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Nature Impact of Channel Planform Change of the river Khowai, Tripura, India

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The Chattagram-Tripura Fold Belt (CTFB) is a relatively young region of deformation developed in an arc-trench setting and may be viewed as westward extension of the more matured Indo-Burman Ranges. The Tripura State occupies the northern part of the CTFB and consists of five major ridges (250∼950 m) with progressively higher elevation towards the east. The four intervening synclinal valleys mostly drain north or south. Khowai is one of such rivers that flow between Baramura and Atharamura anticlines.

To evaluate the nature and impact of channel planform change of the river Khowai during the last 78 years, we georeferenced and mosaiced six obtainable Survey of India maps of 1932-33 and 1974-75 besides satellite images of 1975 (Landsat-2 MSS), 2001 (Landsat-7 ETM+) and 2009 (IRS-P6 L3+L4-mono). A Corona photograph of 1962 was also available for a part of the study area. From these materials, channels of different survey or imaging years were extracted and superposed.

Preliminary results indicate that the Khowai markedly lowered its width-depth ratio and sinuosity—from 2.58 to 1.55—in its alluvial / floodplain reaches between 1932-33 and 1974-75, irrespective of deforested or wooded areas. Its path length reduced by 60 percent. Over the same period, variation in the constricted mountainous reaches of the river was only minor. A number of wetlands associated with the river shrunk or disappeared. Oral histories from the region strongly support these map- or image-based observations.

With the absence of any record of significant increase in precipitation or occurrence of earthquake in Tripura since the early 20th century, this region-wide shift in channel patterns points to tectonic control and signals initiation of a new phase of uplift in the northern CTFB. Human inventions may also have some contribution to the change.