

Comments on the AHEC/2011 report

Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins

The report commissioned by the NRCD, MoEF has been put [on the MoEF website](#) in June 2011.

Where is 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 inadequate). Listing of impacts of various individual projects in one chapter or table, or classifying an impact as local or cumulative does not qualify for it 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 totalling 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 shows the pro hydro bias of the consultants.

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

1. Changes in sedimentation at various points within project, at various points within a day, season, year, over the years and cumulatively across the basin and impacts thereof.
2. Cumulative impact on aquatic and terrestrial flora and fauna across the basin due to multiple projects.
3. 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 and would be after. The report has failed to do ALL THIS.
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 WCD report or the UNFCCC criteria.
5. Cumulative impact of mining of various materials required for the projects (sand, boulders, coarse and fine granules, etc.)
6. Cumulative impact of blasting of so many tunnels on various aspects.
7. Cumulative impact of much dumping into rivers (the normal practice of project developers) and also of also muck dumping done properly, if at all.
8. Impact of silt laden water 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 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, road building, township building, deforestation, transmission lines, etc) for a project and then adding for various projects. Same should also be done for the periods during construction, operation and decommissioning phases of the projects.

12. Cumulative impact of deforestation due to various projects.

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. This is a reality, a norm rather than a theoretical proposition, the study acknowledges this at some places, but makes not attempt to assess the impact thereof. In fact the CEC and Supreme Court orders in 2009 on Kotli Bhel 1A and KB 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 followed.

This is only a partial list.

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 discredits the consulting team and organisation as independent, objective team and thus clouds the objectivity of the report. 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 the AHEC in this report, on the contrary it is positively AGAINST the mandate of the consultants.

- 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 most unscientific, 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.
- The report at several places keeps talking about the huge hydropower potential in Uttarakhand and the amount of power and revenues that the projects can generate for the state government. This is very strange coming in a cumulative impact assessment report and 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 and so on. This also shows how non serious is the report about its own recommendations when they raise question mark over viability of certain projects.

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 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 report firstly 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 ITR study just mechanically calculates the environment flows for these projects and implicitly says the projects can go ahead!

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 PDD report 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 zone (e.g. Bharon Ghati, Loharinag Pala, Jadh Ganga, Alaknanga, Vishnuprayag, Dhauliganga). Almost all of these characterisation 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 shows the shoddy job the consultants have done.

The classification of rivers into No Fish Zone, Trout Zone and Mahseer Zone, or Epirhitronic, Metarhitronic and Hyporhitronic is ambiguous and without reliable references. EMC is based on this unjustified classification. 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 o data”. This applies to groundwater by implication. Thus 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. But the consultants have not bothered to do this. On the contrary, they 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. This shows shocking callousness and wrong conclusions. The conclusion is certainly known to be wrong in case of Loharinag Pala, Pala Maneri, Phata Byung 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 in 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 violations, 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](#).

If the consultant was really interested in assessing the performance of hydropower projects, they should have assessed how the 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, and they show the hydropower projects in poor light. SANDRP analysis shows that per MW generation of hydropower projects in India has come down by a huge 25% in last 20 years. Secondly, 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 of 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 and environment 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. In such cases, there is no flow downstream of power house for about 16-20 hours and sudden release of huge quantity of water in rest of the hours. 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. Again a statement that shows shocking ignorance of the consultant about the aquatic life processes in a river.
- The report asserts without giving details of its basis that (page 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.

- 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 USPs of the storage based hydropower projects.
- 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.

Unfounded recommendations The report makes several unfounded, unjustified recommendations.

- The report says that a threshold of 70% may be fixed for the length of a river basin that can be either 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 how much 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. 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” (page 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, page 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>.¹ However, the report does not refer to this document. This gives rise to a suspicion that portions of the report have been used from other documents without giving specific quotes or reference.

Conclusion Considering the above, one is forced to request the MOEF to reject this report and ask for a more credible agency to re do the report. 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 to start implementing the Environment Flows recommended by the study, only as an interim measure, pending more rigorous assessment. 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.

However, on the whole the report by the AHEC of IIT-R, lead by its chief investigator Dr Arun Kumar 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.

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¹ 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