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"Reconcile land system changes
with planetary health"

Socio-economic assessment of existing agroforestry production systems for fruit and nut production in uzbekistan

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Abstract

Agroforestry systems have the potential to optimise the provision of ecosystem services, yet they are often less financially competitive than conventional agricultural systems, which limits their widespread adoption in Central Asia. Agroforestry offers substantial benefits for smallholder farmers in Uzbekistan by strengthening livelihood resilience amid economic fluctuations, climate-induced resource constraints and environmental variability. Uzbekistan's prominent agricultural products include a diverse array of crops, fruit and nut trees, including cotton, wheat, apples, apricots, walnuts, and pistachios. However, integrating the tree species with crop cultivation and or livestock rearing can improve food security, biodiversity conservation, soil stabilisation, and create microclimates, while also generating employment opportunities and diversifying income sources for smallholder farmers facing local economic challenges. Therefore, it is necessary to comprehensively assess the financial and economic viability of agrisilvicutural and agrisilvopastoral systems in light of the respective sustainability of these systems to other agricultural systems in Uzbekistan. The field study comprises of a socio-economic survey of 250 smallholder farming households practicing fruit and nut production, located in the Fergana Valley region of Uzbekistan, several focus group discussions and expert interviews using the ODK Collect survey application for the harvesting season 2024. Primary data is collected regarding farm net income based on farmer decision-making, off-farm earnings, resource endowments, farm management practices, opportunity costs of land and family labour, seasonal risk sensitivities, socio-demographic factors, biophysical tree and crop data, and pricing data on processed tree, crop, and livestock products based on perception of value chain participants for the analysis. A static and dynamic profitability assessment using capital budgeting techniques and simulation-based analysis evaluate the credibility of agroforestry systems as a sustainable land management practice for smallholder farming households in the Fergana Valley region of Uzbekistan. A comparative analysis of outcomes across various land use systems will highlight the relative effectiveness of agroforestry in enhancing income diversification, improving land use efficiency, and fostering long-term sustainability. This will contribute to rural development, reinforce supply security within the fruit and nut production value chain, and help align land system changes with the principles of planetary health.

Keywords: Agroforestry, capital budgeting, Central Asia, Monte-Carlo simulation, smallholder farming households, socio-economic analysis

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