With climate change and increasing global food demand in the face of declining environmental resources, many development agencies and governments have promoted soil and water conservation practices such as catchment management, legume intercropping, and tree planting in order to help smallholder farmers cope with the effects of climate change on agriculture while sequestering carbon and delivering other environmental benefits. Such interventions, dubbed climate-smart agriculture (CSA), constitute key development strategies across developing countries, and seen as an important means to advancing several of the Sustainable Development Goals (SDGs), including on climate adaptation (SDG 13) and hunger (SDG 2).

However, empirical evidence on the environmental sustainability and food security impacts of externally supported CSA programs for farm-level adoption of CSA practices remains scant, particularly in Sub-Saharan Africa (SSA). Here we analyze the environmental sustainability and food security impacts of CSA-program participation under a large USAID-funded project, Wellness and Agriculture for Life Advancement (WALA), implemented in southern Malawi from 2009 to 2014. We surveyed 808 households across 5 districts through an ex-post quasi-experimental research design. Using soil health measures (including organic matter, Carbon, Nitrogen, and Potassium) and crop yields as indicators of environmental sustainability and food security respectively, we estimate the impacts of CSA program participation on environmental sustainability and food security in southern Malawi. We use endogenous switching regression and propensity score matching to estimate the project’s average treatment effect by selecting our counterfactual based on observable characteristics and by controlling for unobserved differences between participants and non-participants of WALA.

Our study intersects the conference themes of agriculture for development and development & climate change.

We show that CSA program participants realized statistically significantly increases in soil organic matter, organic Carbon, Nitrogen, and Potassium, on average, by 165%, 66.9%, 4.5%, and 31.7% respectively. Similarly, maize yields increased by 96% on average.

Our study contributes to the literature on environmental sustainability and agricultural development by empirically estimating the impacts of CSA programs. Moreover, our findings suggest that externally supported CSA programs can spur environmental sustainability and food security in southern Malawi and elsewhere in SSA.