

## Commentary

# Strategies for soil stewardship of soil erosion and conservation

Jenny Edward\*

Department of Agriculture, University of York, York, UK.

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### ABOUT THE STUDY

Soil stewardship is a critical aspect of sustainable agriculture and land management. Soil erosion, the loss of topsoil through natural or human-induced processes, poses a significant challenge to soil conservation. Implementing effective strategies for soil stewardship is essential to prevent soil erosion, promote soil conservation, and maintain the long-term productivity and health of agricultural land.

### Strategies for soil stewardship

**Conservation tillage:** Traditional tillage practices involve the complete inversion of the soil, which leaves it vulnerable to erosion. Conservation tillage techniques, such as no-till or reduced-till farming, minimize soil disturbance by leaving crop residues on the surface or by disturbing only a small portion of the soil during planting. These practices help to maintain soil structure, reduce erosion, and enhance organic matter content.

**Cover crops:** Planting cover crops, such as legumes or grasses, during the fallow period or between cash crop seasons can significantly contribute to soil stewardship. Cover crops protect the soil surface from the impact of raindrops, reduce runoff, and enhance water infiltration. It also helps to improve soil structure, increase organic matter content, and reduce nutrient leaching.

**Contour farming:** It involves planting crops along the contour lines of the land, following the natural slope of the terrain. This technique helps to slow down the flow of water, reducing its erosive power and promoting infiltration. By preventing water from flowing directly downhill, contour farming reduces soil erosion and conserves the soil.

**Terracing:** Terraces are constructed on slopes to create a series of flat areas that act as steps. It effectively controls soil erosion by reducing the length and steepness of the slope. Terraces help to intercept runoff, promote water infiltration, and prevent gully formation. These are particularly useful in hilly or mountainous regions where erosion is a significant concern.

**Windbreaks and shelterbelts:** In areas prone to wind erosion, establishing windbreaks and shelterbelts can be an effective soil stewardship strategy. Planting rows of trees or shrubs perpendicular to prevailing winds helps to create a barrier that reduces wind speed

and deflects the movement of air. This protects the soil from wind erosion and preserves its fertility.

**Water management:** Proper water management plays a crucial role in soil stewardship. Implementing practices such as contour plowing, grassed waterways, and constructed wetlands can help to control runoff, retain water on the land, and reduce erosion. Adequate drainage systems are also essential to prevent waterlogging, which can degrade soil structure and decrease productivity.

**Soil amendments:** Applying organic matter, such as compost or manure, to the soil is beneficial for soil stewardship. Organic matter improves soil structure, enhances water holding capacity, and promotes nutrient cycling. It also acts as a protective layer, reducing the impact of raindrops and preventing soil compaction.

**Soil conservation education:** Promoting soil conservation education among farmers, landowners, and the general public is vital for effective soil stewardship. Increasing awareness about the importance of soil health, erosion prevention techniques, and sustainable land management practices can encourage individuals to adopt and implement soil conservation strategies.

**Conservation easements and land use planning:** Encouraging the establishment of conservation easements and incorporating soil conservation into land use planning can provide long-term protection for soils. Conservation easements are legal agreements that limit the type and amount of development on a property, ensuring that the land is used in a manner consistent with soil conservation objectives.

**Soil monitoring and research:** Continuous soil monitoring and research initiatives are crucial for soil stewardship. Regular soil testing and analysis help to assess soil health, nutrient levels, and erosion rates. Research efforts can identify innovative techniques and best management practices for soil conservation, leading to continuous improvement in soil stewardship strategies.

Soil stewardship is essential for preventing soil erosion and promoting soil conservation. Implementing strategies such as conservation tillage, cover cropping, contour farming, terracing, windbreaks, water management, soil amendments, education, conservation easements, and soil monitoring can contribute to sustainable land management and protect the long-term productivity of agricultural soils.

\*Corresponding author: Jenny Edward, Email: [edwardaughson12@gmail.com](mailto:edwardaughson12@gmail.com)