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## Governance challenges and digital tools in smallholder agricultural carbon projects: Insights from Kenya

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### Abstract

The generation of carbon certificates through specific farming practices is increasingly used as a mechanism for climate change mitigation. Recently, such carbon projects pooled thousands of smallholder farmers from developing countries to enable them to take part in the voluntary carbon market and receive benefits from carbon credit sales. However, there is very little knowledge on potential governance challenges that might hinder the effective implementation of such large and complex projects, where many different actors such as project developers, verifiers, investors, and donors interact and hold different interests and power relations. Meanwhile, despite numerous studies that unveiled the potential of digital tools in addressing such challenges in other sub-sectors of agriculture, it has not yet been explored in implementing smallholder agricultural carbon projects. This paper employs a qualitative case study of two carbon projects in Kenya, and a participatory and visual mapping tool (Process Net-Map) with stakeholders, to identify the governance challenges arising from the roles, interactions, and power relations of different actors, and the potential of digital tools to address such challenges. Our results show a diverse number of governance challenges at different levels of such projects that have an impact on the adoption of recommended farming practices, carbon monitoring accuracy, and efficiency. Furthermore, power relations between actors reveal deficiencies in the inclusiveness of such projects. Strategies used in resolving some of the challenges include holding and reinvesting carbon revenues at the group level, emphases on co-benefits, and the application of simple digital tools. Based on these results, we recommend the development of local-level capacity to use digital tools to collect and analyse data, reframing the prospects of carbon farming, and development of government schemes that reward participants, to increase the efficiency of carbon projects and the benefits generated for smallholders.

**Keywords:** Carbon certificate, digital tools, governance challenges, Kenya, process net-map, smallholder carbon project