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Step-by-step co-design of agroecological innovations in dairy farming systems in Burkina Faso

In West Africa, the demand for dairy products is growing rapidly, but local value chains are struggling to emerge due to competition from imported powdered milk. Agroecology offers a promising option for strengthening the competitiveness of local dairy chains by reducing on-farm production costs and promoting the inclusion of actors, especially women, in emerging chains. Since 2005, we have been conducting step-by-step co-design work with milk producers, collectors and processors in the Bobo-Dioulasso region (Burkina Faso) to support them in a change process driven by agroecological values. Our approach involves supporting these actors

in technical and organizational 'steps' geared towards redesigning the production system, while also fostering the emergence of an enabling environment for local production. This approach is based on discussion forums involving researchers and local sector stakeholders, and on an *in situ* action research process. At the dairy production systems scale, techniques for the conservation of crop co-products, multipurpose forage crops, shrub fodder banks, a rationing tool for female dairy cattle tailored for pastoral systems and manure management methods were tested. We have assisted dairy sector actors in initiating innovations concerning the organization

of collection (efficient and inclusive collection scenarios), and in the pursuit of new outlets (Wagashi cheese). These different interventions also gave rise to the Bobo-Dioulasso Dairy Innovation Platform initiated in September 2020. **One of the lessons learned from these 15 years of research is that the art of step-by-step co-design lies in the ability to link initiatives aimed at developing promising agricultural systems and to build an enabling environment that includes policymakers and economic stakeholders driven by the determination to develop local dairy sectors.**



▲ During a training session on yogurt production with a group of Fulani women (2012, Koumbia, Burkina Faso).
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Designing innovative coffee agroforestry systems

Increased pest pressure, global warming, biodiversity loss and pesticide overuse are major challenges facing world coffee cultivation. Agroecological development of the system must therefore be favoured, while not losing sight of the profitability for producers. Strategies to ensure adaptive management of coffee agroforestry systems have been implemented through an agroforestry-oriented scientific platform⁽¹⁾. This involves adapting plantations (coffee varieties, shade tree species) and management practices (e.g. coffee pruning and/or shade tree pollarding). **Plantation fertilization and shade management can be tailored to the prevailing coffee price situation**, i.e. when prices are high, shading is reduced and fertilization is increased, but when prices drop, denser shading is promoted to increase nutrient recycling while reducing production and production costs. Selection of the best suited coffee varieties is a further strategic tool.

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▲ C. arabica F1 hybrids planted in agroforestry systems (Matagalpa, Nicaragua). © B. Bertrand/CIRAD

Coffee varieties have until now been selected for very low shading conditions or full sun cultivation. New coffee breeding programs have been geared towards offering varieties specifically adapted to agroforestry system conditions (www.breedcfs.eu). A new F1 hybrid coffee variety called Starmaya⁽²⁾ has dramatically enhanced coffee productivity, disease-resistance and bean quality in agroforestry systems.

A new concept has been developed to promote these innovations, i.e. **the creation of clusters of growers to jointly produce coffee for**

roasters that are fully compliant with environmental and agronomic standards while meeting traceability standards. Coffee production quality and quantity levels are set according to the requirements of the coffee company, which in return commits to a minimum price. Moreover, agroforestry clusters comply with shade tree planting specifications. A 'business driven' agroforestry cluster is: a terroir + agroforestry practices (Rainforest certified) + fully controlled postharvest processing + 100% traceability.

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(3) <https://dailycoffeeneews.com/2017/03/13/new-starmaya-hybrid-could-reshape-the-industry-says-world-coffee-research/>

(4) www.cirad.fr/en/news/all-news-items/articles/2019/science/agroforestry-clusters-a-model-to-complement-fair-trade

IDEAS platform

Supporting actors and researchers in designing innovations enhancing the agroecological transition

The much-needed agroecological transition of agrifood systems, which are now facing multiple challenges, calls for unprecedented changes: (i) systemic and disruptive innovations; (ii) involvement of actors from the entire agrifood system in designing and assessing solutions, and, most often; (iii) revamped coordination of activities and relationships between these actors, including researchers. Innovative design, in open innovation systems, has proven to be a relevant approach to combine these three objectives and foster innovation to feed transitions towards greater sustainability, even if this approach is still uncommon and not

well handled by agrifood system actors. Based on a network of scientists focusing research on and for design, through interdisciplinary projects (agronomy, food sciences, social sciences), **the IDEAS platform, supported by INRAE and AgroParisTech, aims to raise awareness and provide training in innovative design and its use in research and innovation activities, while supporting agrifood system actors in implementing the approach in renewed innovation ecosystems.** It offers researchers and socioeconomic actors *methods* to: (i) spur the creativity of agrifood system stakeholders (*innovation tracking, co-design*

workshops); (ii) facilitate the dialogue regarding desired and possible achievements from the actors' standpoint (*diagnosis of uses, step-by-step design, prototype testing under real-life conditions*); (iii) produce, hybridize and formalize disseminated expert and scientific knowledge (*digital design-support tools*); (iv) imagine new modes of production or processing, and changes in activity, required to implement them (e.g. *land-use scenarios*); and (v) analyze actors' strategies, networks and knowledge (*diagnosis of the sociotechnical system*) in order to enhance new design organization strategies fostering systemic and disruptive innovations.

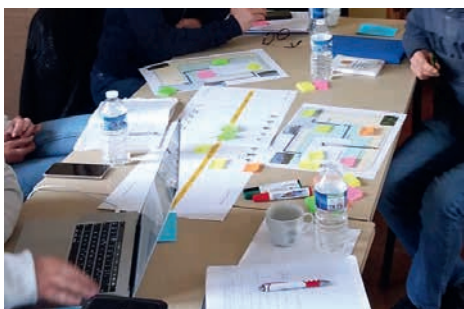


▲► *Designing coupled innovations for legume-based crop and food.*

© C. Gallagher and B. Schugt, 2012



▼ *Designing innovative farming systems targeting improved water quality management.* © R. Reau



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www6.inrae.fr/ideas-agrifood

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