Coffee-Banana Intercropping in Uganda

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Background: Agriculture in Uganda

Uganda is a landlocked country with a total population of 34.9 million and a surface area of 241,000 km,2 of which about 73% is arable land (World Bank 2020). About 72 % of the working population are subsistence farmers who cultivate on average less than 3 ha (NEMA 2014, UBOS 2020). 5.7 million ha of the country's land are under annual crops while 2.2 million ha are under permanent crops. Smallholder system are mostly subsistence-oriented, with farmers growing maize, beans, groundnuts, cassava, millet, sorghum, sweet potato, and banana. Ugandan small-scale farmers have been experiencing farming challenges due to climate change, political instability, changes in market demand and change in farming technologies (UBOS 2020). Although smallholder farmers have been recognized as key contributors in food production and environmental conservation, the zones in which they live have been associated with poor infrastructures, inadequate access to basic social amenities and malnutrition (Mukadasi 2018, UBOS 2020).

A traditional approach to diversified farming

Limited by their socio-economic capacity, farmers have found new, low-cost ways to manage their farming systems to accommodate changing climates and livelihoods. One of these approaches is intercropping, or planting multiple crop species together in the same field. Farmers have been intercropping due to declining farm sizes in an effort to reduce risks related to income and food security. Intercropping increases the amount and diversity of food produced on a plot of land, as multiple species can make more efficient use of light, space, and nutrients than one species planted alone. Increased total productivity and crop diversity improve households' food security, making a wide range of foods more available (Mukadasi 2018, UBOS 2020). Farmers can also earn more through intercropping, as they can sell higher value crops to get better market prices (Mukadasi 2018). Farmers have traditionally intercropped food crops such as beans, maize, cassava, sweet potatoes, potatoes, and bananas, but recently some farmers have integrated cash crops with great success. Here we summarize the benefits of intercropping coffee and banana reported by farmers from central, western and eastern parts of Uganda.

Reducing the risk of hunger with a versatile cropping system

Coffee-banana intercropping has been adopted by a large number of farmers in Uganda who recognize its advantages for income generation, sustainable domestic food production, environmental health, and drought and disease resistance (Mukadasi 2018). Coffee and banana are primarily cash and food crops in Uganda, while banana acts as a staple food meeting more

than 10% of the dietary energy requirements in Uganda (Jassogne et al. 2013). Farmers know that different crops survive differently under varying conditions, hence practicing intercropping on the same unit of land reduces the risk of total crop failure, and the food insecurity that such an event implies. Coffee plants fruit for the first time several years after planting, signifying a delayed financial return on farmers' initial investment. This lack of income during the first few years can be prohibitive for poorer farmers, who need to use their land for productive crops. Planting bananas, which mature quickly, together with coffee gives farmers a source of food and cash at the early phases of coffee development. Once coffee plants mature, they can be harvested twice a year, providing an important income source at these moments, while banana plants provide food and modest income continuously.

Figure 1. A Ugandan banana farmer displays her product; © S. Quinn, CIP, CGIAR

Providing multiple benefits for farming households

Intercropped bananas provide leaves and stalks that can be used as mulch between the coffee trees. This mulch suppresses weeds, which would have been manually weeded by farmers. As a result, farmers found that coffee-banana intercropping decreased their workload even as this practice reduced losses associated with weed infestations. In addition to being a valuable mulch, the banana produces pseudostems that can be fed to livestock, facilitating farmers' ability to further integrate their crop-livestock systems. This source of livestock fodder allows farmers to enclose animals, rather than letting them graze freely, and thus collect their manure in one place to be used to enhance soil fertility.

Coffee-banana intercropping can influence gender dynamics. Generally, men's work is mainly associated with cash crops while women care for food crops. After integrating bananas into coffee fields, women were more motivated to work in the fields, as bananas can be used for household

consumption (Figure 1). Intercropping therefore can improve the balance between women's and men's interests in field work and ownership over the crop produced.

Creating environmental conditions for high quality coffee

The farmers and extension officers reported that coffee produced on intercropped fields was of good quality and high yield. This outcome is linked to the positive environmental effects of coffee-banana intercropping; banana is a provider of ground cover and shade for coffee shrubs, creating a suitable microclimate for coffee quality (Figure 2). The mulching also helped to retain water and control runoff and erosion. As a result, coffee plants from intercropped plots were greener and less affected by drought.

Figure 2. Intercropping bananas with coffee can create the microclimate needed to produce high quality coffee; © 2010CIAT/NeilPalmer

Reducing coffee disease

Farmers who cropped pure stands of coffee experienced losses of trees and production due to infestation of coffee wilt disease. Farmers found that intercropping coffee and banana reduced the spread of the disease and the additional income from banana buffered the financial impact of coffee production losses due to the disease.

An accessible technology

Extension service and farm tools have been recognized as a key factor in adoption of new farm practices or crops, but not all practices and technologies are accessible, especially to poorer farmers. As intercropping is a practice with which Ugandan farmers are already familiar, farmers easily learn to apply the practice through information provided by fellow farmers, extension agents, and in some cases, development project staff.

Conclusion

Coffee-banana intercropping provides benefits to farmers, from increasing their food production and income, to reducing their workload, to improving household gender dynamics. It also has environmental benefits for soil and water conservation, hence supporting sustainable agricultural production. Farmers' experimentation and application of the practice is built on traditional knowledge, but further support and exchange of knowledge regarding plant interactions and pest and disease management could identify further innovations for this agroecological system.

References

Jassonge, L., van Asten, P.J.A., Wanyama, I., Baret, P.V. 2013. Perceptions and outlook on intercropping coffee with banana as an opportunity for smallholder coffee farmers in Uganda. International Journal of Agricultural Sustainability 11(2), 144-158.

Mukadasi, B. 2018. Mixed cropping systems for sustainable domestic food supply of the smallholder farming communities in Nakasongola District, Central Uganda. Canadian Journal of Agriculture and Crops, 3(1), 42-54.

NEMA 2014. State of the Environment Report for Uganda 2014. National Environment Management Authority (NEMA), Kampal,

https://nema.go.ug/sites/all/themes/nema/docs/FINAL%20NSOER%202014.pdf

UBOS 2020. Uganda Annual Agricultural Survey 2018. Uganda Bureau of Statistics (UBOS), Kampala Uganda. https://www.ubos.org/wp-content/uploads/publications/AAS_2018_Report_Final_050620.pdf

World Bank 2020. Agricultural land - Uganda.

https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=UG

Further information:

van Asten, P., Ochola, D., Wairegi, L., Nibasumba, A., Jassogne, L., Mukasa, D. 2015. Coffee-banana intercropping: Implementation guidance for policymakers and investors. Global Alliance for Climate-Smart Agriculture. https://cgspace.cgiar.org/bitstream/handle/10568/69017/CCAFSpbCoffee-Banana.pdf

van Asten, P.J.A., Wairegi, L.W.I., Mukasa, D., Uringi, N.O. 2011. Agronomic and economic benefits of coffee–banana intercropping in Uganda's smallholder farming systems, Agricultural Systems 104, (4), 326-334.

Video: Coffee Intercropping in Uganda. https://www.youtube.com/watch?v=JuKC9C-aVa0