**Soil Erosion Mapping of Bagmati Province Nepal using RUSLE Method**

**Annan Shrestha**

1. **Introduction**

Soil erosion presents a significant global challenge, with estimates indicating that the average rate of soil loss worldwide ranges between 12 - 15 ta/ha/yr [[1](#one)], meaning that every year the land surface losses are about 0.90 - 0.95 mm of soil [[2](#two)]. In contemporary times, the synergistic effects of climate change and anthropogenic environmental impacts have elevated erosion to a critical environmental concern in numerous regions worldwide [[3](#three)-[4](#four)]. Soil erosion is one of the major factors causing destruction and sustainability of agriculture in the upland is soil erosion [[5](#five)]. Soil erosion by rainfall and surface water flow is generally affected by five factors: Rainfall erosivity, soil erodibility, topography, surface coverage, and support practices [[6](#six)].

Several models exist to predict the extent of water induced erosion [7]. This study uses the RUSLE model and arcpy, python and GIS to quantify and understand the spatial distribution of soil erosion in Bagmati Province of Nepal.

**References**

1. Biggelaar, C.; Lal, R.; Eswaran, H.; Breneman, V.E.; Reich, P.F. Crop Losses to Soil Erosion at Regional and Global Scales: Evidence from Plot-Level and GIS Data. In Land Quality, Agricultural Productivity, and Food Security; Wiebe, K., Ed.; Edward Elgar: Cheltenham, UK, 2003; pp. 262–279.
2. FAO; ITPS. Status of the World’s Soil Resources (SWSR)–Main Report; Food and Agriculture Organization of the United Nations and Intergovernmental Technical Panel on Soils: Rome, Italy, 2015.
3. Julien PY. Erosion and sedimentation. Cambridge University Press, Cambridge, 1998
4. Rozos D, Skilodimou HD, Loupasakis C, Bathrellos GD. Application of the revised universal soil loss equation model on landslide prevention. An example from N. Euboea (Evia) Island, Greece. Environ Earth Sci DOI [10.1007/s12665-013-2390-3](https://doi.org/10.1007/s12665-013-2390-3), 2013.
5. Blaikie, P.; Brookfield, H. Land Degradation and Society; Routledge: London, UK, 1987.
6. Renard, K.G.; Foster, G.; Weesies, G.; McCool, D.; Yoder, D. Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (Rusle); United States Department of Agriculture: Washington, DC, USA, 1997; Volume 703.
7. Brady, C.N.; Weil, R.R. The Nature and Properties of Soils, 14th ed.; Prentice Hall: Upper Saddle River, NJ, USA, 2008.
8. Koirala, Pooja, Sudeep Thakuri, Subesh Joshi, and Raju Chauhan. "Estimation of soil erosion in Nepal using a RUSLE modeling and geospatial tool." *Geosciences* 9, no. 4, 2019: 147.
9. Morgan, R.P.C. Soil Erosion and Conservation; Soil Conservation Society of America: Ankeny, lowa, 1985.
10. Sharpley, A.N.; Williams, J.R. Erosion/Productivity Impact Calculator: 1. Model Documentation. USA Dep. Agric. Tech. Bull. 1990, 1768, 235.
11. Morgan, R.P.C.; Morgan, D.D.V.; Finney, H.J. A predictive model for the assessment of soil erosion risk. J. Agric. Eng. Res. 1984, 30, 245–253.
12. Gao,G.Y.; Fu, B.J.; Liu, Y.; Wang, S.; Zhou, J. Coupling the modified SCS-CN and RUSLE models to simulate hydrological effects of restoring vegetation in the Loess Plateau of China. Hydrol. Earth Syst. Sci. 2012, 16, 2347–2364.
13. Panagos, P.; Borrelli, P.; Meusburger, K.; Alewell, C.; Lugato, E.; Montanarella, L. Land Use Policy Estimating the soil erosion cover-management factor at the European scale. Land Use Policy 2015, 48, 38–50.
14. Erencin, Z. C-Factor Mapping Using Remote Sensing and GIS; A case Study of Lom Sak/Lom Kao, Thailand; International Institute for Aerospace Survey and Earth Sciences (ITC): Upper Aise, The Netherlands, 2000.
15. Shin, G.J. The Analysis of Soil Erosion Analysis in Watershed Using GIS. Ph.D. Thesis, Kangwon National University, Chuncheon, South Korea, 1999.