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Lead Piece

Polavaram Dam: Open letter to Shri Jairam Ramesh

Why are you bending over backwards to allow this blot on your record?

On September 2, 2010, I sent the following letter to India's Union Minister of State for Environment and Forests (independent charge) Shri Jairam Ramesh, highlighting how his claim that the controversial Polavaram project will not submerge or affect any people Orissa and Chhattisgarh was factually wrong. The letter also highlighted the contradictions in the Environment and Forest clearances to the project given by his ministry, how the impact assessment for the embankments proposed to be constructed in Orissa and Chhattisgarh does not have environment impact assessment, clearance (as recommended by the Expert Appraisal Committee of the Ministry), consent from the affected people or the state governments, among many other issues. Subsequently, on September 26, 2010, a letter was sent to him with resolutions of gram sabhas of six of the affected tribal village in Andhra Pradesh, stating that the Forest Rights of the affected tribals of the villages as required under the Forests Rights Act are yet to be settled and hence the Forest Clearance given to the project o July 28, 2010 is illegal. We have received no response from the minister on either of these letters.

Respected Jairam Ramesh Ji,

I have just seen your letter dated Aug 18, 2010 to Orissa Chief Minister on the above subject, uploaded yesterday on MEF website.

1. Your letter says that the Forest Clearance has been given to the Polavaram Project on July 28, 2010 is subject to the condition, "... no submergence and displacement of people including STs take place in Orissa and Chhattisgarh...". However, this condition is in complete contradiction with the environment clearance given by your ministry on Oct 25, 2005, which says in para 2, "Total 1,93,35 persons are likely to be affected by this project, out of that 1,75,275 persons in Andhra Pradesh and 6,316 persons from Orissa and 11,766 are from Chhattisgarh." It is clear the condition of no submergence and displacement on Orissa and Chhattisgarh, stated in your letter, in the Tribal Development Ministry's condition, and in the forest clearance letter is in complete contradiction with the environment clearance given by you. One of them have to be cancelled due to this contradiction, we would like to know, which one would be cancelled.

2. This condition of no submergence or displacement in Orissa or Chhattisgarh is based on the proposal to construct embankments along the respective rivers in Orissa and Chhattisgarh. However, the proposal to construct these embankments was not part of the project that was given clearance by your ministry on Oct 25, 2005. This change in scope of the project came to light when the project went for CWC clearance (given on 23.01.2009 following flawed *in principle* forest clearance given by your ministry on Dec 26, 2008). Following a letter from MEF, the Govt of AP applied for concurrence of the MEF for building embankments on 29.01.2009. The issue came up for discussion in the meeting of EAC of River Valley committee on Feb 16-17, 2009. Prior to this EAC meeting, we had sent a detailed letter on 13.02.2009 to the EAC, explaining the implications of the proposal, lack of EIA or public consultation process, how this changes the scope of the project and so on, the same is attached.

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It is clear from details of this letter that hundred of ha of land would be required in Orissa & Chhattisgarh for the building of embankments, for mining of materials for embankments, for leaving land on the banks of the river on both sides, for building approach road, for building cross drainage channels and so on. A very large portion of this land would be forest land and it would also imply displacement of the people and their livelihoods. This itself is sufficient ground to show that MOTA condition, Orissa HC condition, your condition and FC condition of no submergence and displacement in Orissa and Chhattisgarh is impossible to adhere to, and this should again be sufficient ground to cancel both the preliminary and final FC given by your minister.

3. After the EAC meeting of Feb 16-17 2009, the EAC decision was, "The EAC therefore directed the project proponent to initiate suitable action requesting the appropriate authorities in Orissa & Chhattisgarh for conducting public hearings in the respective states of Chhattisgarh & Orissa in respect of embankment proposal and report back to the committee." This decision of the EAC implies that the project needs fresh clearance for this component and since project without this component would violate the various legal norms and conditions the project also cannot go ahead without that. However, the project is yet to take these steps and if it were to take these steps it would violate your conditions of no submergence and displacement in Orissa and Chhattisgarh. It is clear that your condition of no submergence and displacement in Orissa and Chhattisgarh is impossible to adhere to and hence the FC of the project has to be cancelled.

4. Here we would like to add that the EAC decision in Feb 16-17 2009 meeting was flawed since it is clear that the proposal to build embankments in Orissa and Chhattisgarh was changing the scope of the project cleared earlier. So EAC should also have asked that the earlier EC be cancelled till this decision is followed.

5. The Forest clearance given by your ministry, incidentally, has a condition, namely no (x), which says, "The project authority shall maintain flow of water in the down-stream course of river equal to the normal flow of water existing in pre-dam condition". I am at a loss to understand if this condition is to be adhered to how can the dam be built or operated at all? It seems there has not been sufficient application of mind while according the final FC dated 28.7.2010, which is sufficient reason for its cancellation.

These objections to the final FC and narration of the contradictions in your letter actually gives an opportunity to revisit the project and look for better options in achieving the irrigation and water supply in project areas. Hope you will take necessary steps in that direction after canceling the flawed Environment clearance of Oct 25, 2005 (which was also quashed by NEAA in Dec 2007) and the forest clearances of Dec 26, 2008 and July 28, 2010.

Letter on Sept 26 2010 Subsequently, on Sept 26, 2010, a second letter was sent to Shri Ramesh, with copies of resolutions of following seven gram sabhas:
1. Village Kotarugommu (Gram Panchayat: Jodiguppa, Mandal: Vara Ramachandra Puram, Division: Bhadrachalam); 2. Village Pochavaram (GP: Tummineru, M: Vara Ramachandra Puram, Division: Bhadrachalam; 3. Village Gommukoyagudem (GP: Gommukottagudem, M: Bhadrachalam, D: Bhadrachalam); 4. Village Pusugudem (GP: Kondrajupeta, M: Kunavaram, D: Bhadrachalam); 5. Village Regulapadu (GP: Regulapadu, M: Kunavaram, D: Bhadrachalam); 6. Village Venkatayapalem (GP: Venkatayapalem, M: Kunavaram, D: Bhadrachalam); 7. Village Mulagala Gudem (Polavaram Mandal, W Godavari district)

All the gram sabha resolutions said that the Forest Rights of these villages to be submerged by the Polavaram dam in Andhra Pradesh has not yet been settled as required under the Forest Rights Act and hence the Forest Clearance given was illegal and must be cancelled. These resolutions of the Gram Sabhas have also been sent to the Forest Advisory Committee (FAC) of the Union Ministry of Environment and Forests. It's based on the recommendations of this committee, set up under the Forest Conservation Act (1980) that the ministry accords forest clearance to the projects.

Attached with this second letter to the minister was a letter from Gramya Resource Centre for Women, dated Sept 20, 2010, addressed to the FAC and it included the first two of the Gram Sabha resolutions listed above. The Gramya President Dr V Rukmini Rao stated in the letter, "These are only indicative of the overall violations in the area. Due to the flood situation in Bhadrachalam region, the communities could not send all their resolutions but are in the process of gathering and forwarding the same to you. The State Government has misrepresented facts and therefore we request you to immediately cancel the permission to go ahead with the Polavaram dam. As in the case of Niyamgiri Hills, we request you to immediately form and send a fact finding committee who can assess the ground situation and report the reality back to the Ministry."

We have not received any response from the ministry to either of these letters, nor have we seen any action by the Ministry in this regard. The MoEF has clearly violated all the norms in according environment & forest clearances to the Polavaram Dam. It is not clear what is the driving the ministry towards these violations.

The letter has evoked quite a lot of interest in Orissa and Andhra Pradesh. The Orissa government has woken up to the reality of how the project will adversely affect the people of the state. But the Orissa and Chhattisgarh state governments have not previously used the various opportunities to raise their voice against the project. Now the Orissa government has also filed a suit against the clearances to the project.

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Revised Cost Clearance for Sardar Sarovar Project

The Pro dam lobby arm twists Planning Commission to take a U turn

The title sounds too juicy. Is that possible in a democracy? Let us look at the facts.

The Planning Commission of Government of India gave investment clearance to the Sardar Sarovar Project in October 1988 for a cost of Rs 6406 crore at 1986-87 prices. The project is still far from complete. The Project applied for over six fold increase in cost of the project earlier this year. This is a narration of what happened to that application in Planning Commission.

But such small issues won't deter the *big people* from going ahead with *big decisions*. So the advisory committee on Water Resources "accepted the proposal." It is clear from the available records that there was little application of mind on the part of either the Central Water Commission or the Union Ministry of Water Resources or any members of the advisory committee before approving a 500% increase in Sardar Sarovar project cost.

However, let us see what happened at Central Water Commission/ Union Ministry of Water Resources before that in March 2010.

Water Resources Ministry and CWC So on 11 March 2010, when the application for revised cost approval came before the 103rd meeting of the Advisory Committee on Irrigation Flood Control and Multi Purpose projects, the note prepared by the Project Appraisal Organisation of the Central Water Commission claimed the Benefit Cost ratio for India's most controversial large dam was 1.63 even at the revised cost of Rs 39240.45 crores (2008-09 price level). Acting more like a lobby for big dams, the Central Water Commission did not raise any uncomfortable or critical questions about the claims of the Gujarat Government. At the meeting, in response to some questions by the chairman (who is also secretary, Union Ministry of Water Resources), the project authorities gave some factually wrong information. For example, as per the summary record of discussions (all information in this article is obtained under RTI) of the meeting, the project authorities said that among the reasons for delay was, "Besides, stay order from the Supreme Court in May 1995 till Oct 2000 halted physical progress of works although, dam height of 110 m was already attained by May 1995." Now it is a matter of fact that the dam reached the level of 110 m only in June 2004 and in May 1995 when the stay was given, this author was in the Supreme Court chamber and the dam height then was 80 m. But for SSP authorities, the CWC and the Union Ministry of Water Resources, *Kuch bhi chalata hai* (anything goes).

The summary record of the meeting accepts that the Command Area Development plan is yet to be approved. Incidentally, that plan was supposed to be completed by 1989. The summary record also notes the claim of the project authority that the project will be completed by March 2014, even though the attached data sheet mentioned the schedule stretching to 2016-17. About Benefit cost ratio calculations, there were many issues. The manipulations done by the project authorities were apparent.

For example, the document was completely silent on the issue of cost of debt the project authority has incurred and will have to incur, it was also completely silent about the CAG reports that showed that the project had diverted, mis-managed the funds and there were also big issues about corruption and poor quality of the work done so far. The project authorities also did not find it fit to explain as to why the canal network was delayed so much, when neither the court stay order nor the agitation against the project stopped them from building the canal network. But such small issues won't deter the *big people* from going ahead with *big decisions*. So the advisory committee "accepted the proposal." It is clear from the available records that there was little application of mind on the part of either the Central Water Commission or the Union Ministry of Water Resources or any members of the advisory committee before approving a 500% increase in project cost.

The ball then went to the court of Planning Commission through a letter from the Ministry of Water Resources on March 19, 2010. The brief chronology of events in the Planning Commission in this regard is as follows:

- *March 22 2010* PC asks about status of compliance of earlier PC clearance and about R&R.
- *March 24 2010* GOG replies, which is found unsatisfactory by PC.
- *April 7, 2010* A letter goes from PC to Gujarat government raising a series of 19 questions.
- *April 27 2010* The note in the Planning Commission file shows that the answers of GOG are not satisfactory.
- *May 10, 2010* Member (Water Resources), Planning Commission writes following note in the file:

"There are three issues with the SSP:

1. **Environment Compliance**
2. **R&R Compliance**
3. **Command Area Development**

On the first, the MoEF has set up a High Level Advisory Committee on 28th April 2010 for ascertaining *pari passu* compliance.

On the second, the Union Minister of State for Water Resources stated in the written reply in the Rajya

Sabha on 6th My that approval from the R&R sub group of the NCA is yet to be obtained.

On the third issue which is of primary concern to the Planning Commission, while providing investment clearance, it has to be emphasised that by all accounts the progress has not been satisfactory and business as usual will not work. A major change is required. I would suggest the GOG set up an Expert Group for advice on how best a PIM approach could be adopted in the SSP Command to improve farmers' access to water and water use efficiency."

"In view of the recent damaging observations of the CAG in its report tabled in the Gujarat assembly on 30th March 2010 (which suggests that only 18.64% of CCA has been developed and that utilised CCA is only 6.56% of envisaged CCA, it is imperative that a considered view be taken on the way forward and a wide range of experts be consulted on how performance can be radically improved.

The GOG should submit the report of the expert group to the Planning Commission By then the first interim report of the YK Alagh Committee on environment compliance set up by the MoEF should also become available and the clearance by the R&R subgroup of NCA obtained."

- *May 13, 2010* A letter is drafted for GOG following the above note.
- *May 17, 2010* Member (WR) suggests changes in the draft mentioned above and puts a note on the file:" Please note changes I have made in the draft. I just saw CM's letter to DCH. He may be apprised of our view."

Thus a draft of the letter from Planning Commission to GoG was prepared stating that the Planning Commission will be guided by the report of the High Level Advisory Committee, the report of the NCA R&R sub-group and the report of the expert committee as suggested above, before according investment clearance for SSP's revised cost. This did not seem to address all the outstanding issues on SSP, nor was it particularly radical, but it was at least attempting to find a middle ground as a way forward.

But this was clearly unacceptable to the pro dam lobby.

The events moved fast between May 17 and May 20, 2010 and on May 20, the Planning Commission issued the investment clearance without following the steps suggested by the Member (WR) as noted above. The recommendations of the Member (WR) were clearly brushed aside to push ahead with the project. Mr Avinash Mishra, Deputy Advisor (WR) in the Planning Commission, who signed the May 20 clearance letter joked how they took a U turn.

So what happened between May 17 and May 20, 2010? Superficially, a letter from Gujarat Chief Minister to the Prime Minister dated May 1, 2010, urging the PM to expedite the Planning Commission investment clearance for SSP was forwarded to the PC on May 12, 2010. That letter gets mentioned in the May 17, 2010 noting by Member (WR). Very interestingly, the next noting on the file is from MS Ahluwalia, Deputy Chairman, Planning Commission dated May 20, 2010, which reads: "Discussed the issue with Member (WR) and Member Secretary today. Draft Investment Clearance is put up for approval." The same day, the investment clearance for over six fold higher cost of SSP was issued by the Planning Commission, brushing aside the more reasonable approach suggested by Member (Water Resources) Shri Mihir Shah.

But the file notings give only ostensible picture. It is clear that the lobby in favour of the project was working behind the scenes to scuttle the moves that Member (WR), Planning Commission was suggesting. What, how, who and when of these events are unknowns and only one of the players involved in these events can unearth further truth. The only other possibility is that the Prime Minister and the deputy chairman of Planning Commission took the decision to bypass the recommendation of more reasonable, though not the most radical appropriate option available in the situation, suggested by Member (WR). That however, raises even more disturbing questions. Are the Prime Minister and the Deputy Chairman of Planning Commission part of the big dam lobby?

The sad reality is that such lobby is so easily able to brush aside suggestion for slightly objective consideration even for a Rs 40 000 crore decision.

When we released this note, Medha Patkar of Narmada Bachao Andolan sent a prompt response, which also said:

Your Note may also include the fact that while the clearance to the SSP was only for Rs. 6406 crores (until 2010), GoG had spent upto Rs. 30,000 crores (illegally), without any approval of the revised costs.

The cost of the dam as on 2007, as estimated by the Working Group on Water Resources of the XI Plan of Planning Commission is Rs. 45,000 crores, while the same may shoot upto 70,000 crores by 2010.

It is more than obvious that even the Ministry of Water Resources did not, but should have included the agenda to review the Benefit-Cost ration. Pointing out such large scale unaccountability on the usage of public funds and multiplication of costs, such a need for review was also indicated by the Comptroller and Auditor General (In 2004).

The issue is not just about ruling out Mihir Shah's suggestion, but the Planning Commission making such a shocking U-Turn neither to review the SSP from the angle of economic viability nor even take any action against such 6-time increased in spending without approval.

More questions, but where are the answers?

Himanshu Thakkar

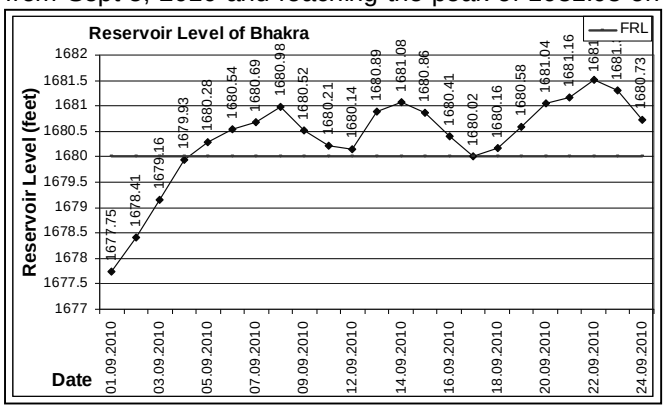
Bhakra reservoir is being operated in casual, adhoc manner?

Need for clearly defined norms of accountability in reservoir operations

There is urgent need for publicly known norms of transparency and accountability in operation of reservoirs that are like time bombs that can explode multiple times. Bhakra exploded in 1988, Ukai in Gujarat did in Aug 2006, Hirakud did in Sept 2008, Srisailam, Tungabhadra, Upper Krishna and Damodar dams did in Sept 2009. The wrong operation of Bhakra, Pong and Tehri reservoirs in 2010 lead to avoidable floods in the downstream areas.

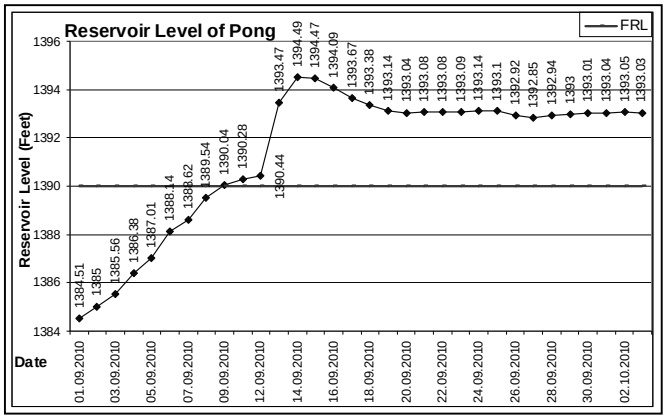
India's most celebrated dam, the Bhakra (also known as Gobind Sagar), seems to be operated in an ad hoc, casual manner, bringing to risk large number of people, their livelihood and also the water availability in the areas served by the dam. The latest instance in this regard happened in Sept 2010 when, because of such casual operation, the dam wall experienced a tilt or deflection beyond the safe limits as accepted by a senior official of the Bhakra Beas Management Board which is in charge of managing the Bhakra, Pong, Pandoh dams and related infrastructure. This seemed like a rerun of the catastrophic events of 1988 when disastrous floods ultimately led to unfortunate killing of the BBMB chairman.

Like in 1988 case, this year, BBMB allowed the level of Bhakra dam to go beyond the declared Full Reservoir Level of 1680 feet (as mentioned on the BBMB website http://bbmb.gov.in/english/menu2.asp and in the CWC weekly updates, see the latest one at: http://www.cwc.gov.in/bulletin(2).pdf, both clearly state that FRL of Bhakra is 512.06 m or 1680 ft), starting from Sept 5, 2010 and reaching the peak of 1681.08 on



Sept 14, 1681.51 ft on Sept 22, 2010. By then BBMB realised that the dam was showing a tilt of 1.07 inches, exceeding what is reported as safe deflection limit of 1.03 inches. After Sept 14, the reservoir level has seen a decline to 1680.41 feet on Sept 16 (the latest date for which the level is available), still above the declared FRL, see the graph below. It may be noted that the Bhakra filling period is supposed to be till Sept 20. Why was the reservoir allowed to fill upto FRL by Sept 5, over two weeks before the end of filing period and why was it allowed to fill beyond FRL, till the dam started showing tilt beyond the safe limit are very important questions, but have no clear answers.

Here it may be added that parts of Rajasthan that gets water from the BBMB systems have seen below normal sowing in this kharif due to lack of adequate water releases from Punjab, so much so that Punjab CM had to recently call a meeting with the BJP leaders of Rajasthan to ensure them that adequate



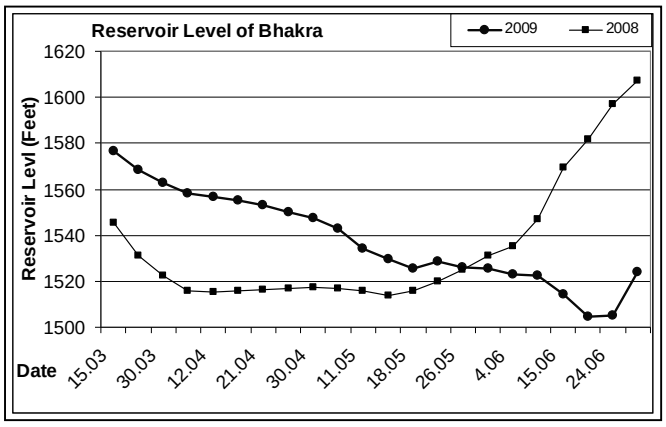
water will be released. So we have a disturbing situation where on the one hand the areas that were supposed to get water are not getting them and the dams that are supposed to supply the water are getting filled up beyond FRL before the due date, see the graph below for the Pong dam levels. In case of Pong dam, the BBMB is also guilty of underperformance of power generation in August 2010, when 33.46 Million Units power was produced when in a relatively drought conditions in the same month last year, the dam generated more than double that amount at 68.46 MU. In Sept 2010, BBMB was forced to release water from the dam without power generation. There is clearly a lot that BBMB officials have to answer for.

In 1988 too the dam level went beyond 1680 feet, then the dam showed tilt beyond safe limits, there was sudden release of 1.45 lakh cusecs when simultaneously, there were also releases from Pong and also there were heavy rains in the downstream areas, leading to unprecedented flood disaster in Punjab. It was possibly the events of 1988 that led BBMB to reduce the FRL of Bhakra from design FRL of 1685 to the reduced level of 1680, but BBMB needs to explain what the reasons for this change were in the first place. If the

reason was the safety of the dam structure, than going beyond the safe level this year would certainly be considered shocking event.

One hint as to why did BBMB decided to fill Bhakra beyond FRL of 1680 feet and Pong dam on Beas river beyond the declared FRL of 1390 feet is provided by the recent press statements from the All-India Power Engineers Federation, which has been urging BBMB to raise the level of water in Bhakra and Pong dams beyond the declared FRL of 1680 and 1390 feet respectively. However, the BBMB is supposed to be managing vital installations that have serious consequences for the safety and security of lakhs of people and can it be allowed to take such decisions in ad hoc, casual way. It is high time that we have clearly defined norms as to how the reservoirs would be operated and who will be responsible for the decisions taken in such matters, and how accountability will be fixed when wrong decisions are taken. The first step in that direction would be to have transparent sharing of information about such decisions on daily basis. This becomes even more imperative in the climate change scene when the rainfall pattern is changing with increased frequency of high intensity rainfall.

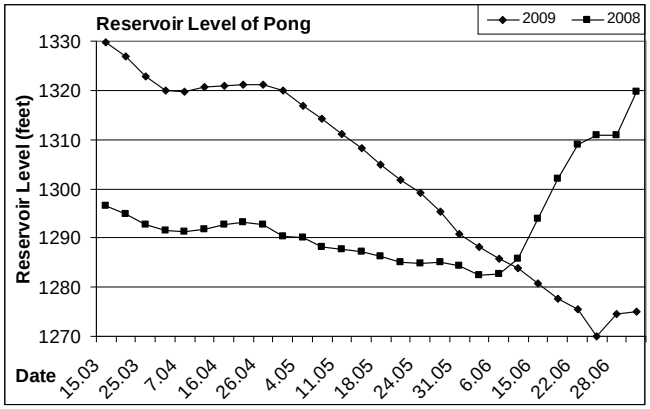
This is not the first time BBMB has been guilty of improper operation of reservoirs. Between March 15 and June 21, 2009, when there is minimum agricultural activity and water use demand for agriculture is least, level of water in Bhakra dam was allowed to be depleted from 480.61 m to 458.62 m, when actually the dam level should have gone up due to the flows from glacier melt starting from May 20. During the same period in the previous year (2008), the water level in Bhakra had gone up from 471.11 m to 482.13 m, see below the comparative graphs for Bhakra and Pong reservoir level during this period in 2008 and 2009.



The fall in Bhakra level in the summer of 2009 (the Pong and Ranjit Sagar reservoirs also showed similar trend in those months) then lead to a situation during monsoon in 2009 when there was serious rainfall deficit of upto 46% in North West India and farmers needed water from Bhakra acutely, but BBMB said it did not have water then. Why was the Bhakra level allowed to deplete in summer of 2009 when it should have increased? There are no plausible or official answers. One possible reason is that the period saw the national elections and the governments wanted maximum power generation during that period to give a sense of power sufficiency in the region. This was indeed a repeat of what happened also in the summer of 2004. But no questions were asked to BBMB officials, nor did BBMB feel obliged to answer any.

One of the reasons why Bhakra and Pong got filled up before the due date this year is that the dams are getting silted up at a rapid rate. One of the major contributions of the silt is coming from the large number of under construction hydropower projects in the upstream Himachal Pradesh.

Each of those major projects is supposed to generate, as per their EIAs, several million cubic meters of muck. The developers there are supposed to have muck disposal plans, but the developers find it easiest and cheapest to dump the muck into the rivers, which ends up the downstream reservoirs. Neither the Pollution Control Board, nor the state or central environment ministries have the will or the capacity to monitor these rampant and well known violations. But one expected BBMB to be concerned about this. It seems even they are also not.



All this goes to show the urgent need for publicly known norms of transparency and accountability in operation of reservoirs that are like time bombs that can explode multiple times. Bhakra exploded in 1988, Ukai in Gujarat did in Aug 2006, Hirakud did in Sept 2008, Srisailam, Tungabhadra, Upper Krishna and Damodar dams did in Sept 2009. The wrong operation of Bhakra, Pong and Tehri reservoirs in 2010 lead to avoidable floods in the downstream areas. No senior engineer has ever been punished by the government in past for wrong operation of dams. It seems we may have many more such disasters in store in future.

Himanshu Thakkar (SANDRP),
Endorsed by: Umendra Dutt (Kheti Virasat, Punjab),
Shripad Dharmadhimary (Manthan Adhyayan Kendra (Pune)

CWC is abdicating its responsibility on Kosi disaster
Kosi Enquiry Commission must persist with CWC to find the truth

The Central Water Commission (CWC) sent its response to the Kosi Bandh Katan Judicial Enquiry Commission, through Letter No 7/2/2/2009-FM.II/427 dated 04.12.2009, authored by C P Singh, Director FM-II, issued "with the approval of Chairman, CWC" as the letter says.

This is our comments sent to the Kosi Enquiry Commission (KEC), in response to KEC notice dated March 4, 2010 on the KEC website (http://kosi-aayog.bih.nic.in/).

The CWC does not say that the breach did not happen due to negligence, so it indirectly agrees that the breach indeed happened due to negligence, but it does not name any individual, institution or government officials.

The 7 page letter from CWC firstly responds to the Terms of Reference of the Enquiry Commission.

1. The first TOR includes, "whether there was any negligence by any individual, institution, government officials in preventing the breach in "Eastern afflux bund" in August 2008, causing change of course of river Kosi…"

As one can see from response of CWC posted on the KEC website mentioned above, CWC refuses to answer this question at all. It does not say that the breach did not happen due to negligence, so it indirectly agrees that the breach indeed happened due to negligence, but it does not name any individual, institution or government officials. India's apex water resources institution needs to clearly respond to such an important issue, particularly when responding to a judicial enquiry commission.

The CWC, senior officials of which were directly involved in the work of sanctioning, monitoring, certifying and ascertaining the completion of the Kosi embankment related works, should have clearly stated A. if the work was completed before the onset of the 2008 monsoon and B. if the recommendations of the field engineers (which were hugely diluted first by the Kosi High Level Committee and then by its sub committee) were accepted for implementation, could the breach have been prevented?

2. Second TOR of the Kosi Enquiry Commission says, "whether anti erosion work on embankment of Kosi particularly Eastern bund was completed by the concerned officials of Govt of Bihar, before on-set of Monsoon season 2008 and whether the recommendation made by the field Engineers of the State Government of Bihar for undertaking major restoration works on being accepted by Kosi High Level Committee could have prevented the breach in Eastern Afflux Bund."

This is a very important TOR. The apex water resources agency of India, senior officials of which were directly involved in the work of sanctioning, monitoring, certifying and ascertaining the completion of the above mentioned works, should have clearly stated A. if the work was completed before the onset of the 2008 monsoon and B. if the recommendations of the field engineers (which were hugely diluted first by the Kosi High Level Committee and then by its sub committee) were accepted for implementation, could the breach have been prevented?

These questions are not only important for knowing the truth about the reasons behind the breach but also important to make necessary amends in the monitoring, sanctioning, implementing and certifying mechanisms. But CWC has refused to answer these crucial questions, as can be seen from the CWC response. We request CWC to kindly answer these questions.

By not answering these questions, either CWC is trying to hide something or to protect someone, or is unable to find answers to these questions, posed by no less than a government appointed judicial commission. In either case, Indian water resources development is in serious crisis.

3. The third TOR of the Kosi Enquiry commission asks, "whether any follow up action was taken by Government of Bihar during the period 1990 till 2005 for strengthening of Spur, Bund, Dams and reservoirs commissioned in the year 1963…"

The response of the CWC is that "No information in this regard is available with CWC". This is quite shocking response. So the Central Water Commission, India's apex water resources organisation, senior officials of which organisation are also involved in monitoring, sanctioning and certifying the flood management works particularly in the Nepal portion of the Kosi project, which were the issue in question, says that it has no information about the actions taken by the Bihar government! This clearly is a self certification of inaptitude on such crucial issue. We would request CWC to kindly withdraw this answer and give full picture of works as requested by the TOR of the Enquiry Commission for the sake of lakhs of people

whose life is at stake when the works that CWC is in charge of in various capacities hold or fail. It should be added here that the Member (River Management) of Central Water Commission is supposed to be an ex officio member of the Kosi High Level Committee and CWC cannot feign ignorance about the works on Kosi project in Nepal being sanctioned, monitored and certified year after year. Incidentally, the Member (RM) of CWC was not a member of KHLC in his personal capacity, but was on KHLC on behalf of CWC.

The second part of the CWC answer here, that Bihar government executes the Kosi project related work in Bihar "as per its priority and availability of funds" is misleading. As later pointed out by Bihar government officials in their response, since all the works regarding Kosi project in Nepal are funded by the Govt of India. Thus the question of availability of funds and priority do not arise.

The Member (River Management) and Chief Engineer (Lower Ganga Basin) of CWC are members of the GFCC and thus CWC is very much responsible for what action and inactions GFCC has done in this regard. It should also be remembered that most of the high level officers of CWC have all been involved in the work of the GFCC. For example, current chairman of CWC Shri AK Bajaj was chairman of GFCC in mid 2007. Later on, Shri RC Jha, the current member (RM) of CWC was chairman of GFCC. Thus both Shri Bajaj and Shri Jha have worked as GFCC chair during the period of neglect of the Kosi embankment that led to its breach in Aug 2008. Under the circumstances, CWC cannot get away by giving a misleading answer that GFCC is not responsible to CWC.

4. The fourth TOR of the Enquiry commission asks, "whether due to change in morphology of river Kosi in the year 1979, due to occurrence of massive landslide inducing Eastward slide of the course, was adequately taken care of for of damages in future and whether the agency responsible for preparing flood proofing schemes took precautionary measures after satellite imagery showed that river Kosi flowing very close to the eastern afflux band."

CWC answer that it has no information about this is again quite disturbing and we would request CWC to let the enquiry commission to know if it was at all aware about the landslide of 1979, the satellite imagery subsequently and the implications thereof.

The response of the CWC here is even more shocking. The CWC says that the 1954 document is not available! Nor does CWC respond to the specific questions asked, about life of embankment and so on, even though it has access to all the documents since 1954 to till date.

5. The crucial fifth TOR of the Enquiry commission reads like this: whether High Level Kosi committee constituted in the year 1978 1. made recommendation for restoration of spurs, construction of studs, edge cutting works, etc and 2. whether the recommendations of the Kosi High Level Committee were cleared by the Govt of India and 3. implemented by Govt of Bihar and 4. whether the recommendation made by Kosi high Level Committee was adequate to prevent the breach of the eastern afflux bund. (The numbers 1, 2, 3 and 4 added to break the question into four parts).

As can be seen, there are four sub parts to this question and one had expected CWC to throw light on each of these since its officials were involved in the issues in each sub part. But as can be seen from the attached CWC response, CWC refuses to respond to any of issues raised. Such non response does not inspire any confidence in this agency whose senior officials are involved at each stage of these issues on behalf of CWC. We request the CWC to respond to these issues and also request the Enquiry Commission not to accept such non responses and ask CWC to respond in detail to each question.

6. The sixth TOR of the Kosi Enquiry Commission is asking if the life of the embankment was 25 years as per the original 1954 project document and what other components were to be done as per the document, including soil and water conservation works in the upstream and if they were implemented.

The response of the CWC here is even more shocking. The CWC says that the 1954 document is not available! Nor does CWC respond to the specific questions asked, about life of embankment and so on, even though it has access to all the documents since 1954 to till date. Being an apex technical body on water resources in India, it is supposed to know these things in any case. We request CWC to kindly respond to the questions in earnest.

7. In response to SANDRP (South Asia Network on Dams, Rivers & People) submission (made to Kosi Enquiry Commission in March 2009 (the same is available on www.sandrp.in and Documents section of http://kosi-aayog.bih.nic.in/), CWC has given a narration of various reports suggesting how the 207 recommendations of the Rashtriya Barh Ayog report of 1980 have not been implemented over the years. The trouble is, CWC is equally responsible for this state of affairs and it has never shown the requisite enthusiasm or commitment to implement the RBA recommendations. Why has CWC not made it

conditional on the states to implement some of the important of the RBA recommendations while it sanctions the flood management projects? CWC cannot say that it is putting no conditions to states in such matters, flood management being a state subject. The funding and sanctioning of flood management projects by CWC are dependent on following certain norms set by CWC in any case. So why the CWC is not putting the condition to the States that it must follow the main RBA recommendations?

8. On the issue of implementation of the catchment area works in the catchment of the Kosi project highlighted in the SANDRP submission, the answer of the CWC is a non answer once again. What has CWC (and MWR) done to ensure that the catchment area treatment works are indeed implemented?

9. The response of the CWC that the paper presented by the CWC officers at the 1st Disaster management congress (quoted in SANDRP submission to Kosi Enquiry Commission in March 2009) on the situation at Kosi project is personal opinion of the officers is completely misleading. The SANDRP representation did not talk about the opinions, but about the facts about serious situation prevailing at the Kosi project as mentioned in the paper by the CWC officers and what did CWC do about it that situation.

The specific issue that SANDRP submission raised was: "In a paper titled "Kosi - A Review of Flood Genesis and Attempts to Solve this Problem" by officials of Central Water Commission AK Jha and DP Mathania (then posted at the Joint Project Office for the Kosi Project in Biratnagar, Nepal), it is stated, "But, this engineering approach has proved to be far too insufficient in its objectives as at present the pond of the barrage at Hanumannagar is almost full of sediments. Soon the embankments would be ineffective to control the Kosi floods. It would thus be naïve to embark upon finding of this menace through structural measures…". This and other documents indicate that the officials in the government agencies at Patna and Delhi knew that the pond of the Kosi barrage was already full of sediments in 2006 and in fact much earlier. The question that needs to be posed to the officials at the CWC, Union Ministry of Water Resources, GFCC and Bihar WRD is, What had they done to address this problem and also what steps they had taken to ensure that this sedimentation does not lead to the disasters like the one Bihar witnessed in Aug 2008?"

By not answering these questions, the CWC has again tried to escape its responsibility & that cannot be accepted. We urge CWC to answer the issues on facts.

This analysis highlights that CWC response to Kosi Enquiry Commission is far from adequate, is refusing to answer specific questions, it is providing misleading answers to many questions, it seems to be hiding some uncomfortable truths or protecting some persons. This will not help the cause of truth that the Kosi Enquiry Commission is supposed to unearth.

10. On the issue of responsibility of GFCC (Ganga Flood Control Commission, a body under Union Ministry of Water Resources), the response of CWC to the SANDRP submission should have stated that the Member (River Management) and Chief Engineer (Lower Ganga Basin) of CWC are members of the GFCC and thus CWC is very much responsible for what action and inactions GFCC has done in this regard. It should also be remembered that most of the high level officers of CWC have all been involved in the work of the GFCC. For example, current chairman of CWC Shri AK Bajaj was chairman of GFCC in mid 2007. Later on, Shri RC Jha, the current member (RM) of CWC was chairman of GFCC. Thus both Shri Bajaj and Shri Jha have worked as GFCC chair during the period of neglect of the Kosi embankment that led to its breach in Aug 2008. Under the circumstances, CWC cannot get away by giving a misleading answer that GFCC is not responsible to CWC.

Most importantly, CWC is abdicating its responsibility by such responses. We request CWC to kindly revisit this submission and give clear and factual answers to the questions asked. We also request Kosi Enquiry Commission to persist with CWC and ask them to respond to the issues again and not accept non answers from CWC.

This analysis highlights that CWC response to Kosi Enquiry Commission is far from adequate, is refusing to answer specific questions, it is providing misleading answers to many questions, it seems to be hiding some uncomfortable truths or protecting some persons. This will not help the cause of truth that the Kosi Enquiry Commission is supposed to unearth, nor will it help the cause of the people who have suffered the impacts of the man made Kosi disaster of Aug 2008 or others who are risk due to the mismanaged works where CWC has such an important role. Most importantly, CWC is abdicating its responsibility by such responses. We request CWC to kindly revisit this submission and give clear and factual answers to the questions asked. We also request Kosi Enquiry Commission to persist with CWC and ask them to respond to the issues again and not accept non answers from CWC.

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Urban Local initiatives and government responses: A case of Dev Nadi in Pune

Most rivers and streams in urban India are dead or on the verge of collapse. With a very few and rare exceptions, these once-beautiful water bodies have been encroached upon, sources dried up or converted into sewage drains all over the country. Water is being sourced or pumped from sites upstream of the city for its needs or from long distances and the city administration has little incentive for cleaning its own muck. The dismal figures of urban sewage treated by sewage treatment plants, their installed capacity and efficiency stand testimony to this. In many cases like Pune, Pollution Control Board has filed cases against the Pune Municipal Corporation (PMC) for not treating city sewage and polluting the water bodies. The Pollution Control Board in turn, does not have a single success story of curtailing river pollution from municipal or industrial sources or restoring a polluted river to its unpolluted state.

Thus Cities have classically 'turned their backs' on their own rivers and streams (Nallahs). Property prices next to rivers and nallahs are relatively low, but still attractive enough for the urban decision makers. At the same time, most of the authorised/ unauthorised slums are located on the banks of these polluted and stinking waterways. Urban disconnect with water sources is also increasing, with dams tapping water sources and degrading rivers farther and farther from the city. Delhi now wants to get water from the Renuka Dam, 315 kilometres from the Capital at the price of 3900 crores, its current sources include Bhakra dam, Tehri dam and Hathnikund barrage. Pune, after exhausting four dams (Khadakwasala, Panshet, Warasgaon, Temghar), now plans to get water from Bhama Askhed Dam, which was originally planned for irrigation, laying a 50 kilometres pipeline at Rs 100 crores; Bangalore gets 80% of its water from Cauvery from a distance of 100 kilometres from the city. Sources of water from the cities like lakes and streams, which once supplied water, are now relegated as sewage drains. Water now is seen coming solely from the tap.

In such a scenario, initiatives taken by citizen groups to protect and restore their streams should be a welcome and remarkable change, worth high lightning. But, in the city of Pune, something very different is happening.

Pune receives around 165 lpcd (litres per capita per day) water through four dams constructed in the upstream of the city. Sewage generated is about 451 MLD (Million Litres per Day), of which around 60% is claimed to be treated. The city has received funds from the Jawarharlal Nehru National Urban Renewal Mission for 'River Restoration and Storm water treatment'. Of this amount, about 200 Crores has been earmarked for stream/ nallah restoration. Interesting to note here is the fact that Pune does not have a separate storm water drainage system and all the natural streams in the city are considered to be storm water drains creating a fuzzy picture. When the reports mention 'desilting and strengthening of primary drains in the city', they may as well mean channelization of natural streams. Funds from Asian Development Bank are also being used for channelization and 'beautification' of rivers and streams in Pune.

Pune lies in the watershed of Mula-Mutha Rivers, with numerous small streams and rivulets meeting these rivers. One such rivulet is Dev Nadi in Baner, which flows for a mere 20 km, before meeting the Mula River. Source region of the Dev Nadi lies at the foot of the NDA hill Complex and is the roosting site of Black Ibis, a bird species. In a sudden spurt of development in the late nineties, the Baner-Pashan area of Pune saw huge residential complexes coming up in an area which was originally a scrub forest and grassland. Rich wildlife was now contained along the banks of streams and rivulets like the Dev Nadi.

The Concord Proxima housing society is one such complex situated right next to Dev Nadi. It houses about 100 residents. In Concord Proxima, under the leadership of Dr. Anupam Saraph, the first Chief Information Officer of Pune, residents make it a point to work along their rivulet on Saturdays, planting trees, weeding and making the small stream bank a vibrant community interaction hub. It also acts as a fun environment education site, with children learning about their water, trees, birds and amphibians in their backyard.

In November 2009, Magsaysay Award winner Shri Rajendra Singh visited the site and praised these community efforts. He advised the community to set up small check dams/ bunds in the rivulet to slow down the flow and facilitate groundwater percolation. This is important as Baner area has been facing water shortage and water supply through tankers is common. The residents, through *Shramadan*, did actually set up a small check dam on the river and have been managing and repairing it for the past year. They had to follow up intensively with the Municipal Corporation to help them with tree plantation along the rivulet to set up a small 'Dev Rai' or Sacred Grove. The area now has about 1200 native trees, specifically suited for river banks.

It was a rude shock for them to learn that the PMC, under the JNNURM program plans to (and has started) channelize the entire stretch of Dev Nadi. This means that the naturally undulating rivulet will be converted into a drain, and also totally eaten up by pipes, with a road above it, at stretches. This means that the efforts of the community of setting up a bund, tree plantation, and acquired environment awareness will be totally lost.

Before turning this into a community-PMC issue, we have to understand whether 'Channelization' is actually a panacea for any problem. Channelization involves dredging and straightening of the channel and then reinforcing it with concrete, converting a living stream into a drain. Channelization acts to force as much water as possible away from an area in a short period of time and hence is a preferred option of engineers. It incidentally also involves a lot of construction work.

In the process, channelization:

1. Cuts the longitudinal connectivity of the water body with its floodplains, leading to water logging in some areas and falling groundwater tables in other areas.
2. It increases the velocity and 'scour' of the water, leading to increased erosion, sedimentation as well as flooding downstream.
3. It opens up river bank area, which is protected under the Pune Development Plan, which is very conveniently used by huge residential complexes as well as slums.
4. It affects and prohibits natural purification of water through the riparian area, which is now estimated to be of a great economic value
5. It totally destroys the natural habitat and therefore the biodiversity along the stream
6. Riparian flood plains act as natural reservoirs of flood waters, containing them considerably and then releasing it gradually back into the stream. Channelization negates this.
7. Dissolved Oxygen (DO) stress is common in channelized sections and if all the streams of the city as well as the river are channelized DO can reduce significantly.

All in all, channelization, though seen as convenient and lucrative to the engineers, is detrimental to the water body and can actually compound problems in the longer run.

Despite this, channelization can be one of the many options for storm water drainage in a heavily populated area, with existing slum population and a highly polluted/ unsteady stream. This is not the case with Dev Nadi which is still a relatively pristine, minimally polluted stretch of river. Interesting to note also that many buildings along the rivulet have been constructed right next to the water channel, without leaving the mandatory 10 meters stretch on both sides. Channelization would be good for them and other such law breakers. So whose interest is the Municipal Corporation trying to protect? A sustainable community initiative's or that of the emerging land sharks?

The community, deeply perturbed by this decision, held an Area Sabha in the location on the 29th August, 2010. Along with the residents of the Concord Proxima and Gera Emerald, a number of citizens, environmental experts, students, reporters, etc., attended this Sabha. Some of the resolutions passed were:

The budget of Rs 200 Crores for Pune's streams, starting with Dev Nadi, should be used to:

1. Build check dams with a gabling along 100 meters of the stream to implement 'Stop the Water, Increase percolation of water ' Program
2. Build a wall (or a fence), ten meters from the channel of the rivulet to demarcate 'River Protection Zones' and protect the rivulet
3. Check the leaks of the sewers along the streams/ rivulets
4. Plant trees with advice of groups working on these streams, to ensure that they become perennial
5. The government should participate in peoples' programs. Over ten groups are working on streams and water bodies in Pune, they should not only be consulted, but also involved in all interventions of the water bodies in Pune along with residents of the local areas
6. All capital projects undertaken in any area, should be referred and undertaken with the advice of Area Sabhas before tendering
7. The PMC should ensure water delivery for all these areas for at least four hours, with full pressure.

It is unfortunate to witness that Municipal Corporations are more than eager to work on 'capital intensive' projects, while neglecting the severe problems caused by encroachments. Let us hope against hope that this very rare endeavour of city dwellers trying to reconnect with their lifelines will not be sabotaged, but will grow and blossom, becoming an inspiration for many such initiatives.

The Additional City Engineer, Water Supply, after visiting the area has promised on September 17, 2010 to 'consider' this initiative, also stating that getting rid of encroachments (no slums, all plush apartment complexes) on the *Nallah* side will be not be possible, if they have been passed by the PMC. So instead of taking a firm stand against these permissions, PMC will turn a Nelson's eye towards constructions that are next to the *nallah*, and accept them as *fait accompli*, maybe leaving small stretches in natural condition, as a compensation for such initiatives. Actually such marginalised natural stretches can face faster degradation and erosion as the velocity and scour of water coming from the channel is very high. It was stated that the main aim of PMC is to increase the 'carrying capacity' of streams through 'capital intensive' projects like the JNNURM. The question of whether a natural stream, with 10 meters left as green zone, has a lesser carrying capacity than a channelized nallah remained unanswered. It is unfortunate to witness that Municipal Corporations are more than eager to work on 'capital intensive' projects, while neglecting the severe problems caused by encroachments.

Let us hope against hope that this very rare endeavour of city dwellers trying to reconnect with their lifelines will not be sabotaged, but will grow and blossom, becoming an inspiration for many such initiatives.

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BOOK REVIEW

Questions on the 'Value' of a river for Indians

Economics of River Flows: Lessons from Dam Removals in America, Editor: Dr. Bharat Jhunjhunwala
Kalpaz Publications, New Delhi, 2009, pp 306
ISBN: 978-81-7835-816-1, Price: Rs. 750

In his last book 'Economics of Hydropower', Dr Bharat Jhunjhunwala had tried to assess the value of so-called green hydropower dispassionately, coming to a conclusion that we have neglected some very important costs of hydropower, while overestimating its benefit. Along with significant economic, social and ecological impacts of dams, he has also surveyed pilgrims and devotees at Dev Prayag, Rishikesh and Haridwar and, using methodologies from environmental economics, has tried to assess the huge spiritual value of rivers. The Book is an interesting mix of ecology, spirituality as well as hard, real world economics.

For example in case of Edwards dam on the Kennebec River in Maine, the owner, facing a $ 9 million price to build a fish ladder, agreed to decommission the dam in stead. In the case of lower Snake River dams in the Pacific Northwest, the FERC concluded that the costs of restoration with dams was higher than the costs of restoration without dams, which included decommissioning as well as replacing the power being generated by the current dams .

As the title suggests, the book takes us through different case studies in the United States, which, despite being world's number one large dam builder, is actually decommissioning (literally removing) some of its dams, after a reality check about their benefits. According to the editor, he embarked on the journey of putting this book together after witnessing that more and more dams are being put up in India, while they were being removed in the US, "*both for securing economic growth.*"

The book is a collection of papers from a wide range of actors active in the dam discourse in US, including activists from American Rivers, researchers from American universities, private sector officials from hydropower companies, as well as government officials from the US Army Corps of Engineers. Each paper is prefaced with the Editor's introduction, comparing issues in India and US.

The book is divided in five parts dealing with:

1. Why Dams are being removed in the US?
2. Examples of Dam removals from US
3. Cost Benefit analysis of Hydropower Dams
4. Environmental Impacts of Hydropower Dams
5. Economic Value of Free flow of rivers

The initial part deals with the reasons and examples of dam decommissioning in the US which range from economic unfeasibility due to use of cheaper sources of electricity, increasing importance of conservation in the minds of people, stringent environment regulations which make some dams economically unviable, dam safety regulations, etc. For example in case of Edwards dam on the Kennebec River in Maine, the owner, facing a $ 9 million price to build a fish ladder, agreed to decommission the dam. In the case of lower Snake River dams in the Pacific Northwest, the Federal Energy Regulation Commission (FERC) conducted a Cost Benefit Analysis for two conditions, first was restoring endangered Salmon fish with existing dams, repairs, restoration and modifications and other was restoring the salmon population without dams. After a thorough study, it was concluded that the costs of restoration with dams was higher than the costs of restoration without dams, which included decommissioning as well as replacing the power being generated by the current dams .

As the editor reiterates in many sections of the book, in US the FERC also conducts cost benefit analysis of its projects in house and compares these figures with the benefits of the dams, while in India the CEA (Central Electricity Authority) and the MoEF are two independent entities. The CEA assumes any demand for power a justification enough for embarking on electricity projects and the MoEF undertakes EIAs accepting this, and the cost of environmental and social mitigation is not included in the project costs of CEA. It is possible that after including mitigation costs, most projects may appear unviable.

Elwha Dam was decommissioned through a second EIA (in India, an EIA is rarely revised, never even reviewed after the dam is commissioned), responding to increasing endangered species, sediment deposition and closing of one of the industrial customers. The result was largely driven by the inclusion of non use value of the Elwha River to the local tribes. According to the author, such inclusion of non use values of rivers is crucial for a country like ours.

The section on Cost Benefit Analysis of hydropower dams begins with an introduction to the 'US Government Guideline for undertaking Cost Benefit Analysis of Regulatory Actions', which demands inclusion of aspects like making a schedule of non quantitative costs and benefits, specifying intergenerational equity, specifying gains and losses to different groups, examination of alternative scenarios, specifying uncertainty (like climate change) etc. None of the factors is included in Indian CBAs. The FERC, while conducting economic analysis of its projects, works on the net costs of three or four

scenarios, consisting of relicensing with no mitigation, relicensing with applicant proposed mitigation to reach to a much more informed and balanced decision.

One of the most interesting parts of the book on 'Economic value of free flow of rivers' begins with a paper on calculating Total Economic Value (TEV) of river which includes on site use value, as well as *off site passive use value*, calculated by various methodologies like contingent valuation method, travel cost valuation method, hedonistic property method, etc. In another paper on *Natural Capital*, the author, after conducting detailed assessment of ecosystem goods and services, proved that New Jersey's Natural Capital is worth $ 154,000 / acre, with freshwater wetlands having highest value. Here, the editor stresses the utmost importance of considering non use values of our rivers in CBAs.

Through various studies, it is proved that riparian areas are efficient at processing organic matter, sediments and sediment bound pollutants, they regulate microclimates, remove phosphorus and nitrogen containing compounds, reduce coliform and pathogens and transform animal waste and chemical fertiliser into less harmful substances.

Probably the most useful single paper of the book is Ann Riley's *Putting a price on Riparian Corridors as Water Treatment Facilities*, in which she succinctly compares annual costs of running and maintaining Santa Monica Urban Runoff Recycling Facility (SMURFF) for 20 years with a 1.6 km long creek (or stream), with restored riparian corridors. Through various studies, it is proved that riparian areas are efficient at processing organic matter, sediments and sediment bound pollutants, they regulate microclimates, remove phosphorus and nitrogen containing compounds, reduce coliform and pathogens and transform animal waste and chemical fertiliser into less harmful substances. After a detailed cost benefit analysis, Ms. Riley proves that while the SMURFF plant will cost about $ 730,000 annually for next twenty years, a restored natural stream and riparian corridor will do the same for at an average annual cost of $ 15,550 to a median of $ 155,000 for a longer duration and for greater volume of water. At the same time the author stresses that, *"There is a range of values intrinsic to a natural environment that a brick and mortar plant cannot emulate".* This paper is of special significance to India, where urban streams are being killed by channelization and encroachments under the guise of development projects.

However, in the introduction of this paper, the author states that the comparison is between 'waste water treatment' capacity of a treatment plant and a natural stream. There is a significant difference between the quality of urban 'waste water' and 'storm water' of developed countries.

'Our people may never visit Haridwar and take a bath in Ganga, but they would derive satisfaction from knowing that Ganga runs free. The problem is this satisfaction obtained from free flow of Ganga is ignored while that from consumption of electricity is shown in calculations of Cost Benefit Analysis of Dams.' In a country full of water worshippers of all religions, Dr. Jhunjhunwala, a trained economist and past faculty at IIM Bangalore, is the one of the few who has attempted putting economic value to spiritual importance of rivers.

All in all, the book is a delightful read for anyone who is concerned about rivers, water resources, electricity, hydropower, environmental economics, etc. It exposes the reader to a much more methodical and holistic approach of dealing with ecology and economics. Of course, we are free to turn our backs to lessons from the US, holding that they have already developed (and damaged) their water resources and per capita water storage. However, the fact remains that while destroying ecological balance and degrading ecosystem goods and services, development, material or otherwise, is not possible. It will be beneficial for us to learn our lessons from their mistakes. As the US has learned the hard way, the ecological and economical cost of dam decommissioning is immense. We already have 100 dams, which are more than 100 years old and 381 large dams between 50-100 years. Silting and sedimentation of reservoirs due to soil erosion and faulty catchment management practises is eating away the life of many of our reservoirs. Repairs and maintenance of dams is shoddy and dam & embankment breaches have been happening regularly. Unfortunately, we aren't objective about our dams & consider decommissioning in case of aging, faulty or dangerous dams.

Considering these facts, maintaining existing, useful dams in good condition, decommissioning the ones which have outlived their capacities, and building new ones only after performing a rigorous, participatory, accountable and comprehensive cost-benefit analysis is the need of the hour. We simply cannot afford to throw away the provincial baby with the bath water.

The book also has its set of limitations. There are several typos and repetitions, which could have been easily avoided and the book would have gained immensely through a more structured and reader friendly format. Some concepts put forth by the author like 'losing our soul by damming rivers like Ganga', 'like US, our needs for social and spiritual betterment will become more prominent than our needs for electricity', etc., are controversial and need to be backed by strong objective research. Also, titles of some of the papers (which are different than their original titles) can be a little confusing. A brief section by the author at the end of the book, tying up the ends and talking about a way forward for India could also have added value.

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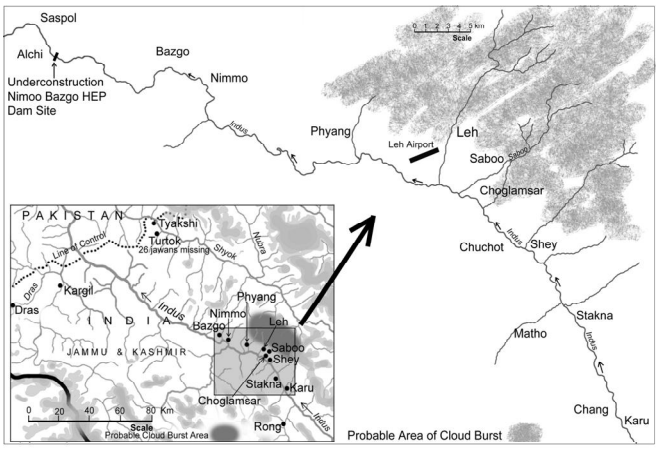
CLIMATE CHANGE & WATER SECTOR

Record rains in Leh due to climate change: DIHAR Based on an analysis of weather data from the last five years in Leh, Ladakh, scientists at Leh-based Defence Institute for High Altitude Research (DIHAR) have attributed the recent cloudburst in the region to prolonged winters which may be due to climate change.



"After going through the sequence of events of the weather that led to the cloudburst in early hours of August 6, it has been reinforced that the catastrophe was due to prolonged winters being witnessed in the region," sources in DIHAR said. The analysis by the research institute under the Defence Ministry was done to look into the reasons that triggered the cloudburst in Ladakh which is usually considered unnatural because it is a rain shadow area. At a recent meeting on "Evaluation of climate change in Ladakh sector and causes of Cloud Burst in Leh," the scientists led by DIHAR director Sashi Bala had analysed the weather data of the last five years in terms of monthly temperature, rainfall, humidity and snowfall. The study indicated that increased temperature and hot summers in the plains lead to increased evaporation and subsequent cloud formation in the hills. "This in turn, led to increased duration of snowfall in Ladakh when compared to previous years."

The region was witnessing unusual phenomenon of bright sunshine in the June and July months causing melting of snow and high relative humidity (72%) as compared to previous years (50%). Tracing the change in weather on the basis of the data available, he pointed out "since snow absorbed the latent heat also, the monthly maximum and minimum temperature remained low and did not shoot up as compared to previous years." The low temperature and high relative humidity lead to formation of dense low clouds in the valley. Since the vapour content in the clouds was high and on trying to cross the glaciers, the vapours further condensed.

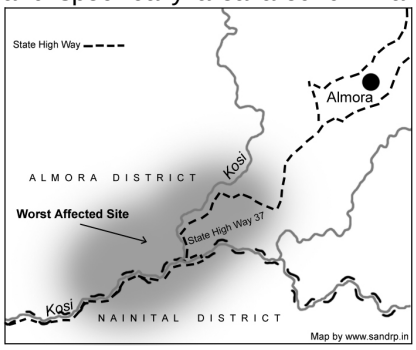
"The clouds could not retain the water droplets that lead to the cloudburst. Since the rainfall was absent on 3rd, 4th and 5th August and was negligible on 7th, 8th and 9th August the theory of occurrence of a cloudburst in Leh due to prolonged winters may be reinforced," the meeting said. The cloudburst, which led to flash floods and mudslides, claimed about 180 lives and injured about 400 people, besides causing widespread damage to public and private property. (PTI 250810)

Flash Flood in Almora Almora and Nainital districts in Uttarakhand experienced devastation in Sept 2010 due to a cloud burst. IMD in its weekly rainfall data has mentioned during the period of September 16-22 the rainfall departure from the normal in Almora was 930%. The heavy rains have triggered landslides in the ecologically fragile area.

Rainfall in some districts of Uttarakhand during 16-22 Sept 2010

	Actual (mm)	Normal (mm)	Departure %
Udham Singh Nagar	362.6	33.8	973
Almora	288.4	28	930
Hardwar	248.3	25.5	874
Garhwal Tehri	254.0	27.4	827
Chamoli	184.5	20.3	809
Bageshwar	248.2	28.0	786
Nainital	402.6	54.4	640

Mushrooming hydroelectric and related works have changed the equilibrium of the soil. The abnormally high rains (bearing the signs of the climate change) has eroded the soils rapidly and caused landslides. Almora and Nainital districts has been affected most severely and specifically area around Kwarab village in Almora Tehsil are the worst affected. According to a Govt estimate the losses are over Rs 620 crore in Almora district alone. In Almora district 211 residential premises have been totally devastated and 1800 more are partially damaged. Over 10000 people have been affected. A portion of State High Way which runs along the Kosi River has been washed away. (THE TRIBUNE 280910, http://almora.nic.in, http://nainital.nic.in, http://www.imd.gov.in)



Salinity rise in Bhitarkanika driving crocs upstream Rising salinity in the waters of the Bhitarkanika river system in coastal Orissa, home to about 2,000 estuarine crocodiles is driving crocodiles towards other water bodies close to human habitation. The recent killing of a woman by a crocodile at a village bordering Bhitarkanika wildlife sanctuary has brought into sharp focus the increasing forays by the reptiles into rivers and water bodies in thickly populated areas.

The wildlife experts have said extreme salinity in the Bhitarkanika River was the reason. "The reptiles were

never earlier sighted at villages surrounding the Bhitarkanika sanctuary," Manoj Kumar Mohapatra, divisional forest officer, Rajnagar mangrove (wildlife) forest division, said. The crocodile attacks on humans mostly take place during new moon & full moon periods when their habitation corridors get hyper saline. (The Economic Times 220910)

Traditional knowledge to adapt to climate change In some remote villages in India, which are most unlikely to pose as models of development, a quiet rejuvenation is taking place, with communities learning to adapt to the climate change reality of today. One of the foremost signs of climate change is the changing pattern of the monsoon. Interestingly, a 2009 Oxfam-India field study in Bundelkhand in UP and MP, Tamil Nadu and coastal Andhra Pradesh shows that reviving ancient water systems, linked with low chemical-input agriculture, which is sometimes a mix of traditional knowledge and "newer" methods, have helped poor farmers devise an effective strategy to cope with the changing monsoon.

Tamil Nadu gets rains mostly during Oct-Dec, the Gundar river-basin "feeding" Madurai and four surrounding districts remain most vulnerable. "I have seen, even as a little boy, that we cannot stop floods," says 62-year-old Gandhi, a farmer from Vellinipatti in Ramanathapuram district ("Velinipatti" means "flood-protection" in Tamil). "But now the rains are very heavy over a shorter period, causing frequent floods. Earlier we knew the seasons. Now we don't understand why this is happening," he says.

This region had an ancient, intricate watershed management system from 300 BC to 200 AD that channelled these seasonal waters into different systems dug in the earth, using the granitic rock base as leak-proof storage. A neerkatti, or water manager, appointed by the village was responsible for judicious distribution and conservation. The system served for millennia but fell into disuse with, first, a colonial and, then, a post-independence governance system. Deprived of ownership and their share of tank waters, local societies let them go to ruin.

Today, NGO Dhan Foundation has helped local communities revive this ancient system, complete with a village neerkatti. Villages contribute at least a quarter of the budget needed for renovation through a watershed association. Those benefiting from the tank contribute according to the size of their holdings at Rs 300 per acre. The remaining amount is received from government schemes or donor grants. The association also keeps Rs 20,000 for drought-relief, tank-repair or loans for soil and water-conservation. For the 20% of the landless, fish-farming offers a livelihood.

The results are remarkable. Villur's ancient tank in Madurai district has now extended its command area from 25 acres to over 100 acres. Elsewhere in Sinkurni, communities now use inter-cropping to beat unpredictable rains, sowing cotton in Aug-Sept, interspersed with lentils like red and black gram. The black gram is reaped in three months, the red gram in six months and, the cotton in nine months. If the cotton fails for lack of water or other reasons, the lentils balance it out with their varied cropping periods.

M P Vasimalai of Dhan Foundation says, "Gundar's farmers already have knowledge about adapting to climate change, because the systems of flood mitigation and drought moderators have been with them since ancient times." The Watershed associations have given a sense of ownership to the communities, who now maintain their own tanks.

Half a country away, in UP's Bundelkhand, land-contouring through checkdams, spillways, bunds and channels to recharge groundwater from the sparse rains have also made significant improvements. Villagers in places like Tajpura and Sunderpura in Jalaun district now have adequate groundwater to enable tubewells or revive old wells to grow their own crops, irrespective of the weather. Using natural systems of bio-composting with farmyard manure and bio-pesticides, such as marigolds and watering from a tubewell, villagers have irrigated 75 bighas of land in Sunderpura for the first time with help from NGO Parmarth.

In Tajpura, farmers say vermi-composting the same farmyard manure doubles the produce. Ajan Singh and his wife Mamtadevi have managed to save over Rs 80,000 by growing organic vegetables on their one bigha of land. Their low-cost natural-input management system of cultivating vegetables has such a reputation for quality that all their produce gets sold locally at rates higher than market prices. Singh nets a minimum annual Rs 35,000-40,000 in a system that will stand him in good stead with reduced rains and rising temperature in the region.

The answer, thus, seems simple enough: revive old ponds, build new ones and teach the villagers how to manage it on their own. In other words, go back to old systems and bring people into the fold of responsibility. (Keya Acharya in Business Standard 210810)

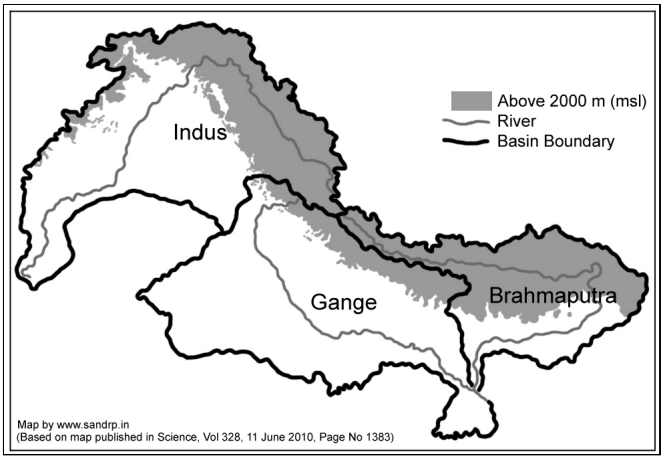
WB to fund IARI adaptation study in 4 districts Indian Agriculture Research Institute has launched a Rs 12 crore scheme for studying how to make agriculture land adaptable to climate change in Madhya Pradesh's Dhar district, Maharashtra's Raigarh, Haryana's Mewat and Orissa's Ganjam district, IARI's Regional Wheat Research Centre's Head Dr S N Mishra said. The World Bank is to help the study. (PTI 020810)

A CDM tool kit The CDM watch has published a CDM tool kit, which can be downloaded from www.cdm-watch.org

A Guide on Carbon Trading FERN from Europe has published a guide on carbon trading; the same can be downloaded from: www.fern.org/tradingcarbon

Melt water contribution for Himalayan Rivers

Snow and glacial melt are important hydrologic process in the Himalayan basins and changes in temperature and precipitation are expected to seriously affect the melt characteristics. Melt water is extremely important in the Indus basin and important for the Brahmaputra basin, but plays a modest role for the Ganges, Yangtze and yellow rivers. A huge difference also exists between basins in the extent to which climate change is predicted to affect water availability and food security. The Brahmaputra and Indus basins are most susceptible to reduction of flow.



A report by three researchers from Netherlands, published in *Science* 11 June 2010, says upstream snow and ice reserves of these basins, important in sustaining seasonal water availability, are likely to be affected by climate change. Walter W. Immerzeel (Future Water), Ludovicus P. H. van Beek (Department of Physical Geography, Utrecht University) and Marc F.P. Bierkens say that earlier studies are mostly qualitative or local in nature. The relevance of snow and glacial melt for Asian river basin hydrology therefore remains largely unknown, as does how climate change could affect the downstream water supply and food security.

Characteristics of Three Major Rivers in India

	Indus	Ganges	Brahmaputra
Total area (sq km)	1,005,786	990,316	525,797
Total population (thousand)	209,619	477,937	62,421
Annual basin precipitation (mm)	423	1,035	1,071
Upstream area (%)	40	14	68
Glaciated area (%)	2.2	1.0	3.1
Annual upstream precipitation (%)	36	11	40
Annual downstream precipitation (%)	64	89	60
Irrigated area (sq km)	144,900	156,300	5,989
Net irrigation water demand (mm)	908	716	480

The scientists examined the role of hydrological process in the upstream areas, which they defined as all areas higher than 2000 m above sea level, on the water supply of the five major Himalayan basins. These basins, which provide water to over 1.4 billion people, vary considerably in their characteristics. The Yangtze has the largest population of the five basins, whereas the Ganges is the most densely populated. The Indus and the Brahmaputra basins have extensive upstream areas (i.e. above 2000 m) and larger glaciated areas than the Yangtze and Yellow river basins. The Ganges, the Brahmaputra, and the Yangtze basins are wetter than the Yellow and Indus basins. The Indus, Ganges and Yangtze basins support large scale irrigation systems with high net irrigation water demand, but in the Indus the difference between basin precipitation and net irrigation demand in highest. The scientists investigated three related components of these river basins (a) the current importance of melt water in overall river basin hydrology; (b) observed cryospheric changes; (c) the effects of climate change on the water supply.

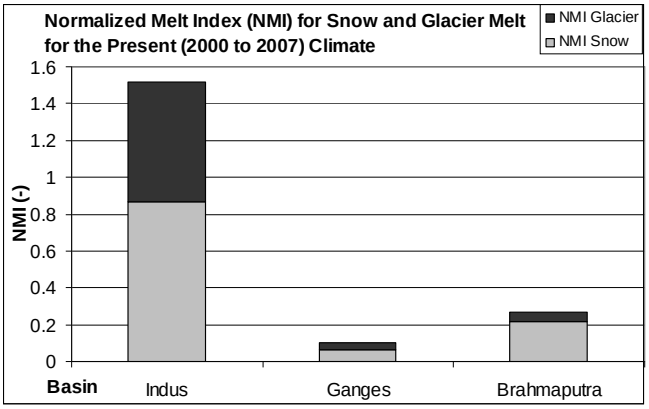
They used the Normalized Melt Index over the period 2001-2007 to quantify the importance of melt water from the upstream areas on overall basin hydrology. NMI is defined as the volumetric snow and glacier upstream discharge divided by the downstream natural discharge. Upstream discharge is calculated with a calibrated snow melt runoff model. Downstream natural discharge is calculated by subtracting the natural evaporation of the basins calculated with hydrological model from precipitation. The NMI is more reliable measure than the commonly used melt water fraction of total river discharge, which is affected by reservoirs and water extractions.

A global study reports that during the summer months as much as 70% of the summer flow in the Ganges and 50–60% of the flow in other major rivers is generated by melt water. However, references are only given to melt water studies in high mountain sub-catchments located in the upstream parts of the Indus and Ganges basin, such as the Sutlej and Chenab rivers. In these upstream sub-catchments river flow is indeed predominantly governed by melt water, but these results should not be projected to the catchment as a whole. This shows the inadequacy of the use of melt water fractions.

Widespread glacier expansion since the late 1990s has been observed in central Karakoram (in the western Himalayas). It may be attributed to its high elevation, the role of supra-glacial debris, and possibly an increase in orographic precipitation leading to accelerated accumulation. Other studies also showed positive mass balance anomalies in the Karakoram for the same period, based on multi-sensor remote sensing analysis and gravity data from the Gravity Recovery and Climate Experiment.

The great size of the basins that they analyze allow them to use melt parameters calculated for whole basins, rather than a different set of melt parameters for each different glacier, because each basin contains many glaciers of all types.

Results from the NMI analysis indicate that for the present day climate, melt water plays an important role in the Indus and Brahmaputra river basins. This is most evident in Indus: Discharge generated by snow and glacial melt is 151% of the total discharge naturally generated in the downstream areas. In the Brahmaputra basin this amounts to 27%. The contribution of snow and glacier water to the Ganges (10%), Yangtze (8%), and Yellow (8%) rivers is limited owing to comparatively large downstream areas, limited upstream precipitation, smaller glacier, and/or wet monsoon-dominated downstream climates. In the Indus and Ganges basins, about 40% of the melt water originates from glaciers, whereas in the other basins the glacial melt contribution is much less.



They say that there is a general decrease in the ice volumes, although regional anomalies exist and, as regional quantification of the trend is lacking, the uncertainty about the trend is substantial. Annual net imbalance rates of 0.5 to 0.9 m/ year have been observed from time series of digital elevation models in the Everest region in Nepal and SPOT satellite imagery in the western Himalayas, whereas radioactivity analysis in ice cores revealed no net accumulation of ice in a high-elevation glacier in Tibet. They used models in combination with derived precipitation trends to identify large-scale trends in snow and ice storage in each of the five basins. Results were inconclusive. They identified a negative trend of −0.22 +/- 0.05 m/ year only in the Ganges basin. A positive trend of 0.19 +/- 0.02 m/year was observed in the Indus basin, while in the other basins no discernable trends were identified.

In total, the paper estimates that the food security of 4.5% of the total population will be threatened as a result of reduced water availability. The strong need for prioritizing adaptation options and further increasing water productivity is therefore ever more eminent.

The research shows a substantial variation in changes in future water supply. The best-guess glacier scenario resulted in a modelled decrease mean upstream water-supply from upper Indus (-8.4%), the Ganges (-17.6%), Brahmaputra (-19.6%), and Yangtze rivers (-5.2%). Although these changes are considerable, they are less than the decrease in melt water production would suggest, because this reduction is partly compensated for by increased mean upstream rainfall (Indus +25%, Ganges +8%, Brahmaputra +25%, Yangtze +5%, Yellow +14%). Results should be treated with caution, however, because most climate models have difficulty stimulating mean monsoon and inter annual precipitation variation. So the researchers say although considerable cryospheric changes are to be expected, their impact will be less than anticipated. Regardless of compensating effects of increased rainfall in the two basins with the largest NMI, the Indus and Brahmaputra, summer and late spring discharges are eventually expected to be reduced consistently and considerably around 2046 to 2065 after a period with increased flows due to accelerated glacial melt. The effects in the Indus and Brahmaputra basins are likely to be severe owing to be large population and the high dependence of irrigated agriculture and melt water.

These anticipated changes will also have considerable effects on food security. By relating changes in upstream water availability to net irrigation requirements, observed crop yields, caloric values of the crops, and required human energy consumption, one can estimate the change in the number of people that can be fed. The results (based on a best guess of 2050 glacier area) show a sizable difference between the five basins. Estimates range from a decrease of −34.5 +/- 6.5 million people that can be fed in the Brahmaputra basin to −26.3 +/- 3.0 m in the Indus basin, −7.1 +/- 1.3 m in the Yangtze basin, & −2.4 +/- 0.2 m in the Ganges basin, and an increase of 3.0 +/- 0.6 m in the Yellow River basin. In total, it estimates that the food security of 4.5% of the total population will be threatened as a result of reduced water availability. The need for prioritizing adaptation options and further increasing water productivity is therefore ever more eminent. (*Science* 110610)

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Bamboo for sustainability & climate friendly growth

Bamboo is an important part of rural livelihood in a developing country like India. Due to its versatile nature and multiple uses, it is also called 'poor man's timber'. Though it grows tall like a tree, it belongs to the grass family. It can withstand the drought as well as flood. During the annual floods in Kosi region in Bihar, it is the bamboo that helps the flood hit villagers. Even during Tsunami, bamboo came to the rescue of people rendered homeless to erect shelters at short notice. There are more than 70 genera divided into about 1,450 species of bamboo all over the world. India is second only to China in terms of bamboo diversity having more than 130 bamboo species spread across 18 genera. The North Eastern states are the store house of bamboo diversity with 58 species belonging to 10 genera. Bamboo is grown on 9 million hectares in India, covering almost 13 per cent of the total forest area of the country. In addition, nearly 1.75 million hectares of bamboo area lies outside the natural forest area. The total production of bamboo is 5 million tons per year.

The bamboo culture thrives in the North Eastern region. From the tender shoots as a delicacy food item to the rice cooked in the hollow of raw bamboo, it is part of the everyday life. From house construction to flooring, agricultural implements, the bamboo pervades the life and culture. We find the most artistic skills in bamboo weaving in these regions. Millions of families are dependent on bamboo resources for their livelihood in India.

New bamboo plantations may curb the pressure from deforestation by serving as wood substitutes. It can be planted to reclaim severely degraded sites and wastelands. It is good soil binder owing to their peculiar clump formation and fibrous root system and hence also plays an important role in soil and water conservation.

Climate change and Bamboo Recent studies suggest that bamboo is more effective plant than trees in increasing carbon stocks through sequestration of carbon. The researchers studying bamboo plantations estimate that a hectare of bamboo has the potential to sequester between 12-14 tons of carbon every year above the ground. Additionally, the extensive root system builds up the carbon sink faster than trees.

The international community, Clean Development Mechanism as well as Indian government have overlooked the potential of bamboo to address the issue of climate change and enhance livelihood opportunities. When bamboo forest is managed by annual harvesting of mature culms it can sequester more carbon, especially if harvested products are converted into durable products like bamboo furniture or household timber. It can be a good substitute for energy intensive products, thus helping to reduce fossil fuel based products. It is used in over 1500 applications, but until recently the life span of these products was short. However, the upgradation in processing techniques has enabled to manufacture durable products that have longer life, mainly in housing components and furniture. Compared to growing trees, a bamboo plantation would repay the investments in carbon development costs within first four years. Moreover, when mature bamboo is harvested, it would fetch handsome net revenues providing employment opportunities to people, mainly artisans. In fact the Medar community in Karnataka is entirely dependent on bamboo weaving, producing items like baskets. They are the poorest groups belonging to the lowest caste among Dalits. One of the ways to strengthen their economic situation is through enhancing bamboo stocks.

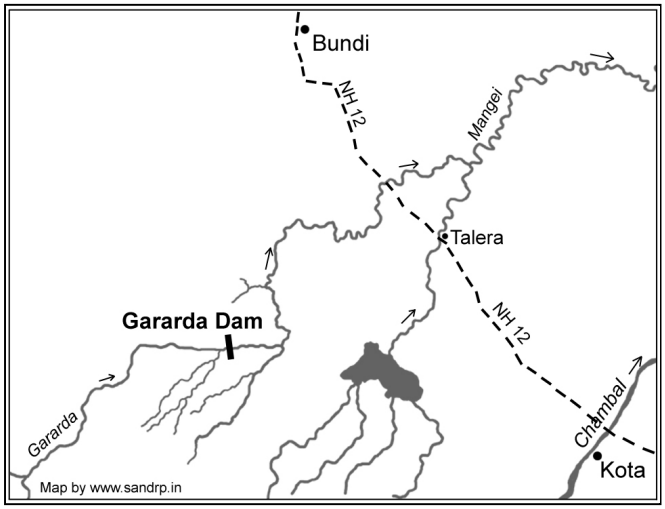
The carbon credit business world wide is in billions of dollars. Large high tech projects as well as those which destroy natural forests like hydel projects get carbon credit benefits. Contrary to these dubious carbon credit ventures, bamboo plantations can bring the carbon credit business at the doorsteps of poor, marginal communities. If CDM as well as those agencies that are aiming to address the issue of climate change include bamboo as one of the tools to mitigate climate change, it would yield 'poor man's carbon credits'. If this can happen directly between the governments and the communities, without the intermediary of market, that would be even better.

While it has many positive impacts on climate change, one should also be aware of the negative impact. Gregarious flowering of bamboo in North Eastern part of India and in some regions of Western Ghats may lead to releasing of large amounts of carbon in the form of dry bamboo. There is an urgent need to evolve a rationale policy to procure and utilize enormous quantity of bamboo crop after the flowering. Ignoring this would cause a devastation of fire that would engulf the diversity in the region. Though India has launched the National Bamboo Mission in 2007, the implementation of this mission is not only slow, but it has failed to address the enormity of the issues related to bamboo.

May be, the step motherly attitude meted out to the North Eastern states is one of the prime reasons for such gross neglect of poor man's timber and negation of bamboo culture. A proper understanding and empathizing with the bamboo culture and financial and technical support would have unleashed the bamboo revolution that would have uplifted the living standards of people in this region. It is high time the national action plan to address climate change in India incorporates these ideas in 'green mission'. (Pandurang Hegde in Morung Exp 200910)

DAMS

Rs 150 cr Gararda dam collapse in Rajasthan On



August 15, 2010 Gararda dam on Gararda River, a tributary of Chambal River, in Bundi district of Rajasthan collapsed. At least a dozen villages on the downstream were flooded. Traffic in Jaipur-Kota Highway near Talera town was also disrupted. According to National Register of Large Dams-2009 from the Central Water Commission, the earthen dam had height of 31.76 m.

According to the enquiry committee report submitted by Kota Divisional Commissioner P L Agarwal, there was wide spread and deep rooted corruption in construction, monitoring and quality control aspects of the Rs 150 crore dam that collapsed in the very first filling on Aug 15, 2010 when water level had reached 291 m. The report also confirms criminal negligence, fraudulent payments and manipulation of records. Those found responsible include some chief engineers, superintendent engineers, executive engineers, assistant engineers and lower staff. Some of those found guilty have been suspended, we have to wait and see what action is taken for the rest. (The Times of India 170809, Bhaskar 021010, National registrar of large dams 2009)

GROUNDWATER

Prayas study on GW irrigation in India With 60% of India's net sown area irrigated by groundwater and electricity supplied at very low rates for agricultural pumping, there have been serious impacts on groundwater availability and the energy used for its extraction. Consequently, efforts have been made -- from pilot projects, to state-wide programmes -- for improving the efficiency of groundwater pumping, and for its recharge and conservation. This report has compiled information on projects undertaken in India over the past three decades towards improving the efficiency of groundwater pumping and its use for agriculture. This compilation consists of around 65 projects, from 142 sources such as reports, journal articles, and news bulletins, on field activities and studies carried out. Projects have been categorized according to their main activities: either implementation of efficiency-improvements, or (empirical or theoretical) studies. This compilation has two purposes. It intends developing a repository of such reports that is publicly accessible and can be easily expanded. As importantly, based on the information collected, it has elicited key factors affecting the implementation of groundwater pumping efficiency programmes. These have been categorised as: (1) Operational, (2) Technical, (3) Financial, (4) Training, maintenance, and monitoring, (5) Integrative, (6) Location-specific, and (7) Institutional. It is intended that such an assessment of past experiences would benefit future programmes. (www.prayaspune.org Sept 2010)

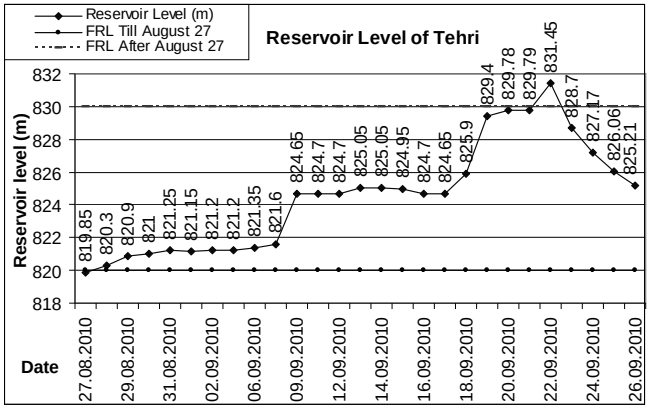
HYDRO PROJECTS

WB to fund BBMB Rehabilitation Project The latest Monthly Operation Summary from the World Bank says, "The projects (power and irrigation assets) under administration of BBMB were built between 1955 and 1978 and include - Bhakra Dam on the river Sutlej with Power Stations on the Left and Right banks (1325 MW); an irrigation channel with two Canal based Power Stations at Ganguwal & Kotla (155 MW); the Pong Dam on river Beas with a Power Station (396 MW); a diversion dam at Pandoh on river Beas (Up stream of Pong Dam) to divert its water to the river Sutlej through a water conductor system, a balancing reservoir and the Dehar Power Station (990 MW) at the tail. The proposed project is a carbon finance operation to support the renovation, modernization and uprating (RM&U) activity at Left Bank Power House of the Bhakra Dam on River Sutlej. The RM&U work will not result in any alteration of water flows and includes the following activities: replacement of existing generation equipments (turbine runner, generator, generator transformer and allied systems) with energy efficient ones; and providing state-of-the art control, instrumentation and protection system for better monitoring and efficient operations. Environmental Category undefined." The proposal of the World Bank to fund the BBMB rehabilitation project raises many questions. What about the outstanding social and environment aspects of the project? It may be recalled the people displaced by the system described above many decades ago, including those displaced by the Bhakra dam are yet to be properly resettled. Similarly, the fast pace of the siltation of the Bhakra dam has been further accelerated by the dumping of the muck by the upstream hydropower projects in the Sutlej and Beas basin, including the World Bank funded Nathpa Jhakri and the Rampur Hydropower projects.

BBMB: Highest-ever generation in Sept 2010 The Bhakra Beas Management Board achieved a record power generation of 1575.5 million units in Sept 2010. The previous best of 1473.4 MU in a month was recorded in Sept 1994 a BBMB spokesman said. 843.6 MU was generated during the month by the Bhakra Dam at Nangal alone, which was also a record. (PTI 011010)

HYDRO PROJECTS IN UTTARAKHAND

THDC's blunders: Will there be accountability?



The filling of the Tehri reservoir saw multiple blunders. The allowed Full Reservoir Level of the project till Aug 27, 2010 was. The dam was filled upto that level by Aug 27, see the above graph. This was first big blunder of THDC. Days before that, the Tehri Hydropower Development Corporation filed a petition in the Supreme court, saying that they be allowed to increase the FRL to 830 m, making a misleading claim that if that was not done, there would be catastrophic floods in the downstream area. They also produced misleading certificates of completion of R&R from the Uttarakhand govt. The Uttarakhand govt was clearly hand in glove with THDC here. A week later, the Uttarakhand govt told the Supreme Court that R&R is not complete and it also suspended the two officials who gave the completion certificate to THDC. But that was too late. In one of the gravest mistakes of its kind, the Supreme Court, on Aug 27 2010 allowed THDC to raise the FRL to 830 m. As events turned out, this was a very grave mistake on its part. The following week the SC did "scold" THDC and the Uttarakhand government counsels for their fights, and R&R suffering in the process, but SC did not reverse its decision of Aug 27, which it should have.

As can be seen from the graph above, THDC started increasing the level of water in Tehri reservoir, from next day, that is Aug 28 itself, as if it was fully confident of SC decision. By Sept 19, even the fraudulently obtained higher FRL of 830 m was almost achieved. This was third big blunder of THDC. Even if SC had allowed it to increase water level on Aug 27, it should have waited till the end of the monsoon. As things turned out, when Tehri reservoir was full to the brim on Sept 20, the water level in Ganga River downstream at Haridwar breached the previous highest ever recorded flood level of 296.23 m and reached 296.3 m.

So when the downstream river was in its highest ever flooded condition, the upstream Tehri was also full to the brim was releasing massive flows downstream, adding to the flood disaster downstream. This was criminal. The dam should not have been filled to the brim when the monsoon was fully active and almost at its peak.

Following the blunders committed by the THDC in filling up Tehri reservoir, the dam authorities have also hurt its own project, besides creating avoidable disaster in the downstream area. The sudden release of huge quantity of water from the Tehri dam by THDC submerged the hydropower machines, including transformers of the under construction 400 MW Koteshwar dam. This will mean losses of hundreds of crores, besides the delay in commissioning of the project that this will cause. Will the THDC officials who bungled in the reservoir operation be held accountable for this? (Matu Jan sangathan, Mint 270910, CEA daily reservoir level bulletins, Mail Today 230910)

HYDRO PROJECTS: NORTH EAST

Environment Minister on test The power ministry is concerned at questions raised by environment minister on hydel projects in the north-east. Power ministry officials acknowledge that mitigation measures adopted by various developers leave a lot to be desired. During a public consultation in Guwahati in Sept 2010, Union Environment Minister Mr Jairam Ramesh assured that he would convey the apprehensions of the local people to the prime minister. Concerns raised include the lack of proper environmental impact of the Ranganadi project in the lower Subansari district of Arunachal Pradesh and the Kopili project in the North Cachar Hills district of Assam. It had been suggested by groups in Assam that NHPC's 1750 mw Mangdechhu project in Bhutan would flood Assam and that no proper mitigation measures have been undertaken for the projects. Concerns were also raised about the Arunachal Pradesh government's green signal to 130 projects without proper environmental assessment. Power ministry officials do not rule out that some state government-approved projects might not have been assessed properly. The environment minister is understood to have suggested that a cumulative river basin environmental impact assessment be undertaken in the north-east to determine the viability of the hydro power projects in the region. Sources in the government said that Mr Ramesh suggested a cumulative bio-diversity assessment for the region and a study of the downstream impacts.

While the first suggestion could mean temporary suspension of ongoing projects, a downstream impact study could mean opening up the issue with Bangladesh. This issue would arise while considering impact of projects in the Bramhaputra river basin. "This is an apprehension. A road map for harnessing hydropower in the region is yet to be worked out" an official explained.

This has forced Prime Minister to step in. The PM will be meeting ministers for power, environment, water resources, external affairs and the deputy chairman of Planning Commission to work out a strategy.

Besides the need to bridge power deficits, the government wants to put on a fast track hydro power

projects in Arunachal Pradesh to counter the reported Chinese projects on the Yarlung Tsangpo in Tibet across the border. This China bogey is used for pushing the Siang basin projects under the false notion that it will strengthen India's negotiating position with China. Mr Ramesh is understood to have assured the prime minister that Siang basin projects would be cleared fast on account of its strategic importance, though this is in compete contradiction with his role as Environment minister. However this intervention will have to wait a while longer as the power minister is out of the country. In the meantime, the power ministry is taking steps to address some of the concerns that have been raised. (The Economic Times, The Times of India 021010)

WATER POLLUTION

Punjab CM's promise The Punjab Chief Minister promised on the floor of the assembly on Sept 30, 2010 that the state will be free of water pollution by end of Nov 2011. The Editorial Comment says it all: "The fact that Ludhiana's toxic Budha Nullah has still not been cleaned up despite funds from the Centre and intervention of the Punjab and Haryana High Court raises doubts about Mr Badal's claims of making the state's water and air pollution-free within a year. In the absence of political backing the Punjab Pollution Control Board has become a toothless tiger. How serious politicians are on this issue is clear from the fact that only 30 of the 117 MLAs were present in the House to discuss air and water contamination on Thursday." (Edit in the Tribune 021010)

Uranium in drinking water in Malwa (Punjab) Punjab government has now accepted in a report filed before the state Human Right Commission that the drinking water supplied in Malwa districts of Bhatinda, Mansa, Faridkot and Ferozepur have Uranium beyond the accepted levels. The source of the Uranium seems to be the ash from the coal thermal power plants, Uranium could be leaching from there to the water sources in the area. A case is going on in the Punjab and Haryana High Court on this issue. (Dainik Bhaskar 300910)

WATER BUSINESS

DJB privatisation starts with Vasant Kunj In what seems to signal the beginning of privatization of water distribution and maintenance of water supply lines, Delhi Jal Board is likely to kick off a pilot project in Vasant Kunj where a private player would be allowed to manage water distribution. DJB is preparing a bid document to launch the project, which it terms as `non-revenue water reduction' through "performance-based contract." Rough estimates suggest that about 14,500 flats in Vasant Kunj receive approximately 3.1 million gallons of water per day. The project would be implemented in three phases over 36 months. Such a move in the past had faced stiff resistance and DJB is again attempting this without any consultation with the people of Delhi. (The Times of India 041010)

RIVERS

M Tech on River Conservation: A missed opportunity? The Alternate Hydro Energy Centre, Indian Institute of Technology, Roorkee has been offering a two year M.Tech. Programme on 'Conservation of Rivers & Lakes' sponsored by this Ministry of Environment and Forests, from academic year 2004-05. Admission in this programme is open for in-service/sponsored candidates from State and Central agencies as well as GATE qualified fresh candidates. According to the prospectus of the Programme, there is a need for properly trained personnel for managing various government schemes like the National River Conservation Program, the National Lake Conservation Program (NLCP), the Jawaharlal Nehru Urban Renewal Mission (JNNURM), etc. Departments of AHEC, Hydrology, Biotechnology, Civil Engineering and Management from IIT Roorkee are a part of this course.
Modules under this Programme include Mathematical Modelling, Numerical analysis, integrated management of water bodies and Aquatic Ecology (Course and title under discussion). Major electives are hydrology, waste water treatment, pollution control technologies, GIS and Remote Sensing, Groundwater hydrology, Environmental Laws, etc. (For information, please check: http://moef.nic.in/downloads/tenders-and-advertisement/advertisements/M_TEch_CRL_Prospectus.pdf)

When experts like Jayanta Bandyopadhyay have been calling for a 'Confluence of Disciplines' in Water Management, courses like these totally overlook the complicated and crucial issues like social dimensions of conservation, the ecological aspects like fisheries management, riparian environment, emerging issues like environmental economics and the use of bioengineering methods for pollution control, and environment education. When thousands of crores of rupees have been spent on Action Plans like Ganga and Yamuna with dismal performance on field, the course structure could gain from a module on 'Lessons learned from past Performance'. Replicable success stories of community participation like restoration of Kali Bein and Arvari do not find a mention, they are not a part of public participation, but are important community initiatives with govt participation.

A course like this can be a one of the ways to bridge the gap between sectors like industry, urban and rural planning, fisheries, forest management, etc. But it seems we like to continue with our techno-centric status quo, which has, till today, failed to produce any lasting results.

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Rajasthan violates *no mines near rivers, dams* norm The Mines department of Govt of Rajasthan has violated the norm that no mines are to be allowed within 1 km radius (to lax in the first place) of dams, rivers, school and religious places when it gave license for mines Sikar district. The Rajasthan minor minerals rules of 1986 have these provisions. (Dainik Bhaskar 230910)

AGRICULTURE

Drought Management Guidelines from NDMA The National Disaster Management Authority has released the "National Drought Management Guidelines – Management of Drought". The Guidelines needs to be looked at critically. (Indian Express 270910)

WATER SECTOR

Bureau of Water Efficiency proposed The Union Water Resources Ministry has started discussions to create a Bureau of Water Efficiency on the lines of the Bureau of Energy Efficiency. National Water Mission under India's National Action Plan on Climate Change hopes to increase water use efficiency by 20% by 2017. (Business Line 01x10)

POWER SECTOR

Ultra mega TPS to dry up Bundelkhand NTPC is to set up 4000 MW Ultra mega thermal power plant in Barethi village in Chhattarpur district in Madhya Pradesh. MP govt has assured NTPC of water supply for the same. The drought prone Bundelkhand will export water embedded in power. (Dainik Bhaskar 300810)

QUOTES

"Rainfall received due to cloudburst in Leh on a single day is higher than the highest in Cherrapunji. We have never seen this kind of rainfall earlier… was a definitive sign of climate change."

P G Dhar Chakrabarti, Director of SAARC Disaster Management Centre (The Hindu 180810)

"Moreover the large number of water harvesting structures built in villages across the country through the Mahatma Gandhi National Rural Employment Guarantee Act should help trap rainwater and increase water supply to farm fields enabling the provision of live saving irrigation."

Report of the PM's Economic Advisory Council (Indian Express 170810)

NEPAL

ADB to fund Upper Seti HEP Study The Asian Development Bank is to fund the detailed Engineering Study for the proposed 127 MW Upper Seti HEP. The Bank website says, "Physical investment and project implementation for Upper Seti… It will also be eligible for the Clean Development Mechanism for climate change… this project aims to provide a knowledge base for subsequent similar projects in planning financial, technical, and safeguard measures in a sustainable manner. Grant $2.5 million (Asian Development Fund)." (www.adb.org)

Wake call for hydrocracy It's time for the hydrocracy in Nepal – the politicians, policymakers, planners, bureaucrats, and intelligentsia who deal in hydropower – to acknowledge the ground realities and grow out of their short-sighted, juvenile vision for Nepal's hydropower future. (Ratna Sansar Shrestha in Nepali Times 270810)

PAKISTAN

VOICES ON THE SUPER FLOOD The federal cabinet was informed that economic losses inflicted by the floods were estimated at $ 43 billion, almost equal to the expenditures incurred on the war on terror over the past nine years. About one-fifth of the irrigation infrastructure, livestock and crops in the country has been destroyed. According to initial estimates, the Pakistan Electric Power Company has suffered a loss of Rs 4 billion to its installations. The cumulative losses of the Water and Power Development Authority and Pepco exceed Rs 13 billion. The floods have affected 79 of the 124 districts — 24 in Khyber Pakhtunkhwa, 19 in Sindh, 12 in Punjab, 10 in Balochistan and seven each in Azad Kashmir and Gilgit-Baltistan. At least 1600 are dead, 20 million people had been affected and 7.5 million of them are homeless. (Dawn 020910) Thus Pakistan suffered its worst ever flood this year, almost the entire nation suffered the impacts one way or the other. Here we are trying to capture the diversity of perceptions about this from the voices that media in Pakistan captured.

"It is a blessing. When good water comes, our livelihoods will improve, fish will come," said Yar Ali Mallah, 21, who comes from a long line of fishermen living in the delta, at the southern end of Pakistan.

"The River Indus has so many canals, dams and barrages that water does not come into the river, and because of the shortage of fresh water, the fish catch has gradually decreased," Gulab Shah, a social worker and district president of the Fisherfolk Forum in Thatta.

"Pakistan does not have a dam to catch the heavy monsoon rains, and if Kalabagh had been built it would have prevented the recent flood damage in north-western Pakistan," said the governor of Punjab, Salman Taseer, a strong advocate of the dam.

"Unless there is a radical break from the past, new measures are likely to favor large World Bank funded projects that sequester still more of the resources of this river into the hands of the powerful, rather than focusing on the long-term survival of marginalized communities such as delta fisherpeople or smallholders in the upper reaches of the valley," Alice Albinia, author of a book on the Indus, "Empires of the Indus". (New York Times 150910)

The Analysis "Political insensitivity of proposing a controversial dam at this critical moment aside, the pro-dam lobby is equally blind about the role of dams, barrages and related structural measures across and along the Indus River in turning the drainage into a nightmare, intensifying the scale of flood and related devastation… The river engineering developments have considerably reduced the frequency of benevolent, seasonal flooding in Kaccha (the floodplain) while increased people's vulnerability to floods over the

decades. Accumulation of silt in the reservoirs and in the embanked riverbed has reduced the drainage capacity of the river. The hill-torrents from Suleman Range and Khirthar Range, which discharge into Indus, bring high loads of silt in their water. The spate irrigation through hill-torrents on the right bank of Indus was once helpful in trapping much of silt on the Pakka (the highlands) and letting less quantities falling into the river. However, the replacement of spate irrigation with canal irrigation enhanced the silt quantity being discharged into the river through the untapped hill-torrents."

"Undoubtedly, the population growth and ill-planned settlement patterns in last several decades have aggravated the flood. However, on the flip side, the very flood protection embankments have created a false sense of security and encouraged ill-settlement patterns in the Kaccha area. The forests, pastures and lakes have been turned into agricultural land. The traditional flood preparedness strategies have been abandoned, particularly in the new settlements, as they were no more needed in the presence of flood protection embankments."

"So when the river swelled after extraordinary rains this monsoon, the government machinery decided to dam up the reservoirs. It increased pressure on the embankments, operation and maintenance of which was forgotten for years. Thus the already fragile embankments could not sustain the pressure and developed breaches. The irrigation authorities also created breaches in the embankments to protect the barrages from possible collapse. The breaches thus developed or created loosened hell in the areas bottled up by the embankments. As if the devastation in the Kaccha was not enough, the water obstructed by the embankments found its way through the canals to inundate the areas, which have never been flooded by the Indus in past."

"Following the breach in Abbas Spur at Taunsa Barrage on August 2, the floodwater found its way to Taunsa-Panjnad Link Canal and Muzaffargarh Canal. The canals allowed the Indus to make a new channel to fall into Chenab River after inundating hundreds of villages and towns in Muzaffargarh district."

"Similarly the breach in Tori Band caused flooding in Jaccobabad (Sindh) and Jaffarabad (Balochistan) districts, where the inundation by Indus makes no sense. The receding floodwater from Balochistan found its way through MNV Drain and RBOD to hit Qambar-Shahdadkot district."

"Besides, the drainage of hill-torrents obstructed by road and canal infrastructure complicated flooding in the Pakka area. Much of the havoc wreaked by flood in Dera Ismail Khan, Dera Ghazi Khan and Rajanpur districts has been due to obstruction of hill-torrents -- Kaanh, Looni, Sanghar and Vahoa, to name a few -- by Chashma Right Bank Canal (CRBC), DG Canal, Kachi Canal and Indus Highway."

"The flood 2010 can be termed the embankment flood, which in its nature, was sudden, unanticipated, far more aggressive and protracted. It exposed the effectiveness of dams and barrages in flood protection, asking for a paradigm shift in water management."

"Instead of mindlessly parroting a quick-fix solution to flood, we need to develop an integrated flood management policy based on people's participation and focusing on the existing challenges pertaining to river regime, drainage and ill-settlement patterns." Azhar Lashary (The News 290810)

Trade offs: Submerge some to protect others The irrigation authorities on Sept 8 made a 40-foot breach in a flood protective embankment near Manchhar lake as part of measures to protect Dadu and Johi towns. The move aims to reduce pressure on a dyke along the Main Nara Valley (MNV) drain. (Dawn 090910)

The UN estimates that the humanitarian crisis is now larger than the combined effects of the three worst natural disasters to strike in the past decade. These include the Asian tsunami and the major earthquakes that devastated Kashmir and Haiti. (Howard Falcon-Lang, Science reporter)

Climate Change Global warming might be one explanation for Pakistan's devastating floods, but scientists believe poor land management, outdated irrigation systems and logging are at least as much to blame. At least 3.2 million hectares — about 14 % of Pakistan's entire cultivated land, have been damaged.

"In parts of Malakand district in Khyber-Pakhtunkhwa more than 70 per cent of forests had been felled by a well-connected "timber mafia" that was difficult to stop. In the militant-infested Swat region, the Taliban were behind much of the illegal logging. The lack of trees leads to soil erosion and exhaustion because tree roots help bind soil, naturally retaining water." Said Jamshed Ali, Secretary-General of Sarhad Awami Forestry Ittehad, an organisation meant to protect forests.

"We need to clear the river channels of silt every four to five years and stop people living within a kilometre of the river channel. There are irrigation channels built using techniques from the 18th century. We need to react to the present-day," Abdul Qadir Rafiq of the United Nations Development Programme said. (Reuters 310810)

Secretary Information and Broadcasting Mansoor Suhail said on Aug 13, 2010 that all water reservoirs of the country have reached to their optimum level and in case of more rains in the catchment areas, there is no way to store the water, so it will have to be released downstream which may result in more floods. (Dawn 140810)

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