Building Resilience and Social Cohesion through Local Innovation Ecosystems in South Sudan

Local innovation ecosystem evaluation in South Sudan

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Executive Summary

The Creative Capacity Building (CCB) project was a pilot project to build a local innovation ecosystem in two sites, Duk and Pibor in South Sudan, during 2022. CCB is a hands on curriculum developed at D-Lab and taught by D-Lab in over 20 countries. The project aimed to train people in the design process and to apply it to developing technologies, products and services that would improve their quality of life, increase income generation, improve their agency and problem solving skills and enhance social cohesion.

This report summarises the findings of an evaluation of the project conducted during January - September 2022. It is based on primary data collected in Duk and Pibor including interviews, focus groups, observations and outcome harvesting workshops. It also draws on a document review, interviews with project staff, and survey data. The key findings included:

Knowledge and learning

1. **Participants valued the hands-on nature of the training** and learning to do things on their own. They gained knowledge and skills in using tools, designing technologies, and in basic business skills. They felt more confident about using tools to make things if provided with materials. A small number said they could use the skills to solve problems outside the CCB setting.

2. **Participants felt proud of their ability to conceptualise and make technologies that solved problems.** They reported positive feelings about how the training promoted agency, self reliance and confidence. There were some specific examples of how this has manifested in their lives, including in starting new businesses and improving their existing livelihoods.

Technology development

3. A total of 18 technologies were built over the course of 10 CCBs. **Many of the technologies were improved after the training, through informal mentoring and during a Co-Creation Event.** CCB participants from both locations continued work on their prototypes, although it was most common in Pibor. Lack of materials was the biggest constraint to refining technologies.

4. **44% of the technologies were being used to reduce labour** by participants, their households or their communities. Participants said the technologies enabled them to simplify and speed-up common manual tasks such as carrying heavy loads (wheel cart), cooking (oven) and maize shelling.

5. The technologies had a transformative effect on some people's earnings. **44% of the technologies were being used to generate an income;** participants sold or rented the technology, or used it to produce a product or provide a service. Participants used the income to meet their basic needs, pay for school fees and/or reinvest in their small businesses. In many instances the income was seasonal. Several groups had launched new businesses.

Social cohesion

6. Chiefs and Local Authorities were responsible for participant selection. There were efforts to promote inclusion by delivering the training in multiple languages and providing spaces for childcare. However **recruiting women was challenging** (women made up 35% of participants) and there was only reference to one person with a disability attending the workshop. It was not clear how Village Chiefs and Local Authorities chose participants and if the criteria were well-aligned with the social cohesion objectives of the project.

7. Women and girls reported making technologies which improved their ability to earn money, and **boosted their feelings of self-reliance.** Some valued contributing to their household's financial wellbeing. Several women in Pibor also expressed more confidence in running their businesses after learning new business skills, such as in customer service.

8. **Participants valued that the training brought unlikely groups of people together.** In Pibor, for example, people of different age-sets were able to work in the same group. Teamwork was valued as a way to generate ideas and build friendships. The majority of groups we interviewed had stayed connected to work together on their technologies (or run their businesses).

Co-creation event

9. Four technologies were refined at the Co-Creation event. **The event had a significant impact on CCB participants' confidence to earn an income and use the design process** to build technologies and solve problems in their lives. By the end of the Event, all but one participant said they felt 'somewhat' or 'very confident' building things out of wood and metal.

10. The majority of the participants **valued working with people from different communities.** All participants reported working with someone who was different to them by age, gender, ethnic group or occupation and several expressed a transformation in how they thought about rival groups. Participants described the Event as an opportunity to exchange ideas, including about other cultures.

The CCB model

11. **Strong relationships** were built between MIT D-Lab and YSAT (based in Juba), and with the Centre Managers and Facilitators in Pibor and Duk. These relationships were key to the good performance of the project.

12. Overall, **people said they felt comfortable in the centre,** despite most travelling long distances and working long hours on their prototypes. Several commented that they enjoyed sitting and eating together or mentioned that it was a nice shady environment.

13. However, there were **significant implementation challenges** including facilitator turnover in Pibor, difficulties moving in the rainy season, difficulties transporting supplies, and a tight project timeline. These affected the set-up of the innovation centres, ongoing mentoring, and business training. Participants noted delays in accessing materials and difficulty fixing technologies that broke.

1 Introduction

This report is an independent evaluation of a project implemented by MIT D-Lab and the Youth Social Advocacy Team (YSAT) in Jonglei State, South Sudan, in 2022, funded by USAID's Bureau of Humanitarian Assistance. The project aimed to pilot a local innovation ecosystem in two sites, Pibor and Duk. The purpose of the innovation ecosystem was to support community members in creating solutions to challenges they face in their daily lives by teaching the design process. The technologies developed and skills learned through the training were intended to improve participants' quality of life and increase their income generation, sense of agency and problem-solving abilities.

The project was established in two sites that experience frequent conflict and cattle-raiding between rival ethnic groups[1]. The project sought to use the design training, and joint work on common projects, to create a neutral space for groups in conflict to meet and build relationships. The team hoped that these new relationships could be used to de-escalate moments of tension and conflict between rival communities.

For D-Lab, a local innovation ecosystem is made up of the following:

- An Innovation Centre that supplies materials and tools to participants
- Regular Creative Capacity Building (CCB) design trainings that are run out of the centre
- On-going mentoring for participants after the CCB training to refine their prototypes
- Business training to enable people to use their technology to earn income if desired
- Co-Creation Summit to take some CCB prototypes to a higher level of development and involve other actors in the design process

All elements of the innovation ecosystem were established in Pibor and Duk to some extent. The Co-Creation Summit in Juba changed focus from bringing together different humanitarian actors to engage with CCB-graduated participants, to bringing together CCB-graduated participants from different ethnic groups across the two project sites. It is referred to from here on as the 'Co-Creation Event' to reflect this change in scope.

The local Innovation Ecosystem aimed to enable participants to:

- develop tools and technologies to solve immediate needs
- develop technologies for livelihood opportunities
- develop problem-solving and technical skills
- develop creativity and increase sense of agency
- impact how aid is practised

The evaluation assessed whether and how the pilot of the local innovation ecosystem met the project objectives and delivered on the anticipated outcomes. It also explored the underlying assumptions in the project design and what adaptations or changes would be needed for future iterations of the project.

The evaluation gathered evidence to assess all the project aims (above) apart from the last one, "impact how aid is practised." This was in part due to the change in scope of the Co-Creation Event and also due to the short time-frame in which the project was delivered.

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[1]UNMISS (2021) Situation in South Sudan: Report of the Secretary-General, S/2021/566

2 Methodology

Overview

The evaluation used a mixed-methods approach to explore the project's processes and achievements. The research was conducted in two phases, which allowed us to adapt the methodology to emerging findings and to the realities of implementing the project in each context. Both phases were carried out by South Susdanese Research Associates.

Inception and research framework

A series of inception meetings were held with MIT D-Lab and YSAT. The meetings provided an opportunity to discuss the context and parameters of the evaluation, and finalise the objectives, evaluation questions, and methodology.

A research framework (see Annex 1) was developed in discussion with MIT D-Lab. Research questions (RQ) 1-3 were foundational questions, exploring the outcomes of the project for individual participants based on their own perspectives and the perspectives of their households, Trainers, and others in the community. RQ 4-5 built on these findings to explore whether the project and the innovation ecosystem supported any other social outcomes - for women, for peaceful coexistence, or for more effective delivery of aid.

Document review

We reviewed project documents from MIT D-Lab and YSAT in order to gain a better understanding of the CCB method, what they were trying to achieve, and the results of CCBs in other contexts. The documents included: the Training of Trainers manual, research papers and previous MIT D-Lab evaluation reports.

Data collection

Two Research Associates collected data in two phases in Pibor and Duk, in June and August - September 2022.

The Research Associate in Duk was fluent in both Nuer and Dinka and conducted the data collection activities in both languages. In Pibor, the Research Associate conducted the data collection activities in Arabic, with the assistance of a Murle translator.

The Research Associates were trained in ethical data collection practices (including COVID-19 safety) as well as the CCB design process. Both were experienced qualitative researchers. Additional mentoring was provided around the participatory methodologies. The data collection was implemented in accordance with The Research People's (TRP) Research Code of Conduct, as well as our policies on safeguarding, data privacy, health and safety, and COVID-19.

We relied heavily on the Facilitators and Centre Managers who supported the Research Associates to mobilise interview participants. All research activities were conducted at the Innovation Centres in the two locations.
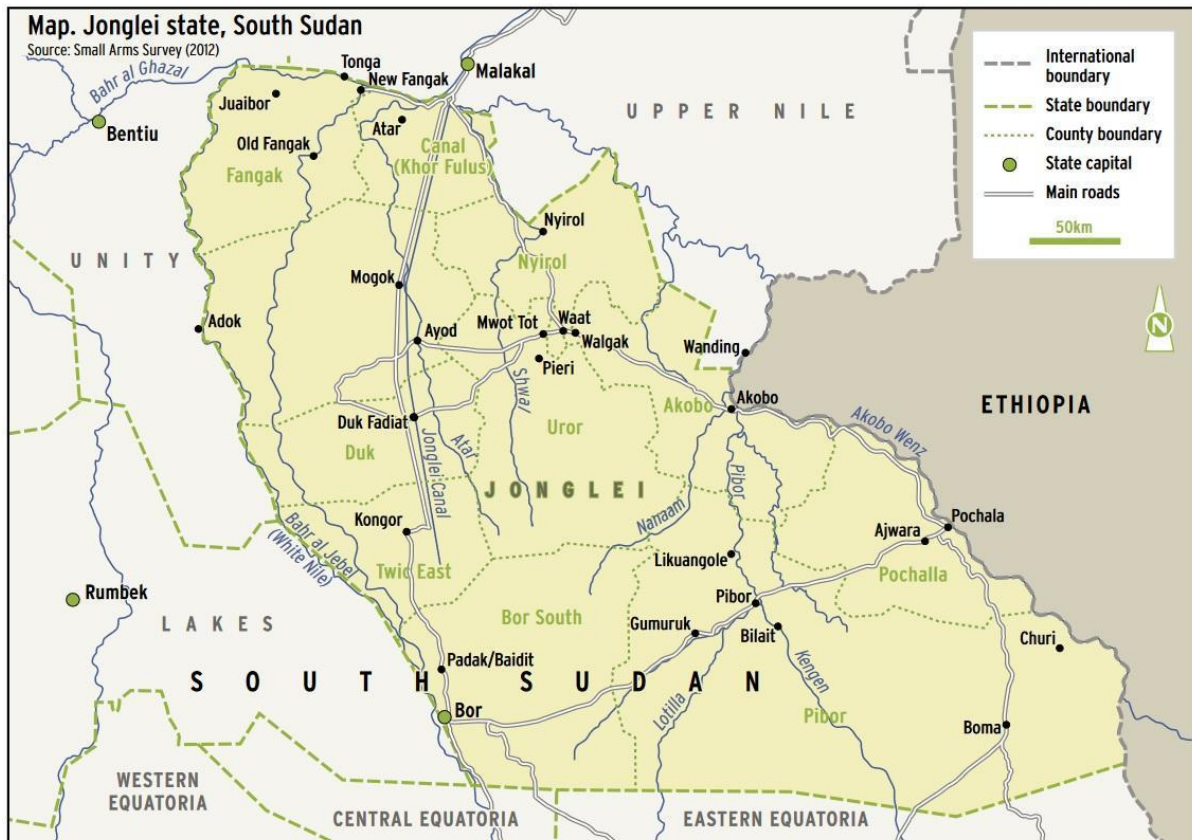
Figure 1. Map of Jonglei State. Source: Small Arms Survey, 2012[2]

We consulted multiple sources in order to triangulate findings and compare the different perspectives of those involved in the project. In total we consulted with 151 people[3] (see Annex 2), through:

- **CCB pre-/post- surveys** - to learn who was participating in the training and their levels of knowledge, skills and confidence before and after the training.[4]

- **Co-Creation pre-/post- surveys** - to understand the value that the Co-Creation Event within the local innovation ecosystem.

- **Outcome harvesting workshops** - to capture participants' views on the changes they had experienced and why those changes mattered. Outcome harvesting is useful in cases where change takes place in complex, multi-stakeholder environments. The approach identifies changes (or outcomes) that have taken place and works backwards to identify (a) how significant the change is (i.e. its level and breadth of impact or potential impact) and (b) what contributed to the change. A table of definitions is available in Annex 2.

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[2] Small Arms Survey. 2012. 'My neighbour, my enemy: inter-tribal violence in Jonglei.' Sudan Human Security Baseline Assessment Issue Brief no. 21. Geneva: Small Arms Survey.

[3] Throughout the report we use "participants" to mean those consulted for the research. When we are talking about those who completed the training we use "CCB participants"

[4] This tool was only deployed during one CCB training in Pibor. Centre Managers and Facilitators had many demands on their time and although training was provided, they lacked the confidence and internet connectivity to consistently use the KoboCollect app. They were unable to use paper surveys due to logistical challenges involved in printing, filling out, returning and inputting data This should be explored for future CCB trainings.

- **Key informant interviews with MIT D-Lab staff, YSAT staff, Local Authorities, CCB participants and members of their households** - to explore people's experience of implementing and participating in the project and their views on its impact.

- **Focus group discussions with CCB participants** - to focus on issues around community cohesion.

- **Questionnaire on the technologies developed** - to capture data on the number of people trained, the technologies in use and those still under development.

- **Observations** - to observe the Co-Creation Event and to see participant's at work in the innovation centres.

- **Researcher journals** - to capture the Research Associate's reflections and impressions of the project.

- **Validation workshops with participants** - to present initial findings back to participants to ensure that we accurately captured people's experiences and to gain feedback and address any gaps. These were facilitated on the last day of each field visit.

Analysis

We used MaxQDA qualitative data analysis software to code all qualitative data. A coding framework was developed collaboratively by the research team based on the research questions. Codes were updated and amended to reflect new themes that arose in the data. Initial findings were collated using an analysis table. These findings were presented to MIT D-Lab for reflection and feedback and as a basis to develop recommendations. Recommendations were generated together with MIT D-Lab.

Returning findings

Findings will be disseminated to participants at the end of the study, in collaboration with the Facilitators in each location. At the time of publishing this report, we are exploring the following mechanisms:

- A visual summary of key findings translated into the local languages and shared as posters at the innovation centres for former and future CCB participants;
- Discussions of main findings with CCB participants, facilitated by the Research Associates;
- Community radio announcements or interview with a CCB participant in Pibor and Duk;
- Publishing the final report on the TRP, YSAT and MIT D-Lab website and YSAT social media platforms.

Limitations

The evaluation was constrained by five main limitations.

- **Limited time between the training and evaluation to assess medium or long-term impacts**. The project had a short time frame of 12 months, and due to logisitcal and capacity challenges, the first CCBs were conducted later than planned. Phase 1 of the evaluation was conducted in June 2022, a few weeks after the CCBs were completed at either site. Phase 2 data collection was conducted immediately after the training in

August 2022, which did not allow enough time for the participants to apply any learning from the training, or to fully utilise their technologies.

- **Limited quantitative data**. The centre managers, facilitators and field coordinators were constrained by delayed timelines and their responsibilities delivering the CCB training. They were unable to collect some of the planned data, including the prototype diaries and pre/post surveys.

- **Logistical challenges**. The researchers in both sites experienced significant logistical challenges including flight delays due to heavy rainfall, communication black-outs due to limited network and internet coverage, and difficulty in accessing the participants, who often moved long distances to attend the interviews and workshops. We adapted the methodology and data collection tools to the changing circumstances, however, the challenges did affect the quality and quantity of data. For example, in Duk, we were not able to review the transcripts to provide feedback during data collection. In Pibor, flight delays meant we could only collect phase 2 data at the very end of the project timeline.

- **Language barriers (in Pibor)**. Unfortunately, it was not possible to recruit a researcher based in Pibor and we relied on translation by a participant with good command of Murle, Arabic and English. This may have affected how some participants understood the questions, and how we understood their responses. The language barrier also affected some participants' ability to express themselves in the outcome harvesting and validation workshops.

- **Sample bias.** It was difficult to mobilise participants due to limited phone use, people's movements and seasonal flooding. We conducted interviews with those able to travel to the innovation centres and with people attending the Co-Creation Event. We expect that this has resulted in a sampling bias towards people who were most highly involved in the project. In particular, we were not able to adequately explore issues around attendance.

Outline of the document

The rest of this report outlines the findings of the evaluation. In Chapter 3, we explore the extent to which the project improved people's problem solving and technical skills, and if it allowed them to develop their creativity and sense of agency. Chapter 4 assesses how the Local Innovation Ecosystem helped participants and their communities improve their lives by applying the design process to develop a technology of their choosing. In Chapter 5, we assess the potential of the Local Innovation Ecosystem to improve social cohesion and provide neutral spaces for building relationships. Chapter 5 outlines the contribution of the Co-Creation Event and 6 explores the CCB model and how well it was delivered. The report ends with recommendations that were co-developed by MIT D-Lab and the research team.

3 Learning and behaviour change
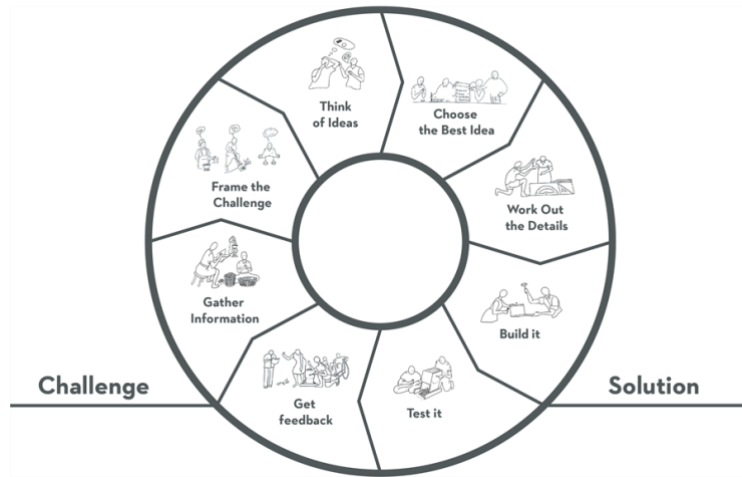
Summary of the chapter

- Participants increased their knowledge and skills to design and create technologies using the tools and techniques provided by the innovation centre.
- Participants felt a sense of pride in their achievements and some changed their approach to work and income generation.
- Participants felt a greater sense of confidence and self-reliance following CCB training, in large part due to their ability to earn an income with the technology they had created.

Overview

The CCB trainings in Pibor and Duk (see Box 1) were well received by participants and members of the community. Many interview respondents mentioned **the high level of commitment that participants and staff gave to the training**. A couple of respondents said that too many participants arrived at the start of a workshop, but that those who remained, after realising there was no seating allowance or stipend, were most committed. This commitment was demonstrated by participants' willingness to work long hours, remain with the project during intermittent conflict (in Duk) and sometimes travel long distances to reach the training centre. One participant in Duk gave birth during the training, and returned with her baby to finish the course. Many of the participants believed that the CCB training was a **significant opportunity for them, in their locality,** and something that they were excited to be a part of.

Box 1: The CCB process

CCB is an intensive five-day design training based on the process pictured in Figure 2. It starts with an overview of the design process, which includes a case study and a hands-on activity, and then participants learn some basic sheet metal and woodworking skills by making a corn sheller. At the end of the day, they generate a list of problems they would like to address over the course of the rest of the training. On the second day, participants select their project and are assigned to a team. They do some team-building activities and then start gathering information and defining the problem they will work on. For the rest of the training, they learn and apply the steps of the design process to their own projects as they build an initial prototype of their solution. They return for a second week to refine their technology so that they have a more fully functioning prototype.

Figure 2 (above): The CCB Design Process. MIT D-Lab

Technical skills and using tools

The CCB training aimed to teach participants how to design and build a technology as well as how to use basic construction tools (such as a saw, hammer and chisel) and more complex skills (such as welding). The training emphasised an iterative approach to design and construction, and the learning opportunities that arise when things do not work as expected.

Many of the participants interviewed said the CCB training gave them the knowledge and skills to make something if provided with the necessary materials and tools. The knowledge and skills gained during the training was additional to their previous experience, as demonstrated by the surprise some participants experienced at what they were able to create. This was restated in the researcher diary observations and the validation workshops in Duk and Pibor.

> *"In Pibor, people could not believe that they can make technology of making a shoe, the new technology has expanded their knowledge in creating new ideas."* - YSAT Staff, Pibor.

Many of the participants gained knowledge and confidence using tools. A few participants said that they knew nothing about using tools before the workshops and were initially intimidated by the tools and techniques, such as welding and sawing. There were reports that some participants incurred injuries while learning, but that these were minor. They expressed pride that they were able to learn these skills, but it was not clear how valuable they would be going forward without access to tools and equipment at the innovation centre.

Almost a third[5] of CCB participants interviewed said they have, can or will teach what they learned at the CCB training to others in their families and communities. The content of what they taught to others, and to what extent, is less certain. A couple of participants taught others how to *use* the technology. Others explained to others how they made the technology. A smaller number stated they *trained* others in how *to make* a technology.

> *"Yes, it helped me gain a lot of experience, I was trained and now I am training people which is a good achievement for me."* - Male CCB Participant, Pibor.

Design knowledge and skills

Fewer than half of CCB participants interviewed could articulate the design process and how this led to the creation of their technology. Although, this does not account for those who understood the design process but were less skilled at expressing themselves. Only a few participants explained how they used the knowledge, skills and understanding of the design process and problem solving outside of the workshop. It may be that simplification of the design process in training materials would help it to be applied more generally outside of the workshops. It may also be that the interviews were too soon after the workshops to capture participants' experiences of applying their problem-solving skills in other areas of life.

Mindsets

The CCB training aimed to enhance participants' confidence and sense of agency.

Many participants described an **increased sense of confidence in their abilities after the training**. Some described how they had surprised themselves with their ability to build something out of nothing and reported feeling "happy", "proud" and "accomplished."

> "*I enjoyed drawing the design on a piece of paper and imagined how the shoes would look when I put it on. I had never imagined that someone can actually develop a shoe, but here I am doing it. A great achievement.*" Male CCB Participant, Pibor.

Some received praise from community members at what they achieved:

> *"I used to think that because I did not go to school then I am a failure in life, but with this I believe I have succeeded in life, having to design a handbag that people use is a great achievement on my side. When I first did the handbag, I went and showed everyone in my area what I made, they did not believe it when I told them that I am the one that did it."* - Female CCB Participant, Pibor.

> *"I felt happy and proud of myself for having developed a wheel cart, some of my friends asked me where I got it from, I told them that my team and I developed it and they were shocked and proud of the great work."* - Female CCB Participant, Pibor.

The majority of participants said that the training gave them a willingness to try new things. A smaller number referred to being more open-minded and to being taught how to think positively when faced with challenges, while others explained that the training helped them be better at solving problems. These comments mostly referred to challenges earning an income and improving their livelihoods.

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[5] 16/52 participants: 12 have taught, 2 can teach and 2 will teach.

A significant minority of participants said that the training gave them the motivation to work hard to make money for themselves and their families. Around a third of participants experienced a shift in mindset on approaching business ventures; they were more driven and willing to explore new income generating avenues. The participants referred to the value of the business training for changing their mindset around product pricing and how to interact with customers (see CCB-B training).

Many participants had new livelihoods opportunities (see Chapter 4) and **just under half felt they were more self-reliant** as a result of the skills and confidence they gained. A few explained that they had been able to better themselves and understand the importance of life-long learning. For some participants who had little or no education, the training changed their perception of themselves and made them feel more confident. For others, the CCB training provided them with the inspiration to change their livelihoods.

> *"My life has really changed, I came from the village and now I am a town boy, my perception about everything has changed."* -Male CCB Participant, Pibor.

> *"I was expecting the training to change me from being bad to good. Like I said before, that I was a raider, but now, I am a scientist with technologies that have not been there before."* - Male CCB Participant, Duk.

Many participants expressed increased levels of confidence after participating in the training. For some, this meant greater ease talking to people individually, in groups and across age-sets[6] and status, both in and outside of the training. Others felt confident to attempt new business ideas and their confidence increased as they put their new business skills into practice and saw the rewards this brought. Many gained a sense of confidence in their abilities to use tools and create a technology that they could use outside of the training. A small number felt they had the confidence to share what they had learned with others.

> *"Sometimes, I thought the white people will not understand me and I was afraid of them, but the Trainers were from South Sudan, I gained courage to interact and even ask questions."* - Female CCB Participant, Pibor.

Finally, CCB participants spoke positively about their interactions with others at the training. The researcher diaries from Pibor and Duk both corroborate that the relationships at the centre seemed relaxed, cooperative and productive:

> *The participants were very friendly to one another; they laugh and make fun, [and] work together to accomplish their mission. I noticed that the wheel cart was broken, the group came together and looked for [a] solution. They came up with a plan to fix it; they brought a rod and weld[ed it] using the generator. It was something great to see them working together.* - Researcher diary, Pibor.

> *I have noticed that participants at the centre [have] some sense of love, care and [are] civilised in [the] way that they look at each other as relatives or friends.* - Researcher diary, Duk.

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[6] "Murle society does not have a formal hierarchical leadership structure, but is broken up into generational age-sets. Males join an age-set in their late teens when they are single, and stay within that age-set for life." Human Security Baseline Assessment (2012) "Small Arms Survey", Sudan Issue Brief (21), pg. 5.

A significant minority explained that they had made friends with people from different areas, status or age-set. This is discussed further in Chapter 5.

CCB-Business training

The CCB-B training was received well and many participants reflected that it helped them to earn an income from their technology. Participants who attended the CCB-B training reported learning skills on interacting with customers, reinvesting profit, and setting prices for their technology. Although, one YSAT staff member believed that participants needed more guidance on price-setting.

> *"When you look at the technologies, they are actually good. Bringing them new to the market is good. But, sometimes, the person needs business skills. I recommend, CCB-B is done frequently for participants [...]. The CCB-B training should follow [the CCB training] and they will be able to know how to market their products and calculate prices."* - Field Coordinator, YSAT.

According to one Facilitator, the content of the CCB-B training seemed new to the participants, but it also needed further adapting to the local context. One MIT D-Lab representative observed that prices and distribution of profits between vendors at local markets operated on a more cooperative than competitive model. More research is needed to understand local markets and adapt the training content accordingly. Additionally, those delivering the training explained there were initial challenges with some participants' expectations, since the CCB-B training was more 'theoretical' than the CCB training. Therefore, it took more time for participants to understand the value of the training.

Participant perspectives

Research Associates conducted outcome harvesting workshops in Pibor and Duk explore and record the outcomes of the CCB project that were most significant to participants. The table below details some of the outcomes relating to learning and behaviour change in Pibor, in people's own words.

Table 1. Outcome harvesting results from Pibor (22nd June 2022).

Participant's change statement	Significance ranking	Contribution ranking
1. Gaining new skills that are beneficial to participants and the community.	**Major**: Participants mentioned participating in other trainings where they've been taught how to use sewing machines, but they wanted to learn how to come up with that machine. With this training they learnt how to come up with technologies using their hands and creative thinking, which is a major achievement	**High**: The training provided them with knowledge and skills of coming up with technologies.
2. Gaining confidence to speak in public. For example, some are community leaders, and	**Major**: Some participants said they were previously shy and lacked the confidence to speak in public but now they are key community leaders who make decisions on behalf of the community.	**High**: the training sessions prompted participants to speak in public and explain how they came up with the

others are leaders in choir groups.		technologies, which boosted their confidence.
3. Most of the participants were able to interact and work with other people from different areas.	**Major**: Before the training, it was hard to bring people from different age groups together, they had their differences, making them not interact with one another. Working together has created some positive relationships among people of different age groups.	**High**: Participants in the CCBs worked in diverse groups, involving people from different age-sets giving them the room to interact.

In Pibor, gaining new skills, becoming more confident and having the opportunity to work with different types of people were all outcomes that participants attributed to the CCB project with a 'high' ranking. These three outcomes were also perceived as 'major' by the participants. The first outcome emphasises the importance of creating a tangible technology and having the autonomy to create this themselves from raw materials.

> *"This training provides us with a lot of things we did not have before like ovens, maize shellers and others which improve how we live as a society."* - Female CCB participant, Pibor.

The second outcome demonstrates that confidence can be built through practice, and that the CCB training was an enabling environment for public speaking. The third outcome emphasises the unique opportunity that the CCB project offered to participants to interact with people from different groups, in this case, specifically age groups.

The outcome harvesting workshop in Duk (see table 2) provided similar results to the workshop in Pibor with regards to gaining beneficial skills and learning how to work with different groups of people. However, the participants in Duk emphasised the mindset changes they had observed.

Participants in Duk perceived positive changes in their living standards which they categorised as 'major' and highly attributable to the CCB training and the technology they were able to develop. Participants also emphasised the sense of agency and 'can do' mindset which they considered to be a 'major' change and highly attributable to the CCB training.

> *"Before creativity and flexibility were not in our veins but now we can think of good ideas, like [the] business idea of preserving fish for sale, using salt - I thought of this after [the] training."* - Participant, outcome harvesting workshop, Pibor.

Lastly, participants discussed a change in attitudes to peace and harmony which they had observed in CCB participants. They explained this change as 'major' but attributed some of this shift in attitude to different groups mixing at church. This resonates with details in Chapter 5, when different members of the community come together to attend church and cultural events during times of peace.

Table 2. Outcome harvesting results from Duk, 19 August, 2022.

Participant's change statement	Significance ranking	Contribution ranking
1. Increasing living standards through income generation	**Major**: The CCB training provided participants with a technology with	**High**: The training provided them with knowledge, skills and a

and labour saving technologies.	which to earn an income, meaning their lives were now 'comfortable' and they were able to sustain themselves and their families.	technology they could use in the market or at home.
2. Changing mindset to be more creative and flexible and a sense that "I can manage".	**Major**: Participants describe that they had acquired "discipline", and had started to come up with new ideas for the market, like salting fish or setting up a beauty salon.	**High**: Participants directly attribute their change in mindset, and shift from "waiting for employment" to generating their own income, to the CCB training.
3. Realising the importance of peace and harmony with more respect for others.	**Major**: Participants state that they realised people were all "equal before God" and that the training introduced them to new relationships and highlighted the importance of peace and harmony.	**Medium/High**: Participants attribute some of this change in mentality to the different churches they visited due to moving to be closer to the innovation centre.

As an example of the transformative change offered by the CCB workshops for members of the community, the participants from Duk offered the following example:

> *"In November, before the CCB started in Duk, we had a guy who impregnated a girl. Because he has no dowry, his in-laws refused him [to marry her] and almost planned to kill the guy. Then, eventually, the training started and he was a participant of CCB. He finished CCB and went on with CCB-B. He graduated with his oven and brick layer. He laid around 300 bricks a day and sold them. Oven was also booming. CRS cash for assets started, he got some capital and started business alongside two operational technologies. Later he paid his dowries and now [is] operating business in town centre."* - Participant, outcome harvesting workshop, Duk.

This chapter summarised the CCB process and CCB participant's learning of the design process. It explored the impact of the trainings on participants' mindsets and agency, highlighting specific changes they experienced as a result of the training. The next chapter will outline how participant's learning was applied to developing specific technologies that could reduce labour and support livelihoods.

4 Technology development & use

Summary

- Most participants continued to work on their technologies after the training.
- Fewer than half (44%) of the technologies were in active use. Some technologies were being refined and others were broken. Most of the participants interviewed who were not using their technology (particularly those in Duk) were awaiting materials to fix them or complete the refinement.
- When their technologies were in use, most participants used them to both reduce labour and to earn an income to provide basic needs for their households.

The technologies

A total of 18 technologies were developed through the CCB trainings. The groups **developed technologies that addressed needs in both communities**. Both Duk and Pibor are remote, rural communities with limited trade routes or social amenities. The technologies responded to common problems such as poor transport and a need to preserve seasonal foods.

Table 3: Snapshot of CCB data on 19 September 2022

	Pibor	Duk
Number of CCBs	4	6
Number of CCB-Bs	1	1
Graduated participants	95 (29 female)	150 (57 female)
Technologies developed	8	10[7]
Technologies used to earn income and save labour	Wheel cart Oven Shoes Fish dryer	Oven Wheel cart Paste maker Tools sharpener
Technologies in storage/under refinement	Fish cooler Brick mould Rat trap handbags	Cooking stove Winnowing tool Brick mould Water irrigation tool Bee hive Rat trap

Many CCB participants continued to refine their technologies after the initial five-day training. In Pibor, the groups that made the oven, wheel cart, and shoes all told us that they had changed at least two things about their technologies (see case study in Box 2). The group that made the oven, for example, replaced the original materials in order to make them lighter, more marketable and user-friendly. In Duk, group members said they were willing and confident about making

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[7] Staff in Duk reported that each team was approximately 15 people. However, members of the group were sometimes absent, making group sizes 7-12 on any given day.

changes, but that a lack of materials kept them from improving their prototypes. Lack of, or insufficient, materials and tools was also observed in the researcher diaries at both sites.

At the time of the evaluation, eight technologies (44%) were being used to save labour and the same eight technologies (44%) were being used to earn an income across the two sites. Those not in use included technologies that had broken and technologies with seasonal use, such as the winnowing machines and brick moulds.

Saving labour

Many of the technologies arose from a desire to find a way to do difficult and repetitive tasks more easily. **Four technologies in Pibor, and four in Duk have resulted in labour savings.**

The majority of the participants interviewed in Duk and Pibor, their household members and other Local Authorities noted the value of the technologies developed to save labour. For example, before the wheel cart, people "*fetched water on their heads*", before developing the maize sheller, they "*spent a long time shelling maize*".

Participants reported that the **technologies improved their quality of life**. In Pibor, the wheel cart was instrumental in transporting luggage from the airstrip to people's homes, NGO offices and the humanitarian hub, transporting goods from the market to people's homes, and most importantly in food distribution. One of the Local Authorities interviewed said;

> *"As I was moving towards the airstrip, I found 2 women pushing the wheel cart and they were carrying drums of water inside the wheel cart, I reacted and asked, "how did they make the wheel cart?" They both responded that during the training, they were taught how to make the technology. At a time when I was in Bor, I saw people using it [a wheel cart] and I hoped that my people in Pibor will also come up with this technology finally I witnessed it with my eyes, though it was smaller than the one I saw in Bor. I was happy for their achievement."* - Local Authority, Pibor.

Similarly, the fish dryer enabled people to preserve fish, which becomes scarce during the dry season, and the shoes also filled an obvious gap in the market. In Duk, the oven was mostly used commercially to make bread or cakes and offered a unique product in the market[8].

> *"Before, people used to take plain tea, but now people are taking tea with my cake as accompaniment. This has made me popular because people send tea sellers to go and buy my cake."* - Female CCB Participant, Duk.

> *"The design process helped me solve the problems in my life, I used to carry heavy Jericans of water causing back pain, but when we designed the wheel cart, I have been able to carry the Jericans of water using the wheel cart."* -Male CCB Participant, Pibor.

Some participants reported that this was the first time they had seen such technologies in their communities.

Earning an income

CCB participants and their household members emphasised that the CCB training gave participants an **opportunity to engage in economic activity and contribute to their household's**

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[8] One participant referred to these as 'modern cakes'.

sustenance. For example, one female household member in Pibor said;

> *"...Yes [the training helped], to a great extent. [My brother] did not have a job, he used to stay idle at home, eat, sleep and go out with friends, but with the training, you can see he has changed. He gives us money to buy food in the house and this has helped sustain our lives here at home."*

Of the 49 CCB participants interviewed for the evaluation, 25 reported using their technology to earn an income, nine said that they did earn an income from their technology but they had sold it or it was broken at the time. Three said that they will earn an income from their technology in the future[9]. Participants **used the technologies to make money** by:

- charging people for the services rendered using the technologies,
- earning rental income from the technologies,
- selling their technology,
- using the technologies to make products for sale.

Figure 3. Shoes made by the participants and refined at the Co-Creation Event.

Some participants **earned money by using the technologies to provide services**. In Pibor, the group that made the wheel cart charged SSP 1000 - SSP 1500 to transport a sack of goods, and made up to SSP 10,000 per day. The group that made the oven used it to dry fish and game (bush

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[9] This relates to it being the correct season to make bricks, harvest grain and, for one participant, when their baby is old enough.

meat) that they sold to customers, charging SSP 1500 per fish, and making up to SSP 10,000[10] weekly. The oven was used to make bread which was sold at SSP 150-200 per piece[11] making up to SSP 60,000 monthly.

The groups that made an oven, maize shellers, and wheel cart **earned rental income from their technologies.** For example, in Pibor, the group that made the oven rented it out at SSP 3,000-5,000 per day to restaurant owners. Similarly, the group that made the wheel cart group rented it out for a daily rate.

Several groups **used the technologies to make products that they sold.** For example, one group made shoes that they sold for SSP 1,500 – 2,000. In Duk, another group made groundnut paste[12] for sale.

A small number of participants used their technologies to start new businesses. For example, one group that made an oven started a business selling bread. They used some of the profits to buy more raw materials and divided the rest amongst themselves. Another group in Duk, used money generated from their technology as capital to start a salon. Several participants said CCB training gave them the confidence to start a business.

Others **used their technologies to enhance existing income-generating activities**. One of the main business activities for women in Pibor is making tea at the market, the Kabarithe women's centre, or in other public places. Some women engaged in tea making participated in the CCB; they made an oven which they now use to make bread, complementing their tea business. They reported making SSP 50,000 in one month. Similarly, the fish dryer provided a way for a group of casual labourers to preserve fish and sell it during the dry season when the river dried up.

Those that earned an income from their technology used it to meet basic needs, pay for school fees and/or reinvest in their small businesses. There were some examples of the participants having more regular access to food after developing the technologies and using them to earn money. A 29-year-old male participant in Pibor said,

> *"I felt proud when I made the technology, since I made the technology I have not slept hungry for days now."* - Male CCB Participant, Pibor.

Some of the technologies **can only be used to earn an income in the dry season.** For example, flooding during the rainy season will make it difficult to use the wheel cart in Pibor.

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[10] KIIs with participants

[11] Or SSP 3000 for buying in bulk

[12] Also known as peanut butter.

Box 2: Wheel Cart case study

One group in Pibor came up with the idea for the wheel cart as a way of generating income. They planned to build a cart that could be used to transport items, generate an income and help provide food for their families.

The team developed a prototype of the wheel cart during the CCB training. They described the process of gathering together their materials, measuring out the wheels, cutting the wood, using wire cutters to cut wires, welding metals together using a generator, inserting nails using a hammer, and then adding in the tires and axle. The building process was new for everyone and the whole team was involved.

> *I have learnt that each one plays an important role, just like the wheel cart, […] all the tools required to make a wheel cart are all important, if one is missing then the tool cannot function, that is why it is important to appreciate everything -* Male, CCB Participant, Pibor.

The initial prototype was built of low-quality wood. Carrying heavy loads meant that the wires sometimes tore and the tires burst due to low pressure and the weight of the cargos. The team refined the original design using stronger wood, better quality tires and to add a second metal rod. They also inserted longer handles to make the wheel cart easier to push.

Several months after its initial development, the group took the wheel cart to the Co-Creation summit for further refinement, including adding a roof made of plastic sheets. They would like to use metal sheets but can't currently access the materials.

Figure 4. The Wheel Cart in Pibor.

How is it being used

The group began using the wheel cart immediately. At home, women used it to carry water or to transport goods to the market, making their work easier.

> *"I had the challenge of bringing items to my shop, sometimes I would use some women who would carry these items on their head and they would walk for some distance to reach the destination, with the wheel cart it has solved my problem, I no longer need to disturb them, I put my goods on the wheel cart and push in on my own to the destination, hence save money and time."* Male, CCB Participant, Pibor.

They were also paid to transport items between distribution sites and the market. For example, people recently visiting from Ethiopia paid the group to transport goods from the airport to the market. The group reported that they can charge 1,000-1,500 SSP for transporting a bag of sorghum or similar. On a good day, they can earn 5,000 SSP per trip taking items from the airstrip to the market and other locations.

> *"There was a time, my wife called me that there was no food at home, so she needed money for buying food, she called me and because that day, we used the wheel cart to distribute items in the market, I was able to get some money and give it to her and she was happy.* - Male, CCB Participant, Pibor.

> *"we organize to meet at the market, we sit down and discuss on what we have gained in a day, then share the money equally among ourselves so that we don't leave anyone behind"* Male, Co-Creation Event Participant.

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This chapter highlighted the CCB participant's perspectives on the technologies they developed and their impact on saving labour and earning income. In the next chapter we focus on gender dynamics and the impact of the project on building relationships.

5 Community dynamics

Summary

- CCB and Co-Creation Event participants worked with new types of people and created new relationships that they hoped would continue.
- Several participants changed their perceptions towards those who were different to them (gender, age or ethnic group) and valued working in groups with different types of people.
- Almost all the female participants felt more independent; the CCBs helped them create an income source and to contribute to their family livelihood.

CCB participant demographics

In total, 245 participants[13] attended the CCB training in Pibor and Duk between March and September 2022. 35% were female. Most were relatively young (20 to 40 years old[14]) but were part of different age-sets. The vast majority said they did not go to school. Only a few completed primary or secondary education.

Most participants **worked in agriculture or ran small businesses** (such as tea shops among females). Other occupations included fishing, teaching, vice-chief, female leader, sand carrier, welder and breeder. More than one-quarter did not work or did only unpaid work, such as volunteering, hunting animals or household chores.

Few people explicitly mentioned their ethnicity but the project intentionally included participants from Murle, Nuer and Dinka ethnic groups. Many reported a Christian faith. A handful discussed their family situations; most had dependent children, many were married, and some were single. One participant was widowed and another lived with his parents and sister.

Non-work activities varied between Duk and Pibor. In Duk, participants organised folk dances, football games, wrestling events, beer parties, prayer meetings and community work during times of peace. In Pibor, participants engaged in community meetings, youth meetings, group agriculture, sharing meals, and organising traditional dances and festivals. Participants from both groups emphasised the importance of organising and participating in traditional dances and songs to strengthen relationships between community members.

> *"In Pibor, [we engage in] cultural dance festival [...]; it brings everyone together, we dance and celebrate our culture and identity as the Murle community"* - Male CCB Participant, Pibor.

CCB Participants said they were skilled in cooking, farming and business. Several engaged in hairdressing, construction, sewing and keeping livestock (including cattle). Others were hunters, fishermen, made charcoal or taught. Generally, the participants' skills and knowledge before the CCB workshop were based on practical activities, with some using their skills to earn an income through business.

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[13] Data from the YSAT field coordinator on 18th September 2022

[14] We have age data for 18% of participants.

Relationships developed among different groups

The CCBs in Duk and Pibor brought together people of different ages, genders and ethnic backgrounds. They aimed to promote social cohesion by fostering new relationships among community members. CCB participants worked with people who were not part of their regular social group, including those from other age-sets, status, genders and clans.

A significant minority of participants said they made friends with people they would not have met otherwise. They spoke positively about how the training had built an atmosphere of cooperation and cohesion between different groups. The common objective of developing a new technology helped some to see past differences, encouraging new relationships, even with those that might be seen as "rivals."

> *"Yes, I am very confident in working with different groups. Working together makes people come together. I always had a challenge working with other age-set groups, but [...] I realised the training brought all people together without any discrimination, so I have learnt to work with anyone regardless of their status or age."* -Male CCB participant, Pibor.

> *"In fact, I met a lot of friends from here where we have sat and eaten together. Some of them I used to see them as enemies, but now we are tight friends, and [it] is the CCB that did that."* - Male CCB Participant, Duk.

Almost **half of the participants worked with their CCB counterparts after the end of the training**, mostly on the technologies they had developed together and sometimes on different projects. Some explained that the friends they made at the CCB were qualitatively different to their friends outside of the CCB training, since they had a shared purpose. As one participant explained:

> *"They [the CCB participants] are different because we are people who share the same skills. So any discussion must be in line with our technology or skills. We also work together regardless of clan unlike in community [where] we work as clan. We chill together discussing developmental ideas, unlike outside friends where we spend the whole day gossiping."* - Male CCB participant, Duk.

Several participants expressed that working together is better than working alone as it allows you to encourage one another, share ideas or ease each other's stresses. One participant explained that he had learned that people are equal and that everyone has something to contribute. Some also expressed ease of working between groups in the CCB training, asking others to teach them about the other technologies.

> *"Because of CCB training, I get exposed to my people and new friends who keep me busy talking about positive ideas. This relieved me from my stress due to [the recent] death of my husband."* - Female CCB Participant, Duk.

Impact of the project on women

35% of all CCB participants were female. The Chiefs responsible for mobilising participants highlighted several challenges recruiting women, including their high workloads at home, childcare responsibilities, language, and cultural barriers. As one participant stated *"women are*

neglected in the village, and they are believed that they cannot do anything"[15]. Nevertheless, the Facilitators reported high levels of attendance among female participants and made efforts to adapt activities around the schedules of breastfeeding mothers[16].

Overall, **female participants were very positive about the CCB training.** Many said that they felt more comfortable and motivated to work outside of home. Several added that working in a team allowed them to feel more secure in expressing their opinions without feeling intimidated or belittled. For example:

> *"Women learned how to speak in public. Women learned how to speak for themselves without intimidation from their husbands"* - Female CCB Participant, Pibor.

Female participants also said that the training gave them technical and financial skills to support their families. Most female participants had little education and many depended on their husband for the household income. One explained that thanks to the technology she had developed, she could generate an income for her family while at the same time staying at home and breastfeeding her baby[17]. Several who owned businesses also said that their relationships with customers had improved as a result of what they learned.

> *"Women are often regarded as vulnerable people, who cannot do anything, their work is just staying home, but with the CCB training, women learn and become experts, they acquire more skills that they use at home for the advantage of the family"* - Female CCB Participant, Pibor.

> *"In the training, they taught us business skills, how to talk to customers, I used the skill in my business, and as we are talking, I have so many customers who come to my place. Everyone wants to know where I learnt these skills from, and they want to join"* - Female CCB Participant, Pibor.

Deeply held cultural beliefs are difficult to shift and patriarchal views of women's roles are reflected in the interviews with many male participants. Nevertheless, **male participants were largely positive about working alongside women** in the training. Some believed, as do many women, that the CCB would enable women to be more self-sufficient.

> *"Most times, we believe that women are meant to be at home do house chores but through the training, they really did their best to learn a lot"* - Male Co-Creation Event participant, Murle from Pibor.

> *"Women play an important role and I believe that they experienced the co- creation Event differently. Mostly in Duk, women are not allowed to do such work but we have seen that they are actually doing great, this work is helping them a lot, they are learning on business techniques, how to be self-reliant. They have the morale to keep working hard for their families"* - Male Co-Creation Event Participant, Dinka from Duk.

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[15] Co-creation participant, Female, Dinka, from Duk.

[16] New mothers were also given a room for breastfeeding.

[17] Previous to this training, the participant used to collect wood for making charcoal and therefore not be able to breastfeed her baby. CCB participant, Female, from Duk.

"Most people believe that women cannot make blocks but I am here and I was able to make blocks, some men were looking at me, and laughing at me saying that work is for men, I asked them; who told them? What men can do, women can do even better" - Female CCB Participant, Pibor.

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This chapter explored how the project supported people to build relationships and influenced community dynamics. It outlined how CCB participants, Local Authorities and project staff all reported that new ties were created between different groups. The next chapter will provide an overview of the Co-Creation Event and its impact on technology development and social cohesion.

6 Co-Creation Event

Summary

- Participants were eager to improve their design and construction skills at the Co-Creation Event, and by the end of the Event, all but one participant said they were very or somewhat confident building things out of wood and metal.
- By the end of the Co-Creation Event, participants felt more confident in their ability to provide for their families by creating or launching a business, with or without their technologies.
- All participants reported working with someone who was different to them by age, gender, ethnic group or occupation and several expressed a transformation in how they thought about rival groups.
- Participants described the Event as an opportunity to exchange ideas, including about other cultures.

Background

The Co-Creation Event took place in Juba over the period of five days. There were 24 participants in total, consisting of 12 CCB graduates who attended from Pibor and Duk, staff from YSAT and one representative from a Juba-based NGO. It aimed to help CCB participants refine the technologies and develop viable business models, and to promote social cohesion by building relationships between participants from different ethinc and age groups. The Event involved team building exercises, training on the design process, practical design lessons, a showcase of technologies developed and a reflection session. Four technologies were refined at the event: oven, wheel cart, paste maker and shoes made from recycled tyres[18].

Figure 5. CCB participants and Facilitators test a water transfer prototype at the Co-Creation Event.

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[18] Co-Creation Event report

In the months leading up to the Co-Creation activity, people in Pibor and Duk experienced incidents of insecurity, mostly associated with cattle raiding. In Duk, participants and Facilitators reported gunfire near the centre and resulting loss of lives. This incident was part of wider ongoing conflict in the region between ethnic groups consisting of road ambushes, cattle raids and child abductions which lead to deadly revenge attacks[19]. This Event was seen by the organisers as an opportunity to bring different groups of people together to build social cohesion through building relationships.

Learning and skills development

The majority of Co-Creation Event participants were keen to improve their design and construction skills[20]. Ninety-five percent of participants surveyed before the Co-Creation workshop said they hoped to "*develop or improve their design skills*" and 74% said they hoped to "*come up with an innovative idea to solve a problem.*" Other soft skills they hoped to learn included building their creativity, more confidence designing prototypes and business skills. One participant wanted to learn how to calculate the quantities of materials needed following the design and sketch stage. By the end of the workshop, all but one participant felt very or somewhat confident making things with wood and metal[21] and all but one felt confident making things from found or recycled materials[22].

After the Co-Creation Event, participants felt **more confident in their ability to support their families.** Eighteen participants claimed to have developed viable business that would improve their livelihoods and 19[23] participants said they felt confident about designing and launching a new business. After the Co-Creation Event, participants reported increased confidence to try new things[24].

The pre- and post- survey data from the Co-Creation Event found that **participants gained in confidence when asked if they could apply the design process to challenges in their community**[25]. In the post-survey, all but one participant replied that they felt very confident using the design process to solve problems in the community[26]. The Co-creation Event also **increased participants' confidence to teach the skills they learned to others outside of the training[27].** However, only 16% of the participants said that teaching others what they had learned was one of their goals after the Event.

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[19] Pax (2022) Human Security Survey, Q2-Q4 2021, Jonglei State

[20] Co-creation pre-survey. The pre- survey had 19 responses, the post survey had 24 responses.

[21] 20 very confident, 3 somewhat confident and 1 neutral, Source: Co-Creation Event post-survey, Juba, 2022.

[22] 17 Very confident, 6 Somewhat confident, 1 Not very confident, Source: Co-Creation Event post-survey, Juba, 2022.

[23] 24 total participants.

[24] Pre-survey, 10 felt very confident, 7 somewhat confident, 2 neutral to try new things. Post-survey, 20 felt very confident and 4 felt somewhat confident to try new things.

[25] Pre Co-Creation Event (n. 19), 14 felt very confident, 4 somewhat confident and 1 neutral about 'using the design process to solve community challenges.' After the Event (n.24) 23 felt very confident and 1 somewhat confident.

[26] One participant felt "somewhat confident."

[27] Before the Co-Creation Event 8 felt very confident, 10 somewhat confident, 1 neutral about teaching CCB skills to others. After the Event 20 felt very confident and 3 somewhat confident teaching skills to others.

Refining the technologies

The technologies were refined by teams of CCB participants from different project sites, a CCB Facilitator and a Facilitator. The teams reviewed the current state of the technologies, built a sketch model using cardboard and other materials, and received feedback from the team, other teams and Facilitators. For example, to increase the mobility of the oven, wheels and a longer handle were added to make it easier to move. To improve its functionality, a provision was added for firewood at the top and bottom, and a lock was added to keep the heat inside.

Figure 6: Photograph of the oven after refinement

Fostering community cohesion

Fostering community cohesion was a large element of the Co-Creation Event, so it is not surprising that this was a key learning point for participants. At the start of the Event, nine out of 15 participants expressed that working with others and building peaceful relationships between communities was what they were most excited about[28]. This implies that peacebuilding and community cohesion is something that was important to participants before the Event.

The Event gave participants an opportunity to work as a team with people from different backgrounds, ethnic groups and clans. In the post-event survey[29] 96% of the participants worked with someone from another tribe/ethnic group, 88% worked with someone of the other gender, 83% worked with someone from another country, and 92% worked with someone with a different type of occupation.

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[28] Co-Creation Event, pre-survey, 2022.

[29] Co-Creation Event, post-survey, 2022 (n10 – 11)

In interviews, several participants said they worked with people from "rival" communities that they had never imagined being in a team with. They talked about the value of teamwork and of fostering cohesion.

"My experience working with different groups from different areas like Duk was amazing, it never hit my mind that we can actually work together with people from Duk, we always had conflict with them but through the training, it was brought us together we decided to leave all our differences and come together and work for the benefit of the community to grow and become peaceful" - Male Co-Creation Event Participant, Murle from Pibor.

Participants described the Event as an opportunity to exchange ideas, including about other cultures. Many felt they had established friendships and expressed their wish to visit "friends" after the Co-Creation Event. Some also indicated that their perceptions of certain groups changed as a result of the interaction they had at the Co-Creation Event.

"The most important [thing] is that I met new people from different areas; people from Murle [clan], they are believed to be very hostile, but in a real sense, they are very hospitable people. I have no friends from Murle, but through the Co-Creation, we have seen that we can actually work together. I have a new friend, I hope one day I will visit their land and enjoy" - Female Co-Creation Event Participant, Dinka from Duk.

This was also reflected in an interview with the NGO representative who attended the Co-Creation Event[30], who stated :

"I was happy when I saw the conflicting regions coming together; through this, they will see each other as brothers and sisters The interaction I saw happening during the Co-Creation Event will have a great impact to their lives; these people will go back to their communities and encourage them to stay peacefully" - Male NGO stakeholder, Nuer from Juba.

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The Co-Creation Event was valued by project staff and CCB participants from different groups as a good opportunity to collaborate and solve problems together. Four technologies were refined and new relationships were built between CCB participants from different geographical areas, ethnicities and age sets. The final chapter explores the Local Innovation Ecosystem model.

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[30] Co-Creation Event, post-survey, 2022. (n9)

7 A Local Innovation Ecosystem

Summary

- Strong relationships were built between MIT D-Lab and YSAT (based in Juba), and with the Centre Managers and Facilitators in Pibor and Duk. These relationships were key to the good performance of the project.
- There were challenges staffing the Innovation Centres and some considered that the Innovation Centres were still understaffed for the work they are expected to deliver.
- Participants were selected to ensure that CCB trainings contained a mixed group. However, women were still under-represented and it was not clear how Village Chiefs and Local Authorities chose participants and if the criteria were aligned with the social cohesion objectives of the project.
- The logistical challenges and the expense of bringing in materials from Juba were a significant challenge for the effective running and sustainability of the project.
- Developing a Local Innovation Ecosystem takes time and the project's timeline combined with the onset of the rainy season[31] meant not all elements were achievable.

Project set-up

The project was designed to foster a Local Innovation Ecosystem that included an innovation centre, CCB training, on-going mentoring, CCB-B training and a Co-Creation Event to involve other actors in the process. The innovation centre was intended to provide an equipped workshop where current and graduated participants would continue to refine their technologies and make repairs. The design assumptions and intentions for each element are listed in Table 4.

In practice, the timeline of the project and the challenging operating environment[32] meant that it was not possible to establish all elements of the Innovation Ecosystem. Training centres were established in both sites, although until June 2022, the centre in Pibor was rented space from another organisation. Only one CBB-B was held in each location and the curriculum had to be thoroughly adapted to fit the available time. In Duk for example, the 5 day training was condensed into 1.5 days. However, Facilitators and some participants believed that more and regular business training would be of value to participants. The mentoring aspect of the Local Innovation Ecosystem was delivered organically rather than systematically. Some CCB participants referred to, and appreciated ongoing encouragement, direction and support from the Facilitators at the Innovation Centre after they had finished the CCB training.

At the time of the data collection[33] **the Innovation Centres were staffed by one Centre Manager and one Facilitator in Pibor, and three Facilitators in Duk**. Centre Managers were responsible for running the Innovation Centres with regards to logistics and sourcing materials for the workshops. They helped to deliver the training, offered administrative support to Trainers and

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[31]All materials and tools had to be brought in by air. Over half of the trainings took place during the rainy season which had a significant impact on travel. Trainers and researchers were often stranded, and tools and materials were frequently delayed.

[32]As well as logistical challenges, the project faced staff turnover among Trainers and insecurity (one incident of shooting near the training centre was reported in Duk).

[33] June - September 2022

helped to identify participants for the workshop alongside local Relief and Rehabilitation Commissioners and other community leaders. CCB Facilitators were responsible for setting up the workshops, with the correct tools and resources, and delivering the CCB training based on what they had learned in the Training of Trainers workshop. They were given a training manual to refer to, but were encouraged to be responsive to participants' needs rather than following a strict syllabus. They also liaised between the participants and the Centre Managers to source materials for building technologies, either from local markets or flown in from Juba. Facilitators and Technicians supported participants during the refining period as the participants continue to work on their technologies after the initial one week training was completed.

Table 4: Innovation Ecosystem design assumptions and intentions[34].

Element	Design assumptions and intentions	Evidence
Innovation centre	- The centre would be situated in an accessible location - Participants would like being in the innovation centre and chose to go there outside of trainings - Supply chains would allow the centre to supply materials and tools to participants	- People spoke positively about the innovation centre's environment - Tools and materials were available during the CCB trainings but there have been challenges accessing materials for repairs
CCB trainings	- Chiefs and Local Authorities would be best suited to selecting and mobilising participants, and that that this would be seen as fair - Participants would attend the full duration of training - Training would impart new technical skills and enable participants to develop useful technologies	- Overall the project successfully mobilised participants. However, mobilising women was a challenge; 35% of participants were female. - It was not clear how Village Chiefs and Local Authorities chose participants and if the criteria were aligned with the social cohesion objectives of the project. - The centres reported relatively low attendance rates (7-10 attendees per team of 15 each day) due to travel and competing demands. - Participants learned new technical skills; 44% of technologies are being used.
On-going refinement and mentoring	- Participants would visit the centre to access ongoing mentoring and Trainers would be available there to provide ongoing mentoring - Tools and materials would be available to allow people to refine their prototypes	- Few examples of participants attending for ongoing mentoring, due to the informal nature of the ongoing mentoring. - The main barriers were access to supplies. - Travel around Pibor and Duk during the rainy season was also a significant challenge

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[34] These design assumptions and intentions were identified from the proposal documents and by looking at the implicit theory of change described through the project inputs and objectives. Key themes from this table are explored in the remainder of the chapter.

Business training	- CCB facilitators would be best placed to mobilise participants and that selection processes would be seen as fair - Participants would attend the full duration of training - Training would impart business skills that would help people run profitable businesses	- The centre was successful in mobilising participants. - There was demand for more business training and some people who turned up to the training had to be turned away. - Participants said they learned useful skills including basic book-keeping.
Co-creation Event	- Co-creation Events would take CCB prototypes to next level of development - Co-creation Events would involve other actors in the creation process	- Improvements were made to all the technologies taken to the Co-Creation Event - The Co-creation Event was re-designed to focus on bringing together participants (rather than promoting engagement with other actors).

Internal and external relationships

The project benefited from positive and productive working relationships between MIT D-Lab and YSAT, with the Local Authorities, and with several other NGOs in Pibor and Duk. In Pibor, Interchurch Medical Assistance (IMA) provided access to its site as a base for the Innovation Centre, including shared use of their training hall and an office for centre staff. In Duk, YSAT shared a compound and resources such as the internet with MedAir. These relationships provide a base for the innovation centre to develop should the project continue.

Facilitators travelled between sites, increasing connections and building relationships between the two communities from Pibor and Duk. In both field sites, the Local Authorities welcomed the Innovation Centres and helped to provide security for the CCB participants. More generally, staff reported good relationships between the Centre Managers across CCB sites, despite them coming from different communities.

Participant selection

The project aimed to bring together participants of different genders, ethnic groups and age-sets in order to improve social cohesion among groups in Pibor and Duk. Participant selection was, in many cases, outsourced to Village Chiefs. Therefore, YSAT only had so much control over who took part in the CCBs. Ingrained social factors, such as responsibility for childcare and housework, as well as cultural practices that prohibit women from participating in some public settings, meant that just 35% of participants were women. More background data is needed to understand if the numbers of women who participated would be regarded as an achievement considering the context.

25 participants were selected for each CCB. The selection criteria used by the Chiefs and Local Authorities were unclear however, they said that they chose the participants on a 'fair' basis and in a way that would avoid conflict. Interviews with Local Authorities and YSAT staff describe participants being chosen for their age, unemployment status and level of perceived vulnerability. Participants mentioned that 'youth' were targeted, since they are generally understood to be involved in fighting and conflict. Others reported being chosen to overcome their 'idleness'. Some

of the participants were widows, and displaced populations were also targeted. Generally, training groups were selected to have a range of ages, genders and clan affiliations. One training included a deaf participant.

Although we did not receive regular pre- and post- surveys for the CCB training workshops, the one we did receive from Pibor detailed 20 participants who attended workshops delivered in July and August. Of these 20 participants, all but two were Murle. Although this survey is a small snapshot of the participants who attended the training in Pibor, it implies that workshops may not always have had the mix of ethnic groups that they intended. This could be because the population in Pibor are more homogenous, making it difficult to recruit participants from diverse ethnic groups at this site.

Centre staff explained that they had to turn away people who arrived for the training opportunistically. In some instances they were asked to return for the following training session. Centre staff said that it was challenging having to turn away extra interested participants and added strain to their roles. Trainers tried to ensure they had the right participants by meeting those selected the day before the training started. During this meeting Trainers and participants introduced themselves and explained the purpose of the training, this allowed participants the opportunity to drop out of the training if they decided it was not suitable for them.

Communities were also alerted to the training by radio announcements or advertisements at the Centre, and some took an interest in the training after seeing graduated CCB participants using their technologies at the market or at home.

Delivering training

The **Facilitators were trained in the CCB methodology** in Arua, Uganda, over six weeks[35]. This training was facilitated by CCB seasoned Trainers from Kulika and three staff from MIT D-Lab. The training was designed to build the facilitators' capacity to run the first CCBs in South Sudan. The CCB project in South Sudan experienced a noticeable turnover in Facilitators for health and other reasons which affected the delivery of the projects in its early stages, especially in Pibor[36]. MIT D-Lab were pleased with how well the remaining **Facilitators committed to the role and progressed** in their expertise and confidence. Trainers from Uganda were called upon to provide ongoing mentorship and to help facilitate workshops in Pibor and Duk to make up for staffing shortages.

Before being trained, the South Sudanese Facilitators had no prior experience in delivering workshops of this kind. The South Sudanese Trainers expressed that they would like future Trainers to be trained by South Sudanese nationals to continue building the skills of people in their own country.

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[35] The six weeks training in Arua included; 2 weeks with YSAT (since they were all new to YSAT) and four weeks being trained in the CCB methodology and how to be a facilitator. This included a week that each team spent doing a CCB training in Rhino and Imvepi, under the mentorship of the CCB trainers there.

[36] In October 2021, six staff were trained in Uganda, three for each centre. One trainer from Duk went on maternity leave between January-June 2022. In Pibor, the centre manager resigned from the role at the beginning of the project and one trainer was let go because he was not able to do the work. This left one trainer in Pibor until she left for maternity leave in July 2022. Another trainer was hired in June and supported by staff from Uganda.

Some YSAT staff expressed that **more Facilitators and Assistants were needed to deliver the workshops** due to the short timeframe of the training (delivered over 5 days) and the challenging operational environment. One Field Coordinator explained that it was challenging to extend the workshops when they experienced delays, since budgets were fixed to cover staff time and participant catering for 5 days. Sourcing translation services was also a challenge, as it was not always clear if there was an approved budget for it.

> *"It is a bit not flexible because the training is supposed to strictly last [5] days, unless we call the management for an allowance to push to the next week. Because, if the participants are in the workshop one week and then the next week as well that means we need another budget. Their catering also matters because the initial budget is usually set to 5 days. The extension of the training only goes ahead when we are told to do it. If the go ahead is not given, we do not decide on our own."* - Centre Manager/Facilitator, Pibor.

Participants appreciated the translation services they received and the expertise of the Facilitators. They enjoyed having meals on site, which allowed them to socialise with other CCB participants and saved them spending time searching for food and refreshments. The translation services and food constituted an important part of creating an inclusive and comfortable environment, enhancing the project's social cohesion objectives. Ensuring these aspects of the training are funded was integral to the success of the project.

Materials

Representatives from YSAT, MIT D-Lab and CCB participants all mentioned that there were **challenges supplying materials to the field site in adequate quantities and on time for at least some of the CCB trainings**. Although supply chains were set up between Juba and the two project sites, prolonged rainfall made flights unable to land for long stretches of time, in some cases delaying training or meaning that some participants were unable to finish their technologies[37]. Centres had a store on site for materials and tools, but it seems that these stores were insufficiently stocked to mitigate longer gaps in transport of goods.

Both YSAT and MIT representatives reflected on the high cost of flights to Pibor and Duk, and this often exceeded the monetary value of the resources being flown. Additionally, the cost of fuel for generators in Pibor and Duk during the project period was reported as high; $150 - $200 monthly[38], and there were occasional delays due to shortage of fuel at the innovation centres.

Materials were transported by air due to **poor road infrastructure, insecurity and seasonal flooding.** An inexpensive alternative would be to source materials locally, but this was said to be difficult as materials were unavailable in the local markets. Until local markets are able to provide materials for the CCB project, it will continue to rely on external funding to source materials from Juba.

Flooding and security

Floods caused by heavy rains also caused issues for participants travelling to the innovation centres and, in some cases, disrupted participants' attendance due to displacement. A significant

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[37] CCB participant, Female, Dinka, Duk.

[38] Estimates provided by YSAT

minority of CCB participants also explained that travelling to the innovation centre was challenging due to the distances they had to cover, particularly those from 'Canal Site' in Duk.

Some CCB participants and innovation centre staff reported risks associated with the **timings of the workshops and the distance that participants had to travel to the Innovation Centre**. While YSAT provided travel costs to participants, some mentioned that this caused conflict among participants who were paid less for travel due to their shorter travel distances.

> *"Some were happy and others were not because of [the] difference in payment due to [the] distance. Those in Padiet were paid less than those at Canal site."* - Female CCB Participant, Duk.

Many participants cited security as a key external factor that impacted their experience of training. One participant was killed during a cattle raid in Duk[39], and some trainings were cancelled or delayed due to insecurity[40]. One staff member expressed concerns transporting materials on the roads in Duk, citing safety concerns around theft.

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This chapter provided a description of the Innovation Ecosystem Model, and its design assumptions and intentions. It explored the perspectives of Centre Managers and Facilitators, Local Authorities, CCB participants and YSAT and MIT D-lab staff, and highlighted the challenges that the project has faced including Facilitator turnover, transporting materials, and insecurity. The final section of the report outlines recommendations arising from the evaluation findings.

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[39] Interview with YSAT staff

[40] Male CCB participant, Murle, Pibor

Recommendations

In response to these findings, a set of recommendations were co-developed by the evaluation team, MIT D-Lab and YSAT. Together we recommend the following future adjustments:

Recommendation 1 | Address supply chain problems to support participants to fix broken technologies and create new ones

The evaluation illustrates that technologies can be genuinely transformative for people's incomes. However, six of the 17 technologies (35%) are currently out of use. Many people report their innovation has broken and say they are waiting for it to be fixed, or to fix it themselves. The supply chain to Pibor and Duk is particularly unreliable during the rainy season which creates challenging delays. However, being unable to fix the technologies may undermine the positive changes that people have described in their feelings of agency.

Recommendation 2 | Adjust project design and timelines to account for implementation challenges in Pibor and Duk, especially during the rainy season

Pibor and Duk were challenging places to implement the CCB project. Supply chains for tools and materials are slow and unreliable. Access by road or plane is very challenging during the rainy season. The evaluation results illustrate the value of implementing the CCB project in this type of environment. However, the funding mechanism for the project had no flexibility for extending time frames to account for the significant challenges it faced.

Recommendation 3 | Clarify community cohesion objectives and groups

The community cohesion activities focussed on bringing together people of different locations, ethnicities, genders and age sets. The evaluation provides evidence that people formed friendships and working relationships with people across these different backgrounds. In some cases, people said they felt surprised at the new relationships they had formed and that there had not been tension between them. Clarifying the community cohesion objectives of the project (for example, to focus on age sets, ethnicities etc) and doing some simple research activities to monitor participant's perceptions of each other would allow Y-SAT to document its achievements in this area over time.

Recommendation 4 | Develop an advanced CCB project

MIT D-Lab has implemented an advanced 'Energy' CCB in Uganda. This project has illustrated that participants benefit from attending a second CCB that allows them to develop knowledge of the design cycle, learn additional technical skills, and build more advanced technologies that address common daily challenges. A similar project in Pibor and Duk would help participants to practice creativity and develop their sense of agency beyond the first CCB training.

Recommendation 5 | Increase the number of CCB-B trainings to make it accessible to a larger number of participants.

Participants that attended the CCB-B training reported that it helped them gain basic business skills including identifying potential customers and tracking costs and income. Our interviews with participants indicate that other participants would have liked to attend a CCB-B and would have benefited from these skills.

Recommendation 6 | Develop a starter fund for businesses

Eight small businesses have been started as a result of the project. The businesses often need small amounts of capital to start, for example to pay for raw materials or to fix broken parts. MIT D-LAB and YSAT will consider developing a fund to provide capital to fledgling businesses.

Recommendation 7 | Form links with humanitarian organisations implementing livelihood activities in Pibor and Duk to identify if there are ways to work together or to influence their projects in future.

In the original concept note, the project included elements designed to "impact how aid is practised" in Pibor and Duk. In particular, the team planned to involve other actors in the Co-Creation Event, including humanitarian organizations. The project design was updated and the Co-Creation Event focussed on bringing together diverse groups of participants from Pibor and Duk including people of different backgrounds, ethnicities and ages. The challenges implementing the CCB also meant that the team had limited time to form linkages with humanitarian organisations through other activities.

This evaluation illustrates that the CCB process provides participants with tangible technologies that are new to the area and that can be used immediately to help earn an income. MIT D-Lab and Y-SAT should pursue connections with these and other humanitarian organisations to help position the Innovation Centre's as a service provider for livelihoods. This could include providing CCB trainings or renting the technologies at a cost, which would help promote the sustainability of the project.

Recommendation 8 | Strengthen the Training of Trainers

The six Trainers were selected by local authorities and had no previous experience in building, mechanics, facilitation or design training. They attended a Training of Trainers in Uganda but, given their lack of previous relevant experience, it was not long enough to build the skills and experience necessary to facilitate the CCBs. YSAT hired part time Technicians from both Pibor and Duk to accompany the trainings and the experienced Trainers from Uganda also provided extra in-person support. In future:

- Have innovation center managers visit other centers to learn what they could be like and share experiences
- Have more capacity-building/training opportunities for the Trainers (eg. in project identification and selection and using Kobo for data collection)

D-Lab provided additional recommendations from their experience of delivering the project:

- Have community outreach activities at the innovation center, in order to bring more people in, have them feel more comfortable, increase the activity etc.
- Have "design/technology road shows" that allow trainers to do short (single day, or half day) activities outside of the center to raise awareness and to provide services
- Develop technology service clusters that bring together the best CCB technologies, specifically those that provide a service such as knife sharpening, paste making, phone charging, etc. and refine them to be rugged and robust enough to withstand extended use.
- Hire "youth ambassadors" to work at the center, helping out but also mobilizing youth to come to the center for activities

● Think about other roles that the innovation center could fulfil.

Annexes

Annex 1: Evaluation framework

This Annex provides an overview of the evaluation framework including the evaluation questions, the evaluation sub-questions, and the methods being used to address each question.

Key Research Questions	Sub Questions	Methodology
1. **Learning**: What impact does CCB training have on participants' knowledge, mindsets and agency?	What percentage of participants report positive change after each workshop in: ● Knowledge and skills related to design ● Mindsets around their ability to solve challenges ● Mindsets around attempting to try things they have not done before From the perspective of people trained, what advantage does the innovation ecosystem give to people to create technologies and tools [over other vocational training models available]? From the perspective of people trained, how does the project contribute to self-reliance including increased agency, problem solving, and technical skills? How do participants describe the value of the CCBs, Co-Creation summits and the innovation ecosystem?	Pre-post workshop surveys KIIs with CCB graduated participants
2. **Behaviour change:** To what extent does the project transfer soft and hard skills that can be used outside of the training environment?	What percent of participants report in the end-line evaluation that they have: ● Continued working on the prototype from the training ● Used the technology in their own day-to-day life ● Used the technology to earn income (i.e. sold, rented, used in a business) ● Applied the design process to another challenge ● Collaborated with other participants from the training ● Taught elements of the design process to others ● Collaborated with members of a group with which they had differences or conflict To what extent do participants use the technology in their homes? How do participants use the technology to generate or create income? To what extent do participants report developing resilience and confidence? In what ways is this	Pre-post workshop surveys KIIs with CCB graduated participants and household members

Key Research Questions	Sub Questions	Methodology
	experienced?	
3. **Technology Development:** To what extent is the project and the local innovation eco-system an effective way for participants to produce things that practically improve their livelihoods or save labour?	What percent of prototypes produced in D-Lab training that, at the time of the endline evaluation, are: ● Actively in development ● In use ● Generating income ● Saving labour What does "success" mean to participants? Are they achieving these definitions of success? How has access to the workshops, mentoring, networking or Co-Creation activities facilitated the development of the prototypes? How do Co-Creation activities impact the design and development (including scale) of prototypes?	Observations KII with CCB graduated participants and community members (customers/ neighbours) Prototype photo diaries Case studies
4. **Gender**: What impact does CCB and the innovation ecosystem have on participating women and girls?	To what extent do the innovation ecosystem activities contribute to greater self-reliance (including increased agency, problem solving, and technical skills) for women and girls? From the perspective of women and girls trained, what advantage does training people to create technologies and tools give them [over other vocational training models available]? How do women and girls describe the value of the CCBs and Co-Creation summit to them? What are the advantages and disadvantages of training? To what extent does CCB impact how female participants' gender role is perceived?	KII with graduates Researcher diary
5. **Neutral spaces:** To what extent are workshops and Co-Creation contributing to the creation of neutral spaces?	Do participants feel comfortable in the innovation centre? How does the design and implementation of the project contribute to or undermine the neutrality of the innovation centre? What relationships are created as a result of the project? How are these relationships similar or different to other parts of a participant's lives? To what extent is CCB or the activities in the innovation center facilitating positive working relationships between different groups? Does bringing people together to build something have an impact on relationships, particularly with respect to conflict?	Interviews with CCB graduates Everyday peace indicators Researcher diary

Key Research Questions	Sub Questions	Methodology
	How do Co-Creation experiences influence relationships between participating IDPs, host community and humanitarian organisations?	
6. **Local innovation ecosystem**: How does the model need to be adapted?	How does the local innovation ecosystem support IDPs in producing things that practically improve their livelihoods and save labour? How does the local innovation ecosystem influence how humanitarian aid is provided? What are the opportunities? What are the risks of the local innovation ecosystem? To what extent did the design and implementation of the project lead to a developed innovation ecosystem in the two locations? Including ● Internal and external relationships and engagement ● Operational aspects - team size, structure and composition ● Participant selection ● CCB, Co-creation summit, and other non-financial support To what extent did other external factors (including those related to the conflict) influence the development of a local innovation ecosystem? What changes should be made for future iterations of the project in South Sudan?	KIIs with stakeholders KIIs with humanitarian aid providers Researcher diary

Annex 2: Outcome harvesting

The methodology combined in-depth interviews with a light-touch 'outcome harvesting' exercise. Outcome harvesting is useful in cases where change takes place in complex, multi-stakeholder environments. The approach identifies changes (or outcomes) that have taken place and works backwards to identify (a) how significant the change is (i.e. its level and breadth of impact or potential impact) and (b) what contributed to the change. For this evaluation we used the following definitions.

Activity	Definitions
Change statement	The observable change in the behaviour, relationships, activities or actions of a social actor (person, group, organisation, community) influenced by the activities of the project.
Significance	Is the change important? ● Minor - change is small or not important ● Moderate - a step towards a transformational change ● Major - a transformational change toward increasing or sustaining livelihoods
Contribution	What was CCB's role in making the change happen? ● Low - it would have happened anyway ● Medium - it happened faster ● High - would not have happened otherwise

Annex 3: Data collection

This Annex provides a summary of all data colleciton activities.

Method	Description	Duk	Pibor
Pre-post surveys	Surveys of CCB participants		20 post- surveys
Co-creation Event survey	Surveys of Co-Creation Event participants	19 pre- surveys 24 post- surveys	
Outcome harvesting workshops	A group discussion to harvest information about changes that have occurred for the participants and how CCB contributed to these changes.	1	1
KIIs with Graduated participants	In-depth semi-structured interviews guided by open-ended questions to explore the attitudes and perceptions of staff and partners toward the project, and learning outcomes and experiences of CCB participants	25	23
KIIs with Household members		2	4
KIIs with Local Authorities		2	3
KIIs with Centre managers/facilitators		2	2
Observations	The observations sought to understand the pedagogy and to explore the extent is CCB an effective way for participants to produce things that practically improve their livelihoods or save labour.	1	1
FGDs	The FGDs drew upon the Everyday Peace Indicators methodology.	4	0
Validation workshops	Findings workshops with the facilitators and a group of CCB graduates to present initial data and explore the themes that are arising.	2	2
Researcher journals	A journal of the researcher's reflections on the project throughout the evaluation.	1	1

Figure 7. CCB participants demonstrating the paste maker.