

Challenges in Sustainable Land Use Management



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1 Introduction

Biodiversity continues to decline all around the world, significantly reducing nature's ability to contribute to our well-being due to a series of common pressures: the uncontrolled, destructive use of natural resources; air, land and water pollution; and climate change, among others. This alarming trend puts economies, livelihoods, food safety and people's quality of life at risk (IPBES 2018).

The adequate use of natural resources requires a compatibility between their use—serving human needs—and environmental conservation, assuring that they will be there for future generations as well and maintaining their ecological functions. Using land in consonance with its capacity is crucial to maintaining the integrity and vitality of natural resources. Based on soil capacity knowledge, soil use and occupation can be planned adequately, alongside a set of conservational recommendations and practices aimed at the protection and improvement of natural resources (Lehmann and Stahr 2010; Pereira and Gomes 2017; Visser et al. 2019).

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Mathematical climate models predict tipping points—a rupture of the balance of the natural system caused by the cumulative effect of disturbances, amplified by the intensity, duration, extension and frequency of interventions, exceeding the resilience of the planet (Lovejoy and Nobre 2018; Veraart et al. 2012). When nearing that point, the probability of a faster or rougher transition to a new point of balance (likely harsh or unfeasible to most species adapted to the previous balance) increases exponentially (Lenton et al. 2019).

Implementing strategies to incentivize sustainable land use, responsible forestry, the restoration of degraded lands, the expansion of research and development in innovation, and the conservation and restoration of ecosystems is fundamental for humanity in order to tackle the challenges imposed by the climate crisis, thus contributing to the achievement of the sustainable development goals (SDG 15 above all).

2 Future Trends

Sustainable development is a growing field that has increased in urgency over recent years. Sustainable land use management is imperative to ensuring the achievement of sustainable development. In most instances, agricultural land use is targeted to ensure maximum production with preservation of the land. However, this is not always possible, and lower income countries lack the knowledge, infrastructure, and resources to practice sustainability (Miheretu and Yimer 2017).

Ensuring that sustainable land use is initiated is largely dependent on the financial capacity of the landowners. Furthermore, government support in terms of finance and resources is required to ensure sustainability. This is difficult in low-income countries such as in Africa due to other problems being prioritised. The inability to acquire financial investment prevents the sustainable use of land (Dallimer et al. 2018).

Additionally, generational gaps pose a challenge to the adoption of new sustainable land use methods. Older generations tend to be unresponsive to new innovative ideas and to use their old methods, which may not be as effective. Younger land owners are more likely to use sustainable practices (Miheretu and Yimer 2017). This generational gap prevents the progression toward sustainability. In other instances, sustainability education is not widely promoted, causing people to be unaware of the importance of sustainability practices. The lack of education causes inadequate practices that lead to land degradation (Mango et al. 2017).

Furthermore, climate change has induced variability in weather patterns and has increased the frequency of extreme weather events and natural disasters. Such occurrences have had adverse effects on land use by causing soil erosion and land degradation (Blake et al. 2018; Tarnavsky and Bonifacio 2020). Already existing sustainable practices need to be adapted to changing climates in order to prevent this issue. However, the unpredictability of these events makes it difficult to develop methods to combat the problem. Therefore, new prediction systems need to

be designed to assist in the creation of sustainable land use management (Zambrano et al. 2018; Issahaku and Abdul-Rahaman 2019).

In urban areas, the sustainable use of land is dependent on government planning. Various stakeholders are recruited in the process, and local and national plans are needed to ensure sustainability. Poor planning results in unsustainability. Usually, development guidelines are provided, but non-compliance results in aberrant development that threatens sustainability. It is therefore noted that planning in conjunction with pre- and post-evaluation is needed. Furthermore, education and resource allocations are imperative for successful land use management (Dambeebo and Jallo 2018).

3 Conclusions

Sustainable land use is a critical research and actuation (researchers and practitioners) area that addresses multiple dimensions (e.g., agroforestry, agro-ecology, habitat fragmentation and landscape ecology, soil erosion and land degradation and the restoration and urban areas). In the beginning of *The UN Decade on Ecosystem Restoration*, and in order to succeed in the *2030 Agenda* efforts towards sustainability, we are challenged to do more. In a context of global change, challenges are identified and must be addressed.

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