Indian Himalayas moving towards highest Dam Densities in the World

In a ground breaking paper published in May 2012, Conservation Biology entitled 'Potential Effects of Ongoing and Proposed Hydropower Development on Terrestrial Biological Diversity in the Indian Himalaya', authors Maharaj Pandit and Edward Grumbine, highlight the colossal impacts of maniacal hydro power development in the Himalayas on terrestrial diversity, forest cover and rates of species extinctions. The authors qualify these findings by saying that they have used conservative estimates and the actual losses may be much *higher* than this prediction.

The shattering findings of the paper say that if 292 proposed and under construction dams in Himalayas (including Jammu and Kashmir, Himachal, Uttarakhand, Sikkim, and the remaining North East, which is a huge underestimation, the actual numbers are closer to 400+) are built, then Indian Himalayas would have:

1. **The Highest Dam Density in the World** Dam density of the region would be: 0.3247/1000 km2, nearly 62 times greater than current average global figures; the average of 1 dam for every 32 km of river channel would be 1.5 times higher than figures reported for U.S. rivers.

Sikkim, the most species rich state in the country would have the highest density (4/1000 km2), followed by Uttarakhand and Himachal Pradesh (both 1.5/1000 km2). Dam densities in the Brahmaputra (0.5825/1000 km2), the Indus (0.2895/1000 km2), and the Ganga (0.1022/1000 km2) basins would be 110, 55, and 19 times higher, respectively, than the current global average.

Ganga basin would have the highest number of dams (1/18 km of river channel dammed) in the world, followed by the Brahmaputra (1/35 km) and the Indus (1/36 km).

2. **90% Himalayan valleys affected** Nearly 90% of Indian Himalayan valleys would be affected by dam building and 27% of these dams would affect dense forests. Out of 32 major river valleys, 28 would be affected by dam building and nearly 90% of the dams would be located between the subtropical and temperate zones.

3. **More than 54000 hectares forest to be submerged** 54,117 ha of forests would be submerged and 114,361 ha would be damaged by dam-related activities. Most dams would be located in species-rich areas of the Himalaya. A disproportionately high percentage (90%) of dams would be concentrated in species-rich subtropical and temperate zones in the Indian Himalaya. Yet at present, due to limited studies and little certainty about the likelihood of all projects being built, it is difficult to quantify precisely the full extent of ecological changes that may result from proposed dam building.

Baspa River Destroyed by the Baspa Dam in Himachal Pradesh Photo: SANDRP Partners

4. Accelerated species extinction By 2025, deforestation due to dam building would likely result in extinction of 22 angiosperm and 7 vertebrate taxa projected. For this startling finding, the authors say “We have been cautious with these projections. Our estimates of forest loss from dam building are lower than those projected by the GOI and we selected the most conservative values”

Over the next 13 years, dam-building activity alone, if carried out in already-degraded forests, is predicted to lead to the extinction of 10 angiosperm and 3 vertebrate species. In scenario 2, haphazard dam building resulted in the loss of 114, 361 ha of forests (including 63,360 ha of dense forests) and in species extinctions doubling over the same period.

By 2100 extinction projections under conservative SAR estimates indicated the potential loss of 1505 angiosperms and 274 vertebrates driven by background deforestation and dam building combined

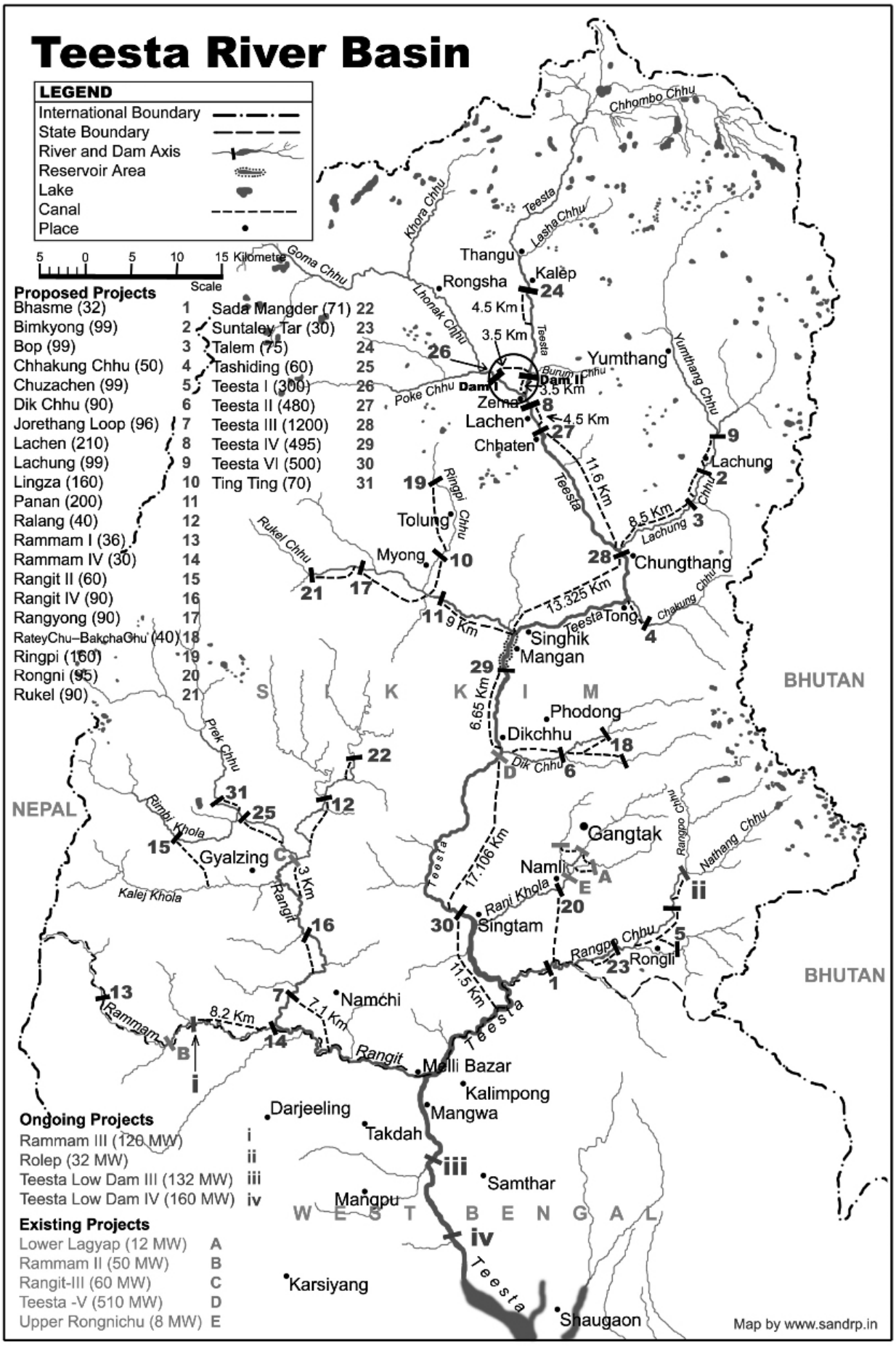
Disturbance due to dam building would likely reduce tree species richness by 35%, tree density by 42%, and tree basal cover by 30% in dense forests.

"These results, combined with relatively weak national environmental impact assessment and implementation, point toward significant loss of species if all proposed dams in the Indian Himalaya are constructed. **It is unknown whether the public, once informed of the consequences, would be willing to choose social goods over ecological benefits. This situation is exacerbated by the fact that the GOI has never carried out studies of the country's future energy requirements that examine alternatives beyond hydropower that may find a reduced need for so many dams (WWF 2007). And, according to a recent study from the Ganga basin, even the assumed social benefits of dams may have little scientific basis (Sadoff et al. 2011). Our results lend support to these claims, but in India, so far, there remains little attention paid to ecological evaluation of large-scale development (Bandyopadhyay & Gyawali 1994; Agrawal 2010)."**

"EIA regulations in India do make assessment of biological diversity "a criterion" for project evaluation. However, lack of scientific studies and poor implementation of EIA processes remain problems, and no projects have been rejected because loss of biological diversity has been cited, except in rare cases involving protected areas and flagship species such as the tiger (Singh 2006). In addition, there is no legal requirement in current EIA regulations for analyses of cumulative effects, but given the density of planned dams on all the major rivers in the study area, our results point toward the need to consider this standard in hydropower assessment (Menon & Kohli 2009; Choudhury 2010)."

Teesta III Dam in Sikkim Photo: Samir Mehta

What makes the findings of this study even more disturbing is the fact that the authors have severely underestimated the number of dams coming up in the Himalayas. They have considered only 292 dams planned or under construction. Whereas, In reality, the number would be closer to 460 dams under construction and planning stages in Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh. See http://sandrp.in/basin_maps/ for details and locations of planned, under construction and completed dams in these states.



Dams planned and under construction in the Teesta Basin
Map: SANDRP