

Innovative Land Restoration Techniques for the African Sahelian Grasslands: Lessons from the Great Green Wall Initiatives

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Abstract: The African Sahelian grasslands are confronted with profound environmental challenges, notably desertification, soil degradation, and biodiversity loss, which are imperative to address for sustainable development and climate resilience. The Great Green Wall (GGW) initiatives in Africa and China provide pivotal insights into successful land restoration strategies. This study conducts a detailed analysis of specific restoration methods implemented within these initiatives, assessing their efficacy and relevance to the unique ecological context of the African Sahelian grasslands. In Africa, the Great Green Wall initiative spans across the Sahel region, encompassing 11 countries from Senegal in the west to Djibouti in the east. It aims to combat desertification and land degradation by creating a mosaic of green and productive landscapes through afforestation, agroforestry, and sustainable land management practices. This ambitious project seeks to improve soil fertility, enhance biodiversity, and promote economic opportunities for local communities. Similarly, the Great Green Wall of China focuses on the Loess Plateau in northern China, covering provinces such as Shaanxi, Shanxi, and Gansu. This initiative addresses severe soil erosion and ecological degradation through extensive afforestation, terracing, and soil conservation measures. By stabilizing soils and restoring vegetation cover, the project aims to mitigate desertification and improve environmental conditions in the region. By examining these initiatives, this study seeks to extract valuable lessons and best practices that can inform effective strategies for restoring and sustaining the ecological health of the African Sahelian grassland. **【Objective】** The aim of this study was to identify the innovative land restoration techniques used in the Great Green Wall initiatives in China and Africa and Identify lessons learned from these initiatives that can be applied to the African Sahelian grasslands. **【Method】** This study employs a comprehensive literature review of local techniques and practices employed by examining case studies from the GGW initiatives in China and Africa. Additionally, insights were gathered through qualitative interviews and discussions with local communities, practitioners, and stakeholders involved in land restoration initiatives. These methods aims to capture indigenous knowledge, community perceptions, and practical challenges faced in implementing and sustaining the restoration efforts across both continents. **【Result】** The comparative analysis of the GGW initiatives in China and Africa underscores the importance of tailored, context-specific approaches to land restoration. Techniques that have proven successful in one region may need adaptation to local conditions to be effective elsewhere. The study highlights the potential for cross-regional learning and the value of combining traditional and modern restoration practices. These findings contribute to the broader goal of achieving sustainable development and high-quality ecological restoration in the African Sahel. The analysis reveals that local communities across regions have implemented a range of innovative techniques and sustainable land management practices over generations. In China, techniques such as the use of drought-resistant plant species and advanced irrigation methods have significantly improved vegetation cover and soil quality. Similarly, in Africa, community-based approaches and the integration of traditional knowledge with modern practices have led to notable improvements in land productivity and biodiversity. The findings underscore the potential of the GGW initiatives to serve as models for land restoration in similar environments. By adopting and adapting these innovative techniques, other regions facing desertification can enhance their ecological resilience and achieve sustainable development goals. The integration of local knowledge and advanced technology will be crucial in scaling up these efforts. The broader implications of this research suggest

that policymakers and practitioners should prioritize adaptable and innovative restoration techniques that consider local environmental and socio-economic contexts. The study also emphasizes the need for ongoing monitoring and community engagement to ensure the long-term success of restoration projects.

• **Key words:** Land Restoration Techniques; African Sahelian Grasslands; Great Green Wall Initiative

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