POTENTIAL NATURAL HAZARDS TO PROPOSED DAMS IN DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH

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For full technical report https://github.com/monsoonforest/dibang-glaciers

The proposed Etalin Hydroelectric Project is located on the Dibang river of Arunachal Pradesh, a high-mountain watershed that is highly prone to natural hazards as a result of its unique and complex geological, ecosystem, weather and climatic conditions. The three main tributaries that give rise to the Dibang river; Mathũ (Mathun), Dri, Talõ ('Tangon' in official documents) are fed by glacier melt, monsoon rainfall and snowmelt. These factors regulate the volume and flow of river water and thus, have consequences for the viability of the planned hydroelectric projects, as well as the safety measures that need to be put in place. A team of independent geologists and hydrologists who reviewed the project documents have suggested that these contingencies have not been adequately addressed by the project developers, potentially putting the people, biodiversity and economies of this 10,000 km^2 region at a high risk. These are explained below.

The three tributaries that give rise to the Dibang river: the Dri, Mathun and Talõ derive water from the melting glaciers, monsoon rainfall and snowmelt. These factors bear consequence for hydro power projects as the volume and flow of water in the rivers are what drives

electricity generation, as well as determines safety measures that need to be put in place.

Seismic Hazards:

The proposed dam site is a seismically active zone, recording 34 earthquakes in the past century. The number of recorded earthquakes is likely a lower estimate as there are currently no operational seismic monitoring stations in Dibang Valley. Seven of these were greater than magnitude 3 on the Richter Scale and had their epicenters in the immediate vicinity of Etalin village. A great earthquake in the Himalayas is predicted in the next 30 years. Scientists believe that the 2015 Nepal earthquake failed to dissipate the Earth's built-up strain. Large earthquakes that do not release such built-up strain (such as the 1947 earthquake in Upper Subansiri district) can lead to great earthquakes in the future (such as the 1950 earthquake in Lohit district). Where the built-up strain from the 2015 earthquake will lead to a future one is anyone's guess.

Glacial Hazards:

The mountains upstream of the proposed Etalin dam contain 300

glaciers and 350 glacial lakes that feed the rivers. These glaciers have already thinned out due to climate change. With predictions of a further loss of up to 60% of their current volume by 2050, the electricity production capacity of these hydro power projects is likely to fall considerably. Thinning of glaciers also gives rise to the unnatural formation of lakes on their surface, which have been known to cause sudden outburst floods.

A combination of glacial lake outburst and cloudburst in Kedarnath in 2013 that led to the colossal loss of lives and livelihoods, and damaged at least two hydro-power projects downstream, stand witness to the destructive power of such events. This calamity had led to the loss of thousands of lives, livelihoods and had also severely damaged at least two hydro-power projects downstream.

Extreme precipitation events and floods:

Extreme precipitation events, i.e., when an unusually high amount of rainfall occurs, leads to a sudden increase in sediment load often causing rivers to change course. In 2015-16, 72 houses of Anpum and Loklung villages in Lower Dibang Valley district were washed away when the Dibang river unexpectedly changed course following extreme rainfall events. Such extreme rainfall events are predicted to become more frequent due to climate change.

Landslide risks:

Recent research using satellite data and more accurate climate models predict that a combination of increased rainfall and glacial melt will substantially increase the risk of landslides in the higher mountains. This puts the people, biodiversity, infrastructure and any hydro power projects built downstream at a much higher risk.

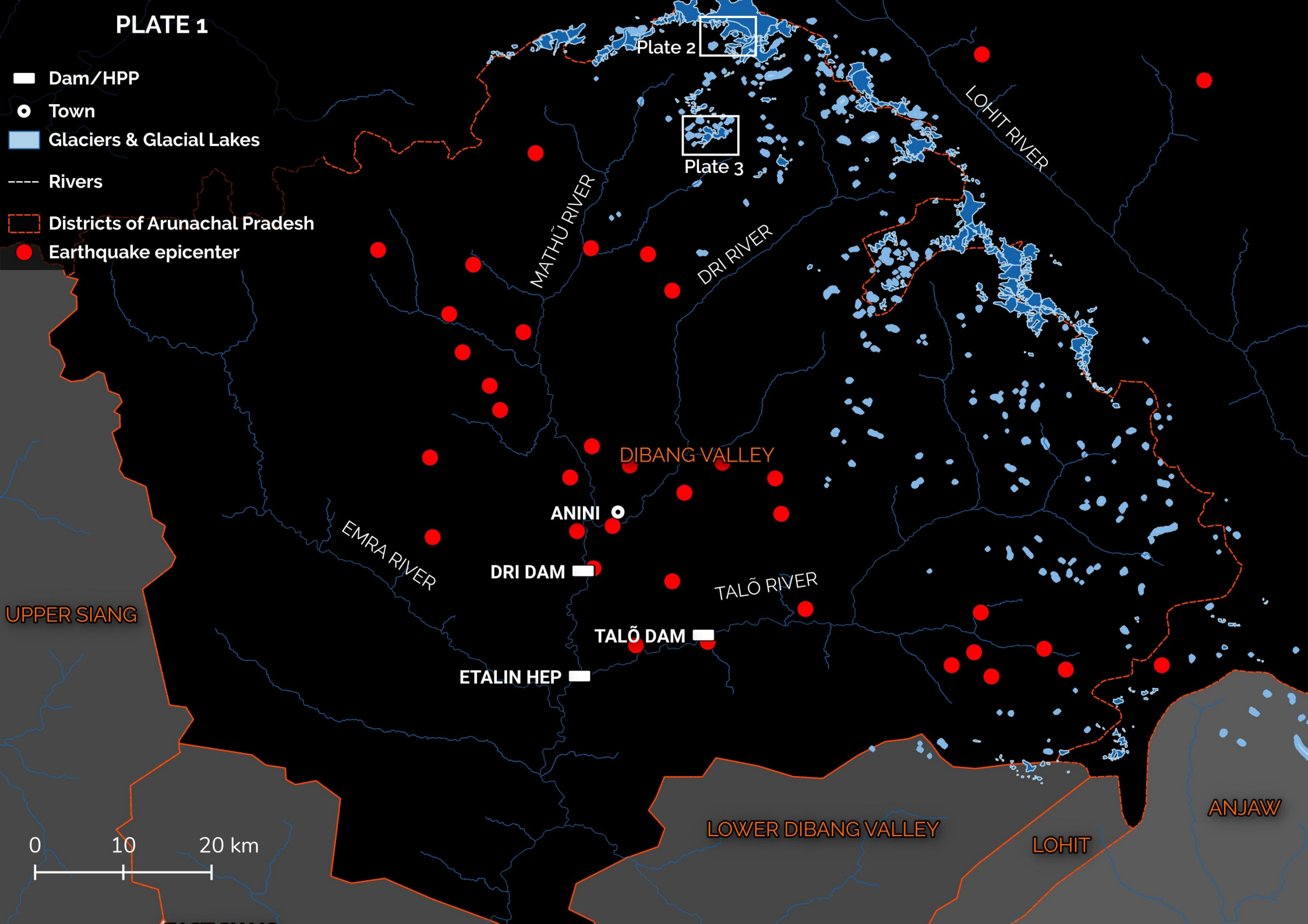
PLATE 1
Dam/HPP
Town
Glaciers & Glacial Lakes
Rivers
Districts of Arunachal Pradesh
Earthquake epicenter
Plate 2
Plate 3
LOHIT RIVER
MATHŨ RIVER
DRI RIVER
DIBANG VALLEY
ANINI
EMRA RIVER
DRI DAM
TALÕ RIVER
TALÕ DAM
ETALIN HEP
UPPER SIANG
LOWER DIBANG VALLEY
LOHIT
ANJAW
0
10
20 km