

Impact of CSA technology packages on smallholder farmers under the accelerator program in Zambia

Report

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1. Background

AICCRA Zambia is collaborating with agribusinesses to increase smallholder farmers' access to climate-smart agriculture and climate information services. Our scaling strategy employs several interconnected and mutually reinforcing channels. These include public and private sector scaling partnerships, individual and collective investments, financing mechanism for SMEs, institutional capacity building and multistakeholder dialogues. AICCRA works with Zambian partners to scale actionable climate smart agriculture (CSA) and climate information services (CIS) innovation bundles that contribute to smallholder farmers' water and food security and build resilience.

The AICCRA Zambia accelerator program tested various CSA technology packages, designed and implemented through agribusiness partnerships, SME bundles. The SME bundles were selected through a competitive process for the packages to address major challenges for CSA in Zambia and covering major agricultural production systems in Zambia. Each bundle was supported by a 50,000-USD grant.

The bundles implemented their scaling concept for a variety of CSA technology packages in a one-year period, supported through AICCRA capacity development on bundle specific priority areas. They each prepared an impact pathway and a proof of concept providing evidence for the viability of their package and upscaling strategy. The primary goal of this report is to provide evidence on the impact of CSA technology packages on smallholder farmers under the accelerator programme in Zambia. We analysed the proof of concept that each SME bundle submitted.

2. Scaling of CSA technology packages

This section summarizes the achievements of each of the 5 SME bundles, based on their impact pathways and proof of concepts.

Bundle 1. Sustainable finance for off-grid solar irrigation

Bundle 1 provided 110,000 smallholder farmers (20% of them were women) with market information on obtaining inexpensive financing to invest in off-grid solar irrigation equipment in the face of climate change. Market information includes daily real-time market prices for inputs as well as connecting farmers to suppliers of off-grid solar irrigation technologies. The bundle is a partnership among three Zambian agribusinesses: Lima Links, which maintains a database of 175,000 smallholders and provides farmers with market data; Vatilite; and Lupiya, which finance and distribute irrigation equipment using a credit rating system, respectively. The bundle works with farmers throughout the value chains of cash crops, legumes, vegetables, fruits, livestock, and poultry. Figure 1 presents their theory of change and impact pathways.

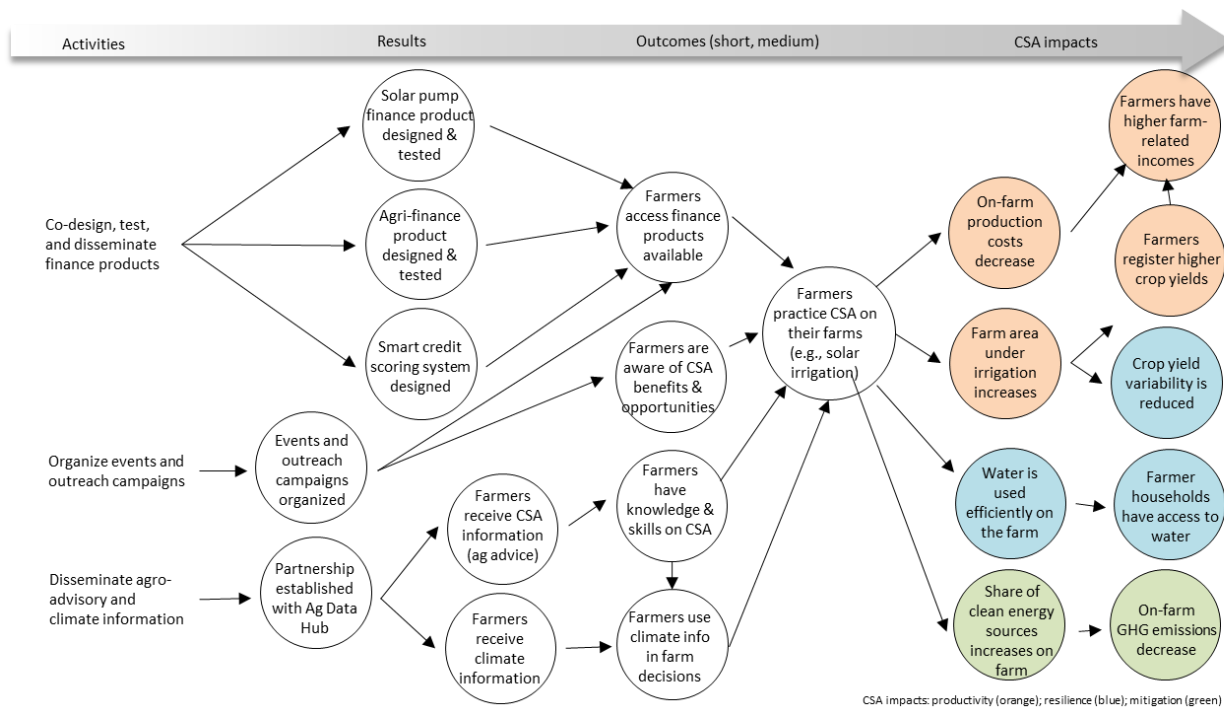


Figure 1: Off-grid solar irrigation impact pathway (Bundle 1)

Challenges

- Delay in application of farmer transaction data
- Limited ready-to-go financing for procuring desired numbers of pumps, needing fundraising
- Limited variety of irrigation pumps on the market
- Limited technical knowledge by sales agents and high repairs on irrigation equipment
- Price increases in quality irrigation equipment, against an increase in substandard cheap equipment
- Lack of trust of clients with business partners and solar solutions
- Lack of knowledge of farmers of the benefits and uses of solar irrigation pumps

Lessons for scaling up

- The partnership has demonstrable experience and success in working in context
- Combination of resources, shared knowledge and expertise, contributed to reduce costs, increased credibility, and reach new audiences that the partners alone would not have been able to reach.
- The partnership leveraging on each other's strengths will advance the prototype and testing in the market.
- For scaling up,
 - o include a greater variety of irrigation equipment and surface and submersible pumps, along with greater sensitization about best use practices of irrigation equipment's, refresher trainings for sales staff and agents.
 - o harness additional farmer transactional data/financial history to support new loans.
 - o expand the model with new partners in new geographic locations in Zambia.
 - o scale procurement and economies of scale for sourcing irrigation pumps and other climate smart technologies

Bundle 2. Promoting integrated aquaculture agriculture systems

The integrated aquaculture agriculture system bundle is a consortium of six SMEs working along the aquaculture value chain focusing on promoting integrated aquaculture agriculture system. The SMEs are in the business of production and distribution of aquaculture inputs and outputs targeting various markets including smallholder farmers. Together, these SMEs reached 45,154 (36% women) smallholder fish farmers. Integrated aquaculture agriculture involves the combination of inland fish farming with crops (bananas, vegetables etc) and small livestock (pigs, goats and chickens) production in a mutually beneficial system. This climate-smart aquaculture innovation offers several benefits, such as environmental sustainability. It minimises the use of inputs, such as chemical fertilisers, and reduces the discharge of pollutants into the environment. This promotes ecological balance, reduces the ecological footprint of aquaculture operations, and contributes to the overall sustainability of food production.

The SMEs have also explained that integrated aquaculture results in increased farm production and income by diversifying agriculture production on a single piece of land through the utilisation of complementary interactions between crops, fish, and livestock. The system achieves higher yields and multiple income streams. The farmers have observed reduced farm expenditure due to the maximum utilisation of resources. It allows for efficient use of resources by utilising waste products from one component as inputs for another. For example, the nutrient-rich effluent from fish is used as fertiliser for crops, water from the fishponds are used to produce vegetables, creating a closed-loop system that minimises waste and maximises resource utilisation. The system also promotes production of other living organisms that are further become food for fish, thereby enhancing biodiversity conservation.

Further, the SMEs explained that the gender equality and social inclusion (GESI) trainings they received from WorldFish, together with the partnership with Kasama Arts Theatre, have helped them to market their aquaculture products, thereby reaching more farmers, including women. Kasama Arts Theatre is a company that uses social-cultural innovations to spread knowledge about the benefits of using CSA technologies in the local context through a shared everyday life situation. The SMEs in this partnership received several capacity development trainings from the AICCRA project. For instance, the SMEs received a training on investment readiness led by Open Capital Advisories, gender equality and social inclusion, climate information services, and have participated in the multistakeholder platform focusing on integrated aquaculture agriculture systems. These activities were aimed at increasing the SMEs' capacity to provide quality CSA and CIS extension services to farmers integrated into their business models (Figure 2).

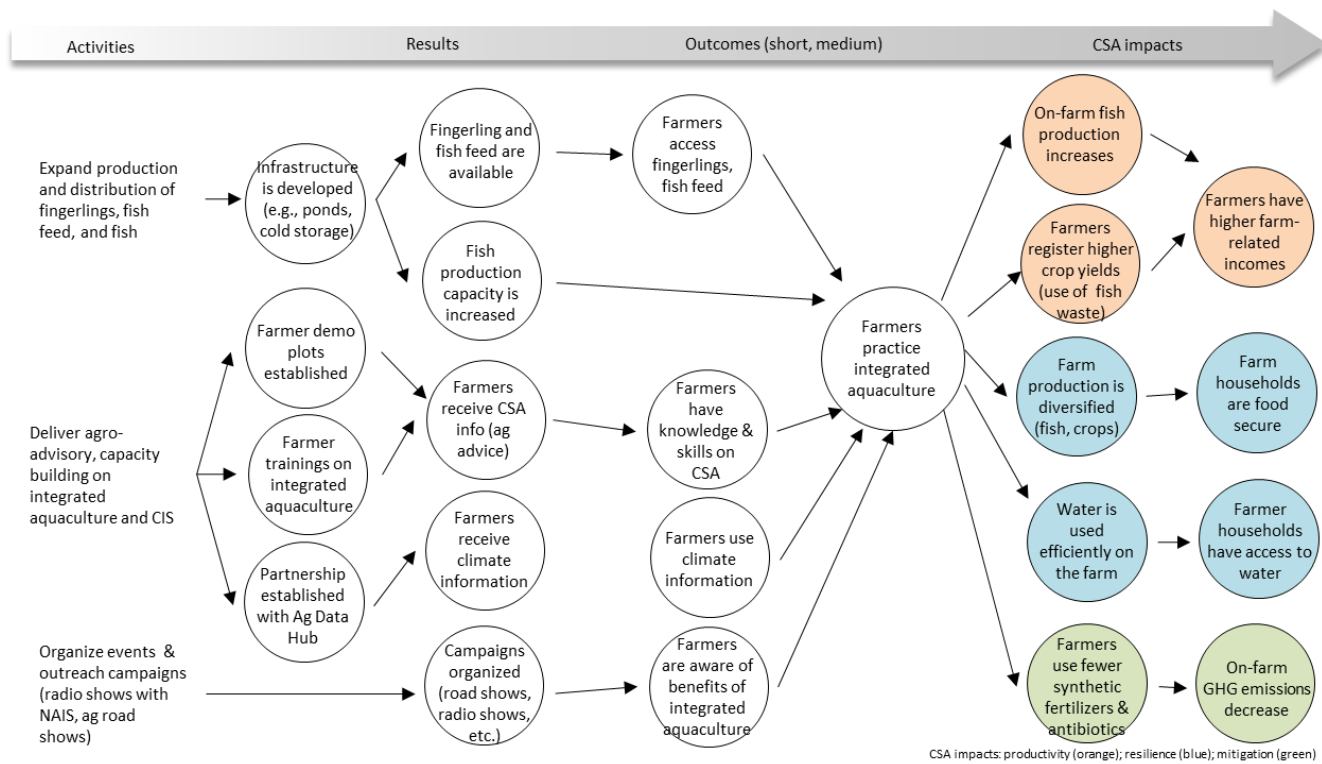


Figure 2: Integrated aquaculture agriculture impact pathway (Bundle 2)

Challenges

- Given the diversity of partners operating across wider areas, providing technical assistance and monitoring of the individual partners was difficult.
- The team drew on internal resources and other initiatives to manage transport.

Lessons for scaling up

- The packaging of agribusiness with improved extension support and communication outreach has proven effective to expand the access to farmers, raise production, market offtake and revenues, across wide areas and diverse contexts in Northern Zambia.
- New knowledge gained e.g. on CSA and CIS technologies, financial literacy and investor readiness, was effectively shared through the agri-business networks, and supported by social innovation and communication channels.
- Having gained relevant agri-business and technical expertise has supported accessing new funding to reach out to more farmers, widening the impact on climate smart aquaculture and agriculture.

Bundle 3. Scaling Climate-Smart Inputs & Agricultural Practices in Zambia

This bundle is a partnership between Corteva, iDE Zambia, Agova, and the *Zambia* Agriculture Research Institute (ZARI). The partnership aims at assisting Zambia's farmers to address climate change, reduce greenhouse gas emissions and address heat stress and drought. Bundle 3 established 390 demonstration plots; 160 seed fairs; trained 110 lead farmers; and 105 community agents to help with the dissemination of PlantCatalyst products and show case the impacts of the CSA technologies in the face of climate change. This partnership together reached 24,200 (7,260 women) farmers to access climate-smart seed varieties for groundnut, maize, and soybean value chains, as well as the use of plant catalyst products. More than 75% of the farmers grow crops on less than 5 acres of land, with more than 80% of the farmers dedicating crop production to maize that is input intensive.

Bundle 3's business model seeks to improve access to climate-smart seed varieties produced by Corteva and Plant Catalyst's natural growth-agent to enhance the uptake of nutrients in plants, improve soil fertility, and reduce the need for synthetic fertilizers. Uptake would be supported by providing farmers with climate information services, training on climate-smart agriculture, and improved linkages to sustainable financing, input providers and market off-takers. The partnership with iDE allows drawing on a wide network of farmers increasing outreach and with ZARI as leading agricultural research institution, upgrading the technical knowledge on climate smart agriculture and seed production (see Figure 3 showing the bundle's impact pathways). Corteva and PlantCatalyst profit from market growth by increasing the number of smallholder farmers who have access to their CSA products.

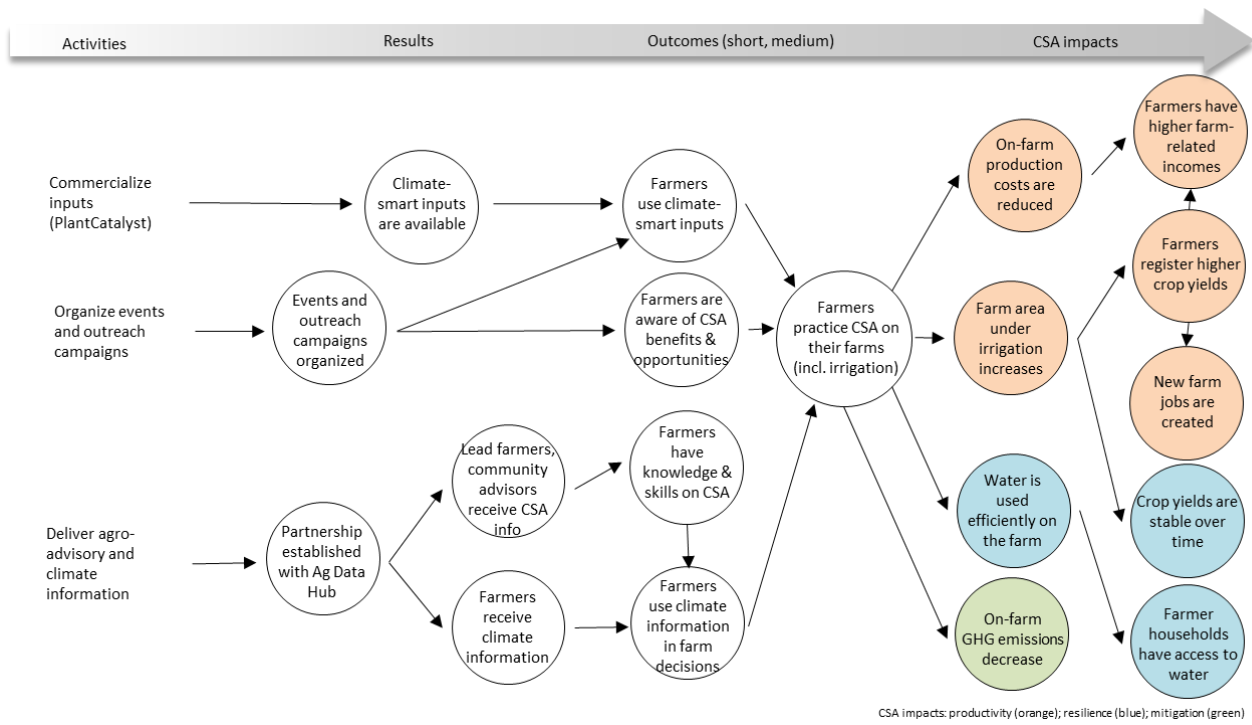


Figure 3: Climate-smart inputs & agricultural practices impact pathway (Bundle 3)

Challenges

- Expanding staff on the ground and train more farmers.
- Scaling a sales and marketing team and building a broader distribution system to meet customer demand.
- Targeted advertising, better inventory management and more farmer training.
- External events affecting farmers lives and therewith the performance of demonstration trials, such as personal events to farmers, weather, pests and diseases

Lessons for scaling up

- The strategic partnerships allowed organisations to use their expertise and resources to complement each other's work, exceed targets.
- Based on that, they engaged in opportunities and explore new partnerships with service providers and expand activities to different locations and different types of service providers.

Bundle 4. Diversified integrated mixed chicken/goats (legume systems).

Bundle 4 is led by Community Markets for Conservation (COMACO) in Eastern Province of Zambia. COMACO is a social enterprise with a mission to work with communities to secure a better life and become good stewards of their natural resources. COMACO finances enhanced climate smart agricultural practises through the adoption of a legume-based farming system and agroforestry that increase crop yields. It also provides market opportunities for smallholder farmers by selling a variety of nature-based food products through a country-wide retail brand, “It’s Wild”, and linking to carbon markets with positive conservation outcomes, including more trees, more wildlife, and healthier soils.

COMACO has a strong, complementary team that makes business and farmer extension support possible. Through the Chitetezo Cooperation Federation, the COMACO business model directly promotes farmer-driven structures to sustainably improve rural livelihoods and reduce climate risks (Figure 4). The Chitetezo Cooperation Federation comprises 62 cooperative institutions spread across 89 chiefdoms, including community forest management groups and traditional leaders, and there are 230,000 registered smallholder farmers (52% women). COMACO has trained 1,346 seed growers (604 females), 258 internal local seed inspectors. The COMACO warehouse was renovated and provides a receipt system, which the cooperatives can access; each cooperative has their aggregation center, to effectively sell their groundnuts. 4 cooperatives advanced on mobile banking system with ABC bank. 15,000 farmers were certified for organic groundnut production.

The COMACO outreach program focus on radio, 1,567 radio timeslots were broadcasted through 7 community-based radio stations during prime time to increase smallholder farmers’ access to CSA technologies to promote organic farming in the cow pea, soybean, and groundnut value chains. In total, the cooperatives have reached 1.1 million small-scale farmers through COMACO Farm Talk, who have been sensitised and trained. COMACO also contributed to the Munda Make Over (MMO) TV program, with 3 episodes broadcasted by ZNBC on farming as a group, groundnut production, agroforestry, compost making, beekeeping, financial literacy. The Federation also hosted the launch of the radio program that translated the MMO TV into audio contents for wider listenership. COMACO also produced video based contents as training material for compost making (<https://www.youtube.com/watch?v=YUn64mcEEdk>) and planting of *gliricidia sepium* trees (<https://www.youtube.com/watch?v=filVUBz4ddQ>).

COMACO worked together with federation farmers to produce nursery for *gliricidia sepium* and so far produced 50 million plants for planting in Eastern province of Zambia. Eastern Zambia is the most drought prone province, with highest poverty rates around 84%, and hence most vulnerable to the impacts of climate change. Soil nutrient levels in the province have diminished and longer dry seasons are reducing crop growth, with maize and groundnuts as the most affected crops.

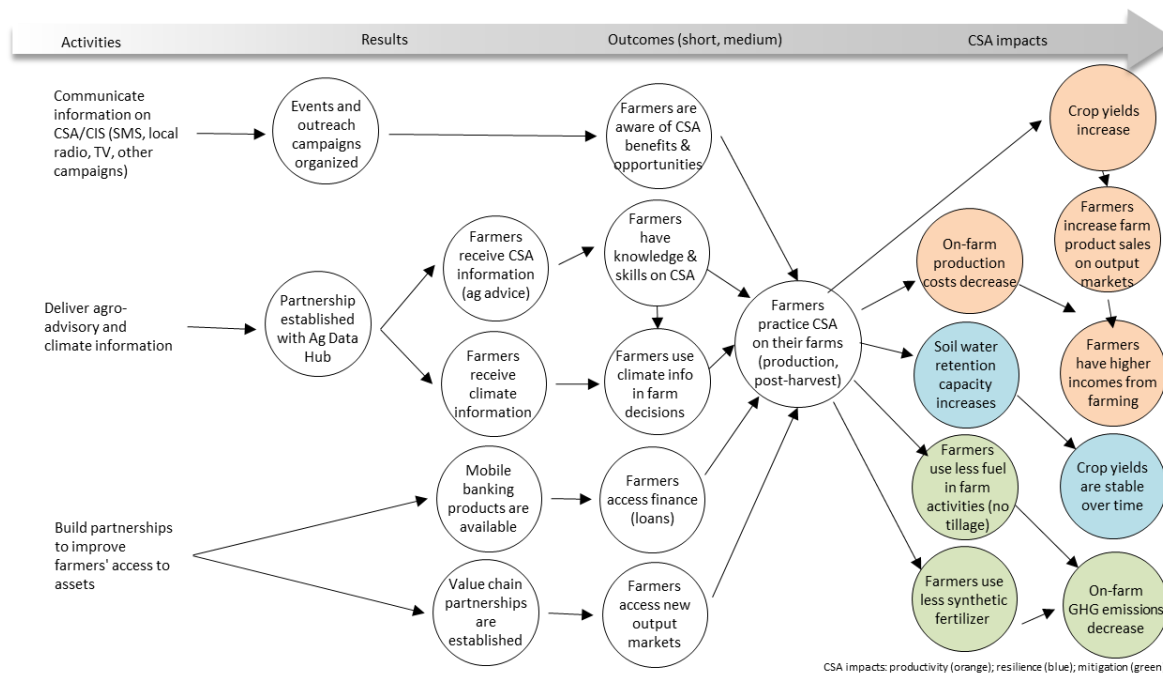


Figure 4: Diversified integrated farming systems impact pathway (Bundle 4)

Challenges

To strengthen the federation this requires continuous investment in human capacity and infrastructure. Federation leaders require

- motor bikes for more efficient cooperative monitoring
- financial support to hold meetings with cooperative leaders.

Cooperative leaders to manage their affairs better they require

- smart phones for easy communication and laptops to help in data management
- financial literacy, record keeping and management trainings

For the federation and cooperatives to be financially more secure they need to source more funding, look for other markets to supplement COMACO efforts in providing markets to farmers, e.g. have carbon funds to go into crop buying themselves.

Fund more locally produced training programs including ICT based platforms like radio talks to increase the dissemination of relevant information on all aspects related to climate smart agriculture and risk management.

Lessons for scaling up

- COMACO is building the federations business sustainability, by helping the cooperatives to become self-managed, taking on the role of farmer education and supporting supply chain logistics, venturing into new markets such as carbon credits, forest products and certified organic foods.
- Radio and web-based communication systems and use of smart projectors has improved the dissemination of information, cost effectiveness of trainings and holding of meetings.
- Cooperatives have developed with time and are at different stages, 12 cooperatives are more advanced. Cooperatives have piloted complementary innovations that can be built on, such as
 - o Various cooperatives are able to start crop buying using their own funds from carbon and ZATP funding.

- 4 cooperatives started digital money services with AB Bank for crop buying, which was excellent innovation and can be improved to reach more areas.
- Sourcing of high-quality seed of high yielding varieties like MGV8 as an opportunity under the organic groundnuts production program.
- Promoting *Gliricidia sepium* for multiple direct benefits and to access alternative income through carbon markets

Bundle 5. Gender equity and social inclusion

The Gender Equality and Social Inclusion (GESI) bundle is led by Better World Innovation (BWI). The partnership is scaling up evidence-based climate-smart agriculture (good agronomic farming practises, climate information services, drought-resilient seed varieties, and plant catalysts) in vulnerable groups by providing integrated agri-services and products. BWI seeks to enhance their capacity for climate-smart agriculture to improve agricultural yields, food security, and household income.

BWI developed a CSA CIS training manual, and a climate smart digital platform known as Harvesti. This digital application is open access and available for downloads in google playstore. BWI reached 66,776 (56,826 women) smallholder farmers through its engagements with farmers, including use of Harvesti. Harvesti provides climate smart advisories to farmers in the crops (groundnuts and soya beans), aquaculture and livestock value chains. The bundle has participated in AICCRA project dissemination events such as the Munda Make Over which was televised on the national TV station. It has also participated in a number of AICCRA capacity development programs aimed strengthening its capacity in delivering CIS CSA technologies to farmers. BWI participated in the GESI training events such as the women webinar series led by IITA in partnership with Larrying Cry. These activities strengthened its capacity to deliver extension services to farmers, particularly women and youths. It has also integrated its work with the government's constituency development fund (CDF), and it has been working with the development committees to train farmers on CDF guidelines. The bundle used this opportunity to identify and organize farmers to access climate smart agriculture practices.

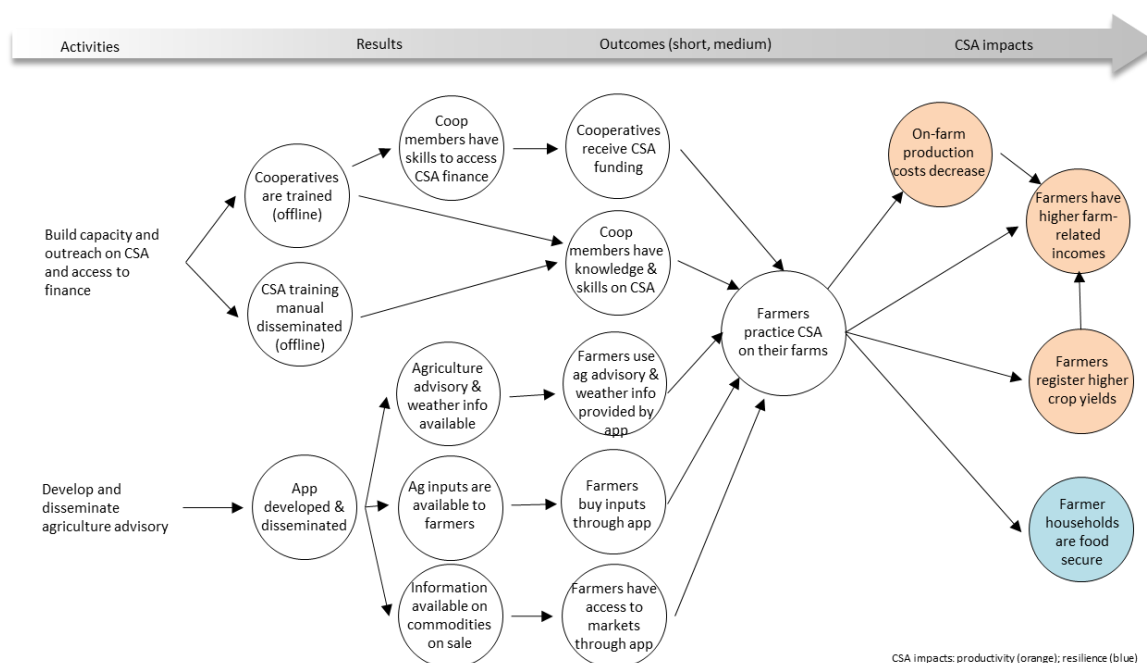


Figure 5: GESI impact pathway (Bundle 5)

Challenges

- High cost of developing the Harvesti mobile app, despite being subsidized. Long time for developing the app delayed the start of training farmers.
- Competition in markets, and high cost of product promotion and marketing.

Lessons for scaling up

The teams' community engagement skills helped in community mobilization and identification of target beneficiaries especially women and youth farmers. The partnership with the local government and the Ministry of Agriculture, extension officers, as well as going through parliamentarians as an entry to women and youth cooperatives supported the upscaling. The recruitment of women and youth beneficiaries received support and less resistance from traditional leaders.

Further partnership with Hollard and FSD Zambia gave leverage for insurance at subsidized costs giving the team a competitive advantage.

Recruiting farmers' aggregators to identify and support farmers directly reduced operation costs as aggregators would promote, market, and sell products to farmers. The recruitment and working with farmer aggregators also gave the team business opportunities to identify other ventures such as the selling of fingerlings to cooperatives who engaged in fish farming.

3 Scaling readiness and use

This section presents the scaling readiness tool, as a method that can be used for Bundle partners to reflect on their progress and validate their agri-business innovation package, the extent to which innovations are ready for scaling to an intended number of farmers, and planning a way forward to address bottlenecks, deepen and expand CSA/CIS interventions. The tool was first applied with Bundle 4, and can be applied to other Bundles in accordance to their reflection and planning schedules.

Methods

The scaling readiness framework aims at deployment of innovations faster, at a larger scale, and at lower costs, to achieve a greater impact on smallholder farms in developing countries (Sartras et al., 2020; Schut et al., 2020;).

Scaling readiness is measured as the combined score of innovation readiness and innovation use. Scaling readiness reveals the potential and key bottlenecks in an innovation package for a specific scaling objective and context.

The scaling potential of a core innovation and/or innovation package is – at a given point in time – also shaped by the social networks in which the innovations are embedded, supported, and used. It distinguishes between network environments in which the innovation still receives considerable support and protection (e.g., a project or intervention), and network environments in which it has been used without any form of support (e.g., as part of livelihood systems).

This thinking aligns with the literature on strategic niche management, which points to the importance of gradually reducing protection of innovation initiatives (niches, Innovation Platform) over time and the ability of niche-level innovations to reconfigure dominant policies, procedures, and practices (regimes).

For application under AICCRA we score the inventory of bundles, innovation packages, at different levels of readiness and use, and generate data and evidence to support that.

- Readiness: The development stage of an innovation and how ready it is for scaling. It is measured along 9 levels of readiness.
- Use: Innovation use represents the extent to which an innovation is already being used in society and by whom. It is measured along 9 levels of use.

Types of innovations include

- Capacity development
- Policy and institutional innovations
- Technologies

Objectives:

1. Validate an Agribusiness SME bundle's innovation and scaling investments for their potential to achieving impact at scale, to support prioritization on the advancement of those innovations
2. Verify key bottlenecks to the scaling of innovations to support decision making on strategic options and opportunities
3. Short-term feedback to support decisions which interventions to advance, where to intervene, and attract investment for innovations that respond to specific needs.

Steps:

Step 1: Validate core innovations: reconfirm the core innovation with the Bundle Team

Step 2: Validate complementary innovations: reconfirm the core innovation with the Bundle Team

Step 3: Score both in terms of readiness and use: explain the scores, allow bundle partners to discuss and agree on the score. Transfer the scores on the readiness and use matrix to visualize their fairing

Step 4: Identify bottlenecks and linkages for advancing the innovation package: discuss the position of the innovation package components on the matrix and what hinders them to move to the top right corner.

Step 5. Strategizing a way forward: Inform the design of innovation packages that improve access the innovation for specific groups. Discuss future priorities and how they should be advanced.

- (i) how to overcome the bottleneck,
- (ii) which partners should be involved,
- (iii) the most effective way to work with these partners, and
- (iv) the kinds of activities and budgets required to overcome the bottleneck innovation

Table A1 (Appendix 1) illustrates the scores described and used for the readiness assessment.

Table A2 (Appendix 2) synthesizes the SMEs composition and achievements, which can be used to prepare for this exercise.

Bundle 4: Diversified integrated mixed chicken/goats (legume systems).

The readiness assessment was done as interactive discussion with 4 members of the Chitetezo Federation and 2 COMACO staff. First, the approach was explained, using the Liebig's Drum as visualization for the purpose of this tool. The participants confirmed that the federation itself is the core innovation, 'the frame of the drum' that holds the farmers applying climate smart agriculture and agri-business interventions, and enables the capacity development and hence scaling of innovations among farmers. Most complementary

innovations were considered at an advanced stage, requiring the federation to improve their sustainability strategy. Less advanced was the Digital Banking system, as a new technology to improve market flows. The climate information advisory services were least advanced as several tools were made available but not sufficiently contextualized and hence not yet in wider use. The readiness assessment was further used to introduce the current state of the federation and focal areas for improvement at the Multi-stakeholder Dialogue (MSD) held 13 June 2023 in Chipata, with 25 representatives from the federation, COMACO and local government officials. MSD participants confirmed the validity of these results.

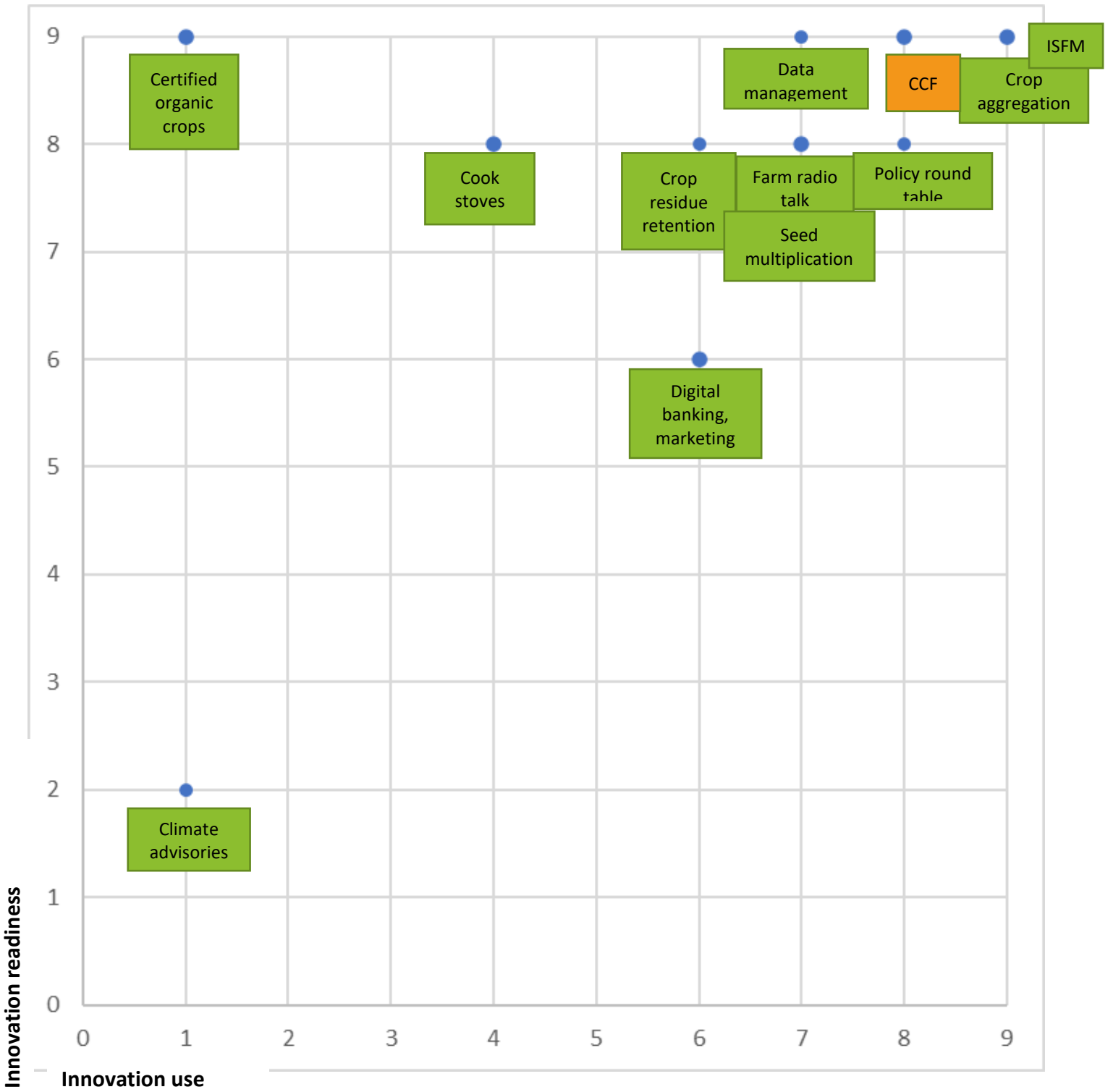
Table 3.1. Structure for assessing steps 1 to 4 with stakeholders, Bundle 4

List of innovations (S1, S2)	Readiness score (S3)	Use Score (S3)	Evidence / indicators, quantitative (S4)	Bottlenecks and how they interrelate (S4)
1. Core: Cooperative structure to upscale CSA and agribusiness	8	9	<ul style="list-style-type: none"> - 62 cooperatives members of the federation - Cooperatives have governance systems that are made of board, sub-committees, and lead farmers 	<ul style="list-style-type: none"> - Cooperative at different stage of development - Need for review of the individual cooperative constitutions to align with objectives of federation - Management capacity needs strengthening
2. Integrated Soil Fertility Management/Agroforestry	9	9	<ul style="list-style-type: none"> - Surveys on federation members by the Ministry of Agriculture in conjunction with CIMMYT showed improved soil organic content. - Crop yield improved. - Managed to plant 52 million trees out of a target of 100 million. 	<ul style="list-style-type: none"> - Survival rates of trees a challenge due to fires and livestock - Accessing seed also a challenge as 60% of farmers reached.
3. Climate Advisory Services	2	1	<ul style="list-style-type: none"> - Training of trainers on use of the app conducted. - Several Apps tested and trainings held, at various stages of development (DACA, E-PISCA, AGRIPREDICT) - Information management systems include extension-lead farmer forward and backward flows. Weather forecast information shared with lead farmers and lead farmers require to 	<ul style="list-style-type: none"> - App not yet calibrated for Zambian context, as is currently based on Kenyan context. - Feedback from lead farmers poor

			confirm accuracy or lack thereof	
Farm talk radio	8	7	<ul style="list-style-type: none"> - Pre-recorded shows - Feedback from farmers on topics covered, through questions directed to mobile phone numbers dedicated for the purpose 	<ul style="list-style-type: none"> - Some areas have poor radio reception, affecting the extent of radio reach
Crop residues retention/Ban on burning radios	8	6	<ul style="list-style-type: none"> - Number of farmers carrying crop such as groundnuts, soyabeans for shelling at home to retain haulms for later use in the fields 	<ul style="list-style-type: none"> - Competition for crop residues with livestock, - people seeking to burn crop residues
Digital Systems/Mobile banking system, with trader arrangement	6	6	<ul style="list-style-type: none"> - Pilot in 4 areas - Transactions take place on platform 	<ul style="list-style-type: none"> - Complicated for farmers, unreliable, system glitches, trust
Cook stove	8	4	<ul style="list-style-type: none"> - Being piloted in 2 chiefdoms 	<ul style="list-style-type: none"> - Initial drawback of one cooking point improved to two to accelerate uptake of the stove.
Seed Multiplication	8	7	<ul style="list-style-type: none"> - Farmers trained on seed multiplication. - Over 600 federation farmers contracted. - Seed purchased from research institution and ZARI is the off taker. 	<ul style="list-style-type: none"> - Access to seed restricted the number of farmers who could participate
Data management (ODK)	9	7	<ul style="list-style-type: none"> - Extension working with lead farmers to capture and upload data to server. 	<ul style="list-style-type: none"> - Server sometimes not reachable - Smartphone for data collection not adequate - Not all areas have data collection tools
Organic crop production	9	1 (certified) 9 (uncertified)	<ul style="list-style-type: none"> - Applying organic principles is the core of COMACO/CCF, all farmers produce uncertified organic products - 2023 started production of certified organic products, 15,000 farmers have been certified for organic production. 	<ul style="list-style-type: none"> - Cost of certification is expensive and is done per farmer, taking up to 3 months to be completed.

			- ECOSET from Cape Town providing certification services.	
Crop aggregation	9	9	- Bulking point accessible, with each positioned within a 5 km radius of the farmer.	- Challenges experienced each year turned to lessons learnt for improving system performance, e.g having a working register
Policy round table	8	8	- Taskforce at chiefdom level to advocate for policy change and at local for coming for by-laws. - Statutory Instrument in place that provides for a bottom-up approach to policy development	- Access to resources key for facilitating the round table, with area accessing Carbon Money active on reforestation related issues.

Figure 3.1 Visualization of the readiness assessment results Bundle 4



4 Appendix.

Table A1. Scaling readiness scores used with stakeholders to map the innovations

Scores	Readiness score (S3)	Use Score (S3)
At conceptual stage, not used (1-3)	Unproven model: Researching the hypothesis that the innovation can meet specific goals using existing basic science evidence	None Not used
Advanced testing and verification of capacity (4-6)	Proven model: Validation of the capacity of the innovation to meet specific goals using existing applied science evidence	Rare: Some stakeholders use it, connected to partners
Incubated, ready under uncontrolled conditions (7-9)	Ready: Validation of the capacity of the innovation to meet specific goals or impact in natural/real/uncontrolled conditions in the specific spatial-temporal context in which the innovation is to contribute to achieving impact without support from an R4D	Common: Used by stakeholders who are not connected to the development of the innovation

Table A2. Key characteristics for assessing the SME bundles' innovation readiness and use

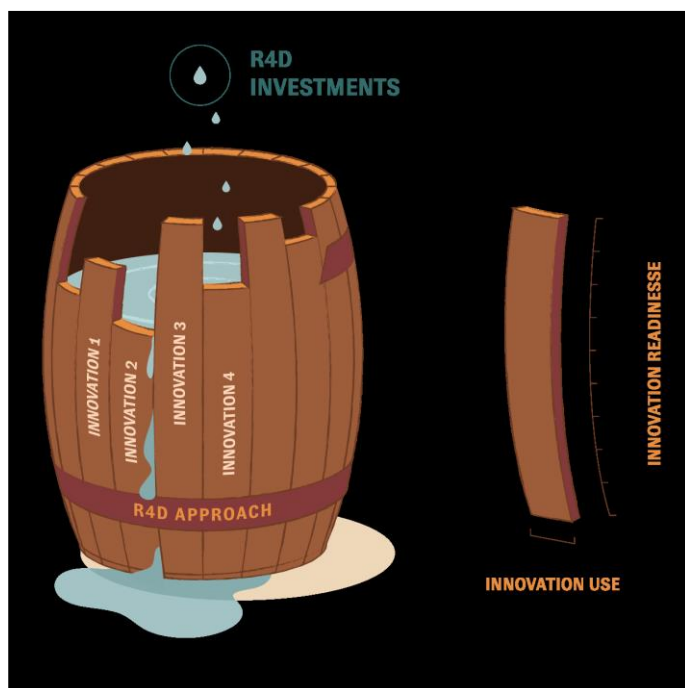
	B1 Solar irrigation	B2 Aquaculture	B3 Dryland Cereals	B4 Legume, livestock, nature	B5 Gender equity and social inclusion
Desired outcome	Increased uptake of CSA (solar irrigation) on smallholder farms	Increased uptake of CSA (integrated aquaculture) on smallholder farms	Increased uptake of CSA (rainfed cereals, irrigation) on smallholder farms	Increased uptake of CSA (production, post harvest) on smallholder farms	Increased uptake of CSA on smallholder farms
Geographical focus, context	Central, Southern	Northern, Luampula	Central Eastern	Eastern	Central
Bottlenecks selected for scaling design	Access to finance for solar irrigation equipment	Access to aquaculture input and output markets	Access to quality seed and natural fertilizer	Capacitating large numbers of self-organized farmers	Access to seed and natural fertilizer for vulnerable groups and women
SME driven partnerships fit for purpose to address those bottlenecks	Lima Links (market information) Vitalite (pay as you go) Lupiya (credit scoring)	Eunimos (feed) ADSEK (feed) Hopeways (breeder) Kasakalabwe (breeder) Triple Blessing (offtaker) Kasama Arts (social innovation)	Corteva (high quality seed) Plant Catalyst (natural booster) iDE (farmer networks) ZARI (technical competence) Agova (leadership)	COMACO (social enterprise, oftaker) Chitetezo Farmer Federation (farmer organization)	Better World Innovation (social enterprise) Plant catalyst (natural booster) Hollard Insurance Financial Sector Deepening Africa Agriculture Holding We Effect
Core innovation Readiness / use	Solar & agri- finance product as incentive for	Integrated CSA Fish farming and agriculture, upscaled through agribusiness and social	Technical synergies around nutrition	Cooperative structure to upscale CSA and agribusiness	Nutrition booster for high quality seed,

	easing access to solar irrigation	networks along the fish value chains	booster and quality seed		targeting vulnerable groups and women
Complementary innovations, solutions and conditions					
Increased production and distribution through the VCs	<p>Access to credit scoring system</p> <p>Access to pay as you go service</p> <p>Uptake of solar pumps, tailored to local needs</p>	<p>Farmers registered</p> <p>Uptake of CSA fish ponds</p> <p>Increased production and offtake through VC links</p>	<p>Conversion of land under CSA cropping practices</p> <p>Farmers linked to input suppliers</p>	<p>Uptake of CSA technologies, incl compost, Gliricidia, min tillage, mulching</p> <p>Improved warehouse storage facilities</p> <p>Uptake of mobile banking payment system, transport and grain quality ensurance</p> <p>Enrolment in higher value branded products, seed growers, grain producers</p>	
Deliver agro-advisories, CIS capacity building	<p>Uptake of Lima links APP that provides information and market prices</p> <p>Lima link APP used to link producers and pump providers, as well as pipeline for sales</p>	<p>Uptake of improved training contents (production, marketing)</p> <p>Agribusiness partners as technical advisors promoting extension messages</p>	<p>Improved capacity, expertise through demonstrations and trials</p> <p>Tapping on IDE farmer networks, and lead farmers as technical advisors promoting extension messages</p>	<p>Uptake of improved training contents (production, marketing, leadership)</p> <p>Social enterprise trainers and federation lead farmers as technical advisors promoting extension messages</p>	<p>Famers as TOT</p> <p>Farmers as aggregators</p>

				Access to Digital Agroclimatic Advisories (DACA), crop advisories and pest infestation alerts	
Outreach campaigns	Lima links App Commercial shows	Radio program Road shows Whats app Commercial shows	Radio program Commercial shows	Radio program (Farm talk) Whats app Web-based, social media Training videos	Harvesti App Radio program
Alliance with government/local structures		High level policy dialogue		Integration of traditional leadership structures	Partnership with local government, Ministry of Agriculture, extension officers, going through parliamentarians
Network for adjusting scaling strategies		Access to new funding		Access to new VC partnerships (inputs, transport, processing, outputs)	USAID Edge IITA seed bank
Validation					
Impact data				Increased legume production and offtake Women in leadership positions Local influence High level influence Alternative markets	

				Finance	
Validate feasibility and acceptability (challenges)	Technical capacity of suppliers Diversity of pumps on offer, price increase	Technical assistance and monitoring	Develop a broader distribution and training system	Reaching out capacity development to the entire federation Cooperatives at different levels of capacity	Technical expertise and extension support Competition Cost of marketing

A3. Scaling Readiness Barrel to illustrate how innovation(s) with the lowest readiness limit an innovation package's capacity to achieve impact at scale.



5. Literature

Sartas, M., Schut, M., van Schagen, B., Velasco, C., Thiele, G., Proietti, C., and Leeuwis, 2020. Scaling Readiness: Concepts, Practices, and Implementation. CGIAR Research Program on Roots, Tubers and Bananas (RTB). January 2020, pp 217. Available at www.scalingreadiness.org and www.rtb.cgiar.org.

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