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22. *Ecosystem Services meet social science (OPEN)*

Comparing scientific and experts' knowledge about ecosystem-based adaptation for smallholder farming systems in Central America

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Ecosystem-based Adaptation (EbA) is the use of ecosystem services and biodiversity as part of an overall adaptation strategy to reduce the adverse impacts of climate change. It includes conserving, restoring and sustainably managing ecosystems to ensure the continued provision of services to people. The concept of EbA, by definition, includes both a focus on ecosystem services and a social component due to the emphasis on helping people to adapt to climate change.

Recent studies indicate that ecosystem-based adaptation could be an important option for helping smallholder farmers adapt to climate change. In Central America, for example, EbA practices such as the use of shade coffee and other agroforestry systems, windbreaks, live fences, cover crops and conservation of on-farm riparian forests can help improve the resiliency of agricultural systems to climate change, while also ensuring the continued provision of key ecosystem services such as water provision, pollination and carbon sequestration. However, despite the potential of EbA to help farmers adapt to climate change, EbA options are often overlooked in adaptation planning.

One key factor affecting the adoption of EbA practices is the knowledge held by local and national experts (including researchers, technicians, farm managers, and extensionists), who can provide recommendations about the options available to smallholder farmers. In order to better understand the extent to which local experts are familiar with EbA practices and are knowledgeable about the adaptation and other benefits they provide and to determine how their knowledge compares to the existing scientific literature, we conducted detailed interviews with over 100 local and national agricultural experts across the Central American region on the EbA options available for smallholder coffee and maize/bean farmers. At the same time, we conducted an extensive literature review (>300 publications) of all known agricultural practices that have been reported as potential adaptation options for these farmers, to better understand the current scientific knowledge on this regard.

Our study indicates both scientific literature and national and local experts acknowledge the importance of the same kind of mechanisms providing adaptation benefits in EbA practices; such mechanisms include buffering the impact of extreme weather events, increasing agro-ecosystems resilience, buffering the impact of pests and diseases effects, and providing socioeconomic benefits, among others. Although the same practices were mentioned in the literature review and the experts' interviews, the practices are mentioned in different

frequencies in both sources of knowledge for this study, which might be due to the fact that in the case of experts their knowledge and recommendations is adapted to the geographical area where they work, therefore, the frequency in which they mention practices is not identical to scientific literature.

Our study suggests that knowledge from local and national experts might not be a limiting factor for the adoption of EbA practices, evidenced by the congruence between the experts' body of knowledge and the scientific literature. We finalize analyzing a set of constraints mentioned by experts as possible limiting factors for adoption, which include farmers' lack of funds, lack of technical assistance to farmers, lack of incentives, and socio-cultural factors related to reluctance to changing practices.