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FAO AGRICULTURAL DEVELOPMENT ECONOMICS POLICY BRIEF 74

Tackling land degradation for sustainable agrifood systems

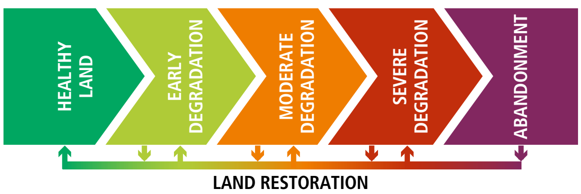
What is land degradation?

Land degradation refers to a long-term decline in the capacity of land to provide essential ecosystem functions and services. It arises from a complex interplay of environmental, socioeconomic and institutional pressures acting at various scales, although human activities (e.g. deforestation, overgrazing) are increasingly responsible. Land degradation occurs along a spectrum (Figure 1), resulting in increasingly severe impacts – from subtle declines in ecosystem function to the complete loss of agricultural viability and abandonment. Land restoration is possible at any stage; however, land may not be fully restored to native conditions or returned to agriculture.

Land degradation affects cropland, pastures and forests. In the case of croplands, degradation is driven predominantly by nutrient depletion and decline in soil health resulting from continuous cropping and/or monocropping, salinization in irrigated areas, pressures from heavy machinery, and the over- or misuse of agrochemicals. It is also exacerbated by natural processes such as wind and water erosion, which are themselves intensified by the loss of vegetation cover following land clearance or overcultivation. These activities lead to the loss of fertile topsoil, while also decreasing biodiversity and agricultural productivity.

Pastures experience degradation by overgrazing, resulting in soil erosion and compaction, and a shift in vegetation that can reduce biodiversity, alter ecosystem functions and decrease land productivity. Forests face their own set of challenges, most notably deforestation and degradation, leading to soil erosion, reduced water quality and altered climate patterns.

FIGURE 1. Spectrum of land degradation and restoration



Source: FAO. 2025. *The State of Food and Agriculture 2025 – Addressing land degradation across landholding scales.* Rome.

KEY MESSAGES

- Around 1.7 billion people live in areas where human-induced land degradation limits yields. Reversing just 10 percent of this degradation on croplands could restore production sufficient to feed 154 million more people each year.
- Countries with a history of intensive agriculture exhibit greater impacts of cropland degradation on yields, though these are often masked by heavy application of synthetic fertilizers and other inputs. In contrast, sub-Saharan Africa exhibits lower impacts, with yield gaps stemming from other constraints, such as limited input access.
- Land degradation is neither inevitable nor irreversible. Targeted investments in people, institutions and sustainable practices can shift agriculture from a driver of degradation to a source of restoration, strengthening agrifood systems.

Beyond impacts on production, land degradation generates societal costs in terms of increased pollution and lost ecosystem services. This underscores the necessity for interventions that balance private incentives linked to degradation and public costs.

Land degradation and production

Land degradation is recognized as a critical global challenge, yet it remains less understood than climate change and biodiversity loss. The SDG framework (Target 15.3) monitors degradation using a recent baseline (2000–2015), overlooking historically accumulated degradation and thus the broader potential for restoration.

NOVEMBER 2025 / ISSN 2520-6540 (online) / ISSN 2520-6532 (print)

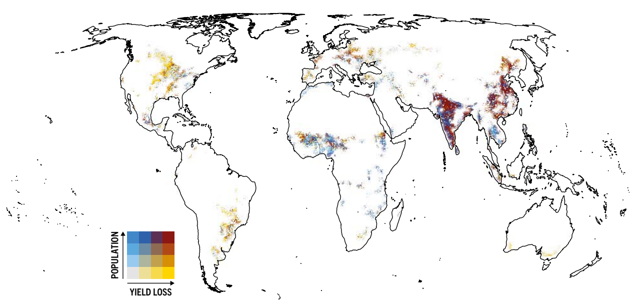
Using a "land degradation debt" to measure the gap between current conditions and those that would prevail without human activity, human-induced degradation is reflected in a 30 percent loss of tree cover, a 20 percent reduction in biomass carbon, and a fourfold increase in soil erosion.

Production challenges associated with land degradation are higher in high-income countries and decrease progressively across upper-, lower-middle and low-income countries. This gradient reflects the history of intensive agriculture in high-income countries, which has necessitated heavy application of synthetic fertilizers and other inputs to maintain yields. Such compensatory actions become increasingly costly over time and may even lead to land abandonment. Across much of Africa, stubbornly high yield gaps stem more from limited access to inputs, mechanization, credit and markets than from land degradation alone.

Exposure to yield gaps driven by land degradation

The impacts on croplands are sobering: 1.7 billion people live in areas where crop yield gaps are driven by land degradation (Figure 2). Reversing just 10 percent of accumulated degradation debt could feed an additional 154 million people annually.

FIGURE 2. Population hotspots exposed to degradation-induced yield losses



Notes: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Hadi, H. & Wuepper, D. 2025. *A global yield gap assessment to link land degradation to socioeconomic risks – Background paper for The State of Food and Agriculture 2025*. Rome, FAO.

India has the highest population exposure, followed by China and Bangladesh. These countries have accumulated a substantial degradation debt which, when combined with high population densities, makes them priority targets for integrated restoration and soil health interventions.

The intersection of farm size with land degradation reveals complex patterns requiring nuanced policy responses. Farms of different sizes face similar degradation levels, yet the impacts and response capacities vary dramatically. Large farms controlling most agricultural land globally bear responsibility for implementing sustainable land management at scale. On the other hand, the sheer number of smallholders (around 500 million globally) and their vulnerability demand targeted interventions to enhance productivity while maintaining soil health and ecosystem services.

Key steps in addressing land degradation

Land degradation is not inevitable: smart investments and policies today can avoid, reduce and even reverse degradation of land across all land-use types and scales.

- **Matching interventions to land condition and farm structure is key.** A portfolio of policy approaches exist to address the core drivers of degradation including regulatory, incentive-based and cross-compliance mechanisms. Land-use regulations are very effective in improving land conditions, while agri-environmental payments show greater context-specificity.
- **Land degradation must be understood within the broader context of land-use decisions.** Farmer's decisions are shaped primarily by productivity and profitability concerns within the context of global drivers such as trade, climate change and demographic transitions. Efforts to promote sustainable land management must consider the economic realities they face and design interventions to align private and social incentives.
- **Address systemic barriers to sustainable intensification.** Unsustainable historical intensification pathways in some regions and persistent yield gaps in others offer a cautionary tale. To ensure food security, systemic barriers to intensification (e.g. lack of mechanization, inputs), need to be addressed without accelerating degradation.
- **Strengthening land tenure and governance is critical.** Tenure security is non-negotiable for sustainable land management and livelihoods. Inclusive governance structures are essential to manage trade-offs and encourage long-term stewardship.

CONTACTS

Agrifood Economics and Policy Division – Economic and Social Development
SOFA@fao.org | www.fao.org/publications/sofa

Food and Agriculture Organization of the United Nations
Rome, Italy

Required citation: FAO. 2025. *Tackling land degradation for sustainable agrifood systems.* FAO Agricultural Development Economics Policy Brief, No. 74. Rome. https://doi.org/10.4060/cd7233en

The FAO Agricultural Development Economics Policy Brief series is available at **www.fao.org/economic/esa/policy-briefs**

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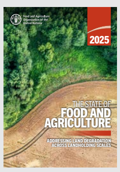

The findings in this brief have been adapted from the FAO report *The State of Food and Agriculture 2025 – Addressing land degradation across landholding scales* (available at https://doi.org/10.4060/cd7067en).

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CD7233EN/1/11.25