



FRANCE

INNOVATIONS IN AGROECOLOGY

CO-DESIGN OF CULTIVAR MIXTURES

A better use of crop genetic diversity is recognized as an essential leverage for agroecology, as it promotes various ecosystem services, in a context of increasing environmental stochasticity caused by global change. Increasing within field diversity through the use of cultivar mixtures is a timely option, as testified by past major “success stories”, and recent bibliographic reviews. Yet, cultivar mixtures are still poorly developed worldwide, even if their use is in strong progression for wheat crop in France.

DESCRIPTION OF THE INNOVATION

The innovation is a participatory ideotyping exercise allowing the co-design of cultivar mixtures to customize the genetic and trait structure of crops and adapt it to innovative cropping systems delivering groups of agroecosystem services. It is based on workshops between farmers, extension services, scientists and other stakeholders of the value chain, allowing to design blending rules. These rules are then used by farmers or agricultural advisors to choose varieties to mix in order to improve the economic and environmental performance of their cropping system.



DESIGN AND SHARING OF THE INNOVATION

The mixtures co-design is based on a transdisciplinary approach, the blending rules being co-designed by farmers, extension services and scientists. These rules are integrated in a multi-criteria evaluation tool allowing a knowledge-based selection of crop genetic diversity that farmers want to implement in their fields.

Developed during the Wheatamix project, this tool was used for three years, providing a high diversity of

cultivar mixtures adapted to each farmer context.

BENEFIT FOR FAMILY FARMERS AND FOOD AND NUTRITION SECURITY

Mixing cultivars within the same field, and thus mobilizing the intra-specific diversity, is a nature-based solution with demonstrated benefits for the regulation of diseases, and considered as an insurance strategy for the farmers (thereby avoiding to put all their eggs in one basket).

It is based on registered varieties having known performance in the agrosystem, and the blending strategy is co-designed with farmers to respond to their local needs.

IMPACTS ON SOCIAL, ECONOMIC AND ENVIRONMENTAL LEVEL

This innovation contributes to the development of innovative cropping systems with improved adaptation and resilience capacity to climate change and the necessary reduction in chemical inputs. Besides, mixtures are generally already used by farmers with low-input agricultural practices (often organic farming), in part as a precautionary principle.



WHEAT CULTIVAR MIXTURES CONTRIBUTE TO VARIOUS ECOSYSTEM SERVICES

LESSONS LEARNED AND RECOMMENDATIONS

Cultivar mixtures co-design provides a smart way for farmers to tune crop genetic structure to their innovative agroecological practices, and to buffer the risks associated to variety choice and environmental variability and heterogeneity.