

ESA conference, August 2018, Geneva

## Tailoring Agroecological Intensification to the Context of Southern Mali: Co-Learning Through Agronomic Experiments with Farmers

---

Eva Huet<sup>1</sup>, Katrien Descheemaeker<sup>1</sup>, Myriam Adam<sup>2,3,4</sup>, Ousmane Dembélé<sup>5</sup>, Ken Giller<sup>1</sup>,

<sup>1</sup>Wageningen University, Plant Production Systems, <sup>2</sup>CIRAD, <sup>3</sup>AGAP, <sup>4</sup>ICRISAT, <sup>5</sup>AMEDD

**Abstract:** Yields are stagnating in the cotton zone of southern Mali, and the system is expected to be further pressured by population growth, urbanisation, institutional and market trends and climate change. Farmers rely on millet, sorghum and maize production for their food self-sufficiency, and on cotton and livestock for income. Agroecological intensification can contribute to increase productivity and nutritious food production, while maintaining healthy ecosystems and equitably improving livelihoods. Uptake of promising options by farmers is not guided by profitability alone but also by perceived risks, embedding in value chains or labour shortages. An existing co-learning process is expanded to better understand these factors.

Participatory trials are set up as part of annual DEED cycles (Describe, Explain, Explore, Design), aiming to offer a basket of options from which farmers can choose the technologies that fit their farm context. Both design and results of trials are discussed together with a farmer research network (FRN). A first series of consecutive DEED cycles (2012-2015) was based on small plot trials, which resulted in the demarcation of niches (e.g. based on soil type or crop rotation) wherein certain options are promising for certain farm types. At farm level, replacing sorghum by soybean or cowpea increased gross margin without compromising food self-sufficiency for low and middle-resource endowed farms. For higher-resource endowed farmers, it was achieved through intercropping maize-cowpea combined with stall feeding of dairy cows.

Building on this experience, the methodology is now enriched by combining three types of trials in a second phase of DEED cycles: small plot trials, field-level demonstrations and farmer field follow-up. For the latter, crop management practices of farmers that participated in the first phase, are monitored to assess the adaptation of options. In neighbouring villages, a new FRN was set up. A first aim is to demonstrate and co-evaluate the promising options at field level. Additionally, farmers are trying several new options at plot level: groundnut (variety x density; 16 farmers), soybean (fertiliser rate x density; 9), cowpea (variety x insect treatment; 12), maize-cowpea (spacing x cowpea variety; 11), sorghum (14) and millet (16) (variety x (organic) fertiliser rate). All options are compared with farmers' practice, and design of treatments is inspired by agroecological principles. For example, options aim at increasing on-farm crop diversity with an emphasis on leguminous crops. Sustainability is evaluated through various criteria (e.g. grain and fodder production, access to inputs, labour requirements, cost-benefit).

Multi-year, adaptive DEED cycles with trials at different scales (field and plot) contribute to better tailoring of options to farmers' reality. Monitoring adaptation by farmers and participatory multi-criteria analysis untangle farmers' decision making and may enhance uptake of the options.

**Keywords:** Mali, Agroecological Intensification, Co-learning Cycle, Trials