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UNLOCKING THE SUSTAINABLE POTENTIAL OF LAND RESOURCES

EVALUATION SYSTEMS, STRATEGIES AND TOOLS

Land evaluation can be used by national policymakers, international development organizations, farmers, and conservationists to increase productivity, biodiversity conservation success, and to promote innovation. Land evaluation helps make better decisions about how to use the land, and is therefore essential to achieving Land Degradation Neutrality (Sustainable Development Goal 15.3). An understanding of long-term land potential is needed to (1) increase productivity while adapting to climate change, (2) minimize the social, economic and environmental risks of land use change, (3) increase restoration success and identify land that could be restored, and (4) promote innovation and knowledge sharing. Many high quality evaluations were completed in the late 20th century and can serve as a foundation for new work. The report provides links to *simple tools* for completing and applying land evaluations at farm to national scales.

1. Increase productivity while adapting to climate change

Land evaluation can be used to decouple increased agricultural production from additional land use change and land degradation, while adapting to climate change. *Strategies and policy options:*

- ▶ Carefully match land use and management with land potential, ensuring the maximum sustainable benefit is achieved from each hectare of land
- ▶ Identify the most productive lands for each crop
- ▶ Identify the most productive crop and management system for a particular piece of land
- ▶ Determine what, and what level, of inputs are required to overcome limitations such as fertility, salinity, and drainage to overcome yield gaps.
- ▶ Design irrigation systems to optimize water use efficiency based on soil variability
- ▶ Target climate change adaptation investments to the soil - climate combinations with the greatest return on investment

2. Minimize social, economic, and environmental risks of land use change

Nearly every country can identify areas where land degradation has caused virtually irreversible losses of agricultural productivity, long before the onset of climate change. In almost every case, this was caused by a mis-match between land use and land potential. Catastrophic soil loss in the Mediterranean and the US Dust Bowl could have been avoided by managing the land within its limits. In virtually every case, land degradation

has led to social dislocations and economic losses, in addition to off-site environmental consequences, including reduced air and water quality.

Strategies and policy options:

- ▶ Complete land evaluation before implementing policies that promote land use change
- ▶ Consider land degradation risk under current and future climate, including inevitable “extreme events”
- ▶ Identify management practices that can cost-effectively reduce degradation risk on each type of land, recognizing that management systems that are sustainable on one type of land may cause degradation on another
- ▶ Identify lands with high productivity and anticipate the agricultural and other ecosystem service impacts of urban urbanization and surface sealing.





3. Increase restoration and biodiversity conservation success

Both land restoration and biodiversity conservation are key strategies in achieving a land-degradation-neutral world. These will require understanding what types of vegetation can be sustainably produced at what levels of production in each part of a landscape, region, or nation.

Knowledge and information from other areas, including other parts of the world, can often be used to better predict the conditions where restoration will be successful.

Strategies and policy options:

- ▶ Stratify land based on both its potential to support different habitat types (biodiversity conservation) and levels of production (restoration for both agricultural production and biodiversity conservation).
- ▶ Target management investments and policy incentives to the most valuable parts of the landscape with high degradation risk.
- ▶ Where resources are available for restoration, target investments and policy incentives to the most valuable parts of the landscape with the greatest restoration potential.

4. Promote innovation and knowledge sharing

One of the simplest ways to accelerate innovation is to create knowledge sharing systems that allow innovators to easily and rapidly share their successes and failures.

The problem is that this information is rarely contextualized by the conditions of where the innovation did and did not work.

Including soil, climate and topographic context when sharing innovations, and in capacity building programs:

- ▶ Allows innovators to quickly find collaborators on similar land and exchange best practices
- ▶ Provides the ability to rapidly evaluate potential innovations under similar conditions

- ▶ Increases the rate of innovation upscaling by targeting areas where they are most likely to be successful
- ▶ Ensures that capacity building includes an understanding of where innovative management and restoration practices are and are not likely to be successful.

5. Simple tools and existing resources to support land evaluation and knowledge sharing at farm, watershed, regional, and national scales

Global maps of potential productivity for a wide range of crops are available through the FAO's Global Agro-Ecological Zones (GAEZ) portal. While these predictions are limited by the underlying soil information, which is often inaccurate at management and restoration scales, they can be useful for preliminary regional potential productivity assessments. This information should be combined with an evaluation of the sustainability of crop production, considering resilience including both degradation resistance and recovery. The USDA's Land Capability Classification (LCC) system is relatively easy to apply, but is limited to degradation resistance and does not consider resilience.

Detailed, high quality land evaluations based on the FAO, USDA and other systems have been completed for many areas, and can be rescued from file cabinets; many of these, along with other global, national and local soil information sources, are now available through organizations such as ISRIC and WOSSAC-UK.

Point-scale evaluations by individuals working in the field are increasingly supported through mobile apps such as ISRIC's SoilGrids and the Land-Potential Evaluation system (LandPKS). More information on these tools is available in the "Selected Sources" section of the report, and at fao.org and landpotential.org.

For more information please contact
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The full report and Summary for Policymakers can be downloaded at:
<http://www.unep.org/resourcepanel/KnowledgeResources/AssessmentAreasReports/LandSoils/tabid/133334/Default.aspx>