Innovation Platforms for Agricultural Development
Evaluating the mature innovation platforms landscape

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3 Overcoming challenges for crops, people and policies in Central Africa

The story of CIALCA stakeholder engagement

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Intercropping of banana and coffee is not allowed officially, is this going to change? Research has shown promising results. I have 1 ha of mixed banana and young coffee, now I have to choose only one crop because of official recommendations. So can I keep both crops? Can I also go and tell other farmers to intercrop their banana with coffee?

(A male farmer from Musaza sector, Kirehe district asking policy makers during a stakeholders meeting organized by the Minister of Agriculture of Rwanda)

Introduction

The great lakes region of Central Africa is beautiful and abundant in hills, people and conflicts. Its high altitude and cooler climate make it ideal for crops. But soils have been exhausted, spare land is rarely available, and competition and struggle for resources has marked much of the region’s history of the past 50 years. Many farmers in parts of this region rank among the most food insecure and malnourished on earth. This is because of low farm productivity since the majority depends on agriculture that is done with minimal fertilizer use. A 2006 baseline survey revealed that more than 60 percent of the population in Central Burundi and South Kivu were food insecure and had very few opportunities to diversify income with off-farm activities. Farm sizes are too small (< 2 ha). Although Democratic Republic of Congo (DRC) still has some spare land, the existing land tenure arrangements do not encourage farmers to invest in soil and water conservation since most of the land is in the hands of the chiefs, locally known as “Mwamis.” These challenges, nested across different scales, point to the need for innovative ways of working through multi-stakeholder processes.

The Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA) was set up to provide science-based evidence that helps bridge the knowledge gap between farmers, public and private extension workers,
CIALCA CENTRAL AFRICA
scientists and policy makers. Thousands of farmers usually find themselves in a
dilemma similar to that of the male coffee farmer quoted above—wanting to
respond to their practical challenges on the ground but finding themselves
constrained due to non-matching policies or institutional settings. On the other
hand, policy makers also lack credible evidence on which to base their decisions.
In this farmer’s situation, planting coffee ensures a seasonal harvest of cash. But
he also wants to be food secure from the same piece of land and so planting
bananas in his newly planted coffee makes sense since, in addition to food,
bananas will provide a steady cash flow throughout the year. Coffee is a big
foreign exchange earner for the country and so farmers are discouraged from
intercropping the two crops. Due to realization of the land shortage though,
farmers are sometimes allowed to plant bananas in the coffee when the coffee
is still very young. They are however required to cut the bananas when the
coffee has reached its productive stage. Greater in number even are farmers
restricted by knowledge and resources, not policies. The combination of these
factors made CIALCA realize that registering any meaningful changes required
many more stakeholders at the table ranging from farmers to policy makers, and
this was how the CIALCA work shaped into “platforms” at different levels to
serve different but connected needs.

Emergent IPs

CIALCA started out as an inclusive research consortium for development,
spearheaded by three international agricultural research centers: The
International Institute of Tropical Agriculture IITA, Bioversity International
and the International Center for Tropical Agriculture, CIAT. It started in
2005, but was formally launched in 2006, operating in the three countries
(Rwanda, Burundi and DRC). Each country had its own challenges as well as
opportunities and this called for different methods of engagement in each of
the countries. In Rwanda for example, where strong national policy shapes
smallholder farming, the Consortium developed platforms around the
government’s research and extension systems. In the DRC and Burundi that
were still recovering from conflicts, the scaling/extension component was
handled through the non-governmental organizations (NGOs) but research
components were still handled through the National Agricultural Research
Systems (NARS).

Different types of “innovation platforms” emerged across different levels.
These brought together different stakeholders operating in these geographical
sites. The levels included field sites in a village or local community (usually
around an experimental field), and an action site that was equivalent to say a
district, national and regional level between countries. The coming together
of the stakeholders fostered cross-learning and experience sharing. The learning
was usually organized through the field days at the field sites, and through
meetings and conferences at the action site and other levels (see Figure 3.1).
Bernard Vanlauwe, CIALCA Scientist says:

At that point in time we had not heard much about innovation platforms. These platforms simply emerged out of need, which was key for their crucial role in fostering adaptive collaboration between different groups of stakeholders, and CIALCA’s impact and reputation in the region.

The platforms emerged and grew as the need arose. For example CIALCA’s collaborative work to fight Banana Xanthomonas Wilt (BXW) with the Rwandan government research and extension departments and the regional stakeholders in the Rubavu area clearly required multiple stakeholders. The “simply emerging” nature of these platforms helped to avoid many expectations and allowed an organic means of platform evolvement. Inclusion within the platform was based on mutual needs fulfillment rather than position filling. This evolvement was very befitting as the CIALCA team was extensively made up of natural scientists that would have found difficulties in managing the different stakeholder expectations.

**Embracing the work challenge**

Following a series of 25 participatory rural appraisals across the region, the consortium decided to focus its agronomic interventions on key entry points in smallholder cropping systems; i.e. bananas, (soy)beans, coffee, cassava and maize. These crops are vital sources of food and revenue, yet their productivity is chronically hampered by inferior planting material, crop diseases, poor agronomic practices and limited capacity to access markets as well as restrictive policy environments.

CIALCA proposed to work on these cropping systems to contribute to its overarching goal of improving the livelihoods of those who depended on agriculture through research investments in system productivity and resilience.

*Figure 3.1 Farmer field day bringing stakeholders together (left) and CIALCA conference organized in Kigali 2011 (right)*

Photos: CIALCA
Research for development activities were varied and dynamic, but greater emphasis was placed on introducing and evaluating better banana and legume germplasm, improving agronomic practices in mixed cropping systems, integrated soil fertility management, integrated pest management, and social innovations for improved crop marketing leading to income. CIALCA made investments in developing intercropping options for staples such as banana and cassava with legumes. Most of these technologies were already being practiced by farmers elsewhere in the East African highlands with varying degrees of success: (i) banana–coffee intercropping concepts were transferred from Uganda to Burundi and (from there) later to Rwanda, (ii) zero-tillage mulch banana x bean intercropping was transferred from Uganda to Burundi and Rwanda, (iii) smart legume intercropping systems in maize and cassava were first tested in West Kenya and subsequently successfully tested and documented in DRC, (iv) soybean processing technologies moved from Uganda/Kenya to Rwanda and DRC. Several key recommendations were made based on this research that is being out scaled, for example the using of sticks to make holes in the banana mulched plantations demonstrated below, ensured minimum soil disturbance providing the much needed source proteins while keeping the banana root system intact (see Figure 3.2).

These thematic areas responded to partner needs identified from the baseline survey as well as participatory rural appraisals. New varieties of the bananas, cassava and legumes were introduced and jointly evaluated by the stakeholders. This was usually done in field trials that were strategically positioned at a field site in a village or local community. Learning and experience sharing was usually carried out through field days while partners active within an action site usually met in organized meetings.

*Figure 3.2* Beans intercropped with bananas benefit from each other

Photo: CIALCA
The banana, coffee and legume intercropping technologies promoted by CIALCA in the region is one way to best demonstrate this. In general, planting bananas with coffee at the right ratios improved labor-use efficiency, overall income by >50 percent and reduced farmer’s exposure to climate shocks (van Asten et al., 2011). While the agronomic and economic benefits were clear from the research and farmers side, the institutional policy arrangement to make these benefits available to farmers were nonexistent. This then created a need for policy actor engagements.

**System synergies and trade-offs: Coffee–banana integration: win–win–lose?**

Despite the coffee–banana intercropping benefits, there was an emerging gender challenge (see Table 3.1). Across the region in general, men often cited a stronger labour investment by women in the management of coffee plots when intercropped with cooking bananas as the women care for the food security of the household. This however brings a strong gender-biased division of farm enterprises, resource control, and task execution, which seems to provide a serious disincentive to really improve resource-use efficiency at the farm level.

**Table 3.1 Pros and cons about coffee–banana integration**

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>• Increased productivity</td>
<td>• Coffee is largely dominated by men in the region. Intercropping means that men are benefiting from labour coming from women as they attend to the food crop</td>
</tr>
<tr>
<td>• Increased income and food security</td>
<td>• The productivity can go down drastically if the banana and coffee densities are not properly managed</td>
</tr>
<tr>
<td>• Better cup quality</td>
<td></td>
</tr>
<tr>
<td>• Better resilience to market volatility</td>
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Source: van Asten et al. 2011

Due to its regional nature and focus on multiple commodities, CIALCA’s activities have now been integrated into the CGIAR research program Humidtropics, which aims to help poor farm families in tropical Africa, Asia and the Americas boost their income from integrated agricultural systems’ intensification while preserving their land for future generations.

**Understanding and exploiting diversity at the farm level**

The consortium stakeholders mapped the flow of resources and quantified soil fertility gradients and on-farm nutrient recycling across sites. Our results showed that farmers disproportionally favor home-gardens in terms of nutrient
and labor inputs, often relying on perennial crops and vegetables in homestead plots that are more fertile. Our quantification of the nutrient stocks and recycling showed that it was absolutely vital to keep crop residues on farm, since this would reduce nutrient losses for many crops by 50 percent or more.

Consequently, given the importance of erosion in the hilly region, the researchers and their local partners conducted a number of integrated technology trials to try to improve productivity while reducing erosion. Technologies tested in various combinations were (i) embankments, (ii) hedge-cropping, (iii) no-tillage. Many were surprised to discover that the various erosion control options did not lead to the aspired improved productivity. On the contrary, all the technologies actually reduced yield of the maize and soybean being cropped together. Just as disappointing, the increased labor, competition for water and space, and soil disturbance to make the embankments did not help to improve productivity over the 1–2 years of the trial. Additionally, the fact that in eastern DRC, the “Mwami” land tenure system did not favor the majority poor farmers growing crops on the land also gave no incentive for farmers to make any meaningful investments in erosion control. The consortium experienced this first hand when one of the experimental field trials was taken away after the landlord had seen that fertilizers had been applied. While this was a loss for experimental data collection, it was by far one of the most natural ways to understand the day to day difficult decisions that the land renting farmers have as a result of the land tenure system.

Innovations delivering impact

From 2006 onwards, socio-technical innovations through platforms sought to improve the livelihoods of poor farmers in Burundi, Rwanda and DRC by enhancing their capacity to improve agricultural productivity for better income, nutrition, and environment. CIALCA demonstrated and disseminated solutions to some of these pressing problems:

- Introduced exotic banana varieties proved extremely popular with farmers and extension partners in certain areas. They are very well adapted to local growing conditions, often yielding double the bunch-weight of local varieties.
- Legume germplasm introduced by CIALCA was rapidly out-scaled through farmer-led seed multiplication in Bas-Congo and the Eastern Province of South Kivu. More than half of the farmers involved in these schemes adopted the improved seed.
- An increased production of soybean has prompted the further development of, and trainings on, various highly nutritious soybean products. These trainings particularly target women, resulting in significant nutritional benefits for the young children in their care.
- An innovative banana–coffee intercropping promises increased farm incomes, and increases the resilience of coffee systems to a warming climate. This has
caught the attention of Rwandan and Burundian authorities, who are actively engaged in validating the technology.

- Xanthomonas wilt of banana steadily conquered a large part of the East African highlands. CIALCA contributed to the fine-tuning of an integrated control and rehabilitation package and collaborated with numerous development partners to mitigate disease impact and halt the spread of the disease into new areas.

Cassava–legume intercrop systems saw significant improvements through the use of fertilizer in combination with manure or compost. Legume and cassava yields have increased by at least 40 percent and 20 percent, respectively.

The Consortium chose three measurable criteria to track progress towards their goal: increasing farm level productivity, improving protein intake and boosting household income. The Consortium anticipated that at the end of the project, 2.1 million people would be aware of CIALCA-related activities of which 400,000 were actively seeking access to knowledge and technologies promoted by CIALCA. They set these milestones at project inception in 2006, and introduced a monitoring process during implementation. Finally, CIALCA evaluated the project at its closure in 2011. In the report (Macharia et al., 2012) the key findings were:

- CIALCA’s interventions improved farm productivity. In the intervention areas, a rapid impact assessment showed that CIALCA innovations had increased average farm level productivity by more than 27 percent. Some yields have increased up to 179 percent.
- CIALCA increased protein intake. Averaged across all of the CIALCA intervention areas we have demonstrated that adoption of CIALCA technologies significantly increases protein intake. The consumption of protein has increased by at least 12 percent.
- CIALCA has increased household income. By adopting improved agricultural practices and market-oriented strategies, a rapid impact assessment indicates that aggregate household income has increased by over 19 percent. In some areas, farmers earn an additional 60 to 90 USD per year from improved banana production and marketing.

**Different areas, different institutional collaborative arrangements**

CIALCA commissioned a study conducted in 2011 to describe the organization of CIALCA: how it came together, how it has adapted to seek out impacts, and where the model’s particular style of partnerships has succeeded or fallen short in the eyes of its participants.

This study (Cox, 2011) noted that the foremost asset of CIALCA’s functioning was its adaptability, which has brought successes in some drastically different country contexts: in Rwanda for example, where strong national policy shapes smallholder farming, the Consortium came to work very closely with the...
government’s research and extension system. Through this, policy engagement was done, the partners trained farmers in Integrated Soil Fertility Management (ISFM) and the use of newly subsidized fertilizers, and helped the country manage the menace of BXW. In the study mentioned above, when the partners and CIALCA staff in Rwanda were asked about their perceived advantages of working with CIALCA, the top two reasons cited were stakeholder engagement, especially farmers, as well as capacity building. Interestingly, policy engagement is also cited as a strength that CIALCA enjoyed. In Burundi and DRC, where national systems are weakened by recurring civil conflict, CIALCA collaborated with a whole assortment of governmental and non-governmental agencies in identifying and disseminating improvements to banana- and legume-based systems. In both Burundi and DRC, the top ranked advantages associated with CIALCA as perceived by partners and staff included introduction of new varieties and means of multiplying them. Since public service provision was relatively weaker, working through NGOs whose mandate focuses on input

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**Box 3.1 How can a project with few staff achieve impact at a regional level?**

CIALCA has made considerable investments in making sure new technologies reach (and are able to be used by) partners and farmers. A knowledge resource center was established in 2010 and works closely with partners to identify “best-bet” impact pathways for technology out-scaling. The center also supports the development and packaging of project knowledge in suitable formats (including radio and video) and languages that clearly communicate the actions required. The training-of-trainers (ToT) approach is a central pillar of CIALCA, ranging from crop production to marketing and nutrition related trainings. CIALCA has organized a total of 159 training events and collaborated with over 60 NGO partners and public extension services for its development-oriented work.

Source: Macharia et al. (2012)

Photo: CIAT/N. Palmer
provision and training gave better returns in Burundi and DRC. On the contrary, in Rwanda, focusing on and following the processes sometimes took longer than desired but gave better and sustainable returns. CIALCA developed communication materials that were widely adopted and distributed by the government extension arm.

The same applies to the rapid propagation of bananas for example, which was adopted and used by the government extension system as a means to produce healthy planting materials while in both Burundi and DRC this was extensively done by the NGOs.

**Capacity development of the actors**

From three autonomous regional offices, CIALCA connected with dozens of civil society organizations and NGOs, and community-based organizations (CBOs). These were trained in different technology packages and through Training of Trainers (ToT) across the region. They in many cases were responsible for reaching areas where CIALCA was not working. In north Kivu Eastern DRC, the radio program that one of the CIALCA staff conducted was found to be effective, especially in relaying messages on the control of the BXW (Figure 3.3).

Furthermore, since its inception, CIALCA was strongly committed to capacity building in a region that had lost much of its best agricultural researchers during the long period of conflict and strife. CIALCA has trained over 20 PhDs, 35 Masters and over 135 Bachelor of Science students who now

![Farmers using CIALCA communication material during the agricultural show in Rwanda](Photo: CIALCA)
occupy strategic jobs such as Directors and Department Heads in national research institutes, central governments and beyond.

Finding the link between good science, stakeholder engagement and impact—the role of partnerships

CIALCA used the different regional experience and scientific evidence coming from trials and surveys to engage the different stakeholders from farmers and extension workers to policy makers in order to influence policy changes. This was not completely familiar ground for CIALCA because we learned that knowing people that know other people helps if you can exercise patience to wait for a policy maker for four hours and have a ten minute discussion. For example, in Rwanda, where the government had virtually adopted a policy of sole cropping to encourage farmers to seriously invest in improving crop production following “green revolution” principles, providing the evidence for intercropping proved vital. Farmers did not always agree with this approach since they wanted to earn money but also be food secure on their small pieces of land. CIALCA research and policy actor engagements on the benefits of intercropping systems managed to provoke some reflection at the national policy level. For example, results on the benefits of banana–coffee intercropping (including improved climate adaptation and cup taste) led to the Minister organizing a meeting with all key public actors, NGOs and farmer representatives to discuss the results. These results generated a lot of debate from the different stakeholders ranging from farmers and researchers, as well as extension workers. This was made possible because of the regional platform sharing results between countries. The point was further proved by the Ministry of Agriculture (MINAGRI) website: “the idea of coffee–banana intercropping was first introduced by (assistant agronomist sic) Dr. Van Asten Piet about two years ago. Since then there have been several studies and analyses and lessons learned from Uganda, Burundi and Rwanda itself.” This further shows that the CIALCA regional platform was recognized in each of the countries.

While writing about the one-day engagement between CIALCA and the Rwandan Agriculture stakeholders, the MINAGRI website gave a very memorable and potential game changer quote that truly highlighted the role of engaging in multi-stakeholder processes: “This workshop is an indication of a change that may occur within the agriculture sector for Rwanda that will ultimately benefit rural farmers and market prices for the country, as research continues” (Rwandan Ministry of Agriculture, n.d.).

To a large extent, the position presented by the ministry website strongly mirrored the sentiments of the majority of the stakeholders in the workshop. One of these stakeholders represented the Belgium Technical Cooperation, BTC. The BTC representative Mr. Somers Raf said:

As an extensionist, my question is when to start doing this? The only issue to be confirmed is coffee cup quality. So far, there is no single trial showing
that banana–coffee intercropping affects yields of either of the two crops negatively. Yes, researchers may do their work still for many years, and better density recommendations may be developed after more experiments are done. However, we need to start. After cup quality is confirmed, the only question is why farmers may not start doing it immediately?

Cup quality results of coffee intercropped with bananas later came out and there was positive correlation between intercropped (shaded) coffee and cup quality, further proving the fact that the shade from the bananas had a positive effect on coffee quality. This engagement led to a shift in policy discourse from the key decision makers in the sector—governments no longer consider banana intercropping as a “crime” and in several regions they are actively encouraging intercropping through government-supported farmer field schools. The national research and extension arm of government, the Rwanda Agricultural Board, RAB, has picked the banana–coffee intercropping system and demonstration fields are being set up. This is a real shift in the institutional environment for smallholders who were previously “punished” for intercropping in banana or coffee fields. As noted by MINAGRI, this change has further opened their interest in developing intensified and well-organized intercropping systems that they would like to promote to smallholder farmers.

This had a big impact and implications as it came towards the end of CIALCA. The resources that had been invested in the banana–coffee research, the long-term engagement with the ministry and other key stakeholders and the affirming voices that were heard during the discussions, all pointed to how the process and the content need to work together to have meaningful outcomes. At several critical stages, when gray areas emerged causing tension between stakeholders, the engagement process benefitted from scientific evidence for moving forward.

Learning from the past, looking to the future

Within the CGIAR, the CIALCA consortium was an absolutely unique collaboration when it started in 2005, both in terms of systems approach, as well as in its philosophy of equal partnership and adaptive management.

A number of factors can be pointed to when it comes to what led to the success of the CIALCA platforms:

- **having an evidence-based engagement process**: the research that was done by CIALCA stakeholders led by the NARS in the different countries gave very interesting and new insights that benefitted the engagement process with stakeholders across levels including farmers, civil society and policy makers. This evidence from “good science” kept the partners engaged even when the process was sometimes challenging due to the fact that CIALCA’s work was covering a very big area in addition to tackling policy related matters;
• **building on existing knowledge-learning from farmers:** enormous amounts of knowledge already exist within communities. Many of the technological innovations used by CIALCA were based on successful smallholder experiences elsewhere in the East African Highlands and were not necessarily developed from “scratch.” Building on this knowledge gave better and quicker place owned results. For example, the coffee–banana system that was studied widely in the CIALCA region was first and foremost picked from practicing farmers especially in Uganda where they provide cash and food security;  

• **multiple level engagements/platforms:** platforms engaged at different levels allowed multiple-level exchange of knowledge and expression of needs. From the villages, to field sites, to action sites and to regional (country to country) exchanges. This multi-level organization facilitated site specific as well as between-sites cross-learning. This allowed, for example, policy makers to hear from the farmers in a very organized and effective way that fostered changes. Regional exchange of information was also easy and acceptable as there was recognition of the region as a single block/platform. Information exchange across countries fostered quick and trusted awareness creation. The research generated in one area/country only required validation in the other countries and this saved a lot of time;  

• **capacity development:** training of different partners, both formally and informally, did not only improve opportunities for these platforms to handle issues by themselves but also created an opportunity for CIALCA approaches and opportunities to continue in the future in different ways. Capacity building of stakeholders improved the quality of engagement of the stakeholders. For example, it empowered farmers to pose questions to policy makers as long as they knew that they had back-up information. Several graduates have been promoted to senior positions within the Rwanda and Burundi national research systems, attesting to a significant return on investment of research leadership;  

• **management and operational flexibility:** the differences between and within countries were too wide to have a “one size fits all” approach. Flexibility in different countries and at different levels allowed a more efficient and cost-effective way to work across countries/levels. Having the flexible donor that walked the journey with CIALCA allowed engagement and implementation to always suit the needs and opportunities within each area without necessarily following the blue print. This was a great incentive for CIALCA’s systems work. This was particularly useful as we worked with the multi-stakeholders since the process was in many cases determining the direction.  

While progress was made on a number of fronts, the consortium agreed that there were areas that called for improvement. One of those areas identified was that improvement could be made by taking a more holistic approach to its research for development processes: integrate livestock, gender and business
planning. The systems learning and policy engagement could also be strength-
thened further to deal with issues such as land tenure that require much wider
social–political engagements that consider factors and approaches beyond land
conservation trials.

One question to openly pursue as CIALCA “platforms” move into a formal
setting within the CGIAR research program Humidtropics, is how far do we
necessarily institutionalize platforms across the region but still allow an organic
and adaptive style of operation and management that encourages place-based
innovations to freely emerge.

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health and the natural resource base of smallholder farmers in Central Africa.

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