**Soil organic carbon may decrease with temperature increase in the future: case study-Gash Barka, Eritrea**

***Tesfay T.***

Postgraduate

Peoples’ Friendship University of Russia Named After Patrice Lumumba

Faculty of Ecology, Moscow, Russian Federation

E-mail: tumuzghitesfay2020@gmail.com

 Soil organic carbon is very crucial for our food, feed, fibre, ecosystem, and climate [1]. However, temperature increase due to climate change may affect SOC negatively [2]. Models enable us understand the interactions between soil and environmental variables such as temperature that is fundamental for sustainable land management actions that enhance soil carbon sequestration and climate change mitigation [2]. Thus, SOC (n = 178) status in Gash Barka (around 1.7 million hectares of land), Eritrea, was modelled with good accuracy (R2 = 0.64) using multiple linear regression model taking temperature as an independent variable, and mathematical equation was developed. On the average, SOC was 0.44% and temperature was 27.83 oC in the study area where temperature is expected to increase by 1.93 oC under the RCP2.6 climate scenario for 2021-2040 [3] in which SOC was projected to decrease by 68.18% according to the developed model. Others also report that temperature increase decreases SOC [2, 4, 5]. Temperature increase may deteriorate soil health, food production, ecosystem, and may contribute to atmospheric CO2 concentration through SOC emission. Thus, serious actions should be taken that reduces or maintains the microclimate of each place. Soil and water conservation activities like constructing big and small dams, ponds, check dams, and other structures, reforestation, afforestation, and good agronomic practices have positive impact on enhancing microclimates. Thus, the study concludes temperature is the main variable that will cause SOC decline in the future and serious actions should be taken to moderate the hot climates.

**References**

1. Tesfay, T.; Mohamed, E.S., Ghebretnsae, T.W.; Ghebremariam, S.B.; Mehrteab, M. Soil organic carbon stock assessment for soil fertility improvement, ecosystem restoration and climate-change mitigation, E3S Web of Conferences 2024, 555 (RIEEM 2024). <https://doi.org/10.1051/e3sconf/202455501015>
2. López-Teloxa, L.C.; Monterroso-Rivas, A.I. Soil Organic Carbon May Decline Under Climate Change: A Case Study in Mexican Forests. Land 2024, 13, 1711. https://doi.org/10.3390/land13101711
3. <https://www.worldclim.org/data/cmip6/cmip6_clim5m.html>
4. Zhao1 F., Wu1 Y., Hui J., Sivakumar B., Meng X., Liu S. Projected soil organic carbon loss in response to climate warming and soil water content in a loess watershed. Carbon Balance Manage (2021) 16:24. <https://doi.org/10.1186/s13021-021-00187-2>
5. Wang M., Zhang S., Guo X., Xiao  L., Yang  Y., Luo Y., Mishra U., Luo Z. Responses of soil organic carbon to climate extremes under warming across global biomes. Nature Climate Change, 14:98–105, 2024. https://doi.org/10.1038/s41558-023-01874-3