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Opinion Article

Effects of the Periodic Plowing on Soil Physical Properties

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DESCRIPTION

Modern conventional agriculture involves a wide range of diverse procedures. The top layer of soil is flipped over throughout the various types of ploughing, much like flipping a pancake. Similar to ploughing, tilling is another procedure that breaks up the soil into tiny bits, much like dragging a comb through it. The soil is broken up and disturbed throughout each of these processes, which results in significant disturbance and issues. The top layer of the fields' plants decays and degrades when they are ploughed and tilled, creating and releasing carbon dioxide and methane in the process. Additionally, fields that have not been tilled (also known as "zero tilled" fields) include deep-rooted plants and fungi that enable carbon storage (absorbing CO_2 from atmosphere). Therefore, the potential for carbon sequestering (uptake of CO_2 from atmosphere) is liberated by not tilling or ploughing. Agricultural soils account for 5% of all Green House Gas (GHG) emissions in the EU under present conventional farming practices. That surpasses the total value of shipping and aviation.

Soil losses from the third treatment without surface residue during the initial rain application was comparable to those from the chisel ploughed and disked surface with some surface residue. Only 23% of the soil was lost in each of these treatments compared to the moldboard ploughed and disked treatment. Precipitation on the semiarid southern North American Great Plains, during an average year, provides approximately 25% of the potential evapotranspiration for crop water use. Terrace constructions have been modified to limit storm water runoff in order to mitigate the ensuing agricultural water demand shortfall during dry-land conditions.

The most significant area of Bangladesh's economy is agriculture. When starting a farm, much equipment is needed to prepare the ground for planting rice or spreading seeds. Sub-soil compaction occurs during such cultivation and is typically brought on by the tillage technique notably by mechanical methods. Due to the use of heavy weight tillage equipment, repeated ploughing may cause plough pan development in cultivated soil. Under power tiller and country plough treatment, plough pans are generated in the same profile mostly in rice fields. The existence of a plough pan may change the soil's physical characteristics, including its texture, structure, density, pore space, consistency, colour, and temperature, as well as its chemical characteristics, including its pH, organic matter content, and nutrient availability. The breakdown of soil structure and a rise in the bulk density of the soil are the most obvious effects of soil compaction. A plough pan layer forms under the standard ploughing technique at a depth of the soil of approximately 20 cm, which may force changes in soil physical qualities and may result in a decline in soil physical quality. The development of plough pan, which lowers soil bulk density and may generate penetration resistance up to tilled depth, is encouraged by intensive ploughing.

For a period of up to 26 years, several studies examining the impacts of deep soil profile modification have consistently shown lower BD and PR as well as enhanced infiltration and crop rooted. These studies have also consistently demonstrated higher yields under full or restricted irrigation as a result of the better soil physical characteristics; however, dry land agricultural production methods were not assessed. We predicted that under dry-land circumstances, profile-modifying deep ploughing to remove thick subsoil layers would have a long-term impact on soil properties and crop yields. Calculate the long-term impacts of deep ploughing on a few physical characteristics, such as infiltration, BD, and PR, as well as crop output and water usage.

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