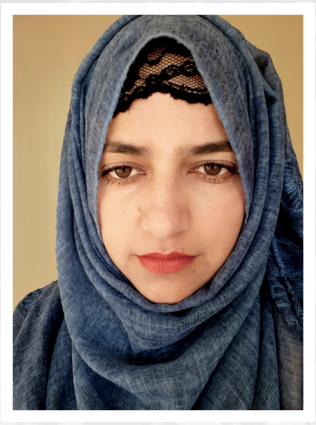
C-MASC Scholar Viewpoint

FROM THE DESK OF MAH-NOOR AZAD



I am Mah-Noor Azad, Ph.D. Scholar at PMAS-AAUR, Pakistan, and I worked with Dr. Rattan Lal in The Ohio State University, U.S.A as a Visiting Scholar from February 2020 to August 2020. During my visit, I worked on the estimation of gaseous emissions and carbon fractionation on the OSU university research farm, having 5-7% slope mulching and chemical fertilizers as treatments during summer. As we know, soil erosion is one of the most serious problems. Human being takes 99.7% of their food from land and less than 0.3% from ocean and other aquatic ecosystems (David Pimental).

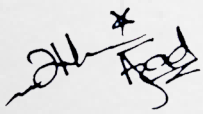
Erosion occurs when soil is left exposed to rain and wind energy. Rain drops hit exposed soil with enormous energy and easily displace the soil particles from the surface (Troeh et al., 1991). It is reported by Batie et al. (1997) that cropland area affected by water erosion on U.S cultivated land gradually decreased 1982-1997 from 152.4Mha to 132.3Mha. There has been speedy increase in atmospheric concentration of CO_2 and other greenhouse gases. Gaseous emissions from terrestrial ecosystems are exacerbated by soil degradation. On-site effects of soil erosion poorly affects soil quality and productivity, and off-site effects are worse, but difficult to properly estimate. Eutrofication and contamination of surface water by no-point surface pollution is serious, and the greenhouse gases emitted by these processes are a big concern (Lal 2001).

The field experiment was conducted during summer 2020 in the experimental area of th OSU research farm. We select a field and divided it into 1 sub plots and set treatments as: mulching (16kg/ha), mulching (16kg/ha) and fertilizers (244kh/ha), and only fertilizers (244kg/ha). Sub treatments were crops, soybean and maize with replications of main treatments.

We observed that the plot with mulching (16kg/ha) and fertilizer (244kg/ha) had highest total organic carbon (4.67mg/kg), and the plot with the lowest (1.21mg/kg) had mulching (0kg/ha) and fertilizer (0kg/ha). Same with particulate organic carbon (7.289mg/kg and 1.106mg/kg), mineral associated carbon (4.67mg/kg and 1.21mg/kg) and dissolved organic carbon (58.19mg/kg and 17.90 mg/kg): each were higher with higher application of mulching and lower with no application. And for gases emission we observe NO2 emission at 0 time was 0.3ppm and 0.5 after 45minutes, CO2 was 591ppm at 0 time and 666ppm was recorded after 45min and CH4 was 1.97 at 0 time and 1.2 after 45 min with higher application (mulching 16kg/ha and fertilizer 244kg/ha) and in control plots (mulching 0kg/ha, fertilizers 0kg /ha) we observe the concentration of NO2 was 0.2ppm at 0time and 0.17ppm after 45 min, CO2 was 563ppm at 0 and 463ppm at 45 and 2.28ppm CH4 was recorded at 0 time and 1.52 at 45minutes.

We conclude with this experiment that with the application of mulching save more carbon and emission of green house gases can decreased with mulching. We have to promote mulching in conservation agriculture to save our soils.

Sincerely,



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