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"Global food security and food safety:
The role of universities"

Does Carbon Neutrality Certification on Coffee Contribute to Local Food Security? Insights from Costa Rica

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Abstract

Coffee covers more than 10 million hectares and provides livelihoods to 4.3 million smallholders in 14 developing countries. Increasing productivity in smallholder systems is central for food security and poverty reduction. At the same time consumer demand for carbon neutral agri-food products increases.

This study examines the Costa Rican case of the world's first coffee certified as carbon neutral in compliance with the Publically Available Specification (PAS) 2060. The study analyses the linkages between carbon neutral value chains and food security in order to minimise trade-offs between productivity and carbon neutrality in coffee agroforestry systems.

Interviews were carried out with key-informants from different relevant backgrounds. Household interviews on food security and coffee productivity were conducted using a semi-structured questionnaire. A dynamic carbon sequestration model, based on a carbon inventory in selected transects was developed to estimate annual emission-compensation-rates.

Product emissions are being related to the coffee's carbon footprint functional unit of kg-green-coffee, implying that use-efficiency of agricultural inputs relative to productivity is determining the product carbon footprint, while productivity is closely linked with food security. Agrochemical inputs constitute 62 % of the coffee carbon footprint, thus, reducing emissions would affect productivity. At the same time, accounting for temporal carbon sequestration to mitigate emissions could reduce the footprint while providing important food products by shade trees. The results also show how shade tree incorporation might lower coffee productivity, however, is linked with improved food intake by coffee farmers and a close link with nutrition of seasonal workers.

Prioritizing input-use-efficiency could motivate investment and research to improve technologies and draw attention to maintaining productivity. Accounting for on-farm carbon sequestration requires relating it to the same functional unit, so productivity also negatively influences the potential to compensate emissions. However, accounting for on-farm carbon sequestration could convince consumers, increase local income and incentivize tree incorporation into plantations, supporting sustainable livelihoods and food security.

Keywords: Carbon footprint, carbon neutrality, coffee, food security, input-use-efficiency

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