OPEN ACCESS Freely available online

ISSN: 2319-5584
Global Journal of
Biology, Agriculture
& Health Sciences

Perspective

Soil Rehabilitation Strategies for Restoring Agricultural Productivity and Ecosystem Stability

Laura Bennett*

Department of Environmental and Soil Sciences, Greenfield Agricultural University, Manchester, United Kingdom

DESCRIPTION

Soil rehabilitation represents a significant field within environmental and agricultural science that focuses on restoring degraded land so it can support healthy plant growth and ecological balance. Over time, various human activities such as intensive farming, industrial expansion, mining operations, and improper waste disposal have caused considerable deterioration of soil quality in many parts of the world. Natural events including erosion, flooding, drought, and salinity intrusion may also weaken soil structure and reduce fertility. When soil loses its ability to sustain plant life effectively, agricultural productivity declines and ecological stability becomes threatened. Soil rehabilitation research concentrates on reversing these negative conditions through scientific assessment and sustainable land management practices.

Healthy soil contains a balanced mixture of minerals, organic matter, microorganisms, water, and air. This combination supports plant root development while maintaining nutrient availability and proper drainage. However, degraded soils often display reduced organic matter content, poor structure, nutrient depletion, and contamination by harmful substances. Compacted soils may prevent roots from penetrating deeply, while erosion removes nutrient-rich topsoil layers that are essential for plant growth. Soil rehabilitation aims to correct these problems through carefully planned restoration methods that rebuild soil structure and improve nutrient cycling. One of the most widely used approaches in soil restoration involves increasing organic matter content. Organic materials such as compost, farmyard manure, crop residues, and green manure crops contribute essential nutrients while improving soil structure. When organic matter decomposes, it supports beneficial microbial populations that assist in breaking down complex materials into forms that plants can absorb. The presence of organic matter also enhances water retention capacity, allowing soils to store moisture more effectively during dry periods. Over time, repeated additions of organic material help rebuild soil fertility and support stable plant growth.

Another important technique used in soil rehabilitation involves planting cover crops. These crops are grown primarily to protect and improve the soil rather than for harvest. Leguminous cover crops such as clover, alfalfa, and certain bean species are particularly valuable because they host nitrogen-fixing bacteria that convert atmospheric nitrogen into forms usable by plants. Other cover crops, including grasses and certain leafy species, help reduce erosion by protecting the soil surface from wind and rainfall impact. Their root systems stabilize the soil while contributing organic matter when the plants decompose.

Soil rehabilitation also addresses issues related to salinity and chemical imbalance. In some agricultural areas, excessive irrigation combined with poor drainage leads to the accumulation of salts in the soil. High salt levels restrict water absorption by plant roots and reduce crop yields. Reclamation practices may include improving drainage systems and flushing excess salts through controlled irrigation. In addition, applying soil amendments such as gypsum can help displace harmful sodium ions and restore better soil structure in affected regions.

Erosion control forms another key component of soil rehabilitation. Wind and water erosion can remove large amounts of fertile topsoil, leaving behind less productive subsoil layers. Farmers and land managers often implement practices such as contour farming, terracing, and vegetative buffer strips to reduce soil movement. Planting grasses or shrubs along slopes and waterways can slow water flow and trap sediment before it leaves the land. Maintaining vegetation cover throughout the year helps keep soil particles in place and preserves the valuable upper soil layer where most plant nutrients are concentrated.

CONCLUSION

Soil rehabilitation continues to gain attention as global populations increase and the demand for agricultural land intensifies. Restoring degraded soils not only improves crop

Correspondence to: Laura Bennett, Department of Environmental and Soil Sciences, Greenfield Agricultural University, Manchester, United Kingdom, E-mail: laura.bennett.soil@greenfieldau.edu.uk

Received: 10-Nov-2025, Manuscript No. GJBAHS-26-31090; **Editor assigned:** 12-Nov-2025, Pre QC No GJBAHS-26-31090 (PQ); **Reviewed:** 26-Nov-2025, QC No. GJBAHS-26-31090; **Revised:** 03-Dec-2025, Manuscript No. GJBAHS-26-31090 (R); **Published:** 10-Dec-2025, DOI: 10.35248/2319-5584.25.14.278

Citation: Bennett L (2025). Soil Rehabilitation Strategies for Restoring Agricultural Productivity and Ecosystem Stability. Glob J Agric Health Sci. 14:278.

production but also supports biodiversity, water regulation, and climate stability. Healthy soils store carbon, regulate water flow, and provide habitat for countless organisms that contribute to ecosystem balance. Through consistent research, responsible management practices, and community cooperation, soil rehabilitation offers practical solutions for restoring degraded landscapes and sustaining productive agricultural systems for future generations.