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Deforestation, Sediment Transport, and Landform Sensitivity in the Himalayan Part of the Ganga Catchment

ROBERT WASSON[1], MANOJ JAISWAL[2], NAVIN JUYAL[2], MALCOLM MCCULLOCH[3] and ASHOK SINGHVI[2]

[1]*Charles Darwin University*
[2]*Physical research Laboratory, Navrangpura, Ahmedabad, India*
[3]*Research School of Earth Sciences, Australian National University, Act 0200, Australia*

The impact on lowlands of land cover and land use changes in adjacent mountains is a subject of continuing strong political, media, scientific, community and policy interest. Debate rages in India, Nepal, Bangladesh, China, Thailand and Indonesia, centred on deforestation and its putative impact on increased erosion and flooding. The evidence for a link between increased erosion, in-channel sedimentation, and flooding is weak. And there are few studies showing the relationship between deforestation and erosion. The research reported here uses a whole-of-catchment approach in which sediment source tracers are used within a Holocene chronologic framework. The results show that: substantial deforestation has occurred in the last two centuries, mostly for commercial purposes, in the lower Himalaya; the proportion of sediment coming from the area of deforestation increased markedly during the last two centuries; most of the sediment derived from the lower Himalaya comes from an area of maximum relief, steep stream gradients, high rainfall, activity seismicity and maximum uplift. Deforestation in the 1950's and 1960's in this area of high landform sensitivity produced a huge sediment transport event in 1970. No single factor contributes to sediment transport in these mountains, but deforestation has played a role.