



## **Impact of land use change on soil carbon loss of the Sikkim Himalayan piedmont**

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Natural and human causes of change in land use on soil carbon were studied at the outlet of the Tista River from the Sikkim Himalayas over the last 150 years. Analysis of topographic maps and satellite images indicates that the land reforms related to location of tea gardens in the piedmont caused rapid deforestation of terraces in the late 19th century. Continuous population growth after 1930 initiated the replacement of floodplain forest by rice cultivation. Both processes changed soil carbon content and intensified fluvial activity expressed through terrace erosion. The replacement of natural forest by tea cultivation reduced the soil carbon content within terraces from 1.95 kg to 1.77 kg (in 1 m of topsoil) respectively. The replacement of natural forest by rice reduced the soil carbon content within floodplains from 0.42 kg to 0.23 kg (in 1 m topsoil) respectively. Much more dangerous, was terrace erosion leading to permanent removal of sediment including soil. The total loss of soil carbon in a 1 m thick soil layer due to conversion of 5 km<sup>2</sup> forest to tea cultivation was about 900 t between 1930 and 2010. While the total soil carbon removed due to 1.8 km<sup>2</sup> terrace erosion reached 3510 t in the same period. Result is the outcome of research project 2012/05/B/ST10/00309 of the National Science Centre (Poland).