Exploring the links between agricultural biodiversity, ecosystem services and human wellbeing. Evidence from the Yucatán, Mexico.

ABSTRACT

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Researchers from different disciplines are being called upon to improve the understanding of the relationship between human well-being and the ecosystems on which it relies, under the assumption that they are intimately tied (Jones and Vincent, 1998; Duraiappah and Naeem, 2005; Carpenter et al., 2009; Gowdy et al., 2009; Ring, 2010; Roe, 2010; TEEB, 2010; Chan et al., 2012; Balvanera et al., 2014). There are however few studies describing the multidimensional synergies and trade-offs between agricultural biodiversity, ecosystem services and human well-being, while evaluation of assumptions, policy instruments and practices is needed (Comim, 2004; Duraiappah, 2004; Carpenter et al., 2009; Barrett et al., 2011). This research hypothesises that the application of an integrated and multidimensional human well-being - ecosystem approach can improve our understanding of agricultural biodiversity and the ecosystem services it provides in terms that are meaningful to the people that depend on them, taking into account the real opportunities open to individuals. We develop an extended version of the Capability-Ecosystem-Approach based on Duraiappah (2004), that links agricultural biodiversity and human well-being through capabilities, conversion factors and endowments that characterize rural households. Through the development of an Extended Capability-Ecosystem Approach we aim to contribute to the growing literature on capabilities and ecosystems by originally introducing the focus on biodiversity in agricultural landscapes. We also aim to contribute to understand what influences the conservation of agrobiodiversity on farm through the application of a multidimensional framework to define well-being. Thirdly, by studying communities located in varied social and environmental contexts but subject to common drivers of change we aim at unveiling the vulnerabilities and opportunities of the human well-being – biodiversity

relationship. The theoretical framework is applied to the case of rural Mayan families of the Yucatán, Mexico, a centre of crop origin and domestication. Agrobiodiversity is a relevant part of the agricultural strategy of Mayan farmers who are *de facto* conserving crop genetic resources and are therefore potential candidates for on-farm conservation interventions (Perales et al., 2005; Smale, 2005). An econometric model that accounts for selection bias is applied and shows that the possible expansion of opportunities open to people through education and urban employment appears coupled with an ageing process of the population working in agriculture and rural out-migration. The latter, coupled with geographical isolation, seems related to the use of higher crop diversity on farm and the conservation of local varieties. When coupled with migration this poses threats in terms of future loss of genetic resources, associated knowledge and cultural values. Finally, the work of women on farm is significantly associated with conservation of local varieties and higher crop diversity for consumption, indicating that conservation strategies should take into account the gender differentiation of associated knowledge and preferred characteristics of varieties. It emerges that agrobiodiversity and related ecosystem services represent important safety nets, support consumption stability and are part of a risk diversification strategy, often linked to cultural and social practices, but strong out-migration from work in the field denotes the difficulties associated with farming. This analysis provides evidence for the need of a complementary and synergetic action of conservation and development policies carried out by policy actors in the Yucatán. The application of the theoretical framework shows that household, village and regional characteristics are to be taken into account if a long-term strategy for the environment and human development is to be successful. The opportunities open to people contribute in fact with productive resources to shape the costs of maintaining crop diversity. Finally, the recognition of the needs and aspirations of different groups in the population would favour the creation of targeted incentives for the conservation of crop genetic resources on farm and the sustainable use of off farm ecosystem goods, expanding the real opportunities that people enjoy.