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Participatory action research (PAR) as an entry point for supporting climate change adaptation by smallholder farmers in Africa

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ABSTRACT

Emerging trends of a changing and increasingly variable climate have introduced new livelihood challenges in rain-fed smallholder agricultural systems that predominate in Sub-Saharan Africa (SSA). The capacity of local farming communities and their institutions to respond to the new and emerging impacts of climate change is often constrained by lack of access to information and improved technologies, as well as poor support mechanisms to promote assimilation of new knowledge. This threatens to heighten vulnerability of the majority of SSA's rural communities who are already facing severe problems of food insecurity and a declining soil resource base. In this paper we use two case studies from Wenchi district in Ghana and Makoni in Zimbabwe to communicate how participatory action research (PAR) methodology, characterised by iterative planning–action–reflection cycles, was coupled with a new concept of field-based farmer learning centres to build adaptive capacity of smallholder farmers to climate change. The study was part of a University of Zimbabwe—led project supported under the Climate Change Adaptation in Africa (CCAA) programme to explore

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the state of resilience in African smallholder farming. The PAR and learning centre processes enabled communities, local leaders, and extension agents and researchers to establish the, hither to, imperceptible link between poor soil fertility and rising institutional challenges within communities. Institutional conflicts related to land tenure and sharecropping arrangements between migrant farmers and native landowners were addressed in Ghana, while local institutions supporting traditional social safety net mechanisms were revitalized in Zimbabwe. In both cases, it was apparent that farmers faced multiple stresses, at the core of which were poor and declining soil fertility and weakening local institutions. The worsening rainfall distribution and increasing cases of drought are broadening the scope for vulnerability, often driving competing claims and conflicts. PAR was successfully used as an entry point, empowering communities to self-mobilize and self-organize to co-learn and experiment with integrated soil fertility management (ISFM) technologies and other improved farming practices. They realised opportunities for achieving high crop yields and generate surpluses in good years. Strengthening local institutional capacity to revitalise community safety nets proved an essential ingredient for enhancing adaptive capacity of smallholders to climatic shocks. The PAR process was a major driver of effective partnerships among community members, extension, policy makers and researchers, but ensuing success generated a new set of social challenges that could not be addressed within the short timescale of the project. We conclude that PAR was a suitable mechanism for supporting self-organization and co-learning processes among smallholder farmers and their service providers, enabling them to use ISFM technologies and strengthen their local institutions around natural resource management. This revealed the scope for building adaptive capacity of these communities against climate change and variability.

1. Introduction

Increasing agricultural production to meet rising demands for food, feed and fibre for a growing but predominantly rural population remains a major developmental challenge for Sub-Saharan Africa (SSA) (World Bank, 2008). Over 90% of SSA's agriculture is rain-fed, and mainly under smallholder management (Batino and Waswa, 2011), rendering farming systems vulnerable to climatic variability. Over 80% of the population is directly dependent on agriculture in one way or the other (World Bank, 2008) yet, per capita agricultural production in the region has been on the decline. Declining soil fertility, weak adoption of mineral fertilizer and other advanced agricultural technologies are some of the fundamental reasons for decreasing per capita food production (Sanchez et al., 1997; IFDC, 2007) and therefore major causes of hunger and food insecurity. It is now widely recognised that faster agricultural productivity growth in Africa will not be stimulated without improvements in soil fertility levels (FAO, 2004; Morris et al., 2007). It is also increasingly clear that significant improvements in soil fertility will not be achieved without substantial increases in mineral fertilizer use and its efficient management in combination with organic nutrient resources available to farming households (Vanlauwe et al., 2010; Bationo et al., 2011; Mapfumo, 2011). However, mineral fertilizer use in the region still averages 8–10 kg ha^{-1}, the lowest among world's developing regions (FAOSTATS). Among the major factors undermining fertilizer use in SSA are the risks associated with rainfall variability, high costs and poor access to fertilizer, and poor producer prices for major crops (Crawford et al., 2003; Morris et al., 2007). The emerging evidence of decreasing rainfall amounts, worsening intra-seasonal rainfall distribution patterns and increasing summer temperatures (IPPC, 2007) implies that many farmers in SSA will find fertilizer use even riskier or more costly. This is likely to exacerbate current problems associated with excessive nutrient mining in farming systems