CHARLES STEWART MOTT FOUNDATION

SELCO FOUNDATION

Energy Access Ecosystem Development in Tanzania

Supplementary Report, Dec 2019

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Above image: An off-grid village in Tanzania where decentralized energy sources provide the only source of energy access

1. CONTEXT & OBJECTIVE OF THE REPORT:

ECOSYSTEM APPROACH & NEED IN TANZANIA

1.1. SUSTAINABLE ENERGY ACCESS & DEVELOPMENT

Two major injustices plague the world today- starker inequality gaps and the unequal impact of climate change. The two are inextricably linked with the impact of one (climate change) grossly exacerbating the impact on the other (inequality). Inequality can go beyond an economic lens to other critical areas of development such as education, health, employment, food security, financial inclusion, water resources and so on, the widening gap between the haves and the have nots becomes starker.

For those who have been able to move out of poverty, progress is often temporary: climate change, natural disasters, social and political instability, exclusive policies and skewed development threaten to rob them of their hard-won gains and force them back into poverty.

In particular, Africa is susceptible to the effects of climate change in part due to its large agro-based populations and complex yet understudied weather patterns. Although the continent's contribution to global greenhouse emissions is small- about 4% of the world's total in 2017, African nations are among the countries most vulnerable to and least prepared for climate change. Even with all the external support, building climate resilience in Africa will take significant resources as well as support from populations to prioritize climate action.

Access to energy is among the most important anti-poverty tools. It underpins all other development goals. Yet energy access, in a decentralized manner, as a pathway to fight poverty is often greatly underappreciated. It is typically approached from a technology centric (lights or machines) or a delivery model (mini grid or PayG) centric lens and often in terms of number of connections rather than how it can effectively be used to meet critical development needs for the poor. No society has modernized without reliable, affordable, accessible energy. Yet its unequal, largely centralized access has also left many behind.

Decentralized sustainable energy solutions offers a way to build on local resources, processes and customizations that are tailored to suit local contexts such that they can appropriately adapt of these adverse changes. Current energy planning and intervention efforts often take on a one size fits all approach that does not take into consideration multidimensional poverty and root causes of inequality. In itself access to energy is not panacea, it should be built on a detailed understanding of the end users' needs with an understanding of the opportunities and constraints arising from local socio-economic and cultural contexts.

Decentralized energy not only offers a way to:

i. **democratize access of basic amenities** at the door step of the poor such as mobile education delivery, agro-processing for small holder farmers, powering home based livelihoods and so on

ii. **creates assets and resilient pathways** for the poor via local financing, shift from consumers to ownership models, imparting skills sets that move the poor from merely being a labor force to decision makers or co-developers in supply chains, integrating sustainable energy as part of critical safety net programs such as education, agriculture, livelihoods, housing and so on.

With the looming deadline of 2030, the SDGs represents international commitment to build a more sustainable, safer and prosperous planet for all humanity. The collective strength in diversity offers an opportunity to build on analogous contexts across and within countries to arrive at multiple blueprints that can serve as an archive of processes of how poverty can be alleviated through ground up, inclusive thinking and interventions via decentralized sustainable energy. Rather than focus on targets of poverty reduction, it is a time to challenge this approach and instead focus on processes that can help reach those targets in a manner that create resilience, assets and sustainable pathways for the poor

CURRENT APPROACH TO ENERGY ACCESS	NECESSARY SHIFT IN PERSPECTIVE
DEFINITION OF LACK OF ENERGY '*Only Energy Access is Development*'	Not the statistics of number of people without electricity but UNRELIABLE and UNAFFORDABLE nature of SUSTAINABLE energy
USER as a PRODUCT CONSUMER	Energy solutions are to be looked as ASSETS and the users as ASSET OWNERS
TECHNOLOGY CENTRIC APPROACH '*Product centric not process oriented approach*'	Solutions to be approached from a holistic perspective. Equal attention to TECHNOLOGY, FINANCE and DELIVERY MODELS
ONE MODEL APPROACH '*Pushing preconceived solutions irrespective of the context*'	Designing the solutions to suit the NEED, GEOGRAPHY, END USER SEGMENTATION & SOCIO-ECONOMIC SITUATION
ONE DIMENSIONAL SOLUTIONS	Bringing long term sustainability in HEALTH, EDUCATION, LIVELIHOODS & LIVING ENVIRONMENT through last mile Decentralized sustainable energy solutions

"Access to sustainable energy can catalyze transformative benefits to enhance wellbeing and socio-economic status of an individual, family and community. Sustainable energy can be a critical instrument to democratize access, affordability and availability for basic human development- healthy homes and livelihoods."

Country socio-economic fabric:

Being one of the most peaceful countries in Sub-Saharan Africa, Tanzania enjoys political stability with economic growth rates of 7% over past decade and is bordered by 8 countries. Tanzania is the largest East African country known for its vast wilderness areas with a total population of around 60 million. However, ranked 159 among 189 in the Human Development Index it provides a challenging environment. Country's ppopulation is widely dispersed with 70% living in rural regions making delivery of services logistically challenging. Economic activities are cantered on agriculture but still largely plagued with issues of labour, drudgery, and climate shocks. In terms of major development sectors, outside the capital, Dar es Salaam, medical services can be patchy. Tremendous progress has taken place in the education sector in Tanzania with major growth in enrolment in primary and secondary schools with Net primary enrolment rate: 94%. Although there are challenges exist in delivering quality education due to poor infrastructure, weak teacher-student ratios etc.

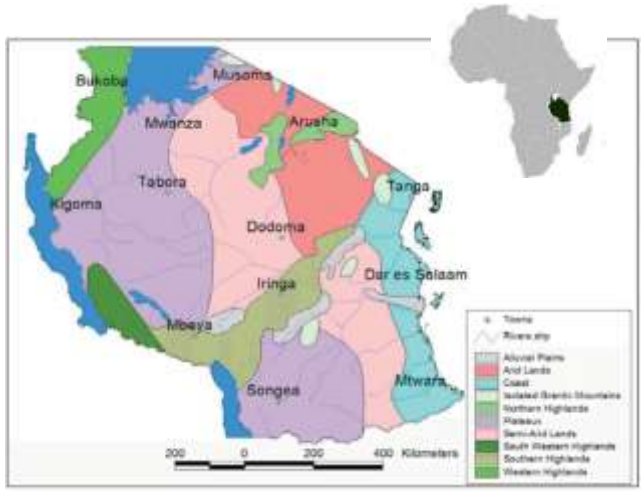


Figure 1: Tanzania's Agro-ecological zones and Crop zones

Tanzania – Energy Landscape: [1]

70% of Tanzania's 50m population resides in rural areas with only 10% of households connected with 7% of the rural population and 40% of urban population to national grid (census 2012).

- Country is vast with low population density making grid extension expensive for far reaching areas (60 persons/km2).
- Biomass represent 88% of total household energy consumption used primarily for cooking
- Poor spend about 35% of their income on energy while better off spend 14%
- In August 2016, The World Bank (WB) signed an MoU with the Government of Tanzania to provide USD209m for the implementation of the country's Rural Electrification Expansion Program.
- Electricity generation, transmission, distribution is provided by central grid owned by TANESCO (98% of electricity supply)
- Generation capacity in Tanzania is 45% Natural Gas + 14% liquid fuel (thermal) and 42% hydro
- Has 109 mini grids with installed capacity of 157MW serving 184,000 customers. 16 plants connected to national grid, remaining 93 are isolated mini grids

[1] Detailed scenario of the country, its energy access needs and stakeholder mapping is done in Country Scenario Report document

- Hydro is most common tech (49) though 19 fossil fuel systems account for 93% of customer connections, 25 biomass mini grids, 13 solar (10 are donor funded). RE potential includes hydro, geothermal, wind, solar (off grid and grid connected) and biomass

Need for an Ecosystem Approach:

Following scoping activities laid out in 2015, the following findings reiterate the importance of developing an enabling environment in Tanzania to reach long-term development using sustainable energy as a catalyst for the country. While there exists local stakeholders involved in the energy access sector, efforts are often siloed or product centric which are unsuited to cater to the diverse contexts of underserved populations. Some of the critical points include:

- In-access to affordable **domestic credit** for enterprises and end users. Micro credit organizations are not engaged in sustainable energy financing.
- **Stringent financing conditions** such prohibitive interest rates and collaterals with urban locations limit reach of financial institutions
- Lack of **local innovations** that move beyond prototype or Western imports to the door step of end user
- Lack of last mile delivery or distribution channels that build on after sales service particularly in rural areas.
- **Import driven market** with less local manufacturing incentives that also compromises product quality and ability of local enterprises to negotiate supplier credit terms.
- **Under capacitated personnel** (tech, biz management, operations, finance) that slows enterprise growth.
- **Policy environment** that can be centralized, lack of overlap with other critical development areas.
- Limited visibility or **capacity of local community partners** who can be anchors to facilitate critical linkages between enterprises, innovators, govt and the people.
- According to national security act **prohibits anyone from distributing electricity other than TANESCO** which creates a monopoly. -
- **Local governments do not have any mandate in energy,** hence hindering decentralized management of energy.
- **Lack of awareness** among policy makers and financial managers, customers about sustainable energy and their role in development beyond powering electrons.

The lack of appropriate enabling conditions for energy access stymy poverty alleviation efforts and necessitate a holistic approach towards building end to end vs band-aid solutions for the poor.

- Solutions needs to consider **local contexts** ie culture, cash flows, vulnerable nature, geography etc.

- Need to bring in indigenous innovation that taps into local components, local knowledge, local partnerships, suitability to needs, micro level problem solving
- Economic growth cannot be seen in isolation rather in consonance with other aspects of ecosystem such as market linkages, reliable suppliers, innovation, capacity building, finance, policy.
- Inclusive economic growth should challenge current ideas of growth re: consumption and distribution of wealth in order to create "social progress" and "environment protection".
- End to end solutions that can sustain beyond putting in place a technical solution but also integrating non-technical aspects such as financing, appropriate ownership models and so on.

Access to **sustainable energy can catalyze transformative benefits to enhance wellbeing and socio- economic status** of an individual, family and community. Sustainable energy can be a **critical instrument to democratize access, affordability and availability for basic human development-** healthy homes and livelihoods.

Objective of the Report

The objective of the present report is to provide a detailed overview of the Energy Ecosystem Development work in Tanzania that SELCO Foundation has been anchoring with the partnership of C.S. Mott Foundation in the first two phases of the program and how it has built the foundation for the subsequent period. The report not only provides an in-depth understanding of each aspect of the existing program but also provides a broader framework for the next phase by connecting these elements to the long-term objectives for energy access in the country. The report also focuses on various other links that are evolving in the context of strengthening enabling energy access in Tanzania and how they would all fit into the country's SDG 7 vision.

Figure 2: Local Innovators at work in SIDO workshop, Iringa, Tanzania

2. C.S MOTT – SELCO PARTNERSHIP:

WHAT, WHY & HOW

Aligned Agendas: C.S. Mott Foundation and SELCO Foundation

The primary goal of the partnership was to set up the desired eco-system for energy access in Tanzania for critical development parameters to develop using sustainable energy as a catalyst. There is a mutual strong recognition to develop local resources towards building on local solutions. This further aligns with the government's own efforts to industrialize Tanzania in a sustainable manner by tapping into local human resources and institutions. The suitable climate and industrial path of Tanzania offers opportunities for the country to take a leadership position in demonstrating different development pathways powered by sustainable energy in a localized, decentralized manner.

In order to cater to the needs of underserved populations nimble approaches are required to leapfrog over more traditional centralized models. Recognizing the importance of (i) local clean energy entrepreneurs, (ii)need for decentralized clean energy models and processes and (iii) building the ecosystem in the energy access sector.

It is in this context that SELCO Foundation and C.S Mott Foundation partnered together to draw on learnings from India in building an energy access ecosystem in a sustainable manner over the last two decades. SELCO Foundation continues to share common philosophies in growing the energy access ecosystem in Tanzania with C.S Mott Foundation. It is these shared agendas that continue to act as a guiding light for the program as more local partners and funders join to grow this program.

Stark Energy Access Needs
70% of population in Tanzania resides in rural areas. 32.8% of population has access to electricity. Of which 16.9% have access to electricity. Low density and sparse distribution challenges grid extensions

Analogous Contexts
India's diverse contexts can be used to draw parallels in similar cross-country contexts. From terrain, population densities, maturity of financing, local entrepreneurial capacities etc.

Systems Approach
Multiple factors play a role in the sustainable delivery of energy solutions. Combination of 5 pillars contributes to holistic solutions- innovation, policy, skills, finance and incubation of local enterprises & civil society

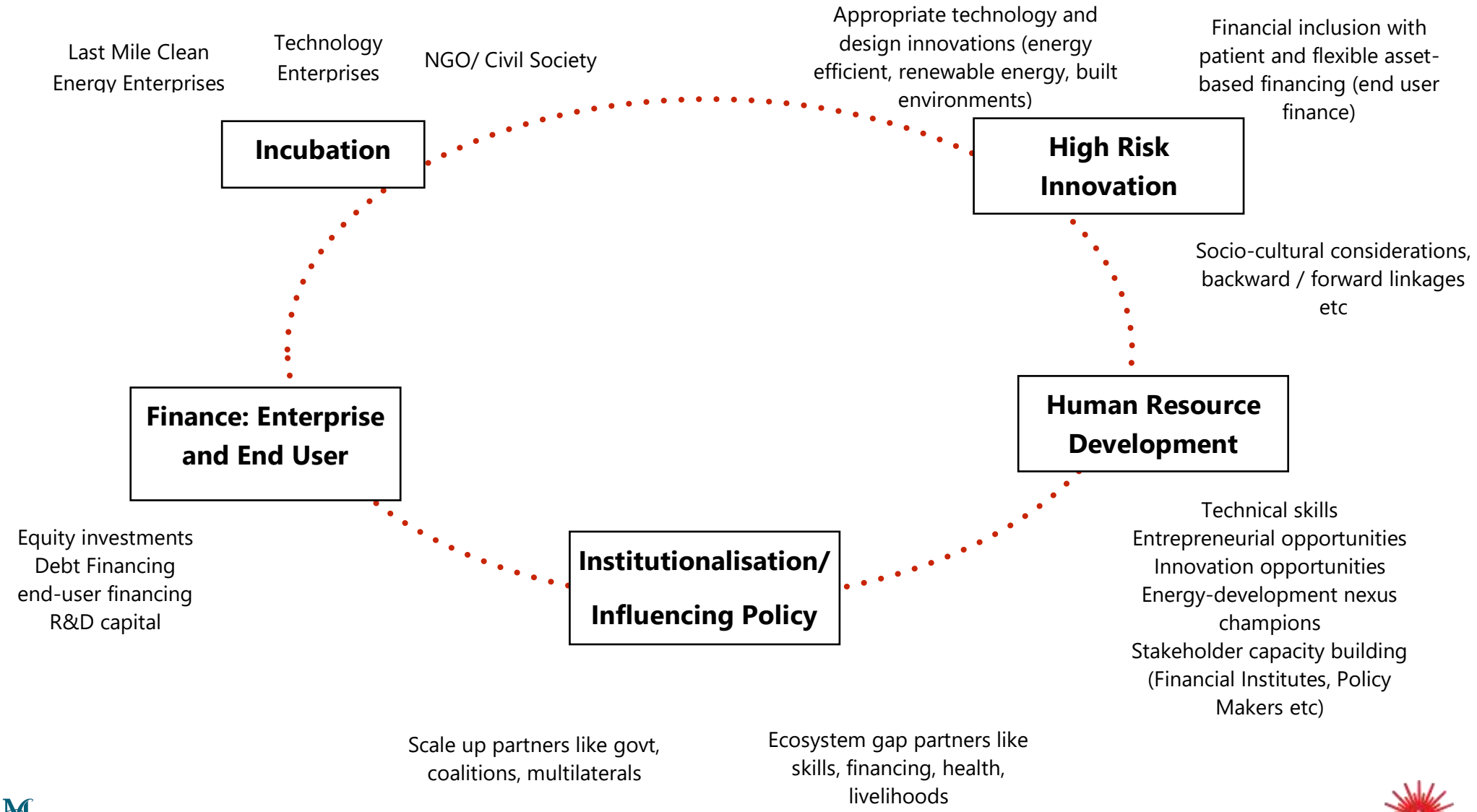
Government Buy In
Active government policies to ensure socio-economic growth and energy access via key policies like MKUKUTA, LTPP, BRN, Vision 2025 and National Electrification plans

SDG 7 across all SDGs
Energy Access by itself is not impactful, rather it role cuts across every other SDG. It enhances the delivery of other critical outcomes such as education, productive use, health, jobs, water etc.

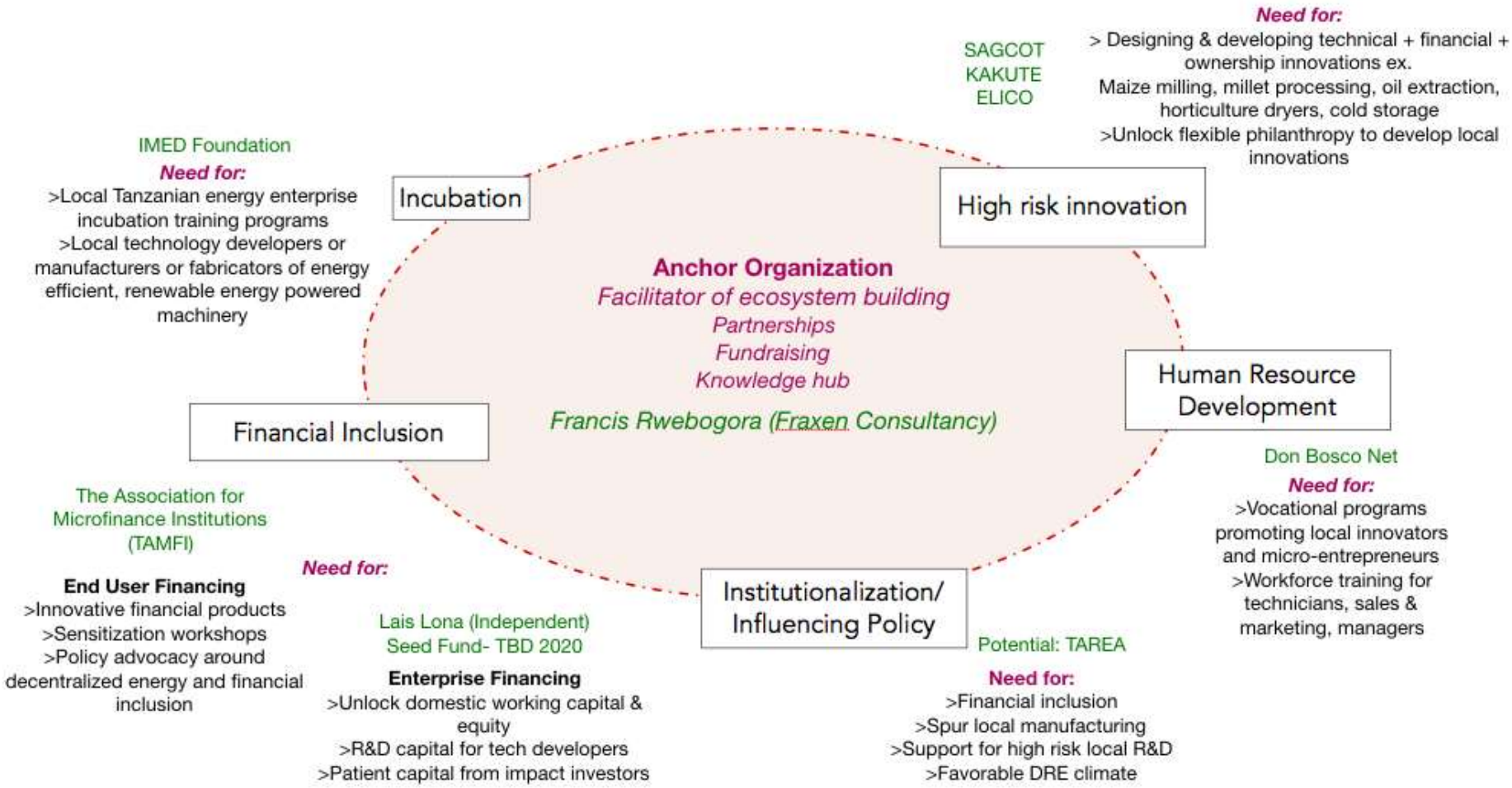
Local Capacities
Inclusive pathways to build local capacities to be problem solvers such that solutions on the ground are designed, developed and deployed by local stakeholders bringing in more ownership and sustainability of solutions.

TEMPLATE OF ECOSYSTEM APPROACH

Last mile energy access cannot be tackled from a purely technical aspect, rather, it needs to be nested in a systems based framework that takes into consideration other aspects such as critical financing, greater awareness among policymakers/financiers/end users, local energy enterprises, conducive policy push among others that will catalyse the reach- terrain, end user segments.



CURRENT SNAPSHOT OF PARTS OF ENERGY ACCESS ECOSYSTEM IN TANZANIA BEING DEVELOPED AND LOCAL PARTNERS



TIMESTAMP	MILESTONES IN EACH PHASE OF PROGRAM			
Phase I: 2015-2017	Scenario report on Tanzania & Nigeria energy ecosystems	Stocktaking and in person meetings with key stakeholders	Validation of ecosystems approach via stakeholder workshops in Moshi	Selection & co-developed proposals with local partners in each ecosystem pillar
Phase II: 2017-2019 **On-ground partners**	Implementation commenced with Don Bosco (Skills)	Scoping for Innovation partners and pathways for pilots on the ground	Learning Exchange Visit for 11 champions from Tanzania re: Ecosystems	Kick off meetings commenced with IMED Foundation (Incubation)
Broader connections based on 2 phases	***Other country interests:*** Malawi, Sierra Leone, Burkina Faso, DB Tech Africa ***Global Partners interested in outcomes from TZ:*** International Solar Alliance, IRENA, SE4ALL, WHO, USAID ***Interested Funders on TZ Ecosystem Work***: DOEN Foundation, IKEA Foundation, Good Energies Foundation			
Phase III: 2019 – 2022 **Macro Country and Global Ecosystem**	African Country Assessments	Contd. technical assistance to DB + IMED + TAMFI + Innovation Pilots with other programs	Implement complementary programs to existing partners: seed fund, integrated livelihood centres for awareness, unlock local end user &	International stakeholder push for TZ/Africa ecosystems work re: ISA, IRENA, SE4All + cross country exchange programs

1. Phase I

Identify the ecosystem gaps and shortlist the local stakeholders who play a critical role in strengthening the ecosystem

2. Phase II/III

Strengthen capacity of ecosystem partners so that they develop programs in their respective ecosystems and champion the systems approach philosophy

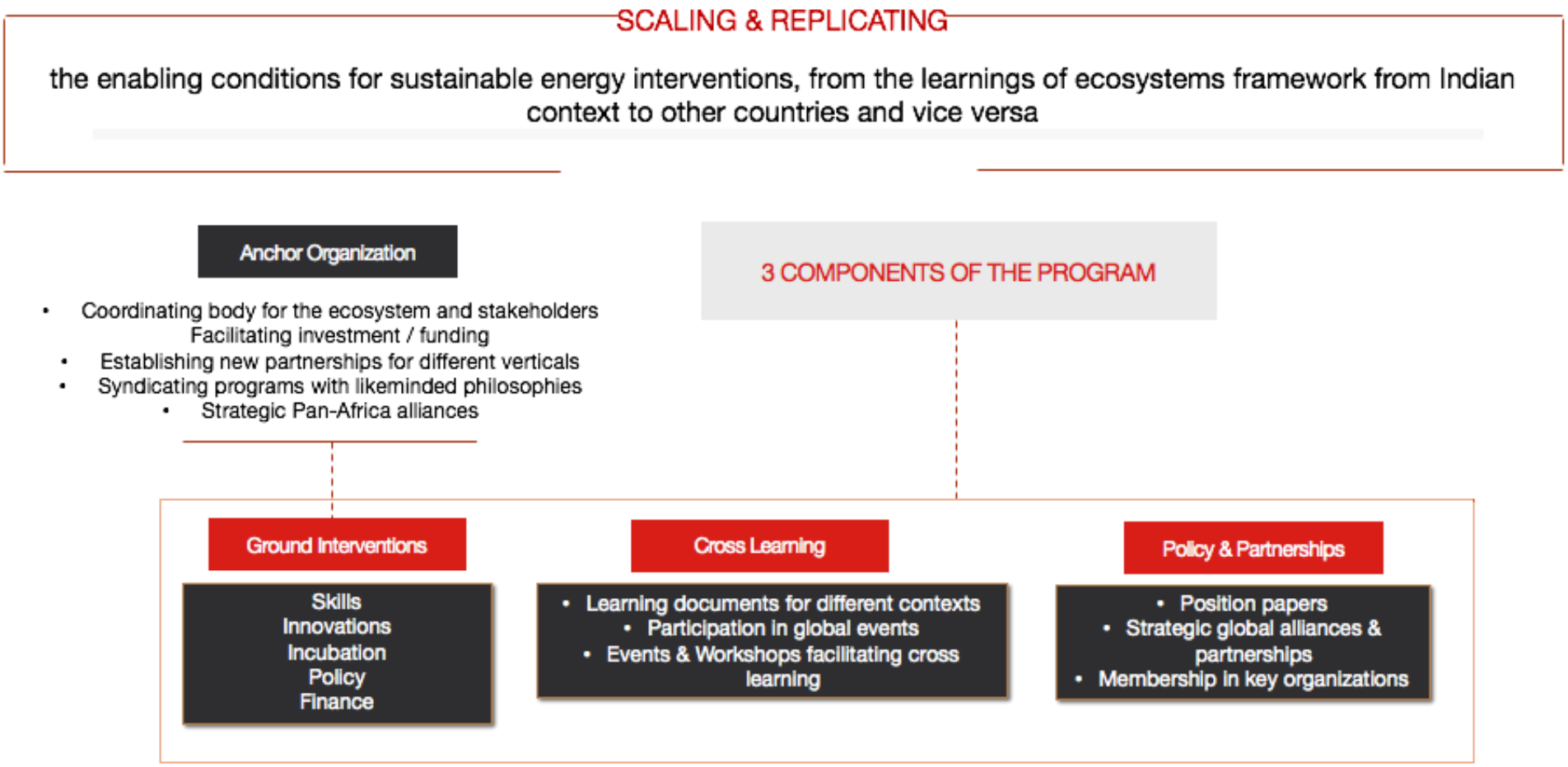
3. Phase II/III

Facilitate ground level interventions

In technology linkages, design of end user financing mechanisms, technical skill development, policy inputs; provide advisory support; and share operational insights with partners to implant select interventions for a robust ecosystem.

Simulate Cross Learnings from models that are working in the Tanzanian context, and apply the ecosystem framework analysis on another country in Africa to set the groundwork for exploring cross over learnings with other countries in the region.

PROGRAM DESIGN IN TANZANIA FOR ENERGY ACCESS ECOSYSTEM BUILDING

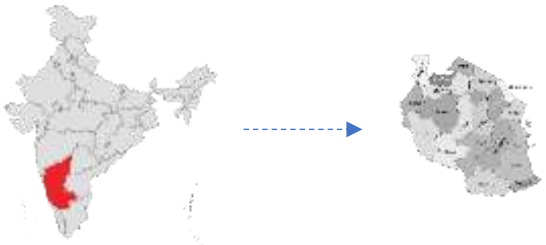


1. SCOPING & INTRODUCTION TO ECOSYSTEM APPROACH

2. IMPLEMENTATION WITH GROUND PARTNERS

3. MACRO COUNTRY & GLOBAL ECOSYSTEM HUB

- Documenting learnings from programs in India
- Identifying local ecosystem partners in Tanzania
- Creation of Workplan providing in-depth understanding of ecosystem gaps and addressing them
- Comprehensive resource library with clear categorization, databases of partners, knowledge papers, outreach pieces across various mediums



Replicating and contextualizing learnings from India to Tanzania – This is across all the phases of the program in different modalities

FINANCING with **TAMFI**

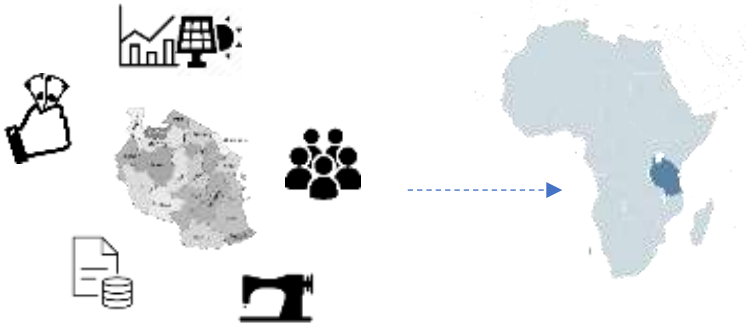
INCUBATION with **IMED**

SKILL DEVELOPMENT with **DB TECH**

- Complementary programs in different verticals with other partners to support Mott programs.
- FI linkages, post training support, enterprise financing
- Interventions in multiple energy nexus verticals and concrete interlinkages between different partners are built

Models and processes leading to the foundation of Global Ecosystem Hub in Tanzania for East Africa.

In phase 3, SELCO Foundation seeks to bring the ground work in Tanzania to a global platform and also using the templates developed to influence other country strategies on how to approach energy access ecosystem building. The Foundation will continue to provide critical technical assistance support to ground partners in the form of advise, knowledge transfer in form of training, documentation, visits where needed.



In the upcoming phase of the project – the focus will be towards strengthening all the pieces of ecosystem in Tanzania and taking the learnings beyond to East Africa

Creation of an Anchoring Structure to facilitate interaction between partners

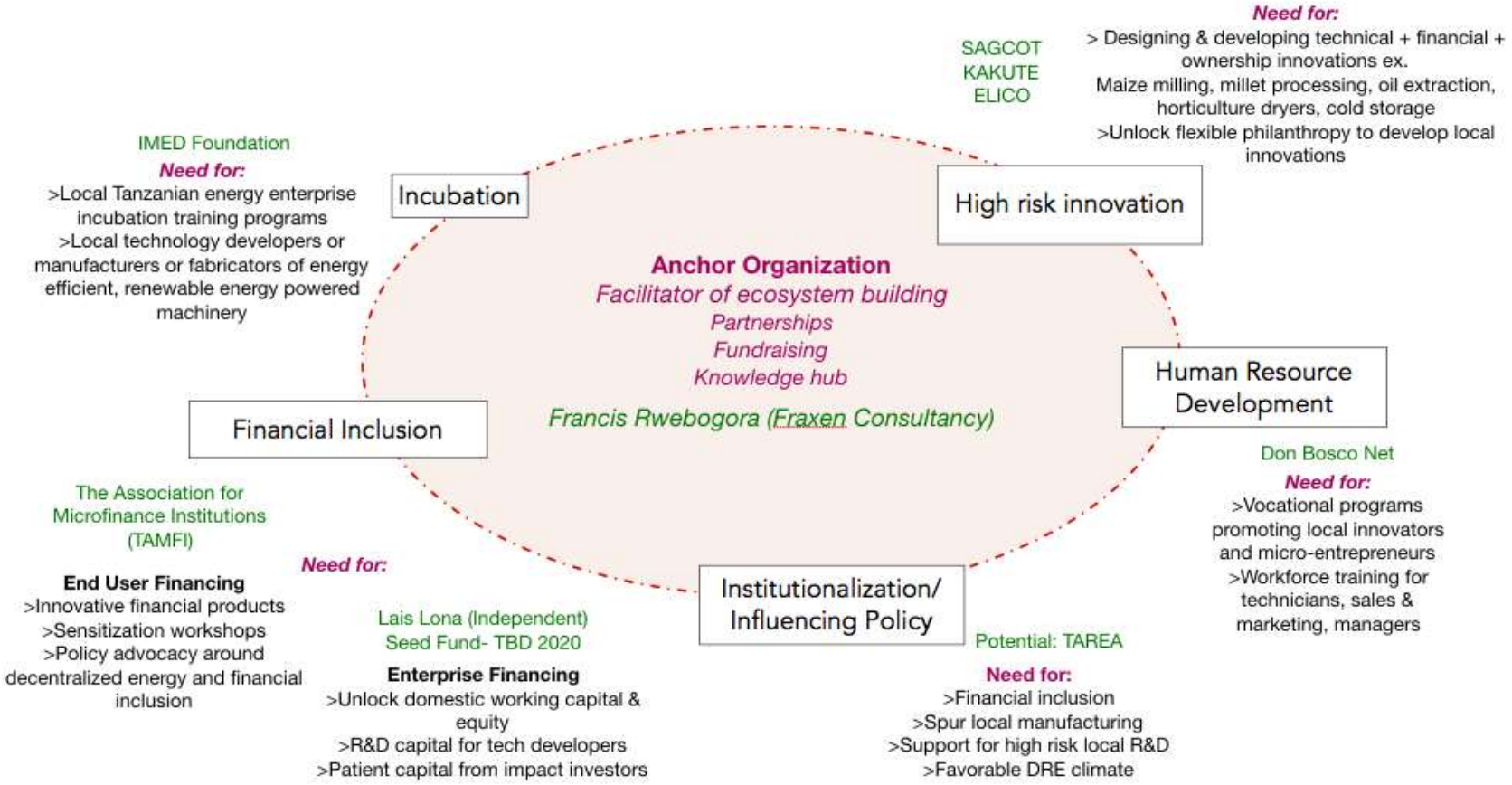
3. ENERGY ACCESS ECOSYSTEM DEVELOPMENT WORK IN TANZANIA :

OVERVIEW OF THE PROGRAM

3.1. PARTS OF THE ENERGY ACCESS ECOSYSTEM AND LOCAL PARTNERS

How does current work fit into bigger picture for the country?

The program has been developed towards achieving different aspects of Sustainable Development Goals for Tanzania by using sustainable energy as a catalyst. The long-term objectives of each part of the ecosystem being developed are described below including a description of each partner. Efforts are being made to synergize programs such that they each feed into one another and do not operate in silos. This is mainly being anchored by Francis Rwebogora and SELCO Foundation.



3.2. SKILL DEVELOPMENT PROGRAM OVERVIEW

Partner organization: **Don Bosco Planning and Development office (DB NET), Tanzania**

Objective of the program: There is a need to develop skill technical capacity to enhance delivery and installations thereby increasing confidence in decentralized renewable energy, spark young innovators who can local problem solvers and inspire youth to explore entrepreneurial opportunities to give them choices beyond a salaried labor force.

About hosting institution: The program is hosted at Don Bosco VTC Dodoma and Don Bosco Iringa VTC as part of their existing electrical course for most vulnerable youths of the region. These youths are typically marginalized, materially poor, drop outs, orphans and addicts. Don Bosco Vocational Training Centre is a non-profit organization, recognized and registered by the Government of Tanzania. It started its activities in Iringa in 1981 and Dodoma in 1982. In line with the Salesian mission, the centres prepare young boys and girls for life with technical and life skills. In addition, the centre works with.

Main outcomes of the program:

- Template of facilities to allow for training that includes demonstration and experimental centres that will supplement the theoretical training and also create a makerspace to foster innovation
- Development of robust content in collaboration with VETA, TAREA and the Technical Advisor that combines theory but also critical practical skills that are conducive to rural installations and needs.
- Develop a pool of skilled trainers across Tanzania who can also train similar courses in other similar vocational institutes
- Inspire and incubate different skill sets such as innovators, entrepreneurs that are local problem solvers who can design and deliver customized asset-based solutions for the poor

Main components of the program:

Training Facilities	Content Development	ToT	Training Program	Post Training Linkages
Demonstration and experimental centre that will supplement the theoretical training and a makerspace to foster innovation	Development of the syllabus and training modules for SE training in collaboration with VETA, TAREA and the Technical Advisor for the students	Upgrade skills of the instructors to train students in solar technician curriculum, entrepreneurship and innovation programs	Training of electrical students with contextualized solar technical training and also as a platform for entrepreneurship and innovation program	Support at end of training program towards three typologies of graduates - those opting for employment and those seeking opportunities to become innovators or entrepreneurs.

Timeline of activities and supporting ecosystem development with Don Bosco program:

- Technical training program was started in 2018 with content and TOTs co-developed using SELCO Foundation, TAREA material.
- In 2019, Finias Magessa, an experienced consultant in the field of renewable energy in Tanzania was engaged by Don Bosco to fine tune the solar technical program and build the innovation and entrepreneur development programs. He has been working closely with the SELCO Foundation's skill development team.
- Visits to DB Tech Dodoma and Iringa were made by SELCO Foundation in May 2019 in order to provide inputs on the existing centres and how effectively the centres can be used to deliver the programs by matching the content and curriculum. The solar technical training curriculum and content was well received and training is ongoing at DB two centres based on the collaborative efforts of Finias and SELCO Foundation team.

Figure 3: Finias and Don Bosco official in discussion with SELCO Foundation Skills team regarding Technical Training course development

- As part of Finias' efforts to develop the Entrepreneurship Development Program and Innovation program, a week long learning exchange visit was arranged to SELCO Foundation in October 2019 towards sharing inputs to develop appropriate programs for the same within Tanzania.

Figure 4: Discussion at DB tech center, Iringa during SELCO Foundation visit to Don Bosco, May 2019

- Further efforts are planned to develop a high-risk funds/seed-fund post training for these innovators and entrepreneurs. Planning efforts include identifying a host for the seed fund to administer and devolve the funds appropriately.
- DB Net to coordinate with IMED Foundation to see how DB can liaise for advanced entrepreneurship skills development and also exploring possibilities to link potential interested entrepreneurs from DB Net into the incubation project.

Figure 5: Finias discusses with local innovator in India during his visit. Oct 2019

Partner organization: **IMED Foundation, Tanzania**

Objective of the program: To identify and nurture the capacities of local Tanzanian energy enterprises to deliver last mile energy solutions that improve quality of life and other development for underserved communities of Tanzania.

About hosting institution: IMED Foundation mission is to support individuals and organizations to develop competencies and solutions that enable them realize their full potentials. Their vision is to become a role model in education and learning for enterprise development. Over the years, IMED Foundation has developed an in-depth knowledge and rich networks with actors in the entrepreneurship ecosystem in Tanzania including regulators, trainers, consultants, researchers, entrepreneurs who can serve as mentors, innovation and entrepreneurship projects, etc. They already have the experience of running an energy enterprise incubation program – TAREBI from 2014-17.

Main outcomes of the program:

- Increased understanding around energy access and its relation to other development themes. **Moving beyond a technology centric understanding of energy supply for the poor.**
- Increased knowledge about strategies to **balance social and commercial** missions for local energy enterprises and develop sustainable business models keeping the poor at the center.
- **Institutionalize a training curriculum at a local level** via IMED Foundation that is accessible to enterprises beyond the program.

Main components of the program:

IMED program has started from September 2019, and currently IMED is in Pre-Incubation phase where the process is underway to select the enterprises. As part of designing the program, the core training team visited India in November 2019 with an aim to co-develop an end to end incubation process while firming up the content and delivery methodologies along with conceptual and operational insights towards executing an effective incubation program for energy enterprises in Tanzania. The details of the visit are shared in the next section. The following schematic gives an overview of the timeline in which the program would unfold over two years.

Timeline of IMED Incubation process:

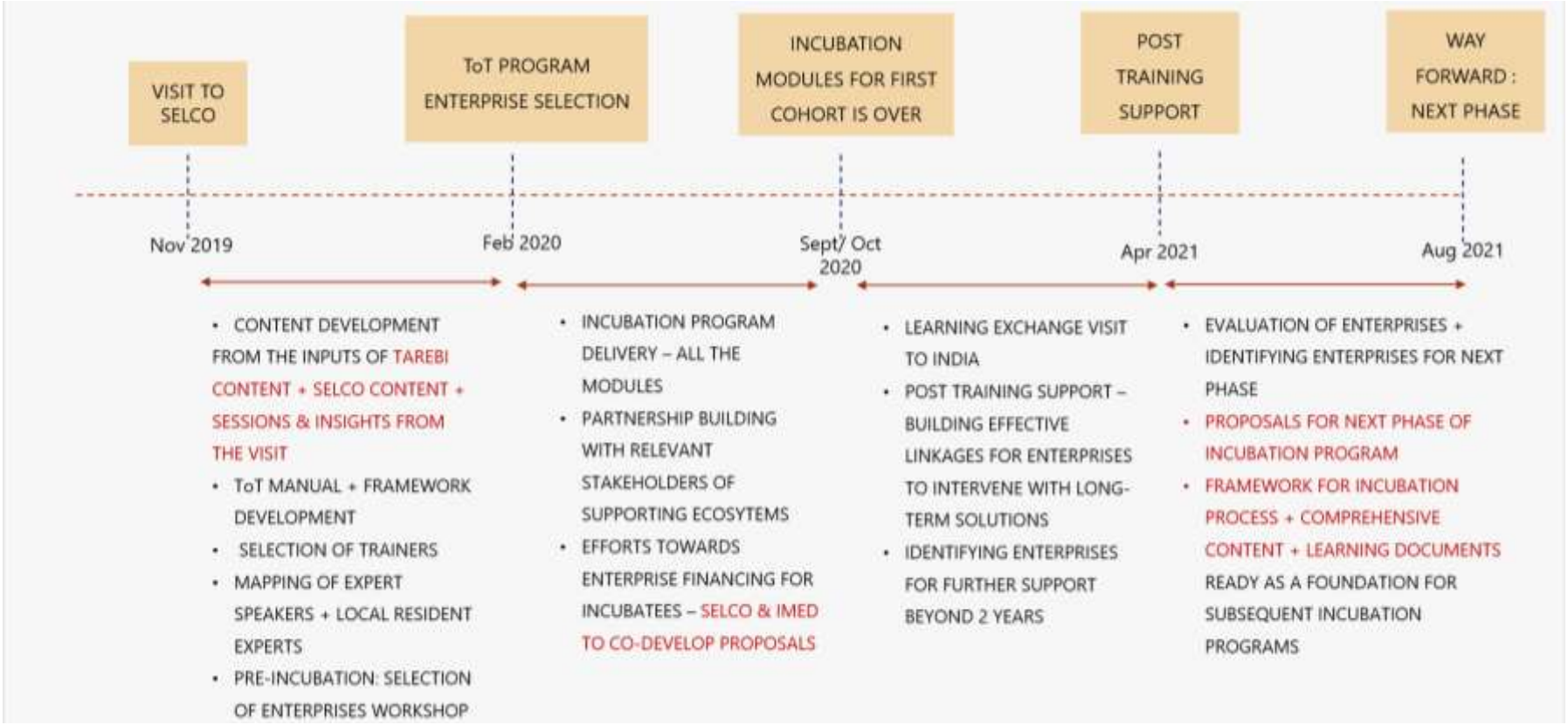


Figure 6: IMED core training team visits SELCO Foundation team, Nov 2019

3.4. STRENGTHENING END USER FINANCING FOR DRE SOLUTIONS

Partner organization: **Tanzania Association of Microfinancing Institutions (TAMFI).**

Objective of the program: To improve capacity of the microfinance institutions on understanding and become familiar with the clean energy technologies and access to financing for enterprises and end users on the renewable energy sector in Tanzania.

About Hosting Institution: Tanzania Association of Micro finance Institutions (TAMFI) is a not-for-profit umbrella organization for micro finance institutions in Tanzania. It was formally registered in 2001 as a sole network for micro finance activities in the country. Members include Commercial, Community and Microfinance Banks, NGOs, Private MFIs, SACCOS, apex of informal groups, micro -insurance company and Business Service Providers. The association seeks to develop capability of micro finance institutions and the micro finance sector in general through advocacy, lobbying, research and development, responsible micro finance, capacity building, and information gathering and dissemination. TAMFI's Mission is to facilitate the creation of an enabling environment for development of a sustainable microfinance sector through the participation of all stakeholders.

Main outcomes of the program:

- Financial institutions are **familiar with sustainable energy technology/ financing innovations**
- New sustainable **energy financing products and schemes are developed** by a range of financial institutions
- **De-risking tools are engaged** that can unlock domestic finance
- Enterprises and end users of sustainable energy solutions have the **access to affordable DRE financing** from local FIs

Main components of the program:

Content development
Program contents about clean energy technologies, innovations in financing the enterprises and end users will be developed by TAMFI capitalizing on the experience of SELCO Foundation on their activities of providing capacity building to India financial institutions. This is important on the process because it will document the local content and innovations of energy financing in the local settings

Capacity Building
After the program contents have been developed, SELCO will provide training of trainers (TOT) to the selected TAMFI personnel. This will prepare them to be ready for training and other capacity building initiatives to the identified MFIs general managers, branch managers, field loan officers, risk management officers etc. However, financial training, advisory and mentorship will be provided to the

Clean energy financing products
The program will support the MFIs on understanding the nature and challenges of CE projects and therefore designing customized financing schemes to suit the demand. Various de-risking mechanisms will be shared, and tested to the Tanzania energy enterprises.

Although the program has just started, through Mott's support, multiple strategic meetings and visits have been arranged between 2018-2019 with TAMFI's champion director Ms. Winnie Terry during the previous phase of the program in order to assist with strategic program design and execution

Figure 7: Ms. Winnie Terry, TAMFI, during her Learning Exchange Visits to India – Left: With Francis and Alyosious Fernando (father of SHG Movement), Nov 2019, Right: With an energy-livelihood end-user, Nov 2018

3.5. OTHER CORE ECOSYSTEM DEVELOPMENT WORK

Enterprise Financing Ecosystem: As work towards above-mentioned ecosystems are evolving, the criticality of simultaneously developing appropriate landscape assignment was undertaken by an independent consultant Lais Lona. This research was aimed at exploring Tanzania's solar enterprise financing landscape and identify key areas that can be targeted in order to strengthen the energy ecosystem. The findings in this research were based on in-depth interviews with 100 small to medium solar enterprises and 15 local financing institutions across Tanzania.

The output of the report will be critical for IMED Foundation's Incubation work as the report provides insights into the financial support systems for local enterprises. Some of the key recommendations include - there is a need for more targeted policy dialogues in the country to support the implementation of renewable energy policies and updated tax regulations to include all solar products & components exemptions. To tackle access to financing challenges, technical assistance is needed for both solar SMEs and local financing institutions. The use of complementary risk-management mechanisms may help better match long & short-term solar SMEs financing needs. Current efforts are underway to identify modalities that make appropriate financing accessible to these local enterprises.

Developing Grassroot Energy Innovation for Productive Use and Well-being: As one of the important pieces of energy ecosystem development in Tanzania, SELCO Foundation has co-developed a proposal with KAKUTE Ltd, a local innovation development organization in Tanzania with the support of DOEN Foundation. The work would rightly fit into SELCO Foundation – C.S.Mott Foundation mandate of building local solutions by strengthening local ownership models. The proposal looks at decentralized energy innovations that improve farm and non-farm livelihoods, and develop implementation models that address both demand and supply-side challenges. This will result in equitable economic growth and reduce the impact of poverty in rural areas. The innovation program provides a much-needed on-ground innovation learnings/ models for the local enterprises, community partners and all the other relevant stakeholders who are involved with ecosystem development work in Tanzania. The details of other innovation proposals are described in the next section.

4. ENERGY ECOSYSTEM BUILDING STRATEGIES :

Overview of different strategies around core partnership programs

In order to build a holistic energy ecosystem building process, different strategies have been incorporated by SELCO Foundation towards identifying pipeline of partners, synergizing their efforts such that each of their programs feed into one another and also developing potential programs in Tanzania. Also, apart from the knowledge and advisory support to ecosystem development programs in Tanzania that are directly in partnership with C.S. Mott Foundation, there have been other critical initiatives and conversations which are complementary. The following section summarizes these tactics, strategies and insights in building and/or strengthening the energy access ecosystem in Tanzania. Several of these strategies are made more actionable by the presence of a strong local program coordinator – Francis Rwegobora. This furthers the importance to build an anchor partner that will continue to forge these pathways at a local and regional level.

Learning exchange visits for ecosystem partners and other Tanzanian energy access champions: Visits to India in order to provide practical insights, training + exposure visits for ecosystem partners to strengthen their programs. These visits are also curated such that participants have opportunities to speak with their counterparts in an Indian context.

Stakeholder local workshops: To identify relevant partners from different sectors to initiate programs in regional locations or to build on existing programs that have alignment with the ecosystem program.

Specific one to one meetings: Exploratory meetings to generate awareness around the program and in the process initiate new conversations with partners in Tanzania who have existing programs or are in the process of developing new programs to see how our efforts can be synergized.

Participation in the events/ conferences: Bringing in partners from Tanzania to conferences/ events in India or recommending their participation in other global events such that it adds value to the ongoing Tanzanian program and also plugs in these champions to conversations that can replicate the Tanzanian experience or bring in new perspectives.

Figure 8: Delegation from Tanzania meets with Dr. Veerendra Heggade, Founder of by Shri Kshetra Dharmasthala Rural Development Project (SKDRDP), Nov 2019

Building other strategic partnerships to support the core programs: Bringing in other champion partners to the ecosystem development work who are not part of C.S Mott Foundation supported program to fit in other relevant pieces around energy access in Tanzania**.**

Learning documents to support programs in cross-country programs: Knowledge and learning transfer through process documents, visit reports, strategy documents, and other relevant documents that would provide programmatic inputs to partners.

Facilitating on-ground pilot implementations with local partners: On-ground pilot implementation strategies with local partners in Tanzania – providing essential learnings for larger implementation models and showing a "proof of concept" on the ground that can be replicated.

4.1. Learning exchange visits for ecosystem partners and champions:

4.1.1 Learning Exchange Visit for 11 energy sector champions from Tanzania – Nov 2018 (Refer report in Annex)

With C.S.Mott Foundation and SELCO Foundation program initiatives were underway; it was critical to share a foundational understanding of energy access ecosystem development work with partners. Hence a set of champions (chosen from different organizations who play critical role in energy access in Tanzania) were invited for a 10-day visit with the objective of cementing the concept of an ecosystem approach, and providing a platform for champions to share their insights onto how would it be relevant for Tanzania.

Further, building strong relationships with the representative delegates as well as facilitating strong connections among themselves so that the synergies will be built as they fine tune their programs.

Figure 9: Champions from energy sector from Tanzania meet rural solar livelihood entrepreneur during their visit to India, Nov 2018

4.1.2 Participation in community financing models conference- International Conference on SHG Movement – Nov 2019 (refer report in Annex)

Against the backdrop of an International Conference on Promotion of Self Help Group (SHG) Movement, anchored by Shri Kshetra Dharmasthala Rural Development Project (SKDRDP) and co-hosted by SELCO Foundation, Tanzania partners were invited to accomplish the following objectives:

- Understand the successes and failures of community-based financing using Self Help Groups as a tool and the role of financial intermediaries in extending the reach of financing to the last mile.

- Adapt what is relevant in this financing approach to existing counterparts in Tanzania i.e., SACCOs, community banks etc. including the broader enabling conditions that allowed such an approach to thrive ie Central Bank
- Develop interconnectedness among C.S. Mott supported programs and other complementing programs (described in detail in the next section)

Figure 10: Delegates from Tanzania and the Philippines visit on-ground implementation sites during their visit to India, Nov 2019

4.1.3. Learning exchange visit by IMED Foundation core training team to build Incubation program strategies – Nov 2019 (refer report in Annex)

Through the 5-day visit comprised of specialized incubation sessions with SELCO Team, relevant stakeholders, and interactive field visits - the aim was to provide conceptual and operational insights towards executing an effective incubation program for energy enterprises in Tanzania.

- To support the IMED team in firming up 6 months to 1 year operational + conceptual steps
- Support in firming up the content, curriculum, and all the other components of the 2-year program.

understanding of end to end support that the incubatees need + the tapping the existing local resources

Figure 11: Team from IMED visits a household where local enterprise has implemented solar solution through financing from local FIs, Nov 2019

4.1.4. Learning exchange visit for Finias (DB Net consultant for Solar technical training, EDP and Innovation program) – Oct 2019 (refer Agenda in Annex)

A learning exchange visit was arranged for Finias, the consultant for Don Bosco who is key in delivering all the three components of the program to SELCO towards sharing inputs for comprehensive need, background, context and recommend the modality of EDP and Innovation program for skill development ecosystem. The visit was organized with following objectives.

- Facilitating an overall understanding of the Skill Development ecosystem in Sustainable Energy and how the skilling program could go beyond technical training program in Tanzania
- comprehensive need, background, context and recommend the modality of EDP and Innovation program for skill development ecosystem
- Understanding of energy ecosystem pieces in Tanzania, tying up each ecosystem's work and exploring his role as a champion in the skill development programs in Tanzania

Other exchange visits:

Paul Yillia from The Energy Nexus Network (TENN) in Sierra Leone visited SELCO to gain insights on modalities of energy access ecosystem development akin to Tanzania ecosystem program – June '19

MCPI, KDCI and K-Coop teams from the Philippines visited SELCO to gain programmatic inputs for their existing energy financing programs akin to TAMFI program – Sept '19

4.2 Local Stakeholder Workshops in Tanzania:

One of the effective ways of identifying the partners who have the potential to co-develop relevant programs towards strengthening Tanzania's energy access environment has been the stakeholder workshops. All through the multiple phases of the program, these workshops have provided platforms to initiate new partnerships, identify champions and develop complementing programs. In March and July 2017, these local stakeholder workshops lead to identification of the existing partners such as TAMFI, IMED Foundation, KAKUTE including the program coordinator, Francis Rwegobora (refer workshop agendas in Annex). More recently in 2019, similar workshops were conducted to identify other pipelines of opportunities.

Figure 12: Dr.Harish Hande, SELCO Foundation speaks to local energy access stakeholders in Tanzania during ecosystem partnership building workshop in Dar es Salaam, Jul 2019

4.2.1 Two Stakeholder workshop on Innovation Partnerships for Strengthening Energy Access Ecosystems around Livelihood & Health in Tanzania – Dar es Salaam & Iringa, July 2019 (refer report in Annex):

These two workshops had an objective to identify and shortlist intervention opportunities with the stakeholders to demonstrate/ support ecosystem approach. Some of the potential partnerships that got initiated/ evolved during the workshops include:

Figure 13:Stakeholder workshop at Iringa, July 2019

- **YODEPO :** Led by the motivated individual, Geofrey Thobias, YODEPO is a grassroot NGO with interests in anchoring and stabilizing FPO/ FPC formations in the region of Iringa. Post workshop, YODEPO has been chosen as one of the incubatees for IMED program. Through a good connect with community, it has been considered to explore a revolving fund for the local rural energy enterprises through YODEPO.

- **TCRS**: It is an organization whose work is concentrated in refugee relief and resettlement to southlands of refugees who fled from the many conflict-ridden great lakes and other neighboring countries to find asylums in Tanzania. Aligning with TCRS mandate to work with local communities apart from just the refugee settlements,

possibilities have been explored to develop a joint need assessment at the district of SAME on Disaster Risk Reduction (DRR) program to co-develop a proposal in which local partners of this program can get involved.

Figure 14: Ecosystem partners meeting during the visit to India, Nov 2019

4.3. Building other strategic partnerships to support core programs

With the different critical ecosystem pieces (Skills, Incubation and Financing) being developed in Tanzania with Mott Foundation's direct involvement, effective partnerships with different stakeholders who complement this work in various ways were also simultaneously being developed.

4.3.1. Formation of Clean Energy Thematic Work Group and other strategic MoUs between relevant partners during the visit to SHG conference to India, Nov 2019

Figure 15: Ecosystem partners meeting during the visit to India, Nov 2019

- SAGCOT or The Southern Agriculture Growth Corridor of Tanzania and KAKUTE are the two key organizations that were part of the visit to India. The discussions with SAGCOT had started before, and during the recent visit of SELCO team to Tanzania, the conversations were initiated towards agri-energy nexus interventions with SAGCOT. KAKUTE (funded by DOEN Foundation for grassroot innovation) being one of the key players in developing energy – livelihood innovation pilots across Tanzania, the partnership is aimed at establishing a strategic tripartite agreement between SAGCOT, KAKUTE and SELCO Foundation for the purpose of analyzing and demonstrating role of sustainable energy driven, efficient solutions in chosen agricultural (on farm and off farm) value chains. This will provide the much-needed evidence in terms of technological and financial models for sustainable energy driven interventions in Tanzania that would complement Mott's existing programs.

- Both TAMFI and IMED Foundation initiated meetings with the group to ensure their programs have relevance in some SAGCOT areas and also among themselves such that financiers and enterprises are incubated in overlapping areas.
- Consortium (called as Clean Energy Thematic Work Group (CETWG)) initiated by Tanzanian partners (KAKUTE, SAGCOT, TAMFI, IMED, YODEPO, Francis) to regularly share and sync their programs for the larger development of the energy access ecosystem in the country. This will be coordinated by Francis to regularly convene and facilitate necessary exchanges in support of the program development.

  The major objective of the consortium will be:

  - Identify new opportunities, develop project and implement as joint partnerships or the consortium with a lead organization.
  - Support ongoing projects implemented by partners, sharing information and experiences, in a transparent and open environment.
  - Strengthen partner's capabilities to conduct renewable energy projects, by sharing experiences, creating partnerships and identifying funds for implementation.
  - Support towards unlocking energy financing, creating strong energy businesses and be the link between the government and private sector.

4.3.2 Pilot implementations to gather learnings and provide templates for tech/ finance/ delivery models

Solar livelihood implementations with a local solar enterprise (Please refer to the summary in annex): In order to establish an initial platform to gather learnings from on-ground implementations of solar livelihood interventions, two livelihood implementations were facilitated through SEPON Ltd (local enterprise) in two typologies of communities. The communities were selected by SEPON Limited considering the potential exposure/ learnings/ evidence the implementation would provide to different ecosystem stakeholders towards unlocking some of the financial and delivery models of technological innovation. These implementations provide the first proofs for other local stakeholders involved with the on-going programs in energy ecosystem development work. Three solar powered sewing machines were implemented in two different communities with specific needs (refer report in Annex-the details of the implementation and potential outcomes).

Figure 16: Benard Okech, SEPON Ltd, with the sewing machine entrepreneurs post implementation

Apart from this, there are a few other partnerships that are evolving which are aimed towards on-ground implementations with local stakeholders.

LIST OF PROPOSALS	DESCRIPTION	OBJECTIVE
SEED PROPOSAL FOR DB TECH GRADUATES	Proposal for potential seed fund opportunities for the graduates of EDP and Innovation programs of DB Tech	• Catalyst for **energy microentrepreneurs** to kick start potentially sustainable energy enterprises aimed at last mile deployment of energy services in rural Tanzania. • Catalyst for **sustainable energy innovators** to creatively find solutions from prototype to product to address pervasive socio-environmental issues in rural Tanzania.
KNOWLEDGE + AGRI RELATED IMPLEMENTATION WITH SAGCOT+ KAKUTE	Creating a platform for energy + agro innovation templates development and knowledge partner	• To build a strong environment for energy access ecosystems around deployment of **farm and dairy related livelihood innovations** in the regions where SAGCOT is involved with the farmers • Small and medium scale champion farmers and agricultural enterprises to have enhanced awareness, understanding and impacts of sustainable energy driven, efficient technologies in the chosen agricultural value chains
INNOVATION PILOTS WITH KAKUTE (DOEN FUNDED PROGRAM)	Developing grassroot energy innovations for livelihoods by strengthening local stakeholders	• **To understand the specific needs of communities**, identify innovations that address those needs, and implement them • **Forge partnerships** with and between local communities, energy enterprises, community organisations, supply chain actors, financial institutions, educational institutions, and other stakeholders to ensure that the project's impact is self-sustaining • **To document and capture the leanings** in a manner that the project can be used by other stakeholders to better inform similar interventions. • **Co-developing potential templates** of technology, finance, business models from the learnings that may act as a predecessor towards developing sustainable delivery mechanisms for energy – development nexus solutions across different regions in Tanzania

SUPPLIERS BENCHMARKING DOCUMENT FOR SOLAR TECHNOLOGY SOLUTIONS FOR LOCAL ENTERPRISES IN TANZANIA (PARTNER TO BE DECIDED)	Development of a benchmarking document to provide a comprehensive understanding and awareness towards the pricing and quality of technology components in the supply side environment in Tanzania.	• **Local solar enterprises having an overall understanding of the available local supply environment** for the major components related to solar technology (panels, batteries, charge controllers, inverters, etc) in Tanzania. • **Benchmarking of pricing and quality rating** for the above-mentioned components are developed as a reference for the local energy enterprises • **Local stakeholders for major technology components** (local manufacturers, importers, distributors) related to **relevant livelihood implementations** are mapped (sewing machines, irrigation systems and other agriculture value chain implementations, pottery, and other recommended solutions) • **Price comparison and mapping between local market environment and cost of importing it from India or other import markets in Tanzania**, for major solar technology components consisting of both solar part as well as livelihood appliances is developed.

Figure 17: Community where Solar Powered sewing machine was implemented through SEPON Ltd.

5. WAY FORWARD

TANZANIA AS AN ECOSYSTEM HUB

Given the momentum of the program, Phase 3 will involve more intensified efforts to bring together elements that showcase the effectiveness of an ecosystems approach in development long term solutions. Specifically, these efforts include:
>Ongoing support in program design and execution for existing partners
>Acting on partner pipelines and developing complementary areas ex. seed fund for innovators and local entrepreneurs, unlocking domestic finance like working capital, implementing ground interventions around livelihoods among others.

More often than not, funding and associated devolvement structures particularly in the global south yields results in the short term but they generally do little to shape or change the systems that produce the problems in the first place. What is needed instead, is to tackle the real root causes of poverty, inequality and climate change in a manner that is devised and delivered by local stakeholders. SELCO Foundation seeks to conceptualize and implement an international knowledge and implementation platform based on the learnings from India and Tanzania to position UN's SDG 7 as a critical catalyst for a sustainable and equitable future in the Global South. A dedicated "Centre" - Global Ecosystem Hubs- will be an umbrella organization capable of creating, supporting and linking multiple "Regional Hubs**"** across at least 6 geographies.
The main objectives include:

- Become a learning exchange platform that will create connections, facilitate productive transfers of local knowledge, local expertise, networks in order to catalyze implementation of pro-poor sustainable energy solutions.
- Transform efficiency and effectiveness of impact by adopting an ecosystems approach for replication and contextualization leading to localized implementation and ownership.
- Drive for sustainable energy and development agendas that are shaped and implemented among locally led voices in communities and regions of distinct climatic, geographic, political, socio-economic features i.e. South-South cooperation.

In September 2019, a Roundtable discussion was organized on the fringes of Climate Week in New York City, which brought together practitioners, thought leaders, philanthropists, funding agencies, among others to discuss the scope of such a concept (refer Roundtable Minutes in Annex). The objective of the roundtable was:

- Concept alignment
- Fostering partnerships: Synergies between planned and existing programs and agendas
- Global Hubs Founding partners - Role and commitments
- Regional Hubs Partners - overall and sectoral
- Scope and Timelines for next steps

This convening provided an impetus to synergizing efforts in other countries such as Sierra Leone and Ethiopia where similar ecosystem programs are being explored with local partners. It has also opened up funding opportunities to expand thinking on this concept and loop in local partners to initiate programs on the ground mirroring the program in Tanzania.