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Co-designing new organizational strategies to promote biodiversity access

A key challenge for the agroecological transition

▲ *Presentation of the Adaptive Governance for the Coexistence of Crop Diversity Management Systems (CoEx) project at Niakhar, Senegal.* © *V. Labeyrie/CIRAD*

Promoting farmers' access to diverse genetic resources and associated knowledge is a major challenge of the agroecological transition. Current agricultural models prioritize centralized production and circulation of these resources. Such models are, however, limited in their ability to deal with global changes because they do not foster agroecosystem resilience. It is thus urgent to characterize the plurality of ways farmers manage agrobiodiversity and to understand their impact on its availability so as to co-design new management methods that are tailored to each context and address changes underway.

To this end, the first challenge is to develop a unified conceptual and methodological framework to gain insight into: (i) how the diverse range of actors and the structuring of their interactions affect agrobiodiversity dynamics; and (ii) what implications they have with regard to farmers' ability to harness it. The theoretical framework of socioecological networks is relevant in this respect[1]. **A second challenge is to develop appropriate co-design methods, and modeling is promising in this respect.** For instance, to support West African farmers in their reflection on the implementation of new agrobiodiversity management institutions, a combination of role-playing games with multi-agent systems helps them collectively discuss several scenarios to secure their seed supply and sustain dynamic conservation of local varieties[2].

▲ *Bambara groundnut seeds, Ethiolo, Senegal.* © *V. Labeyrie/CIRAD*

Combining this type of approach with genetic models further broadens the perspectives. An ongoing collaboration with a group of about 20 French small-scale seed producers and two genetics laboratories* aims to co-design and assess the potential impacts of a change in organization with regard to the level of genetic diversity managed via different scenarios. These experiments with local networks open up interesting avenues for co-designing new agrobiodiversity management methods.

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For further information

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(2) Belem M., Bazile D., Coulibaly H., 2018. Simulating the impacts of climate variability and change on crop varietal diversity in Mali (West-Africa) using agent-based modeling approach. *Journal of Artificial Societies and Social Simulation*, 21(2): 8. https://doi.org/10.18564/jasss.3690

Agroecological principles as design guides

Agroecology ideas have a long history and have been gaining attention recently as they aim to simultaneously address productivity, nutritional, social and environmental concerns about the sustainability of agriculture and food systems. Agroecology manifests as science, practice and social movements and has been defined in multiple ways, thereby giving rise to the 'multiple agroecologies' concept. Principles, defined as 'statements that provide guidance on how to behave towards a desired result', are needed to navigate such a complex and adaptive space.

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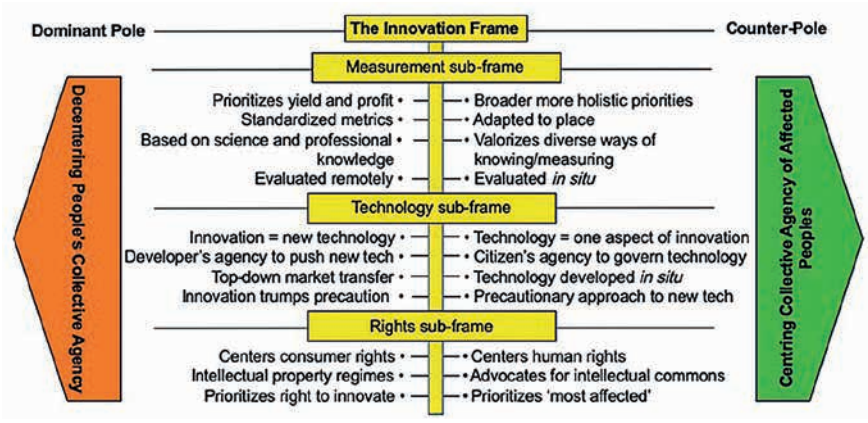

▲ *The subframes of the innovation frame have both a 'counter-pole' that centers the collective agency of people and a dominant pole that decenters people's collective agency.* © *2021 Anderson and Maughan*