Farmers' competencies for transforming agricultural livelihoods: A competency model approach for designing, implementing, evaluating, and adapting capacity-strengthening initiatives

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Abstract

Access to information, capacity strengthening, and on-farm experimentation—key functions of agricultural extension and innovation—are needed for smallholder farmers to restore and protect their land, improve the productivity and resilience of their production systems, engage with markets, and ultimately achieve sustainable livelihoods. This requires deliberate efforts to strengthen smallholder farmers' competencies for success in smallholder agriculture. A competency model approach to inform the design, implementation, monitoring, evaluation and adaptation of capacity strengthening activities provides a practical framework for improving the effectiveness of capacity building strategies and activities. It allows goals and objectives to be explicitly defined and clearly communicated, guides the structure and content of training materials, and frames the assessment of competencies to inform their delivery. This paper summarizes the experience of Catholic Relief Services in using a competency model approach to build Skills for Marketing and Rural Transformation (SMART Skills) in Southern and Eastern Africa and Central America, and in evaluating outcomes and impacts.

Introduction

Smallholder agriculture, which handles a third of the world's food supply (Shroff, 2022), is crucial for global food security and economic growth, especially in developing nations (Abraham and Pingali, 2020). However, outdated practices pose a threat to the land and water resources necessary for food and livelihood security (Suvedi and Kaplowitx, 2016), a situation exacerbated by climate change.

Access to information, capacity strengthening, and on-farm experimentation is essential for smallholder farmers to restore and protect their land, improve the productivity and resilience of their production systems (Mwamakamba et al., 2017), engage with markets (Omiti et al., 2009), and ultimately achieve sustainable livelihoods. This requires deliberate efforts to enhance their competencies for success.

This paper discusses Catholic Relief Services' (CRS) use of a competency model approach in its Agriculture and Livelihoods Program signature global approach to capacity strengthening: Skills for Marketing and Rural Transformation (SMART Skills). A participant-centered approach for improving the essential skills (Ashby et al., 2011) that smallholder farmers need to successfully transition from livelihoods characterized by low productivity, limited market participation, and high vulnerability to external shocks to livelihoods that provide a living income is resilient and enables producers to thrive in sustainable landscapes.

This paper focuses on CRS's use of a competency model approach to design, implement, evaluate, and adapt capacity-strengthening initiatives to ensure their effectiveness and cost efficiency. It is based on a study that evaluated its performance in Central America, Malawi, and Ethiopia, focusing on regenerative agriculture and innovation competencies.

Method

Competency model approach

The competency model approach provides a practical framework for delivering SMART Skills (CRS, 2021), a set of interrelated regenerative and productivity-enhancing organizational, financial, and marketing competencies that smallholder farmers need to successfully manage their agricultural activities.

This approach allowed CRS to:

1. Adopt a modular and competency-based approach that allows for prioritization and streamlining
2. Explicitly define capacity-strengthening goals in terms of concrete behavior change and evidence of impact, allowing for clear communication with multiple stakeholders
3. Align the structure and content of training materials and tools with concrete behavior change goals while allowing for contextualization to tailor training content to the needs and priorities of smallholder farmers and the local context
4. Incorporate capacity assessments to inform the design and ongoing adaptation of capacity-strengthening strategies and activities

Competencies assessment methodology

The study used a mixed-methods approach, combining the Situation, Task, Actions, and Results (STAR) behavior-focused method (Sanghi, 2016) with SenseMaker, a narrative-based approach (Guijt et al., 2022). The STAR method was used to assess competency levels, while SenseMaker was used to assess the internalization of behaviors for each competency and its outcomes and livelihood impacts.

Case studies and sampling

The study included four projects (case studies) that were implemented in different regions but shared a common approach to promoting experiential learning and on-farm

experimentation by: a) adopting a participant-centered approach that a) builds on existing skills by using behavior change-oriented learning experiences to fill identified competency gaps, b) uses Farmer Field Schools (FFSs) to enhance adult learning for demand-driven extension and to stimulate on-farm innovation, c) supports farmer-led innovation plots and/or more formal Farmer Learning Centers (FLCs) to enhance adult learning for demand-driven extension and to stimulate on-farm innovation and d) supporting farmer-led innovation plots and/or more formal FLCs to help farmers identify and test solutions to problems and opportunities they have prioritized. A summary of these case studies, including sample sizes and corresponding confidence intervals and margins of error by project and type of project participant, is presented in Table 1.

Table 1 | Sample size and respective confidence intervals and error margin by project and type of project participant

Project and timeframe	Region/ country	Type of participant and reach	Midterm assessment	Final assessment
Water-Smart Agriculture (WSA) **2015–2021**	Central America	3,209 Innovation farmers with 415 research plots	N = 732 (95%[1], 0.06[2])	N = 572 (95%, 0.10)
		99,750 Scaling farmers organized in FFS	N = 284 (95%, 0.06)	N = 255 (95%, 0.10)
Prepared and Resilient (PAR) **2016–2020**	Guatemala	711 farmers in 51 FFS[3]	N = 192 (95%, 0.06)	N = 122 (95%, 0.10)
		1,621 farmers in 73 SILC[4]	N = 200 (95%, 0.05)	N = 111 (95%, 0.09)
	Nicaragua	414 farmers in 16 FFS	N = 263 (95%, 0.06)	N = 150 (95%, 0.10)
		2,187 farmers in 145 SILC	N = 300 (95%, 0.05)	N = 105 (95%, 0.09)
United in Building and Advancing Life Expectations (UBALE) **2014–2019**	Malawi	86,224 farmers in 3,699 SILC & 61,982 farmers in 3,208 Market Clubs	N = 454 (95%, 0.06)	N = 626 (95%, 0.06)
		27,765 farmers with 191 FFS & 230 VNRMC[5]	N = 468 (95%, 0.07)	N = 490 (95%, 0.07)
Development Food Security Activity (DFSA) **2016–2021**	Ethiopia	20,780 farmers in FFS & FLC[6] for crops	N = 205 (95%, 0.05)	N = 137 (95%, 0.07)
		23,379 farmers in FFS & FLC for livestock	N = 186 (95%, 0.05)	N = 143 (95%, 0.07)
		1,250 farmers in SILC & Market Groups	N = 182 (95%, 0.05)	N = 239 (95%, 0.05)
		7,273 farmers in SILC & Off-farm Businesses	N = 184 (95%, 0.05)	N = 184 (95%, 0.07)

Note: [1]Confidence level; [2]Error margin; [3]Farmer Field Schools; [4]Savings and Internal Loan Communities; [5]Village Natural Resource Management Committees; [6]Farmer Learning Centers

Results and Discussion

SMART delivery model comparisons

The four projects studied delivered the SMART Skills in different implementation contexts (i.e. literacy levels, market engagement) and to respond to different donor requirements, which influenced the capacity strengthening content, the choice of extension capacity-building methods and the time required for behavior change. As a result, each project used a different delivery model[1] to implement capacity strengthening activities, which in turn influenced the outcomes and impacts of implementing the SMART Skills approach.

Fig. 1 represents the distinct sets of competencies targeted by each project and their sequencing throughout the project timeframe. The number of competencies delivered by each project increased from five in WSA to 24 in DFSA, leading to a higher level of complexity in the design of the extension delivery models.

UBALE and DFSA smallholder farmers were expected to acquire competencies in multiple technical areas. This required careful planning to sequence activities. The demands on the time of extensionists, front-line service providers, and farmers at times became overwhelming in these complex projects, likely diminishing the effectiveness of capacity-strengthening activities.

The periodic assessments undertaken using the competency model approach provided information to project staff to focus and adjust capacity-strengthening activities to better meet the priorities and learning needs of the participants.

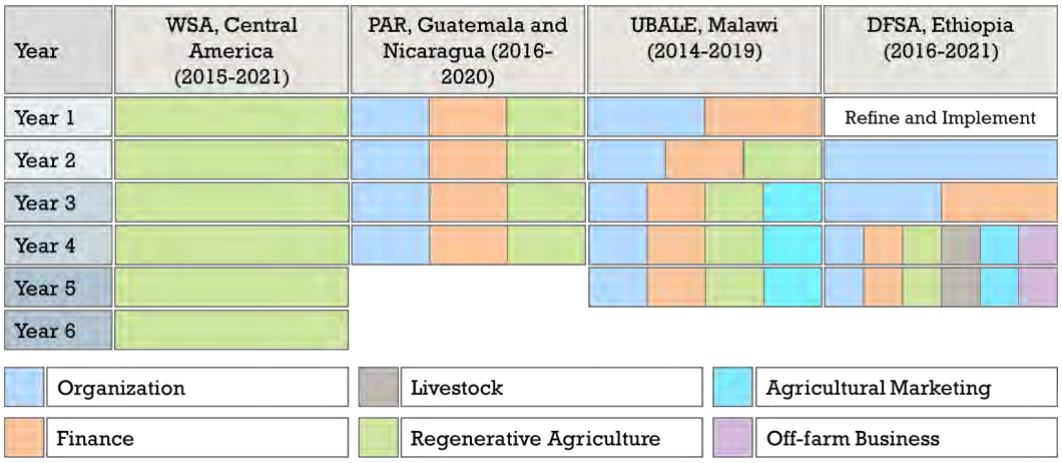

Fig. 1 I Delivery sequence of various sets of competencies throughout the projects' lifespan

Reaching scale

The four projects achieved scale by training extensionists, who then trained local field agents. The ratio of field agents to farmers (1:15) was lower for regenerative and productivity-enhancing competencies than for other competencies, and therefore more costly.

The WSA's approach to achieving scale was to establish proof of concept through on-farm innovation plots with 3,209 farmers, which produced evidence-based results.

[1] A delivery model refers to the action-oriented strategy and process used to facilitate learning experiences that promote behavior change toward specific development outcomes and goals.

These results were important in convincing 61 national organizations to invest in strengthening these competencies, reaching 99,750 farmers over four years.

UBALE involved the national extension system in project implementation. The Ministry of Agriculture's Agricultural Extension Development Officers (AEDOs) provided regenerative and productivity-enhancing capacity strengthening through a lead-farmer extension model, which included the establishment of demonstration plots in FFSs and innovation plots through Farmer Learning Centers.

Level of competencies achieved by farmers

Figure 2 illustrates the changes in farmers' regenerative and productivity-enhancing agricultural competencies from midterm to endline. After the midterm assessments, the project teams identified competency gaps and took steps to address them. Except for PAR, there were statistically significant improvements in competency levels by landline

WSA innovation farmers increase their competency levels by 3% and improve maize yields by 41% (Turmel et al., 2021). PAR project participants maintained a functional level of competency after four years but experienced a 3% drop in competency due to two hurricanes in 2021 that hit the target region within two months.

Participants in the UBALE project had a 5% increase in their competency level, reaching a developing level at the endline. Further progress may have been limited by the participation of AEDOs as trainers who had multiple responsibilities beyond their role in the UBALE project. DFSA project participants remained at the basic competency level but had the highest percentage increase (15%).

These findings suggest that literacy level, duration, and intensity of capacity-strengthening activities, on-farm experimentation, and peer-to-peer learning influence competency levels. The late introduction of FLCs in the UBALE and DFSA projects may have affected their results.

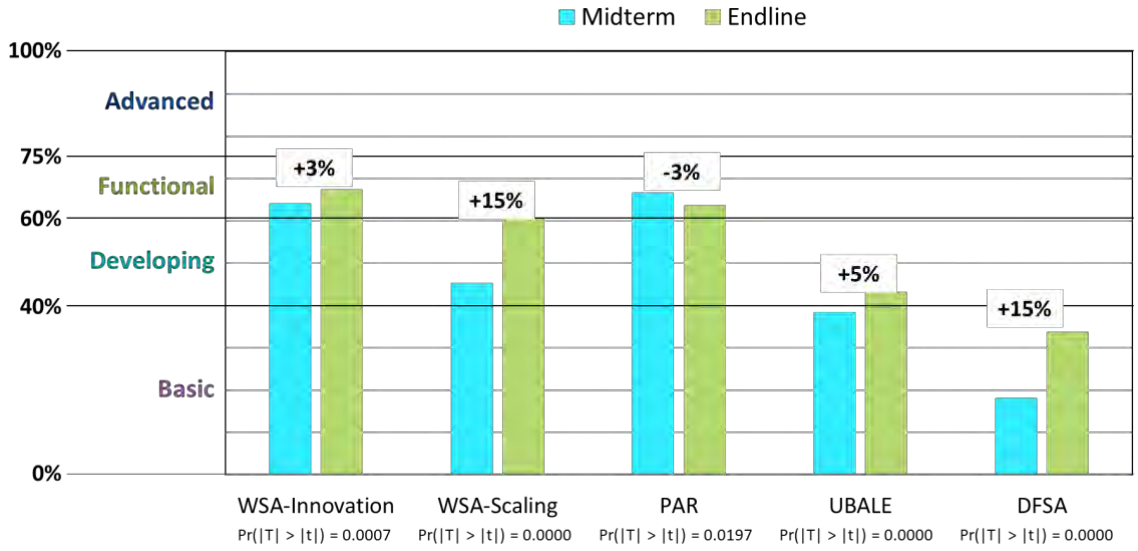

Fig. 2 I Average level of regenerative and productivity-enhancing agriculture competencies achieved by farmers at midterm and endline

From practice to adoption

To explore how farmers assess the costs and benefits of implementing regenerative agriculture practices and identify factors that promote or hinder the long-term adoption

and scaling of these practices, a tool from SenseMaker called a 'slider' was used. Farmers placed two core practices on a continuum between 'extremely costly' and 'highly beneficial', based on their experiences (Fig. 3).

Farmers perceived the two core practices as more beneficial than costly. Simpler practices, such as maintaining permanent soil coverage, have a greater perceived benefit-to-cost ratio. However, more knowledge-intensive practices, such as addressing crop nutrition needs, which require investment in fertilizers, have more varied perceptions, with some outliers indicating higher costs.

Farmers' perception of the positive cost-benefit of implementing regenerative agriculture practices is an indication that they will continue to implement these practices, moving from learning and practicing to internalizing this behavior change and adopting these practices for the long term.

NRM Behavior	Maintaining permanent soil coverage			Addressing crop nutrition needs		
	N	Extremely costly	Highly beneficial	N	Extremely costly	Highly beneficial
WSA-Innovation	452 (79%)		89	553 (97%)		86
WSA-Scaling	143 (56%)		88	242 (95%)		87
PAR	222 (82%)		91	258 (95%)		78
UBALE	460 (94%)		78	488 (99%)		80
DFSA	135 (99%)		77	195 (95%)		75

Fig. 3 I Farmer's perceptions of the cost-benefit of two core regenerative agriculture practices at endline

Constraints to implementing regenerative agriculture practices

Farmers were asked about the relative importance of knowledge and skills, financial resources, and family labor as constraints to implementing soil and water management practices using a SenserMaker triad signifier question. Most farmers indicated that they faced at least one of these constraints (Fig. 4).

The endline findings reveal that, consistent with the level of competencies attained by farmers, knowledge, and skills were a minor constraint for most, except for DFSA project participants, who had the lowest competency levels. For the WSA and PAR project participants, family labor was also a constraint.

Across all cases, financial resources were a common limiting factor in implementing these practices, suggesting the need for complementary interventions to enhance farmers' financial management and marketing competencies.

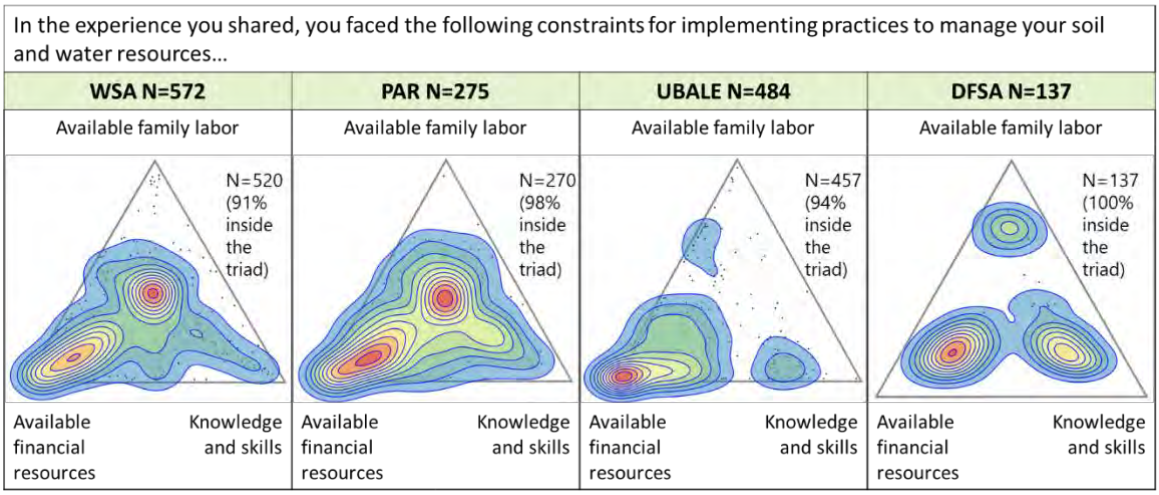

Fig. 4 I Farmer's perceptions of the constraints to implementing regenerative agriculture practices at endline

Perceived benefits of implementing regenerative agriculture practices

Farmers were asked about the relative benefits of implementing regenerative practices for restoring and protecting soil and water resources (planet), improving food availability (people), and improving income (profit). Ideally, farmers would perceive all three benefits equally, which would be represented by responses in the middle of the triad.

Participants in the WSA and PAR projects indicated that regenerative agriculture practices contributed equally to all three areas. In UBALE (Malawi), farmers perceive that these practices have primarily improved food availability. In DFSA (Ethiopia), most farmers perceived that adopting these practices helped them restore and protect their soil and water resources, with fewer reported benefits in terms of improved income or food availability. In DFSA, training was primarily provided through a food or cash-for-work scheme on communal land. As a result, farmers did not perceive direct benefits from increased food production or improved income.

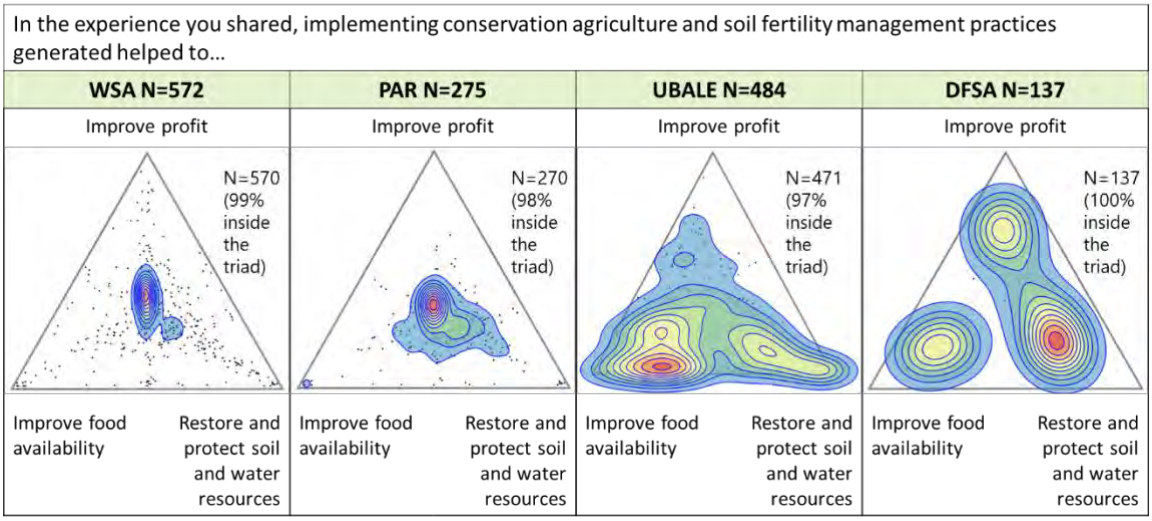

Fig. 5 I Farmer's perceived benefits of implementing WSA practices at endline

Conclusion

The competency model approach has proven to be an effective tool for tracking the progress of capacity-strengthening programs. It has provided valuable evidence on how these programs contribute to achieving intermediate results, such as increased production or productivity and improved livelihood outcomes.

The insights gained from applying the approach in the four case study projects led to the reshaping of CRS's capacity-strengthening strategy. The key elements of this revamped strategy, aimed at enhancing effectiveness and cost efficiency, include the following:

- Updating technical manuals: The technical manuals are being updated, with the revisions informed by the competencies and related behaviors of the respective technical areas.
- Client-focused and action-oriented approach: This strategy emphasizes understanding what farmers need to do to succeed and working with farmers to define what they need to know to adopt new practices. This process is action-oriented, with the degree of behavior change measured in terms of the specific actions that a farmer takes – or does not take – to achieve a particular goal.
- Adaptive management: The strategy involves tailoring the curriculum and making periodic refinements to capacity-strengthening strategies. These adjustments are informed by regular competency assessments.

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