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“Competing pathways for equitable food systems transformation:
Trade-offs and synergies”

Incentivising the conservation of rare agrobiodiversity in Ethiopia

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Abstract

Agrobiodiversity is critical for human survival and wellbeing, yet is at risk of rapid and global decline. Maintaining agrobiodiversity generates private and public benefits, including climate resilience, food security and economic development opportunities. However, the costs of maintaining such public goods often fall on poor smallholder farmers who maintain crop genetic diversity on-farm in an ad-hoc manner based on their private preferences. A more strategic approach, which more fairly distributes these costs and benefits, is payments for agrobiodiversity conservation services (PACS). PACS draws upon concepts from payments for ecosystem services, which has been widely applied to multiple environmental sectors. PACS compensates farmers for opportunity costs incurred by maintaining rare crops for public good over those with higher private returns. Here, we report on a PACS scheme around Kafa Biosphere Reserve, Ethiopia, aiming to conserve rare landraces of the nationally important crop, enset (*Ensete ventricosum*). Enset, is a staple food for over 20 million Ethiopians and is characterised by hundreds of locally-adapted landraces. Surveying over 500 farmers (35% women) from 22 communities using a four cell method, we identified 175 farmer-recognised landraces, 57 of which were rare and in need of conservation effort. All 22 communities submitted offers in a competitive tender for the conservation of these rare landraces. This yielded average cultivation costs of £2.16 per plant with different landraces ranging from £0.36 to £14.71. The cost variation may link to differing farmer preferences regarding landrace traits such as taste, growth rate, and drought or disease susceptibility. Seeking to address trade-offs between environmental (i.e., maximising landrace diversity) and social (i.e., maximising participation) outcomes, a linear programming model selected 44 landrace offers across 15 communities. We consequently demonstrate the ability to achieve significant landrace diversity conservation in a cost-effective, equitable and transparent manner. This approach has the potential to be scaled-up and applied across a wide range of crops, thereby delivering outputs relevant to global biodiversity framework targets and sustainable development goals through sustainable, *in situ* conservation of agrobiodiversity, contributions to food security and poverty reduction, and maintenance of traditional land management practices of local communities.

Keywords: Agrobiodiversity, conservation, enset, Ethiopia, livelihoods, public policy