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Dams, Rivers & People

VOL 9 ISSUE 5-6-7 JUNE JULY AUG 2011 Rs 15/-

Lead Piece

AHEC's Pathetic Cumulative Impact Assessment of Ganga Hydro projects

Flawed, Shoddy, Biased and Unacceptable

Uttarakhand state in North India is on a hydro projects building spree. The Upper Ganga System alone, including Bhagirathi and Alkananda Rivers and their tributaries, till their confluence at Dev Prayag, has more than 130 large and small hydro power dams planned, commissioned and under construction. The overall impact of such an unprecedented cascade of dams on the fragile river system and surrounding environment is a matter of serious concern.

Looking at the shoddy and biased cumulative impact assessment report done by AHEC-IITR, it is clear that MoEF hired AHEC only to facilitate dam building permissions, without any consideration to the ecological balance and impact of the mega dam schemes on local populations.

Looking at the ecological and cultural sensitivity of the region, Central Empowered Committee (appointed by the Supreme Court) referred the Kotlibhel IA, 1B & 2 projects back to the Forest Advisory Committee f or reconsideration of Forest clearances issued under the Forest Conservation Act (1980). A sub-committee of FAC after visiting the area, recommended that a "thorough study of the carrying capacity of Ganga tributaries has to be undertaken." MoEF hired The Alternate Hydro Energy Center of IIT Roorki (AHEC IITR), without undertaking any bidding process. The stated reason for not inviting any other institute was: "Considering the exceptional nature of job and limited availability of time it is suggested that instead of adopting the bidding process we may seek proposal from only one institution of choice."

MOEF commissioned two studies: *Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins* which was given to AHEC, IITR & *Assessment of Cumulative Impacts of Hydroelectric Projects on aquatic and terrestrial biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand*, which was given to Wildlife Institute of India, Dehra Dun.

A number of objections were raised about AHEC's independence, competence and experience in undertaking such an important study. An Intervention Application has been filed by JP Dabral and Bharat Jhunjhunwala in the ongoing Supreme Court Writ Petition (202 of 1995) in Feb 2011, the IA is still pending before the SC. Between 2001-2010, AHEC has published barely 8 publications on rivers out of its 301 publications. 7 of these are about water quality and merely one is on environmental impact of small hydro power projects. AHEC does not have any publications related to all the issues covered in the TOR, namely geology, glaciers, landslides, ecosystem sustainability, ground water regime, river flows, cultural and religious impacts, wildlife and aquatic flora and fauna. Activists have made a representation to IIT, Roorkee and MOEF in 2010, requesting that the study may be withdrawn from AHEC and giving suggestions regarding interpretation of TOR in case study was continued with AHEC. None of the questions raised have been answered either by AHEC or the MoEF.

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The report by AHEC, commissioned by the NRCD, MoEF has been put on the MoEF website in June 2011. It has all the fallacies that were feared and expected.

Where is the Cumulative Impact Assessment? The report was supposed to do a cumulative impact assessment of various hydropower projects and related developments in Alaknanda and Bhagirathi basins. However, the report does not go beyond listing individual project impacts (which too are not comprehensive or adequate). Listing of impacts of various individual projects in one chapter or table, or classifying an impact as local or cumulative does not qualify for the report to be called a cumulative impact assessment. The report was expected to also assess what are the TOTAL impacts of the projects and what are the additional impacts that go beyond the totaling of individual project impacts. The report has completely failed to do this and hence does not qualify as a cumulative impact assessment report. In fact the report is more about how to continue to build big hydro projects rather than making an assessment of the cumulative basin wide impacts of hydropower projects, which also shows the pro hydro bias of the consultants.

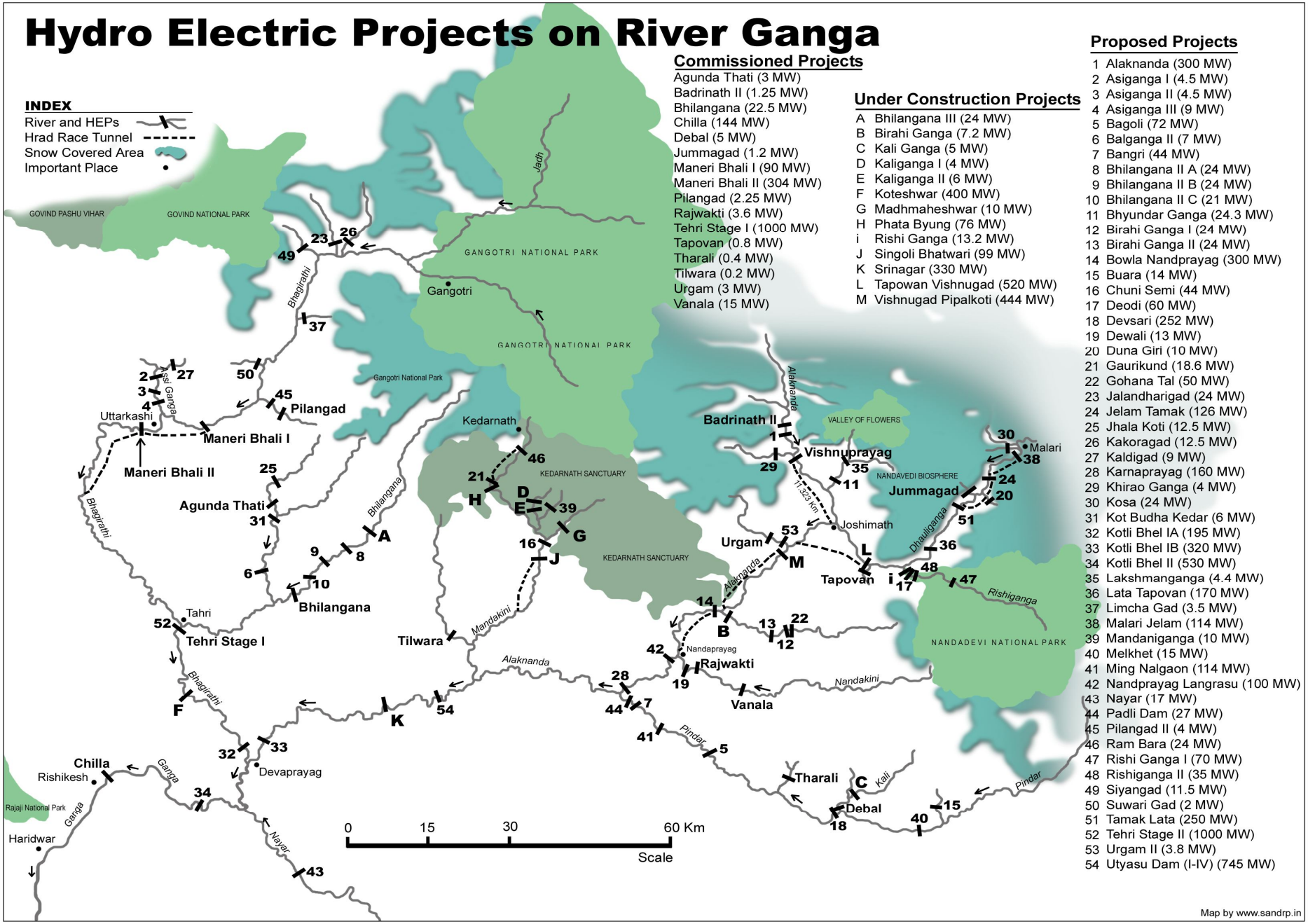
The government of India through a decision of an authority chaired by the Prime Minister has decided that no hydropower projects will be built on the initial 135 km stretch of Bhagirathi River. AHEC report lists hydropower projects on this stretch as under construction projects, and tries to build up a case of restarting work on projects in this stretch.

Cumulative impacts NOT ASSESSED Specifically, some of the cumulative impacts that the report has not assessed include:

1. Cumulative impact on hydrological flows, at various points within project, at various points within a day, season, year, over the years and cumulatively across the basin and impacts thereof. This will include impacts on various hydrological elements including springs, tributaries, groundwater aquifers, etc. This will include accessing documents to see what the situation BEFORE project was/ is and what would be after. The report has failed to do ALL THIS.
2. Changes in sedimentation at various places within project, at various points of time within a day, season, year, over the years and cumulatively across the basin and impacts thereof.
3. Cumulative impact on aquatic and terrestrial flora and fauna across the basin due to multiple projects.
4. Impact on Green House Gas emissions, project wise and cumulatively. No attempt is made for this, on the contrary an attempt is made in section 8.6 to suggest that there is no issue here, which is shocking denial of scientifically established facts, see for example the report of the World Commission on Dams or the UNFCCC criteria for CDM credits for large hydro. Interestingly, this attempt of the report to underplay this impact is in complete contradiction with a report submitted to the Union Environment Ministry in Dec 2010 by IIT consortium, including IIT Roorkee, where the AHEC is stationed[1].
5. Cumulative impact of mining of various materials required for the projects (sand, clay, boulders, coarse and fine granules, etc.)
6. Cumulative impact of blasting of so many tunnels on various environmental and social aspects.
7. Cumulative impact of muck dumping into rivers (the normal practice of project developers) and also of muck dumping done properly, if at all.
8. Impact of silt laden water (rejects from the delisting chambers) into the river channel downstream from the dam, and how this gets accumulated across the non monsoon months and what happens to it. This again needs to be assessed singly and cumulatively.
9. Impact of release of silt free water into the river downstream from the power house and impact thereof on the geo morphology, erosion, stability of structures etc, singly and cumulatively.
10. Impact of differential water flow (during peaking hours power generation vs none in off peak hours) downstream from power house in non monsoon months, with sudden release of heavy flows during peaking/ power generation hours and no releases during other times.
11. Cumulative impact of all the project components (dam, tunnels, blasting, power house, muck dumping, mining, project roads, project township, deforestation, transmission lines, etc) for a project and then adding for various projects. Same should also be done for the periods during construction, during operation and decommissioning phases of the projects.
12. Cumulative impact of deforestation due to various projects[2].
13. Cumulative impact of non compliance of the environment norms, laws, Environment clearance and forest clearance conditions and environment management plans. Such an assessment should also have analysed the quality of EIA reports done for the hydropower projects so far. The quality of the EIA reports of hydropower projects has in general been very poor.

[1] IIT Consortium, which includes IIT Roorki has mentioned 'Potential release of green house gases from the impoundments' as a critical impact of hydropower project in Upper Ganga basin in 'River at a Glance' Draft Management Plan for Ganga Basin submitted to the NGRBA in Dec 2010

[2] IIT Consortium Ganga River basin Management Plan mentions "The area under the influence of hydroelectric projects is suspected to undergo decline in its forest cover and experience enhanced landslides."


Hydro Electric Projects on River Ganga
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Maneri Bhali II (304 MW)
Pilangad (2.25 MW)
Rajwakti (3.6 MW)
Tehri Stage I (1000 MW)
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GOVIND NATIONAL PARK
GANGOTRI NATIONAL PARK
Gangotri
Gangotri National Park
Uttarkashi
Kedarnath
KEDARNATH SANCTUARY
VALLEY OF FLOWERS
Badrinath II
Vishnuprayag
NANDAVEDI BIOSPHERE
Jummagad
Malari
Joshimath
Urgam
Tapovan
Maneri Bhali I
Maneri Bhali II
Pilangad
Agunda Thati
Bhilangana
Tahri
Tehri Stage I
Tilwara
Nandprayag
Rajwakti
Vanala
NANDADEVI NATIONAL PARK
Devaprayag
Chilla
Rishikesh
Rajaji National Park
Haridwar
Tharali
Debal
Jadh Ganga
Bhagirathi
Alaknanda
Mandakini
Nandakini
Pindar
Kali
Ganga
Nayar
Dhauliganga
Rishiganga
11-23 Km
0 15 30 60 Km
Scale
Map by www.sandrp.in

This is a reality, a norm rather than a theoretical proposition, the study acknowledges this at some places, but makes no attempt to assess the impact thereof. In fact the CEC and Supreme Court orders in 2009 on Kotli Bhel 1A and 1B projects actually required an assessment of *effectiveness of the mitigative measures and compliance of the stipulated conditions on which various projects have earlier been cleared,* see FAC minutes of meeting dated May 30-31 2011 on http://moef.nic.in/. This particular legal requirement of CEC and Supreme Court order is yet to be fulfilled.

Considering the cultural and ecological uniqueness of rivers in Upper Ganga Basin, they belong to the Management class of A or B and deserve optimum e-flows allocation. However the report relegates them to class C or D which automatically means meager e-flow releases. This is completely wrong.

This is only a partial list of cumulative impact assessments that have not been assessed by the IIT R report.

Pro Hydro bias of the AHEC, IIT R The consultant team lead by Dr Arun Kumar, Head of Alternate Hydro Energy Centre, IIT Roorkee has shown their pro hydropower project bias at many places, repeatedly across the report. The assessment of Cumulative Impacts of Hydropower Projects needs to be done by a credible, independent agency. But the pro hydropower project bias shown by the consultants clouds the objectivity of the report and thus discredits the consulting team and organisation as independent, objective team. Here are a few of the instances where the consulting team has shown their pro hydro bias:

- The government of India through a decision of an authority chaired by the Prime Minister has decided that no hydropower projects will be built on the initial 135 km stretch of Bhagirathi River. Strangely, AHEC report not only lists hydropower projects on this stretch as under construction projects, but even tries to build up a case of restarting work on projects in this stretch (e.g. in last para in section 12.3, page 12-5). Such advocacy of abandoned projects is not even part of the mandate of this report; on the contrary it is positively AGAINST the mandate of the consultants.
- The report at several places keeps talking about the huge hydropower potential in Uttarakhand and the amount of power & revenues that the projects can generate for the state govt. This is very strange coming in this report & when these issues are not part of the mandate of the report. Moreover, the assessment of the potential hydropower generation and revenue thereof in the report does not even take into account the recommendations made in the report about environment flows, certain rivers to be left free of hydro projects[3] and so on. This also shows how non serious is the report about its own recommendations.
- The report says in section 1.6, "Considering the above, hydropower generation appears to be a viable alternative to meet the ever increasing power demand… its share in the mix of power has significantly reduced and is far below the desirable level." The authors are not quoting anyone here. Now what is a desirable level of hydropower share in power sector is neither discussed in the report nor is it part of the objectives of the report. Similarly, viability of the hydropower projects is subject to a number of studies and questions, one of them is supposed to be studied by this report. It is uncalled for, for the report to start with a conclusion about the viability of the hydropower projects.
- In section 8.6 the report makes a bland statement (quoting outdated IAEA statement of 1996) "hydropower is one of the cleanest ways to generate electricity in terms of GHG emissions." This is a most unscientific statement, considering that WCD report and even UNFCCC has recognised that reservoirs can be significant sources of GHG emissions particularly in tropical and semi tropical climate.

These are only a few of the instances showing bias of the consultants FOR hydropower projects; there are many more, which are not listed here. It is clear that such a bias discredits the report at the outset, when the report is about cumulative adverse impacts of hydropower projects.

Inadequate Recommendations on Environment flows Looking at the massive scale of the impacts of cascade projects, one of the most crucial tasks of the report was its prescription for maintaining e-flows. In fact one of the major objectives of the report was to make an assessment of environment flow requirements when projects divert large stretches of rivers into the tunnels. The report does a poor job of this.

The consultants have downplayed the current ecological and social status of the Upper Ganga River Basin. The range of eflows recommended through the report rests on Environment Management Class of the river in question. Rivers with a lower Environment Management Class (because of degraded ecology and unwillingness of the society to protect these rivers) are allocated lower range of eflows. However, rivers in the Upper Ganga Basin are some of the most unpolluted, pristine and ecologically important rivers in the country. The social, environmental, cultural, religious, aesthetic, recreational and economic importance of Bhagirathi, Alaknanda and their tributaries and the various Prayags etc., needs no

[3] This is listed as an Action Point even in the Ganga River Basin Management Plan though it is not confined to Upper Ganga River Basin.

elaboration. Considering these facts, rivers in Upper Ganga Basin deserve the Management class of A or B. However, most of the rivers are relegated a C or D class (and Environment Weight-age Band of D), which is completely unjustifiable. The basic categorisation is wrong and eflows recommended through these assumptions are not acceptable for rivers in Upper Ganga Basin.

The report says that the consultants had limited data on river cross sections and velocity of flows. Secondly it says that it could not apply the Building Block Method due to lack of data, time, manpower and other resources required. But in that case the consultants should have asked for data, time and resources required rather doing a poor job of the environment flow assessments. Thirdly, the consultants have rather mechanically applied the methods to assess environment flows. Thus while the study by the Wildlife Institute of India (Dehradun), also on cumulative impact assessment of hydropower projects on terrestrial and aquatic biodiversity concludes (the WII study is not yet in public domain, but see the minutes of the FAC meeting dated 30-31 May 2011 on MEF website, which has quoted some relevant portions of WII study presented to FAC) has concluded that the Kotlibhel 1B, Kotlibhel 2 and Alaknanda Hydro projects should not be built due to the serious nature of the impacts of these projects, the IITR study just mechanically calculates the environment flows for these projects and implicitly says the projects can go ahead!

SANDRP analysis shows that per MW generation of hydropower projects in India has come down by a huge 25% in last 20 years. None of the four major hydro projects in these basins, viz. the Maneri Bhali I, II, Tehri and Vishnuprayag projects are generating electricity as promised at the time of techno economic clearances. The % under performance ranges from 9.2% (Vishnuprayag) to 33.26% (Maneri Bhali II). Maneri Bhali II and Vishnuprayag projects have never generated electricity at the promised levels.

Moreover, in addition to environment flows, the river also needs certain flood flows at least once a year. Even the report of the Central Water Commission that this report quotes has made recommendation for flood flows, but this report has not followed the CWC recommendation for flood flows.

Wrong facts on fisheries The report says (row 8, column 1-3 in ES Table 1B on page E -23) that Rishi Ganga is a no fish zone. This is factually wrong, for example, the Project Design Document submitted for the Rishi Ganga project for its application to get CDM credits lists the fish found in the river! In fact, no basis or reference is given for characterising a large no of rivers as no fish zones (e.g. Bharon Ghati, Loharinag Pala, Jadh Ganga, Alaknanda, Vishnuprayag, Dhauliganga projects). Almost all of these characterisations seem wrong. More importantly, some of these may be due to the hydropower projects already built (e.g. Tehri, Maneri Bhali I and II on Bhagirathi and Vishnuprayag on Alaknanda). Not recognising these realities substantiates the shoddiness of the job the consultants have done.

The classification of rivers into No Fish Zone, Trout Zone and Mahseer Zone, or Epirhitronic, Metarhitronic and Hyporhritronic is ambiguous. There are also a few community conserved Fish Sanctuaries in this region but the report fails to mention them.

Wrong conclusions about impact on springs, drinking water and irrigation The report could not assess the impact of projects on springs "due to limitations of data". The report has failed to do justice to this crucial aspect. However, if the authors had been objective and astute, they could have easily found from local communities the impact of the projects on the local springs and thus their access to drinking water and irrigation. This experience is universally negative and the authors could have found this out for the completed and ongoing projects. On the contrary, consultants have claimed "negligible" impact in case of 23 projects, low impact for 7 projects and medium impact for just one project out of the 31 projects listed in Table ES 1A to 1C on pages E22-24. IIT Consortium's *River Ganga at a Glance: Identification of issues and priority actions for Restoration,* a part of Ganga River Basin Management Plan also states "drying of local water sources" as a critical impact of hydropower schemes. Thus the Cumulative Impact Assessment report is in contradiction with the IIT Consortium report in this aspect too.

The conclusion of the IIT R report is certainly known to be wrong in case of Loharinag Pala, Pala Maneri, Phata Buyng and Singoli Bhatwari. In case of Vishnuprayag project, page 11-35 says the impact on springs and drinking water is L-Med, but in table 1A on page E-22, the impact is listed as negligible, showing inconsistencies within the report. Again in case of Vishnuprayag, the report on page 11-35 says "there are not many springs in the area" through which the 19.4 km of river gets bypassed. The authors have the same conclusions also for Maneri Bhali I and II, this is shocking and untrue.

Moreover the report says (sec 7.2, page E-11) that "The impact of HPs on irrigation is generally positive and localised." This is also completely wrong, if springs get

destroyed in building hydropower projects, the impact on irrigation would certainly be negative and devastating since springs are the main source of irrigation in these areas. There are several instances where the traditional irrigation techniques like Kuhls and Guhls have been destroyed in the area due to the hydropower projects. In case of 5 projects the report assesses this impact to be Positive!

Objective assessment of hydropower performance not done The consultant has tried to assess the performance of the hydropower projects in terms of generation, but has failed to do an objective assessment. On the contrary, by using rather irrelevant factors like generation per unit discharge, per unit head and per river stretch, the consultant has tried to show the performance of the projects in rather charitable light. Moreover, they have not assessed the actual generation, but assessed the promised generation, thus misleading the readers. Thus, Srinagar project, which is yet to start generation and which has been mired in serious controversy of violation of environment norms and laws, building project beyond the height or capacity permitted and in submergence of religious sites, is sought to be shown in positive light by saying (page E-15), "For Srinagar project, 336 unit of power is generated from each m of diverted river". The project now stands stalled due to the High court and MoEF order.

The report says, without any basis that a threshold of *70%* may be fixed for the length of a river that can be either submerged or diverted by hydropower project in a basin! Such unscientific and biased recommendations are a prescription for disaster and an invitation to build as many hydropower projects as possible in any basin.

If the consultant was really interested in assessing the performance of hydropower projects, they should have assessed how the actual generation per MW has been changing over the years and how the actual generation compares with the promised 90% dependable generation. These aspects help reflect the actual generation performance of the hydropower projects. About 89% of operating hydropower projects in India are generating power at below the promised 90% dependable generation.

The performance of Bhagirathi and Alaknanda basin hydro projects is no different. For example none of the four major hydro in these basins, namely the Maneri Bhali I, II, Tehri and Vishnuprayag projects are generating electricity as promised at the time of techno economic clearances. They are all generating at below the promised generation level, the % under performance ranging from 9.2% (Vishnuprayag) to 33.26% (Maneri Bhali II). Maneri Bhali II and Vishnuprayag projects have never generated electricity at the promised levels.

Unfounded conclusions Some of the unfounded conclusions of the report include the following.

- The report concludes (para 11.10.12 page 11-27) that "The socio-economic impacts are positive in all cases". This is shocking, not only because it is untrue, but no plausible basis is given for this statement. This when the report itself says (page 1-14), "This study does not include socio-economic survey of the area, the effect of Hydropower Projects on landscape, livelihood of people living in the area around the hydropower projects…" How then did the report make sweeping conclusion that the socio economic impacts are positive in all cases?
- The report says (para 11.10.7 page 11-26), "The run of river schemes do not disturb the discharges in a substantial way except that the stretch of the river between the barrage and the power house is bypassed." This is incorrect since the flow pattern even downstream of the power house changes in non monsoon months when the projects try to operate as peaking stations. This has a lot of different impacts on the downstream stretch of rivers, including leading to death of people and cattle and destruction of properties in the downstream areas. The ignorance of the consultant of this seems very strange.
- The conclusion of the report in the same para that "The impact of RoR HPs on aquatic ecosystem is low to medium and localised" is also strange. The aquatic biodiversity in river does not exist in isolation in different stretches, but exists as an integrated process across the basin and when that process is disrupted by a dam and tunnel, it has river basin wide impacts.
- The report asserts without giving any basis that (p 12-5) "Glaciers are much higher altitudes, upstream and distant to be affected by hydropower projects."
- The report concludes that in case of 22 of the 31 projects assessed, the impact of the project on the cultural and religious places is negligible, which includes all projects on Alaknanda except two. This is a shocking conclusion when Alaknanda projects are slated to destroy all five holy prayags (confluence of rivers). For example the Vishnuprayag project, as the name signifies is one of these five prayags, but its cultural and religious impact is described as negligible. Same is the case with Kotlibhel 1B, which will destroy devprayag.
- The report says (page E-15), "Storage base project provide base load and are operated accordingly." This is completely wrong and shows the ignorance of the consultants about operation of hydropower projects. Storage based project are in fact in better position to provide peak load than run of the river projects that do not have adequate storage capacity. In fact provision of peak load power is supposed to be one of the USP of the storage based HEP.

- The report says life cycle energy ratios for hydropower plans reach values ranging from 170-267 for ROR and 205-280 for reservoirs but no specific reference is given for this (like many other figures), nor is it substantiated with any calculation for Indian conditions. In any case this is not part of the mandate of the report.

On the whole the report by the AHEC of IIT-R is a very shoddy piece of work and needs to be rejected and a credible agency be asked to take up the cumulative impact assessment afresh.

Unfounded recommendations The report makes several unfounded, unjustified recommendations.

- The report says that a threshold of 70% may be submerged or diverted by hydropower project in a basin. This is indeed a shocking recommendation. Firstly, no basis is given for this figure of 70%. Secondly, this is a prescription for disaster and invitation to build as many hydropower projects as possible in any basin, since the calculation of the river length is supposed to include the tributaries and some lengths of some of the tributaries may not be suitable for one reason or other in any case, for hydropower projects. Such recommendation shows not only pro hydropower bias of the consultant, it also shows that the consultant lacks the scientific rigour.
- The report says that fish passes, fish ladders and fish lifts can partly restore upstream migration of fish impacted by hydropower projects. But the report is unable to provide a successful attempt to achieve this in Indian conditions.

Misrepresenting the WCD report The report arbitrarily uses 10% of the mean annual flow to be released as environmental flow as a recommendation of the World Commission on Dams. This is misleading and incorrect as WCD report makes no such recommendation. In fact WCD report says, "Targeting particular ecosystem outcomes increasingly results in flow releases that go beyond the historical notion of a 'minimum release', often arbitrarily fixed at 10% of mean annual flow. A minimum release may serve to keep the river wet but it may not be an ecologically effective measure" (p 239). It further says (p 294), "Dams should provide for an environmental flow release to meet specific downstream ecosystem and livelihood objectives identified through scientific and participatory processes."

Moreover, the WCD report says (p 239), "Locally driven processes to establish the objectives of environmental flows will lead to improved and sustainable outcomes for rivers, ecosystems and the riverine communities that depend on them. Ecosystem responses to dam operating regimes are variable, so dam owners should undertake regular monitoring and a five yearly evaluation of environmental performance. This evaluation should inform modification of environmental flows where necessary."

Unfortunately, the IITR report has shown no value for locally driven processes anywhere in its report.

Cut Paste job? The report makes a recommendation (no 21 in section 12.6.6, p 12-9): "Typically, river restoration focuses on surface systems and their longitudinal and lateral connections, whereas the vertical dimension has been largely ignored". This is a bit strange and irrelevant recommendation. More interestingly, this sentence appears word to word in the following document: http://www.jnabs.org/doi/pdf/10.1899/08-017.1.[5]

However, the report does not refer to this document. This gives rise to a suspicion that portions of the report (like the one cited above) have been used from other documents without giving specific quotes or reference.

Cumulative Impact Assessment in contradiction with Ganga Management Report The IIT Consortium, which includes the IIT-R submitted the Ganga Basin Management report to the National Ganga River Basin Authority in December 2010. The present report does not mention many points which have been mentioned by its (IIT-R) own past report. The Consortium reports states: *"Implementation of these (Run-Of-River and Run-Of-River-(with) Pondage) projects have resulted in significant alteration in hourly, daily and seasonal flows over substantial river length, and in some parts, the river has lost her identity. A substantial part of the river flow is forced through tunnels or has been converted into deep impoundments. An estimated 82 km length of the river in this segment out of total UGS (Upper Ganga Segment) length has been converted into impoundments, major part of the flows has been forced into tunnels. The area under the influence of hydroelectric projects is suspected to undergo decline in its forest cover and experience enhanced landslides. Potential release of green house gases from the impoundments, drying of local water sources and damage to residential structures and moderation in local climate leading to breeding of mosquitoes and other insects, causing health hazards are also reported. The river ecosystem is under stress and the riverine environment tends to shift to lacustrine environment."* These crucial issues do not find mention in the Cumulative Impact Assessment Report.

Conclusion Considering all this, one is forced to request the MOEF to reject this report and ask for a more credible agency to redo the cumulative impact assessment.

[5] Ecology and management of the hyporheic zone: stream–groundwater interactions of running waters and their floodplains, by Andrew J. Boulton et al, J. N. Am. Benthol. Soc., 2010, 29(1):26–40 by The North American Benthological Society, Published online: 5 February 2010

However, in the meantime, so that the time and resources spent in doing this report are not completely lost, the MoEF should immediately take the following steps in view of the recommendations of this report:

- Ask the project developers of operating projects to start implementing the Environment Flows recommended by the study, only as an interim measure, pending more rigorous assessment. The developers of the under construction projects should be asked to follow the e-flows recommended by this report if the downstream releases recommended in the environment clearance is lower than the eflows recommended by this report. An empowered committee with 50% representation of the local people should be formed for each project to ensure compliance of this.
- The recommendation of the report (no 16 on page 12-25) that "Gap between two consecutive projects along a stream should be sufficient for the river to recuperate itself" needs to be immediately implemented. For this, the MoEF should institute a credible agency to prepare the criteria for assessment of such distances which will be different for different rivers and different stretches of the same river.
- The recommendation of the report (no 25 on page 12-26) that a number of small streams in these basins "are the main contributors of biological production of the main rivers" needs to be implemented and such streams should be declared as no projects zones. The streams identified by the report include Nayar, Birhi Ganga, Bhyunder Ganga, Balganga and Asiganga.
- The installed capacity of a hydropower project should be planned to be in conformity with the water available after satisfying the needs of environmental flow.

The IIT R report tries to undermine the issue of GHG emissions from hydro projects by quoting an outdated 1996 report. In the process, it ignores the scientifically established impact of reservoirs emitting methane, it also contradicts reports from MoEF, NEERI, UNFCCC, WCD, UNEP and even the Ganga Basin Management Report that the institute was part of it. Needless to add, it also undermines its own credibility in the process.

However, on the whole the report by the AHEC of IIT-R is a very shoddy piece of work, needs to be rejected and a credible agency be asked to take up the cumulative impact assessment afresh.

Himanshu Thakkar and Parineeta Dandekar (www.sandrp.in)

The Expert Appraisal Committee on River Valley Projects (MOEF) critical of AHEC-IITR report

This committee considered this report in its meeting on June 2, 2011 and some of the observations recorded in the minutes of the meeting show how shoddy this report is even accordingly to this official, statutory committee:

(i) There is no clear cut recommendation on e-flows. E-flows have been computed by five different models viz. Hydrological Index Method, Modified Tenant's Method, Desk Top Approach, Habitat Simulation Methodology, FRANCE and EMC-HMD and results from these models vary tremendously. A clear recommendation should be made regarding the e-flow rate in pre-monsoon, monsoon and post monsoon. The study does not clearly indicate which model to follow for Indian conditions. **Further, the Building Block Method, the model generally used for computing environmental flows in other studies and seems to be near to Indian conditions, has not been used.**

(ii) The figures given for environmental flow in table 7.16 does not include the figures of EMC-FDC (Flow Duration Curve) method given in table 7.14. Instead it has figures by 75% of Q95 method. It is not clear whether table 7.14 is superfluous or 75% of Q95 method should be discarded.

(iii) The conclusion that 30% of the river stretch is available as free flow does not seem to be correct. The Committee had looked into FRL and TWL of each project and found that there is hardly any free river stretch available between the upper most and lower most projects.

(iv) The cross section of the river taken at one place for computing the discharge & e-flow, extrapolating for the project site would result into misleading conclusions.

(v) The study does not take into consideration the flows required in the tributaries as many of the fishes move to these tributaries.

(vi) The environmental flows only take into consideration the depth required for movement of the fish, however, lacks details of the flow requirements at various times of the year and at various stretches. However, environmental flow needs to be maintained for the whole aquatic biota.

(vii) Environmental flows also need to take into consideration the monsoon flows. Ideally, it should mimic the natural river flow. Importance of monsoon flushing also needs to be given equal importance. The monsoon release has to meet the need of the aquatic biota which primarily needs intermittent large flows in this period. The effect of floods in submergence the wet lands which are important habitat need to be analysed.

(viii) The effect of HEPs on primary productivity of the river like fish catch etc. also needs to be studied.

(ix) Around the year study covering different seasonal variations would be required, but the present study represents winter scenario (Nov-Feb) only.

(x) A fast flowing turbulent river with cold temperature also supports some cold tolerant fishes like loaches and snow trouts, hence these species may be present in upper reaches of Alaknanda-Bhagirathi rivers particularly during summers.

(xi) The available fish diversity, presence of over-wintering/ migratory fishes- mahseer, snow-trout, their body size, presence of breeding and feeding grounds must also be considered in quantifying downstream flow.

(xii) The Garhwal Himalayan waters are reportedly rich in piscine diversity, hence require efforts for conservation.

(xiii) The different life stages and size of the fish should be considered for estimation of environmental flow requirement.

(xiv) There are many sites in the Garhwal region having pristine habitats, esteem religious, aesthetic & tourism importance. Gangotri, Yamunotri, Badrinath and Kedarnath are four top Hindu's religious shrines. Millions of people visit these places every year particularly during summer. The rivers, rivulets & streams traversing through these shrines (or near the roads to these shrines) have high sensitivity. Hence besides e-flow (based on downstream aquatic liabilities) the above points need also be considered for estimation of downstream flow.

(xv) Periphytic assemblage on and underneath the bed rocks, boulders, cobbles forms an important food material for snow-trouts, and some other hill stream fishes, hence need also to be studied under CIA.

Cumulative impact assessment report by AHEC-IIT Roorkee

A review of the river-ecology aspects

This review is focused on the river-ecology aspects and implications of the Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins upto Devprayag, by the Alternate Hydropower Energy Centre at IIT Roorkee, for the Ministry of Environment and Forests. This report followed a recommendation by the Forest Advisory committee of the Ministry, that no further approval for the diversion of forest land be accorded to hydropower companies until the cumulative impact of the numerous hydropower projects coming up in the various basins, were assessed. The AHEC-IITR submitted their draft report in March 2011. This was put up on the MoEF website in June 2011.

"We feel that benchmarking the current status of the floodplains with the conditions 10,000 years ago is not reasonable." Alright. How about just 30 years for these two sub-basins? *So in their entire study, they have no benchmark, and no assessment of incremental impact over time at all.*

Scope First of all, this assessment must be understood and acknowledged to be only a partial one, and not the basis for any decisions on hydro-power projects. The AHEC-IITR assessment covers only two upper sub-basins of one tributary of the Ganga, the Alaknanda and the Bhagirathi. The assessment of cumulative impact is premised on the understanding, and backed very substantially by the River Continuum Concept[6], that a river is one entity, from its small tributaries to its estuary. As such, the physical and biological processes initiated in its upper reaches have critical links with the trophic build-up along the entire length of the river, and indeed the oceans they connect with. Rivers are the earth's circulatory systems, and serious disruptions at any point in the cycle, affect the whole.

Sub-basins are just a part of the build-up, and in this case, do not even cover the entire ecological zone of the rhithron (fast flowing, cold waters of the mountain stretch). Therefore, a cumulative impact assessment would rightly require that impacts be assessed along an entire river system (because that is the scale and spread of the impacts), and with the increment of the various human caused impacts; such as fragmentation by blockage and diversion, abstraction for irrigation, for industry, sewage and effluent drainage and so on. While it is understandable that such an assessment may have been too much for AHEC to undertake by itself and in just 6 months, it would have been possible to have multiple competent agencies conduct assessments in different stretches of the Ganga simultaneously. It is only then that it would be possible to understand and co-relate the incremental and cumulative impact of all the actions put together. Partial analysis cannot be the basis for policy or executive decisions. Moreover, all the main recommendations on environmental aspects contain caveats and provisos, and are numbingly equivocal.

However, let us take a closer look at this partial assessment.

In their preambles to the various sections (chapters 6-7 that deal more specifically with the biological aspects), they quote the best definitions that convey well-considered environmental concern. Like "hydrological variability being essential to maintain the health of river" and the need to ensure that "optimum flows" are maintained by hydro-projects "that are compatible with maintaining the integrity of the aquatic environment downstream", and so on. You know they have a comprehensive picture in mind when they specify downstream water-bodies to include "coastal waters, wetlands (mangroves, sea-grass beds, floodplains) and estuaries." They even use words like *integrity.* And then they do the following.

They put paid to the consideration of the increment of "past actions" by placing it in a light where it seems ridiculously excessive, and then dismiss it altogether. On the important issue of baseline conditions for river ecosystems (7.3.2) they quote a study which in a general sense is referring to the changes in flood-plains worldwide due to human occupation, saying that "less than approximately 10% of the original (i.e. 10,000 years ago) floodplains still remain". The IITR study then go on to say that "We feel that benchmarking the current status of the floodplains with the conditions 10,000 years ago is not reasonable." Alright. How about just 30 years for these two sub-basins? *So in their entire study, they have no benchmark, and no assessment of incremental impact over time at all.*

One has to bear in mind that this assessment is likely to be held as a template for methodology for other assessments across the country. In the plains stretches of the Ganga itself, it would be critical to examine the nature and extent of human induced modifications over at least the past 100 years, for which detailed written records are available.

Methods and recommendations The AHEC assessment report reviews at some length the existing methods being used for over three decades in various countries for estimating environmental flow requirements based on current science. They then dismiss their

6 Robin. L. Vannote et al: *The River Continuum Concept.* 1980. Can. J. Fish. Aquat. Sci. 37: 130-137.

applicability summarily. Their cryptic explanation for this rejection of methodologies used by other nations is that "they may be area-specific, and the same may not (be) used for Indian condition" and "keeping in view the water availability and water requirements in Indian basins". No further explanation, no science here either. Instead, they cherry-pick three elements from the very methodologies they reject, and put all three together in one single sentence as their recommendation. They recommend "the *minimum* flow given by the World Commission on Dams, *and* 75% of low flow based on Q95, *along with* the actual *minimum* required based on Environmental Management Class (EMC) and Hydraulic Mean Depth (HMD)" (the italics have been placed in this quote for emphasis only). Let us take a closer look.

The AHEC report reviews at some length the existing methods being used for over three decades in various countries for estimating e-flow requirements based on current science. They then dismiss their applicability summarily, without any scientific justification.

First, if you think that *and* and *along with* mean adding up, they don't. They are three different calculations to choose from, all three yielding the lowest flows of all methods in use elsewhere. Second, please notice that the 'optimum' flows of their earlier definitions quietly become 'minimum' flows. What minimum flow requirements mean for a hydro-power company is really maximum exploitation thresholds. Third, the authors of the AHEC report misrepresent the World Commission on Dams (WCD) as having prescribed 10% of Mean Annual Flows as environmental flows. WCD does not prescribe this. Q95 is the rate of flow in a stream that is exceeded 95% of the time, or 18 days of the lowest flows in a year. It is the very minimum, and in order to cope with this stress period, most adult fish and larger aquatic life-forms have to migrate down to larger stream volumes in order to survive. AHEC recommends that a further 25% may be abstracted out of this minimum, and provide for even further reduction when they say "along with actual EMC and HMD". Look closely, and you will see that they are actually ***three different ways that can be used either as per convenience, or in succession to reduce flow requirements further than the minimum environmental flow requirement that any country has arrived at so far.***

Environment Management Class The report outlines various ways for this. One of them, the EMC-FDC (Flow Duration Curve) method, is a grading based on an assessment of existing levels of modification & disturbance and subsequent biotic degradation in a river-stretch. You assign a river-stretch a class as per its environmental health-status, A to F in descending order[7]. The more the existing modification and worse the degradation class, the less water you need to allocate for environmental considerations. "The higher the EMC, the more water will need to be allocated for ecosystem maintenance or conservation, and more flow variability will need to be preserved."(7-23). Look at their tables that allot classes to various river-stretches, and you can see that ***wherever there is a hydro-project, which is the reason that stretch of river gets a lower grade in the first place, the smaller the percentage of Mean Annual Flows they need to allocate for the river's well-being.***

There is also lack of clarity in the assigning of EMC classes to stretches of the river. They mark them on the tables as EMC (biotic), which seems to refer to either their location on the epirhithronic, metarhithronic and hyporhithronic transitions (altitude zones for speed of flow and temperature), or their corresponding trophic levels. Here they are placed in EMC classes B, C and D. ***These can be zonation labels, and not grades to classify levels of modification, on the basis of which flow variability can be assigned***.

In other places they have gone into detail in defining EMC classes being assigned as per the disturbance levels in a river. They also take it another step towards obscurity when they say these classes are assigned by "expert opinion". The assessment needs to be absolutely clear about how they have gone about assigning environmental management classes, because this can be used by hydro-power companies in whichever context is useful to assign the least flows possible.

Hydraulic Mean Depth is used in this report to specify the minimum depth of water required to be left in the river in order to just keep alive the aquatic life-forms normally found in a river, in their words, "for their survival". They call these 'environmental flow requirements', and as per their own estimation, the minimum water requirement for benthic macro-invertebrates, fish, and otters is as follows: The basis for their assignment of depth and velocity for benthic macro-invertebrates (BMIs) is obscure. There is sufficient recent research on flow-modifications brought about by hydro-power projects to indicate that radical alterations in depth and velocity of water creates a transition in the dominance of BMI groups from palustrine (swiftly moving waters) to lacustrine (slow moving to stagnant waters) species[8]. This invariably leads to negative trophic cascades on predator species.

[7] A for rivers in a natural state with very minor modifications, to F for where the river ecosystem has been completely modified, with almost total loss of biota and habitat

[8] Daren Karlisle and others. Alteration of stream flow magnitudes and potential ecological consequences: A multiregional assessment. Front. Ecol. Environ. 2011, 9(5): pp 264-270.

Among the fish they recommend that snow-trout, barils and loaches need a mean depth of 20-30 cm (just shin deep water) with a flow velocity of 50-100 cm/ sec[9]. Catfish they say, need 15-20 cm depth (little more than ankle deep) in flow faster than 100 cm/ sec, and fish like mahseer, the largest cyprinid fish in the world, need a depth of just 30-50 cm (shin to knee deep) with a flow-velocity of 25-50 cm/ sec. The smooth-coated otter (*Lutrogale perspicillata*) the report says, will do just fine in 30-50 cm of water too, flowing at 25-50 cm/ sec. They've got their otter quite wrong[10], but even so, a typical family of smooth-coats, two parents and 4 pups, require among other habitat features, between 7-10 kilometers of deep unaltered stretch of river as territory in order to be able to get sufficient fish from[11] to survive. ***AHEC recommends knee to shin-deep water that will barely submerge an otter, let alone be habitat for enough fish for this apex predator of the mountain river-reaches. Otters, incidentally, are listed under schedule I of the Wildlife Protection Act of India, the highest protection category.***

So this is what you are left with when you take 10% of mean annual flows, reduce it to 75% of Q95 or the lowest-flows, and reduce it further again by grading river-stretches by EMC and punishing them further for having been degraded already by hydro-projects, and then give all life in the river an HMD or depth of water that even a zoo or an aquarium would not. This is done in a river where on an average, the natural rate of flow can be close to 500 cubic meters of water, every second.

So this is what you are left with when you take 10% of mean annual flows, reduce it to 75% of Q95 or the lowest-flows, and reduce it further again by grading river-stretches by EMC and punishing them further for having been degraded already by hydro-projects, and then give all life in the river an HMD or depth of water that even a zoo or an aquarium would not. This, in a river where on average, the natural rate of flow can be close to 500 cubic meters of water, every second.

After recommending the above environmental flows, they have a major proviso (6-35). They say that "to evaluate the impact of HP on aquatic life much more detailed and quantitative data than available at present on the fauna and flora is required. Thus, at present *it is not possible to give any firm assessment on the impact of HP on the biodiversity* of the Alaknanda and the Bhagirathi basins. However, it is necessary to maintain the *minimum* environmental flows at each HP project to sustain the biodiversity of the rivers." If this is not a firm assessment of impact on biodiversity, how can it result in recommendations other than the use of the ***'precautionary principle',*** which is not to radically alter things we do not understand the impacts of. But no, they have now converted "*optimum*" flows to "*minimum*" flows and go ahead and recommend flows specifying depth, species-wise and in centimeters.

After recommending a range of options that yield the minimum possible flows, and then calling them environmental flows, the AHEC-IITR actually recommends the following: *"Modification or manipulation in morphology of stream channel in the form of increasing bed form, roughness, heterogeneity, and channel sinuosity is also recommended to improve habitat structure and induce hyporheic exchange flow in streams and rivers."* (See recommendation 12.4.14.) ***Is this science? Can anyone in AHEC-IITR please explain how this can be manipulated without ensuring flows that create such conditions? And with their recommending modifying channel sinuosity in Mountain Rivers, they just give themselves away.***

They also give themselves away repeatedly in the few specific recommendations they make. For example, they are clearly aware of the trickle that they have recommended because they further recommend that "in the diverted stretches of the river bed, at suitable intervals, about one meter high check dams may be constructed *where water would collect* to meet the needs of the local population." (Recommendation 12.6.4.17) One meter high for *water to collect*, in a river-bed where on average the flows are in hundreds of cubic meters every second!

They also recommend that *"no further allotments for hydro-power sites may be made for rivers where the percentage of river length affected is high. A threshold, say 70%, may be fixed for this purpose."* There is no analysis leading to this percentage, and no further explanation, no science. You think at first that they are saying "no" to further allotments where too many have already been done, but they are actually doing the inverse.

[9] The velocities mentioned here are within a normal range, but it would be impossible to get a combination of hydraulic mean depth and prescribed velocities for any length on a river-bed whose slope and bed-morphology are constantly changing.

[10] This is the habitat range of the Eurasian otter (*Lutra lutra*) and the small-clawed otter (*Aonyx cinerea*), neither of which find mention in their lists. The smooth-coated otter is essentially a plains animal that inhabit large and deep rivers and lake-habitats there. Ref. S.A. Hussain. Conservation status of otters in the terai and lower Himalaya of Uttar Pradesh, India. Proc VIIth International Otter Colloquium.

[11] S.A. Hussain and others in the IUCN Red List of Threatened Species.

What this "say 70%" really means for Himalayan Rivers is that you can "affect" an entire river from the point that it has sufficient flow to make commercial exploitation viable, all the way down. Most rivers originating at glaciers here have a flow of about only 1 cumec at the snout of the glacier, and it takes about a third of the length of a sub-basin, for 3rd and 4th order streams to build up sufficient flow to make hydro-power generation feasible at a commercial scale.

Along the Bhagirathi main-stem 31% of the river sections will be diverted into tunnels, and here, sub-surface flows will be greatly reduced due to greatly reduced above-ground flows. The recommendations for e-flow do not take this into consideration at all.

But there is a clue where this "say 70%" might come from. If you look at AHEC's analysis of the likely modifications that will come about when the projects built, underway & planned in the two sub-basins are complete, it says that "about 31% of the Bhagirathi river length is diverted whereas 39% of the river is submerged." 70% see? They also say that "on the other hand, Alaknanda River may have 27% of the river length diverted & only 21% submerged". *Only*.

The report says that *"the endangered golden mahseer, which is migratory in nature will be adversely affected if any barrier which is more than 15 m in height is placed across their migratory route".* That is quite a leap. Of imagination. Ask a fisherman or a fish-scientist, and they would confirm that mahseer would find it impossible to get over a barrier ***even 2 m*** high. Mahseer are sometimes referred to as the elephants of fish; they can hardly jump. Why would AHEC say 15 m? It is not a random number. As per WCD, a dam higher than 15 m is a large dam. Should this report form the scientific basis for future cumulative impact assessment of hydro-projects, ***any dam below the height of 15 m could ignore their impact on mahseer migration altogether.*** This would include most dams on the smaller side-streams precisely where mahseer do go to spawn.

"Out of the 70 commissioned and under development projects, 54 are ROR type and 16 projects have substantial storage to regulate stream flows. It is clear that the *ROR projects will not have any impact on stream flows.*"(p. 7-66). They have also lumped all smaller projects (with pondage less than 20 m deep, and storage less than 10 million cubic meters is considered an ROR. Even "Kotlibhel 1A and 1B have *considerable* storage being used to provide head for the generation of power and there is little or no regulation of flows. Hence for the purpose of stream flow variability, this project is also considered an ROR project". They also found that "5 commissioned and under construction projects have *substantial* storage capacity to regulate incoming stream-flows. *This could be either beneficial or harmful*." Full stop, and no explanation. *Classic equivocation.*

On the question of ground water however, **they have chosen to ignore the most significant of alterations; the severe reduction of hyporheic (subsurface) flows under the river-bed and along the riparian zone and flood-plain areas.** Along the Bhagirathi main stem 31% of the river sections will be diverted into tunnels, and here, sub-surface flows will be greatly reduced due to the greatly reduced above-ground flows. Their recommendation for e-flow requirements do not take this into consideration at all. This vertical and lateral connectivity is entirely ignored in their recommendation, even though they have given lip service to its importance in their preambles.

On ground water and springs (7-108) While the report says it does not have enough data on this matter and that "it may be difficult (or improper) to conclude with confidence on the impact of construction of hydro-projects on the availability of groundwater and drinking water sources to the population in the project area" they still go ahead and say "due to construction of a dam... it is expected that there would be a positive impact of project for groundwater recharge and availability", and then go on to say "It may be noted, that due to the construction of tunnels it is expected that the discharge of a few springs may reduce but at the same time the discharge of a few springs may increase. It appears that the overall impact may be the *redistribution of the flow*"! Redistribution? There is repeated evidence at very many villages, wherever there has been tunneling below them, that due to the great quantities of explosive used for blasting tunnels, the impermeable layer that causes sub-surface flows to emerge as springs to the surface get shattered underneath, leading to the spring percolating through the cracks and disappearing from the surface. People have located their villages hundreds of years ago, on the basis of spring water availability and potentially arable land at particular locations. If it gets 'redistributed' a few km down slope, I guess they should just shrug and relocate their entire village and their agriculture fields to this new location.

The AHEC-IITR assessment also says that "periodic high flushing flows are desirable to prevent settling of fine, clogging interstitial spaces in the substratum" (7-105). They themselves also say on the other hand, that "normally the flushing is carried out once every year. *Flushing is not very environmentally friendly because a large amount of accumulated sediment is released during a short period when the natural flow may be smaller and this may cause environmental problems in the downstream areas*." It is precisely these flushing flows that have been listed as extremely harmful in all the studies that have been conducted on the impacts of hydro-power projects.

The report also recommends that "Fish passes may be made an integral part of hydro-power projects". By saying this they have put away the problem and given the go-ahead for the hydro-projects. Surely the good engineers knew that building a fish pass or ladder more than 15 m high has not been feasible so far?

Protected Areas Rivers in India are not protected under law, except in areas that fall within Protected Areas such as Wildlife Sanctuaries and National parks. The report contains a sub-title 'Forest and protected Areas' (6.13). Under this title is a whole three sentences. "The basin is home to a number of protected areas and reserve forests. These areas and hydro-power projects are shown in Fig. 6.12. *It can be seen that seven projects are located in the protected areas."* ***This is all they have to say regarding the impact of hydro-projects on river-stretches that are within Protected Areas. A Protected Area seeks to protect life-forms and habitats in the terrestrial and aquatic realms and their transitions, and the cumulative impact of the incremental reduction of these habitats bears serious consideration. This has been ignored.***

People have located their villages hundreds of years ago, on the basis of spring water availability & potentially arable land. If it gets '*redistributed*' a few km down-slope due to a project, are they to simply relocate their village & fields to this new location? … The nation deserves better science, & not a trojan-horse bearing short-sighted commercial interests.

Finally, despite all their protestations that "the development of hydro-power projects should be based on *scientific facts* and not started or stopped due to pressures/lobbying by individuals/groups", the concluding statement of the AHEC-IITR report on the issue of environmental flows is: "Environmental Flow Requirement depends on development stage of the area and societal requirement …" Whatever happened to *scientific facts* along the way?

Finally, the ultimate decision on how we use our rivers and how much, will be negotiated in the political realm. But there is a need for a more honest science here. While the AHEC-IITR report uses the language of science and reproduces lengthy reviews of scientific method, ***in all the critical aspects such as cumulative assessment of impacts and recommending e-flows, science and precision are seriously lacking.***

Conclusions and Recommendations They have 14 conclusions regarding the **cumulative impact**. Of these, three have been listed to be positive (tourism, irrigation and the economy). Five have been listed as having nil or insignificant impacts (seismicity, glaciers, religious places, water quality in storage dams and water quality in ROR projects). The remaining 6 impacts are slope stability, loss of spring water, sedimentation, dumping of muck, fish passage, by-passed sections of the river going dry. It is appropriate to note that all this amount to a big nod.

They have **42 recommendations.** Of these 17 points relate to those which need to be researched in more detail, monitored more closely or implemented with more care. Then there are 9 points that relate to religious and social aspects where more care needs to be taken. Then is a list of inane and contradictory recommendations. Their first conclusion is that "the impact of hydro-power projects on seismicity is nil". That such projects do not induce earthquakes. However in their recommendation number 7 they say that hydro-projects more than 20 m high, especially close to the Main Central Thrust may be avoided, and if not avoided, then monitored. There is also no consideration to the seismic impact of thousands and tonnes of explosives being used to blast kilometers of tunnels. Even if they do not induce earthquakes, the incremental damage likely to be caused is entirely ignored.

Regarding flows, after recommending flows in centimeters, they revert to the cover-up of words that say **'optimum flows should be released, variation of flow must be maintained, the very harmful flushing should be resorted to, unthinkable channel modification should be undertaken, fish passes should be made, banks should be reforested, and 70% of a river length can be modified.** They also recommend that 1 m high dams be made on the river bed where rivers are diverted, and round it off with ***a general statement that there should be a gap between hydro-projects, enough for the river to 'recover itself'. What this gap should be, & what are the parameters of recovery are of course not stated***.

Is it a mere coincidence then that AHEC-IITR's own professed competence really lies in turbine design & hydro-power plant efficiency? Or that they have standing memoranda of understanding with state govts of *all* the West Himalayan states for the development of hydro-power (including Uttarakhand where they conducted the study in question), and that their recruiters are the biggest hydro-power companies in the country (see: http://ahec.org.in/)? **If this AHEC-IITR report is accepted by govt as the template for assessments of cumulative impacts of hydro-power projects in India, we will take the life out of our rivers, and much more. The nation deserves better science, & not a trojan-horse bearing short-sighted commercial interests.**

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Cumulative impact Assessment report by AHEC IIT Roorkee

A review of Water quality, biodiversity and ecology aspects

The confusion among various sections of people about the Hydropower development is exacerbated by the lack of information on the effect of constructing and operating a chain of dams and structures in the fragile mountain ecosystem. The cumulative effect of such a chain is far greater than that of each structure taken singly. Most dams are planned as if they exist in a little bubble of their own, without any reference to upstream and downstream events. The AHEC report *Assessment of the Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins* was expected to fill this grave need. A perusal of this report raises doubts about whether it has met these expectations.

While studying such a report commissioned by the govt, one expects absolute adherence to two principles. Firstly, the **science** referred to and quoted should be accurate and proven. Ambiguity and confusion should be absent, or if unavoidable, then acknowledged as such. Perhaps more important is that an analytical report should be **conceptually accurate, just and unbiased**. The following critique is confined to **Chap 6** which deals with **Water Quality, Biodiversity & River Ecology**. The title of the chapter indicates that the scope of the chapter is to report the effect of hydro-projects on river ecosystems. However, the statements made to report water quality show a transparent bias on the part of the authors.

A 33% increase in **BOD** after the water passes through the tunnel (6.3.2) is quickly dismissed with the explanation that it is still within permissible limits for drinking water (for human beings) without acknowledging the effect of this increase on benthic invertebrates & other components of the ecosystem.

When it comes to **fecal coliform** counts upstream and downstream of commissioned projects, this bias is apparent. Any decrease in the coliform count is applauded by the statement that water downstream of the dam is of better quality. An increase is attributed to the colonies near the dam; the structure is of course blameless. There needs to be an understanding in a paper of this importance that environmental impact is not only that of the concrete structure itself, but of all that goes into its making. Quarrying of mountainsides for stone, construction of access roads, construction of colonies for personnel, and the people brought in large numbers into ecologically fragile areas all have deleterious, mostly permanent, effects on the area which need to be taken into account.

The authors had access to water quality studies conducted earlier in 2006, 2007, and 2009. The reader would appreciate use of these to examine **temporal changes** in the water quality. The only place where this have been done is with the 2007 report, where an increase in turbidity has been attributed to 'some construction activity' (6.5 (iii)). We know that construction activity- especially the construction of dams- increases turbidity, but to what extent is this increase? How does it affect the ecosystem?

In assessing **biodiversity**, the report seems unconvinced of the effect of dams on riparian habitats and states the need for more data on the existing biodiversity to come to any conclusions. The effect of dams on various ecosystems is well-documented. Notable reports include '*Biodiversity Impacts of Large Dams'* written for IUCN/UNEP/WCD by Don McAllister et al. The present report does not acknowledge any such information. They have chosen to use fish alone as one of their classification systems (6.8.3). According to this, the entire epirhithronic zone – a zone characterized by steep rocky slopes and boulders-is classified as a 'no-fish' zone. However, this classification focuses on only one element of an ecosystem & so dismisses not only the importance of other river species (e.g. crabs) but also the validity of the concept of an ecosystem in the first place.

A reader will be tempted to judge (and dismiss) this report on the basis of a single sentence in section 6.10. '*An* "**environmental flow**" is the *minimum* discharge required.. .' (Emphasis added). This definition is conceptually inaccurate and ethically at odds with the idea of e-flows. E-flows (always in the plural) are the 'suite of flow discharges of certain magnitude, timing, duration and frequency that together ensure a flow regime capable of sustaining ecosystem processes' (Smakthin and Anputhas, 2006). A river needs a complete flow regime consisting of high flows, low flows, and intermediate peaks to survive. Each of these flow conditions have a unique and crucial role to play. To assert that 'minimum discharge' is the same as 'environmental flow regime' is wildly inaccurate when stated by a layperson; it is criminal to state this in a report of this importance.

This review is a record of disappointment and a statement of concern. The much-awaited cumulative assessment would, it was hoped, guide a sustainable and knowledge-driven harnessing of hydropower while also safeguarding mountain ecosystems. This report fails to meet these expectations. Most important thing here is the question of how to make mountain ecosystems and Himalayan appetites co-exist. There is far too much at stake. The money and time spent in making the report is possibly not been spent in vain; all that is needed is a fresh, knowledgeable and unbiased look at this same information.

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Industrial and Domestic Water Supply Dams for Mumbai:

No EIA, No public hearings, No clearances, No monitoring: They are BENIGN DAMS!

Northern part of the global biodiversity hotspot of Western Ghats is a relatively lesser studied region in terms of ecology. Nonetheless, it is home to some rare, endangered and endemic species as well as tribal populations in districts like Raigad, Thane and Nashik (in Maharashtra) and Dangs in Gujarat. Murbad region of Thane has been listed as a Proposed Ecologically Sensitive Area because of its biodiversity, proximity to Tansa Wildlife Sanctuary and 'high number of threatened species'[12]. The Western Ghat region of Thane district comes almost entirely under the Tribal Sub Plan (TSP or the Integrated Tribal Development Program), especially talukas like Murbad, Shahpur, Jawhar and Wada. According to the Ninth Five Year Plan (1997-2002), one of the reasons for this focused effort was, *'Post-independence, the requirements of planned development brought with them dams, mines, industries and roads – all located on tribal lands. With these came the concomitant processes of displacement, literal and metaphorical. Tribals found themselves at a profound disadvantage in the face of an influx of better-equipped outsiders into tribal areas. The repercussions for the already fragile socio-economic livelihood base of the tribals were devastating – ranging from loss of livelihoods, land alienation on a vast scale, to hereditary bondage*.'

Apart from the funds invested by the government in various tribal development schemes in this area, many organisations like Shramik Mukti Sangathana and Van Shakti have been working for many years with the tribal population addressing issues like education, land rights and health care. There are a number of protected areas and reserved forests in this area, like the Tansa Sanctuary. The region also has a rich tradition of community conservation, with numerous *Dev Rais (*Sacred Groves*)*, *Devachi Zaade* (Sacred Trees), a temple fish sanctuary (documented, there can be a number of such sanctuaries, undocumented) which protects endangered Mahseer. Wada region alone has 7 'Prioritised Scared Groves' and Wada, Jawhar and Murbad region has been marked as Protected Area Buffer and proposed Ecologically Sensitive Area (ESA) by Bharati Vidyapeeth's Report submitted to the Western Ghat Expert ecology Panel.

All in all, this is a region rich in biodiversity, housing some of the last relics of majestic Western Ghat Forests, providing innumerable ecological goods and services to Mumbai including water supply, erosion control (reservoirs like Bhatsa, Tansa, Barvi, Morbe, Modak Sagar and Upper Vaitarana), regulating micro climates, supplying timber and non timber forest produce, herbal medicines, etc . It is home to a number of tribes which are entirely dependent on the forest and its ecological balance to sustain them. A number of tourism initiatives have made this area a popular trekking and weekend destination for the urban Mumbaikars.

It is obvious that such a region would be protected and valued for the benefit of current and future generations of Mumbai as well as the tribal *padas. In reality, something very different is happening here. More than eight large dams have been planned in this region in the tribal belt and dense Western Ghat Forests of Thane and Raigad Districts. These dams, which will affect a minimum of 25000 people (mostly tribals) and submerge thousands of hectares of Prime forests, agricultural and residential lands do not require any environmental clearance and involve no public hearing, no Environment Impact Assessment*[13] *.We will not even know what has been the impact of such a massive scale of infrastructure on tribal populations and their forest.*

We present a brief status of some of the upcoming dams and the extent of irregularities involved in the process:

Kalu Dam The Kalu dam site is situated in the TSP area of Murbad Tehsil in Thane District. This dam, with a storage capacity of 407.99 MCM will submerge an area of 2100 ha, including about 1000 ha of forest land. (Photo (all photos by author) **Above:** Illegal work on Kalu Dam Foundation Excavation).

Various Irregularities in Kalu Dam Although the project does not have Forest Clearance, work has already started on what they refer to as 'non Forest Land' (which is forested Adivasi land).

On January 6, 2011, The Forest Conservation Division of the MoEF issued a circular revising para 4.4 of the

[12] Bharucha et al, 2010,*Current Ecological Status and Identification of Potential Eco-sensitive Areas (ESA) in Northern Western Ghats*, Bharati Vidyapeeth's Institute of Environment Education and Research (BVIEER)

[13] *If they do not submerge part of the Protected Area*

Guidelines on the Forest (Conservation) Act, 1980 regarding projects involving forest as well as non forest lands. According to 21 March 2011 circular issued by the MoEF, the original guideline has been strengthened and which is now in force (since March 2011 and also before that) says: ***"If a project involves forest as well as non forest land, work should not be started on the non forest land till the approval of the government for release of forest land under the FCA 1980, has been given. This fresh circular has been issued, "to avoid further mischievous interpretation". The ongoing work on Kalu Dam blatantly defies the legal stipulation in this circular.***

Letter from local people from the Kalu dam area, Shramik Mukti Sangathana and SANDRP have been sent to the Forest Advisory Committee regarding this matter on the 30th May 2011 and subsequently. We have not received any response yet.

The project authorities claim that the contractor has undertaken only 'Ancillary' activities as they have yet to receive Forest clearance. These Ancillary activities include only temporary work, they claim. However, the contractor and Project proponents have already caused massive deforestation and destructive excavations. Such destruction of forest without the Forest Clearance is also illegal and in violation of the FCA. Levelling work is on going with more than 30 dozers and 100 JCBS on the site, plying incessantly.

- A huge foundation excavation for the dam is ongoing.
- A guest house for Project officers, staff and contractors has been constructed , which is a lavish structure fitted with AC and LCD TV sets
- Ironically, though the scope of 'Ancillary Works' include shelter for dam workers, at Kalu the workers and their children sleep in the river bed (which is dangerous and illegal), while the CRPF police force, installed at the site for months, reside in rooms.
- The non forest land on which this excavation and levelling is continuing belong to Adivasis. No legal process of acquisition has even been started regarding these or any other lands which need to be acquired for this project.

Since there have been no EIAs, no Environmental Clearance, no Public Hearing, local peoples voice remains unheard even on paper.

The entire area to be submerged and affected by Kalu Dam is a **TSP-Scheduled Area.** The provisions of PESA (Panchayats Extension in Schedule Area) Act require informed consent from Gram Sabhas for this project. **No such consent has been given by any Gram Sabhas. Most of the Gram Sabhas have resolved to resist this project. Thus the ongoing construction of this dam also amounts to Violation of the PESA Act.**

The submergence area of Kalu Project includes about **1000 ha of forest land**. The area is inhabited by Scheduled Tribes and other traditional Forest Dwellers who depend entirely on the Forest land and resources for their bona fide livelihood needs. Many of these tribals and traditional Forest Dwellers have filed Individual Cultivation Rights claims under the 'Scheduled Tribes and other Traditional Dwellers (Recognition of Forest Rights) Act 2006 (FRA). Further, about 20-25 hamlets/ villages have their community forest rights in this forest in the form of food gathering, collection and sale of minor forest produce like Bamboo, Mahua, Mangoes, Karwandas, Tendu leaves, cashews, gum, firewood, etc. They also depend on this forest for herbal medicines. Most of these have not been documented or settled yet.

The 2006 FRA, Section 4 (5): "**No member of a forest dwelling scheduled tribes or other traditional forest dwelling communities shall be evicted or removed from forest land under his occupation till the recognition and verification process under this act is complete."** Therefore the ongoing work on Kalu dam is a violation of the FRA also. The Katkari, Thakur and Mahadev Koli Tribes have more than 20 traditional worship places in this forest area and there are many sacred groves and trees associated with these places.

Overview of the status of on-going and planned dams for supplying water to Mumbai and suburbs

Dam	District	Storage Cap, MCM	Submergence Area, Ha	Forest Area affected, Ha	Population affected	Environmental clearance required?
Kalu	Thane	407.99	2100	999	3169	No
Shai	Thane	348 (Planned Utilisation PU)	Not available	43000 trees to be cut	5124	No
Middle Vaitarna	Thane	172 (PU)	3473[14]	760 (over 100000 trees cut)	Eight villages (minimum 1600 people)	Yes, submerging part of Tansa Wildlife Sanctuary. Cleared
Balganga	Raigad	127.76 (PU)	1240	265	8000	No
Gargai	Thane	180 (PU)	NA	NA	NA	Yes, affecting part of Tansa WS
Pinjal	Thane	425 (PU)	NA	NA	NA	Yes, affecting part of Tansa WS
Barvi	Thane	250 (PU)	NA	1214 (news reports)	3375	No

(All Planned Utilisation Figures from: MMRDA Regional Plan for Mumbai Metropolitan Region 1996-2011)

[14] Bombay Community Public Trust: Understanding our civic issues: Mumbai's Water Supply

The lands and forests also act as grazing grounds for cattle and goats. Fish from the streams and river are an important source of protein for these tribals.

The project contractor has already clear felled thousands of trees near the dam site without seeking permission even from the Regional Forest Department. After repeated agitations by Shramik Mukti Sangathana, the local Forest officials confiscated one JCB, one Dumper and more than 3000 cubic meter of Timber. But this is just a small fraction and the felling is continuing in the absence of any strong action by the Forest Department, or any other Department.

Shai Dam Shai Dam is being built adjacent to Kalu Dam, on the river Shai. Shai envisages submerging nearly 495 ha of forest land, chopping of more than 42000 tress, affecting 20 villages and a population of more than 5000.

Under The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, tribals and forest dwellers in Shai have legitimate community and individual rights over the forest, which are yet to be ascertained and recorded. Without this process and settlement of these claims, it will be illegal to divert (clear fell, in this case) their forest land. Grampanchayats of Shai have written a letter to this effect to the Chief Conservator of Forests, Thane, nearly a year back. Villagers have been filing these claims for the past few months & the process is far from complete.

No clearance has also been taken for the tree felling non forest land with tree cover as required under the Supreme Court orders. There is considerable tree cover even in non-forest lands of Shai, which would require Forest Clearance, but this has not been obtained.

Unfortunately, the FAC has already recommended Shai Project for Forest Clearance. In a letter dated 30th May 2011, Shramik Mukti Sangathana, Shai Dharan Virodhi Shetkari Sangharsha Samiti and SANDRP have written to the FAC to cancel this approval. Shai Dharan Virodhi Shetkari Sangharsh Samiti is an apex body of villages affected by the dam. All the 10 Gram panchayats representing the 20 villages affected by Shai have passed resolutions against the dam for three consecutive years.

Balganga Dam Balganga Dam has been planned by CIDCO (City and Industrial Development Corporation) in Pen taluka of Raigad to supply 350 MLD water to the expanding suburbs of Navi Mumbai. Nearly 13 villages with a pre-dominant tribal population will be severely affected by the project. The project work has already begun and is likely to submerge around 1,240 ha land of which 602 ha comprises paddy fields with 265 ha marked as forest land. Livelihoods of over 8000 people will be affected by this dam.

Local people are against the dam and it is reported that till now CIDCO has been successful in convincing only 70 people of the 8000 affected to sign up for the compensation package. Though CIDCO claims that this 350 MLD water is for drinking water purposes for the suburbs of Navi Mumbai, there are reports that the water will be used for Navi Mumbai Special Economic Zone (NMSEZ). "The govt recently sanctioned 400 MLD water from Balganga River for the NMSEZ project as a permanent source of water.' (DNA 011210). The 2008 Expert Committee Meeting on Infrastructure Projects also notes in its minutes "Water requirement for the project (NMSEZ) is 795 MLD which will be sourced from Balganga Dam on River Balganga and MJP water works on Patalganga, Morbe Dam of NMMC & Hetawane Dam."

Nearly 70% work on the Balganga is now complete, with no Forest Clearance, which as discussed earlier, is illegal. As is the case with other dams, Balganga also does not require any Environmental Clearance, EIA or Public Hearing.

Barvi Dam ***Displaced for the fourth time*** Height of the Barvi dam was raised from the original 38.1 m to 44.7m in 1979, to 52m in 1985, to 66.5m in 1999, and now is being raised to 72m this year.[15]

This is to enhance the total storage capacity from 174 million cubic metres (MCM) to 347 MCM to supply water to civic bodies of Thane, Navi Mumbai, Kalyan-Dombivili, Ulhasnagar, Bhiwandi-Nizampura, and Mira-Bhayander. This time over, the 3375 people will be displaced according to the Superintendent Engineer of MIDC. No Environmental Clearance has been obtained. More than 3000 acres of forest will be submerged.

Middle Vaitarna Dam (Photo above is of the valley that will be submerged by the dam.) Middle Vaitarna Dam is coming up on the Viatarna River between the Upper Vaitarna and Modak Sagar dams. FAC has cleared diversion of 760 ha of prime forest in the region. Locals say that in reality forests on a much larger scale have been cut, not only in the submergence zone, but also in the catchment. Middle Vaitarna had received

[15] How to Kill an Ecosystem, DNA, World Environment Day Special

Environmental Clearance. According to Thane's Honorary Wildlife Warden Punam Singvi, **more than One Lakh Trees have been cut for this project.** Compensatory afforestation for this irreplaceable Western Ghats forest is planned in Beed, a drought-prone district in Vidarbha, 374 kms from here.

Gargai and Pinjal Dams Gargai and Pinjal Dams are planned across respective rivers, tributaries of Vaitarna, in the Wada Taluka of Thane District[16]. .According to dam officials, these dams will come up in forest area. "Due to the vast forest cover, we will have to carry out deforestation on a large scale for building the dam and it will require a go- ahead even from the Central ministry of environment and forest. *If the paperwork gets delayed then the project too will get delayed*" says Chief Engineer, Civic Water Supply Projects Department, A. Pednekar. He also said that though the exact dam location has not been finalised, the actual dam site will be in the forest area and a significant portion of a wildlife reserve sanctuary will be affected[17].

Even as the work on Middle Vaitarna dam proceeds 24X7, it is having a huge negative impact on the wildlife of the region. In Feb 2010, a Leopard mother abandoned her two cubs at the dam site and did not return, presumably disturbed by the sound & activity near the region.

The shocking state of affairs where these projects do not even require impact assessments or mitigation plans is due the serious anomalies in the EIA notification 2006. The Sept 14, 2006 EIA notification lists "LIST OF PROJECTS OR ACTIVITIES REQUIRING PRIOR ENVIRONMENTAL CLEARANCE" under a schedule defined in the Notification. Section 1(c) of this schedule is for River Valley projects. This section includes only hydro projects above 25 MW and irrigation projects.

Without getting into the debate of how much Mumbai needs this water and what has it done in the past to protect its water sources and rivers from pollution and encroachment and by way of demand side management, rainwater harvesting and curbing non essential uses, it is assumed that when such a large scale infrastructural activity is taking place, affecting more than 25000 people from vulnerable communities and submerging thousands of hectares of forest from a global biodiversity hotspot, all the possible environmental and social checks will be strenuously put in place. However, it has been seen that the most primary environmental governance mechanisms like Environmental Clearance which includes Environment Impact Assessment and Public Hearing is not taking place.

In dams where Protected Areas are also being submerged, officials are looking at Environmental Clearance as hurdles, which need to be 'fast tracked'. Indeed, it has been reported that Gargai and Pinjal Dams are on 'Fast track'. In fact the ministers and senior officials have no problems telling the journalists that when you want to reach some place fast, you need to jump some signals, admitting that they have already indulged in violations.

Compare this with what was included in the EIA notification before 14.09.2006 under River Valley Projects: "River Valley projects including hydel power, major Irrigation and their combination including flood control." Thus, till 14.09.2006 all large dams and river related projects required environment clearance and hence EIA-EMP and also public hearings. However, after 14.09.2006, following categories of dams and river related projects got excluded from the EIA notification:

1. All Dams not meant for irrigation or having hydro installed capacity below 25 MW. (The authors of the notification seem like illiterates on environment issues, since this excludes say the 20 MW Gumti dam on Tripura having massive submergence area of 4634 ha. They do not seem to realize that the installed capacity of hydro power does not decide the quantum of impacts.)
2. All drinking water dams
3. All Industrial water dams
4. All flood control dams or embankment projects.

These are shocking exclusions, since all these projects have massive impacts, both socially and environmentally. Like the massive dams for Mumbai, controversial Renuka dam in Himachal too would not have required EIA, PH and EC if it were not affecting a portion of the Renuka sanctuary. Similarly, the embankment projects related to Polavaram project in Orissa and Chhattisgarh do not require EIA, PH and EC, the CWC and AP govt has argued. There are several such examples one can give.

A number of letters have been sent by dam affected communities, local organisations and SANDRP to the Union Minister, National Advisory Council, Forest Advisory Committee, Western Ghats Expert Ecology Panel as well as the local Collector, Forest officers, etc. We have received no response yet.

As we listen attentively and justify the needs of Mumbai, are we also need to listen to our life support systems, vulnerable communities, climate change concerns and future generations?[18]

Parineeta Dandekar

[16] For more details: www.sandrp.in/drp/DRP_Feb_2011.PDF

[17] Indian Express 261210

[18] News reports on the issue: governancenow.com, www.dnaindia.com/mumbai/report_barvi-dam-how-to-kill-an-eco-system_1551249-all, www.countercurrents.org/jadav110311.htm, www.dnaindia.com/mumbai/report_maharashtra-s-kalu-dam-lies-on-bed-of-faults_1551660, www.dnaindia.com/mumbai/report_is-environment-ministry-nod-needed-for-project-on-kalu-river_1558418

National Wetlands Atlas, 2011: *Taking baby steps in the right direction*

Wetlands are amongst the most productive ecosystems of the world, and also one of the most threatened ecosystems, especially in our country. Wetlands are being 'reclaimed', poisoned, encroached upon all the time, by a number of land grabbing activities, including by the governments. (Indian Railways plan to reclaim 650 acres of Howrah Wetlands). Ramsar Wetlands, supposedly the most prestigious wetlands in India too face a similar fate (See: India's Ramsar Wetlands in Peril, Dams, Rivers & People Feb 2011 edition).

The value of wetlands and their plight has been in discussion in India for the last couple of years. End of 2010 saw Wetlands (Conservation and Management) Rules, 2010, being notified, the first legislation specifically for protecting wetlands in India. Though it leaves some major gaps (See 'This cannot help protect the Wetlands, Sir in DRP Dec-Jan 2011 issue), it is a step in the right direction. 2011 has seen one more such step, this time through the publication of **National Wetland Atlas** under the National Wetland Inventory and Assessment project, a joint undertaking of the MoEF and Space Application Centre, ISRO, Ahmedabad which has used pre monsoon and post monsoon remote sensing data and satellite images to present wetland maps of India in an Atlas format.

Total 201 503 wetlands have been mapped at 1:50,000 scale. In addition, 555 557 smaller wetlands (< 2.25 ha) have also been identified. Total wetland area estimated is 15.26 M ha, which is 4.63 % of the geographic area of the country.

Looking at the rapid disappearance of Wetlands in our country, (it is estimated that India has lost 38% of its wetlands in just the last decade. In some districts, the loss of wetlands has been as high as 88%)[19] inventory and classification of wetlands comes out as one of the key components in Wetland protection. A number of efforts at Wetland inventorisation have taken place earlier. The first scientific mapping of wetlands of the country was carried out by Space Applications Centre (ISRO), during1992-93 for MoEF. The mapping was done at 1:250,000 scale using IRS 1A LISS-I/II data of 1992-93 timeframe under the Nation-wide Wetland Mapping Project.

According to ISRO's report made for CWC in 2009, the waterlogged area of Major and Medium commands alone in Bihar stood at 627888. However, according to NWA, Bihar's man made waterlogged area is hardly 34878 ha, a difference of 593030 ha in just 2 years!

The project used wetland classification system based on Ramsar Convention definition of wetlands. This inventory put the wetland extent (inland as well as coastal) at about **8.26 m ha** (Garg et al, 1998). This estimate (24 categories) did not include rice/paddy fields, rivers, canals and irrigation channels. Further updating of wetland maps of India was carried out by SAC in 2004-05, again at 1:250000 scale. In recent years, a conservation atlas has been brought out by Salim Ali Centre for Ornithology and Natural History (SACON), **covering 7 million ha**. SACON publication is especially important as it was the first work of its kind which actually used the data to highlight the rapid deterioration of wetlands.[20]

The latest National Wetlands Atlas categorises wetlands in India under nineteen classes which have been mapped using satellite remote sensing data from Indian Remote Sensing Satellite: IRS P6- LISS III sensor and presented in the format of an Atlas. For each wetland, following layers have been generated:

- Wetland extent including open water, aquatic vegetation, hydric soils,
- Water spread (pre and post monsoon),
- Aquatic vegetation spread, turbidity level of water
- small wetlands,
- base layers of major roads, railway, settlements.

Results are organised at 1: 50,000 scales at district, state and topographic map sheet (Survey of India reference) level using Geographic Information System (GIS). A noteworthy feature has been mapping of wetlands below 2.25 ha, which though small, are often crucial for water security and wildlife habitat. The 19-category classification used for the latest Atlas has been used in SAC's past study and has been accepted by wetland and remote sensing data experts.

Results Some of the interesting features and results of the Atlas are described here.

- **Rivers and streams categorised as wetlands** The report includes rivers and streams as wetlands and hence the area of wetlands in states rich with river and flood plain network is very high. For example, % of wetlands as rivers and streams is high in Mizoram (96%), Nagaland (89), Uttarakhand (77), Assam (83). This is a welcome step as neither SAC's earlier reports, nor SACON considered rivers as wetlands.
- **Gujarat has the highest wetlands area in the country** with 65% of its wetlands classified as intertidal mudflats, with barely 8% as rivers and 7% wetlands being reservoirs.

[19] V.S. Vijayan (2004), *Inland Wetlands of India: Conservation Priorities*, SACON

[20] http://www.wetlandsofindia.org/wetlandwiki/index.php/Andhra_Pradesh

Maximum wetland percentage in Maharashtra and Andhra Pradesh is attributed to reservoirs. Maharashtra: 36% wetlands under reservoirs and 30% under rivers/ streams, Andhra 28% under reservoirs and 27% under rivers/ streams. According to SAC Report 1998, Area of reservoirs in Maharashtra was 130119 ha which has increased nearly three folds in the past 13 years to 368135 ha.

- **Maximum number of Karnataka's wetlands is under smaller tanks and ponds**. (35% tanks /ponds, 33% reservoirs and 28% rivers/streams)
- **61% of Tamilnadu's wetlands are classified under lakes, ponds and tanks**.
- 62% of Manipur's wetlands are **lakes and ponds**, while 19% of Rajasthan's wetlands are **tanks and ponds**.
- Haryana has the highest % of **wetlands under 2.25 ha** at 24%, Tripura: 17, W Bengal: 12.52, Orissa 10%.

The NWA includes all reservoirs & barrages as wetlands. However, big reservoirs are methane-emitting dead ecosystems, which cannot support even indigenous fish species. All large dams are built at the expense of bio diverse rivers, floodplains and wetlands. Only a few reservoirs, that too only their fringe areas support some biodiversity. The ecosystem goods & services received from wetlands as against reservoirs have nearly nothing in common. How then, can reservoirs be included as wetlands?

AREAS OF CONCERN

Man-made waterlogged areas Man-made water logged wetlands have been defined by NWA as: "Man-made activities like canals cause water-logging in adjacent areas due to seepage, especially when canals are unlined. Such areas can be identified on the images along canal network". According to the NWA, the total wetland area of the country under man-made wetlands is **135704 ha**. **This number appears to be an extreme under estimate,** considering that irrigation induced waterlogged areas in Punjab are more than **85000 ha**[21] **and in Karnataka are 43472 ha**[22] **totalling to 128472 ha from just the two states**. The Working Group constituted by the Ministry of Water Resources estimated in 1991 that an area of **2.46 million ha**[23] was suffering from the problem of water logging under irrigation commands.

Rivers as wetlands Maximum area under wetlands in the country come from rivers and streams. Rivers and streams cover 34.5% (5258385 ha) of overall wetland area of the country. However, rivers are not included as wetlands as per the Wetlands (Conservation and Management) rules 2010. This has been a major drawback of the Wetlands Rules.

Reservoirs as wetlands The NWA includes all reservoirs and barrages as wetlands. However, big reservoirs are methane emitting dead ecosystems, which cannot support even indigenous fish species. All large dams are built at the expense of bio diverse wetlands, floodplains and rivers. Only a few reservoirs, that too only their fringe areas support biodiversity. The ecosystem goods and services received from wetlands as against reservoirs have nearly nothing in common. How then, can reservoirs be included as wetlands?

State wise wetland area

Sr No	State/UT	Geographic area (sq. km)	Wetland area (ha)	% of National wetland area	% of state area
1	Jammu & Kashmir	222111	391501	2.57	1.76
2	Himachal Pradesh	55673	98496	0.65	1.77
3	Punjab	50362	86283	0.57	1.71
4	Chandigarh *	114	350	0.00	3.07
5	Uttarakhand	53566	103882	0.68	1.94
6	Haryana	49663	42478	0.28	0.86
7	Delhi	2966	2771	0.02	0.93
8	Rajasthan	342269	782314	5.13	2.29
9	Uttar Pradesh	240928	1242530	8.14	5.16
10	Bihar	91689	403209	2.64	4.40
11	Sikkim	7096	7477	0.05	1.05
12	Arunachal Pradesh	87658	155728	1.02	1.78
13	Nagaland	16521	21544	0.14	1.30
14	Manipur	22327	63616	0.42	2.85
15	Mizoram	21087	13988	0.09	0.66
16	Tripura	11040	17542	0.11	1.59
17	Meghalaya	22420	29987	0.20	1.34
18	Assam	78438	764372	5.01	9.74
19	West Bengal	88805	1107907	7.26	12.48
20	Jharkhand	79714	170051	1.11	2.13
21	Orissa	153845	690904	4.53	4.49
22	Chhattisgarh	135194	337966	2.21	2.50
23	Madhya Pradesh	308414	818166	5.36	2.65
24	Gujarat	197841	3474950	22.77	17.56
25	Daman & Diu*	112	2068	0.01	18.46
26	Dadra & Nagar Haveli	487	2070	0.01	4.25
27	Maharashtra	307748	1014522	6.65	3.30
28	Andhra Pradesh	275045	1447133	9.48	5.26
29	Karnataka	191791	643576	4.22	3.36
30	Goa	3702	21337	0.14	5.76
31	Lakshadweep*	828	79586	0.52	96.12
32	Kerala	38863	160590	1.05	4.13
33	Tamil Nadu	130409	902534	5.91	6.92
34	Puducherry *	492	6335	0.04	12.88
35	Andaman & Nicobar Islands*	8249	152809	1.00	18.52
	Total	**3297467**	**15260572**	**100**	**4.63**

[21] Shkya et al,2010, *New drainage technologies for salt-affected waterlogged areas of southwest Punjab, India,* CURRENT SCIENCE, VOL. 99, NO. 2

[22] Perspective Plan for Karnataka for 2005, Karnataka State Land Use Board, GoK, Bangalore, p. 261,
Girish Kulkarni, 2007, *ECONOMICS OF IRRIGATION INDUCED LAND DEGRADATION AND ITS RECLAMATION IN UPPERKRISHNA PROJECT COMMAND AREA, PhD Thesis,* University of Agricultural Sciences, Dharwad

[23] mowr.gov.in/.../component%20of%20reclamation7872571015.pdf

Sr no	wettcode	Wetland Category	Number of Wetlands	Total Wetland Area (ha)	% of wetland area	Open water area	
						Post Monsoon area	Pre Monsoon area
	1100	**Inland Wetland: Natural**					
1	1101	Lake/Pond	11740	729532	4.78	454416	198054
2	1102	Oxbow lake/ cut off meander	4673	104124	0.68	57576	37818
3	1103	High latitude Wetland	2707	124253	0.81	116615	109277
4	1104	Riverine wetland	2834	91682	0.60	48918	29739
5	1105	Waterlogged	11957	315091	2.06	197003	112631
6	1106	River/Stream	11747	5258385	34.46	3226238	2628182
7	1201	Reservoir/Barrage	14894	2481987	16.26	2260574	1268237
8	1202	Tank/Pond	122370	1310443	8.59	916020	349512
9	1203	Waterlogged	5488	135704	0.89	85715	33822
10	1204	Salt pan	60	13698	0.09	5293	2599
		Total - Inland	**188470**	**10564899**	**69.23**	**7368368**	**4769871**
	2100	**Coastal Wetlands - Natural**					
11	2101	Lagoon	178	246044	1.61	208915	191301
12	2102	Creek	586	206698	1.35	199743	189489
13	2103	Sand/Beach	1353	63033	0.41	-	-
14	2104	Intertidal mud flat	2931	2413642	15.82	516636	366953
15	2105	Salt Marsh	744	161144	1.06	5369	2596
16	2106	Mangrove	3806	471407	3.09	-	-
17	2107	Coral Reef	606	142003	0.93	-	-
	2200	**Coastal Wetlands - Man-made**					
18	2201	Salt pan	609	148913	0.98	105253	94047
19	2202	Aquaculture pond	2220	287232	1.88	196514	186963
Total - Coastal			**13033**	**4140116**	**27.13**	**1232430**	**1031349**
Sub-Total			201503	14705015	96.36	8600798	5801220
Wetlands (<2.25 ha)			555557	555557	3.64	--	-
Total			**757060**	**15260572**	**100.00**	**8600798**	**5801220**

Confusing nomenclature Classification system of NWA is sometimes confusing. E.g., 'riverine wetlands' is an unclear term. Do they indicate floodplains or the water bodies within floodplains that cannot be distinguished directly as oxbows or meander cuts? Then what does the separate category of 'Natural Waterlogged areas' mean?

In absence of comparative analysis with respect to previous surveys, the current Wetland Atlas is likely to end up, like its predecessors, as a mere template for the next Atlas.

No attempt at analysis or comparison The most surprising aspect is that the NWA report makes absolutely no effort to compare results obtained from past studies, including one from SACON, which was at the same 1:50000 scale. It was exactly the analysis and comparison that was done in the SACON study that highlighted the rapidly deteriorating state of wetlands in the country[24].

NWA has not even tried to compare the results with data generated by their own organisation, twice in the past.

Reservoir area There are a number of discrepancies, which can throw light on interesting reasons. According to SANDRPs analysis of CWC Register of Large Dams, 2002,[25] the area submerged by large dams in the country is **4.42 million ha**. However, according to NWA, the area under 'reservoirs' is much less at 2.48 m ha. **Thus there is a difference of 1.94 m ha between the reservoir area in 2002 and the one indicated by NWA.** As the NWA does not differentiate between dams and large dams, the difference between areas becomes even more glaring. However, NWA makes any serious analysis difficult as it does not clearly differentiate between its own definition of 'Reservoir'/ barrage and tank. Again, its surprising to note that while the report discusses water logging, salinisation, etc, it makes no attempt at calculating siltation of reservoirs, a threat to these supposed wetlands.

Detailed information on important wetlands includes some randomly selected wetlands, which has excluded some threatened Ramsar wetlands like Bharatpur.

According to experts like Prof. Madhav Gadgil, pdf files, which is an output of the NWA is of little help to planners and conservationists, and the SAC should put fully geo referenced data in the public domain, for use and integration by various layers.

All in all, though the National Wetland Atlas is indeed a useful publication, its usefulness and applicability would have increased many folds if attention was paid to analysis of data as well. In absence of critical analysis, the current Wetland Atlas will also end up, like its predecessors, as a mere template for the next Atlas.

Parineeta Dandekar

[24] http://www.downtoearth.org.in/node/9258
[25] Dams, Rivers and People, May-June 2007

Jairam Ramesh's Tenure at MEF: An assessment

Big bang, lacking in systemic changes

"Kicked upstairs" is how many lobbyists gleefully describe Jairam Ramesh's removal from Union Ministry of Environment and Forests (MEF) in the cabinet reshuffle on July 12, 2011. Their glee in fact reflects on the biggest failure of Ramesh era, namely that he could not bring systemic changes. Had he brought them, the lobbyists would not have been as happy as they are now.

But let us first look at his positive contributions. And there are many. Ramesh has been reported to have listed these as some of the achievements of his tenure at MEF: Literal (glass doors at his office) and virtual (up-to-date website) transparency, public hearings on GM Brinjal (and others), speaking orders (e.g. on Posco, Vedanta, among others). These are all correct claims, but each came with significant limitations. The regularly updated MEF website is indeed a remarkable achievement of Ramesh. However, some of the crucial information that was statutory requirement (e.g. six monthly compliance reports of ongoing projects, which are still not available as per statutory requirements or regular updating of agenda notes and minutes of meetings of Forest Advisory Committee) were missing on the website; some of it appeared only after RTI applications, some not even till date. His orders did speak at times, but they did not always throw full light on the issues on hand (e.g. final order on Posco clearance). And then there were times when he refused to listen at all. Public hearings (for not-project-specific-issues like GM crops or North East Dams) were good initiatives, but he did nothing to institutionalise them.

Ramesh is also very happy to institutionalise National Green Tribunal, but his failure to ensure that NGT starts functioning **before** the National Environment Appellate Authority was wound up meant that there was a vacuum for over a year when neither of them was available. Jury is still out on how effective NGT will be, but its formulation has many serious problems.

Has he been transparent? Has he been accessible? Has he been responsive? Has he been clean, honest? Was he hard working, focused, active, zealous? Indeed yes for each of these, a major plus point of Ramesh tenure was his accessibility and responsiveness.

Ramesh also got more than his share of brickbats, though. Small minded commentators like the *Indian Express* editor Shekhar Gupta has actually accused Ramesh of being publicity clamouring (headline hunting), but such commentators completely fail to understand the importance of environment issues. Gupta also said on TV channel on the night of reshuffle that Ramesh had brought emergency raj at MEF, which is again completely off the mark, as the following analysis shows.

Has he been consistent? One has to say no, many times he was not. While he cancelled clearances to Vedanta and Posco for lack of adherence to the Forest Rights Act, he refused to do the same in case of Polavaram dam in Andhra Pradesh, where the displacement of tribals is many times more and violations even more blatant, which remains the situation till date.

To what extent was he constrained by the fact that he was not a cabinet minister and the Prime Minister was not with him on most issues? There are a number of occasions, when it seemed he had to tow the PM line (e.g. Posco, Lavasa, Jaitapur, Navi Mumbai airport, dereservation coal block from No-Go areas) and he may have taken a different view, left to himself. At many such points, he claimed he had to balance, but balancing is not an environment minister's mandate. His mandate is protection of environment as per legal norms. On many such occasions he did not do justice to his mandate.

Has he been consistent? One has to say no, many times he was not. While he cancelled clearances to Vedanta and Posco for lack of adherence to the Forest Rights Act, he refused to do the same in case of Polavaram dam in Andhra Pradesh, where the displacement of tribals is many times more and violations even more blatant, which remains the situation till date. Even on Posco, while three different committees from his own ministry gave evidence about violations, he ultimately succumbed to the pressure from the lobbyists and gave it ok when on ground there was no change in the situation from the point when he had cancelled the clearance. He knew his *YES BUT* option has no meaning since the ministry has no capacity to ensure compliance, but he kept using that options (e.g. Posco, Navi Mumbai airport, Jaitapur).

On many occasions, even when repeatedly forewarned, he stubbornly refused to act till violations and environment conflicts on ground lead to deaths (e.g. thermal power projects in Srikakulam in Andhra Pradesh), but ultimately he acted. Precious lives could have been saved had he acted earlier. Similarly a lot of groups wrote to him that IIT Roorkee is not the right agency to do cumulative impact assessment of Ganga basin hydro projects due to the agency's pro hydro bias and that the pan IIT consortium is not the right agency for preparing the Ganga Basin Management Plan due to their lack of knowledge of ground realities or understanding of governance issues, but he remained stubborn on both occasions. The pathetic outcome in the form of Ganga Cumulative Impact assessment is now available for all to see (there are three different articles on this in this issue of DRP.

All the same, the number of battles he fought during his 25 month tenure makes an impressive list. He faced opposition from PMO (blind push for big hydro projects in North East), Power Minister Shinde, Coal Minister Jaiswal, Planning Commission vice chair Montek, Agriculture Minister Pawar (GM crops, Lavasa), Civil Aviation minister Patel (New airport for Mumbai), Orissa Chief Minister (Posco, Vedanta), Delhi Chief Minister (Renuka dam in Himachal for Delhi's water supply), Kerala Chief Minister (Athirapally), Maharashtra chief minister (Adarsh, Lavasa, Jaitapur, Mumbai airport among others), Uttarakhand Chief Minister (hydro projects on Bhagirathi among others), IPCC chief Pachauri (wrong predictions about glacier melting), lobbyist media groups like *Indian Express* (GM crops, hydro projects in North East), Madhya Pradesh Chief Minister (Maheshwar hydro, Ken Betwa link), among many others.

For me, Jairam Ramesh made one of the most important remarks at the discussion on approach to the 12th Five Year Plan when he said that the target of the plan should be how to improve governance and not target higher growth.

Moreover, Ramesh was also fighting battles within the MEF. So while he remained accessible and responsive, he could not ensure that his ministry officials were also accessible and responsive. On the issue of implementation of Forests Rights Act in particular and reforms in forestry sector in general, he was known to be battling with the forest bureaucracy.

The biggest limitation of the Ramesh tenure at MEF was that he could not bring systemic changes in the functioning of the ministry. He kept saying that Environment Impact Assessments are dishonest, cut paste jobs, but did nothing effective to change that situation.

He has been on a steep learning curve from the beginning. He learnt a lot, but the learning curve remained steep right till the end of this tenure. Climate change is an example where he took over the complete negotiation on the climate change issue on behalf of the Govt of India even at international level. One of the important contributions of Ramesh on the climate change front was in formulation of India Climate Assessment Report and in pushing the case that India also needs to take responsibility for the climate change impact of its activities. However, this need not have been done at the expense of weakening of the pillars of Kyoto protocol, which he ended up doing.

Even his fiercest critics acknowledge that Jairam Ramesh has brought the environment to the front pages, his track record will be difficult to emulate by his successors. As one of his sternest detractors Shekhar Gupta of *Indian Express* said, Ramesh ended the ATM raj that prevailed at MEF when Raja and Balu were MEF ministers.

For me, Jairam Ramesh made one of the most important remarks at the discussion on approach to the 12th Five Year Plan when he said that the target of the plan should be how to improve governance and not target higher growth. He invited undeserved criticism when he emphasised that the target of achieving 100 000 MW capacity addition in power sector for the 12th plan is not ecologically sustainable. His welcome initiatives to protect the Panna Tiger Reserve (against submergence due to Ken Betwa river link project), western ghats, wetlands, river zones and to improve our knowledge base on glaciers remain to be taken to logical conclusion.

However, the biggest limitation of the Ramesh tenure at MEF was that he could not bring systemic changes in the functioning of the ministry. He kept saying that Environment Impact Assessments are dishonest, cut paste jobs, but did nothing effective to change that situation. He did not penalise EIA consultants for fraudulent EIAs, even when evidence was presented to him and when law empowered him to do so. He kept saying the public hearings are fixed, but did nothing to make them more genuine. He knew that MEF does not have capacity to ensure compliance with the conditions of clearance that his ministry gives, but he did nothing to change that. Here again even when evidence was presented to him about non compliance (e.g. on Polavaram, Karcham Wangtoo, Nathpa Jakhri, Baspa, Phata Buyang, Shingoli Bhatwari, Srinagar), he failed to act appropriately. Right in the beginning of his tenure he said that the MEF's rejection rates of projects is very low, but his tenure has not seen any higher rejection rates. We kept writing to him that his EIA notification excludes massive dams like Kalu and Shai in Maharashtra's ecologically fragile tribal areas from the requirements of EIA, Environment clearance and public hearing, but he refused to act. He agreed on the floor of Parliament that Ganga and Yamuna Action Plans have failed to clean up the rivers, but the new initiative in the form of National Ganga River Basin Authority has absolutely no elements to take care of the reasons for failure of the Ganga and Yamuna Action Plans.

In conclusion, Ramesh's tenure in MEF cannot be assessed in a hurry. There are lots of positives there, but also many question marks. Yet, he has succeeded in bringing the environment issue deservedly, onto the front pages of media. So much so that the biggest discussion point of this cabinet reshuffle is not elevation of Ramesh to cabinet rank, not his getting important portfolio of Rural Development, but his *removal* from the Environment ministry. One prominent English news channel devoted its entire half hour of 9 pm prime time slot to discuss just that!

Let me end with what I wrote to Ramesh the day he was shifted out o MEF by way of paying tribute to Ramesh's work in MEF (with sincere apologies to late poet Shailendra, lyricist of song अजीब दास्ताँ है ये from film दिल अपना और प्रीत परायी, for taking liberty with his lines):

मुबारक हो तुम्हे की तुम नया मंत्रालय बसाओगे!

हम जब भी MEF देखेंगे, तुम हमको याद आओगे!!

Himanshu Thakkar **[An edited version appeared at:** www.rediff.com]

Report

Workshop on Reservoir Operations Management in Kerala

In response to increasing hydroelectric and irrigation projects in India and Kerala and their severe deleterious impacts on downstream ecology and livelihoods, the Kerala State Resource Centre of the Forum for Policy Dialogue on Water Conflicts in India has been carrying out an Action Research program in the Chalakudy River Basin in Central Kerala since 2008.

In response to increasing hydroelectric and irrigation projects in India and Kerala and their severe deleterious impacts on downstream ecology and livelihoods, the Kerala State Resource Centre has been carrying out an Action Research program in the Chalakudy River Basin in Central Kerala.

While the broad objective is resolving upstream – downstream conflicts existing in the basin between hydro power and irrigation uses, one of the aims is also to develop year round **'Reservoir Operations Model'** options for the Kerala Sholayar and Poringalkuthu HE projects in the Kerala part of the river basin inclusive of ensuring minimum flows that would synchronise with the needs of the downstream Major irrigation project, the Chalakudy River Diversion Scheme (CRDS).

The Reservoir Operations Model was presented at a **National Workshop held on June 21, 2011 at Chalakkudy** to seek comments and inputs from a select audience. Experts from across the country and the State, members of Kerala State Legislative Assembly, Member of Parliament, local self govt representatives, and officials from all the concerned departments were invited.

The Introductory session was chaired by Prof. M K Prasad who emphasized the need for changing existing policies and laws in order to preserve natural resources including rivers. Dr. A. Latha, Principal Coordinator of the Forum's work in Kerala, briefly presented the need and significance of River Revival in Chalakudy river basin. She stressed that Reservoir Operations Management is one of the strategies towards improving flows in the heavily dammed river. Catchment restoration, ensuring environmental flows, LSG (Local Self Government) level water resources management planning, regulation of sand mining and abatement of pollution are other relevant components in river revival.

The first session was chaired by Himanshu Thakkar from SANDRP, New Delhi. S.P.Ravi from the CPSS made a detailed presentation of the ROM. Dam re-operation patterns were suggested for the existing main reservoirs, Sholayar and Poringalkuthu HEP operated by Kerala State Electricity Board. The river presently has six dams out of which four are part of Interstate Parambikulam Aliyar Diversion. For Sholayar, a reduced monsoon discharge by 10 – 15 % and non – monsoon discharge to be increased correspondingly was suggested.

It was recommended that the present average non-monsoon discharge of 201 MCM (Million Cubic Meters) can be increased to about 230 MCM. The data processing steps were explained. For Poringalkuthu HEP, it was suggested to run the station as base load station at about 24 MW capacity from the present peak load during summer. For the major irrigation project downstream, the altered flows would ensure improvement in 15 cum/ sec with a balance of 2.25 cum/ sec to be released into the main river. The suggested ROM after fine tuning based on expert comments is to be presented before policy makers. Steps to seek the support of people's representatives, LSGs, and public will also be carried out. Improved system and functional efficiency of CRDS is to be assured in a participatory manner.

The second session on 'Improved Water Management' in CRDS was chaired by Suhas Paranjpye with a detailed presentation by P. Rajaneesh. It was specifically based upon the exhaustive field level monitoring of the canal and irrigation management in the CRDS. Canal survey and documentation of problems in water management followed by mobilization of farmers and local self govts, farmer level best water management practices documentation, linking up departments and farmers, formation of LSG level water resources management committees was discussed in detail.

The audience appreciated efforts made by CPSS to take water to the tail end after more than a decade. This has been made possible through joint efforts of all stakeholders within two years of working in the field.

In the next session, K J Joy opened the floor to the audience to seek consensus on developing ROM model into a public document and to use it as an advocacy tool. The overarching recommendation that emerged out of the open session was to consider ROM as an integral part of a larger strategy towards river revival rather than an operational strategy to re-operate dams in rivers. The need to take the learnings from this model, its process of evolution and the stakeholder participation in improving upstream – downstream linkages to a national level was acknowledged by the experts.

The last session was presided over by Chalakkudy MLA Sri BD Devassy & inaugurated by Member of Parliament, Sri KP Dhanapalan. SP Ravi made a presentation of the important recommendations from the meeting. S.Unnikrishnan proposed vote of thanks.

Zabna AB and A.Latha, CPSS, Kerala

CLIMATE CHANGE & WATER SECTOR

IMD: Flood risk increased through the century The Indian Meteorological Department has come out with a Research Report on "Changes in extreme rainfall events and flood risks in India during the last century" which states that noticeable changes have occurred in the extreme rainfall events that happened in the past century over India. Trend analysis of frequency of rain days, and heavy rainfall days shows significant decreasing trends over central and many parts of north India and increasing trends over peninsular India. According to the report, the desert areas of the country have experienced increased number of wet days. The flood risk has increased significantly over India and the minimum temperature in the 2050s is expected to rise by 4°C all over India, with a further rise in temperature in the southern peninsula. (www.indiawaterportal.org/node/17898)

DAMS

Orissa argues against Polavaram dam before expert committee An Expert Technical Committee constituted by the Orissa govt to look into the irregularities in implementation of the controversial Polavaram project has submitted a written memorandum to the Supreme Court-appointed Gopalkrishnan committee, strongly objecting to the construction of the project on multiple grounds.

The expert team which visited the site of the project on May 23-24 alleged that the project design has been changed and Probable Maximum Floodwater flow from the dam which was originally stipulated at 36 lakh cusecs has been raised to 50 lakh cusecs.

The expert teams have also objected to the construction of embankments suggested by the Andhra Pradesh government, as they would submerge many tribal villages in Malkangiri district. The team also took exception to the fact that mandatory palli sabha (village council) meeting in areas likely to be affected due to the project have not taken place. The Orissa Secretary, Water Resources said that the court appointed committee has been appraised of the violations of Environment Protection Act and Forest Rights Act (FRA). The apex court had directed former member of the Central Water Commission M Gopalakrishnan to inspect the Polavaram project along with CWC and submit separate reports to the apex court by July 19, the next date of hearing.

In the meanwhile, the Gopalakrishnan team, has predictably, suggested that the project does not violate the Godavari Tribunal Award, as per reports. The Apex court has asked the states to file their responses to the report. (The Hindu, 250511, 270511, for more details on various gross irregularities in the Polavaram project: http://www.sandrp.in/drp/DRP_Aug_Sept_2010.pdf)

Delay in repairing Moolathara Dam affecting Chittur Failure of the Water Resources Department to repair the Moolathara regulator-cum-bridge which had breached in November 2009, has affected paddy cultivation in 45000 acres of land in Chittur taluk in Palakkad district. The Moolathara regulator is a component of the inter-State Parambikulam Aliyar Project (PAP) that provides irrigation water to Chittur. The regulator breached owing to the release of a huge quantity of water from the Aliyar Dam of the PAP following heavy rains in Tamil Nadu. Chief Engineer of Water Resources Department, Kozhikode, said the Irrigation Design Research Board had not yet provided the design for the new structure. (The Hindu 090511)

Oustees of Kelo Dam in Raigarh are on indefinite hunger strike demanding Rs 10 Laces per acre of land or land for land and proper rehabilitation. Government acquired their land for average Rs. 70,000/- per acre. With rapid industrialization, prices of land are now 10 to 15 laces per acre in Raigarh district. As per the project report, initially the Kelo dam was meant for irrigation and water for only two industries, but it seems now major part of water will go to industries. It is very unfortunate that both the two major parties who promised not to acquire farmer's land without consent have shown no interest in the happenings. (R. Agarwal 040511)

GROUNDWATER

Uttar Pradesh to pass Groundwater Bill The UP Ground Water Department had prepared the UP Ground Water Conservation, Protection & Development (Management, Control and Regulation) Bill 2010 which was put in public domain for objections and suggestions. The Bill was opposed by the industrial and business lobby as it proposed strict regulation on extraction of ground water in multi-storey buildings and use of heavy pumps to draw water. As per a study of the SGWB, state's dependency on ground water resources has doubled over the years but the capacity to recharge aquifers through rain water harvesting have gone down.

There are over 630 townships dependent on ground water. Over 60% of total water demand of industries is being met through ground water. The number of tube-wells is over 28,000, deep tube-well over 17,000 and shallow private tube wells around 40 lakhs. The Bill proposes forming a Ground Water Authority to notify the areas where ground water resources are under stress. It also directs forming Water Users Associations to regulate the use and re-charge Ground Water. Provisions for commercial users and industries will include a complete ban on construction of new well in critical and over-exploited areas. The ban will continue till such areas are de-notified by the GWA. The proposed Bill has penal provisions for contaminating ground water in any manner. (Times of India 230511)

HYDRO PROJECTS

Kerala Ministry hears concerns on Athirappilly HEP For the first time in the history of Kerala, the Power Ministry invited parties opposing the Athirappilly Power Project for a face to face dialogue. Power Minister of the newly elected ministry agreed to verify the arguments placed by River Research Centre, Chalakudy River Protection Forum, Chalakudy River Protection Samithi and Athirappilly Action Council against the proposed Athirappilly Hydro Electric project in Kerala. The Civil society had been demanding for a face to face dialogue with the KSEB and Power Ministry for a number of years. But both the institutions had never consented to a dialogue. Evidence-based grass root level campaign and legal interventions have been able to stall the project for the last ten years. The local self governments have also expressed their apprehensions against the project to the Minister. The Minister made it clear that while the Government is concerned about the increasing power shortage, there is no compulsion to go ahead with the Athirappilly Project at any cost. (River Research Centre)

HYDRO PROJECTS IN UTTARAKHAND

THDC wants all HEPs on Dhauliganga Tehri Hydroelectric Development Corp has approached the Ministry of Power for allocation of all the hydropower projects located in the Dhauliganga river basin. According to THDC, integrated development of the Dhauliganga river basin by just one developer would be beneficial as it would result in economies of scale and help optimise operations of the cascade powerhouses in terms of water regulation, silt control, and catchment area treatment. THDC states that some downstream projects, such as the 240-mw Chungar Chal, 230-mw Sela Urthing and 280-mw Urthing Sobla, should be allotted to a single developer. The corporation asked the power ministry to recommend the allotment of the above projects to the utility as it had also been allotted the 330-mw Bokang Bailing HEP in the river basin. THDC has already placed this request before the Uttarakhand govt.

UJVNL to set up three HEPs in Chamoli The three projects in question are the 300-mw Bowla Nandprayag, 100-mw Nand Prayag Langasu and 280-mw Tamak Lata, in Chamoli district of the state. UJVNL has scrapped plans to set up the 230-mw Sela Urthing HEP in Pithoragarh district, 140-mw Taluka Sankri HEP in Uttarkashi district, and 70-mw Rishiganga-I and 35-mw Rishiganga- II HEP in Chamoli district. The projects failed to receive forest clearance as they were located in a wildlife zone. (The Project Monitor 220211)

HYDRO PROJECTS IN North East INDIA

Serious adverse Impacts of Lower Subansiri Speakers said at a state level workshop at Golaghat on *Big dams in North East India* that the Expert Committee constituted by the Govt. of Assam with experts from IIT Guwahati, Dibrugarh University and Gauhati University, to study the downstream impacts of the project, in their Interim recommendations in 2009 asked the government to stop work pending completion of the report. But they were ignored by the power company and both the State and Central governments. In their final report submitted in June 2010 this committee has recommended that: "The selected site for the mega dam of the present dimension was not appropriate in such a geologically and seismologically sensitive location, therefore, it is recommended not to construct the mega dam in the present site. He also said that the drastic daily variation in river flows which will take place after these dams are commissioned, particularly in winter is a matter of grave concern. For example, the average winter flow in the Subansiri River in its natural state is approximately 400 cubic meters per second. But after the commissioning of the 2,000 MW Lower Subansiri project, flows in the Subansiri river in winter will fluctuate drastically on a daily basis from 6 cumecs for around 20 hours (when water is being stored behind the dam) to 2560 cubic meters per second for around 4 hours when the water is released for power generation at the time of peak power demand in the evening hours. Thus the river will be starved for 20 hours and then flooded for 4 hours with flows fluctuating between 2 & 600 % of normal flows on a daily basis. The downstream livelihoods and activities likely to be impacted by this unnatural flow fluctuation include: fishing, flood-recession agriculture (e.g. mustard), river transportation and livestock rearing in grasslands for dairy-based livelihoods. The natural flow pattern of a river is like its 'heart beat' and alternate starving and flooding of these major rivers on a daily basis is a threat to the ecological and social security of the Brahmaputra floodplains. (Assam Times 170711)

Sulphuric Acid Affecting the Kopili HEP North East Electric Power Corp's (Neepco) officials have claimed that the Kopili Hydro-Project is facing a serious threat due to rise in the level of sulfuric acid in the water of the Kopili river. The practice of unscientific and open coal mining in Jaintia Hills of Meghalaya has been identified as one of the major reasons for the rise in acid level, which is affecting the hydel project. The project had to be shut down for 20 days last year due to damage caused to an important machine because of high level of sulfuric acid in the reservoir. The occurrence of defects in the machinery has brought down the production of power from 275 MW to 225 MW. A recent study by the Geological Survey of India said the ph of water in the Kopili River is between 2.3 to 2.7 at present as against the normal range of 7, indicating string acidity. In the Jaintia Hills of Meghalaya, most coal mines are privately owned and they practice open-mining system. After extracting coal, the mines remain abandoned and many heavy metals are left exposed which subsequently react with oxygen to form different chemicals. (For details see: www.sandrp.in/drp/April%20May%202011.pdf, Times of India 140511)

LSHEP Turbines stuck Fearing severe downstream impacts of more than 168 large hydel projects being developed in upstream Arunachal, Assam's Peasant organization Krishak Mukti Sangram Samiti (KMSS) has been opposing large hydel dams. In March this year, KMSS stopped unloading of turbine runners for the Lower Subansiri Hydel Project from three barges at Taripal Ghat of Biswanath Chariali in Sonitpur district. The Vessels have been there in the state since August 2010 to unload the logistics for the project as the All Assam Students' Union (AASU) and KMSS are persistently opposing it. The five cargo ships from Bangladesh were utilized by Assam-Bengal Courier India Limited for NHPC to transport 679 million tons of machines for Lower Subansiri Project. This May, opponents organised a dharna for an indefinite period at the Pandughat in protest against the anchoring of the three barges. Members of several organisations joined KMSS and demanded expulsion of the barges. They also warned of agitation until the barges were driven out of the State's boundary. (Times News Network 020511, Assam Tribune 120511, 050511, The Telegraph 060511)

China's RoRs not a cause of concern? Stating that the hydro projects being planned by China upstream of India's north east borders are run-of-the-river and not storage projects, concerned govt agencies including the Ministry of Water Resources are not showing immediate concern of China's threat of diverting the Brahmaputra. A meeting of the Committee of Secretaries, headed by Cabinet Secretary reviewed the various issues concerning China's bid to divert Brahmaputra River and the possible threat to India. Ministry of Water Resources submitted that ongoing Chinese activity on the Brahmaputra may not have any significant impact on the river water downstream in India. Beijing is planning a string of six dams in this area — Lengda, Zhongda, Langzhen, Jiexu, Jiacha and Zangmu near the city of Tsetang in Central Tibet.

However, many experts in India are uneasy about China's claim of run-of-river projects without storage. All big ROR schemes involve 'Pondage' or storage and it is very difficult to decide whether a particular case is pondage or storage. Many engineers hydro power engineers, indulge in playing with the word (RoR) to get permissions, where as they store water for morning and evening peak power generation.

Strategic affairs experts opine that China's reported plan to divert Brahmaputra waters further authenticates China's "opaque" hydro-engineering plans and its intention to build more dams on the river. As in the case of the Mekong, it intends to begin work quietly on large dams on the Brahmaputra. India's reluctance to speak up - and the habit of Indian officials to regurgitate China's empty assurances - only emboldens Beijing to opaquely pursue projects to the detriment of downstream users. (Assam Tribune 110511, Times of India 130611, Deccan Herald 160611)

HYDRO PROJECTS IN JAMMU AND KASHMIR

NHPC to deposit 'Water Charges' to J&K govt In a response to a petition filed by NHPC through its Chief against the state govt, the Jammu High Court has ordered NHPC to deposit the amount raised through various bills forwarded to it by the state govt. According to the Minister, Public Health Engineering, Irrigation and Flood Control, pending bills worth Rs 138 Crores from Nov 12, 2010 till March 31, 2011 have been forwarded to NHPC for clearance.

The state cabinet has constituted a sub-committee to study the terms and conditions of the agreements under which seven power projects have been handed over to National Hydroelectric Power Corp which will be headed by state finance minister. The agreements which will be studied by the sub-committee relate to the Salal, Dul Hasti, Uri-1, Sewa, Nimo Bazgo and Chutuk projects. According to the J&K Water Resources Act-2010, the J&K govt will impose water usage charges on all major and medium hydro-projects, a measure towards economic self-reliance. J& K govt estimates that it will earn revenue of Rs 900 crore per year through this. This is the first time the state govt would be levying water usage charges from the power projects. The Minister also said that Uttarakhand and Himachal Pradesh have asked for copies of the J & K Act. (Daily Kashmir 270511)

HYDRO PROJECTS IN HIMACHAL PRADESH

Karcham-Wangtu HEP High-handed attitude The Project authorities have warned downstream communities "They will not be responsible for losses" in case of sudden water rise. Proving the opponents' worse fears true, JP Karchham Hydro Corp released advertisements stating that water levels between the Karchham Dam and Wangtu can increase suddenly at any time between May and October. It has gone further to state that it would not be responsible for any accident that may occur as a result of any negligence or flooding. The Principal Secretary, MPP and Power, Himachal Pradesh has said while the company must issue a statutory warning for inhabitants to take care, it cannot absolve itself of responsibility in such matters and the erroneous impressions conveyed by the company should be cleared. The project started commercial generation of electricity from May 15 when the first generating unit of the 1,000 MW project was commissioned. (Times of India110511)

ADB's much touted 'green label' not working Report by Himdhara Environment Research & Action Collective and SANDRP titled *In the Name of Clean Energy* concludes that four ADB funded projects[26] under the

[26] The 195 MW Integrated Kashang Stage I, II and III, the 402 MW Shongtong-Karccham in Kinnaur, the 111 MW Sawara-Kuddu hydropower project in Shimla district and the 100 MW Sainj hydropower project in Kullu District, all being built by HPCCL.

'Himachal Clean Energy Development Programme', are no different than others where a 'comprehensive safeguard framework' like ADB claims does not exist. The performance of both sets of projects is equally pathetic on all counts. The report puts together field observations on the violations of norms and legislations that are supposed to protect the livelihood interests and environmental rights of the project affected communities.

The report points out that all four ADB project locations are eco-fragile in nature. All four are coming up in heavily dammed basins where there has been no credible cumulative impact assessment or carrying capacity studies, where rivers have been destroyed several times over and the performance of the past projects have been pathetic on benefits, costs and impacts. All four are in seismic zone IV, being built on catchments of glacial rivers, some so close to the glaciers that the projects are likely to accelerate the melting of glaciers. These projects are not coming up in isolation but are part of a cascade of projects within a river basin and none of the Environment Impact Assessment studies bring out the gravity of the impacts of all projects related activities, including dams, blasting, mining, tunnelling, road construction, townships construction, dumping of muck and related activities.

Recently, a Public Hearing for the World Bank funded Luhri Hydro Electric had to be cancelled after public protests making it clear that the environmental and social impacts of Hydropower projects as well as the increasing gap between their promise and performance, especially in the Himalayan region have become issues of serious concern. And yet these projects continue to be promoted in the garb of renewable and clean energy. So much so that govts are borrowing millions of rupees from international banks & financial institutions to fund these so called 'green' projects.

In HP the Asian Development Bank is leading the way by financing four HEPs through a Multi Financing Facility of $ 800 m under the misleading name of 'Himachal Clean Energy Development Programme'. "ADB would have steered clear of projects in ecologically sensitive areas and sites that are important from the conservation point of view, like Kinnaur and Sainj, if its commitment towards a cleaner environment and climate justice was real" the report states. "The ADB loans for HP HEPs are reflective of its economic interest & giving it the 'green' colour amounts to a serious lack of ethics". (The report available at http://www.sandrp.in/hydropower/Report_Adb_Financed_HEPs_HP%20210511.pdf)

IRRIGATION

Farmers demand white paper on Rs 5000 crore irrigation scam and water theft in Vidarbha One of the outcomes of Vidarbha Water Convention (Paani Parishad) convened by Maharashtra Pradesh Congress Committee president and chaired by Chief minister Prithviraj Chavan and Union Water Resources minister Salman Khursheed at Yavatmal has been the demand of white paper on alleged massive corruption of about 5000 crores in the Prime Minister Relief Package Fund allotted to increase irrigation facility and irrigation water robbery by diverting water for over 60 private power plants in the region. According to Kishor Tiwari of Vidarbha Janandolan Samiti, "We will request Chief Minister Prithviraj Chavan to ask centre to arrange C.B.I. enquiry on graft charges leveled by the Public Accounts Committee and the Comptroller and Auditor General and serious irregularities and advance payment under Accelerated Irrigation Benefits Programme schemes under Vidarbha Irrigation Development Corporation done by past Maharashtra Irrigation Minister Ajit Pawar. Pawar, now as Power Minister has been encouraging the power plants to use nearly 40% water reserved for irrigation while Vidarbha reels under a huge irrigation backlog."

Many questions have been raised related to governance and accountability of the Thermal Power Plants in Vidarbha. A number of environmental and social costs have been externalized in the power plant EIAs. For example, laying transmission network from the proposed and under-construction plants would require around thousands of ha of land. Despite the fact that the transmission lines render land under them barren and pose hazard to those living close by, none of the environmental impact assessment reports of the projects considered this.

There is no account of the total land the power plants would need. In Chandrapur, the state govt has acquired more than 800 ha of forestland for the power plants. In Nagpur, Mahagenco's Koradi Thermal power project is expanding illegally. It has cleared more than 400 ha of compensatory green belt it created in 1978. According to the statutory board's report, 47 projects would need 1,353 million cubic meters of water annually. This water, most of which is to be sourced from irrigation projects in the region, would deprive about 200,000 ha of agricultural land from irrigation, the statutory board and Vidarbha Industries Association estimated. The erstwhile Water Resources Minister has not only encouraged Power Plants to be set up in Vidarbha but has been instrumental in passing the MWRRA (Amendment) Bill, 2011 through extraordinarily underhand and secretive methods. The Bill gives the cabinet the right to decide water allocation, whereas through the MWRRA Act (2005), this right was with the MWRR Authority, whose tenet was also 'equitable water distribution'. (For details: www.sandrp.in/drp/April%20May%202011.pdf, Down to Earth 280210, Vidarbha Times 240511)

RIVERS

Community conservation Reserves in Aghanashini & Bedthi Basins West-flowing Rivers Aghanashini and Bedthi in the Uttara Kannada District of Karnataka are some of the last free flowing rivers in Karnataka. They

support extremely rich biodiversity, including endangered and endemic species like the Lion Tailed Macaque. At the same time, they provide rich ecosystem goods and services to the dependent population. According to a study conducted by IISC[27], the economic valuation of estuarine bivalve collection alone stands at 69 million per year to local community. Apart from the economic gains, the fish and bivalve form an integral part of the nutritional security of the community. About 4000 ha of forests in this basin, including the vulnerable and rare *Myristica* swamps will be now be protected through gram panchayats. Community conservation reserves also include private land. Their management is in the hands of local administration. Through community reserves, it is hoped the rivers will be protected from destructive projects and will remain undammed and free flowing in the future, protecting biodiversity and providing invaluable ecosystem goods and services to dependent communities. (From Dr. Bhalachandra Hegde, 160611)

Ancient Fish Sanctuary on the River Vaitarna A community conserved river stretch, or a fish sanctuary has been documented just downstream of the upper Vaitarna project in Thane District of Maharashtra. The stretch, known as the Tilaseshwar Sanctuary protects endangered Mahseer fish, which have been revered in Hindu mythology. Pollution and fishing in this stretch is strictly not allowed by the villagers. The sanctuary is at the mercy of water releases from Upper Vaitarna Reservoir. In May 2001, when water was not released from the dam, a huge fish kill was observed when hundreds of dead Mahseer fish were taken out of the river and buried nearby by the locals. India has more than 30 such fish sanctuaries along its rivers from Sringeri on the Tunga in Karnataka to Baijanath on the banks of Gomti in Uttarakhand. These sanctuaries receive no formal protection, but protect riverine stretches & associated biodiversity through community efforts. Mahseer fish, which has suffered the most due to dam construction, finds refuge in these sanctuaries.

River Regulation Zone MoEF has set up an 'Expert Group for the formulation of Guidelines for Management of River Fronts through the River Regulation Zone'. The only ToR of the Expert Group is 'To prepare a discussion paper on River Regulation Zones for the purpose of formulating guidelines /regulations to protect the riverine environment'. It has 10 members, 8 of whom are current or former Government officials.

UP plans to restore Gomati The govt has begun efforts for the conservation and restoration of the river Gomati at its originating point: Madho Tanda in Pilibhit. It has been found that the river been encroached in at least 33 villages. The river conservation drive has been started under the Mahatma Gandhi National Rural Employment Guarantee Act. It will also map the flood plain of the river under land records. The govt action has come on the impetus of the Gomti march, which was carried out by the community organizations in May 2011. The govt has started de-silting of the river near Fulhar Lake, considered to be the origin of the river. Gomti is one of the major tributaries of Ganga and like Ganga, suffers from pollution, encroachment & reduced flow. (Times of India 010511)

Kham Nadi Rejuvenation Plan On June 20, 2011, a public consultation was organised on rejuvenating Aurangabad's Kham River, reducing pollution and using the natural water sources in the city. Organisations like Nisarga Mitra Mandal, Institute of Engineers and Urja Sahayog have been working on restoring Kham River. They have organised weekly cleaning on the Kham banks for the past eleven weeks, through the local citizens. (Kham Nadi Bachao Abhiyan Press Release, 130611)

HC stays Pune Channelisation projects In a landmark order, the Bombay High Court has ordered a stay on concretisation and channelization through storm water drain project in Pune. The Petitioner, Baner Area Sabha has said that the concretisation of streams and rivers in the city in the name of storm water drain project affects the ecology of the river, helps encroachments and results in floods. Noting the fact that *"Having regard to the fact that the estimated cost of the project in question is Rs 220 crores and the Petitioners' case is that the impugned works impede the natural ecological flow of water and that once the river beds are narrowed and concretised, it will not be possible to set the clock back; we are of the view that interests of justice will be served if the petitioners are permitted to make a representation to the Govt of India, Ministry of Environment and Forests, which may be considered by the Minister in charge."* The petitioner will be making a representation before the MoEF about the same. Till the time, no construction has been allowed in Pune Rivers and streams. It has been stated by various experts and stakeholders time and again that major urban water works like channelization should involve a complete Environment Clearance as the environmental and social impacts of channelization have been documented to be severe. (For details: www.sandrp.in/drp/DRP_Aug_Sept_2010.pdf)

WATER OPTIONS

Gujarat's high Agri growth Not due to SSP Gujarat has achieved agriculture growth rate of 8.0% for the decade 2000-01 to 2009-10, highest in India and three times the agriculture growth during the same period at national level. According to a study by Professors Ravindra Dholakia and Samar Data, some of the factors that made this possible include water conservation, extension, cash crops, support for livestock development, revamping of agriculture related infrastructure including electricity provision through jyotigram scheme.

[27] Boominathan et al, *Economic Valuation of Bivalves in the Aghanashini Estuary, West Coast, Karnataka,* CES, IISC

In Water conservation specifically, it says three major programmes received a fresh impetus from the year 2000. With assistance from the Planning Commission, watershed development programmes were scaled up, adding about 100000 ha per year. By 2009, nearly 2,000 projects covering 2 million ha had been completed. Another 900,000 ha were under execution. Second, the Jal Kranti programme for constructing check dams, recharging wells & reviving village ponds/tanks was vigorously pursued. By the end of 2008, "a total of 113 738 checkdams, 55 917 bori bandhs & 240 199 farm ponds were constructed by the Water Resources Dept". Third, micro-irrigation (through drip & sprinkler) received a boost in the past decade spearheaded by the Gujarat Green Revolution Company. During 2006-10 nearly 2 lakh ha were covered, benefiting a similar number of farmers. Interestingly, the report does not seem to have mentioned the Sardar Sarovar Project or other big dams contributing to this success. (Business Standard 140711)

WETLANDS

Youth leader trying to protect wetlands, shot dead In a shocking incident, Tapan Dutta, the former Howrah District Youth Trinamul Congress President, fighting to save the wetland near Bali-Jagacha in Howrah District was shot dead in Kolkata on 6th May 2011.

According Nagarika Manch, a portion of the 750 acre wetland was being filled up illegally by corporate houses with the connivance of local & district administration. At a later stage, further filling up activities started for the proposed Railway Coach Factory & the eastern dedicated freight corridor. Mamata Banerjee, whiling laying the foundation stone claimed that it would bring about an "industrial revolution" in the region. The Indian Railways has been depositing tonnes of fly ash to fill the eco sensitive wetlands. Due to these destructive and short sighted activities, most of the canals and drains in the wetlands were blocked, resulting in inundation of the entire area in monsoon. Since the land filling has started, the residents of the adjoining villages have complained about inundation of field and homes during monsoon, a phenomenon they had never experienced in the past. As the flood waters remained stagnant for a long time, the community also had to face lethal outbreak of waterborne diseases and malaria.

Tapan Dutta and his associates from the 'Bali Jagacha Jala Bhumi Bachao Committee' made a series of appeals and organised deputations about the illegal landfilling and also filed a case at the Calcutta High Court. Accepting their demand partially, the High Court passed an interim order prohibiting filling up of any water body in that area. Despite the powerful land mafia threatening and trying to bribe him at many occasions, Mr Dutta continued his valiant crusade against the destruction of ecology. Police suspect the hand of land mafia behind the act but his assassinators are still at large. (Nagarik Manch Press Release 260511,)

More funds for Wular lake protection Union Environment minister has said the Centre is planning a bigger project for the protection and restoration of Wullar Lake, Asia's largest fresh water lake in north Kashmir. "The cleaning of Dal lake project is in progress and the union govt is committed to a much bigger project for the protection and restoration of Wullar Lake," Ramesh said. Under the 13th finance commission, Centre has sanctioned Rs 120 crore for the conservation of the Wullar lake.

Wular is one of India's Ramsar site and what the minister failed to mention is that Wular suffers not only from pollution, but is also threatened by huge water level fluctuations through the under construction 330 MW Kishanganga Hydropower Project which plans to divert the water from the Kishanganga river into Jhelum, which feeds the Wular lake. Due to the project, the lake will get additional water in monsoon as well as non monsoon months, the inflows will have huge fluctuations as the hydropower project is likely to operate for a few hours when water is available and during the rest of the hours there will be a drop in the inflows. These big fluctuations in the inflow will affect the ecological balance of the wetland. Nearly all of India's Ramsar Wetlands of India have been affected because of serious hydrological modifications. (www.sandrp.in/drp/DRP_Dec_2010_Jan_2011.pdf, Governance Now 160511)

AGRICULTURE

Andhra Pradesh for chemical free cultivation Taking note of the Non Pesticide Management technique, the AP govt has issued an order by which the agriculture dept will work with the rural development dept to reduce the cost of cultivation and move towards pesticide-free cultivation, Community Managed Sustainable Agriculture (CMSA). The technique does away with the use of any synthetic pesticide in agriculture and uses natural pest repellents like neem, garlic, chillies, plant extracts, etc. Looking at the performance of CMSA being practiced on 10 lakh ha in the state, Agricultural Ministry acknowledged the fact that income of the farmers have increased substantially and they get better price for their pesticide-free produce. (Down to Earth, 230511)

Champaran Farmers take up SRI In an encouraging step forward, farmers of Champaran, Bihar will take up system of rice intensification to meet the target set by Chief Minister Nitish Kumar to help Bihar become self-sufficient. SRI will be implemented in all 38 districts of the state. The Champaran District agriculture officer flagged off the Kisaan Vikas Rath, which would pass through most of the villages of all the blocks in June to create awareness among farmers of Champaran about the SRI technique. Farmers selected to get demonstration of SRI technique in their fields were given farm kits. SRI would cover 2,470 acres. (The Telegraph 230511)

Bumper production in Assam village under SRI The greater Kokila village, located along the border has recorded a bumper paddy yield through 'Sajal Dhara' variety. Even as other arable land remains bare, about 113 bighas of land in and around Kokila are cultivated with paddy cultivated under SRI. Just four years ago, this cultivable land had been cropless. In 2007, an industrious youth of Kokila village Montaz Ali started the SRI method of cultivation on 2 bighas of land and was able to produce 1,640 kg of rice per bigha. Having seen the productiveness of technique, the other cultivators of Kokila and its surrounding areas adopted the SRI (system of rice intensification) method. Paddy cultivation using the SRI method was done in more than 250 bighas in 2010. Last year one bigha of land produced 1600 kg of rice, while only 840 kg can be harvested through conventional cultivation. Most of the farmers used compost and cowdung instead of chemical fertilizers. (www.assamtribune.com/scripts/detailsnew.asp?id=may0511/state05)

Biodiversity and Wildlife

NBWL Clears 40 proposals in two hours, including a TPS taking water from the Chambal Sanctuary The National Board for Wildlife, with Environment Minister Jairam Ramesh as its chairman, has been virtually reduced to a mere clearance house for diversion of forest land. As many as 40 proposals were cleared in two hours in the 21st Standing Committee meeting of the Board on April 25, 2011. Exasperated over the alleged unilateral decisions of the Minister, several members have written letters to Ramesh expressing their dissent. The meeting was conducted in great haste for simply giving clearances and most of them got just 24-72 hours to study project proposals running into hundreds of pages. As many as 38 proposals reached at the eleventh hour giving them little time for preparation.

"These are by no means ordinary proposals but relate to the protected areas and wildlife sanctuaries which constitute just about 4 % of the total area in the country. Our decisions in these meetings concern the critically endangered wildlife. This is certainly not the way to dispose of such proposals", pointed out a member, on condition of anonymity. The opinion of the Board is binding on the Govt.

During the same meeting, permission was given for setting up the 330-MW Dholpur thermal power project (stage II) for drawing water from the National Chambal Ghariyal Sanctuary at Dholpur, Rajasthan. The member-secretary told the board that the study report on the water intake requirements of different projects from the Chambal River had been received from the Director, Wildlife Institute of India, and circulated amongst the members. The report had recommended that no new projects could be allowed to take water from Chambal as the present flow was inadequate and declining at the rate of 3 % every year. After discussions, the committee accepted the study report and decided to recommend the proposal subject to the condition that no new projects on the Chambal would be considered by the committee in future. (www.firstpost.com/politics/jairam-ministrys-new-record-40-clearances-in-3-hours-11355.html#disqus_thread)

WATER AND INDUSTRIES

Bhopal Industrial Area hit by water shortage The only company in India that manufactures graphite electrodes has shut its one 30 MW unit due to water shortage, near Bhopal in Madhya Pradesh. All water sources in Dahod village feeding the industrial town, Mandideep, have run dry. Water crisis has also gripped nearby Pilukhedi (40 km north of Bhopal) industrial area where main artery Kolhans and Uljhawan Rivers run. Companies like Coca Cola here are huge users of freshwater. The govt is left with only three tube wells that may also run dry anytime in Pilukhedi. The private suppliers lift water from contaminated sources & supply to industries. Mandideep requires at least 10 million liters of water per day against the existing supply of 2 MLD from all sources. Bhopal known as the 'city of lakes' has been facing water scarcity nearly every year. (The Pioneer 140511, Business Standard 100511)

QUOTES

"The new land acquisition draft is more dangerous than the (existing) Land Acquisition Act. It opens everything for acquisition. And, while there is a ceiling on the land that a villager can possess, there is no ceiling on the land that can be taken from the villagers."

KB Saxena, former Union Secretary (Business Standard 050811)

"About the Kalabagh Dam, I have been hearing about it since childhood and that even dictators who did not need public support were unable to build it."

Pakistan Prime Minister Yousuf Raza Gilani (The News 060811)

"The generation capacity in India has been growing more than three times as fast as household electrification. Supplying lifeline electricity of 100W per household to unelectrified households requires less than 10,000MW of generation capacity. Yet, though the country is expected to add at least 60,000MW of generation capacity during the 11th Plan itself, 25% of its people are left out. Thus, capacity addition is not benefiting unelectrified households proportionally."

(*The Mint 300611* Ashok Sreenivas and Shantanu Dixit from Prayas Energy Group)

The UN estimates that every $1 spent on sanitation reaps an economic benefit of at least $9, because of improvements to health and because it frees people to be more economically active… The World Bank has recently shown that more than six percent a year is being wiped off the GDP of countries failing to provide their citizens with adequate sanitation, because of health effects and the resulting lack of education and work opportunities.

(The Hindu 290611, *quoting a forthcoming WB-Water Aid study*)

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NEW REPORT

Thermal Power Plants on the Anvil: Implications and Need for Rationalisation

Research Areas: Regulation & Governance; Author(s): Shripad Dharmadhikary, Shantanu Dixit; August, 2011

A massive expansion in thermal power generation in India is on the anvil. Environmental clearances have already been granted to about 200,000 MW of thermal power projects and capacity totalling to another 500,000 MW is in various stages of securing environmental clearance. This report highlights, apart from the sheer scale of the capacity addition, the geographic concentration of the proposed plants, their predominantly private sector ownership, the severe environmental consequences and the implications for resources like coal and water. The report discusses the implications of the over-capacity in the making, the problems of a market driven sector and emphasises the need for a course correction. This course correction is required from both, the power planning perspective and from the social and environmental perspective, to restore balance and basic good governance processes in the development of thermal power in the country. It also proposes some key actions to meet these aims.

TS Eliot on Rivers:

I do not know much about gods; but I think that the river
Is a strong brown god—sullen, untamed and intractable,
Patient to some degree, at first recognised as a frontier;
Useful, untrustworthy, as a conveyor of commerce;
Then only a problem confronting the builder of bridges.
The problem once solved, the brown god is almost forgotten
By the dwellers in cities—ever, however, implacable.
Keeping his seasons and rages, destroyer, reminder
Of what men choose to forget. Unhonoured, unpropitiated
By worshippers of the machine, but waiting, watching and waiting.
-T.S. Eliot

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Edited, Published, Printed & Owned by Himanshu Thakkar at 86-D, AD Block, Shalimar Bagh, Delhi – 88
Printed at Sun Shine Process, B-103/5, Naraina Indl. Area Phase – I, New Delhi – 110 028