

Session 2 : **Technical and socioeconomic levers for sustainable intensification**

2.4. Accompanying methods

Co-learning cycles to support innovation and adoption of options of agro-ecological intensification.

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The population in southern Mali is growing fast, particularly in the cotton zone of Koutiala district reaching a growth rate of 3.4 % for certain households (Falconnier, 2016) and a density of 70 people/km² (RGPH, 2009). The increasing population density in urban and rural areas will require farmers to produce more food to meet the additional demand. However, agricultural production in this region is challenged by natural resource scarcity and degradation (e.g. land) and climate variability. In this regard, agro-ecological intensification (AEI) is seen as a promising way to increase agricultural productivity and provide nutritious food while maintaining healthy ecosystems and equitably improving livelihoods (Wezel et al., 2015).

AEI options comprise technologies targeted to various components of the farming systems and include also farm management, and marketing improvements. In the past, relevant AEI options (e.g. diversification of crops and stall feeding of cows) have been developed and promoted. Despite their potential, adoption of new options remains low in west Africa in general (Ndjeunga et al., 2005), and in particular in southern Mali.). Main reasons for low adoption include (i) high farming risk, refraining farmers to invest or change practices; (ii) high transaction costs leading to poor incentives for collaboration between farmers and traders, and (iii) and lack of information on sustainable options.

A possible strategy to facilitate the scaling of AEI options is to involve stakeholders in a co-learning (Falconnier et al., 2017) and co-innovation process (Dogliotti et al., 2014), that is based on the cycles of Describing, Explaining, Exploring and Designing (DEED) (Giller et al., 2008). The approach combines different activities at different levels, including on-farm crop and livestock trials, demonstration trials, farm household surveys, modelling exercises, focus group discussions and village workshops, and discussions among actors of value chains on how to foster their collaboration using AEI options.

The overall aim of this study is to contribute to AEI and improve smallholder livelihoods based on an approach of communication that brings the stakeholders together for co-learning using the DEED cycle. By so doing, different approaches are jointly used in iterative learning cycles with farmers and other stakeholders.

The approach is being used in southern Mali in the framework of the project "Pathways to Agro-ecological intensification in southern Mali", since 2012, as well as in other Sub Saharan African countries (Descheemaeker et al., 2016). Sharing of knowledge on the use and the usefulness of AEI options among the stakeholders is acknowledged as trigger to test and eventually adopt the options. Also, farmers recognized that the discussions during the workshops make them aware of the need to use AEI options to face the challenges from the production systems.

- Descheemaeker, K., Ronner, E., Ollenburger, M., Franke, A. C., Klapwijk, C. J., Falconnier, G. N., . . . Giller, K. E. (2016). Which Options Fit Best? Operationalizing the Socio-Ecological Niche Concept. *Experimental Agriculture*, 1-22.
- Dogliotti, S., García, M. C., Peluffo, S., Dieste, J. P., Pedemonte, A. J., Bacigalupe, G. F., . . . Rossing, W. A. H. (2014). Co-innovation of family farm systems: A systems approach to sustainable agriculture. *Agricultural Systems*, 126, 76-86.
- Falconnier, G. N., Descheemaeker, K., Van Mourik, T. A., Adam, M., Sogoba, B., & Giller, K. E. (2017). Co-learning cycles to support the design of innovative farm systems in southern Mali. *European Journal of Agronomy*, 89, 61-74.
- Giller, K. E., Leeuwis, C., Andersson, J. A., Andriessse, W., Brouwer, A., Frost, P., . . . Windmeijer, P. (2008). Competing Claims on Natural Resources: What Role for Science? *Ecology and Society*, 13(2).
- Wezel, A., Soboksa, G., McClelland, S., Delespesse, F., & Boissau, A. (2015). The blurred boundaries of ecological, sustainable, and agroecological intensification: a review. *Agronomy for Sustainable Development*, 35(4), 1283-1295.