les dossiers
d'AGROPOLIS INTERNATIONAL

Expertise of the scientific community in the Languedoc-Roussillon region (France)

Family farming

Number 19

Ecological intensification of annual crops

The internal research unit *Agroecology and Sustainable Intensification of Annual Crops* (UPR AIDA, CIRAD) focuses on the functioning and conditions underlying the ecological intensification of annual cropping systems on family farms in the tropics. The aim is to analyse and design annual crop based cropping systems that make effective use of resources and ecological processes by assessing, from different spatiotemporal dimensions, their agricultural, technological, environmental, economic and social performances. AIDA aims to ensure the food security of local populations in developing countries by focusing research mainly on the production of staple annual crops, such as upland rice (Madagascar, Southeast Asia), maize (Africa, Latin America, Asia), sorghum and millet (drylands in Sub-Saharan Africa) and cassava, which is often cropped in rotations with these main crops. The research is also devoted to annual crops, such as cotton (Sub-Saharan Africa) and sugarcane (Indian Ocean and the French West Indies), that are planted to consolidate the income of these people.

UPR AIDA contributes to the intensification and stabilization of production in these different types of tropical family farming agrosystem. It intends to develop an agroecological approach for the intensification of annual crops via two complementary technical pathways: (i) improving the eco-efficiency of resources and inputs used in the production process, and (ii) better management of ecological processes that regulate agroecosystem functioning so as to enhance the growth and production of crop species and ensure ecosystem services (fertility, natural pest control, etc.). UPR AIDA thus focuses on innovative and complex cropping systems that mobilize a more diverse range of biological agents (service plants, mulch, predators, competitors, etc.) that interact with each other and with crop plants.

The unit strives to conduct effective research along three interacting thematic lines concerning these complex systems: understanding/design/assessment. It thus develops collaborations with other research units that are more specialized in biology and ecology for the first line, social science of innovation for the second, and economy and political science for the third. It is active mainly on the crop field scale—its status and management. However, in compliance with the agroecology concept, it also takes other scales into account depending on the processes studied, the specific impacts and the involvement of different stakeholders. The farm scale is especially important for analysing the relevance and technical/economic performance of these innovative cropping systems. •••

The ABACO project—Agroecology-based aggradation-conservation agriculture

© K. Naudin

▲ *An exchange between farmers on a test plot where Bambara beans were grown in infertile soil using CA practices under the ABACO project, Alaotra Lake region, Madagascar.*

Family farming in semiarid Africa is in an increasingly vulnerable position due to the direct and indirect effects of climate change, demographic pressure and resource degradation. Conservation agriculture (CA) is promoted as an alternative to restore soil productivity through increased water and nutrient use efficiency in these regions. However, CA adoption is low for a number of technical reasons, but especially due to the fact that CA has often been promoted as a technical package without enough flexibility for adaptation to the diverse range of tropical family farming conditions. Farmers' involvement in designing and implementing locally tailored CA practices, as part of a long-term soil rehabilitation strategy, is the core approach implemented by the ABACO initiative.

This project brings together scientists and practitioners from western, eastern and southern Africa, coordinated through the African Conservation Tillage Network. It relies on agroecologically intensive soil rehabilitation measures and increased water productivity in semiarid regions—options which are implemented, tested and disseminated through local co-innovation platforms. ABACO proposes to assess approaches tailored to the needs at different sites, rather than applying strict definitions of CA approaches that might not be suitably applicable at all sites. Simulation models are used as a support for multiscale analyses (field, farm and territory) in order to efficiently inform local stakeholders and policymakers on the trade-offs necessary between the different components (agronomic, environmental, economic and social) regarding the sustainability of rainfed crop production.

Éric Scopel, eric.scopel@cirad.fr

For further information: http://abaco.act-africa.org