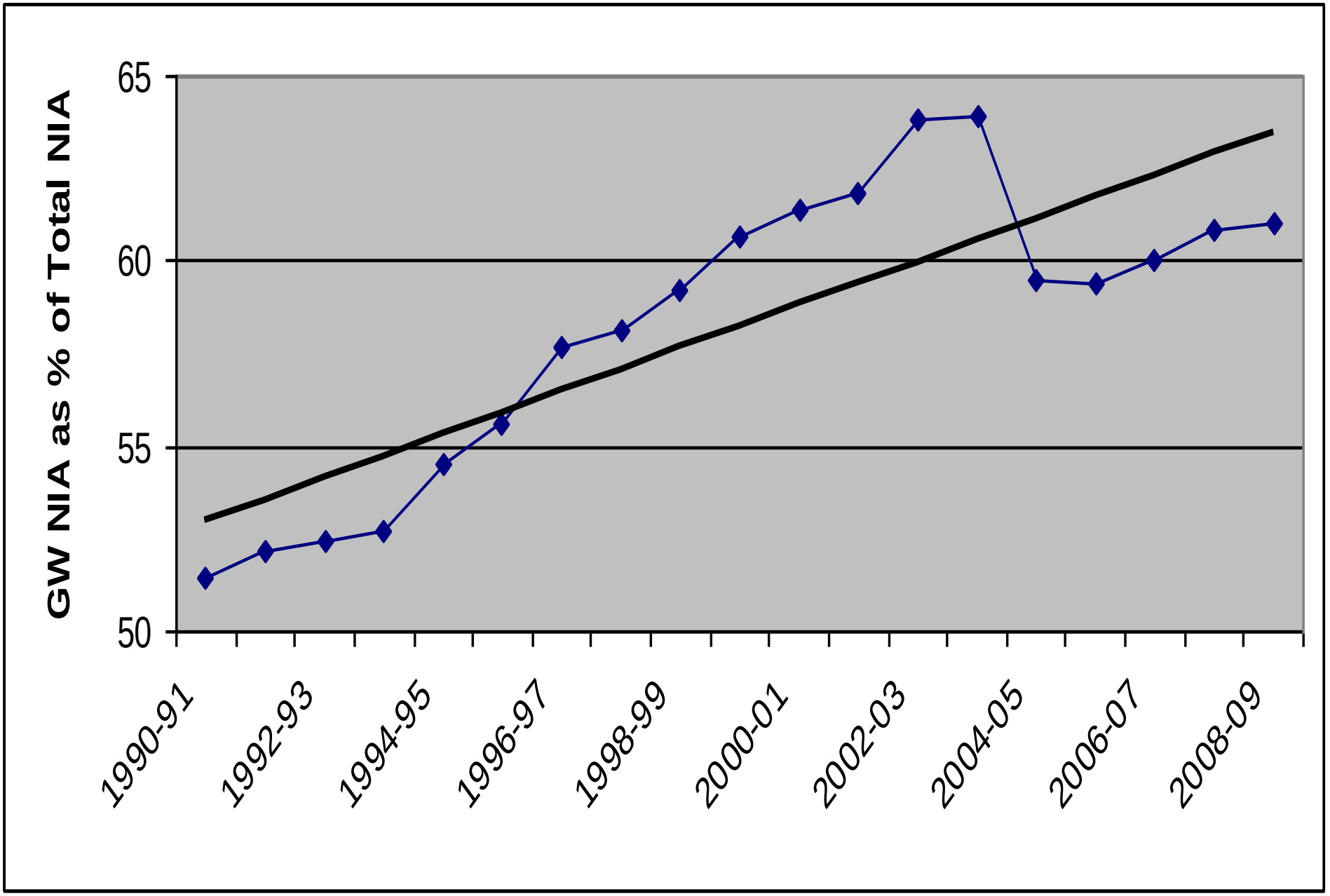
In the same period, area irrigated by groundwater was going up steeply, more than compensating for the decrease in area irrigated by M&M projects.



The increase in overall irrigated area, in spite of decrease in contribution from big dam irrigation projects was possible due to the steep increase in groundwater irrigated areas.



Increasing GW dominance in Total NIA



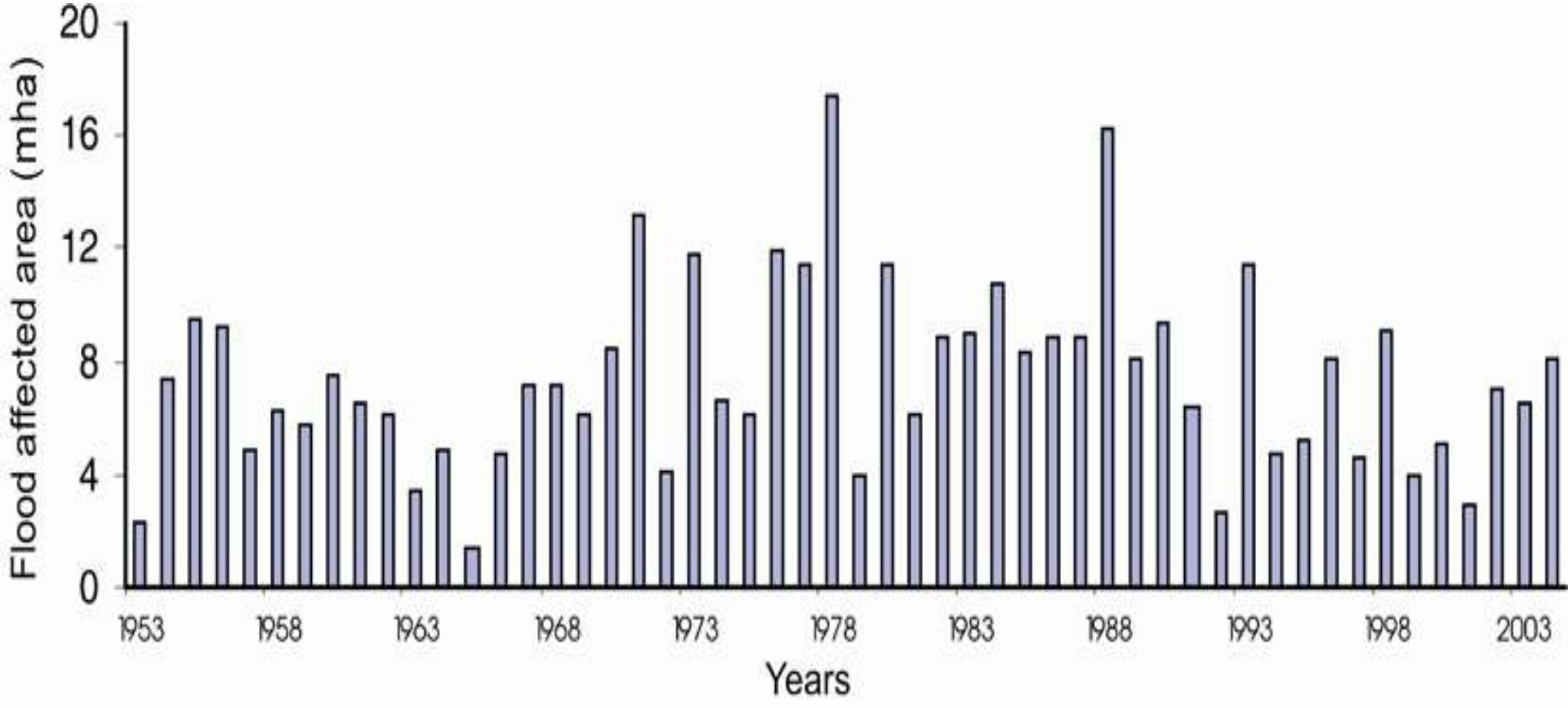
Monsoon normal or above normal in majority of these years

Year	Monsoon Rainfall
1991	91 %
1992	93 %
1993	101 %
1994	110 %
1995	100 %
1996	103 %
1997	102 %
1998	106 %
1999	96 %
2000	92 %
2001	92 %
2002	81 %
2003	102 %
2004	87 %
2005	99 %
2006	99 %
2007	105 %
2008	98 %
2009	77 %
2010	102 %

Big Dams help Control Floods?

- The dams already constructed can be of some limited help provided there is transparent, accountable reservoir operation policy. There is none today.
- Wrong operation of large dams have actually led to disastrous floods: Ukai (2006), Hirakud, Chandil, Ranganadi (2008), Srisailam, Upper Krishna, Tungbhadra & Nagarjunsagar and also Damodar dams (2009), Bhakra, Pong and Tehri (2010) in recent times
- No engineer/ bureaucrat or minister has ever been punished for wrong operation of dams
- If flood management is the objective, dams are not a viable or desirable proposition.
- Embankment similar story, e.g. Kosi (2008)

Flood affected area: 1953 to 2004



Many a gaps between Assumptions & Reality

Assumption	Reality
Thermal: Hydro ratio of 60:40 is good	CEA member hydro says there is no study to back that figure – cannot be true for whole country, all seasons
Hydro is required for peaking power	No study about how much of hydro generation is currently providing peaking power; ROR projects cannot provide peaking energy most of the time; most consumers do not pay extra for consumption during peaking hourspump storage project non viable?
Hydro is Green – environment friendly	That claim is yet to be proved in a credible manner – big hydro have very huge social and environmental impacts, costs are paid by others.
Hydro is renewable	Storage projects are silting up – leading to reduced power generation – ultimately stopping – e.g. Gumti HEP in Tripura
Hydro is cheap	Provided all the social and environmental costs are not counted and huge subsidies given to the industry are ignored
Hydro is clean – no pollution	Storage projects in tropical countries emit methane – 21 times more potent GHG than CO2 – Indian dams could be emitting methane equal to 18.7% of India's total CO2 emissions.

Idle Reservoir Capacity during 1994-2009

Sr No	Year (Annual monsoon rainfall)	No of reservoirs monitored	Monitored capacity (BCM)	Capacity filled up (BCM)	BCM Idle Capacity	% Idle Capacity
1	1994 (110%)	63	125.14	112.63	12.51	10
2	1995 (100%)	63	125.14	98.44	26.7	21.34
3	1996 (103%)	63	125.14	89.53	35.61	28.46
4	1997 (102%)	68	129.4	101.2	28.2	21.18
5	1998 (105%)	70	130.6	106.1	24.5	18.76
6	1999 (96%)	70	130.6	97.6	33.0	25.27
7	2000 (92%)	70	130.6	82.66	47.94	36.71
8	2001 (91%)	70	130.6	87.49	43.11	33.01
9	2002 (81%)	70	130.6	69.25	61.35	47.09
10	2003 (105%)	71	131.28	78.76	52.52	40.01
11	2004 (87%)	71	131.28	85.1	46.18	35.18
12	2005 (99%)	76	133.021	109.695	23.326	17.54
13	2006 (99%)	76	133.021	120.451	12.430	9.34
14	2007 (105%)	81	151.77	124.150	27.62	18.20
15	2008 (98%)	81	151.77	114.262	37.508	24.71
16	2009 (77%)	81	151.77	89.84	61.93	40.80
17	2010 (102%)	81	151.77	115.23	36.54	24.08
	17 years avg			40.32 (8.5 SSP)		26.57

Implications of empty storage capacity

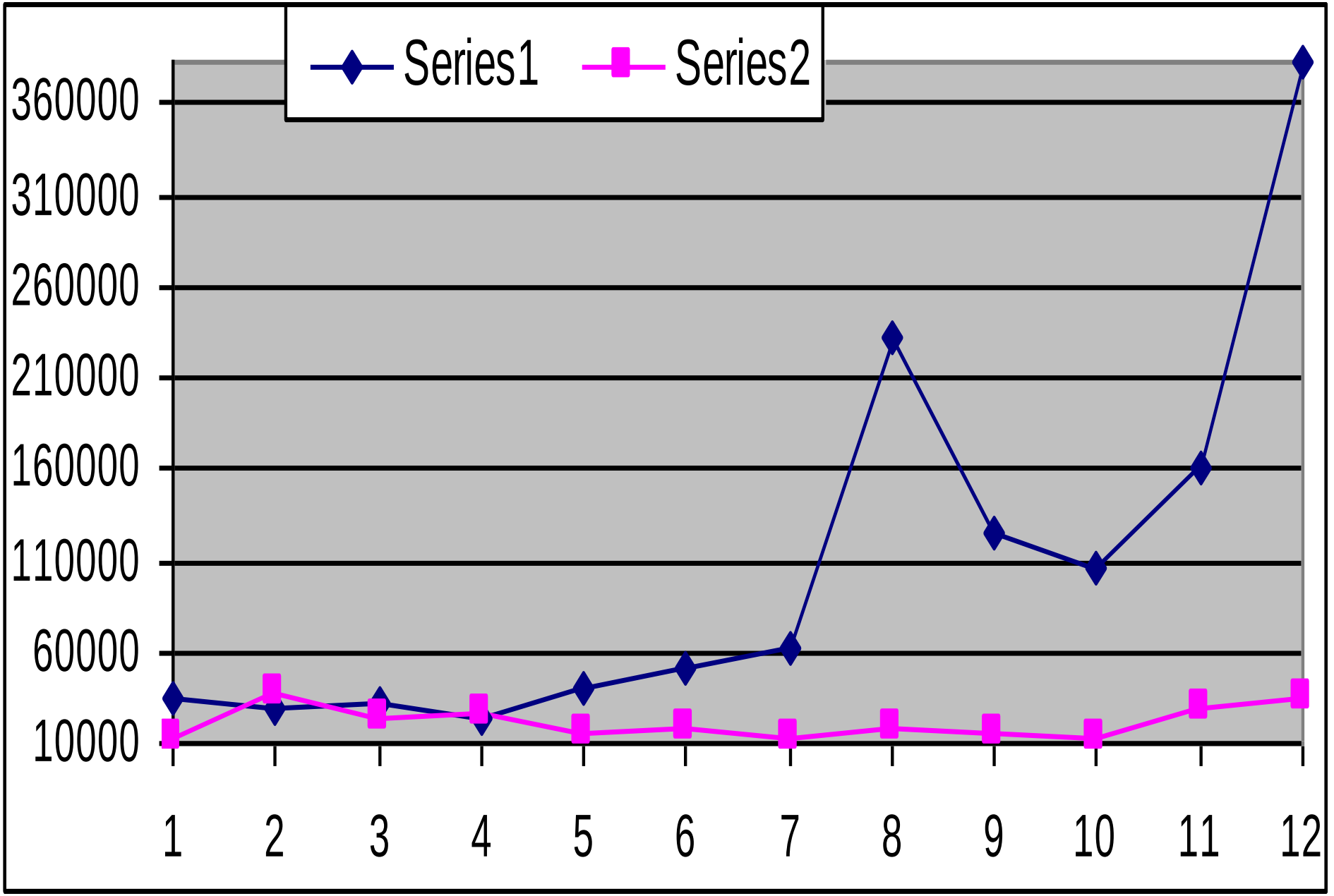
- On an average, each year about 40.32 BCM (equivalent of 8.5 Sardar Sarovar Projects) of LIVE storage capacity out of only the monitored storage capacity is not filled up for the last 17 years.
- That means that on an average an investment of Rs 50000 crores has remained idle in each of the last 17 years.
- This happens when in 11 of the 17 years the rainfall was almost average or above. (See the figures in brackets in col. 2.)
- Should we not be trying to understand why this is happening? How we can make the existing storage capacity play the useful role it is supposed to, in stead of pushing for more storages?

Note: This analysis needs to be done storage wise and river basin wise for all large storages. We could not do it as we could not get the required information.

Water Storages are silting up fast

- As per the report of NCIWRD (Govt of India, Sept 1999), about 1.4 BCM of existing storage capacity is getting silted up every year.
- At today's rates creation of 1.4 BCM storage capacity would cost Rs 1448 crores.
- Our calculations, based on CWC reports of siltation for 27 dams, show the loss is at 1.95 BCM per year.
- That means that on an average, each day we are losing Rs 4 crores worth of storage capacity through siltation.
- And there is little serious attempt to stop this.
- The required Catchment Area Treatment for even Bhakra was not done. Same for other projects

Per Ha cost of irrigated area over the years



Large infrastructure = poor performance?

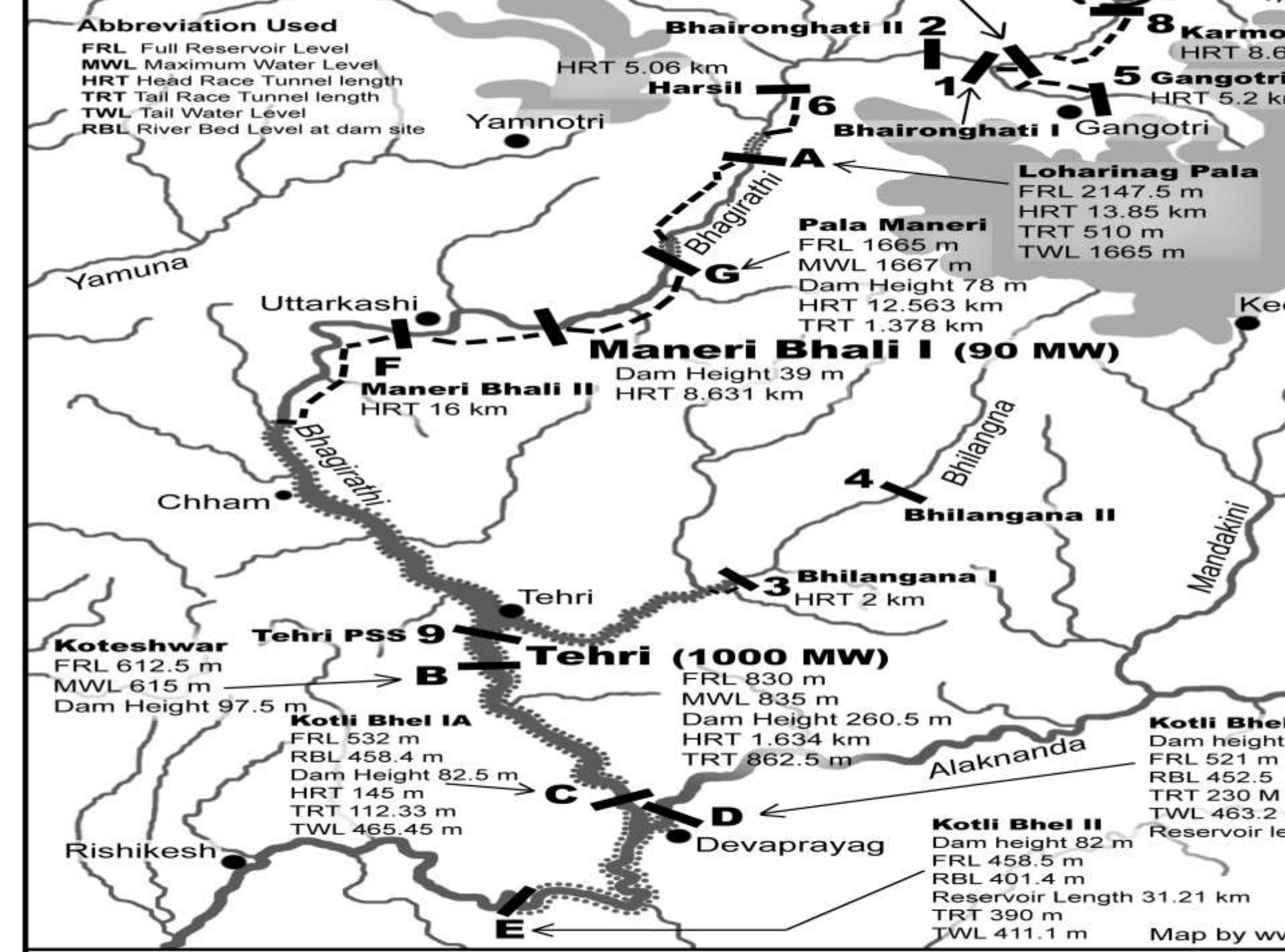
- India has the largest Irrigation Infrastructure in the world but it is performing far below its capacity.
- Finance Minister Chidambaram said in his budget speech in Feb 2005, "Water-use efficiency in the Indian agriculture is one of the lowest in the world".
- The mid term appraisal of 9th 5 Year Plan had noted, "With a 10% increase in the present level of water use efficiency, it is estimated, an additional 14 m ha can be brought under irrigation from existing irrigation facilities".
- The 14 m ha of additional irrigation is an agenda for over a decade at current rate of additional irrigation being created.
- Gap between potential created and realised is over 20 m ha and is growing
- Annual R&M requirement is $ 4 billion – a tiny fraction is being provided and the result is poor performance.
- Why is there no serious attempt to make amends in this situation?

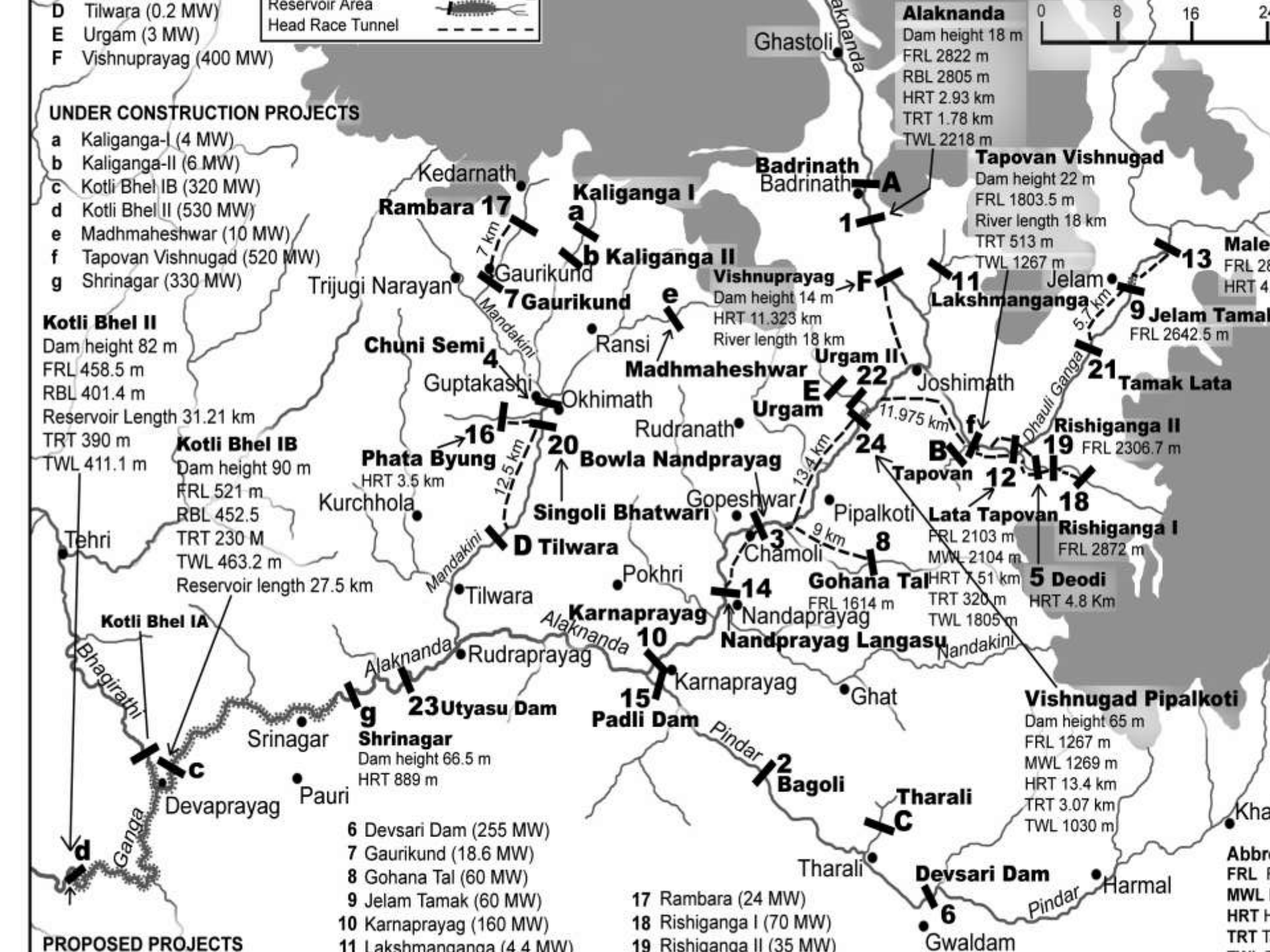
The hidden costs – who pays them - 1

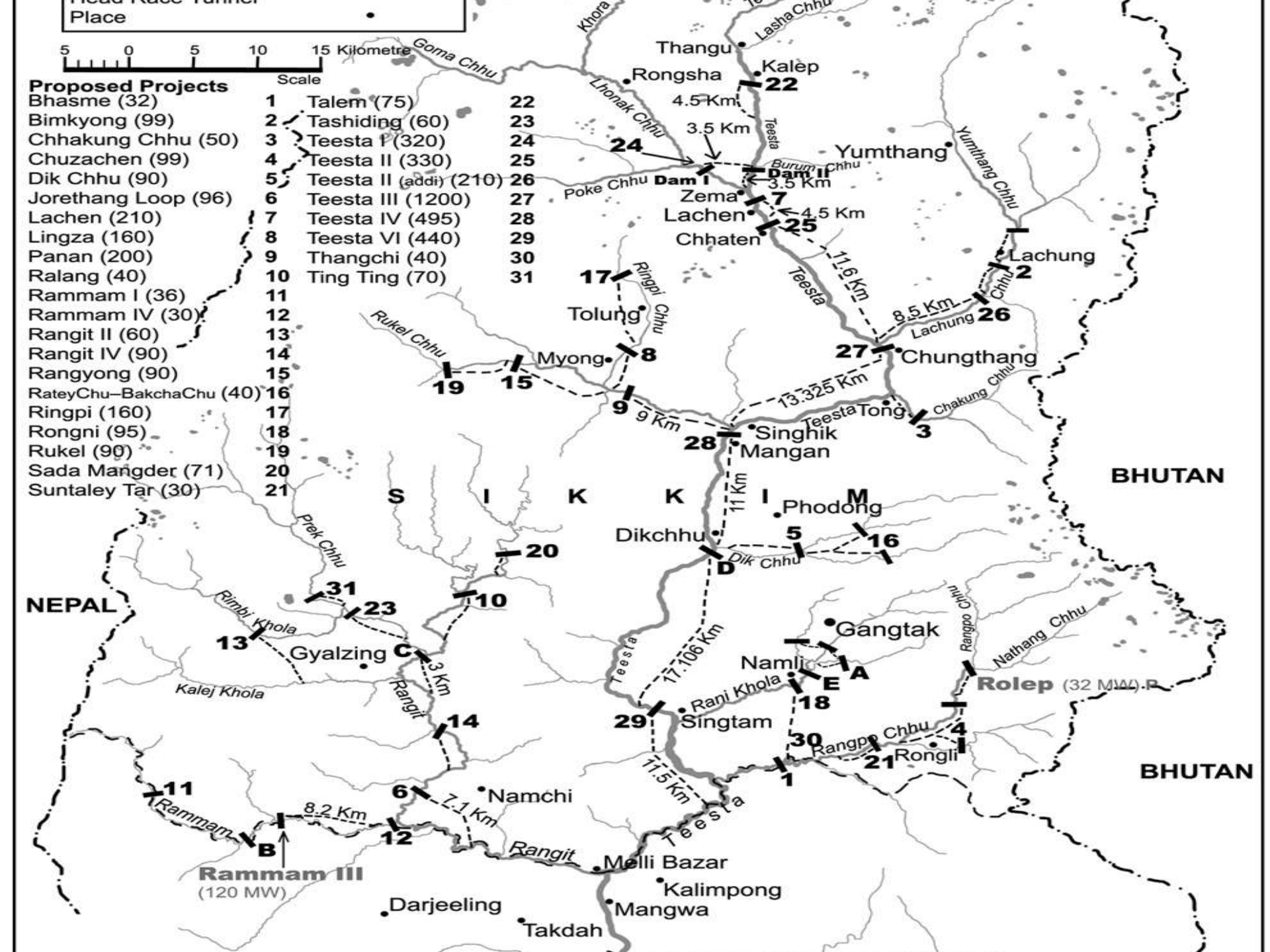
- Total reservoir area of India's 4528 large reservoirs is 4.42 million ha as per SANDRP estimates.
- In 2000, the Planning Commission acknowledged about WRD that "25 million persons have been displaced since 1950 on account of development. Less than 50% have been rehabilitated – the rest pauperised by the development process". The actual numbers are more likely to be nearer to 35-40 million and proportion of those rehabilitated much lower.
- Decades after the celebrated Bhakra dam was completed, when in 1970s the then Union Irrigation Minister KL Rao visited it he recorded "it is curious how we handle our projects. The village of Bhakra on the bank of the river Sutlej was submerged. The Dam resulted in great suffering to the people of the village, but nobody took note of the people's representations. I found that the new village of Bhakra had neither drinking water nor electricity though surrounded by blazing brilliant lights. This was indeed unfair." The story is not much different for other large dams.

The hidden costs – who pays them - 2

- Pong, Bhakra, Hirakud, Tawa, Bargi, Nagarjunsagar… - you name the dam and you will find that people affected there from are still fighting for R&R.
- Large dams also submerge forests, lead to practices resulting in water logging and salinisation and also water intensive cropping patterns
- WB: India's rivers are fetid sewers
- CPCB: No rivers has potable water in plains area of the country (1981)
- Dams kill rivers – no water is allowed downstream from the dams for the river, for the environment or even for downstream communities & economic / livelihood activity like fisheries


Abbreviation Used
FRL Full Reservoir Level
MWL Maximum Water Level
HRT Head Race Tunnel length
TRT Tail Race Tunnel length
TWL Tail Water Level
RBL River Bed Level at dam site
Bhaironghati II
2
HRT 5.06 km
Harsil
6
Yamnotri
1
Bhaironghati I
Gangotri
8
Karmo
HRT 8.6
5 Gangotri
HRT 5.2 k
A
Loharinag Pala
FRL 2147.5 m
HRT 13.85 km
TRT 510 m
TWL 1665 m
Bhagirathi
Pala Maneri
FRL 1665 m
MWL 1667 m
Dam Height 78 m
HRT 12.563 km
TRT 1.378 km
G
Yamuna
Uttarkashi
Maneri Bhali I (90 MW)
Dam Height 39 m
HRT 8.631 km
F
Maneri Bhali II
HRT 16 km
Bhagirathi
Chham
Bhilangna
4
Bhilangana II
Mandakini
3
Bhilangana I
HRT 2 km
Tehri
Tehri PSS
9
Tehri (1000 MW)
FRL 830 m
MWL 835 m
Dam Height 260.5 m
HRT 1.634 km
TRT 862.5 m
Koteshwar
FRL 612.5 m
MWL 615 m
Dam Height 97.5 m
B
Kotli Bhel IA
FRL 532 m
RBL 458.4 m
Dam Height 82.5 m
HRT 145 m
TRT 112.33 m
TWL 465.45 m
C
Alaknanda
D
Devaprayag
Kotli Bhel
Dam height
FRL 521 m
RBL 452.5
TRT 230 M
TWL 463.2
Reservoir le
Rishikesh
Kotli Bhel II
Dam height 82 m
FRL 458.5 m
RBL 401.4 m
Reservoir Length 31.21 km
TRT 390 m
TWL 411.1 m
E
Map by ww


D Tilwara (0.2 MW)
E Urgam (3 MW)
F Vishnuprayag (400 MW)
Reservoir Area
Head Race Tunnel
UNDER CONSTRUCTION PROJECTS
a Kaliganga-I (4 MW)
b Kaliganga-II (6 MW)
c Kotli Bhel IB (320 MW)
d Kotli Bhel II (530 MW)
e Madhmaheshwar (10 MW)
f Tapovan Vishnugad (520 MW)
g Shrinagar (330 MW)
Kotli Bhel II
Dam height 82 m
FRL 458.5 m
RBL 401.4 m
Reservoir Length 31.21 km
TRT 390 m
TWL 411.1 m
Kotli Bhel IB
Dam height 90 m
FRL 521 m
RBL 452.5
TRT 230 M
TWL 463.2 m
Reservoir length 27.5 km
Kotli Bhel IA
Alaknanda
Dam height 18 m
FRL 2822 m
RBL 2805 m
HRT 2.93 km
TRT 1.78 km
TWL 2218 m
Tapovan Vishnugad
Dam height 22 m
FRL 1803.5 m
River length 18 km
TRT 513 m
TWL 1267 m
Vishnuprayag
Dam height 14 m
HRT 11.323 km
River length 18 km
Urgam II
Lata Tapovan
FRL 2103 m
MWL 2104 m
HRT 7.51 km
TRT 320 m
TWL 1805 m
Gohana Tal
FRL 1614 m
Nandprayag Langasu
Vishnugad Pipalkoti
Dam height 65 m
FRL 1267 m
MWL 1269 m
HRT 13.4 km
TRT 3.07 km
TWL 1030 m
Shrinagar
Dam height 66.5 m
HRT 889 m
Rambara 17
Kaliganga I
Kaliganga II
Chuni Semi 4
Phata Byung
HRT 3.5 km
Singoli Bhatwari
Bowla Nandprayag
Madhmaheshwar
Urgam
Lakshmanganga
Jelam Tamak
FRL 2642.5 m
Tamak Lata
Rishiganga II
FRL 2306.7 m
Rishiganga I
FRL 2872 m
Deodi
HRT 4.8 Km
Padli Dam
Utyasu Dam
Bagoli
Tharali
Devsari Dam
6 Devsari Dam (255 MW)
7 Gaurikund (18.6 MW)
8 Gohana Tal (60 MW)
9 Jelam Tamak (60 MW)
10 Karnaprayag (160 MW)
11 Lakshmanganga (4.4 MW)
17 Rambara (24 MW)
18 Rishiganga I (70 MW)
19 Rishiganga II (35 MW)
PROPOSED PROJECTS
Badrinath
Kedarnath
Ghastoli
Trijugi Narayan
Gaurikund
Guptakashi
Okhimath
Ransi
Rudranath
Joshimath
Jelam
Kurchhola
Tehri
Devaprayag
Srinagar
Pauri
Rudraprayag
Karnaprayag
Nandaprayag
Gopeshwar
Chamoli
Pipalkoti
Pokhri
Tilwara
Ghat
Tharali
Gwaldam
Harmal
Alaknanda
Bhagirathi
Ganga
Mandakini
Dhauli Ganga
Pindar
Nandakini
7 km
12.5 km
11.975 km
13.4 km
9 km
5.7 km
0 8 16


Head Race Tunnel
Place
5 0 5 10 15 Kilometre
Scale
Proposed Projects
Bhasme (32)
Bimkyong (99)
Chhakung Chhu (50)
Chuzachen (99)
Dik Chhu (90)
Jorethang Loop (96)
Lachen (210)
Lingza (160)
Panan (200)
Ralang (40)
Rammam I (36)
Rammam IV (30)
Rangit II (60)
Rangit IV (90)
Rangyong (90)
RateyChu–BakchaChu (40)
Ringpi (160)
Rongni (95)
Rukel (90)
Sada Mangder (71)
Suntaley Tar (30)
1 Talem (75)
2 Tashiding (60)
3 Teesta I (320)
4 Teesta II (330)
5 Teesta II (addi) (210)
6 Teesta III (1200)
7 Teesta IV (495)
8 Teesta VI (440)
9 Thangchi (40)
10 Ting Ting (70)
11
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13
14
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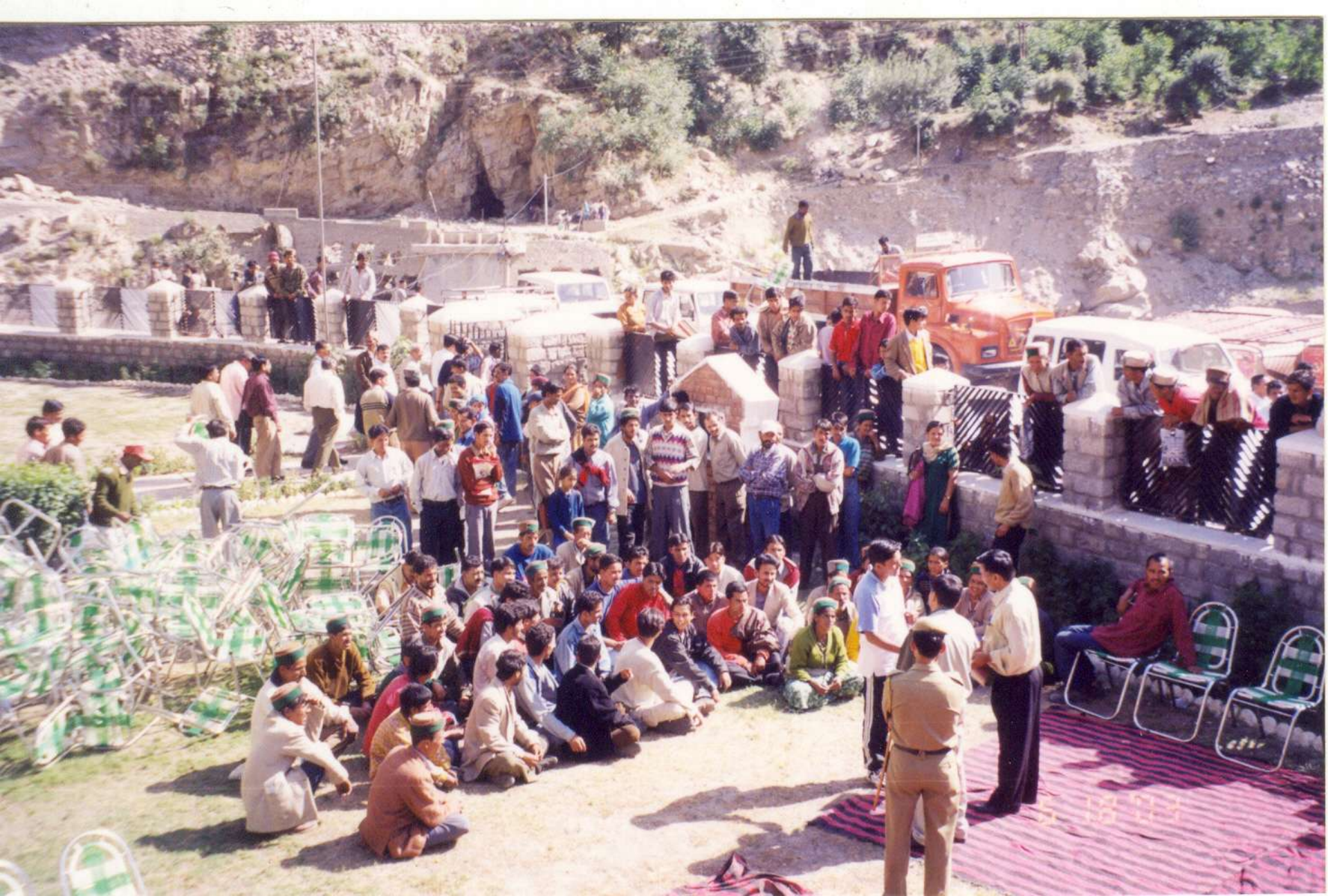
26
27
28
29
30
31
Goma Chhu
Khora
Lasha Chhu
Thangu
Kalep
Rongsha
Lhonak Chhu
4.5 Km
3.5 Km
Teesta
Yumthang
Burum Chhu
Dam II
3.5 Km
Poke Chhu
Dam I
Zema
Lachen
4.5 Km
Chhaten
Yumthang Chhu
Lachung
Chhu
11.6 Km
8.5 Km
Lachung
Ringpi Chhu
Tolung
Rukel Chhu
Myong
Chungthang
13.325 Km
Chakung Chhu
Tong
9 Km
Singhik
Mangan
BHUTAN
S I K K I M
11 Km
Phodong
Dikchhu
Dik Chhu
Prek Chhu
NEPAL
Rimbi Khola
Gyalzing
3 Km
Rangit
Kalej Khola
17.106 Km
Gangtak
Rangpo Chhu
Nathang Chhu
Namli
Rolep (32 MW) R
Rani Khola
Singtam
Rangpo Chhu
Rongli
11.5 Km
Namchi
7.1 Km
8.2 Km
Rammam
Rammam III
(120 MW)
Rangit
Melli Bazar
Kalimpong
Darjeeling
Mangwa
Takdah

Protests at Allain Duhangan PH

Protests at Karcham Wangtoo PH



Non existent Environment compliance

Dump next to habitation Averi

Dump next to Primary School Averi

How ROR projects kill rivers: Dhauliganga

Tehri town under destruction

Inspection of deserted Tehri town

Some additional benefits of Tehri

Large Dams also contribute to Global Warming

- Scientific studies published in research journals show that large dams emit significant amounts of methane, which is 21 TIMES more powerful than CO2 in global warming.
- Methane is emitted from reservoir area, from spillways, from turbines and from downstream rivers.
- Indian large dams, even by conservative estimates, emit 17 million tons methane a year, which is equal to emission of 357 MT of CO2.
- This is about 18% of India's TOTAL official emission of 1889 MT in 2000; or almost same as the total power sector emission of India in 2004-05.
- Indian govt does not even measure methane emission from large dams, even though planning commission has been asking for it for the last five years.
- The proposed 3000 MW Dibang HEP in Arunachal Pradesh, for example, even by conservative estimates, would emit at least 3.3 MT CO2 equivalent methane every year.
- Tipaimukh: GHG emissions to be studied after the clearance

The achievements: claims vs the reality

- It can be nobody's case that nothing has been achieved.
- While net irrigated area has increased to 62 m ha, the lands irrigated by large dams stand at 17 m ha at peak, the rest is by groundwater and small systems. This means that only about 12% of net cultivated area of 141 m ha get benefits from large dams
- India's foodgrains production that was 50 MT in 1950 has reached 216 MT in 2006-07, 233 MT in 2008-09
- However, what is the contribution of large dams? 10-12% as per two independent assessments. And this is gross contribution. Net contribution would be much lower.
- In the process, we have precipitated an agrarian crisis and also an ecosystem crisis (dried and polluted rivers, decreasing GW levels, pollution of GW…)
- **Is that good enough?**

The Agrarian crisis and large dams

- Everyone from the Prime Minister, the President, down to the farmers agree that India's agriculture is facing serious crisis. Farmers are committing suicides in thousands every year. Agriculture growth rates are down to 1-2%, yields are stagnating or declining, and canal irrigated areas are decreasing in a number of states
- Everyone also agrees that every farmer would benefit from better water management
- India continues to be blessed with a bountiful monsoon which can be a great resource for every farmer if put to use through local water systems.
- GW is India's lifeline: That lifeline is in serious crisis
- Only way to sustain this lifeline is through local water systems, recharging GW
- But big dam dominated WRD won't allow that to happen

Large Dams – Some Broad Issues

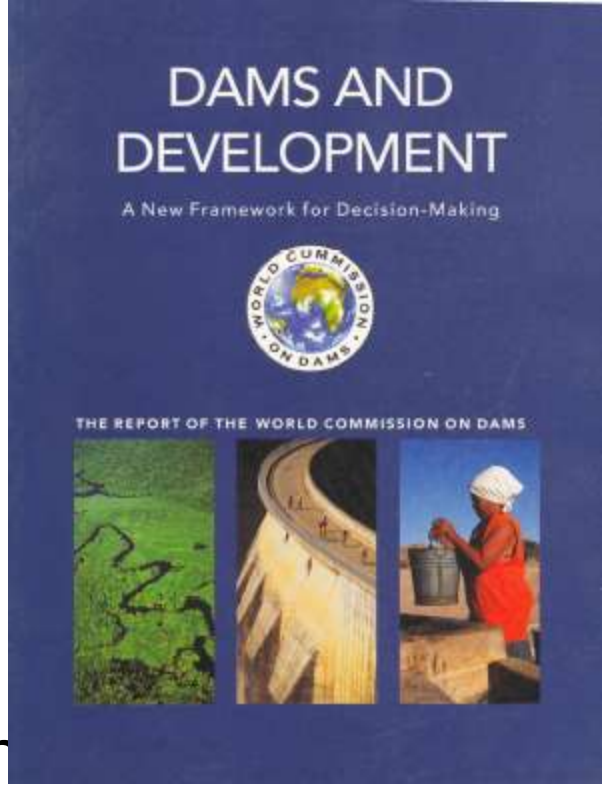
- **Large Dams generally tend to be undemocractic**: They do not come out of the framework of planning and decision making process like the one suggested by WCD. If they were to come from such a framework, they would certainly be more acceptable.
- **Large Dams exclude the needs of the poorest and neediest** As they are indicated by aggregation of demands of a large number of people, but they do not address the specific components of those aggregate demands, particularly those of the poorest and the weakest.
- **LD involve tradeoffs** at the expense of the poorest and benefiting relatively better off.
- **Large Dam Developers are unaccountable**. There have been no credible post facto evaluation of performance of the projects as against the demands they were set out to satisfy and as against the benefits they were to deliver. On the other hand they create huge social impacts, which are seldom addressed, thus creating more problems rather than solving existing problems.
- **Large Dams are poor performers** Performance appraisal of India's large projects show: Diminishing generation from large hydro projects, large hydro projects not providing peaking power, large storage capacities remaining unutilised, Stored water remains unutilised, creation of unviable storage capacities, high costs of irrigation from large projects when less expensive options exist & large dams providing hardly 10% of the food grains production, when options could have provided greater output.

Why this push for big DAMS?

- Simple answer is: big money, easy money, non existent governance
- More involved answer: little accountability, weak regulation (MEF, CERC, SERCs, CAG, CVC, Courts), externalisation (paid by others) of key costs, no post facto assessments or evaluations, corruption, easy padding of costs, state ready to take up the risks, etc.

“Balanced View”

Is there hope for the future?



- Yes, if there is will:
- Report of the World Commission

on Dams: The report was a result of an exercise in which majority of commissioners were supporters of large projects. This was the first ever an transparent, open, inclusive process to assess the development effectiveness of large dams and it came out with a unanimous report in November 2000. The Report offers a framework for decision making process on Large projects and options.

Particularly in the context of River Basin Planning, it is crucial to understand what Core values are shared

WCD Core Values:

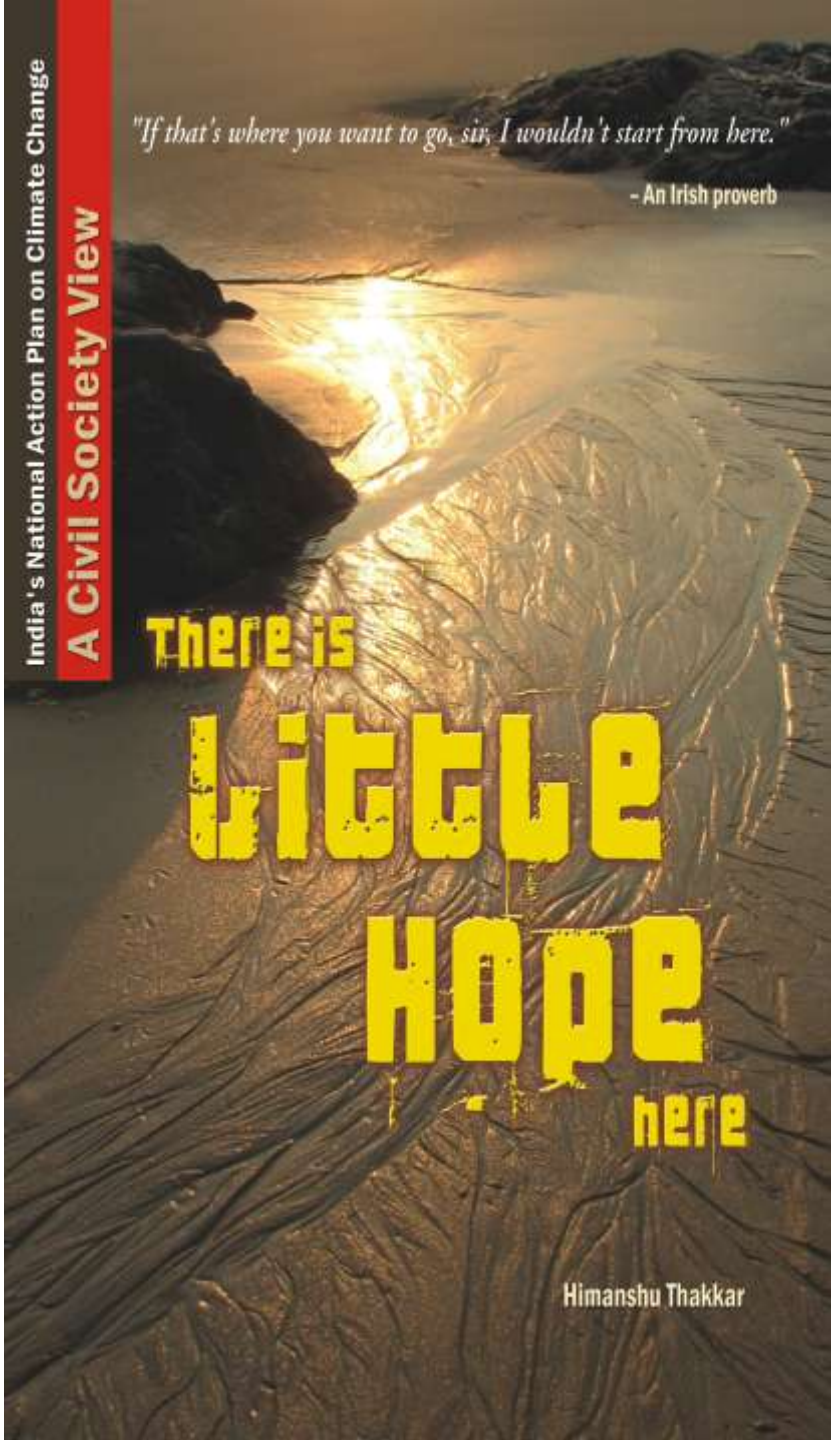
- Equity
- Accountability
- Participatory Decision making
- Sustainability
- Efficiency

Some Key overarching issues

- Gaining Public Acceptance
- Options Assessment
- Existing infrastructure
- Social Impact Assessment
- Recognizing Entitlements, sharing benefits
- Environment Impact Assessment
- Sustaining Rivers, ecosystems
- Ensuring Performance Appraisal: Technical, financial, economic, social and environmental
- Ensuring Compliance

Climate Change, India and NAPCC

- Climate change will worsen India's water and power, floods situation.
- India is more vulnerable to climate change than US, Europe or China
- Within India, poor people, rural population, coastal population, tribal population are most vulnerable.
- India's NAPCC is mostly blind to this reality.
- It has no place for these people in its plans, in missions, in visions or even in its formulation.
- This is not being very smart.



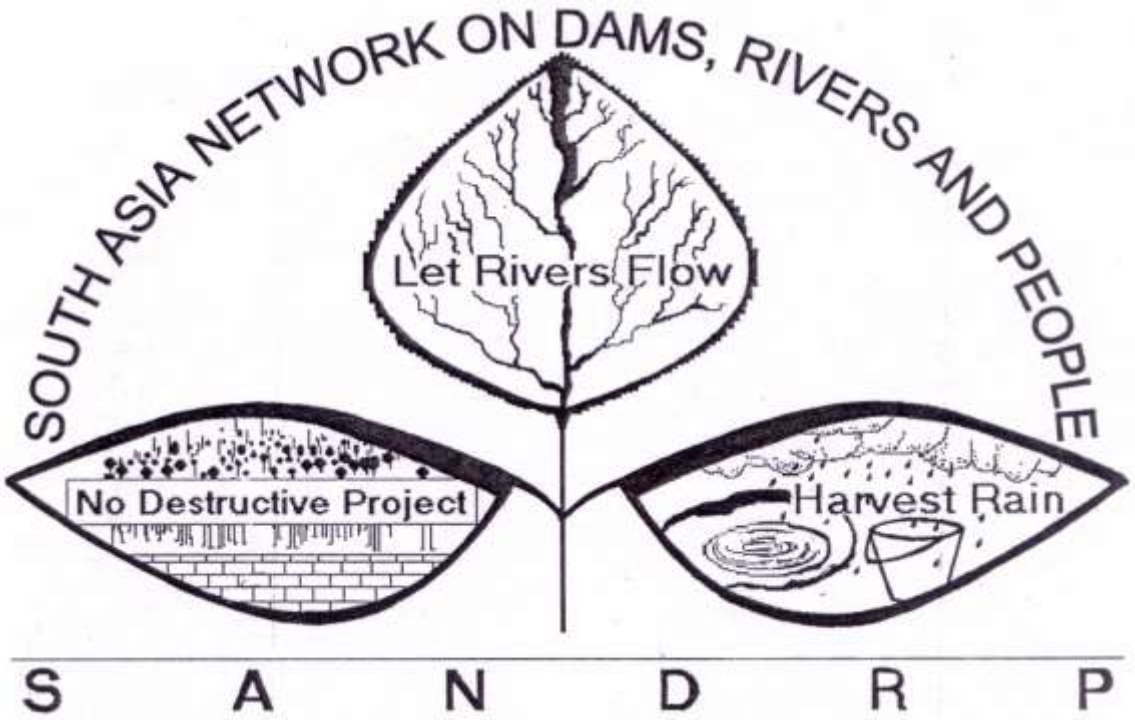
Better Options Exist – Lessons-1

- There are some success stories in India where people and ecosystems are given priority over everything else. Here the improved decision making through multi-stakeholder planning processes on water services have delivered sustainable solutions rather than trade offs
- It is possible to cater to the justifiable demands of the people over large areas spanning over several districts, through hundreds of small projects.
- These projects have much more equitable, sustainable benefits and there could be unexpected spin off benefits, as against unexpected, spin off losses in large projects. (e.g. GW levels go up, sometimes the seasonal rivers become perennial)
- These projects can also help evolution of institutional mechanism for decision making and management.
- These provide real option for people to earn decent livelihood in sustainable way, without brutalising them first, without involving toxic, dehumanising corporate dreams. On the lines of what is making organic cool and chemical uncool.

Better Options Exist – Lessons-2

- Organic farming, with support for carbon build up in soil would help water conservation, soil conservation and also reduce global warming in the process, but there is no support for it. As the World Development Report 2008 shows, GDP growth generated by agriculture is four times more effective in benefiting the poorest half of the population than growth in other sectors, but there is no support for such activities.
- People are striving, fighting for this in different ways. E.g. in Alwar (Rajasthan) and Narmada Valley
- The large stock of created infrastructure and the poor performnace of the same also provides an option to achieve better benefits
- Techniques like the SRI also offer great potential
- An important exception though: In all such success stories, demand is not sacrosanct by itself, unlike it is in the market. This is also indicated by the global warming issues. Only justifiable demand can have a place in a just world.
- There can be many ways for a better future, status quo is not one of them…..
- **Let us end on that hopeful note….**

THANK YOU



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Dialogue on Mainstreaming River Basin Planning: Future of Large dams