



Greenhouse Gas Mitigation Strategies in Kenyan Coffee Plantations: Economic and Social Impacts Over Two Decades

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Abstract

Coffee cultivation in Kenya contributes significantly to greenhouse gas (GHG) emissions through deforestation and agricultural practices. Mitigation strategies are crucial for environmental sustainability while considering economic viability. A mixed-methods approach combining surveys, interviews, and financial modelling was employed to assess the effectiveness of carbon sequestration through reforestation and sustainable farming practices. Reforestation projects showed an average annual reduction in CO₂ emissions by 15% over two decades, with a notable increase in biodiversity and farmer income by up to 30% compared to conventional coffee cultivation methods. The study highlights the dual benefits of carbon sequestration for both environmental health and economic resilience in Kenyan coffee plantations. Promoting government incentives, community engagement, and international funding could accelerate the adoption of these sustainable practices across Kenya's coffee sector. coffee cultivation, GHG mitigation, reforestation, social impact, sustainable farming The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Kenyan, deforestation, carbon sequestration, agroforestry, climate change adaptation, sustainable intensification, livelihoods assessment

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