C-MASC Scholar Viewpoint

FROM THE DESK OF GURMEET SINGH DHERI

The rice-wheat sequence is an important cropping system of Asia which feeds millions of people and supports the livelihoods of most of the farmers of the region. This system has impacted the natural energy exchange between the soil-plant-animal-environment continuum. Adoption of intensive tillage, inefficient irrigation methods, excessive use of synthetic fertilizer, and removal of crop residue has exacerbated the risk of accelerated soil erosion, loss of biodiversity and soil C reserves, depletion of water resources, pollution of the environment, and global warming. If appropriately managed, the soil can play a central role in the decarbonization of atmosphere, and the solution to climate change is underfoot—i.e. soil—as said by Dr. Rattan Lal, World Food Prize Laureate. The adoption of minimum soil disturbance, retention of crop residue and cover crops is necessary for the existence of life in the soil and on the soil. Conservation agriculture has the potential to achieve the aspirational value of "4 per mille" in the tropics.

In-situ retention of crop residues is one of the critical components of conservation agriculture which is advocated to enhance soil ecosystem services and avoid environmental pollution from straw burning. The mode of straw management affects its decomposition rate, C exchange, thus GHG emissions and global warming. Thus, the assessment of straw management induced GHG emissions is pertinent to identify low C emissions technologies for mitigating C footprints of agriculture. Besides a rich source of C, soil application of crop residues also supplements synthetic fertilizer and reduce indirect emissions of fertilizer, environmental pollution, and economic loss of the farmers on a long-term basis.

The encouraging effects of residue retention on soil C stock and soil health have been reported in field crops. As agriculture makes a significant contribution to the world's greenhouse gas emissions, crop residue management is expected to influence C flux and global warming. Therefore, it is essential to study the effects of on-farm residue management technologies on C exchange through the soil-plant-environment continuum for a tradeoff between soil C and GHG emissions.

My aim at C-MASC is to study the effects of fertilizer and crop residue management on soil C and greenhouse gas emissions. Under restricted permissions in response to COVID-19 pandemic, I have a contingency plan for the assessment of biofuel crops on soil C and greenhouse gas emissions.

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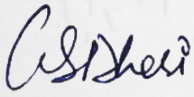
Sincerely,



Dr. Gurmeet Singh Dheri
Assistant Soil Chemist
Department of Soil Science
Punjab Agricultural University, Ludhiana (PB), India