Clay Research, Vol. 42, pp. 36-49 (2023 & 2024)

Characterization and Classification of Clay Rich Alluvial Soils to Explore Soil-Landform Relationship in Lower Indo-Gangetic Plains of India

SHREYASI GUPTA CHOUDHURY [1], *, TAPATI BANERJEE [1], SUBRATA MUKHOPADHYAY [1], BIRENDRA NATH GHOSH [1], NIRMALENDU BASAK [1], CHANDRAKALA M. [2], JAYJAYANTI MUKHOPADHYAY [1], UDAYAN RUDRA BHOWMICK [1], MASJUDA KHATUN [1], FEROZE HASAN RAHMAN [1], AND NITIN G. PATIL [3]

[1] ICAR-National Bureau of Soil Survey and Land Use Planning, Regional Centre, Kolkata-700091, West Bengal, India
[2] ICAR-National Bureau of Soil Survey and Land Use Planning, Regional Centre, Bengaluru-560024, Karnataka, India
[3] ICAR-National Bureau of Soil Survey and Land Use Planning, Amravati Road, Nagpur-440033, Maharashtra, India

Abstract: *Characterization and classification of soils divulge its genesis and processes of formation, which is strongly related to geomorphic cycles followed by landform development. The alluvial plains are complex landscape assemblages formed by the overlap of multiple riverine systems. Soils developed under alluvial plains are having wide variations depicting the partial influence of different rivers and the quality and quantity of sediments, spatially and temporally. To investigate the characterization, genesis and classification of alluvial soils with its subsequent spatial occurrence in the Lower Indo-Gangetic Plains of West Bengal, the present study has been carried out in Habibpur block of Maldah district, West Bengal situated within Tangon and Punarbhaba river plains under two contrasting landform situations (old alluvial plains and young alluvial plains) with varying slope classes. Soils of old alluvial plains were very deep, moderately well drained, slight to moderate erosion with having clay enrichment (presence of argillic horizon) in the sub-soil layers and classified as Alfisols. Inceptisols with very deep, well to somewhat poorly drained soils were found under young alluvial plains. In general, the pH, soil organic carbon and cation exchange capacity of the surface horizon ranged from 5.7 to 6.6, 0.3 to 0.9 % and 6.3 to 15.1 cmol (p+) kg^{-1}, respectively. Data on pedogenic indices revealed that, the P1 and P2 pedons of old alluvial plain and P4 pedon of the young alluvial plains had relatively lower sand/silt ratio as compared to the P3 pedon of young alluvial plains (nearly level) in both surface and sub-surface horizons showing the more matured soils with relatively higher profile development in P1, P2 and P4 pedons than P3 pedon. The distance and influence of the river on soil devepoment has been found to be very crucial and could dominate over the other soil forming factors active in alluvial plains.*

Keywords: Earth system; Geogenic process; Geomorphology; Pedogenesis; Sedimentalogy

---

Present Address of Shreyasi Gupta Choudhury: ICAR-National Bureau of Soil Survey and Land Use Planning, D. K. Block, Sector 2, Salt Lake City, Kolkata-700091, West Bengal, India
*** Email ID of Corresponding Author (SGC):** shreyasi.acss@gmail.com; S.Guptachoudhury@icar.gov.in
ORCID ID
SGC: 0000-0002-4929-2011
TB: 0000-0003-4446-0183
SM: 0000-0002-9156-5562
BNG: 0000-0002-2416-3600
NB: 0000-0002-2281-0253
CM: 0000-0003-1612-0800
JM: 0009-0003-7792-3268
URB: 0009-0001-8178-7612
MK: 0000-0003-4505-7265
FHR: 0000-0002-7193-6864
NGP: 0009-0000-1888-0227
DOI: https://doi.org/10.56093/CR.v42i1.4