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ICT4AGROECOLOGY - A FARMER PARTICIPATORY RESEARCH PROJECT IN TANZANIA

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Abstract:

The role of technologies to support a transition to agroecological production systems is becoming increasingly important (e.g. digital or biotechnological technologies). Technologies are often assigned the role of a key driver of change where the proposed, mostly proprietary technologies shape the change process and require adaptation of the farmer and the production system to the technology in order to allow the technology to realize its maximum potential. We place the focus on the farmer and the agroecological production systems and retool digital technologies to support the farmers in realizing the maximum potential of their agroecological production systems. Here, we present the current outcomes of the Research and Advocacy on Agroecology program, coordinated by Swissaid Tanzania, and implemented by national and international partners, including Sustainable Agriculture Tanzania (SAT), Sokoine University of Agriculture (SUA) and the Swiss Federal Institute of Technology (ETH).

Introduction: With the increasing use of information communication technologies (ICTs) in all facets of human life, also the potential contribution to agriculture has been widely recognized in recent decades. The terminology ‘e-agriculture’ was introduced in the World Summit on the Information Society in 2003 (WSIS 2003). Since then, ‘e-agriculture’ has experienced a rapid expansion, which culminated with its rebranding as ICT4Ag (ICT for agriculture), a term that came to be associated with the creating of business opportunities offered by the newly founded partnership of ICT corporations and agribusiness (e.g. Kalibata 2013). As agroecology is also gaining momentum over the past two decades in particular in developing countries (de Schutter 2010, FAO 2018a,b), discussions are ensuing on two issues: a) identifying best agroecological practices under different environmental conditions based on robust data from field research and b) the role of ICT technologies. How can technologies support the research, production and advocacy of agroecological systems, specifically in a development context?

In developing countries like Tanzania, small holder farming is fundamental to food security and a prime sector of employment. Hence, Tanzania is pursuing a policy of upscaling farming systems towards more productivity and

efficiency that includes its small holder population basis. How exactly to do this in an ecological sustainable way is at the core of the debate. With our research we aim to contribute to both the tailored use of ICTs supporting small holder farmers in their efforts of, simultaneously, improving agroecological production methods and identifying the best set of local practices. Material and methods: The AgroEco Research platform is one of the three tools that we have developed under the ICT4AE (ICT for Agroecology) domain. The AgroEco Research platform is a tool for systematic data gathering and analysis connected to identical (split plot) field trials set up by scientific researchers in three different geographic regions of Tanzania: Masasi (Mumbaka), Morogoro (Vianzi) and Bagamoyo (Chambezi). The main objective of these trials is to develop a robust data set of the local impact of a combination of different common agroecological treatments (soil management, pest control and intercropping) to increase the productivity of two staple crops: maize and cassava. The AgroEco Research application allows the systematic collection of pre-defined parameters concerning growth and yield as well as organic inputs (compost, mulch, biocontrol). Further, we have developed an automated statistical evaluation tool that is connected to the data collection website and simultaneously analyses the collected data submitted to the web-based platform using the statistical application (Shiny Web application R).
Results: We will present the current state of results after 3 years of data collection on maize at three agroecologically different locations in Tanzania (Morogoro, Bagamoyo and Masasi region). We will present the functioning of the combined data gathering and statistical analysis applications and show first results of the coordinated field trials at the three locations. Preliminary findings regarding the local impacts of the treatment combinations (soil: compost and mulch), intercropping (legumes) and biocontrol measures (a combination of different botanicals and ash) will be presented and lessons to be learned for each location. From our first years of data collection, the preliminary lessons seem to be that the best return of effort yield soil management practices delivering reliable and recurring benefits while labor intensive pest control practices deliver variable outcomes.
Discussion: Agroecology is the contextualized application of ecological principles to agriculture, and, therefore, the identification and application of the best locally adapted practices is key for its success (Wezel et al. 2009, Altieri 1995). Most importantly, farmers take center stage, their role is strengthened, and their knowledge, skills and participation are considered indispensable (FAO 2018a,b; DeSchutter 2010). In this sense, agroecology can be seen as the skill-full, situated and sustainable art of farming. However, as every art and craft, it needs continuous adaptation, experimentation and training. As agroecological forms of farming differ substantially from conventional, industrialized farming in many aspects (Hilbeck and Oehen 2018, Oehen and Hilbeck 2015), so does the need for technologies tailored to the tasks and goals of agroecology. We have been retooling digital ICT tools for this purpose since many years and tested in small holder farming contexts. We succeeded in developing farmer- and farming-centered support tools rather than changedriving technology tools. The consequences are significant as in our approach to ICT4AE, the farmers are partners in the development process and own the applications and, more importantly, their outcomes. The tools become part of their operation allow them to see the differential impact of practices they apply with the aim to identify those practices that deliver the best return of their effort and continually improve and adapt them to their needs.

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