

Handout 7.3.7: Case Study

The Power of Intercropping Banana and Coffee

UGANDA, RWANDA, BURUNDI, DEMOCRATIC REPUBLIC OF CONGO

Increasing temperatures are having substantial impacts on the suitability of coffee systems across Eastern and Central Africa. Since 2006, the International Institute for Tropical Agriculture (IITA) has investigated the benefits of the traditional practice of Coffee Banana Intercropping (CBI). On-farm research indicates that growing the two crops together can contribute to all three Climate-Smart Agriculture pillars.

In terms of productivity, CBI increases total revenue per unit area by more than 50% compared to monocropped banana or coffee, without affecting coffee yield. Bananas make coffee production systems more diverse, reducing risk while increasing food security during dry seasons. In newly established coffee farms, bananas can offset cash flow constraints in the early years before the coffee becomes productive.

In terms of resilience, bananas provide valuable shade coverage for highly climate-sensitive coffee crops. In addition, bananas are capable of remaining hydrated under drought stress, reducing water competition during drought, compared to other shade trees.

CBI also mitigates greenhouse gas emissions by increasing above- and below-ground carbon stocks. On average, mixed cropping can sequester around four times the carbon that unshaded monocultures can. Furthermore, the increased productivity of CBI systems reduces overall carbon footprint, as emissions related to agricultural inputs are spread over a larger agricultural output.

In Eastern Uganda, over 85% of coffee farmers have at least one CBI plot. “The results were spectacular,” comments Piet van Asten, a scientist at the International Institute of Tropical Agriculture (IITA) in Kampala, Uganda. “[But] ...the downside is that it increases competition among the different plants for water, nutrients and light. This needs to be managed by using good agronomic practices such as integrating fertilizers and organic nutrient inputs, managing plant density and canopy cover appropriately, and practicing good soil and water conservation.”



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Case Study B1.1 Smallholder conservation agriculture mechanization scheme in Zambia for mitigation of climate change

Zambia, located in the southern region of sub-Saharan Africa, is one of the most vulnerable countries to the threats posed by climate change. Its agricultural and food systems are already being affected by extreme weather events. Over the past years, severe drought spells have reduced agricultural production; in some cases causing total crop failures. Heavy rains and flooding has also affected production. Numerous agricultural projects are being implemented to support climate change adaptation and mitigation strategies. One of these strategies concerns mechanization for conservation agriculture.

Conservation agriculture is a farming system that is based on minimum soil disturbance, the retention of crop residues or other materials to maintain soil cover, and the use of crop rotations. Minimum soil disturbance is an essential component of sustainable agricultural mechanization. Zero tillage is ideal, but the conservation agriculture crop production system may involve controlled tillage or reduced tillage. In Zambia, rippers drawn by tractors or draught animals are used, as well as direct seeders.

For entrepreneurs focusing on production-related mechanization and land preparation, it is essential to have the appropriate equipment readily available for land preparation by ripping or direct seeding. These two practices are in line with conservation agriculture principles. Incentives and tailored support are required to facilitate the demand for these services and mitigate the risk assumed by the entrepreneurs who must make an initial investment to obtain the equipment needed to implement conservation agriculture.

A smallholder mechanization project led by AFGRI (a private sector farm equipment supplier located in Lusaka and affiliated with the John Deere Corporation) has worked to increase smallholder farmers' access to sustainable mechanization technologies. Smallholder farmers were provided loans and equipped with tractors and rippers. Depending on the local market potential, the smallholder farmers were also supported in obtaining trailers, slashers, maize shellers and sprayers. The project partners included the private sector (AFGRI), the Zambia Conservation Farming Unit of the Zambian National Farmers Union and the non-profit organization 'MUSIKA'.

Under this project, the smallholder farmers received a loan from a machinery dealer to purchase a tractor and associated equipment, including equipment for reduced tillage. The farmers were contractually obliged to pay the loan back over a three-year period. They paid back the loan by offering conservation agriculture-based ripping, transport and other services to farmers in their neighbourhoods. In this way, the benefit trickled down to the whole community, and those who received loans were able to pay the money back. The project benefitted 28 smallholder farmers who became hired providers for conservation agriculture mechanization services. The

Conservation Farming Unit promoted conservation agriculture practices. Emphasis was placed on conservation agriculture because of its advantages over conventional farming in terms of climate change mitigation. Conservation agriculture reduces carbon dioxide emissions, minimizes soil disturbance, and avoids soil erosion and degradation. The Conservation Farming Unit encouraged the supply and use of the ripper, and provided conservation agriculture training to contractors. The Unit also played a key role in selecting potential candidates by considering their compliance to conservation agriculture principles and their capacity to offer conservation agriculture-based ripping services in their neighbourhoods. The fact that conservation agriculture was introduced through mechanized services made it more attractive to farmer clients.

MUSIKA took interest in the smallholder mechanization project as a means of stimulating economic growth in rural areas. They provided the smallholder farmers with financial training before the loans were disbursed, and all the clients received training on conservation agriculture principles and business skills, including calculating costs, margins and charge rates for services. Legal advice was also offered so that all contracts and obligations were fully understood. The loan was typically around USD 45 000 at 12 percent annual interest. All the clients have met all their contractual obligations. To date, there have been no defaults on the loans.