Unearthing a Theory of Change for Creative Capacity Building

MIT D-Lab | CITE:
Evaluating capacity development for local innovation

Massachusetts Institute of Technology

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MIT D-Lab │ CITE

The Comprehensive Initiative on Technology Evaluation (CITE) at the Massachusetts Institute of Technology was created in 2012 to develop and disseminate rigorous, practitioner-oriented evaluation methodologies for use in global development. Based at MIT D-Lab since 2017, CITE is implemented by an interdisciplinary team of researchers and practitioners working at the nexus of evaluation methodology, sociotechnical systems, and global development challenges. This report is the first in a series of reports under the CITE project, "Designing an evaluation methodology to assess capacity development for local innovation." This project is developing an evaluation methodology to assess changes in local capacity for innovation and creative problem-solving, as well as the outcomes of interventions that seek to strengthen this capacity.

MIT D-Lab

MIT D-Lab works with people around the world to develop and advance collaborative approaches and practical solutions to global poverty challenges. The program's mission is pursued through academic offerings, including over 15 MIT courses, professional education courses, and student fieldwork opportunities; research groups focused on domains and methods with relevance for rural communities facing development challenges; and a portfolio of participatory design, innovation, and entrepreneurship programs implemented in collaboration with partners around the world.

Unearthing a Theory of Change for Creative Capacity Building

Author: Laura Budzyna, MIT D-Lab
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Acknowledgments:

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Acronyms

CCB - Creative Capacity Building

CITE - Comprehensive Initiative on Technology Evaluation

IDIN - International Development Innovation Network

ITTC - Intermediate Technology Transfer Centre

KNUST - Kwame Nkrumah University of Science and Technology

MEL - Monitoring, Evaluation, and Learning

MIT - Massachusetts Institute of Technology

USAID - United States Agency for International Development

INTRODUCTION

Unearthing a Theory of Change

In the fall of 2019, a team of researchers at MIT D-Lab embarked upon a journey to develop, field test, and refine a methodology to evaluate programs aimed at strengthening local capacity for innovation. This project interested us not only as researchers, but also as practitioners. Since it was first developed in 2007 by Amy Smith and Kofi Taha, our team at MIT D-Lab has been implementing the Creative Capacity Building (CCB) methodology, an approach that explicitly seeks to strengthen local capacities for innovation and promote community-driven problem solving. Although we were invested in measuring the outcomes of CCB, we had long grappled with the challenge of assessing its results consistently across contexts.

Over the course of more than a decade, D-Lab staff, instructors, researchers, and colleagues have implemented CCB workshops and methods in diverse locations around the world. Because of this, CCB interventions share certain core elements, but also differ in important ways across distinct local contexts. This presented the first challenge for our team: what did all of these efforts have in common? What specific skills, capacities, and mindsets did these programs aim to develop? How might participants continue to develop and use these capacities after the workshops ended? If they did, how might that affect the households and communities where they lived? Finally, how had each program been designed to accomplish these goals?

Our point of departure was to uncover the program theory *under which* practitioners were operating. Practitioners have an implicit understanding of how a long-established program works. This understanding is developed through lived experience and passed from practitioner to practitioner, even if it is not documented in a formal evaluation framework or directly measured. Eager to tap into the wisdom of program implementers, we decided to frame the first phase of our work around this foundational question: **What is the existing state of program theory around CCB at MIT D-Lab, and how did that theory come to be?**

This question led us to look back to 2016. At that time, we had set out to unearth the implicit theories of change driving three different CCB programs in Tanzania, Ghana, and Uganda. That effort had two objectives: first, to build out localized theories of change for each CCB program to use in their everyday work; and second, to develop a unifying theory of change for the CCB methodology informed by these practitioners' experiences.

This process was messy, and it revealed how pinning down an intervention's theory becomes even more slippery when it has been adapted to completely different contexts. Still, in the end, it resulted in a shared, working framework sourced from practitioners and participants. Documenting this participatory process, and the theories of change that resulted from it, became a logical starting point in our quest to identify the existing program theory informing CCB.

This report shares the results of that effort. In the following sections, we describe the process used to elicit site-specific theories of change for CCB programs in Tanzania, Ghana, and Uganda, as well as the process used to synthesize these findings into an overarching theory that describes how the CCB methodology works in general. Finally, we share the reflections we gained through this process, in the hope that it can guide other researchers, evaluators, and practitioners seeking to undertake similar efforts.

Creative Capacity Building in 2016

By 2016, MIT D-Lab's **Creative Capacity Building (CCB)** methodology, first developed in 2007 as an intervention to strengthen individuals' and communities' capacity to innovate, had been adopted and adapted by several of MIT D-Lab's global partners. Just as MIT D-Lab was becoming interested in establishing a cohesive evaluation framework for CCB, these partners were using CCB in different contexts, with different populations, and toward different ends.

While this diversity posed a challenge for a unified program theory, the team saw a clear opportunity. By looking across three programs, we could learn from each partner's experiences to both develop customized frameworks that would serve these partners' MEL needs and combine them into a rich, comprehensive theory of change for CCB.

In 2016, we set out to do two things:

1) First, work with multiple partners to develop a **locally-relevant theory of change** for each CCB program, building these partners' MEL capacities in the process.

2) Second, develop a **global theory of change** for the CCB methodology, informed by these partners' experiences.

Borrowing from the sister methodologies of Outcome Mapping and Outcome Harvesting, we embarked on a yearlong process of working with three different partner organizations to uncover the implicit theories of change governing each local program, and then roll them up into a global theory of change.

By documenting the theories of change developed four years ago, we aim to establish a starting point for our design of a more rigorous evaluation framework. We hope that they might inform future measurement of CCB and other interventions that seek to enhance the capacity to innovate.

We also saw inherent value in documenting the participatory process we followed with each partner to unearth implicit theories of change driving their programs. We aim to share the process in enough detail that others might replicate it for interventions related to capacity building or social change.

CREATIVE CAPACITY BUILDING

What is Creative Capacity Building?

Creative Capacity Building (CCB) trainings are immersive, multi-day workshops that teach participants from a particular community how to co-create low-cost solutions using local resources. Over the course of multiple days, participants learn and practice the CCB design process (Fig. 1) by identifying a challenge or opportunity in the community and then building a working prototype to solve that challenge or take advantage of that opportunity. In the process, they learn basic woodworking and metalworking skills as well as new strategies for working in teams. The CCB curriculum is visual and hands-on, designed to be accessible to participants of any literacy level and educational background. Ultimately, CCB aims to build the capacity to innovate by building confidence in creating technologies that can improve lives and livelihoods.
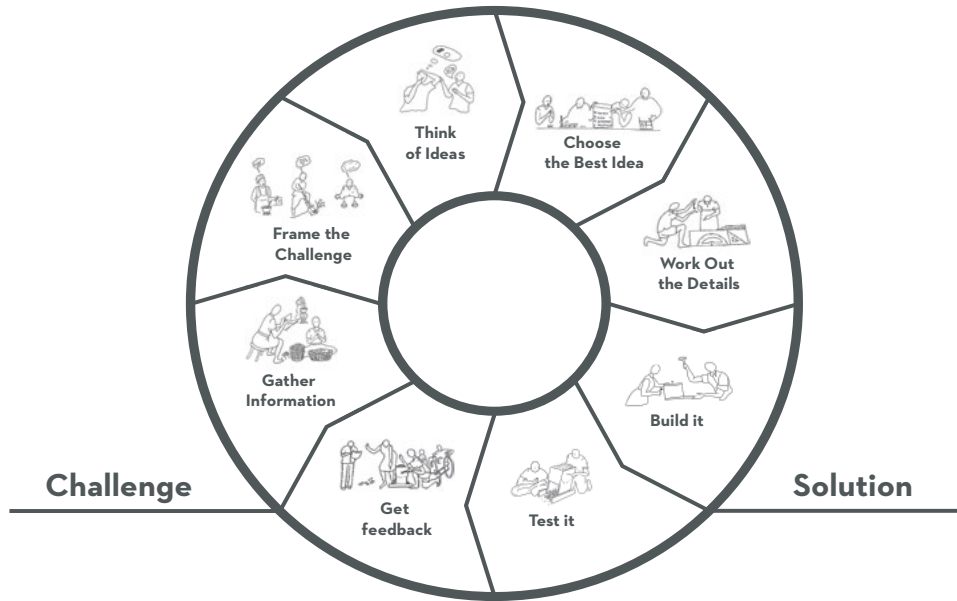
Image: Courtesy of MIT D-Lab

> *"MIT D-Lab's Creative Capacity Building (CCB) methodology promotes community-driven innovation, providing a pathway for community members to design solutions to the challenges they face. Underpinning CCB is the belief that anyone can be an active creator of technology, not just a passive recipient."*
> *(MIT D-Lab, 2020)*

Technologies produced at CCB workshops have ranged from time-saving devices for farmers, to small-scale manufacturing equipment for entrepreneurs, to solutions that promote community health and well-being. Examples include rice threshers, cassava graters, soap cutters, and oil presses, among many others.

CCB workshops are designed to be integrated into community development programs led by local organizations, as a method to jointly identify problems and as a catalyst for collaborative solutions. When CCB training is paired with small grants, technical mentorship, and access to tools, materials, and workshop space, participants can continue to develop their prototypes into technologies they can use or that can generate income.

CCB began in 2007 as an experimental workshop with a rural, resource-constrained community of displaced people in northern Uganda. In its first few years, CCB workshops were led by MIT D-Lab staff and students. Over time, the method was adopted by many of D-Lab's global partners and network members interested in incorporating community-led innovation into their programs. These partners included innovation centers and makerspaces, non-governmental and community-based organizations, and schools and universities. Meanwhile, MIT D-Lab continued to iterate on the methodology, adapting the curriculum to a variety of settings: rural, urban, and refugee camps. At the time of this writing, CCB has been facilitated in 18 countries across the Americas, Africa, Southeast Asia, and Europe.

CCB workshops have been used to engage a wide variety of audiences across a broad range of geographies. CCB participants have included, among others:

- Smallholder farmers in El Salvador
- Small-scale miners in Colombia
- Artisans in Botswana
- Refugees in Uganda
- Schoolchildren in Tanzania
- Cocoa farmers in Indonesia

As a result of its continued adaptation and proliferation, CCB's implementation has taken a wide variety of forms. Both MIT D-Lab and its partners around the world have used CCB in different contexts, with different populations, and toward different ends. On the one hand, this has made it challenging to arrive at an all-encompassing theory of change or to recommend a single evaluation strategy. On the other hand, this represents a wealth of examples of how CCB's program theory manifests itself in practice.

The Spread of CCB through the International Development Innovation Network

The proliferation of CCB trainings accelerated between 2012-2017, under the International Development Innovation Network (IDIN) program. Led by MIT D-Lab, IDIN was supported by USAID's Higher Education Solutions Network through the U.S. Global Development Lab and implemented by a global consortium of partners, including universities, non-governmental organizations (NGOs), and community innovation centers in 20 countries.

One of IDIN's three objectives was to build local capacity for innovation and design. To meet that objective, many of IDIN's partners implemented community CCB trainings as a core component of their activities.

International Development Innovation Network

GOAL:

To create and build a global network of changemakers that enables the design, development, and dissemination of innovations that address key development challenges associated with poverty, while building capacity in communities for local innovation and creative problem-solving.

OBJECTIVES:

1. Co-Create Effective Solutions: Develop and disseminate technologies, products, and approaches that address key development challenges and improve the lives and livelihoods of people living in poverty.

2. Build Local Capacity for Innovation and Design: Empower, train, and support more people from communities facing development challenges to engage in design, innovation, product, and venture development.

3. Generate Knowledge and Spread the Approach: Increase knowledge about and adoption of a Creative Capacity Building approach to addressing development challenges.

— Excerpted from IDIN Final Report to USAID (Budzyna, 2018)

Three of the locations emerged as CCB hubs early in the IDIN program: **Arusha, Tanzania**; **Kumasi, Ghana**; and **Pader, Uganda**. While all three CCB programs used the same curriculum, there were key differences in institution type, context, audience, and complementary programming. This variety presented the perfect opportunity for us to compare across sites.

IDIN in Tanzania

Twende is an innovation center in Arusha, Tanzania dedicated to alleviating poverty through the design, development, and dissemination of appropriate technologies. Twende welcomes local innovators to benefit from its workshop space, tools, and guidance from trained design instructors. **ECHO East Africa** is the regional branch of the global nonprofit ECHO, which aims to reduce hunger by supporting sustainable agriculture and the development of appropriate technologies. During the IDIN program, Twende and ECHO co-facilitated CCB trainings with schoolchildren, farmers, and local entrepreneurs. They also provided follow-up support: Twende offered its workshop space and technical advice, and ECHO provided small "picogrants" to help CCB participants continue to improve their prototypes.

IDIN in Ghana

The **Intermediate Technology Transfer Centre (ITTC)** at **Kwame Nkrumah University of Science and Technology (KNUST)** works closely with KNUST's academic units to research, co develop, and transfer technology to support small- and medium-scale industries in and around Kumasi, Ghana. During the IDIN program, KNUST delivered CCB trainings to skilled fabricators in Kumasi and to farmers in the surrounding rural areas, often engaging KNUST students to test and refine prototypes after the fact.

IDIN in Uganda

Caritas Uganda operated the **Tet Centre**, an innovation center in Pader, Uganda, during the IDIN program. The Tet Centre facilitated CCB trainings in multiple rural communities; after the trainings, they facilitated regular meetings of "Technology Groups," loaned out tools on a rotating basis, and coordinated savings and lending groups to help communities purchase additional materials.

UNEARTHING A THEORY OF CHANGE FOR CCB: OUR APPROACH

Our goal was to unearth the implicit theories of change that drove the CCB programs led by IDIN partners in Tanzania, Ghana, and Uganda, drawing on the wisdom of both the program's implementers and its participants. In doing so, we hoped to also build the capacity of each program to engage in monitoring, evaluation, and learning of its own programs.

As we began to design our approach, we knew that the following three features would be critical.

We wanted to design...

1) A **participatory** process that would deeply engage program staff, participants, and other stakeholders in the creation of a theory of change. In addition to being in line with MIT D-Lab's principles of participatory design, this would result in localized theories of change with much greater relevance to the local team.

2) A process that would uncover **emergent and unexpected outcomes** and did not presume a prescribed set of results. As CCB was still a relatively new methodology operating in a variety of complex settings, we wanted to be open to a variety of outcome pathways.

3) A process that would emphasize and enhance **learning** among all who participated. In particular, we hoped that this engagement would spark thoughtful reflection among those managing and implementing CCB programs, and that it would demystify monitoring and evaluation methodologies for those with less experience.

The following key questions guided our process:

1) What outcomes do the implementers hope to see?
2) What outcomes have implementers observed?
3) What outcomes have participants experienced?
4) How are these similar and different across contexts?

With these criteria in hand, we identified two approaches and methodologies that would fit with our goals: Outcome Mapping and Outcome Harvesting.

Outcome Mapping

What outcomes does the implementer hope to see?

Outcome Mapping, a participatory approach to MEL planning, is the evaluation methodology we selected for engaging the staff of CCB programs. This methodology focuses on desired changes in behavior as a result of initiatives on social change. We found that this approach was a good fit for CCB for two principal reasons: (1) its framing of program participants as development actors in their own right and (2) its participatory and learning-focused process for mapping and measuring outcomes. Our workshop design drew heavily on *Outcome Mapping: Building Learning and Reflection into Development Programs* (Earl et al., 2001), a facilitation guide for conducting an outcome mapping workshop.

The following ideas and principles from Outcome Mapping directly informed our approach

- **Outcomes are defined as changes in behavior**: "Outcome Mapping focuses on one specific type of result: outcomes as behavioural change. Outcomes are defined as changes in the behaviour, relationships, activities, or actions of the people, groups, and organizations with whom a program works directly." (Earl, et al., 2001, 1) We used this same definition when outlining outcomes of CCB.

- **Programs can influence, but not control, changes in behavior:** "Outcome Mapping assumes that the boundary partners control change and that, as external agents, development programs only facilitate the process by providing access to new resources, ideas, or opportunities for a certain period of time." (1-2) We framed CCB as a program and methodology that has the potential to influence people and organizations.

- **Outcome mapping focuses on people:** "As development is essentially about people relating to each other and their environments, the focus of Outcome Mapping is on people….At its essence, development is accomplished by, and for, people." (2) We centered our understanding of the CCB impact pathways on the people who participate and the actions they can take in their communities.

- **Outcome mapping builds team consensus through a participatory process:** "It helps answer four questions: Why? (What is the vision to which the program wants to contribute?); Who? (Who are the program's boundary partners?); What? (What are the changes that are being sought?); and How? (How will the program contribute to the change process?)." (3) We used these same questions to frame and design participatory workshops with CCB program staff.

- **Outcome measurement focuses on learning:** "Outcome Mapping focuses planning, monitoring, and evaluation on targeted behaviours, actions, and relationships within a program's sphere of influence, as well as on learning how to increase a program's effectiveness in relation to its ultimate goals." (10) We framed the experience as an opportunity for the program team to learn. We explicitly separated this effort from donor reporting requirements, which focused mostly on output tracking.

From *Outcome Mapping: Building Learning and Reflection into Development Programs* (S. Earl, F. Carden, Q. Smutylo 2001)

Outcome Harvesting

What outcomes have participants experienced?

Outcome Harvesting, a methodology developed as an extension of Outcome Mapping, was also a key part of our process to understand the outcomes of CCB to date. This is a participatory approach to evaluation that focuses on observed (not planned) changes experienced by the participants, often used for newer programs where outcomes are not fully understood. According to the developers of the method, "Unlike some evaluation methods, Outcome Harvesting does not measure progress towards predetermined

outcomes or objectives, but rather collects evidence of what has been achieved, and works backward to determine whether and how the project or intervention contributed to the change" (Wilson-Grau et al, 2013). This methodology documents outcomes in detail ("who changed what, when, and where?") as well as the program's role in influencing the outcome. We chose to approach our process without a preconceived or prescribed list of outcomes for CCB. In this way, we could incorporate the full range of outcomes observed by program staff or participants.

Within our Outcome Harvesting work, we also borrowed some ideas and techniques from the Most Significant Change (MSC) methodology, a form of participatory monitoring and evaluation that collects stories of significant change instead of using predefined indicators (Davies, R et al., 2005). Similar to Outcome Harvesting, Most Significant Change often uncovers unexpected and emergent changes. It also invites a wider range of people to assign importance and value to particular outcomes. In order to solicit stories from program staff and participants, we used MSC-inspired questions like, "Looking back over the last month, what do you think was the most significant change in _____?"

Once we had framed participatory design as a social change initiative aiming to influence individuals' behavior, it was easy to apply techniques from Outcoming Mapping, Outcome Harvesting, and Most Significant Change.

Theory of Change Workshop Agenda

Part 1: Developing Local Theories of Change

Through an Outcome Mapping workshop, CCB program staff co-create a theory of change specific to their program.

Part 2: Validating Local Theories of Change

In one-on-one interviews, CCB participants share their stories on the changes they have experienced since the workshop. CCB program staff review the findings and finalize the theory of change.

Part 3: Consolidating a Global Theory of Change

IDIN staff consolidate the three local ToCs into a global ToC.

SITE	DATE	IDIN PARTNER(S)
Arusha, Tanzania	January 2016	Twende, ECHO
Kumasi, Ghana	June 2016	KNUST (Technology Consultancy Centre)
Pader, Uganda	August 2016	Caritas Gulu (Tet Centre)

UNEARTHING A THEORY OF CHANGE FOR CCB: IMPLEMENTATION

Part 1: Developing Local Theories of Change

DAY 1

The first day of each workshop had two objectives: **(1)** to motivate the group to reflect on the desires and observed outcomes of their CCB program and **(2)** to create a draft theory of change (ToC) for their CCB program.

Why think about impact?

Caritas Uganda staff participate in a Human Histograms activity at the Tet Centre. Photo credit: Tricia Johnson

Human Histograms

To get a sense of the group's prior experience with evaluation, their perspectives on the program, and the degree to which their thoughts were divergent or convergent, we kicked off with a game. We shared pairs of statements, then asked workshop participants to stand toward one side of the room if they agreed with one statement and toward the opposite side if they agreed with the other, and along the spectrum in between. Then, we called on individuals to ask why they had chosen to stand in that spot. This got people thinking, moving, and speaking, and set the tone for the day.

A few examples:

I am very sure about how CCB leads to change in my community.	*I'm not at all sure about how CCB leads to change in my community.*
CCB affects most people in the same way.	*CCB affects each person differently.*
It is most important for us to have an impact on people's livelihoods and incomes.	*It is most important for us to have an impact on people's mindsets and relationships.*
I feel very comfortable conducting interviews and collecting information.	*Conducting interviews and collecting information are new to me.*

Why Measure Impact?

We then posed this question to the group: Why should we care about measuring impact? As people shared their ideas one by one, we listed them on a piece of flip-chart paper. Once everyone had shared, we went over the list one more time together, and left it on the wall for the remainder of the workshop.

How does CCB create impact?

All of the remaining activities of the first day drove toward the same goal: to co-create a draft theory of change for the CCB program.

To set the stage, we shared the following driving questions for the day:

- Why do we do CCB? What's the point?
- What happens after the CCB ends?
- How might CCB change individuals?
- How might CCB change communities?
- Who changes? How? Why?
- Who does not change? Why not?

Explaining the Theory of Change

Most of the workshop participants were not familiar with the concept of a theory of change or results framework. We first shared a basic input-output-outcome-impact framework:

INPUT: What do you have?
OUTPUT: Whom do you want to reach?
OUTCOME: What do you hope they will do?
IMPACT: How will the community change?

In each workshop, we illustrated the framework using a technology that had been developed at that innovation center: a manure spreader in Tanzania, a cassava grater in Ghana, and a beehive in Uganda. We drew up a blank framework, asked each question, and then filled it out in real time as a group. **By using a tangible, familiar example with clear answers to each question, we were quickly able to cut through the jargon.**

Example: "If Frank builds a manure spreader and delivers it to farmers, then farmers will use the manure spreader to fertilize their crops. Crop yields will improve, which will improve farmers' incomes, reduce hunger in the community, and strengthen the local economy."

INPUT: Manure spreader.
OUTPUT: Farmers buy the manure spreader.
OUTCOME: Farmers use the manure spreader to fertilize their crops.
IMPACT: Crop yields improve, farmer incomes improve, hunger is reduced, and the local economy is strengthened.

Theory of Change

"If we _____ , then _____ will result"

manure spreader	7+80 farmers	farmers use machine / collect + spread manure	more harvest / enough food / income $ (farmers + county) / healthier livestock
What do you have?	Whom do you want to reach?	What do you hope they will do?	How will the community change?
INPUT	**OUTPUT**	**OUTCOME**	**IMPACT**
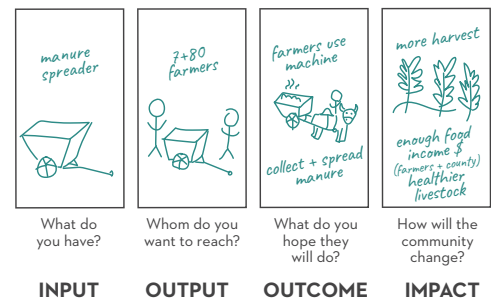
Our next step was to take this framework and apply it to the CCB training itself. Using the same structure, we began to fill in CCB's inputs (the training itself) and outputs (the participants), but we left the outcomes and impacts blank. **We then framed the goal for the rest of the day: to fill in the blanks and complete the map.**

Theory of Change

INPUT	OUTPUT	OUTCOME	IMPACT
What do you have?	Whom do you want to reach?	What do you hope they will do?	How will the community change?

Articulating a Vision for Impact

Our next step was to articulate a collective vision for impact (to fill in the last square of the ToC.) We posed the following questions to the group:

> *What are your hopes and dreams for this community?*
> *If the CCB program is successful, what will the community look like in 10 years?*

First, we asked participants to reflect on these questions individually, writing down their ideas. After 10-15 minutes, we invited them to pair up and share their ideas with their partner. Each pair then reported out their ideas to the larger group. We recorded and clustered each idea as it was shared. During a lunch break, we consolidated these ideas into 3-4 statements articulating the team's vision. We then summarized those statements on sticky notes and placed them in the blank "Impact" space on the CCB theory of change.

Defining Outcomes

To finish filling in the blanks, we moved to the "Outcomes" column. We first posed these two questions:

> *Who do you work with directly?*
> *Who might you influence through CCB?*

As a group, we generated a list of stakeholder groups. We wrote the name of each group on the top of a different piece of flip-chart paper and hung the papers around the room.

We then posed this question:

> *After the CCB, what do you hope they will do?*

We passed out sticky notes and asked the workshop participants to write one action on each sticky note and place it on the corresponding stakeholder sheet. As a group, we consolidated and clustered these actions into categories of outcomes. Once we were happy with these categories, we summarized them on sticky notes and placed them in the blank "Outcome" space on the CCB theory of change.

Recap

To finish the day, we read out the draft theory of change as an if/then statement, drawing on the themes placed on the theory of change template. We were careful to call this draft a "prototype"—a first draft to be refined and tested.

IDIN in Tanzania

"If we teach CCB to students and community members, then participants will continue to **work on** their CCB projects, **disseminate** them to people who can benefit, and **use** them for their own benefit. They will **apply CCB skills and ideas** in their daily lives, and they will **teach** these ideas to others. The organizations we work with will provide more **support to innovators** and will **adopt and promote the CCB approach** in their own work. Together, this will contribute to a world with **improved access to technologies** that improve people's lives, a **stronger local economy**, and a **nation of innovators** and problem-solvers."

IDIN in Ghana

"If students, farmers, artisans, and community members participate in CCB, then they will continue to **work collaboratively on their CCB projects**, **create new technologies or improve existing ones**, and **benefit from these technologies**. They will **apply CCB skills and ideas**, including design thinking and problem solving, in their daily lives, and **disseminate these ideas to others**. This will contribute to a **better local economy**, **greater social well-being**, and a **more innovative community**."

IDIN in Uganda

"If we provide CCB trainings in communities around Pader, then participants will **collaborate** to **continue working on their CCB projects**, **create new solutions** to challenges, **make products to sell**, and **teach CCB skills to others**. Local leaders will **support CCB implementation and follow-up** and donors will **provide funding and support** to CCB programs. Together, this will contribute to more **self-reliant**, **economically empowered**, **innovative**, and **peaceful** communities."

Text in blue = Outcomes; **Text in green** = Impacts
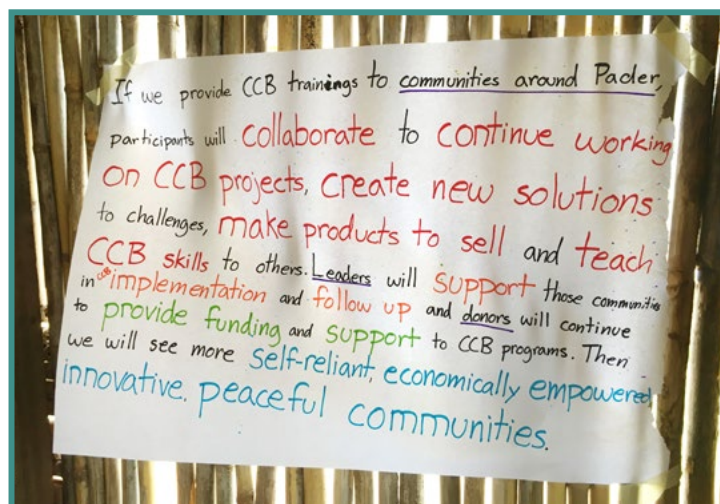
A draft theory of change for CCB created by the Caritas Uganda team.
Photo credit: Laura Budzyna

DAY 2

The second day of the workshop had two objectives: (1) to invite staff to share motivating and inspiring stories from the CCB program to date and (2) to identify enablers and barriers to outcomes. We opened the day by reviewing the draft theory of change from the day before, sharing any additional changes made since Day 1.

What outcomes have you seen?

Storytelling

Drawing from the Most Significant Change approach, we handed an index card to each staff member and asked them to answer the following questions:

> *What is the most significant change you've seen after a CCB?*
> *Why is that story important?*

On the opposite side of the index card, each staff person wrote a headline for their story.

A Caritas Uganda staff member shares a CCB impact.
Photo credit: Laura Budzyna

Selected Story Themes

A Nation of Young Builders (Tanzania)	*We have solutions for our problems* (Tanzania)
I thought I had no creativity (Ghana)	*Realizing my potential* (Ghana)
From the Dark to the Light (Uganda)	*Community Group Formation* (Uganda)

Then, one by one, each staff person shared their story aloud.

This activity served two purposes. First, it allowed staff a space to celebrate the achievements of their programs. Second, it allowed us to revisit the theory of change in the context of these stories.

Afterward, we asked the group how the stories they just heard did or did not fit with the draft theory of change. Did the stories focus more on one type of outcome? Did they mention any outcomes that we missed? We adjusted the theory of change accordingly.

When do we achieve outcomes? When don't we?

Recipe for Success

The final activity of the day focused on a "recipe for success," in which we teased out the enablers and barriers to the outcomes we hope to see. We posed the following questions to the group:

When are we most likely to achieve these outcomes?
When are we least likely to achieve these outcomes?

We then facilitated a brainstorming session where participants shared enablers and barriers they had observed in three categories: Participants, Context and Conditions, and Implementation.

Example Enablers	Example Barriers
• Group members live close to each other • Resources are available to continue the project • Project is relevant to the community's needs • Group members are motivated and interested in the project	• Workshop takes place close to harvest time • Insufficient follow-up support or resources are available • The project is not relevant to the whole group • Participants have limited time / competing commitments

This activity, in addition to providing content for the "assumptions" section of the theory of change, also raised hypotheses to validate later with participants and opened up critical discussion around potential programmatic tweaks.

We closed this half day by framing the work our team would be doing over the following week: interviewing 20-30 past participants. We shared that we would try to gain some insights into the following questions: Does reality match the hopes and dreams of the program staff? Which outcomes are most important to the participants? Who achieves outcomes, when, and why?

Part 2: Validating Local Theories of Change

DAYS 3-6: PARTICIPANT INTERVIEWS

Interviewing a CCB participant in Oguta, Uganda. Photo credit: Tricia Johnson

In the second stage of our work, we began to gather input on the theory of change from the CCB participants themselves. To do this, we set out to learn which outcomes participants had actually experienced and valued. It's important to note that the purpose of these interviews was not to evaluate the programs' outcomes, but rather to validate and inform the theory of change.

At each site, we identified three or four CCB trainings that had taken place within the last 12 months. With the help of the local partner, we then invited all of the participants from those trainings to be interviewed, and we informed them of the date and time we would be conducting interviews in their area. Over the course of three to four days, we conducted semi-structured interviews with the help of an interpreter (usually a staff member of the partner organization) and a note taker. Interviews took place in the respondent's place of work, school, or a common area near their residence, which allowed us to see several of the CCB technologies firsthand. Each interview lasted approximately 30-45 minutes. In each country, we interviewed between 20 and 35 people, for a total of 84 interviewees representing 10 CCB trainings.

	# of respondents interviewed	# of CCB trainings represented
Tanzania	33	4
Ghana	30	3
Uganda	21	3
Total	**84**	**10**

Our semi-structured interviews adhered to the following broad format.

- **BEFORE:** How did you find out about CCB? Why did you decide to participate? What were your goals?
- **DURING:** Tell me about your experience in the training. What was the most memorable moment? What project did you work on? What did you learn?
- **AFTER:** What is the most important change you've experienced since the CCB ended? What are you doing differently now? Why is that change important?
- **IN THE FUTURE:** What do you hope to do next?
- **FEEDBACK:** How can we improve the CCB program going forward?

Interviewing a CCB participant in New Longoro, Ghana. Photo credit: Maya Ranganath

By asking about participants' goals before the training, takeaways during the training, actions since the training, and future aspirations, we could obtain a picture of each individual's conceptual "map" of their own change pathway. We also took the opportunity to ask for feedback on the program, as this information would be immediately beneficial to the program staff.

Analyzing the Data

Our next challenge was to analyze the interview data—and fast! Our goal was to have results ready to share with program staff in time for the sensemaking workshop, just a few days after the conclusion of interviews.

For each of the five sections (Before, During, After, In the Future, and Feedback), we used qualitative coding to identify patterns in the responses. We pulled out the most common themes and representative quotes for these themes. For the "After" section, we already had a ready-made set of codes: the list of outcomes from the first workshop. In other words, we counted the number of times participants mentioned each outcome in the theory of change. This process helped us to identify which outcomes were most and least common among participants. We also added new codes for outcomes not predicted by staff - this, critically, is how we captured unexpected outcomes, and, in cases where they were common enough, added them to the theory of change.

For each country, we disaggregated certain themes by CCB cohort, as results often varied from cohort to cohort or village to village due to specific circumstances. This was an effort to make the findings as specific and actionable as possible for the program staff, but it also helped to illuminate enabling factors and barriers.

We prepared data visualizations—slides and flip charts—for each sensemaking workshop to make the results clear and easy to understand. We also generated a list of discussion questions based on the findings.

KEY FINDINGS

1   **Participants reported similar changes in knowledge, skills, and mindsets across all three sites.**

In spite of the diversity across and within the three sites, we heard remarkably similar themes about what participants had taken away from the experience. The first was a sense of **agency**, and more specifically, the belief in one's own ability to solve a problem. This confidence was supported by a second mindset shift: a newfound appreciation for and **valuing of local materials and resources**. Third, participants spoke to the specific skills related to using the **design process**; in particular, many highlighted the importance of gathering input and feedback from potential users. Finally, participants cited strengthened **relationships** and connections with others through collaborating on shared solutions. The consistency of these responses across sites suggests that in spite of implementation differences, the CCB curriculum itself is quite robust and has broad resonance across contexts.

2   **However, the outcomes that participants took afterwards differed quite markedly from site to site.**

In Tanzania, we saw the highest continued engagement around the **CCB project** itself: the three most common outcomes were continuing to work on the CCB project (61%), applying CCB skills and ideas to other challenges (57%), and disseminating their CCB project to others (43%).

In Ghana, we saw most outcomes focused on **applying the design process** to new technologies. The three most common outcomes were applying CCB skills and ideas to other challenges (76%), creating a new product (46%), and disseminating a new product (43%). Participants' continued engagement with the CCB technology was comparatively much lower (just 16% used them and 13% continued to work on them).

In Uganda, the outcomes centered on the CCB group continuing to **get together and use their maker skills**. The most common outcomes were collaborating with others in the CCB group (86%) and making handmade products to sell (86%). While several continued to use their CCB project (38%), few continued to work on it (14%) or other projects (19%).

3   **These differences seem to be due in part to the design of each CCB program, including variation in participant profiles, resources, and structure.**

Programmatic choices made by each implementing team, especially participant recruitment and programmatic structure, seemed to correlate with differences in outcomes, both across and within sites.

This played out most clearly in the **profiles of the participants**. Across all sites, farmers were more likely to use the CCB technologies, business owners were more likely to turn the CCB technology into an income-generating opportunity, and makers and fabricators were more likely to apply the design process to other challenges. For example, in Ghana, most participants were fabricators living in the city of Kumasi. The agriculture-focused technologies they produced in the CCB trainings were less relevant to them, but the design concepts they could now apply in their daily work allowed them to custom-make new products.

The second category of factors had to do with **program resources**. We saw the strongest outcomes when participants had access to funds, tools, space, materials, or advising to continue working on past or new projects, either provided directly by the program or already available in the community and accessible to participants. Twende in Tanzania, for instance, offered a well-equipped and conveniently located workshop space, and this enabled the high rates of continued project work.

Finally, we tended to see the strongest outcomes among **cohesive groups**, especially if group members lived close together, and even more so if they were a pre-existing group engaged in other non-CCB activities together. To promote this, some programs also built longer-term engagements into the design (e.g., Twende's weekly after-school program and the Tet Centre's regular Technology Group meetups), which promoted continued collaboration and iteration.

4 Economic and contextual factors also mattered.

Four other factors emerged as major enablers of outcomes, especially for the continuity of CCB technologies or other projects. The first was a **concrete economic motivation**: if the CCB technology represented a clear income-generating opportunity, participants were more likely to iterate on it and use it. Second, participants with an **existing business or farm** in which to apply their solution were much more likely to do so than participants who did not already have this platform. Third, individuals and communities with **existing markets**, relationships, and channels for dissemination were more likely to sell their CCB technologies. Finally, CCB technologies that were developed at a timely moment for the **season**—such as a harvesting technology developed right before harvesting season—were more likely to see continuity than those developed off-cycle.

DAY 7: SENSEMAKING WORKSHOP

The final step in our process was to share our findings with the team in a two-hour sensemaking workshop. The goal of this final session was to share out the results, collectively agree on any updates to the theory of change, and facilitate a discussion around programmatic recommendations and next steps based on the results. We introduced the session like this:

"Last week, we made our first prototype of a Theory of Change. This week, we went to the field to refine it."

We reminded participants of last week's process and questions: Does reality match our hopes and dreams? Which outcomes are most important to the participants? Who achieves outcomes, when, and why? We then shared the five guiding questions from the interviews and background information about who was interviewed.

Caritas Uganda staff make guesses and reveal the results of the participant interviews. Photo credit: Tricia Johnson

Next, we shared the interview results. We did this in a combination of ways: a slide deck with overall findings, a "gallery walk" where participants could get a closer look at specific questions or cohorts, and a game where participants could guess the results before each "reveal." We focused the sharing on outcomes: the most and least commonly mentioned outcomes, and the barriers and enablers that participants mentioned for each outcome.

As participants interacted with the results, we provided the following questions to spark discussion and to gain additional context and insight:

- What does the data tell you?
- Why might we be seeing this pattern?
- What surprises you about these results?
- What questions do you have?

We then suggested changes to the theory of change based on the participant input, obtaining consensus among the group on how to update the theory of change to accommodate the new findings.

Finally, we posed two or three discussion questions based on the results. We invited staff to choose a topic they wanted to discuss in more depth in a small group; our team took notes in these discussion groups and shared them back with the program teams. A few examples of the questions discussed:

- What is the best way to recruit and select participants?
- What are some strategies to engage and influence institutions?
- Should we promote more innovative problem-solving? If so, how?
- How can we help participants overcome the challenges related to business/markets?
- Should we collect this kind of information on a regular basis? How often? How might we use it?

The results of the participant interviews displayed on the walls of the Tet Centre. Photo credit: Laura Budzyna (both photos)

Part 3: Consolidating a Global Theory of Change

Our final step was to look across the three theories of change, identify commonalities and differences, and develop a comprehensive theory of change.

Theories of Change

IDIN in Tanzania

"If we teach CCB to students and community members, then participants will continue to **work on** their CCB projects, **disseminate** them to people who can benefit, and **use** them for their own benefit. They will **apply CCB skills and ideas** in their daily lives, and they will **teach** these ideas to others. The organizations we work with will provide more **support to innovators** and will **adopt and promote the CCB approach** in their own work. Together, this will contribute to a world with **improved access to technologies** that improve people's lives, a **stronger local economy**, and a **nation of innovators** and problem-solvers."

IDIN in Ghana

"If students, farmers, artisans, and community members participate in CCB, then they will continue to **work collaboratively on their CCB projects**, **create new technologies or improve existing ones**, and **benefit from these technologies**. They will **apply CCB skills and ideas**, including design thinking and problem solving, in their daily lives, and **disseminate these ideas to others**. This will contribute to a **better local economy**, **greater social well-being**, and a **more innovative community**."

IDIN in Uganda

"If we provide CCB trainings in communities around Pader, then participants will **collaborate** to **continue working on their CCB projects**, **create new solutions** to challenges, **make products to sell**, and **teach CCB skills** to others. Local leaders will **support CCB implementation and follow-up** and donors will **provide funding and support** to CCB programs. Together, this will contribute to more **self-reliant**, **economically empowered**, **innovative**, and **peaceful** communities.".

Commonalities & Differences

Vision / Impact			
	Tanzania	Ghana	Uganda
Economy	Stronger local **economy**	Better local **economy**	**Economically empowered** communities
Community Innovation	Nation of **innovators** and **problem solvers**	More **innovative community**	More **innovative** communities; more **self-reliant** communities
Individual Well-Being	Improved **access to technologies** that **improve people's lives**	Greater **social well-being**	More **peaceful** communities

We began by looking at the themes in the vision/impact portion of each theory of change. First, we noted that all three theories of change emphasize CCB's potential to drive economic impacts through increased income generation. All three theories of change also highlight the idea of a community of innovators and problem solvers, and an economic and cultural shift away from being the recipient to being the producer of ideas and solutions. Finally, all three also mention an overall improvement in well-being and quality of life, but with different nuances and pathways. For instance, IDIN in Uganda's idea of well-being focuses on more peaceful communities, stressing that the collaborative CCB approach contributes to community cohesion. On the other hand, IDIN Tanzania's statement focuses on improved quality of life through access to improved technologies.

Outcomes for Participants			
	Tanzania	Ghana	Uganda
Continue CCB projects	**Continue** their **CCB** projects	**Continue** their **CCB** projects	**Continue** their **CCB** projects
Create or improve other solutions	**Create** new technologies/ solutions	**Create** new technologies/ solutions or **improve** existing technologies	**Create** new technologies/ solutions
Use solutions	**Use** technologies for their own benefit	**Use** technologies for their own benefit	**Use** technologies for their own benefit
Disseminate or sell solutions	**Disseminate** new technologies to people who can benefit	**Sell** new technologies	**Sell** new technologies
Apply CCB skills and ideas	**Apply CCB skills and ideas** in their daily lives	**Apply CCB skills and ideas** in their daily lives	
Teach CCB skills and ideas	**Teach** these ideas to others	**Teach** these ideas to others	**Teach** these ideas to others
Other			**Make** and **sell** handmade products

We then moved on to outcomes. Outcomes for participants were, for the most part, similar across the three theories of change. Notably, these divide into two categories or pathways: the outcomes of the **product** and the outcomes of the **process**. Several outcomes focused on the technologies themselves: continue CCB projects, create new solutions, use solutions, and disseminate or sell solutions. The use and sale of these projects were seen as the main mechanisms with which to drive toward the impacts of both income generation and well-being. The second group of outcomes focused on CCB skills and ideas: two ToCs mentioned applying CCB skills to other challenges, and all three mentioned teaching them to others. These were seen as the main drivers toward the impact of more innovative communities.

The IDIN in Uganda theory of change specifically mentioned handmade products (not necessarily innovative or problem-solving technologies) as a specific outcome.

Outcomes for Institutions			
	Tanzania	Ghana	Uganda
Partners: Adopt, implement, and promote the CCB methodology	**Adopt and promote the CCB approach** in their own work		**Support CCB implementation and follow-up**
Funders: Support local innovators and CCB programs financially	Provide more **support to innovators**		**Provide funding and support** to CCB programs

Notably, the theories of change developed in Tanzania and Uganda encompass outcomes not just for participants, but also for local leaders, partner organizations, and donors. These tended to fall into two categories. The first category focused on implementing organizations and partners, who would ideally adopt, implement, and promote the CCB methodology after engaging with it. The second focused on funders, who they hoped would support CCB programs and other programs to support local innovators with their resources. These components argue that by engaging these actors directly with the CCB program, they can shift mindsets and resources toward investment in local innovation and innovators.
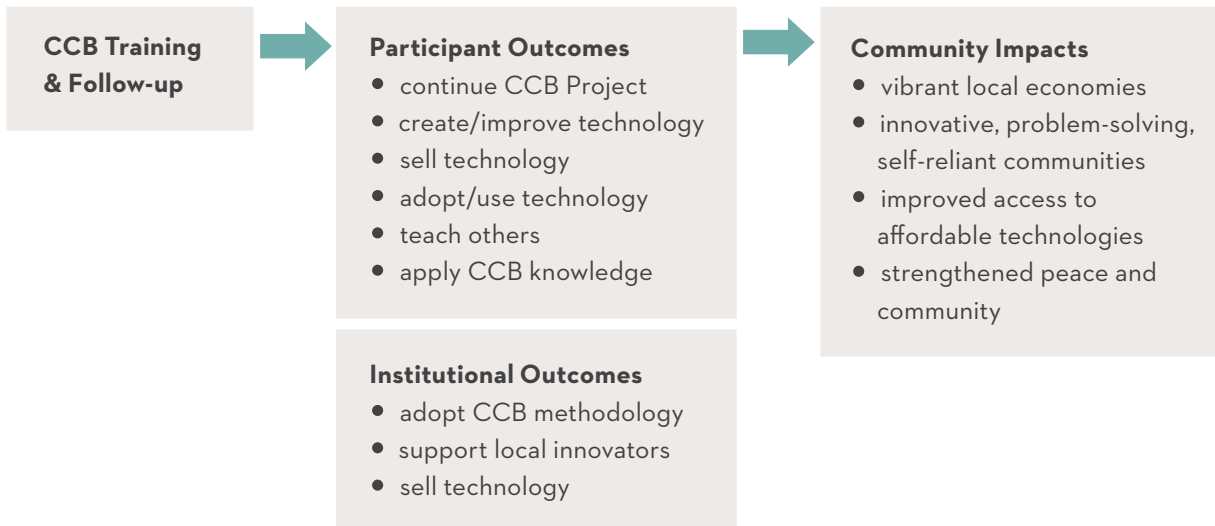
Global Theory of Change

The following table illustrates the common elements of all three local theories of change.

Participant-Level Outcomes	Institution-Level Outcomes	Community-Level Impacts
Continue CCB project	Adopt CCB methodology	Support vibrant local economies
Create/improve technology	Support local innovators and local innovation	Promote a culture of innovative problem-solving
Sell technology		Improve access to affordable technologies that improve quality of life
Adopt/use technology		
Apply CCB skills and ideas		Strengthen peace and community
Teach CCB skills and ideas		

We brought these common elements together in the following global theory of change:

"If people participate in CCB trainings, then they will continue their CCB projects and create, improve, sell, and use technologies. They will also apply CCB skills and ideas to other challenges and teach those ideas and skills to others. Other institutions will adopt, implement, and promote the CCB methodology and provide more resources to local innovators and local innovation. Together, this will contribute to more vibrant local economies, a culture of innovative problem solving, improved access to affordable technologies that improve quality of life, and strengthened peace and community."

CCB Training & Follow-up →

Participant Outcomes
- continue CCB Project
- create/improve technology
- sell technology
- adopt/use technology
- teach others
- apply CCB knowledge

Institutional Outcomes
- adopt CCB methodology
- support local innovators
- sell technology

→ **Community Impacts**
- vibrant local economies
- innovative, problem-solving, self-reliant communities
- improved access to affordable technologies
- strengthened peace and community

INSIGHTS AND REFLECTIONS

We noted five features of our process that worked well and that may serve as recommendations for others.

Speak the language of design: Since the implementers of CCB workshops are often technologists, makers, and designers themselves, we knew it would be important to use language that would resonate with them. Our theory of change creation process embodied many elements of the participatory design process—prototyping, gathering feedback, and iteration—that are taught in the CCB workshops themselves. Describing the first draft as a "prototype" helped illustrate its purpose: an imperfect but functional model to be refined and tested. Understanding our technical audience also helped us focus on concrete and tangible examples, such as by explaining the concept of a theory of change using the example of a problem-solving technology.

Build buy-in: We knew that our visits would entail a time cost for our local partners, so we did our best to ensure that our visits would have value to them. In our workshop design, we were careful to give the floor to the workshop participants from the start. Asking them to share their opinions and ideas in the first few activities set a tone that they were the drivers of this process, and thus motivated active participation. We also leveraged the interview phase as an opportunity to obtain information that would be immediately useful to the program teams.

Make quick, tangible progress: Any lofty discussion of a program's vision brings a risk of having circular conversations without moving forward. A clear, well-paced structure helped us to advance the conversation. One helpful tool was to clearly and visually define the objective: hanging a theory of change on the wall and leaving blank spots to fill in reinforced the reason for each activity that followed. We also made a point to consolidate input on the fly, leveraging tea breaks, individual brainstorming time, the help of a co-facilitator, and group work to quickly draft text and move to the next step.

Keep an open mind: Our process emphasized open-ended responses, both in the staff workshops and in the participant interviews. We did not share examples of CCB theories of change with implementers or ask participants about particular outcome areas. This allowed us to listen for the outcomes that were most salient and relevant for staff and participants, and to keep an ear to the ground for unexpected outcomes.

Integrate capacity building: The process also explicitly built in opportunities to grow MEL capacity at the organization. Program staff learned the concept of the theory of change, accompanied interviews as translators, and engaged in sensemaking processes to analyze the data. After the workshop, we shared tips for integrating data collection on the defined outcomes as a regular activity into their processes.

We also noted three things we would do differently in future iterations.

Build in complexity: The theory of change template we used in these workshops was fairly linear and simplistic. One of the limitations of outcome mapping as a methodology is that it focuses on observable actions and not on internal changes that lead to those actions, such as changes in knowledge, skills, and mindsets. While participants mentioned several of these takeaways, they did not form a part of the theory of change model that the staff developed. Our model also did not illustrate which outcomes led to which impacts, include potential feedback loops, or make assumptions explicit. While this helped to keep the process straightforward and expedient, we missed out on unearthing some of the more nuanced connections and distinctions.

Include participants' vision for impact: In our interviews with participants, we limited our questions to how their CCB experience had affected them personally. However, we did not ask them about the outcomes they had observed in their fellow participants, or the outcomes they hoped to see realized in their community. This was a missed opportunity to understand more deeply these participants' vision and the potential they saw (or did not see) in CCB.

Follow up: While the workshop incorporated enough MEL capacity-building to expose staff to MEL's purpose, concepts, and processes and to share some tools for continuous outcome monitoring, it did not incorporate long-term accompaniment to see that strategy through. More follow-up would not only strengthen each organization's ability to monitor outcomes on their own, but might also contribute to additional iterations of the theory of change.

Future Work

Since this exercise took place, CCB has continued to evolve, and our team has set itself the task of developing and formally testing an evaluation framework. To that end, our next steps include the following.

- **Continue to develop the theory of change with new insights from CCB practitioners:** In the years since these workshops, MIT D-Lab's collaborators around the world have continued to implement CCB in an ever-widening variety of contexts. Many have also adopted and implemented MEL strategies of their own to understand the outcomes and impacts of these trainings. By interviewing these practitioners, D-Lab is updating its understanding of trainers' hoped-for and observed outcomes to inform updates to the theory of change.

- **Take inventory of CCB measurement tools:** Building off this work, both MIT D-Lab and its collaborators have developed MEL tools that have since been used in a variety of CCB programs. As a next step, the team will take inventory of these tools, the questions that they employ, and the outcomes that they attempt to capture.

- **Measure the capacities that lead to outcomes:** While the 2016 exercise focused on the actions taken by CCB participants, it is now critical for us to understand which capacities developed by participants in the trainings led to these actions, and through what causal mechanisms. An important piece of this team's work will be to unpack the concept of "capacity to innovate" into specific skills, and then develop instruments that can approximate each skill.

Conclusion

Looking back at our 2016 process with fresh eyes has given it new value. Four years ago, this work served the critical purpose of producing a common working framework for evaluating CCB, building the MEL capacity of partners in the process. Now, it serves as a key historical source for understanding the evolution of CCB program theory, a starting point for a more rigorous evaluation framework for CCB-like interventions, and a participatory model for others to follow and adapt as they uncover the implicit theories that drive their own interventions.

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