

# Info Note

## Scaling climate-smart agriculture:

### Co-creating business models in the supply and finance chains in Nyando, Western Kenya

*Cor Wattel, John Gathiaka, Richard Mulwa, Marcel van Asseldonk, Lia van Wesenbeeck, Remco Oostendorp, John Recha, Maren Radeny and Jonne Bosselaar*

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#### Key messages

- In the context of Nyando, with very small land sizes and subsistence agriculture, it is hard to envisage a large investable CSA portfolio.
- Smallholder farmers and commercial parties tend to see each other as risky partners in business. Building trust and long-term partnerships are the key to success of upscaling CSA investments.
- From the viewpoint of commercial players, Nyando is considered competitive in drought-resistant crops (sorghum and cassava). Seeds and fertilizers for these crops are an interesting market for the input suppliers. Milling sorghum into flour could add value to their business.
- It might be profitable for smallholder farmers to turn their sorghum food crop into a cash crop. This business model could be further enhanced with warehousing and with contracts with off-takers, but this requires certain conditions to be met for it to be successful.
- In the context of Nyando, modest increases in smallholder farmer finance are possible, through two channels. Firstly, through linkages between banks and community savings groups. And secondly, where farmers have access to marketing contracts with off-takers.

This note presents the experiences with co-creating two business models for climate-smart agriculture (CSA) scaling in the Nyando Basin area of Kisumu and Kericho counties, through partnerships in the value chain. It is part

of the NWO-CCAFS research project “Climate-Smart Financial Diaries for Scaling in the Nyando Basin, Kenya”, led by the Amsterdam Centre for World Food Studies, in consortium with Wageningen Economic Research, University of Nairobi and CCAFS East Africa.<sup>1</sup>

#### Background

When striving for out-scaling and upscaling of CSA practices, one of the possible pathways is to create scale through the private sector. Getting the private sector on board can create larger investment capacity, as well as broader outreach and scale of operation. Such private sector actors could be value chain companies, including input suppliers, off-takers as well as financiers and investors in the financial value chain.

This study explores the potential for such private sector partnerships in the lower Nyando Basin. Nyando is dominated by smallholder farming with households owning about one hectare or less of land, and commercial firms are only present to a limited extent. We explore the potential for increased business between value chain companies and smallholder farmers, and between financial institutions and smallholder farmers. The underlying assumptions are that:

- Partnerships between smallholder farmers and private sector (commercial parties) can contribute significantly to scaling of CSA;
- Increased business between commercial parties and smallholder farmers is driven by viable business

<sup>1</sup> Other publications of this project can be found at <https://ccafs.cgiar.org/resources/publications> and <https://www.nwo.nl/projecten/w-08260310-0>

models that offer profits and advantages for both the smallholder farmers and commercial parties.

A first exploration about possible business models was presented in an earlier CCAFS Info Note in 2019<sup>2</sup>. That exploration generated a longlist of possible models to create better linkages between farmers and commercial parties. It also provided the insight that the majority of smallholder farmers in Nyando lean towards subsistence farming to meet food security needs, with a diversity of food crops and fragmented product volumes for the market. This evidently limits the potential for commercial linkages. Nonetheless, there seemed to be opportunities with input suppliers, who operate closer to the farmer communities than the banks and the processors; and also with community groups of male and female farmers who are highly trusted by their members.

The present Info Note describes the development of two business cases, out of the longlist mentioned above. The two cases were developed “on paper”, as realistically as possible, with participation of the key stakeholders. The implementation of these models is a decision for the stakeholders themselves. The Info Note ends with lessons learnt of the co-creation process for the topic of scaling CSA.

## Method and process

The method followed is a combination of co-creation with design-thinking, and restricted by the handicaps of Covid19 containment measures.

The co-creation approach meant that the research team developed the business cases in close collaboration with a commercial party, with the three community-based organisations (CBOs) and with sub-county agribusiness officers in Kericho and Kisumu. The research team was well aware from the beginning that the implementation of the business models was not within the scope of the research project. The team offered its intellectual support to the stakeholders, in thinking through their business ideas, articulating them into coherent models, and making some basic calculations about their profitability. This was an iterative process, with several rounds of ideation, prototyping and adjustment.

The co-creation process was organised loosely around the five steps of the design-thinking approach. Design-thinking is a human-centred and forward-looking approach to innovation (Tschimmel 2012). Its origins lie in the ICT and design sectors, but it can be applied more widely to the development of products and services and business models (Frisendahl 2012).

Design-thinking typically follows five steps in the innovation process (Figure 1):

- Empathize: gaining an empathetic understanding of the problem, through the lens of the users and stakeholders;
- Define: defining the core problem you want to resolve;
- Ideate: generate ideas about possible solutions, within and outside the box;
- Prototype: creating a model of the proposed solution;
- Test: testing the model with the users in an iterative process.

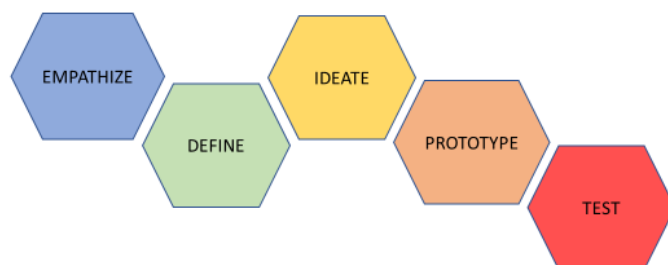


Figure 1 Five steps in Design-Thinking  
(Source: [dschool.stanford.edu/resources](https://dschool.stanford.edu/resources))

The research project intended to fulfil this process up to the prototyping phase. Real-life testing of the model was considered to be beyond the scope of the research project.

Evidently, Covid19 posed limitations to the interaction between stakeholders, as well as to the on-site presence in Nyando for researchers from Nairobi and The Netherlands. The activities took place in the period between late 2019 and Q1 2021, when Covid19 was vividly present in the latter period and restricted mobility and social interactions. Therefore, a pragmatic approach was chosen. Stakeholder interaction was broad in the empathizing phase (2019), involving commercial parties, CBOs and farmers (both female and male). But it was narrowed down substantially in-between, during the definition, ideation and prototyping stages (mid-2020 to Q1 2021). The definition phase was largely conducted by the research team themselves, and the ideation and prototyping phases took shape mostly in bilateral interactions between researchers and the commercial parties at hand. Devolution and hand-over of the results to the broader stakeholders would take place at the end of the prototyping phase.

<sup>2</sup> Wattel et al. (2019).

## Selection of business models

The exploration phase in 2019 generated a longlist of business ideas. These ideas originated from the farmers and CBOs themselves through community workshops, and from commercial parties (banks and input suppliers) through interviews. This process and the resulting business ideas were described in an earlier CCAFS Info Note (Wattel et al 2019).

The lens of the stakeholders themselves was leading during the community workshops and company interviews in 2019. The researchers asked the companies and the farmers about their own business ideas, why these ideas made sense from their perspective, and how these would contribute to CSA scaling. This created the empathizing perspective that characterizes the first step in design-thinking.

Subsequently the research team decided on the “definition” for further business case development. It formulated the basic question and made a shortlist selection of three business ideas to be elaborated. The basic question defined was *“Can we help develop a proposition for increased business between farmers and commercial parties that would help the farmers to scale up their CSA practices?”*

The three pre-selected business ideas were:

- Sorghum farming as a cash crop;
- Linking savings groups with services from banks;
- Horticulture as an intensification strategy.

The three business ideas were then validated with the commercial parties. This ensured that the business cases were based on sound business rationale and commercial appetite. It represented an iteration between step 2 and step 1 of the design-thinking model. More in general, the research team liaised with the commercial parties as entry points for the ideation (step 3) and prototyping phases (step 4). Further discussion with the farmers, CBOs and county executives were scheduled at the end of the prototyping phase (step 4). If covid19 had not existed, a more interactive face-to-face discussion with the farmers, CBOs and county executives – throughout the process - would have been desirable. But the research team had to simplify the approach to keep it manageable through distance communication.

One of the three pre-selected business models did not pass the first validation loop. The idea to increase horticultural production in Nyando<sup>3</sup>, as an intensification alternative under land scarcity, was not considered

<sup>3</sup> The horticulture option referred to a business model suggested in the original research proposal to NWO-CCAFS. This circular model would combine horticulture with improved breeds of sheep and goats and with agroforestry, and would close nutrient cycles (dung as fertilizer for horticulture, agroforestry as fodder for the animals). In none of these sectors,

attractive for agribusinesses in the fruits and vegetables sector. Other locations were more suitable and therefore more competitive. Therefore, two business models were retained for further development.

## Model 1: From food to cash crop – the case of sorghum farming<sup>4</sup>

### Setting

In the Nyando basin, an estimated 47% of the farmers grow sorghum (end-line survey 2020 of NWO-CCAFS-ACWFS). The largest acreage of sorghum is sown in the long rain season, and a smaller portion in the short rain season. Sorghum is by nature a drought-resistant crop. More resistant seed varieties have been developed by KALRO, as one of the possible CSA practices in Nyando. Sorghum is currently produced as a food crop, with surpluses being sold on the local market. At the same time the flour mills in the region face a shortage and only operate during harvest season; sorghum is imported from neighbouring Uganda. This represents a unique opportunity for Nyando farmers, if they are able to produce sorghum at a competitive cost of production.

### Process of co-creation

The ideation (phase 3) and prototyping (phase 4) were largely done in collaboration with a commercial input supplier from the region: Magos Enterprises. This input supplier is a local SME, with two outlets, three vehicles and a demo farm. Magos had proven to be a reliable partner in the CCAFS project and had some experience – partly successful - in building end-to-end supply chains for sorghum, cassava and rice. The company owner showed appetite to engage in sorghum and cassava production in the Nyando region.

The research team helped the company owner to think through his business idea and adjust its scale. This was done through a series of weekly online working sessions, where the company owner explained his proposition and the research team helped systematize these ideas into a coherent business model. Basic cost-benefit calculations were used to explore the profitability and break-even volumes, which helped the company owner to make some adjustments to his initial ideas. This iterative exercise also assisted the research team to become aware of the challenges for Nyando to be competitive in comparison to imports from Uganda and also in comparison to other production regions in West Kenya (Siaya, Ahero) which are closer to Kisumu city.

however, commercial companies other than input suppliers play a significant role.

<sup>4</sup> Initial thoughts were on both sorghum and cassava. But cassava was later dropped because not many farmers grow it compared to sorghum, and cassava is more prone to diseases.

In a second round, the research team analysed the sorghum business model from the farmer perspective. This entailed a round of discussions with the three CBOs, and a field visit of the CBO representatives and some interested farmers from Nyando to neighbouring production regions in Ahero and Siaya. The Nyando delegation visited experienced sorghum farmers in Ahero and Siaya, as well as the demo farm of the input supplier and a cooperative flour mill in Ahero. The field visit enabled the Nyando farmers to become acquainted with alternative farming and marketing possibilities for sorghum.

The research team then prototyped a business model for the input supplier (aggregation and flour milling) and a business model for the farmers (sorghum as a cash crop).

### Design of the business model

#### Sorghum milling into flour

The business model prototype for aggregation and milling of flour is visualized in Figure 2.

Magos already sells improved sorghum seeds and fertilizer to farmers in Siaya and Ahero, and provides them with trainings at his demo plot. The company's new business idea is to set up a flour mill, where it would mill sorghum as well as other grains, to produce different mixes of flour for ugali and porridge and also pure sorghum flour. The flour mixes can be sold to retail consumers, or to shops, hotels, schools and wholesalers.

The mill would purchase sorghum from farmers in Siaya and Ahero region, and could also purchase sorghum from Lower Nyando if farmers produce more significant volumes. The mill would also provide milling services to farmers and traders, against a milling fee per bag. The

mill would receive products on the spot, and could also set up a few aggregation points in the main sorghum producing regions.

The mill would break even with a sales volume of 2900 kg flour per month plus at least 4000 kg per month in milling service to farmers and traders. Achieving this volume will require an effort of the company in building up sales markets for flour and purchase volumes of sorghum and other cereals.

#### Sorghum as a cash crop

For the farmers, a business model was elaborated about sorghum production as a cash crop. This model is visualized in Figure 3.

Farmers already produce sorghum as a food crop and sell the excess harvest to the market. Their main input in this traditional production system is labor; seeds are selected from previous harvests. The switch towards a more commercial practice of sorghum production implies using certified seeds and fertilization. At the expected range of yields (12-16 bags per acre, compared with 6-8 bags in traditional farming) this scenario proved to be profitable for farmers, even if the sorghum was sold on the traditional informal market with lower prices at harvest time (*scenario 1: simple and direct*). It would require farmers to invest KSh 9800 US(\$ 92) per acre in inputs and possibly to pre-finance part of the labor (48 man-days per acre).

Higher sales prices could be achieved if a mechanism of storage and warehouse receipt financing would be developed (*scenario 2: collective storage*). This would enable the farmers to store the product a few months, until better prices can be achieved later in the season.



Figure 2 Aggregation and milling of sorghum flour

The storage costs are significant because of the need for a bi-monthly drying of the grains. Therefore, the model is only profitable if the yields are higher than 13 bags per acre and the price differential between the harvest and the sales moment is larger than KSh 10 per kg.

Another option would be that farmers negotiate beneficial off-take contracts with the commercial partners, for example with the flour mills (*scenario 3: contract farming*). In this scenario it might be possible to find input financiers who offer supply chain finance based on the off-take contracts.<sup>5</sup>

Scenarios 2 and 3 would require a high level of farmer organization, to secure the reliable management of the warehouse, the aggregation of product and repayment of the loans.

In any of these scenarios, it will be important to balance the introduction of external inputs (e.g. inorganic fertilizer, certified seeds) with healthy soil and water management and other CSA practices that enhance resilience.

### Transferring Model 1 to local actors

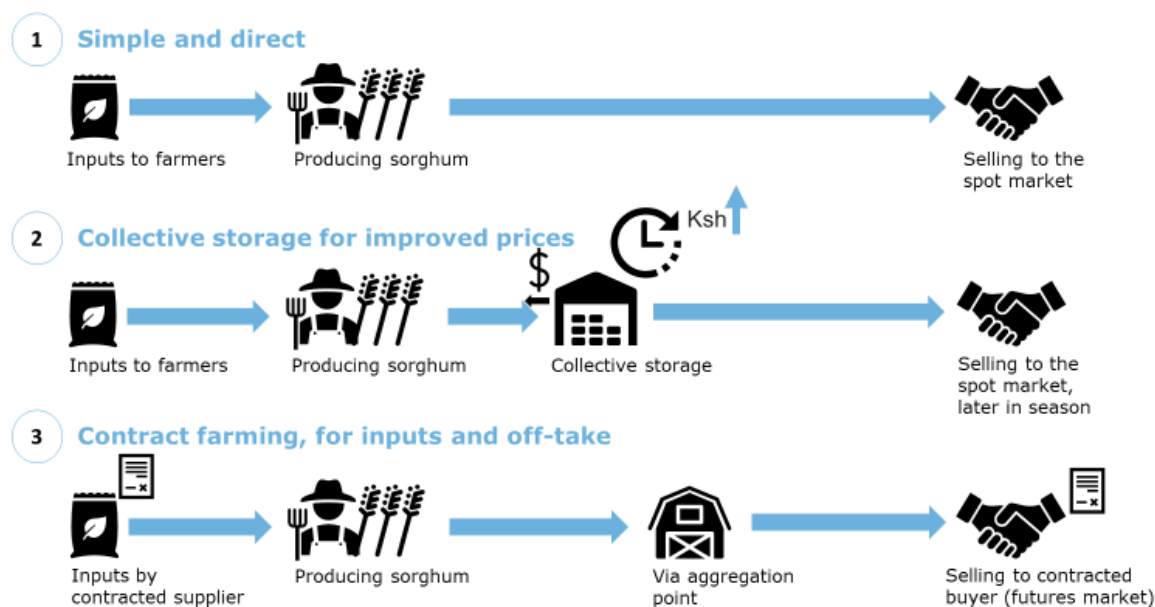
At the end of the prototyping phase, a validation meeting was envisaged with the input supplier (Magos), the CBOs, the farmers and the agribusiness officers of the (sub-)county governments. This meeting would also include a hand-over discussion, by which the stakeholders themselves could decide on steps to take for this model to materialize. However, newly tightened Covid19 measures in March/April 2021 made it impossible to organize this meeting. Instead a short presentation was done during the closure meeting of the NWO-CCAFS-ACWFS project in June 2021, and the

business model infographics were shared with the stakeholders.

Suggestions were made to the CBOs and county officials to make the following exploratory steps:

- Discuss the pros and cons of commercial sorghum production;
- Invite the Magos company to come and make a presentation of their service offer to the Nyando farmers.

Based on these steps, the farmers and CBOs can decide whether they are interested in the offer of the company. They can jointly agree on further steps to take.



<sup>5</sup> Examples of financiers offering this type of finance may be AgriWallet and Digifarm, as well as some (microfinance) banks.

## Model 2: Savings groups' linking with a commercial bank

### Setting

In Nyando there are 58 savings groups, operating under the umbrella and support of three CBOs, FOKO, NECODEP and KAPSOKALE. The groups cover 2,500 households (among a total population of about 23,000). Approximately half of the groups are women-only groups, one third are mixed male-female groups, and the rest are youth groups. Group sizes range from 15 to 30. Although centralized figures are not available, the total annual savings volume of these groups stands around US\$ 95,000.

The groups and CBOs also play a role in the diffusion of climate-smart practices. The farmers have indicated high levels of trust and loyalty with their groups, and see their groups as the most suitable vehicle to engage in commercial relations.

### Process of co-creation

After the phases of empathising (phase 1) and defining (phase 2) described on page 2-3 of this note, the ideation (phase 3) was initiated through several rounds of talks of the research team with a commercial bank. This bank is already operating specific services for village savings and loan associations, also in West-Kenya. It showed interest to extend these services to the Nyando basin, and proposed to do a needs assessment with the groups at hand.

Before this collaboration could further take shape, a non-disclosure agreement needed to be formalized which would protect the bank against improper use of any confidential information. The process to formalize this agreement took longer than expected and this absorbed most of the time available for the co-creation process.

As an alternative option it was considered to organize a field visit of Nyando savings groups to farmers in neighbouring counties who had several years of experience with the bank linkage model. However, the field visit could not be organized, despite willingness of CARE Kisumu to host it, due to the tightened Covid19 measures in March/April 2021.

As a conclusion, this business model could not be co-created, neither with the commercial party nor with the farmer groups. However, the research team did develop a prototype of this model, based on the information collected so far. This prototype could enable the CBOs to explore the idea further on their own initiative, possibly with support of the county government.

## Design of the business model

The business model prototype for linking savings groups with a bank is visualized in Figure 4.

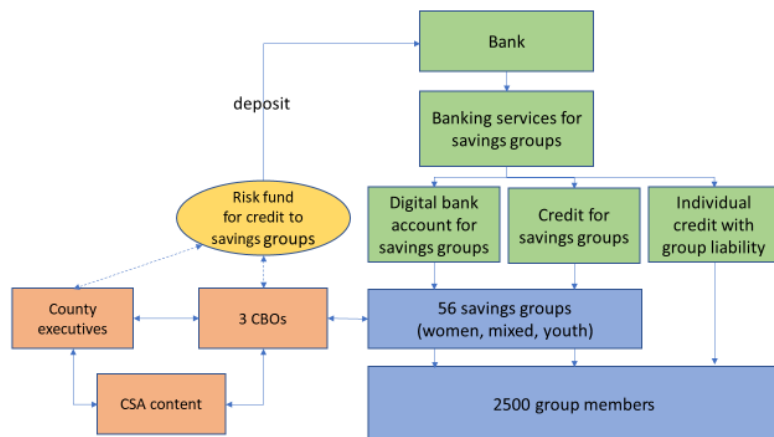


Figure 4 Linking savings group to a bank

In this model, the savings groups operate their savings and loans as they always do. If they prefer, they have the option to use a mobile money account of the bank, instead of their physical cash box, to make their member deposits into the group fund and to disburse and repay the loans between the members and the group fund. If the group has idle money, it can deposit it at the bank against an interest.

The bank can grant loans to those savings groups that show an active and good track record. Or it can offer loans directly to group members, through the bank's group liability loans, or through individual loans in case of larger amounts. These loans are regulated by the normal bank procedures for microcredit: this implies that all parties have to be clear about the obligation to repay and to pay the interest.

For loans to savings groups, the bank requires a risk fund to share the repayment risk. Such a risk fund can come from an external party (e.g., a donor, an NGO, the county government or a project), or it can be brought in by the CBOs themselves. The terms and conditions of such a risk fund need to be negotiated with the bank. The bank might agree to operationalize the model with the CBOs, but it will probably do its transactions directly with the groups and their members. Usually the bank offers explanations and training to the groups to make sure that all members are well acquainted with the model and with his/her rights and obligations.

This model could help the savings groups to encourage better relations with bank institutions, improve their liquidity management and potentially to access loans that could reinforce their own member lending. This enhanced savings and loans pool could enable the farmers, especially women who are the majority in savings groups, to increase their investments in CSA practices, or in any

other options that could reinforce their income and resilience.

### Transferring Model 2 to local actors

A short presentation of Model 2 was held during the closure meeting of the NWO-CCAFS-ACWFS project in June 2021. A short business model infographic was shared with the CBOs and county officials.

Suggestions were made to the CBOs and county officials to make the following exploratory steps:

- Discuss the pros and cons of the bank linkage for the savings groups. This should include a reflection on negative experiences with banks, and whether this model could work better.
- Organize an exchange visit through CARE Kisumu with the savings groups who had longer experience with the bank linkage model.
- Invite the bank to come and make a presentation of their service offer for savings groups.

Based on these steps, the groups and CBOs can decide whether they are interested in the offer of the bank. In that case the bank will probably first do a needs assessment to decide how their service can best take shape in the conditions of Nyando.

### Results of the co-creation process

The first result of the co-creation was **awareness raising and motivation** among the farmers and CBOs about alternative viable economic options. This started in phase 1 (Empathize), when male and female farmers discussed commercial parties' perceptions about Nyando farmers, and brainstormed about possible new business options. Also in phase 4 (Prototype), the discussions and field visits focussing on sorghum farming gave the farmers a new perspective on gaining income with sorghum.

The second result was a set of **realistic prototypes of new business models** that could prosper in the drought-prone and very small-scale farming conditions of Nyando. The realistic character is embedded in the fact that the commercial companies had appetite to engage, and that the business models had already been tested in similar circumstances. These models may not radically transform the livelihoods of the farmers. But they can constitute modest but secure improvements for them, which they can control through their own groups and organisations.

The third result is yet to be achieved: farmers and CBOs are still to **digest and test the proposed business models**, to adapt and negotiate the prototype models to their own preferences, and to make their own decisions to engage. The sub-county government officials have shown a high degree of willingness to support them in this process. The materials produced by the research team,

and the co-creation discussions with different stakeholders, have hopefully planted a seed of inspiration.

### Lessons learnt for scaling CSA

- In the context of Nyando, with very small land sizes and subsistence agriculture, it is hard to envisage a large investable CSA portfolio. Viable initiatives tend to be small in scale (hundreds rather than thousands of farmers) and require modest financial investments (tens rather than hundreds of thousand dollars).
- Smallholder farmers and commercial parties tend to see each other as risky partners in business. Farmers in Nyando rely strongly on their trust networks and are hesitant to use formal credit to invest in CSA practices.. They engage with commercial parties preferentially through their community (savings) groups. For commercial parties, it is risky and costly to deal with smallholder farmers as individuals. Therefore, it is crucial to build joint business on well-organized formal group formations.
- From the viewpoint of commercial players, Nyando is considered competitive in drought-resistant crops (sorghum and cassava). The challenge is to create a business model with end-to-end services: inputs for increased yields, securing output markets and finance. For business models with best chances of success in the area, the sorghum case is a first step into that direction.
- Turning sorghum into a cash crop is a new opportunity for the Nyando farmers. Since sorghum is a favourable food staple in the region, farmers would still have their food secured, while increasing their commercial surplus. If farmers apply the right practices and realize a higher yield, the additional revenue covers their investments and generates them a profit. At the same time, sustained attention is needed for the application of CSA practices that prevent soil and water resources to degrade or deplete.
- Farmers could obtain higher sales prices if additional post-harvest facilities are in place, such as a mechanism for storage and warehouse receipt finance. But our cost-benefit analysis shows that these options only generate net profits if yields and price differentials are large enough.
- For the input supplier, commercial sorghum farming would expand its seed and fertilizer market. It is feasible to combine this with the establishment of a flour mill, as an integrated business model. Whether Nyando could become an attractive supplier for such a flour mill depends on an increase of its production volumes, a good farmer organisation, and a competitive cost of production.

- In the context of Nyando, modest increases in farmer finance are possible, through two channels. Firstly, through linkages between banks and savings groups which can provide a platform for client origination, and for loans to savings groups in proportion to their own capitalization. To increase uptake of bank loans by savings groups and individual farmers, trust-building is necessary to repair the dented image and fear of bank loans in the region. The second opportunity is in case of farmers having marketing contracts, such as with flour mills. These contracts could operate as collateral for agricultural loans.

## Concluding reflection

Co-creating a business model is an iterative multi-perspective process, rather than a linear thinking process. At each step you learn more about the drivers. The constant dialogue kept giving new insights in opportunities and barriers, which helps reshaping models to local reality and needs. For example, commercial sorghum farming was earlier never perceived by farmers as an opportunity. Co-creation requires building trust and giving space to collect all views.

The design-thinking model proved to be a useful methodological framework, also if applied in this specific case of business model development with local rural actors. Its systematic step-by-step approach, and its guiding principles, helped to structure the business case development and to stay close to the stakeholders' priorities.

## Further Reading

- Frisendahl, T. (2012), Design-thinking business analysis – business concept mapping applied, Berlin Heidelberg: Springer Verlag.
- Tschimmel, K. (2012), Design-thinking as an effective toolkit for innovation, *Proceedings of the XXIII ISPIIM Conference: Action for Innovation: Innovating from Experience*. Barcelona. ISBN 978-952-265-243-0.

- Wattel, C.; van Asseldonk, M.; Gathiaka, J.; Mulwa, R.; van Wesenbeeck, L.; Oostendorp, R.; Recha, J.; Radeny M.; Bosselaar J. (2019) "Scaling climate-smart agriculture: towards co-creating business models in the input supply chains and finance chains", CCAFS Info Note, November 2019.

**Cor Wattel** ([cor.wattel@wur.nl](mailto:cor.wattel@wur.nl)) is a Researcher at Wageningen Economic Research.

**John Kamau Gathiaka** ([gathiaka@uonbi.ac.ke](mailto:gathiaka@uonbi.ac.ke)) is a Senior Lecturer and a Development Economist at the School of Economics, University of Nairobi.

**Richard Mulwa** ([richard.mulwa@uonbi.ac.ke](mailto:richard.mulwa@uonbi.ac.ke)) is a Professor at the Centre for Advanced Studies in Environmental Law and Policy (CASELAP) and School of Economics, University of Nairobi.

**Marcel van Asseldonk** ([marcel.vanasseldonk@wur.nl](mailto:marcel.vanasseldonk@wur.nl)) is a Senior Scientist at Wageningen Economic Research.

**Lia van Wesenbeeck** ([c.f.a.van.wesenbeeck@vu.nl](mailto:c.f.a.van.wesenbeeck@vu.nl)) is the Director of the Amsterdam Centre for World Food Studies

**Remco Oostendorp** ([r.oostendorp@vu.nl](mailto:r.oostendorp@vu.nl)) is Professor of International Economics at VU Amsterdam. Research

**John Recha** ([j.recha@cgiar.org](mailto:j.recha@cgiar.org)) is a Climate Smart Agriculture and Policy Scientist, CCAFS East Africa.

**Maren Radeny** ([m.radeny@cgiar.org](mailto:m.radeny@cgiar.org)) is a Science Officer, CCAFS East Africa.

**Jonne Bosselaar** ([jonne.bosselaar@wur.nl](mailto:jonne.bosselaar@wur.nl)) is a Junior Researcher at Wageningen Economic Research.

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