

Putting banana-coffee intercropping research into action

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KEY FINDINGS

- Quality research and evidence that a practice is climate smart is not enough to influence policy uptake.
- Effective dialogue between researchers and decision makers at national and local levels is necessary to enable uptake of climate-smart practices.
- Climate-smart research should be presented in good style and format to enable informed decision-making.



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SUMMARY

Research of the International Institute of Tropical Agriculture (IITA) and its partners shows that growing coffee and banana together is generating >50% more income for smallholder farmers and can help them cope with the effects of climate change. However, turning research into action on the ground requires effective dialogue and communication between researchers and policy makers. This study looks at how well informed government bodies, private sector and non-profit actors were of IITA's research and to what extent the practice has been adopted.

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Background

Smallholder farmers are disproportionately vulnerable to the impacts of climate change as a result of poverty, marginalization and reliance on natural resources. Climate change will likely negatively affect crop yields and threaten food security in most tropical and sub-tropical regions. Identifying approaches that strengthen ongoing economic development efforts and enhance the adaptive capacity of farmers, households and communities are therefore vital to counter the effects of climate change (Frank and Buckley 2012).

In Rwanda and Uganda, coffee and banana are two major crops ensuring both food security and household incomes for smallholder farmers. In addition, coffee is a major export crop and a valuable source of foreign currency. The Uganda Coffee Development Authority estimates that in Uganda, the sector is almost entirely dependent on about 500,000 small-holder farmers. In Rwanda, this number is around 400,000, according to the National Agriculture Export Development Board.

Population pressure in Rwanda and Uganda has led to a decline of plot sizes and small farm sizes (<3ha) and the need to find suitable solutions to ensure food security for a growing population. Promoting agricultural practices that protect the key export and food crops and make optimal use of small acreage is vital to the survival of smallholder farmers.

The coffee sector has been cited as the most vulnerable to increases in temperature with pessimistic projections seeing Uganda's coffee production entirely wiped out in less than 100 years (NPA 2010). Experts already note an increase of pests (berry borer) and diseases such as (coffee bacterial wilt and leaf rust in the Arabica coffee) which they attribute to increases in temperature. Hence the interest of public, private and non-profit

actors in these countries to identify and promote climate-smart agricultural practices that address climate challenges in a sustainable way. Recognizing and building on agricultural practices developed by smallholder farmers over decades to manage risk at farm level is a proven way of effective response to climate change. The traditional practice of intercropping banana and coffee in East and Central Africa is a practice that can be enhanced to help farmers adapt to climate change.

Since 2006, the International Institute for Tropical Agriculture (IITA) in East Africa has researched into the multiple benefits of intercropping banana and coffee in Uganda, Rwanda, Burundi and the Democratic Republic of Congo. These benefits include: improved soil fertility through provision of mulching materials in situ, protection of soil and coffee plants from extreme temperatures, improved quality and production of coffee, income risk management, sustainable intensification of small plots, water management, protection against erosion and run off during heavy rains and moisture retention during dry spells as well as protection against weather extremes (Van Asten et al. 2011).

Under the Africa Soil Health Consortium project funded by the Bill and Melinda Gates Foundation and coordinated by CABI, IITA and partners developed a training manual for agronomists on optimal banana-coffee intercropping density, which has recently been published. At the time of the study, this manual had not yet been officially disseminated to actors in the coffee sector in either Rwanda or Uganda.



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Scope and Methods

The purpose of this study was to validate and enhance the body of outcome evidence at policy level that has led to increased adoption of banana-coffee intercrop systems in a sustainable manner in Uganda and Rwanda; and to gauge in how far IITA/ CCAFS have contributed to this uptake. In this context, an outcome is broadly defined by CCAFS as 'the use of the research by non-research partners to change policies and practices'. The study therefore looked not so much as to whether intercropping in accordance with IITA cropping density stipulations had been adopted by farmers but more in how far government bodies, private sector and non-profit actors were aware of the research and were promoting the practice.

After establishing a timeline of the research into the banana-coffee intercropping with IITA staff members and identifying key actors involved in Uganda and Rwanda, face to face interviews were conducted with these actors. This was complemented with a study of relevant scientific literature, media reports and blogs to see if the research results of IITA had achieved wider attention and promotion. The study also identified actors who had not been initially involved in the research and dissemination of results. Overall, 15 interviews were conducted in Uganda and 11 in Rwanda with government officials, researchers, NGOs and coffee farmer associations. One field visit in Rwanda was undertaken and an interview with a 'progressive' farmer conducted.

Findings

OUTCOME EVIDENCE UGANDA

Intercropping is not new to Uganda and various organizations have been recommending intercropping of banana and coffee together with other shade trees (Oduol and Alma 1990). A trend analysis of coffee-farming systems in Eastern Uganda suggests that the ratio of intercropping has increased over the past 5 years with currently more than 85% of farmers having at least one plot with coffee and banana intercropped. Nevertheless about half of the coffee farmers in Central and Western Uganda are reported to still practice monocropping (Bongers et al. 2012). The contribution of IITA has been to scientifically verify the benefits of banana-coffee intercropping and to recommend sustainable ratios of crop density for improved quality and quantities of coffee.

KEY ACTORS UGANDA

The coffee industry in Uganda has undergone major reforms since the early 90s and the coffee market is now completely liberalized. As a result, producers' share of export prices increased significantly. Liberalization of the sector also means that there are several actors in the field from the private and non-profit sector who promote best practice in coffee cultivation and climate change adaptation.

The Ugandan Coffee Development Authority (UCDA) is the government body that regulates and monitors the sector. It also endorses research results related to coffee and advises the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) and the National Agriculture Advisory Services (NAADS) accordingly. Both UCDA and NAADS are responsible for disseminating coffee related research. Dr. Ngabirano, Managing Director of UCDA explained that he was well aware of the research of IITA that was carried out in collaboration with the National Crops Resources Research Institute NACRRI (recently a National Coffee Research Institute (NACORI) has been established). He pointed out, however, that the results of the research had not

officially been submitted to UCDA and therefore had not yet been recommended as a climate-smart practice. Plans for coffee-specific extension officers to be trained by UCDA would offer a possibility for the practice to be included in the curriculum, if research results and training materials were received and approved by UCDA.

Dr. Africano Kangire, who formerly headed research at IITA/NACCRI was adamant that IITA's results on the density of banana-coffee spacing would be the recommended practice for the newly formed NACORI and communicated to the zonal research institutes across the country. He emphasized that different steps had already been undertaken to publicize the practice to farmers, extension services and regular coffee shows organized by Café Africa in each district.

Interviews with NAADS coordinators showed that they were aware of the research and recommend intercropping to farmers. They however lack manuals on optimal spacing to effectively promote the practice. NAADS and the National Agricultural Research Organization (NARO) are working closely to facilitate multi-stakeholder innovation platforms for a range of commodities. The established platform for banana and coffee could provide a possibility for sharing research results and guidelines on intercropping.

The National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE) is an umbrella of 155 coffee farmer associations across the country representing some 150,000 households involved in the coffee sector. The Uganda Coffee Farmers Alliance (UCFA) organizes some 53,000 farmers in a three tier system from village to national level. Each of these organizations work to increase farmers' involvement in adding value along the coffee chain and provide training in best practices of coffee cultivation through demonstration plots and farmer field schools. According to UCFA, approximately

eight of ten farmers are already practicing some level of banana-coffee intercropping. Both organizations encourage this practice as well as the use of other shade trees as a climate-smart practice. They are aware of the work of IITA and pointed out the need for a manual to promote the recommended varieties of crops and planting densities as well as the need for farmer appropriate materials in local languages.

An important body for informing policy and disseminating good practices in coffee cultivation is the National Coffee Platform. The secretariat to the platform is provided by the NGO Café Africa. Fliers and posters of IITA's research findings have been distributed at District coffee shows organized by Café Africa on a monthly basis. Café Africa is also involved in the development of standardized training materials for farmers which are being piloted in 6 districts. One module deals with climate change and environment and will include the practice of banana-coffee intercropping.

The work of IITA on banana-coffee intercropping also informed a recent study on ecosystem-based adaptation by the United Nations Development Programme (UNDP) in Rakai and Kapchorwa District (UNDP 2013) as well as an advocacy initiative on climate-smart agriculture of the Climate Adaptation Network-Uganda (CAN-U) (Oxfam 2013). Two other development partners, the Agribusiness Initiative (ABI) Trust and the Hans Neumann Foundation are planning to fund the production of standardized materials for coffee farmers on production practices that would include IITA's research.

There are a number of NGOs such as Solidaridad, Twin UK and the Rain Forest Alliance involved in the coffee sector which are addressing issues of climate change. A video of the Rain Forest Alliance shows banana-coffee intercropping as a climate-

smart agricultural practice but does not reference the source of information of this practice (Rainforest Alliance 2013).

Interviews were not conducted with government bodies responsible for climate change. It is however interesting to note that an analysis of adaptation and mitigation options for the Mbale region makes reference to the work of IITA. The Integrated Territorial Climate Plan 2014-2029 which builds on this identifies research into sustainable intensification of annual crop production systems such as banana-coffee systems as a priority. This illustrates that the work of IITA is gradually being built on by government bodies.

At present there are many players but no monitoring or regulation of organizations offering climate-smart solutions. A recent workshop organized by CCAFS and the Climate Change Department (CCD) recommended that CCD "undertakes an inventory of climate change adaptation and mitigation agricultural activities by various actors and assesses elements of community climate resilience with a view of making the projects aligned to Uganda's NAPA and Vision 2040". Further collaboration with CCD will be instrumental in the adoption of banana-coffee intercropping.

OUTCOME EVIDENCE RWANDA

Strict monocropping of coffee has to date been the policy of the government. Coffee farmers, however, are well aware of intercropping practices from neighbouring countries and keen to adopt them to better utilize small plots as well as for the perceived benefits of the practice. High population pressure (Rwanda has the highest population density in Africa) has led many within research and extension communities to recommend intercropping to relieve pressure on land, ensure food security, but also to protect coffee plants from increasing temperatures and erratic weather patterns.

KEY ACTORS RWANDA

The coffee sector is regulated and monitored by the National Agricultural Export Development Board (NAEB) which is also responsible for achieving the national planned production and quality targets. National research and advisory services are combined in one body, the Rwanda Agricultural Board (RAB) rendering it easier to connect research results to the programmes of the extension services.

Under the Consortium for Improved Agricultural Livelihoods in Central Africa (CIALCA) programme, ISAR (now RAB) started trials based on IITA findings in Eastern Province to test the optimal density of intercropping banana with coffee and the effects on the quality of coffee produced under this system. In 2013, after rounds of engagement that included sharing of results that were coming out from research done in Uganda and Burundi, a major breakthrough was gained when the then Minister of Agriculture and Animal Resources convened a meeting of all major actors in the coffee sector inviting research, extension, development partners, NGOs and representatives of coffee farmers and cooperatives within the country to discuss the benefits of intercropping. The outcome of that consultation was to further initiate trials in the east of the country through farmer field schools (FFS). Some farmers who attended the meeting have taken up the practice and reported improved quality of coffee grown under the shade of banana trees.

Local government in Eastern Province seems in favour of promoting banana-coffee intercropping in the interest of food security and as a climate-smart practice. The Governor for Eastern Province, Odette Uwamariya, had purportedly called at a recent coffee award ceremony – The Cup of Excellence – for the results of the trials to be swiftly documented. There were also reports of a member of parliament with a large land holding

intercropping banana with coffee. This indicates a significant change in attitude and behaviour at official levels.

Research trials in the east of the country, which have now experienced two coffee harvests are said to be positive and research results will soon be documented and presented to NAEB. The Director for Coffee at NAEB, Celestin Gatarayihya, appeared open to allowing the practice of intercropping if the outcome of trials provided evidence of the benefits.

The scientists involved in the trials, Dr. Walyaro and Dr. Birigamana, both of Rwanda Agricultural Board (RAB), not only spoke of positive trial results but also indicated that further trials had commenced in other parts of the country. Farmers, they confirmed, were keen to adopt the practice. What could be a major challenge, however, is the provision of sufficient quantities of appropriate planting materials by RAB. The farmers interviewed already pointed out the constraint of accessing the right planting materials and varieties of banana for intercropping. Extension work related to coffee is the responsibility of RAB. The scientists suggested that it would be useful to already involve extension staff in the on-field trials so that they become familiar with techniques and requirements of intercropping.

It was estimated that the time between scientific documentation of trial results until official approval and adoption of intercropping as a climate-smart agricultural practice by the Ministry could take up to two years. To speed up changes in mindset, Svetslana Gaidashova, Head of Banana in RAB suggested that a brief be put together by RAB and circulated to relevant actors. She also pointed out the need to sensitize the Minister of Agriculture and Permanent Secretary, who had recently taken up their post so as to rekindle the interest of the Ministry in fast tracking results from the trials.

Conclusions and recommendations

In Uganda, the research of IITA into banana-coffee intercropping is widely known by key actors in the coffee and agricultural production sectors. This practice, however, has not yet been officially adopted by government bodies. The diffused character of the coffee sector in Uganda with multiple actors together with the unregulated field of climate change adaptation has resulted in slow uptake of the practice. The achievement of outcomes as defined by CCAFS can therefore be seen to be in initial stages. A recently finalized manual on banana-coffee intercropping for agronomists is welcomed as an important contribution to climate-smart farming practices. Whilst it is not the mandate of IITA to train national actors, sharing this manual through the coffee platform and with agronomists and extension staff of different organizations would be an important next step for IITA to ensure effective uptake at policy and implementation level. In addition several recent international publications and reports include reference to banana-coffee intercropping as a climate-smart agricultural practice and recognize the work of IITA into this.

Rwanda has seen a significant shift in attitude among major actors in the Government over the last two years. The National Agricultural Exports Board and the extension services have moved from a strict monocropping regulation of coffee to conviction of the benefits of intercropping. Even though policy formulation around this practice may still take some time, there appears to be good reason to be optimistic about final uptake of this practice.

Two possible channels for promoting intercropping in Rwanda are Technoserve and Starbucks. Technoserve's Farmer Field Schools (FFS) present an important channel for promoting intercropping provided it is given green light by the Ministry. Starbucks, a private sector player with special interest in women coffee producers, would possibly be another channel for promoting intercropping.

During the course of the study it became evident that research and demonstration that a practice is climate smart alone is not sufficient to influence policy uptake. The structures, procedures and processes in place for communicating research results to end-users, the organization of the coffee sector, government ambitions and targets and, at times, conflicting interests of actors all influence the promotion of agricultural practices.

Overall, IITA and partners need to adopt a more strategic communication approach to ensure uptake of research at policy level. Presenting research results in good style and format and fostering key partnerships with government and other stakeholders would facilitate the adoption of climate-smart research. An innovative route to publicize the work of IITA would be to join the Twitter initiative on intercropping under #intercropping.

Management response

In its 2012 technical report to CCAFS, IITA reported its work on coffee-banana intercropping as an outcome, noting that this work has been widely exposed in the East African region, and coffee authorities in target countries have abandoned their past policies and recommendations that coffee should not be intercropped with banana. This outcome study confirms that the research conducted is highly significant and has received considerable exposure in the region, demonstrating how a traditional practice can be supported to be scaled up as part of climate-smart agriculture. The work is particularly significant in Rwanda where mono-cropping with coffee has been the practice supported by Government, but a significant shift in attitude has been observed among major actors in the Government over the past two years. However, the outcome is still in early stages, and with greater and more targeted engagement efforts, the significance can be increased. CCAFS management takes cognizance of the recommendations made in the study, and encourages IITA to address these, and further development of outcomes related to this research at a later stage.

REFERENCES

Bongers G, Jassogne L, Wanyama I, Nibasumba A, Mukasa D and Van Asten P. 2012, Understanding and exploring the evolution of banana-coffee farming systems in Uganda. Kampala: International Institute of Tropical Agriculture.

Frank J and Penrose Buckley C. 2012. Small-scale farmers and climate change. How can farmer organizations and Fairtrade build the adaptive capacity of smallholders? London: International Institute for Environment and Development.

[NPA] National Planning Authority. 2010. National Development Plan (2010/11–2014/15). Kampala: Republic of Uganda - National Planning Authority.

Oduol PA and Alma JRW. 1990. The banana coffee Robusta traditional agroforestry system in Uganda. *Agroforestry Systems*, 11 213-226.

Oxfam. 2013. The impact of climate change on coffee in Uganda: Lessons from a case study in the Rwenzori Mountains. Oxford: Oxfam.

Rainforest Alliance. 2013. Taylors of Harrogate: Climate Smart Farming in Uganda. Available at: <http://www.rainforest-alliance.org/multimedia/uganda-coffee-taylors>

[UNDP] Bureau for Crisis Prevention and Recovery (BCPR). 2013. Climate Risk Management for Sustainable Crop Production in Uganda: Rakai and Kapchorwa Districts. New York. UNDP BCPR.

Van Asten PJA, Wairegi LWI, Mukasa D and Uringi NO. 2011. Agronomic and economic benefits, of coffee-banana intercropping in Uganda's smallholder farming systems. *Agricultural Systems*, 104 (2011) 326-334, p. 333.

FURTHER READING

CTA.2012. Banana-coffee intercrop system most beneficial. Available at: <http://knowledge.cta.int/Dossiers/Commodities/Other-commodities/Coffee/Related-developments/Banana-coffee-intercrop-system-most-beneficial>

Andersson M. 2014. Cooking banana farming system in rural Uganda –A comparison between agroforestry systems and non agroforestry systems. Upsala: Swedish University of Agricultural Science.

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