



Learning from the Budikadidi Project in the DRC:

**BOLSTERING THE SOY VALUE CHAIN TO
ADDRESS MALNUTRITION**

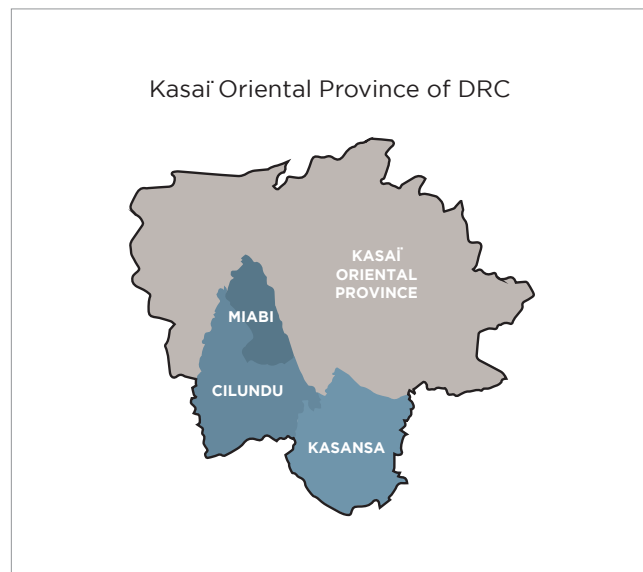
Introduction

Since 2017, a Catholic Relief Services (CRS)-led consortium has implemented the USAID-funded Budikadidi Resilience Food Security Activity (RFSA) in the Democratic Republic of the Congo (DRC)'s Kasai Oriental Province to sustainably improve household nutrition, food security, and economic well-being. The baseline evaluation revealed that families in the implementation area consumed less than four of the 12 food groups, and only 33% of women consumed animal-source protein. While practicing a value chain activity¹ was found to be associated with lower prevalence and depth of poverty, only 10% of farmers (predominantly men) were participating in value chain activities. To address protein deficits, the original project design focused on small livestock value chains; however, the midterm evaluation showed that a goat epidemic had severely weakened this intervention and the intended dietary impact was not visible amongst targeted households. While knowledge of dietary diversity had increased, protein availability and accessibility remained a challenge for most households. In response, CRS pivoted and launched a soybean pilot.

Globally, soybean is the fastest-growing broad land crop in the world; however, African producers supply less than 1% of the world's soybeans. Compared to the global average of 2.76 tons per hectare, soy production throughout Africa has been less efficient at 1.28 tons per hectare.² A 2015 USAID-funded assessment of the soy value chain in the DRC found that low soil fertility, poor agricultural practices, and a lack of optimized seed caused a production rate of only 0.5 tons per hectare.³

So, why soy?

- **Nutritional value:** In the absence of animal-source proteins, soy plays a critical role in improving food security, offering the highest protein and protein quality scores of any non-meat product locally available.
- **Conflict-resistant:** Because soy must be processed and stored well, it is relatively conflict-resistant as armed groups prefer to take food items that can be immediately consumed.⁴



Budikadidi takes place in the Cilundu, Kasansa, and Miabi health zones of the DRC where no development actor has previously focused on the soy value chain. CRS' soy pilot targeted 50 villages, constituting about 10% of the Budikadidi geographic zone.

Following the outbreak of conflict in 2016, Budikadidi programming was progressively adapted with a greater focus on conflict sensitivity. Amid continued tensions, the conflict-resistant nature of soy strengthens the sustainability of this value chain.

- **Soil fertility management:** Soybean cultivation plays a unique role in sustainable agriculture due to its ability to fix atmospheric nitrogen through symbiotic interactions with rhizobia in the soil. Hence, soy production improves soil fertility which is critical amid climate change. Soy is attractive for intercropping and crop rotation as farmers can replenish their soil without expending on large amounts of costly nitrogen fertilizers.
- **Gender equity:** In the DRC, women play a large role in agricultural production but often have limited decision-making autonomy and participation in other aspects of agricultural value chains. However, women are active in the production, processing, and sale of soy in the DRC. Developing this value chain is gender transformative as it will provide new livelihood opportunities for women.

1 "Agricultural value chain activities ... include, but are not limited to, pre- and postharvest activities such as a joint purchase of inputs, activities to increase productivity while maintaining quality, bulk transporting, sorting, grading, processing, and trading/marketing (wholesale, retail, export)." ME&A. Final Report: Baseline Population-Based Survey of the Food for Peace DFSAs in DRC. 2018.

2 USAID/Feed the Future. Soybean Innovation Lab: Activities & Impact Report 2020.

3 USAID. Assessment of the DRC's Agricultural Market Systems: Value Chains in the North & South Kivu and Katanga Provinces. LEO Report #16. 2015.

4 Ibid.

Why now?

- **Growing demand:** Compared to cassava and maize (grown by 70% and 55% of farmers, respectively), soybean was only grown by 8% of farmers in the targeted area at baseline. During the first years of Budikadidi, however, staff observed an increased demand for soy in targeted communities (for use in local dishes) being progressively met by household-level production. This growing interest presented an opportunity for the project to build upon in response to sustained protein deficits.
- **Appropriate equipment:** Since it must be processed, soy has largely been inaccessible to rural farmers lacking proper equipment and electricity needed to produce at scale. Innovative alternatives enable farmers today to process soybeans without electricity or generators.
- **Improved seeds:** Thanks to the recent efforts of USAID’s Pan-African Soybean Variety Trial Program and actors like CRS partners International Institute of Tropical Agriculture (IITA) and National Institute of Agronomic

Soy beverage, not milk

While soy products provide protein and iron, they are plant-based and thus not a nutritional substitute for dairy milk. To underscore this important distinction, there is a growing movement to use the term soy beverage instead of soy milk. This learning brief applies this language.

Studies and Research (INERA), improved soybean seed varieties are now tested and available in the DRC. As soy has a short cycle, it can be grown in both agricultural seasons, enabling participating farmers to quickly observe the positive impact of improved seed on yields during the pilot period.

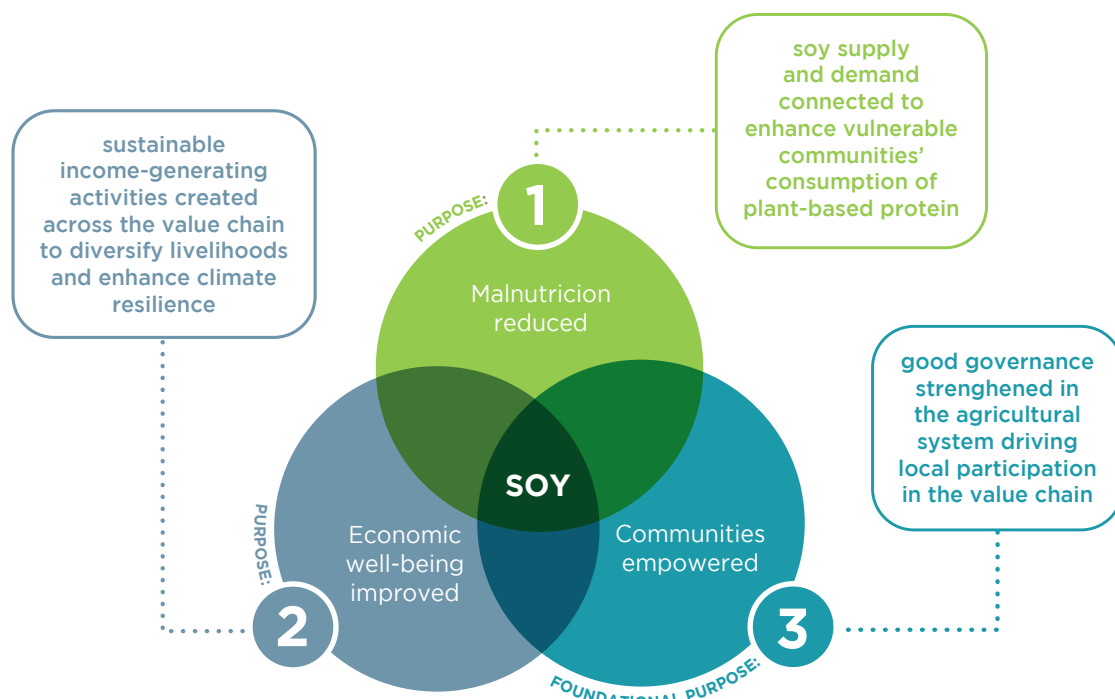
Derived from a series of staff interviews, participant feedback, and a desk review, this case study documents the Budikadidi soybean pilot and offers early learning to inform next steps.

Pilot Strategy

The Budikadidi team first addressed soybean processing, securing soybean processing kits for local producer organizations, in 2020. Upon

observing an immediate increase in demand for soy products, the team leveraged private CRS funding in 2021 to provide comprehensive assistance across

The soy value chain: a result of Budikadidi integrated programming



the soy value chain. Throughout these efforts, the Budikadidi agriculture team collaborated with their health colleagues to promote consumption of soy for improved nutrition. To enhance the soy value chain in the Kasais as a solution to vulnerable households' protein deficit, the pilot focused on soy production, processing, marketing, and demand creation, as described below. The pilot targeted a total of 129 producer organizations (PO) in soy production and processing, engaging over 15% of the farmers participating in Budikadidi agricultural programming.

Production

During a series of pre-pilot consultation meetings conducted to engage key stakeholders (see list) and mitigate anticipated challenges, agronomists from the Kasais noted that only one degraded soybean seed variety was locally available. In response, CRS collaborated with INERA and IITA to identify four improved varieties available elsewhere in the DRC and conducted four-month trials with selected Budikadidi farmers. Based on performance within the local conditions in the Kasais, three of the four varieties (SAGA, B24/MAC, and SAPROSOYI) were selected for the pilot.

Budikadidi then engaged 74 POs (1,480 members) and 150 individual farmers to launch soybean production. CRS, INERA, and SENASEM conducted a soybean cultivation training for all participating farmers (including Budikadidi Lead Farmers) and supplied them with posters and picture boxes reinforcing proper soybean cultivation. Farmers then prepared their fields and sowed soybean seed during the 2022 dry season (May–August). Budikadidi engaged the project's Lead Farmer network to embed soy production as a priority in their regular supportive supervision with farmers in their communities.

Simultaneously, SENASEM trained 29 existing seed multipliers to expand the availability of improved soybean varieties in the targeted area. In addition to proper management of soybean seed fields, multipliers were trained in soybean seed post-harvest management and seed packaging. The 29 trainees then received a total of 80 kilograms (kg) of soybean seed to launch seed multiplication. They also received regular supportive supervision from SENASEM staff for pest management and mitigation of the impact of drought conditions.

Processing

With the goal of local processing of locally produced soybeans, CRS launched an open bid amongst Budikadidi-supported POs interested in the soy value chain. POs presented their application to a panel of Budikadidi staff, government technical

Key stakeholders in the soy value chain pilot

- **L'Institut National d'Etudes et des Recherches Agronomiques / National Institute of Agronomic Studies and Research (INERA):** This national agricultural research actor supplied soybean seed varieties, facilitated technical trainings, and contributed to the design of resources used throughout the pilot.
- **Le Service National des Semences / The National Seed Service (SENASEM):** In addition to facilitating soybean seed multiplier trainings, this national actor also conducted technical monitoring visits and led the seed certification process.
- **L'Association des Producteurs de Semences du Kasai Oriental / The Kasai Oriental Seed Producers Association (APSKO):** This regional actor offered technical supervision to soybean seed multipliers.
- **International Institute of Tropical Agriculture (IITA):** Forming a new partnership with CRS in the DRC, IITA offered technical expertise to inform the roll-out of the soy pilot.
- **Various local government actors:** Agriculture Extension Service staff supported training roll-out, information cascade within communities, and joint supervision visits. Sector leadership supported and validated selection processes, and government doctors in each zone informed the food hygiene content.
- **Private Agriculture Service Providers (PASP):** PASPs, local community members trained by Budikadidi to provide on-going technical agricultural assistance to farmers in their community, were engaged in the training roll-out to integrate soy as a focus of their supportive supervision.
- **Lead Farmers, Community Action Committee (CAC) Leaders, Lead Mothers, and Community Leaders:** These community-facing local leaders collectively promoted soy consumption amongst Budikadidi participants.



Members of a producer organization use a SoyaKit to process soybeans into soy beverage. [Photo CRS]

staff, and local officials, of which 55 were selected (1,650 members, 70% women)—50 to receive manual equipment (SoyaKits) and five to receive semi-industrial equipment (VitaGoats). Selection criteria included demonstration of an active management committee, internal governance systems and documentation, a soy-specific business plan, and capacity to finance soybean processing start-up activities. VitaGoat recipients met additional conditions including possession of adequate space and a business start-up fund exceeding US\$ 200. Forty-four of the 55 selected POs are women's organizations, composed primarily of Lead Mothers who promote nutrition messaging in Budikadidi communities. Women's interest in the pilot, driven largely by a lack of livelihood options, underscores the potential of the soy value chain to positively influence women's income generation and control.

CRS secured both processing models—SoyaKit and VitaGoat—from the non-profit [Malnutrition Matters](#),

which offers sustainable, low-cost food technology solutions to address malnutrition.

SoyaKits: While upscale industrial processes are costly and require infrastructural support, SoyaKits (costing about US\$ 200) offer an accessible solution for local communities to enter the soy value chain. As pictured above, soybeans are processed through an efficient manual grinder and then cooked over a simple stove, requiring no electricity. The kit's heat retention cooking bag cuts fuel costs and smoke in half. On average, one hour of processing 600 grams (g) of soybeans yields 3.5 liters (L) of soy beverage, 3.5 L of yogurt, or 600 g of tofu. SoyaKits are ideal for many Budikadidi POs because of their mobility. Contained in a lightweight plastic tub, the kit can be easily stored in and moved amongst the homes of PO members enabling the daily processing workload to be tackled by two to three members at a time.



Members of a producer organization employ a VitaGoat to process soybeans. [Photo CRS]


VitaGoats: Supporting highly functional POs with adequate space, Budikadidi also procured five VitaGoat systems, semi-industrial systems costing around US\$ 5K, which enable indirect soybean processing. Pictured to the left in use by members of the Tudienzela PO, the VitaGoat system begins with a pedal-based grinding function, followed by a cooking process consisting of a stainless-steel steam boiler, pressure cooker, and filter press. The process is 10 times more efficient than open-stove cooking. With a production capacity of 30 L of soy beverage per hour, the VitaGoat system enables POs to sell soy products at great volume, elevating soy as a significant income-generating activity.

As part of Budikadidi’s governance programming aimed at strengthening local structures, all agricultural POs received training to develop internal statutes and regulations, financial management systems, and decision-making processes. Once selected as soy value chain participants, POs attended soy-specific technical trainings. A *Malnutrition Matters* consultant joined Budikadidi and partner staff to facilitate SoyaKit- and VitaGoat-specific trainings on the safe and correct use of the equipment, including

“ Today, soy beverage is produced locally in our community via the VitaGoat equipment while before we could not find it even at the provincial level!

—KAKANGAYI SECTOR LEAD

soy beverage, yogurt, and tofu processing techniques. The training content also introduced good practices in food handling and hygiene, including optimal SoyaKit and VitaGoat equipment cleaning and respecting optimal temperature and humidity during soy product storage. In anticipation of future equipment repair or replacement needs, the Budikadidi team identified local artisans to participate in processing equipment trainings to ready their support to POs. Additionally, Budikadidi drivers—trained mechanics—accompanied these coaching sessions to identify and brainstorm solutions to potential breakdowns. The few breakdowns which have arisen to date have successfully been resolved by this local cohort for a nominal fee paid by the POs.

A woman with short dark hair, wearing a green t-shirt with the CRS logo and blue gloves, is focused on grinding soybeans in a manual mill. The mill is mounted on a wooden table. She is holding a metal tray to catch the ground soybeans. The background is a plain, light-colored wall.

Sylvie Kaseka, a Lead Mother within CRS' Budikadidi project, grinds soybeans in DRC's Kasansa health zone, which will be used to make soy beverage and soy cheese. She sells the vitamin-rich soy products at the local market.

[Photo by ©Michael Castofas for CRS]

Marketing

Central to value chain development, Budikadidi staff immediately coupled technical agricultural trainings with marketing capacity strengthening. Content included:

- Entrepreneurial skills tailored to the local context (including product presentation and packaging).
- Soybean production and supply planning.
- Business plan development including business partner relationship management.

Following these early trainings, 18 business coaches held check-ins with PO leaders to assess the progress of their business plans and strengthen their forecasting skills as their businesses grew. Each business coach is a local youth with a degree in economics or management who has been trained by Budikadidi to provide ongoing entrepreneurial support. In addition to this leadership role, youth were engaged in the pilot as PO members, many of whom demonstrated great interest in the soy value chain and expressed ambitions for wider marketing of their products.

A three-day workshop convened the 74 soybean-producing POs, 55 soybean-processing POs, 29 seed multipliers, and 23 PASPs, resulting in signed sales agreements that remain active today. Upon the creation of this local soy value chain network, additional market linkages were developed to expand the scope of the soy value chain. Budikadidi linked soybean processing POs with the Congolese Control Office to provide soy product quality assurance feedback through regular monitoring by health zone staff, further professionalizing local POs.

“ *This is the first time to see yogurt consumption in Cilundu and Miabi.*

—MIABI TERRITORY ADMINISTRATOR


Demand Creation


To foster growing demand for soy products, Budikadidi introduced the launch of the local soy value chain through a series of soy product tasting sessions. Each of the 55 soy-processing POs held a session in their community where individuals were able to taste soy products free of charge and meet the PO members from whom they could purchase soy products in the future. All 55 POs offered soy beverage to their community, while VitaGoat POs also provided cheese, tofu, and yogurt. In addition to participating on the processing PO selection panel, local leaders attended these tasting sessions to encourage community interest in soy.


A local recipe (using soy) for Lead Mother cooking demonstrations

This easy-to-prepare recipe is promoted for infant and PLW's consumption based on the high-quality protein, fiber, iron, and vitamin A content. Both soybeans and amaranths can be grown year-round so are consistently available and affordable.


INGREDIENTS:


 3 tablespoons soybeans


 1-2 bunches amaranth

 3 large eggplants

 4 tomatoes

 1 onion

 3 spoonful of palm oil

 Pinch iodized cooking salt

INSTRUCTIONS:

- Wash all vegetables.
- Cut amaranth into slices, crush tomatoes, and cut onion and eggplant into chunks.
- Dissolve soybeans in water.
- Heat oil in a frying pan and add onions and tomatoes.
- Add soy liquid to tomato sauce and stir for one minute.
- Add amaranth and eggplant to pan and cover with lid.
- Stir regularly until vegetables are fully cooked.
- Serve hot.

Budikadidi also reinforced soy consumption promotion within its ongoing nutrition programming. On a monthly basis, Lead Mothers facilitate care group meetings to promote key nutrition behaviors (including children’s improved dietary diversification, and pregnant and lactating women’s [PLW] increased iron consumption), conduct home visits to further encourage parents’ uptake of positive practices, and lead cooking demonstrations with locally available, nutritious ingredients within care groups and at health facilities. As the soy pilot unfolded, Lead Mothers encouraged soy consumption and promoted

specific recipes incorporating soybean (see example page 8). As many Lead Mothers are also members of soy processing POs, they could immediately couple these promotional activities with supply of soy products to those most at risk of protein and iron deficiency.

The project also included promotional spots on soy consumption through its regular radio programming. Today, youth members of radio listening clubs actively reinforce key messages, including soy consumption, amongst young parents in their community.

Early Results

A survey conducted in June 2022 amongst 195 community members (clients of the SoyaKit and VitaGoat POs) revealed that only 40% knew about soy and only 17% had ever consumed it prior to the pilot. Today, 66% of these community members consume some form of soy twice or more per week. Nearly all participants intend to sustain their soy consumption with 87% attesting to encouraging others to purchase soy products as well. Ninety-four percent of the respondents expressed their primary source of satisfaction with soy as its positive influence on their health, with specific anecdotes including increased consumption and energy as well as improving their children’s dietary diversity.

Early pilot results also point to satisfaction with profitability amongst participating farmers. The Ureka PO in Disanga Village recently devoted one hectare each to soy and corn production. After four months, soy production cost a total of US\$ 225 and yielded US\$ 800 in revenue, resulting in US\$ 575 in profit. Conversely, corn production cost US\$ 250, yielded US\$ 650 in revenue, resulting in only US\$ 400 in profit. These findings align with a soy production study conducted in North Kivu in 2014 which revealed that the average farm produced revenue twice as high or more from soy compared to beans or potatoes.⁵

In response to growing interest in consuming and producing soy, early signs of community-led market expansion include:

- The Medical Director of the Lukalaba General Hospital now recommends hospitalized patients consume soy products to contribute to their treatment, and nearby POs have rallied to meet this demand.
- Several POs are in negotiation with local schools to sign service agreements and supply soy products for sale to students.
- Two VitaGoat POs have invested early profits into purchasing land and cultivating soybeans.
- Several small restaurants now sell soy beverage with meals.
- One VitaGoat PO sells soybean by-products to pig and poultry farmers for additional income generation.
- One VitaGoat PO has purchased a freezer and constructed a formal point of sale to sell their products.

⁵ Texas A&M University. Conflict-Resistant Agribusiness in Democratic Republic of Congo. 2014. [Discussed in: USAID. Assessment of the DRC’s Agricultural Market Systems: Value Chains in the North & South Kivu and Katanga Provinces. LEO Report #16. 2015.]

Success Story



Godet prepares soybeans for small-scale purchases from her home, contributing to household consumption throughout her community. [Photo: CRS]

Before Budikadidi, Godet Tshibitsiabu and her husband struggled to secure protein for their family of seven on the income earned from small-scale farming in Miabi. In 2018, Godet was trained as a PASP. “Confident in my new abilities, I invested myself in the implementation of several economic activities,” including selling soap and market garden supplies within her community. When Godet’s husband was trained to use the VitaGoat in 2021, she tasted the soy beverage and saw another economic opportunity. She visited three soybean processing POs in neighboring villages and signed agreements to provide them with soybeans.

One year later, Godet manages a microenterprise supporting the soy value chain. She owns 10 bikes and has hired 20 individuals to transport soybeans from farmers to processors. Transporting more than 2.4 tons of soybean per quarter, she anticipates earning nearly US\$ 2,000 in income this quarter. To mitigate any potential challenges with supply shortages throughout the year, she has

“ *The demand is great because soybeans are now consumed in many ways in our community: soy beverage, cheese, cake, porridge, and roasted soybeans mixed with peanuts. Today, I cannot go a day without selling soybeans at home!*”

—GODET

secured business linkages with soybean producers in the neighboring province.

Godet credits her access to soy products with diversifying her family’s diet while the stable income earned from her soy business has improved their access to health care. But Godet is not yet content. She envisions a more robust soy value chain in the future: “Our hope is to see real strengthening of linkages between all the soy value chain actors (seed multipliers, input suppliers, producers, and processors to end consumers) so each actor can reap profits at each level!”

Learning & Recommendations

Early pilot results suggest that local communities are eager to produce and consume more soy, representing a market opportunity to improve nutrition and livelihoods, particularly among women. CRS promotes strengthening the production, processing, and marketing of soy in the Kasaï through the application of the following learning gained during the pilot phase.

Strengths to leverage

Field staff note that local interest in soy has been driven by its affordable availability in small quantities. Lead Mothers have eased community access to a newer product by packaging single servings of soy beverage for immediate consumption, removing cost and time as deterrents to initial acceptance. This approach ensures that the product is well-suited to the consumer while leveraging their existing trust in the supplier, i.e. Lead Mothers.

Early development of the soy value chain has engaged women in the targeted area more than traditional value chain programming, yielding several anecdotes of female entrepreneurial leadership (in particular, local sales driven by Lead Mothers). As the soy value chain is further professionalized in the Kasaï, the project team should remain focused on inclusivity at all levels. Continued programming will benefit from close analysis of the impact of soy participation on women's overall workload to ensure that added responsibility in one income-generating activity does not yield excessive burden. Likewise, implication in the soy value chain may yield gains

in resource control that could be expanded upon, contributing more widely to the transformation of gender norms and women's empowerment.

The Budikadidi team's expansive stakeholder engagement, ranging from local to national actors across government, research institutions, and the private sector, was a strength of the pilot stage that must continue. Technical collaboration remains critical as additional technologies are tested in the local area to increase yields and pursue greater scale. Potential technologies to be tested include inoculum, fertilizers, and seed drills to enhance soybean production, as well as threshers and winnowers to enhance post-production harvesting.

Pilot POs have demonstrated impressive ownership of the growing local soy value chain, including ambitious initiatives to expand their market scope. Further accompaniment is needed as they seek to penetrate bigger markets, such as Mbuji-Mayi and other cities in the DRC. Market expansion will require a honed capacity to anticipate supply and demand and sign annual contracts accordingly. Additionally, geographic expansion will require POs to navigate and secure affordable cold chain solutions while strengthening their post-harvest management.

Priorities for sustainability

While the Budikadidi soy pilot established a solid foundation to achieve sustainability (see box below), a priority moving forward remains addressing processing equipment maintenance. SoyaKits and VitaGoats have proven their relevance in the rural zone, but they will inevitably

Sustainability

With the aim of creating a locally-driven value chain to sustain soy consumption, CRS has played a facilitative role and focused on developing local actors' capacity, motivation, resources, and linkages, the four factors of sustainability as outlined by [USAID/Food and Nutrition Technical Assistance \(FANTA\)](#):

- **Capacity:** In addition to the technical capacities necessary to produce or process soy, training content and coaching have finetuned the managerial skills of local POs as value chain actors, preparing them to operate independently of Budikadidi.
- **Motivation:** Community demand for soy products continues to grow as anecdotes of improved health circulate, motivating value chain actors to meet this demand in service to their community while diversifying and improving their own livelihoods.
- **Resources:** While early provisions of new seed varieties and soy processing equipment garnered initial interest in the value chain, participation is now sustained by local seed and soybean production.
- **Linkages:** Signed contracts formalize POs' commercial business linkages across the value chain while their direct links to government entities and research institutions enable access to continued technical assistance.

require replacement parts to outlive the project's lifetime. Local artisans have successfully resolved minor maintenance needs to date; however, the project team is currently pursuing contracts with suppliers in the capital city (Mbuji-Mayi) to eventually secure replacement parts. Formally engaging these parties in the budding value chain will be critical moving forward.

Further development of the soy value chain also offers two important opportunities to sustainably combat malnutrition. Standard nutrition projects often treat moderate acute malnutrition in food insecure areas through distribution of imported corn soybean plus (CSB+), an effective but unsustainable approach. First, local soy production can be used to locally manufacture CSB+, reducing transport and shipping costs and making this proven, life-saving treatment more available to children in need while further strengthening the value chain. Secondly, increased soy consumption—promoted by Lead Mothers including through cooking demonstrations—can improve children's diets, helping to prevent malnutrition and reducing the number of children in need of supplementary food.

Limitations to consider

As appreciation for dietary diversity has risen and access to dairy has not improved, soy beverage

is perceived as an appealing dairy alternative. Soy beverage, however, does not offer the same nutritional value as dairy milk. In fact, soy beverage is the least nutrient-dense of soy products. While consumption of roasted soybeans is superior to other legumes (offering 68 g of protein and 7 milligrams (mg) of iron per cup compared to the 14 g and 5 mg provided by beans), soy beverage has a high water content with one cup providing only 5 g of protein and less than 1 mg of iron. While further developing the soy value chain in the Kasaï, actors should capitalize on community interest in soy beverage while progressively focusing on the production and sale of more nutritionally dense soy products such as tofu, cheese, and yogurt. Budikadidi invests in nutrition-sensitive agriculture, supported by a focus on multisectoral integration across the consortium. This collaboration can be leveraged to enhance wider understanding (amongst staff, value chain actors, and consumers) of the distinction between and promotion of both plant-based and animal-source proteins.

The Budikadidi soy pilot has demonstrated the potential impact of investing in the soy value chain within the DRC, from offering promising livelihood alternatives for men *and* women within communities facing poverty to improving their families' access to protein. With additional donor investment, CRS and partners are ready to support the expansion of the soy value chain within and beyond the Kasaï.



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