33. Co-design of scenarios and adaptation strategies to climate change in the highlands of Madagascar

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In Madagascar, rice is the major staple food. The availability of fresh water for irrigation and the temperature at some plant stages are critical variables for the farmers' choice of cropping systems and their self-sufficiency in rice. Climate change is expected to affect the rainy season and temperature, potentially impacting the crop yields. Participatory research and development take into account local knowledge and innovations to support the co-development of local adaptation strategies. We propose a methodological framework for the participatory development of scenarios with farmers and stakeholders to identify and evaluate possible adaptation strategies to climate and other global and local changes. The idea is to understand the farmers' perceptions to risk and their way to cope with technical change. First, we conducted farmers' interviews to understand the current systems and constraints to create a farm typology. Then focus groups were held to identify the main drivers of change and develop, in full partnership with local population, four scenarios related to climate change, infrastructure, access to market and labour availability. These scenarios were then applied in the context of four farms selected to represent each significant farm of the typology. For each scenario, some adaptation strategies (*e.g.* new varieties, crop management, diversification of production, water control in the valley) were selected and further assessed with the farmers using a farm model to simulate the impacts on relevant indicators. This methodological approach showed that combining scenarios and models in a participatory approach effectively tackles the issue of climate change impact and possible mitigation strategies rooting solutions linked to the local social, economic and resource constraints. This could lead to further local development policies.