



Is hydropower benign, reliable and financially viable?

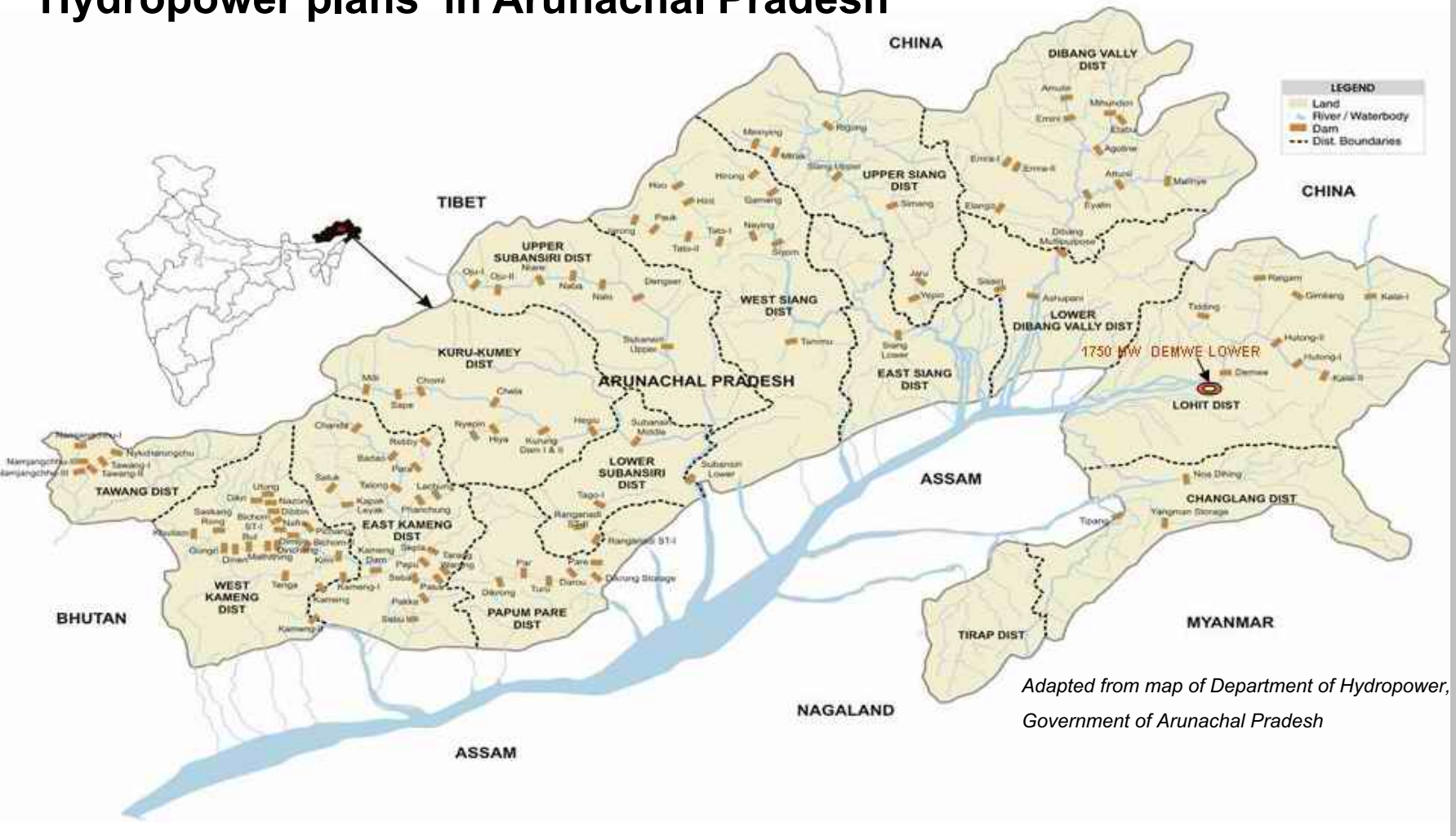
A reality check from Northeast India

By

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Kalpavriksh

Hydropower plans in Arunachal Pradesh



Adapted from map of Department of Hydropower, Government of Arunachal Pradesh

- 160 MoUs/MoAs have been signed for 46,948 MW; 189 projects as per river basin studies
- Large projects under construction: 600 MW Kameng, 2000 MW Lower Subansiri, 300 MW Gongri
- Large projects commissioned: 405 MW Ranganadi Stage – I and 110 MW Pare

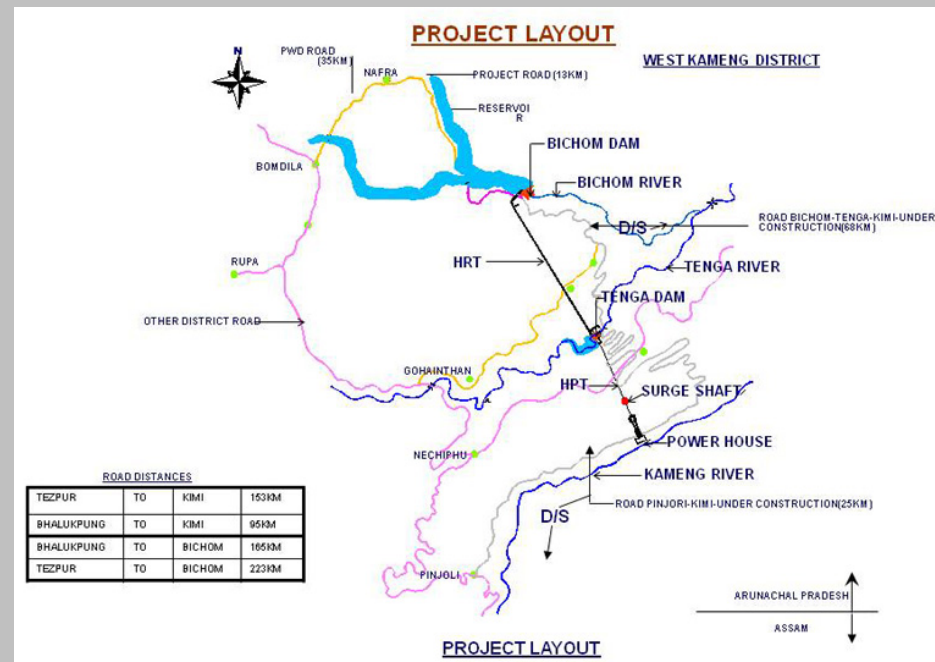
600 MW Kameng: Under construction since 2005

- Estimated commissioning: Unit I & II: Aug 2019, Unit III & IV: December 2019
- Geological surprises, major design change of primary structures, flash floods
- Original cost: Rs. 2496.90 crores (December 2004, CCEA)
- Revised cost: Rs. 6179.96 crores (March 2015 CEA)
- Actual cost: Rs. 7494.35 crores as of July 31, 2019

Is environmental risk assessment in Himalayan hydropower adequate & realistic?

Time and cost over-runs inevitable

e.g. 1200 MW Teesta III (Sikkim)

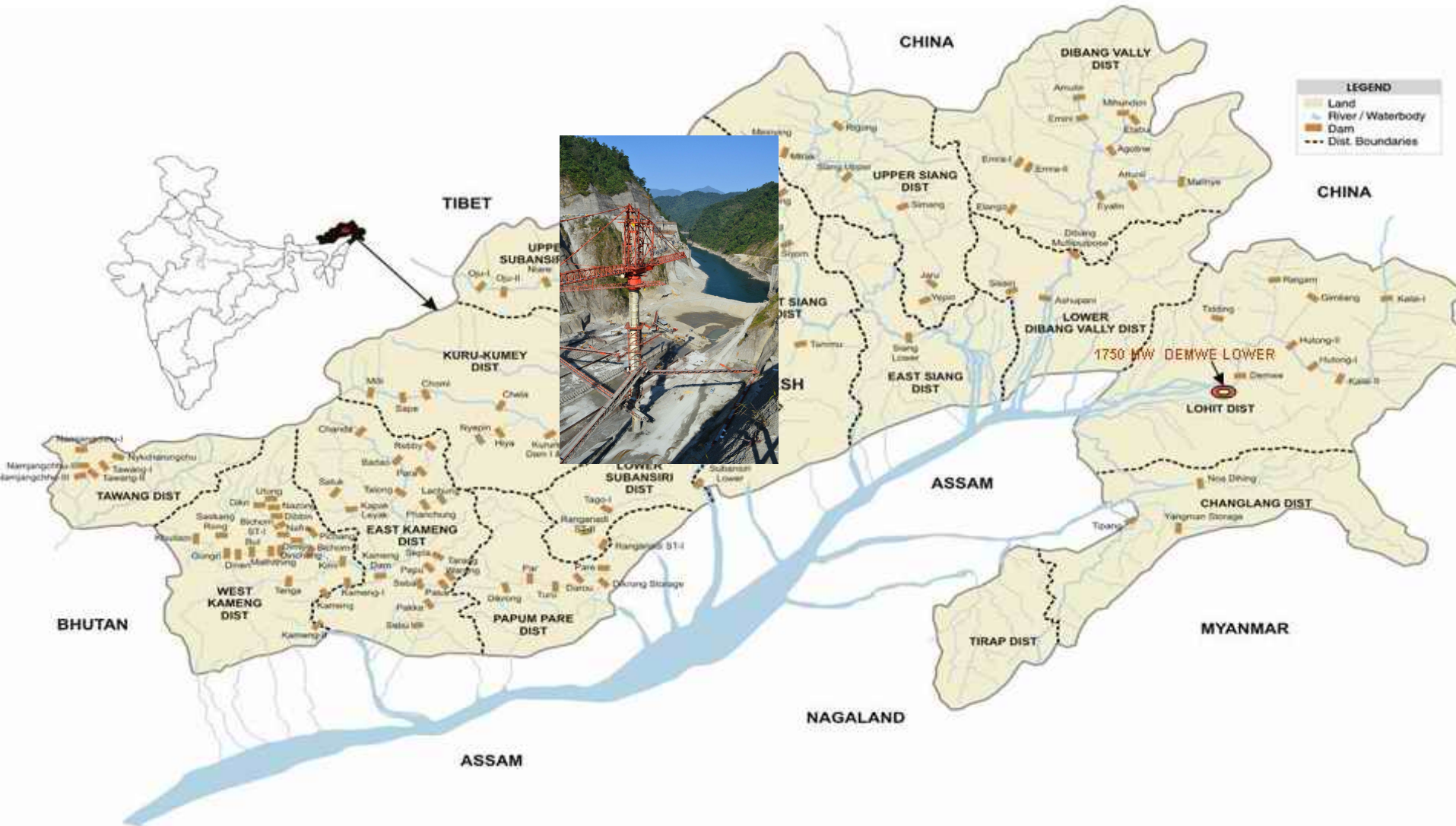


Forests, community rights and impacts of conservation offsets

- **Arunachal Pradesh: 42 projects – 30, 568 ha forests to be impacted (Pandit & Grumbine 2012)**
- **2880 MW Dibang Multipurpose project: 4577.84 hectares forest, 3.24 lakh trees**
- **Ongoing legal disputes related to land, forests and compensation**



Assam: Downstream impacts of dams in Eastern Himalayan foothills



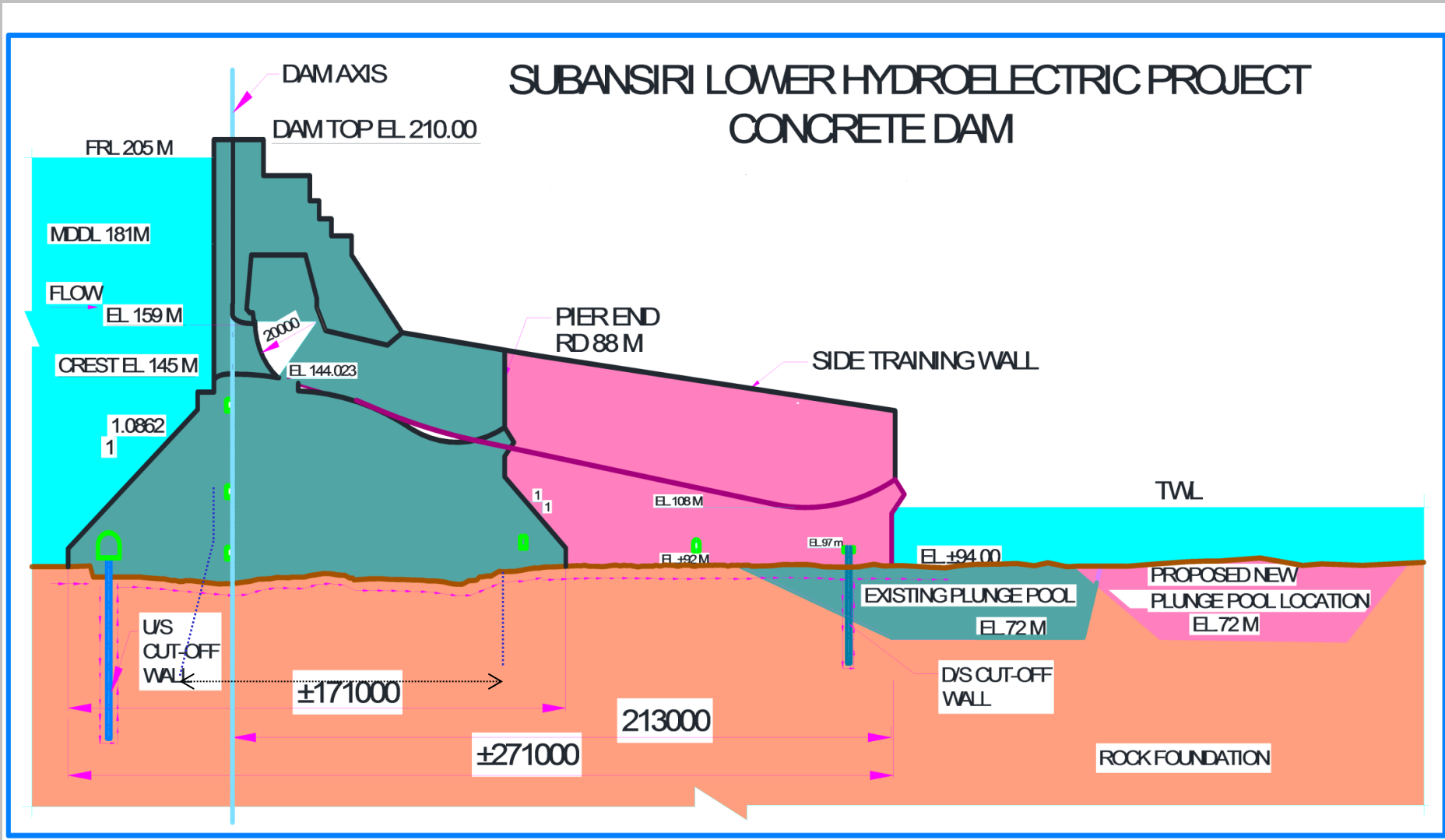
Downstream impacts of dams

Downstream impact concerns raised in the region include:

Loss of fisheries; changes in *beel* (wetland) ecology in the flood plains; impacts on agriculture in riverine islands and tracts; impacts on other livelihoods due to blockage of rivers by dams

e.g. driftwood collection, sand and gravel mining, navigation; increased flood vulnerability due to massive boulder extraction from river beds for dam construction and sudden water releases from reservoirs in the monsoons; dam safety and associated risks in a geologically fragile and seismically active region; drastic alteration in natural flows due to power generation patterns.

2000 MW Subansiri Lower: Changes in project design



Original: Rs. 6285.33 crores Revised: Rs. 19,496.34 crores

High and Dry: Diurnal variations due to peaking in floodplains

Siang river: Average January flow of around 1000 cumecs will fluctuate daily between 328 cumecs and 5063 cumecs on a daily basis



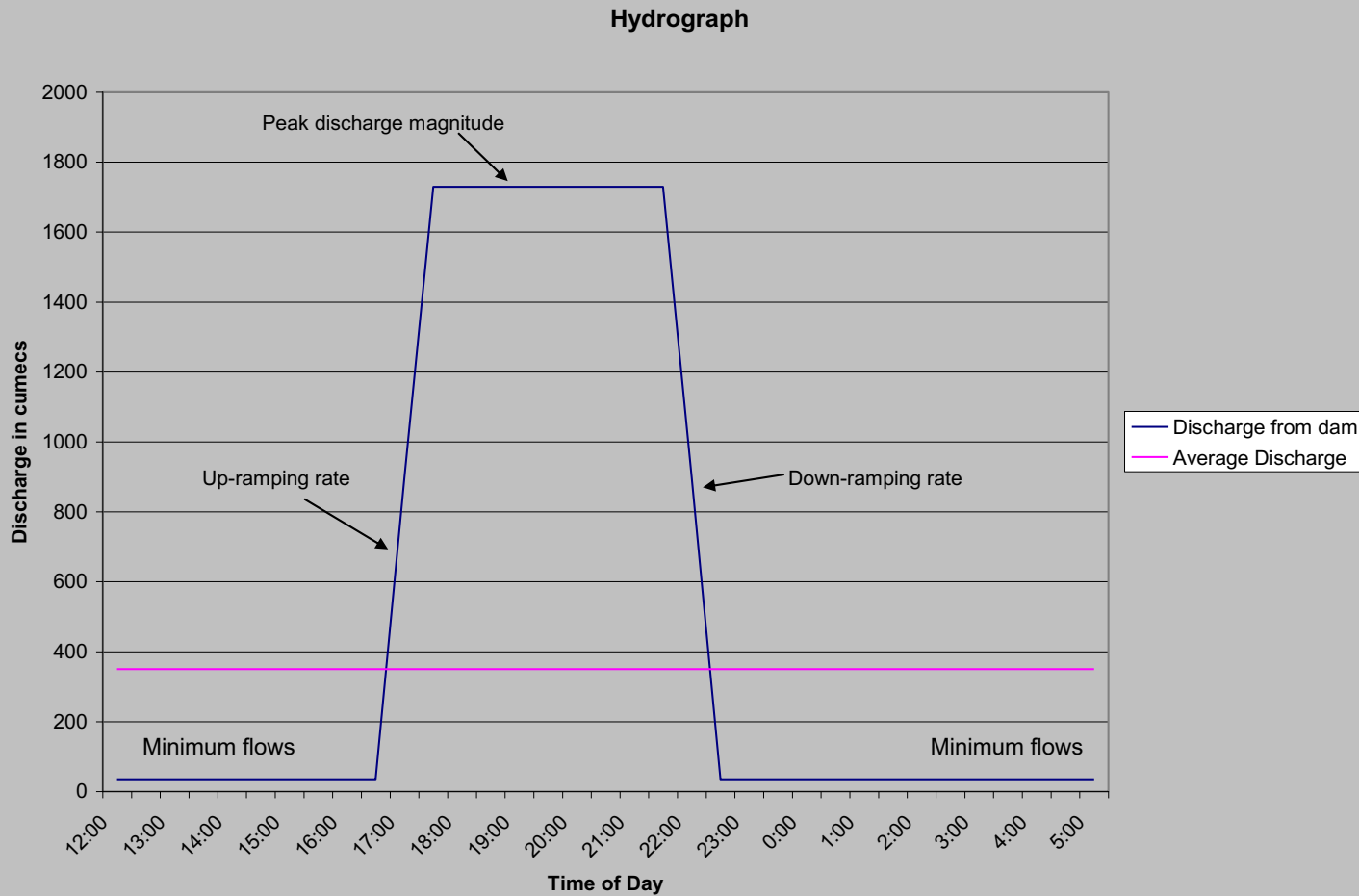
Lower Siang Hydroelectric Project

Chapter-7: Prediction of Impacts

TABLE-7.9
Water levels w.r.t. discharge variation and ground levels

Section No.	Distance from Lower Siang Dam Axis (km)	Water Level (El. m)		General Bed Level (El. m)	Remarks	
		For 5063 cumec for 3 hrs	For 328 cumec for 21 hrs		River Bank	
S-4	25.09	147.96	140.88	138.19	152.50	End of Hilly terrain
S-3	33.62	142.61	138.87	137.66	150M	D. Ering Sanctuary at El 150m
S-2	43.23	133.33	128.05	121.97	137.59	D. Ering Sanctuary at El 137m
S-1	51.31	123.70	118.90	114.71	126.24	D. Ering Sanctuary at El 133m

Daily winter flow hydrograph in Lohit river after commissioning of 1750 MW Demwe Lower project: WII study



N.B. This is an indicative graph

Subansiri Lower: Diurnal variation between 240 cumecs and 2579 cumecs

