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January 17, 2014

The Chairperson and all Members,

Expert Appraisal Committee,

River Valley and Hydroelectric Projects,

Ministry of Environment and Forests,

Government of India,

New Delhi.

**Subject**: Lohit Basin Study by WAPCOS - Agenda Item on 71st EAC Meeting on 20-21 Jan 2014

Dear Chairperson and Members,

We would like to offer the following comments on the Lohit Basin Study, which is being considered in the meeting of the EAC (RVHP) during its meeting dated 20-21 Jan 2014.

1. The Lohit Basin Study and particularly its component of environmental flows assessment are seriously flawed. Even the Terms of Reference (TORs) for the study has serious problems.
2. The Study leaves out a large portion of the Basin that is, the section of the basin below the Brahmakund.
3. In the e-flows assessment, there is no proper process of setting objectives, there is no participation of basin communities, no objectives are identified or articulated, social aspects are completely left out, the methodologies, including BBM are wrongly applied, there is no clearly identified link between suggested flows and the ecological or social processes that these flows will sustain or for which these flows are necessary, the environmental flows are decided on an ad-hoc basis, the flows recommended are not really environmental flows in the sense that they do not mimic the natural flows, but rather are highly flashy with high daily variations, and the entire assessment is unscientific.

We elaborate on these issues in detail below.

**Problems with the TORs**

1. The TOR apparently specifies the study area for the Basin Study to include only the section upto Parsuram Kund. In effect, a large and very important part of the basin, the section on the plains, is left out of the study area.
2. The notion of environmental flows required by the TOR is problematic. TOR talks about environmental flows at two places. At one place, the TORs call for

“Assessment of maintaining minimum releases of water during lean season to sustain riverine ecology, maintain water quality and meet water requirements of downstream users.”

At another place, the TOR calls, as a part of the Outcomes, for

“Assess requirement of environmental flow during lean season with

actual flow, depth and velocity at different level.”

Both these represent a flawed understanding of environmental flows. One, the notion of “minimum flows” is quite different from the concept of environmental flows, even if one is talking about lean season. For example, e-flows will also involve consideration of the duration and flashiness (rate of change) of the flows; “minimum flows” does not capture that notion. Second, assessing the e-flows only for the lean season - which is what is required by the Outcomes - is also flawed. A scientific e-flows assessment must give e-flows for the entire year.

**Problems with Lohit Basin Study – Overall Concerns**

1. Continuing the flaw in the TOR, the Basin Study covers only the part of the Lohit basin upto Parsuram Kund. Thus, the Basin Study is seriously incomplete and flawed as one large section of the Basin is out of the study.
2. There is a separate study on the impacts of Peaking on the Dibru-Saikhowa National park, which the minutes of the 53rd Meeting of EAC imply is a part of the Lohit Basin study. (Minutes of 53rd Meeting state that “The issue of impact on Dibru-Saikhowa National Park was also discussed. WAPCOS informed that as a part of Lohit Basin Study, a separate report is being submitted to the Ministry shortly.”) However, this study of impacts of peaking is not clearly put as a part of the Basin Study. Even if it is, this would constitute only one aspect of the Basin Study of the Lohit plains. Thus, by no stretch of imagination can the peaking impact study be said to have fulfilled the role of a Basin Study for the part of Lohit basin downstream of Brahmakund.
3. There is virtually no consideration of any social concerns or social impacts in the basin. This is even though the TORs clearly mention that the Basin Study should be in terms of:

“Determination of regional ecological fragility/sensitivity based on geophysical, biological, socio-economic and cultural attributes.”

**Problems with Lohit Basin Study – Free Flowing Section of River**

1. The report discusses at length the issue of what length of river will be left “free flowing” after the construction of the various hydropower projects and dams.
2. This usage of the word “free flowing” in the Lohit Basin report is incorrect, and misleading. While WAPCOS does not define “free flowing”, from the context it is clear that what they mean by “free flowing river” is that portion of the river that is not in the submergence zone of the dams, or the portion where the flow has not been diverted from the river channel (into a tunnel, for example). Thus, a more accurate word for what the WAPCOS report calls “free flowing” would be just “flowing”. It is important to understand that even if a section of the river is “free flowing” as per the report, it does not imply that the flows are unaltered or in the natural state; far from it. In fact, in any location downstream of the first hydropower station will have an altered flow regime as it involves peaking operations.
3. In fact, this analysis of “free flowing” river in the Basin Study is not only flawed, but is also not according to the TORs. The TORs require it to look at sections of the river left with “normal flow”, not merely “free flow”. The relevant extract from the TOR is:

“Length of river stretches with *normal flow* due to commissioning of various hydroelectric projects due to diversion of flow for hydropower generation.” (Emphasis added)

1. The study should actually be assessing what is the length of the river with “normal” flow, and what would be the impacts where “normal” flow is no longer there, and how much of the river should be maintained with “normal” flow. None of this is done. Instead, a misleading and incorrect usage of “free flowing” is adopted, leading to wrong analysis.

**Problems with Lohit Basin Study – Environmental Flows Section**

1. The most serious problem with the e-flow assessment is that there is no attempt at formulating objectives, and there is no attempt at any “societal” or “stakeholder” process to determine the objectives. Thus, the e-flow assessment has no objectives, whereas objectives form the core of any e-flow assessments.
2. Second, equally problematic issue is that there is no consideration whatsoever of any social impacts of flow modification. There is no consideration of impacts on lives, livelihoods, culture of the basin communities. There is no mention of these issues at all in the close to 600 page report.
3. The report (including the Basin study section) considers only that part of the river where dams are to be constructed. In doing this, it leaves out almost 120 km of the part of the river that flows in the floodplains, where it sustains significant ecological diversity and livelihoods of many people. The dam-centred nature of the e-flows assessment is clear from the fact that it has also selected only the six dam sites as the locations to determine the e-flows.
4. While the report recommends some e-flows, there is no study or finding on the link between ecological impacts and flow modifications. That is, the report has no findings regarding to what extent and in what manner the change in flow will impact various ecological constituents like fish, riparian vegetation, aquatic flora etc. Without identifying such linkages, any e-flow assessment is purely *ad-hoc* and unscientific.

To just give one example, in the section titled “IMPACTS ON FISHERIES DUE TO FLUCTUATIONS IN WATER LEVEL” the report states[[1]](#footnote-1):

“Although, experimental data on the impacts on fish species present in river Lohit is not available but it can be predicted that daily fluctuation in water level will have adverse impacts on fisheries *to some extent*. Hence, *a continous (sic) environment flow downstream should be maintained for minimizing* the impacts and for the sustence (sic) of aquatic fauna.” (Emphasis added).

Thus, this study which took two years can only specify that the change in water levels will have adverse impact “to some extent”. When the extent of impact is not known, then the belief that a “continuous environmental flow” will sustain the aquatic fauna is only a matter of faith or ad-hocism. While this may be alright in a quick first cut assessment, a two year, well-funded study needs to come out with a better understanding of the impacts of change in flow on aquatic life.

1. The above example also highlights how the WAPCOS report confuses environmental flow with minimum flow. In fact, as we will show later, its notion of environmental flow, with all the sophisticated calculations it tries to do, is essentially a minimum flow.
2. The report calculates e-flows using several methods, including Tenant Method and BBM. In using the Tenant method, it uses the table developed by Tenant in 1975. The first question is how can a co-relation (represented by this table) developed for rivers of Montana be used for a river in quite different condition? As Acreman and Dunbar (2004) say[[2]](#footnote-2), “This approach [Montana Method] can be used elsewhere, but the exact indices would need to be re-calculated for each new region”. But the WAPCOS Report neither re-calculates the indices nor does it provide any reasoning as to why the Lohit basin is similar to the basin where Tenant developed the original indices and hence they can be used as they are. Second, the report arbitrarily states that “Assume that fair and degrading conditions are prevailing in the basin”[[3]](#footnote-3) and then draws on the Tenant Table to derive an e-flow of 10% for lean and 30% for non-lean season. Thus, the e-flow objective is set in an arbitrary manner. The objective should be a societal decision, but here the consultants have arbitrarily set it.
3. In using the BBM method, there is no attempt to identify which parts of the flow are necessary to meet which ecological or social needs. The blocks are built up, again, arbitrarily. The report indeed states that “The BBM methodology used in this study constructs a synthetic hydrograph which must satisfy the water requirements in the river for maintaining a desired condition.”[[4]](#footnote-4) But the desired condition is not the outcome of any societal process. Nor is there any scientific co-relation developed between various flow levels and patterns and how they will help (or not) maintain various desired conditions. Indeed, such desired conditions are not even specified. The report identifies four seasons of the year (low, high and the two transitions between these) and states that “The minimum flow during this period is *assumed* as 30% of average flow...” (For High Flow Season; for low season, its 20%, for the other two, its 25%, but all of them are assumptions, that is, arbitrarily assigned values. Emphasis added).
4. This is not in any manner the Building Block Method as no specific blocks are identified relating to specific ecological or social needs. The percentage of the flow for a particular season that will constitute the e-flow is also arbitrarily assumed, rather than being the outcome of the requirement for a clearly identified, desired condition of the river. This is completely unscientific application of the method.
5. Moreover, the final hydrograph that emerges from the application of this so-called BBM method is not a hydrograph that represents environmental flows. An environmental flow hydrograph is expected to mimic the natural flows. The National Water Policy 2012 of Government of India, adopted in December 2012, reinforces this, stating that “A portion of river flows should be kept aside to meet ecological needs ensuring that the low and high flow releases are proportional to the natural flow regime, including base flow contribution in the low flow season through regulated ground water use.” [[5]](#footnote-5)

But the hydrograph that emerges from the Lohit Basin Study’s BBM is a highly flashy construct with “environmental flow” for some hours and then a sudden “peak” flow for some hours, every day. Such a variation is not found in nature, and cannot be called environmental flow in any way.

For example, consider what would happen in the leans season month of February with the e-flows as recommended by WAPCOS[[6]](#footnote-6). The Basin Study itself notes that, *every day in month*,

“… there will be Environmental Flow” [of 66 cumecs] for a period of … 21 hours. This will be followed by flow equivalent to rated discharge of 1729 cumec. [for 3 hours]”[[7]](#footnote-7).

In other words, every day in February, the flow will be 66 cumecs for 21 hours, suddenly rising to 1729 cumecs for the remaining 3 hours[[8]](#footnote-8). For other months, essentially the same phenomenon will take place, except that the e-flow is different for each month so the flashiness will be lesser. (However, even in the month with highest e-flow, June, the flows go from 460 cumecs to 2085 cumecs.)

1. The Basin Study also does not show how these e-flow releases will “sustain riverine ecology, maintain water quality and meet water requirements of downstream users”, as mentioned in the TOR.
2. Thus, is all manners, the e-flow assessment is severely flawed, there is no proper process of setting objectives, there is no participation of basin communities, no objectives are identified or articulated, social aspects are completely left out, the methodologies, including BBM are wrongly applied, there is no clearly identified link between suggested flows and the ecological or social processes that these flows will sustain or for which these flows are necessary, the environmental flows are decided on an ad-hoc basis, the flows recommended are not really environmental flows in the sense that they do not mimic the natural flows, but rather are highly flashy with high daily variations, and the entire assessment is unscientific.

Given all the above, we request you to set aside the Lohit Basin Study as being highly inadequate and flawed, and initiate efforts to complete the Basin Study as a more scientific and participatory effort. We also suggest that the clearances to other projects in the basin be kept in abeyance till the completion of such a proper Basin study. This is in consonance with the basic principles of proper environmental assessment and protection, in particular the Precautionary Principle, and also in line with the spirit of the Office Memorandum of the MoEF dated 28 May 2013.

We look forward to appropriate action on this submission. We will be happy to provide any further details as required.

Thanking you,

Sincerely

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1. Page 9-262. Pdf Page 265 [↑](#footnote-ref-1)
2. Acreman, Mike and Micheal J Dunbar (2004): *Defining Environment River Flow Requirements – A Review,* In: *Hydrology and Earth System Science*s, 8(5), 861-876 : Page 864. [↑](#footnote-ref-2)
3. Section 9.4 (i), Chapter 9, Page 6; pdf Page 288. [↑](#footnote-ref-3)
4. Section 9.4 (iv), Chapter 9 Page 8, pdf Page 290 [↑](#footnote-ref-4)
5. Section 3.3 of National Water Policy 2012 [↑](#footnote-ref-5)
6. For Lower Demwe Project [↑](#footnote-ref-6)
7. Section 9.7. Chapter 9, Page23 and 28 or Pdf Pages 310 and 305. [↑](#footnote-ref-7)
8. This is another indication that what WAPCOS has recommended are not e-flows, but “minimum flows”. [↑](#footnote-ref-8)