

Restoration of Agroecosystems with Conservation Agriculture for Food Security to achieve UN-Sustainable Development Goals

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Abstract

Sustainability of agroecosystems is the most challenging task for humans in this anthropocentric era. The faulty agriculture practices and several undesirable anthropological factors caused substantial soil erosion, desertification, and soil dryness, resulting in a severe decline in soil biodiversity and crop productivity. The mismanagement of agriculture land has deteriorated around 25% of the world's total land area, resulting in the annual loss of approximately 24 billion tonnes of soil. By 2050, 95% world's land might be degraded if current trends continue. The tillage practices are responsible for more than 150 t ha⁻¹ of annual soil loss around the world. Soil erosion is responsible for 40% of all soil deterioration worldwide. Agricultural land degradation is mainly caused by intensive soil ploughing, removal or burning of crop leftovers, poor pasture management, and insufficient crop rotations. Conservation Agriculture (CA) practices are essential for soil quality restoration and improvement. The global annual adoption rate of CA has been 7 M ha year⁻¹ over the last ten years. By decreasing soil erosion, maintaining soil structure, and encouraging soil organisms, by using CA practices, Brazil has stored around 12 million tonnes of carbon from 23.6 M ha of land. The regenerative CA practices are also important to the achievement the sustainable development goals (SDGs). This review seeks to gather and provide collective literature on the global agroecosystem situation and the impact of CA methods in restoring our degraded agroecosystems for food security.

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FIGURE 1.pdf available at <https://authorea.com/users/474665/articles/564392-restoration-of-agroecosystems-with-conservation-agriculture-for-food-security-to-achieve-un-sustainable-development-goals>

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FIGURE 4.pdf available at <https://authorea.com/users/474665/articles/564392-restoration-of-agroecosystems-with-conservation-agriculture-for-food-security-to-achieve-un-sustainable-development-goals>



FIGURE 5 RCA through Sweet potato residue mulching in the subsequent wheat crop increases soil moisture in North Western Himalayan soils (IISWC, 2020)

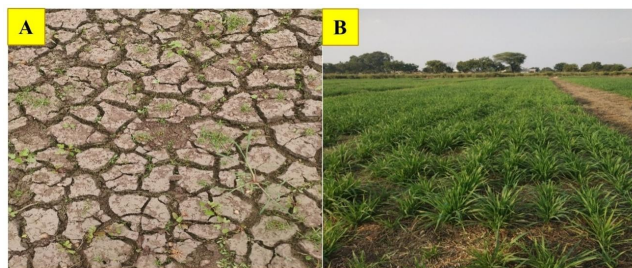


FIGURE 6 (a) Intensive cracking in the black soil of central India and (b) represents their quality enhancement through crop residue retention for RCA (IISS, 2018).



FIGURE 7 Improved RCA measures to boost up soil health and productivity: (A) retaining crops residues on the soil surface (B) intercropping practices with wide foliage crop to reduce soil erosion (C) conservation agro-forestry sytem on hills (D) in-situ live green manuring (E) zero-tillage practice in standing crop stubbles using happy seeder (F) sal leaves mulching under chili crop to conserve soil moisture & enhance soil properties (G) gram crop under zero-tilled-residue retained field (H) improved CA-based agri-horti system in boulder soil of hilly areas (I) addition of compost to improve soil health