FACILITATING A SUSTAINABLE TRANSITION IN THE AGRICULTURAL SECTOR IN UGANDA THROUGH STRATEGIC NICHE MANAGEMENT DESIGN AND PERMACULTURE

Master Thesis
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Thanks to all the Consortium Members, Family and Friends

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Table of abbreviation

ACT……Agroecological Criteria Tool

AFSA……. Alliance for Food Sovereignty in Africa

ESAFF……Eastern and South African Small Scale Farmers Forum

MLP …….Multilevel perspective

GRC……..Global Regenerative Collab

PMA……..Plan for modernisation of agriculture

NGO……..Non-governmental organisation

SNM ……SNM

Appendix

1 Introduction

One of the major issues we are facing nowadays is food insecurity for a booming global population. By 2050 we will reach an estimated 10 billion people, which have to be fed under the current agricultural industrial system, unless the sector will go through a transition (Foley et al., 2011). As the population and at the same time the demand for food is rising, challenges and externalities, such as ecosystem degradation coming from the current industrial agricultural system will most likely be enhanced.

Sustainable Design Engineers, have the capacity and expertise to face wicked problems, such as the food crisis, the loss of ecosystems and the decline of biodiversity. These wicked problems are addressed in the thesis and a solution is presented with the help of strategic niche management and socio-technical experimentation. Here a consortium from Uganda which focus on regenerative agriculture is being used as a case and where socio-technical experimentation used, in order to enhance a transition in the agricultural sector of Uganda.

I will first introduce you, regenerative agriculture as a solution for the wicked problems mentioned before and a short summary of the formation of the Ugandan Permaculture Consortium (UPC). Afterwards I will present you the methods and theory complementing strategic niche management. Following theory and methods, I will outline the general agricultural system, narrow down to the Ugandan agricultural sector and hypothesise what would be necessary in order to change the system.

Lastly, I will present you a multi-level perspective and the case of the UPC and its members as well as the strategy used by the consortium in order to bring about a change, through socio-technical experimentation. Here, different projects started by the UPC are being showcased. In the end I will present you some of the network difficulties the UPC is facing and present you a design solution in which the projects are being put into the context in order to create a more stable network with the help of working groups, interessement devices and the creation of mutual activities across the projects.

2 Regenerative Agriculture as a solution

Redesigning the conventional agricultural system through permaculture increases microorganisms, plants and other organisms which are important for increasing soil fertility, regulate pests and disease by increasing biodiversity. As there is a multitude of several plant life it also attracts pollinators and other forms of biodiversity. On farm level, an efficient use of natural elements such as water, soil, solar energy, indigenous seeds, soil organisms, pollinators and natural enemies is the norm in regenerative agriculture. At the same time, optimal planning of plant rotation and creating symbiosis between plant life and other organisms for example through nutrient binding mushrooms puts the farmer into the position of agroecosystem care taker. More specifically, there is great potential for permaculture as a philosophy to change systems, as the permaculture design process provide principles to guide the design, implement and maintain resilient agroecological systems (Krebs 2018), especially in countries such as Uganda, new sustainable agricultural systems are needed. *In the following, I will provide a short summary why a change is needed in Uganda and the strategy how to facilitate a green transition through the build of the Ugandan Permaculture Conosrtium.*

Uganda Food Insecurity why it is needed

Modernising the agricultural sector has not contributed to the well-being of the country as a whole, as food insecurity is still a major issue. A solution for an ongoing demand for food, for a rising population is needed, which will not compromise natural environments. Trade-offs, such as contamination of ecosystems, decrease in biodiversity or the bioaccumulation of contaminants in the food, deriving out of the agricultural sector, need to be mitigated.

Hypothesis: Through a socio-technical system design approach, radical sustainable change in the agricultural sector in Uganda can be potentially initiated through the regenerative grassroots movement in Uganda. Here, the main methodologies are strategic niche management, socio-technical experimentation, collective impact and the build of a stable network are used to design the project towards systems transition. *As a result, the Ugandan Permaculture was formed.*

Build of Consortium

In May 2022 the UPC was founded consisting of, community based organisation and small holder farmers, with the aim to transform the agricultural sector into a sustainable sector. The consortium consists of permaculture and regenerative practitioners, with the goal to create space for collaboration to promote regenerative practices. It is made up of grassroots and community-based organisations, all focusing on a green transition in the agricultural sector through regenerative practices. Interesting, are the diverse focus points and activities done in relation to regenerative agriculture, through the different groups. Such as policy development, upcycling of organic waste, focus on marginalised groups, on the environment, communities, roadwork, and infrastructure. Here the strategy lies to bring together regenerative practitioners and create a community of practice which can share knowledge, resources and support each other in their work towards a green transition. *In the next chapter, I will elaborate on the theories which are relevant to enable a sustainable transition.*

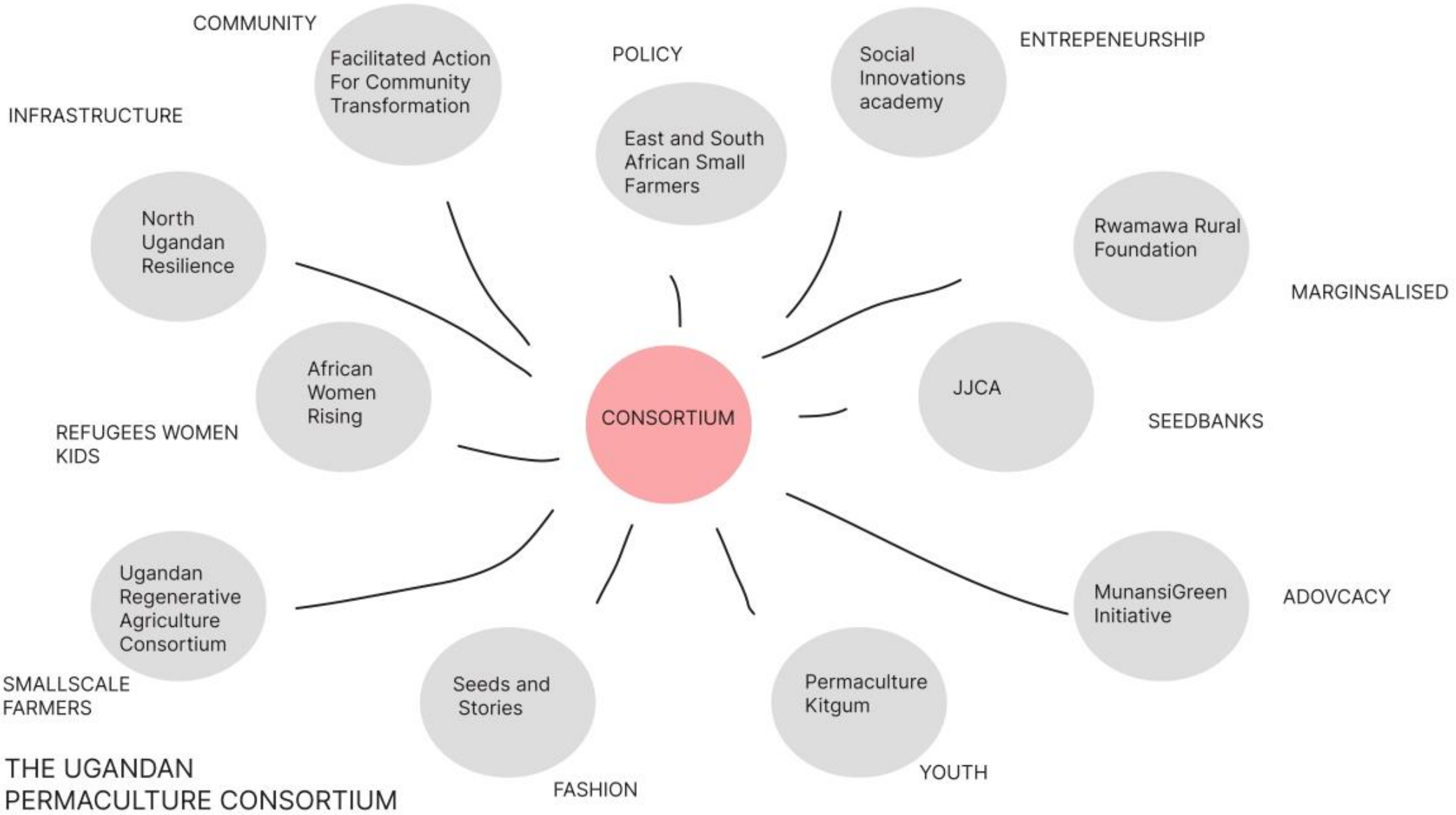

Figure 1 Ugandan Permaculture Consortium Members

3 Theory and Methods

Data collection

Reflexive and dissensus interviews and meetings as a source to collect data

Throughout the thesis I have been conducting more than 30 interviews with actors ranging from permaculture activists, regenerative focused web developers, regenerative focused crypto currency developers, the Ugandan Biogas Alliance, governmental stakeholders, NGO leaders, researchers, permaculture farmers and practitioners mostly from Uganda.

The Interviews can be found in the appendix and were transcribed through the online tool speech to text https://speech-to-text-demo.ng.bluemix.net/.

Important was that the interviews were based on a reflexive and dissensus approach. Reflexivity as to mirroring immediate responses in order to get to root issues and gaining insights from the interviewee, with the intention to bring the narrative and the story of the one interviewed to the forefront. A dissensus approach shows “truth and insights” and can build trust. A combination of semi-structured reflexive and dissensus interviews were used as a means to negotiate and interesse the interviewee through the narrative of the consortium, also establishing an opportunity to join the consortium (Langley 2013). These interviews and meetings contributed a lot, to the network building of the consortium. Conducting the interviews ranged from having online calls from 20 min to 3 hour long meetings, in which we negotiated our intentions on common ground. Depending on the willingness and interest of the person to connect with the network, I sent out documentation of the narrative of the consortium after the meeting. Data was also collected from the consortium working group which was formed during the thesis. Here we worked 6 hours per week for a period of 3 months. A variety of methods to collect qualitative empirical data have been used throughout the duration of the thesis. Such as open Questionnaires, surveys, meeting minutes, note taking, Miro workshops, brainstorm session, mapping activities, email and whatsapp conversations and the creation of worksheets and reports coming from the consortium working group.

Table 1 Empirical Data collection

Empirical Data	Amount
Interviews	26
Presentations	5
Questionnaires	4
Workshops	4
Reports	3
Worksheets	5
Consortium Meetings	3
Consortium working group Meetings	40

Interessement devices and boundary objects

Interessement has been used in many different forms throughout the project. With the help of interessement devices, agency can be configured and possible actors aligned in a new way as they potentially create interessement for actors (Hansen & Clausen, 2017). According to Hansen & Clausen (2017) they are essential enablers of navigational strategies and the reorganisation of the Actor Network. Workshops, narratives, icons and images are examples of interessement devices (Hansen & Clausen, 2017). A boundary object is a tool, which is used in cooperative and collaboration settings between heterogenous actors, like companies, organisations, or individuals, to exchange, generate, transform and interpret knowledge, which can lead to problem solving (Carlile 2002).

Boundary objects are purposely used to create a basis, for common understanding and create a structure, where novel ideas can be explored even without having a pre-consensus between the actors involved (Carlile 2002; Star 2010). Mobilisation of actors to weave into the network has been conducted in a Whatsapp group called "Permaculture Uganda" in which a narrative of the consortium has been portrayed in text as well as video form. The narrative of the consortium has been also used in many online webinars and events in which I got to connect and expand the network with similar stakeholders in the regenerative field from Congo DRC, Zimbabwe and Namibia. The build of an interessement device and boundary object is being showcased in the last chapter of the thesis, which is being co-created by several groups across the UPC and has been used throughout the Master thesis, in forms of workshops, scenarios and the build of the project profile.

Table 2 Places from which consortium members joined

Places from which consortium members joined
Ugandan Permaculture Whatsapp Group
Online Webinars
Permaculture Consortium Members
Referred by Danish Embassy
Referred through Ugandan Permaculture Consortium
Through Online search

Multi-level perspective (MLP) and SNM (SNM)

A MLP on a system makes it easier to understand the connections between the niche, regime and the landscape. The landscape pressures the regime due to disruptive events which create opportunities for the niche to anchor into the regime (Geels 2011). According to Bilali (2018), the landscape pressures, which are important for the agricultural sector, are: -Globalisation and internationalisation of agrifood market -, population growth -, global financial crisis -, changes in diets and lifestyles -, neo liberalisation -, international treaties and conventions -, common agricultural policy -, increasing concerns about the environment -, climate change -, war -, corona -, hunger and malnutrition among other place based landscape pressures which have to be defined. Pressures which are relevant for the MLP in Uganda are corruption, pests and diseases, droughts, refugee streams and school drop-outs.

The regime describes the agricultural sector as a locked-in system which consists of: intensive, conventional, industrial agri-food sector and its associated rules and practices -, business codes and regulation -, food safety laws -, existing business networks -, logistic transport and infrastructure -, government actors and institutional structures -, political discourse on agricultural development -, dominant agricultural practices -, main consumers of goods -, technical innovation and others (El Bilali, 2018). In Uganda subsistence farming and cultural events such as national agricultural shows and expos are relevant in the regime as well as stakeholders such as the Makere University and other research institutions.

The third dimension is called Niche. There, novel innovations are being nurtured which might have the capacity to create its own regime or replace or merge with the old one. Durable niche and regime interaction is being done through linking mechanisms (El Bilali

2018), wherein new rules, laws, practices, technologies, new networks deriving from niche are being suggested. Those linkages can also be described as anchoring processes (Elzen et al. 2017) which address different dimensions such as markets, lobbying, regulations, norms, visions, infrastructure in the context of niche regime interactions, which ultimately can lead to sustainable transition. Agroecology, agroforestry, climate-smart agriculture, horticulture, permaculture, regenerative agriculture are some of the niche practices and philosophies in the Ugandan context. In the next chapter I will present ways how niches can be strategically put into place, in order to bring about green transition.

SNM and Socio technical experimentation as strategy

Throughout the thesis, SNM has been used in order to facilitate a pathway for grassroots movements in the regenerative sector to gain agency and potentially transform the agricultural-food sector in Uganda. SNM incorporates 1) incubation and shielding from the regime and selection pressures. 2) Secondly, it includes, nurturing of the innovation by broadening the network with actors, which are not necessarily part of the niche, but in favour of it. This creates an environment to gain new insights and develop ideas through socio-technical experimentation. Experiments are key arenas for nurturing and are defined as initiatives, which have the capacity to create sustainable change due to their innovations, structure, agency and network. 3) Lastly, the embedding process into the regime is being done by connecting with stakeholders in the regime which are supportive of the niche, also called hybrid actors. After being nurtured the niche innovations can be market ready and compete against already existing structures. Niches can be empowered through either fit and conform - meaning that it fits to the unchanged selection environment of the regime for example market structures. Or through stretching and transform- the acceptance from civil society, political parties, opinion formers in media, trade unions, institutional investors, sectors that might benefit an opening and re-configuring of the regime. As a result, niches such as the regenerative agricultural sector, can transform the regime, the agricultural sector from within. In the context of the thesis SNM has been used as a tool, which navigates change processes by adding actors, knowledge sharing, and the development of pilot projects leading toward a more sustainable agricultural sector (Smith and Raven 2012, Ceshin 2014).

Collective Impact Methodology in the context of the consortium

A complementary method which was used and introduced into the UPC is collective impact. The methodology goes well along SNM as it gives structure and a template of different preconditions which are needed for successful impact. Collective impact is a way to change systems, build trust and begin to find solutions that change the outcomes in the systems. Through the methodology social and environmental challenges can be addressed as a collective rather than through fragmented groups. A precondition is the alignment and collaboration of stakeholders in between the network as well as across sectors, which address the same issues to work together towards the same goal. The illustration (figure 2) showcases five conditions which are needed, in order to initiate successful change as well as the different levels where collaboration can take place between the network, stakeholders, the working group and the target group oftentimes the community. Collective impact is used as a tool in the consortium which is part of the strategy as well allowed to put members into a set of roles. Working as a collective requires collaboration on many different levels. *In the next chapter, I will describe collaborative-design as the main design methodology used throughout the project (collectiveimpactforum.org, 2022, Kania & Kramer 2013)*

The Five Conditions of Collective Impact	
Common Agenda	All participants have a shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed upon actions.
Shared Measurement	Collecting data and measuring results consistently across all participants ensures efforts remain aligned and participants hold each other accountable.
Mutually Reinforcing Activities	Participant activities must be differentiated while still being coordinated through a mutually reinforcing plan of action.
Continuous Communication	Consistent and open communication is needed across the many players to build trust, assure mutual objectives, and create common motivation.
Backbone Support	Creating and managing collective impact requires a separate organization(s) with staff and a specific set of skills to serve as the backbone for the entire initiative and coordinate participating organizations and agencies.

Figure 2 The Five conditions of collective impact (Kania & Kramer 2013).

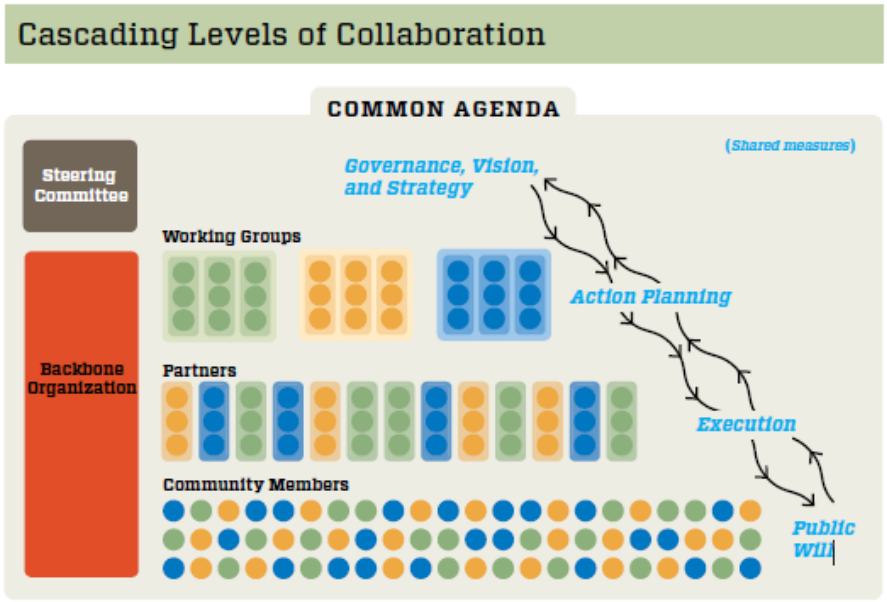

Figure 3 Cascading Levels of Collaboration (Kania & Kramer 2013).

Participatory and Collaborative design

SNM as well as the methodology of collective impact requires collaborative efforts on many different levels. The design process of socio-technical experiments and the design of prototypes and pilot projects, coming from the UPC, is done in collaboration among users, stakeholders, designers, communities and other actor-networks (Koskinen et al. 2011). In collaborative design, the users and stakeholders are being invited to take part in the design process. There, ideas, concepts, prototypes, tools, interessement devices are being developed together with the designer and users (Binder and Brandt 2008). According to Munthe-Kaas (2015), collaborative design is an approach to the development of innovations by including actors and users in collaboration, whereas participatory design only engages the user. User-centred design observes the ones involved without letting them partake in the process. As knowledge is only limited to the ones which are engaged, another strategy in the consortium was to broaden the network, which is complementary to SNM and the nurturing of the socio-technical experimentation. Whereby which the knowledge horizon can be broadened, and ideally feedback loops created between translocal networks.

Translocal Networks and network weaving

A connection to translocal networks gives room for participation, collaboration, bonding from the translocal and locally based network in Uganda throughout multiple phases in the project. According to Avelino et al. (2020), translocal networks reinforce the social impact of local networks when linkages are established as well as an increased access to resources. At the same time, linkages between the local network, and the governmental networks can be

established, possibly leading to change processes (Avelino et al. 2020).

This process is important to create and facilitate interactions between relevant stakeholders and provide the necessary resources (money, people, expertise): The network should be broad to include multiple views and voices, multidisciplinary, facilitating second order learning with the help of third parties. Deepening bonds in the network, where people who represent the organisations, should be able to mobilise commitment and resources within their own networks (Avelino et al., 2020)**.** In the context of the consortium, we identified possible partners and collaborators, which are either from the same regenerative movement or other similar sectors, which would support the consortium in any way either through collaboration and ideation of project designs. We reached out for example to the "Slow Food Movement", "The Ugandan Biogas Alliance" "Global regeneration CoLab" and "SEEDs: Economic Renassaince" as well as other networks which were part of participatory or collaborative design processes.

Community of practice

The UPC as well as the working group can be seen as a community of practice. Herein, same experiences are shared, complex matters discussed, the meaning of the work explored, and an identity is built throughout time. Communities of practice share knowledge where the members of the group create, refine, communicate, and use knowledge which can be seen as a versatile and dynamic knowledge resource. There are three dimensions of communities of practice: 1) a similar understanding or meaning of the organisation they are part of, 2) mutual engagements and participation processes 3) and lastly similarities and repertoire which is being shared across one another (Wenger et al. 2002). Characteristics of communities of practice are the acceleration of the development of knowledge through a variety of activities, such as problem solving, experience seeking, discussing, documentation and development of pilot projects (El Bilali 2018).

Such communities of practice have the capability to develop novel innovative ideas in the network, which can be put in the context of socio-technical experimentation, and strategically used to transform parts of the system (El Bilali, 2018).

As these theories and methods provide the foundation of the strategy build in the consortium, I will outline a state-of-the-art chapter about the agricultural system as of today, in Uganda and lastly the regenerative movement and its possibility to facilitate change in the system.

4 The agricultural system as of today

The industrial agricultural system

The current state of the agricultural system globally and its downsides

One of the major issues we are facing nowadays is food insecurity for a booming global population. By 2050 we will reach an estimated 10 billion people, which have to be fed under the current agricultural industrial system, unless the sector will go through a transition (Foley et al., 2011). As the population (demand for food) is rising, challenges and externalities coming from the current industrial agricultural system will most likely be enhanced.

Nevertheless, industrial agriculture is viewed as the most effective and efficient way to produce food because of its low prices and high yields (De Ponti et al., 2012; Gliessman, 2015). However, without regards to environmental and social externalities. According to a report from "Sustainable Food Trust" in 2016, industrial agricultural practices produce the cheapest and most profitable forms of food in the short term while damaging the ecosystems and human well-being in the long term.

Our global agri-industrial system is one of the main causes, exceeding the planetary boundaries in relation to the loss of biodiversity or unbalancing the nutrient cycle (Steffen et al., 2015). The agricultural industrial sector is responsible for more than 30% of greenhouse gas emissions, perpetuating climate change and at the same time appropriates 38% of the planet soils and 70% of the fresh water supply (Crippa et al., 2021).

Excessive environmental impacts of the system include the loss of many ecosystem services such as pollination, carbon capture, loss of food diversity, loss of soil fertility, homogenisation of agricultural

landscapes (Helenius, 2020). Also, the contamination through high intensive pesticides in the ecosystem adding to ecotoxicity and the bioaccumulation of contaminants in our food web, leading to a decline of biodiversity and aggravated pest control due to ongoing mutations of insects (Aladesanmi 2019).

Our current agri-industrial system is dependant on the enormous amounts of energy inputs in form of fossil fuels and failure to recycle nutrients into the system is striking, as this demands the depletion of for example phosphorous, a diminishing nutrient. Those nutrients are highly needed in agricultural practices and with the decline of availability crucial for our survival (Buckwell and Nadeu, 2016; Sherwood, 2020).

On the one hand, the agri-industrial sector contributes to social externalities, such as compromising public health and the well being of people, by contributing to diet-linked, non-transmittable diseases (Tilman and Clark,2014; Willett et al., 2019). On the other hand, the system promotes imbalance and inequity in entitlement to food, contributing to hunger and malnutrition (Tilman and Clark,2014; Willett et al., 2019). From a socio-cultural perspective, the globalised agricultural food system adds up to the homogenisation of food cultures and the cultural disconnect between the consumer, processor and producer leading to a loss of understanding about the food one consumes in its place-based context (Helenius 2020, Wilkins,2005; Kneafsey et al., 2008; Spiller, 2012). Furthermore, according to a Harvard Environmental Law review, the externalities are not being accounted to the farmers, grain trading companies, meatpackers etc., but instead the responsibility is being shifted to the public (Breggin & Myers, 2013 p. 505). As a result, creating a wicked complex socio-cultural web of connections between the consumer and the food system, making him and her responsible for the activities deriving from the industrial system and at the same time disconnecting and creating a loss of sense of food (Helenius 2020).

Also from an economical perspective, the industrial food system contributes to a decline of rural livelihoods, competes with smallholder farmer incomes and the vicious cycle of ever-increasing yields (Tilman et al., 2002). Especially in the global south, smallholder farmers and ecosystems had to suffer due to the industrialisation of the agricultural system, one of which is Uganda.

The current state of the agricultural sector in Uganda

Uganda, once known as an area consisting of multiple kingdoms, underwent a massive cultural transformation after the British colonisers came to the country. Especially the agricultural system was influenced by the British, as they saw the indigenous ways of practicing agriculture, for example polycultures, with great scepticism and instead had strong faith in the "modern" agriculture. (Stump 2013). Focus lied on the cultivation of cash crops for export such as cotton, coffee and tea (Ingres, 2020). Initially, there was an upward trend in production and exports of commodities until the cooperative system collapsed in 1990 due to economic and political turmoil in the 1970s to 80s (Dijkstra & Van Donge, 2001; Flygare, 2006). As a result, small scale farmers had to suffer consequences and lost bargaining power against more established, industrial agricultural cooperatives (Wiegratz,2010).

Agricultural modernisation means raising the agricultural productivity per unit of land, labour or both, through coupled technological and institutional change (Oman & Wignaraja, 1991), in which subsistence-oriented production is shifted to a production of a marketable surplus (Ingres 2020). Modernisation includes: - specialisation, meaning the focus on one or a few products such as tea, coffee and cotton; - the intensification which means an increased production per land, unit or animal; - the mechanisation of labour, and an expansion in scale for higher produce (Bernstein, 2009; Hardeman & Jochemsen, 2012).

Some innovations benefit the sector such as technological change which can increase the output from agriculture and the income of farmers, shortening production cycles, reducing labour needs and protecting crops from pests and weather etc.

Although, the "modernisation" of the agricultural sector has not contributed to the well-being of the country as a whole, hence food insecurity is still a major issue. Another factor is that Ugandans jobless growth continues, as 64 – 83% of Ugandans below 30 years are unemployed (Reuss & Titeca, 2017). McCulloughs (2017), views the Ugandan agriculture not as a "bastion of low productivity but, rather a large reservoir of underemployed workers."

Land governance, a legacy from the colonial times, is still another issue, as small-scale farmers were being pushed away from their places, to make way for oil recoveries (Ingres, 2020). This is being justified, by seeing smallholder farmers as a barrier for development (Ingres, 2020).

A solution for an ongoing demand for food and a rising population is needed, which will not compromise natural environments while at the same time reducing trade-offs deriving out of the sector.
One of the main policies complementary to the industrialisation of the sector is the Plan for Modernisation of Agriculture (PMA) deriving from 1997. In this, it was speculated that the modernisation of the agricultural sector would lead to increase of incomes of poor farmers, raising farm productivity, increasing the share of agricultural production which would result in the creation of on-farm and off-farm employment. The policy targets smallholder farmers in which incentives are being created such as consultations, governmental financial support, eradication of export taxes and others. Here, the focus lies on increasing food security, by pushing for specialisation of cash crops, in households rather than through household self-sufficiency (PMA Report 1997). Basically, intensifying agricultural outputs through the use of technology, fertilisers and homogenisation of fields by shifting smallholders from polycultures to monocultures with the vision to create faster growth through the agricultural sector in rural areas.

The PMA lays out several constraints of the subsistence farmer, which includes productivity related challenges such as the lack of sufficient food, lack of land, soil infertility, lack of proximal water sources, lack of inputs, pests and diseases, lack of skills and knowledge, lack of capital and financial support, lack of markets and low prices, poor road and transport networks, lack of storage and processing, insecurity and loss of goods due to crime (PMA 1997).

Governance constraints, include insecurity of persons and property, corruption, lack of accountability and transparency, poor delivery of basic public services, weak local leadership, lack of consultation of farmers by government and non-governmental entities, monitoring and implementation of the program inhibit the development and lead to failure of the program.

Some other governmental actions taken to complement the agricultural sector were reforms such as the liberalisation of agricultural input trade, liberalisation of domestic and export produce marketing and processing, removal of restrictive tariffs and non- tariff barriers and the abolishment of taxes on agricultural exports (PMA 1997).

In the last decades the Ugandan government's emphasis on modernisation of the agricultural sector has intensified, mirroring a trend in the global north as well as a rise of land investors, from overseas (Sjöström, 2015; McMichael, 2012; Munk Ravnborg et al. 2013). Although, in the last years the Ugandan government has been implementing other strategies, such as the Nationally Determined Contributions Registry in 2022 (UNFCCC 2022), in order to reduce carbon emissions through different sectors one of which is the agricultural sector. Here regenerative agriculture could play an important role to reduce carbon and mitigate climatic and environmental degradation.

What is needed in order to change the agrisector?

Now the question arises, what is needed in order to systemically change the agrifood system, especially as there are countless agribusinesses and cooperatives in the food sector which are focusing on a transition into a more sustainable system (Helenius 2020). According to Helenius (2020), global and national food policies are needed but at the same time transformative initiatives formed at the grassroots level are essential for greater systemic change.

Food sovereignty can only be achieved by involving the grassroots and communities and place-based contexts food is being produced, processed and consumed (Rosset, 2008; Patel, 2009; Clapp, 2016). The agricultural sector cannot transform into a more sustainable system separately as it is one of the building blocks of the wider food system, as transition is dependant on policy mixes and governance (Geels and Schot, 2007; Diercks et al., 2019; Helenius 2020).

As a result, I decided to narrow down the focus from the whole food system to the agricultural sector which consists of practices, policies, supply chains, economies, technology and other metrics, resembling a holistic design approach throughout the thesis. As the focus lies on the agricultural sector, I identified several philosophies which are useful in transforming the sector, which I will describe in the following paragraph.

Hypothesis: Through a socio-technical system design approach, radical sustainable change in the agricultural sector in Uganda can be potentially initiated through the regenerative grassroots movement in Uganda.

Throughout the thesis I have been exploring the ideas of several niche agri-food philosophies such as agroecology, regenerative agriculture and permaculture. The most relevant philosophies in the context of systemic change and the project of the UPC were regenerative agriculture as well as permaculture. In the following I will present three different definitions of permaculture, regenerative agriculture and agroecology.

Permaculture:

"Permaculture [derives out of indigenous practices and] is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing their food, energy, shelter and other material and non-material needs in a sustainable way" (Ferguson, 2014).

Regenerative agriculture:

"[Regenerative agriculture is] a system of land stewardship, rooted in centuries-old indigenous wisdom, that provides healthy, nutrient-rich food for all people, while continuously restoring and nourishing the ecological, social and cultural systems unique to every place" (O'Connor, 2020).

Agroecology:

"*Agroecology is the integration of research, education, action and change that brings sustainability to all parts of the food system: ecological, economic, and social. It's transdisciplinary in that it values all forms of knowledge and experience in food system change. [..]The approach is grounded in ecological thinking where a holistic, systems-level understanding of food system sustainability is required." (Gliessmann, 2015).*

All three definitions slightly differ from each other, although they fall under the same category of niche agricultural philosophies. Throughout the thesis, emphasis lies on permaculture and regenerative agriculture, although throughout the project we have also been using agroecological based tools which I will refer to in

later chapters. Oftentimes those aforementioned philosophies get mixed up, although there are clear differentiating characteristics for each of these. In the thesis, I will use permaculture in the same context as regenerative agriculture.

Permaculture and its potential to transform systems

Permaculture is a value principled indigenous agriculture practice, which includes the regeneration of degraded land and ecosystems. It focuses on needs of the people and distributes the yields in a fair and just manner (El Bilali, 2018). Originally it was meant as permanent agriculture, although it was expanded into a permanent culture to include the socio-economic aspect (El Bilali, 2018). Permanency can be achieved by addressing justice and sustainability holistically, while at the same time, focusing on the economy, society and ecology.

Maye (2008) argues, that permaculture should be seen as a community centred planning philosophy with the goal to increase the well-being of communities and nature. In other words, permaculture incorporates a theory of human-environment relations that positions humans as ecosystem care takers, highlighting holistic design approach and management, to meet human needs, while increasing ecosystem health (Toensmeier and Bates 2013).

A basic understanding of regenerative agriculture emphasises the need of reducing pollution intensive-technological agriculture and energy consumption through the use of nature-based methods and solutions (Holmgren 2002). Focus lies from food production, processing, distribution, waste management as well as to policy and economy for integrating social processes and participation (Krebs, 2018).

Permaculture is driven by a model of change that focuses on systemic engagement with existing networks and institutions in favour of direct governance, including the supply chain by reintegrating production and resource management under the ownership of local individuals and communities (Dawborn and Smith 2011).

More specifically, there is great potential for permaculture as a philosophy to change systems, as the permaculture design process is non-linear but dynamic, where observation, analysis and design principles are created to understand complex systems and in comparison to agroecology, permaculture in addition provides principles to guide the design, implementation and maintenance of resilient agroecological systems (Krebs 2018). From a socio-ecological

transitional perspectives, permaculture incorporates as a design strategy, landscape multifunctionality, ecosystem mimicry, ecoagriculture, intervention ecology and adaptive management schemes (Ferguson and Lovell, 2014).

From a social perspective, practitioners in that field, oftentimes envision new forms of economy which is compatible with the permaculture scheme which help to transition into a better just agricultural economy (El Bilali 2018). One example is SEEDS, a cryptocurrency which rewards regenerative farmers and practitioners for regenerative agricultural activities.

Also novel technologies are deriving out of the permaculture movement such as community based platforms which provide interoperability in between networks, such as HYLO, which I will elaborate on later in the thesis.

Oftentimes, permaculture can be seen as design activism, where practitioners build new counter-normative experiences, of social, political, economical and technological life, presenting a powerful critique through demonstration of alternative agricultural practices under their specific value system (El Bilali, 2018).

As clearly mentioned before, permaculture has the potential to bring about sustainable transformation in the agricultural sector. In the next chapter, I will discuss the benefits and downsides of permaculture and regenerative agriculture regarding the agricultural system.

Permaculture and Regenerative agriculture and its diverse benefits and downsides

In comparison to the conventional industrial agricultural system, regenerative agricultural systems are profitable for a growing population, efficiently uses the existing farmland without compromising the ecosystem and provides a multitude of ecosystem services (Badgley et al 2007; FAO, 2019).

Profitability of regenerative farming is seen in the context of crop resiliency, lower farming inputs, enhancement of soil fertility and an upward trend in demands of goods coming from regenerative farms (LaCanne, 2018). Industrial hybrid crops are weak against climatic changes, such as drought and other extreme weather conditions, vulnerable against pests and the ongoing battle against mutations and susceptible to economic volatility (Foley et al., 2011). Also,

conventional farming still achieves higher yields than regenerative farming practices. Some argue that for an on growing population, regenerative farming practices would not be enough to achieve food security (De Ponti et al., 2012). On the other hand, organic and indigenous crops are more resilient due to their natural adaptability against climatic shocks and because of the build-up of organic matter, the farmer needs less nutrient input and would use natural enemies against pests. Nemes (2009), came to the conclusion that permaculture was responsible to higher profitability due to higher yields and reduced external inputs, minimising costs in comparison with conventional farming. Furthermore, worsening climate effects will be responsible for shifting our farming practices and as a result increase financial risk for farmers (McCarl et al., 2016). A 30-year longitudinal study was done in the Us comparing large scale farming fields between organic farming and conventional farming in which the fields had to suffer shocks due to five drought years from 1994 – 1998 (Omondi 2016). It was clear, that the organic system outperformed the conventional farming system because of organic matter that build up throughout the years (Omondi, 2016). This highlights the need of resilient crops and farming practices which can buffer climatic shocks and at the same time reduce greenhouse gas emissions and sequestering carbon.

Another aspect of regenerative farming in regard to profitability, is the ongoing trend in demand for sustainable, just and high-quality products deriving from regenerative and permaculture practices (Greene & Vilorio, 2018). Some multi-national companies and NGOs such as Coca-cola, Bayer, Mars and Danone are promoting regenerative farming in their business models, signifying the adoption of niche into more established structures (Peters 2019; Vermeulen et al., 2019). At the moment, the demand for regenerative products and partnerships is too high as there is not sufficient availability in the market (Langley, 2019) although in the future it might become the norm with the ongoing trend.

Practicing permaculture on the farm maximises the productivity of farmland whereas over-tilling degrades soil structures, use of pesticides and inorganic fertilisers contaminates the soil, the environment as well as the goods coming from the farm (Bossio et al., 2020). Another aspect are techniques such as the recycling of organic waste onto the farmland. For example, perennial pastoralism

increases soil fertility and at the same time provides a healthy environment for livestock in comparison to intensive mass production of pigs and chicken in conventional farming where the usage of antibiotics and perverse living conditions are the norm (Nicholls, 2016). Regenerative agriculture improves air, water, soil, biodiversity, and food while mitigating climatic changes and contributing to a large amount of provisioning, supporting and regulating ecosystem services (Nicholls, 2016). Redesigning the conventional agricultural system through permaculture increases microorganisms, plants and other organisms which are important for increasing soil fertility, regulate pests and disease through biodiversity (Nicholls, 2016). As there is a multitude of several plant life it also attracts pollinators and other forms of biodiversity. On farm level an efficient use of natural elements such as water, soil, solar energy, indigenous seeds, soil organisms, pollinators and natural enemies is the norm in regenerative agriculture (Nicholls, 2016). At the same time, optimal planning of plant rotation and creating symbiosis between plant life and other organisms for example through nutrient binding mushrooms puts the farmer into the position of agroecosystem care taker (Nicholls, 2016). The enhancement of functional complementarities and interactions between soil, crop and biotic components are one of the reasons maximising the productivity of farmland in balance with the environment through permaculture is made possible (Nicholls, 2016).

Table 3 Comparison between industrial farming and regenerative farming (Gemmil-Herren et al., 2021).

Industrial Farming	Regenerative Farming
Large quantities of food	High-quality, nutritious food
Dependent on fossil fuel energy	Minimal fossil fuel use
Creates massive GHG emissions and environmental pollution	Reduces emissions and environmental pollution
Dependent on inputs outside of farm (fossil fuels, industrial fertilizers, etc.)	Minimal non-renewable external inputs (industrial fertilizers, pesticides, etc.)
Uses industrially-derived mineral fertilizers	Uses nutrients, seeds, animal feed and bedding on farm when possible
Vulnerable to pricing, extreme weather, disease, etc.	Resilient against external shocks
Depletes soil fertility	Builds soil fertility
Depletes and extracts natural capital	Builds natural capital (air, water, soil, etc.)
Grows a monocrop at the expense of diversity to maximize yield of one crop	Agriculturally diverse crops & livestock
Threatens biodiversity	Preserves natural diversity of wild plants, insects, birds and animals
Provides a high economic return	Provides reasonable economic return
Good quality of life, with externalities that impact individuals, society, and the environment	High quality of life for the farmer & those surrounding farm

Permaculture as a grassroots movement and community of practice

From a socio-technical perspective, permaculture can be seen as an international grassroots network. El Bilali (2018): “The empowerment of people at the grassroots level, as a catalyst for resistance and transformation for communities who seek alternative ways of cultivating and integrating into the dominant globalised economy makes permaculture design methodology revolutionary”.

According to Seyfang and Smith (2007), grassroots networks are important change agents which mobilise the necessary resources for transitioning into more sustainable structures, in response to societal or environmental challenges. Oftentimes they adapt to changing conditions in fast ways, whereas large locked-in systems and institutions are not able to (Seyfang and Smith 2007, Leach et al., 2012).

In this context I would like to make clear that in the grassroots permaculture network, communities of practices emerge, such as the UPC which was formed throughout the master thesis.

There are three elements which communities of practice share: 1. The domain of interest and the maintenance of an identity. Applied to the permaculture movement, it is the dissatisfaction of the current socio-ecological agri-food system and the desire to live life more sustainably, the search for climate adaptive agricultural practices grounded on the permaculture design principles and ethics (El Bilali 2018). 2. Communality, which allows common practices, connecting, interacting and mutual learning. Permaculture design courses, workshops, demonstration sites, online webinars, online permaculture expositions, Networks such as the global regenerative colab (GRC) and their working groups, HYLO as an online community platform, and the UPC establish a sense of communality. 3. The third element are shared practices which include tools, ideas, documents, stories, resources which are being shared in the often transparent and open-source structures in the permaculture movement. In the context of the UPC it would be a standardised shared measurement system.

Although, some of the challenges the permaculture movement is facing are insularity, exclusivity, particularity and scale mismatch

when it comes to farm practices and project funding for example. These challenges will be addressed further in the upcoming sections.

The state of the art chapter is building the knowledge foundation in which the project is being build upon. In the next chapter I will elaborate on the Project and provide a deeper understanding of the UPC and the strategy used. Down below you can see a model which describes the Design Strategy for the UPC and another illustration describing the development of the Ugandan Permaculture Consortium and some pictures from several workshops hold in the consortium.

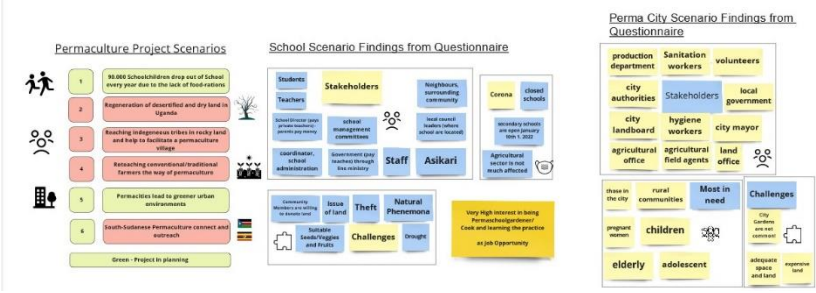

Figure 5 Scenarios which lead to pilot projects.

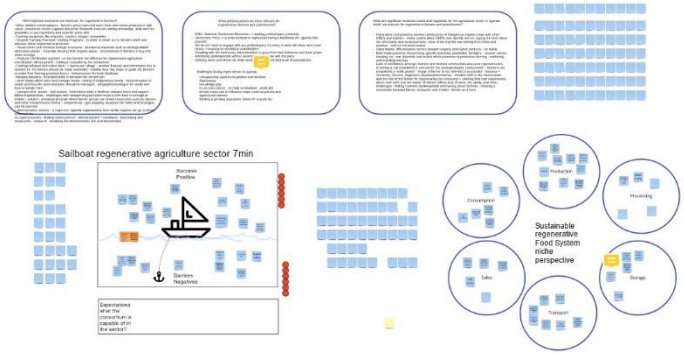

Figure 6 Niche perspective workshop undetailed.

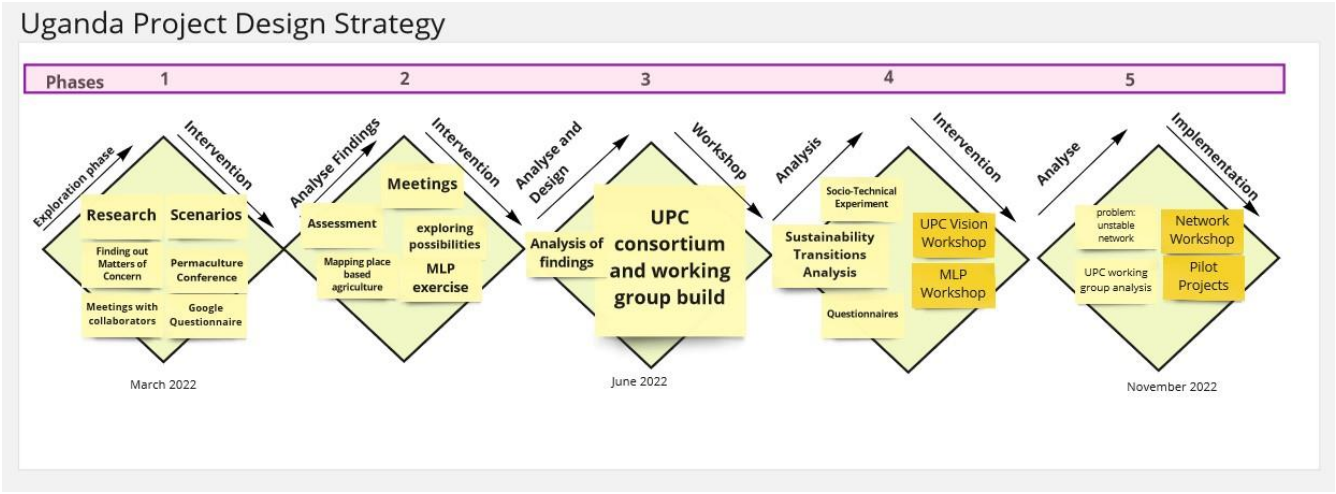

Figure 4 Uganda Project Design Master Thesis Strategy.

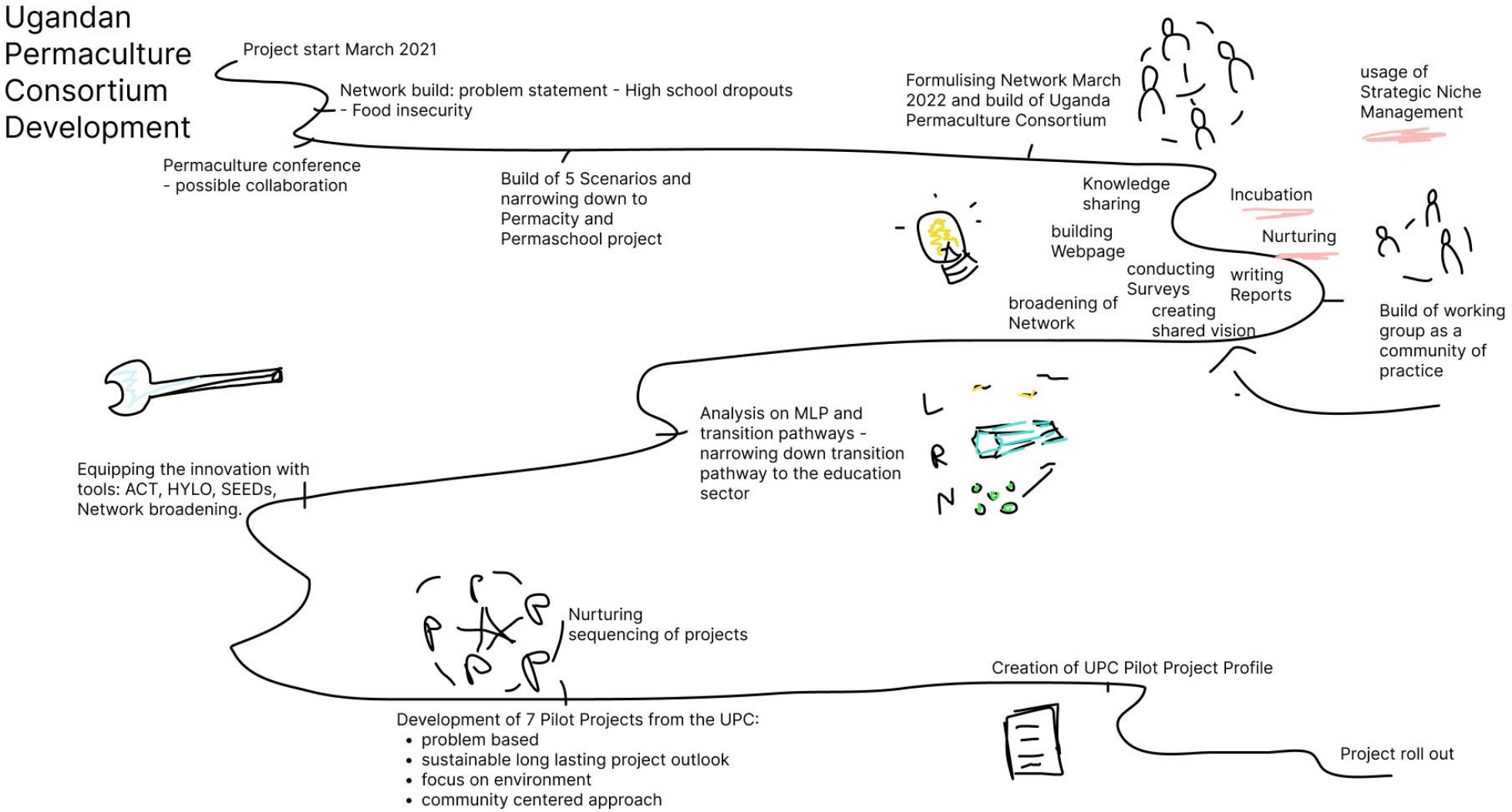

Figure 7 Ugandan Permaculture Consortium Development.

5 Project Description

The UPC

In May 2022 the UPC was founded consisting of, community based organisation and small holder farmers, with the aim to transform the agricultural sector into a sustainable sector. The group was build after having several bonding activities (Agger et al. 2015) networking events and conferences with Ugandan permaculture practitioners. Stakeholders from the consortium all revolve around permaculture as their solution to ensure food security and empower individuals and communities to be self sustaining.

The group is consisting of diverse members all with different focus points.

Seeds and Stories' mission is to empower rural women through regenerative fashion and capacity building products. Munansi Green Initiative Ltd is a local community grassroots NGO that focuses on Agri-forestry, climate change awareness mitigation and adaptation and ecosystem restoration. Mirembe Greenpark is a rural community based project promoting horticulture and the involvement of marginalised groups with the aim to create sustainable, food secure communities. Northern Ugandan Agriculture Extension Foundation focuses on research on permaculture and the extension of their vision. Fliptown promotes regenerative agriculture in their locality and uses culture such as art, media and music to promote more regenerative practices with focusing on youth. Eastern and South African Small Scale Farmers Forum Uganda (ESAFF) works towards promoting food sovereignty, economic empowerment for small holder farmers and the change of land ownership rights and policies for farmers. African women rising, also a community based organisation, works to empower women, consults farmers, builds demonstration sites in refugee camps as well as focuses on redesigning homesteads into permagardens by ensuring microfinancing for the locals. North Ugandan Resilience Initiative focuses more on infrastructural work by building roads, watershed restoration and climate smart agriculture.

All members in the consortium are doing their own projects in relation to permaculture. They support communities, teach and educate farmers, restore ecosystems, reach out to youth, create and use novel technologies such as cryptocurrencies in their projects,

work with marginalised people. In summary the consortium have great amounts of impact on a social and enviornmental level.

In the following, I will describe three different projects which are being rolled out from the consortium group members to emphasise the diversity of the group members and their ways of working, while being from the same permaculture grassroots movement.

Broadfield Permaculture:

Charles Mugarura is a permaculture designer and entrepreneur, who was one of the founding members of the Permaculture Institute in Uganda. His business focuses on research, production, consultancy and community. His research is especially about the self-sufficient economy of permaculture projects.

He sees that there is a need, to work in communities and groups as well as including the public sector, envisioning that permaculture could compete with regional agricultural systems. Broadfield offers seeds at a lower price to farmers and support their projects through consultation. He raised the concern that it is difficult for small scale farmers to get loans from the government as they have fixed standards. His current work focuses on ways how regenerative small-scale farmers can have access to regional and global markets. Herein he broadened his network with a German start-up, which supports smallholder farmers through fair trade. For better understanding the ways Broadfield Permaculture works I facilitated a mapping exercise in which from start to end we followed the way they conduct consultation for small-scale farmers and help them to realise the transformation into more regenerative agriculture. Some of the key points, which are important in terms of a permaculture design approach, are the holistic understanding of the community, environment and the farm where the consultation takes place. Broadfield Permaculture focuses on the use of economic, social, and regenerative crops as well as the creation of networks and cooperatives of small farmers in the same community which can share storage rooms, land, tools or seeds.

Eastern and South African Small Scale Farmers Forum

ESAFF, which is also part of the UPC, is focusing on the development of small-scale farmers. They emphasise on the development of local, regional and international policies and programmes which support small-scale farmers. Other focus areas are the economic empowerment, food sovereignty, movement building, financing and

agroecology. They sell for example products derived from farmers on their webpage, as well as use media outlets to promote agroecology for smallholder and young farmers. Another interesting project ESAFF intiated in two districts in Uganda, from the lens of Multi Level Perspective, was the creation of a community led initiative to educate and equip women farmers to ensure secure access to their lands. Land ownership for women is a problem, as men are taking away their land when the farming businesses are successful. ESAFF designed a project in which women are being educated about the rights through the community led organisation. In both districts the organisation reached out to people and policy makers through creative ways such as songs, dramas and storytelling, which led to great success by increasing male engagement where cultural norms about land ownership, which are harmful and widely spread, were being diminished.

Small-scale women farmer: “The process of land registration was one of my biggest challenges because the procedure was difficult and too corrupt, but I’m thankful for this training because it helped me map the various people I’m supposed to meet up to help me with the process without asking for any money”.

African Women Rising

African Women Rising is an NGO, which is focusing on implementing permaculture in the northern parts of Uganda, since 2006. Values of the designs are based on the permaculture principles, as well as long term and resilient design. Mainly, they help local communities and private people, to redesign their homesteads into site specific garden designs, especially by finding unused spaces around the properties. With the help of agroecological principles and techniques, they locate the contours of the private homes, and locate waterflows, capture swells, use preparation of deep soil techniques, recycle locally available resources such as animal manure and wood ash into their garden. Their approach is to maximize crop and tree production in the form of place-based agriculture and give local people and communities the opportunity, secure food and possibly generate an income. Also, they consult individuals and communities about micro financing.

In 2019, they conducted an impact assessment on a project, where they worked together with refugees from South Sudan. The refugee settlement Pallabeck inhabits approximately 72800 Refugees out of which are 19.000 households in 2022. There used to be forests and

ecosystems until the settlement was build in 2014. Those natural environments turned into wastelands and the surrounding forests are being cut down due to the need of fire wood. Refugees have been given 30x30m permagarden plots, and where trained in permaculture design. There was a great significant development in the project in 2019 where from 20 participants to reaching 4500 refugees in the end which were part of developing permagardens. Main findings of the assessment are the higher increase in food availability, increase in income through sale of fresh and nutritious vegetables, the dependency on food aid being diminished, a high improvement in household nutrition from 1 meal to 3 meals as well as the opportunity to use the permagarden all year round, even during the dry season. Another important factor is the high amount of food aid provided by the World Food Program which led women's breast milk to dry up (Fretwell 2019). In general, the monthly food aid given out in that settlement could only serve one meal per day for the expected duration of about three weeks (Fretwell 2019), and was cut from 100% to 60% since the war in Ukraine started in 2022. Since permaculture projects occurred in and around the settlements from the NGOs, refugees adopted more sustainable practices and could ensure more food for their families as well as helped to regenerate the ecosystem surrounding them (Fretwell 2019). Once, some of the women started eating fresh greens, their breastmilk started to come back (Fretwell 2019). In July 2022, African Women Rising has been given permission from the government to design a 12 hectare big permaculture demonstration site. This showcases the success of the former project done in 2019 and the importance of regenerative practices which restore the surrounding ecosystems as well as provide opportunities for refugees to educate themselves on permaculture, be independent from outside food sources and possibly empower them to raise their economies.

During the thesis and development of the project, I realised that there was a great need to create a way for the practitioners to collaborate. Initially some of the groups are competing against one another to gain funding. Two groups even worked next to each other in the same office in pallabeck refugee settlement, although they did not think about collaborating with one another. Some of the members urged, that collaboration can lead to more impact such as Proscovia from African Women Rising:"*[We are doing the same thing*

but in isolation, if we are to harmonise, we leave it at an organisational level so we can combine the different NGOs which are working on the same. We never know what will the result out of the collaboration be. Everybody is looking, the same way. Our generations will be the ones inheriting the land, which is why it is important to create longlasting projects]".

As a result, my underlying question was how to ensure participation and collaboration processes, which can bring about change in social and environmental innovation through a stable network. With the aim to facilitate the creation of a community of practice, deriving out of the network.

Throughout the year the network grew into a consortium, out of which a working group developed. The working group meets up 3 times a week online on zoom and has hold more than 22 meetings. In that particular group, I take on the role as a manager, navigator and facilitator, design workshops, organise networking events and especially create space for collaboration and feedback loops between the consortium and the working group. Feedback loops are created in the form of written reports about the knowledge acquired. Also the monthly meetings for the consortium serve to support interaction and engagement in the group. In the working group, we identified tools such as HYLO, SEEDs and the Agroecological Criteria Tool. The working platform used is Miro where workshops about the vision and strategies, brainstorm sessions about the use of the tools, mapping exercises of regenerative supply chains, visualisation of roadmaps and the strategy of the consortium, moodboards for the development of the logo and the webpage of the UPC is being created. The working group has been working on the agreement of the UPC, developing the network, creating worksheets about the tools which might be beneficial for the consortium members, strategizing and discussing the ongoing engagement of the consortium as well as looking for funding. During the meetings we allocate one member to take notes which are organised on a google drive and made accessible. Moreover, these different activities are comprised in reports which are being send back to the consortium. One of the most important aspects is the creation and management of the school pilot project which will be elaborated in a later stage in the thesis.

Another important aspect is that the group members are quite diverse with different skills (**Appendix).** We work on ways how we

could support the consortium network in creating transition pathways to facilitate changes in the agricultural sector.

In the following chapter I will describe the industrial agricultural and regenerative sector from a MLP and how the findings were used in order to complement SNM and the Socio-technical experimentation in the context of the consortium.

6 MLP and SNM and Socio- technical experimentation in the context of the consortium

The Multilevel perspective has been used in order to understand the agricultural sector in Uganda. Therefore, I created a survey for the Ugandan National Farmers Federation which was answered by 11 participants. Building on El Bilalis (2018) paper: *The Multi-Level Perspective in Research on Sustainability Transitions in Agriculture and Food Systems: A Systematic Review,* I reformulated questions in order to understand the MLP of the agricultural sector in Uganda.

The MLP Theory comes from the Sustainable Transitions Research. It describes the interaction between the current system which is in place, and how innovations can contribute to a systemic transition. Transition pathways are opened up by outside influences such as for example climate change or corona. When the rigid structure is opened up, innovations coming from the niche, such as permaculture and regenerative agriculture, have the capacity to change the regime, the current agricultural sector.

According to the survey the government is currently driving the industrialisation of the agricultural sector in the whole nation.

Landscape:

Outside influence which opens up regime structures in Uganda are several climatic issues such as drought, dry spells, floods landslides and in general unpredictable weather patterns. Others are pests and diseases such as locusts, the army worm, foot and mouth disease and poor hybrid seeds. Other social issues which reveal pathways are large refugee streams, high-school dropouts, the dependency and decrease of food aid due to the Ukraine war and Corona leading to more food insecurity. Additional pressures are the ongoing corruption in the agricultural sector such as the stealing of government funds meant for farmers and embezzling of resources.

Regime:

In Uganda, the regime consists of multiple governmental and non-governmental groups which promote conventional agriculture. Several ministries decide policies and strategies for the modernisation of the agricultural sector although in the recent years a focus is shifting to more sustainable ways how agriculture can be practiced. Also, there are business codes and standards such as sanitary/phytosanitary standards, ethical code of conduct for agricultural extension and advisory services, supply chain standards, safety and health standards, although which are not too well known among farmers. Most commonly practiced by farmers is subsistence farming and shifting cultivation by clearing large amounts of lands, mixed farming, soil tillage, fish farming, pastoral nomadism and other rudimentary old practices. Main goods cultivated are dairy products, cash crops such as coffee, beans, bananas, maize, cocoa, edible oils and others. Schools, hotels, the army, refugees and the Ugandan local and regional communities are the main consumers of the agricultural goods. Goods are also being exported to surrounding countries such as Kenya, DRC Congo, South Sudan as well as the global north. As farming is being practiced by almost 70% of the working population in Uganda, cultural events such as national agricultural shows, exhibitions, expos and educational shows are quite common.

Niche:

Since 2019 the government has been implementing policies supporting a transition from conventional to climate smart agriculture through trainings and other services. In Uganda the most important stakeholders which promote regenerative farming are Non-Governmental organisations. Some of them are closely related to the government such as AFSA and others are community based organisations for example ESAFF. Regenerative farming is also done through for instance permaculture and other more indigenous ways to do agriculture, by small holder farmers, although it is more commonly known as conservation agriculture. A roughly estimated 10% out of 40% which are practicing regenerative agriculture in some way are knowledgeable about it. Other niche practices are agroforestry, animal integration, usage of biochar and composting, cover cropping, pasture cropping, perennial plants, usage of renewable energy, ecological aquaculture and other practices.

Furthermore, a trend in usage of fertilizers and other more conventional methods is getting mixed up with the indigenous farming practices. The regenerative agricultural sector is not established although in the country are many fragmented groups, promoting permaculture for example through trainings, consultation, redesigning of homesteads, microfinancing, using organic waste for fabrics, in refugee settlements, in connection with regenerative cryptocurrencies, saving indigenous seeds through seedbanks, value addition and processing, education system, entrepreneurship, infrastructural work, soil regeneration, watershed and ecosystem restoration. The practitioners in regenerative agriculture emphasise a holistic approach to farming, by including the community and designing with and for the environment. Nevertheless, markets for regenerative products are not yet established, which is why they get mixed up with conventional products. Even though there are a lot of benefits through regenerative farming, it is still unknown in the country. Common are the build of cooperatives between small-scale farmers which create value addition centres or storage rooms, incubation centres and demonstration sites. The usage of alternative materials such as plastics or organic waste to preserve and store food as well as other innovations emerge out of the niche. As there is a lot of corruption in government institutions, the regenerative movement in Uganda is hesitant, but would only cooperate from a distance. Community elders and village leaders are seen as important stakeholders as they have a lot of local influence and agency. Some of the challenges the regenerative movement in Uganda is facing are feeding an on growing population and the refugee streams. Unsupportive agriculture policies and national frameworks, stiff competition, even amongst permaculture organisations due to funding, are also seen as challenges. The niche sector is still in its beginning stages, hence the UPC aspires to enforce and embed regenerative agriculture into the regime. *The question is how we can strategize a way so that regenerative agriculture can be more accepted in the Ugandan culture and adopted by farmers and finally lead to transition of the agricultural sector. In the following I will highlight the importance of SNM in the context of the UPC Strategy.*

Hypothesis: Through a socio-technical system design approach, radical sustainable change in the agricultural sector in Uganda can be potentially initiated through the regenerative grassroots movement in Uganda. From the MLP perspective, transitions are defined as

shifts from one regime to another and are the result of interaction between niche, regime and landscape. When the regime is destabilised due to landscape pressures, the niche has the opportunity to transform or replace the existing regime (Grin et al 2010, Geels 2011). One of the strategies is through SNM and the design of Socio-Technical Experimentation. In the context of the Multi-level perspective, niches grow in their own localities and gain agency. Influences such as climate change or Corona deriving from the landscape pressure the regime, which create transition pathways for niches and their innovations which can transform the regime. Niches have the capacity to bring forth and develop innovations as they are not disturbed and bound to the rigid structures of the regime (Grin et al 2010, Geels 2011).

SNM can be seen as a tool, which guides processes in between the niche stakeholders such as knowledge sharing, practice-oriented experience sharing, the initiation of pilot projects which can redirect development unto a desired path, in the case of the UPC, towards a more sustainable agricultural sector (Shot 2008). The strategy was developed to support socially desirable innovations such as green transitions as well as radical innovations which are not complementary to the larger system (Shot 2008).

Shot and Geels (2008) argue, that exposing these innovations to the current market or other selection environments will transform the regime and might replace the socio-technical configuration in the long term, when standards, skills, designs or for example government regulations create rules which use or regulate the new adopted innovation. Socio-technical experimentation gives insights about what kind of steps need to be taken in the context of SNM to incubate, nurture and scale up the innovation.

MLP, SNM and additionally Socio-technical experimentation served as a Strategy to build the UPC as well as facilitate and create sequences of projects, which might lead to a green transition on a local and hopefully on a national level. In the next chapter I will elaborate on the usage of socio-technical experimentation in regard to the UPC.

What is the Strategy of the consortium

The UPC was founded as a group of permaculture and regenerative practitioners, with the goal to create space for collaboration to promote regenerative practices. It consists of grassroots and community-based organisations all focusing on a green transition in

the agricultural sector through regenerative practices. Interesting are the diverse focus points and activities done in relation to regenerative agriculture, through the different groups. Such as policy development, upcycling of organic waste, focus on marginalised groups, on the environment, communities, roadwork and infrastructure. Here the strategy lies to bring together regenerative practitioners and create a community of practice which can share knowledge, resources and support each other in their work towards a green transition. By building the group, engagement between group members can be assured and a network established, which has the potential to be more engaging and supportive of one another. In the consortium we strategically try to understand the agricultural setting and find ways to contextualise embedding processes which favour the regenerative agricultural niche to facilitate a green transition (Ceshin 2014). Here we used MLP to understand the agricultural sector in Uganda as well created workshops on the permaculture niche sector with some of the actors from the working group. MLP as well as the niche sector understanding could help the consortium working group to identify transition pathways. Due to the ongoing engagement in the consortium and its working group, it can be seen as a lab to test new innovations, where knowledge is deepened, and as an agent of change, where groups not familiar with regenerative agriculture from the sustainable niche are collaborating on promoting permaculture in their projects. As the UPC consists of grassroots and community-based organisations, diverse projects are being developed throughout the country in different sectors, all with the goal to promote regenerative agriculture. Considering, that all the groups are grassroots organisations, Strategic Niche Management, from the sustainable transitions research field showed to be the most suiting methodology when empowering grassroots organisations as well creating a green transition. Mutually complementing is the concept of collective impact which is used in the context of the consortium, where environmental and social issues can be addressed as a collective rather than isolated from one another. Here, having a common agenda, vision, a shared measurement system, mutually reinforcing activities, and continuous communication as well as backbone support, are important ways to transform a system as a collective.

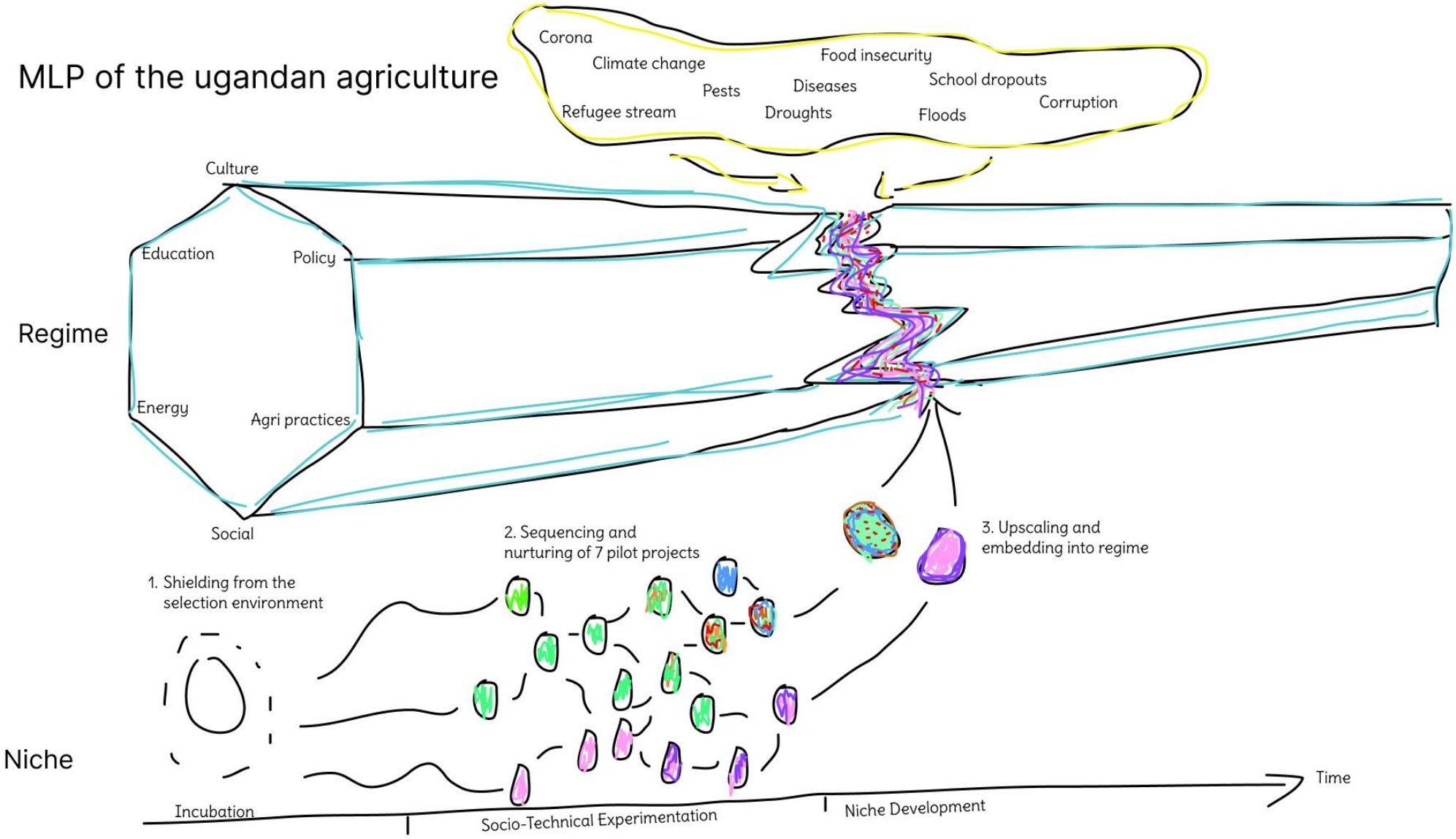

Figure 8 MLP on the agricultural sector in Uganda and Socio-Technical Experimentation of the Ugandan Permaculture Consortium 2022.

Strategic Niche Management

SNM highlights ways on how to transform systems and empower innovations which are created by grassroots organisations with the help of protected socio-technical experiments. According to Raven (2005), experiments, are also defined as initiatives, and can be used as learning labs, transforming future visions into strategies as well as broadening the networks around the grassroots movement. This strategy focuses solely on the niche in any given sector. Our approach is to emphasise the development of the regenerative agriculture sector in Uganda, consisting of several community-based organisations, NGOs, start-ups and institutions practicing new sustainable ways of doing agriculture.

Socio-technical experimentation

One of the main approaches in SNM is Socio-technical experimentation.

Definition: Socio-technical experimentation can be described as a partially protected environment where a broad network of actors can learn and explore (I) how to incubate and improve radical innovations and (II) how to contribute to their societal embedding (Ceshin 2014).

They are protected from the mainstream and selection environments such as markets or other dominant competitive environments. Projects coming from the experiments, are at first implemented in real life settings in small scale and after incubation and nurturing, developed until they can be scaled up to be robust against selection environments (Ceshin 2014).

Socio-technical experiments function as learning labs, for further development of innovation, in which knowledge can be deepened. Also, they provide space as communication tools to stimulate interaction with local and translocal networks and as well as agents of change to transform mindsets of particular actors or networks when new ideas are diffused into them (Ceshin 2014).

In the following chapters I will describe the process of socio-technical experimentation of first incubating, nurturing and lastly empowering the niche innovation which can then be embedded into society. Here, I will describe the protection of the niche environment during the

incubation phase. Nurturing the consortium is being done through equipping tools such as the usage of regenerative technology, regenerative cryptocurrencies, funding strategies, impact assessment and network broadening.

Incubation

As sometimes path-breaking innovations fail to successfully compete within selection environments, such as markets, it is important to protect the innovation from the beginning stages (Smith and Raven, 2012). The consortium as well as the working group can be seen as protective spaces, where innovations in regenerative agriculture, through for example new technologies such as the crypto currency SEEDs, can be developed. Herein, the consortium working group is developing an agreement to bind the relationships in the consortium which stabilises the structure. Also registering the consortium, is in the planning which would protect the innovation as well legitimise the consortium. When protection is established, nurturing and supporting the innovations through improvements, and the expansion of socio-technical networks are significant for a more stable and impactful network. An important binding factor was the creation of a shared vision and mission statement in the context of the UPC. We, the working group, sent out questions to the organisations and followingly refined the answers. You can read the narrowed version of the vision and mission statement down below.

Vision statement

"The vision of the consortium is to promote resilient farming communities, through sustainable food systems, as well as empower them with skills, knowledge and resources to create healthy ecosystems. "(UPC Vision Workshop, 2022)

Mission statement

"Our mission is to tailor regenerative practices within communities through skills and knowledge development."(UPC Vision Workshop, 2022)

According to Shot and Geels (2008), expectations can turn into visions, which contribute to following a shared path, initially weaving a more stable network. They are crucial in SNM as those expectations legitimatises nurturing and the protection of the innovation (Shot and Geels 2008). When a protective space, is being established the innovation can be nurtured.

Nurturing

Nurturing is an important step in strategic niche management, because it furthers development of the innovation, allows broadening of the network by deepening trust and having multiple perspectives on the innovation and permits second-order learning processes through sequencing and ideation.

An important decision made, was the build of the consortium working group after creating the vision. Within the context of collective impact, it serves as a crucial support to develop ideas, manage the consortiums direction and strategy and coordinate participation.

In the consortium working group we established ways on how to create learning feedback loops between the working group and the consortium, allowing first order learning. This is being done through writing reports, presentations, worksheets, conferences and workshops which have been organised for the UPC members. Another important factor is the initiation of second-order learning processes, where knowledge is deepened further and integrated in the activities of the consortium. One example is the involvement of regenerative innovations such as HYLO and SEEDs into the project design of the pilot project as well specifically using transition pathways tied to the education system. After formulating the vision in the consortium, we had several workshops on translating the vision into a strategy, which was broken down into steps, principles as well as challenges which might come up in the future. Here we used backtracking as a way to understand how we can achieve the vision as well find supporting tools and focus points such as research, advocacy and policy development, access to information and resources, environmental health, economic empowerment and profitability as well as capacity building and community engagement which were elaborated further. In the process we narrowed the vision into 5 steps which are crucial in achieving the vision:

Figure 9 Five crucial steps for reaching the vision of the UPC.

Other ways the working group supports the consortium is through identifying tools and sharing the knowledge with the supporting group. This is being done through written reports which are send back consecutively to the consortium members and meetings were these are then discussed. The tools are HYLO, a community-based platform solely made for regenerative practitioners, SEEDs, a cryptocurrency made to reward regenerative activities and the ACT which assesses the environmental and social impact made in projects.

HYLO:

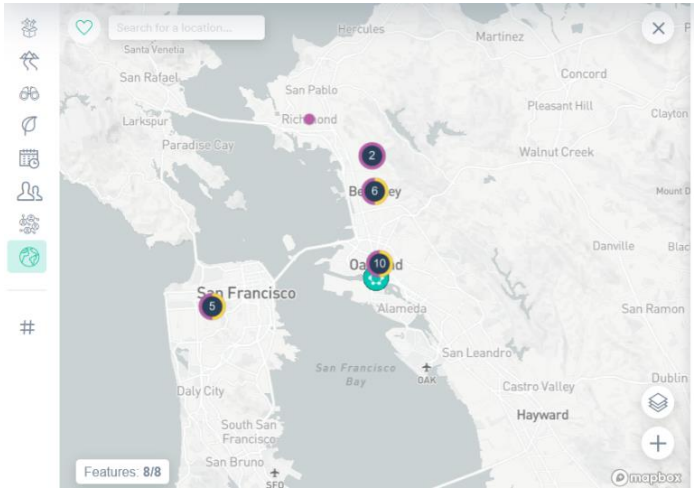

Figure 10 HYLO Platform Map

HYLO.com is a community-based online platform for regenerative practitioners, farmers, projects, cooperatives and networks which focuses on knowledge and resource sharing. On the platform's world map, you can visualise place based regenerative activities. HYLO gives the opportunity to connect online to close by farmers, where possibly collaboration or cooperatives can be build. Especially, resource sharing and strategic planning of demonstration sites, seedbanks, machines, which are not being used by farmers, can serve as a way to connect and support regenerative practitioners. Another important aspect is the interoperability on the platform which creates opportunity to engage with other networks or permaculture groups on a global level where challenges, insights and experiences can be discussed. In the working group we anticipate that the usage of regenerative technology could be another way to interesse youth into regenerative projects because farming in general is disfavoured by young Ugandans. The consortium working group, identified the tool as this would help the consortium members to organise themselves and visualise their activities on the platform. Usage and integration of the tool will be done in the first pilot project of the consortium, the school project. Here we plan to map out the projects

as well test out HYLO. The UPC has full support of HYLO and the developers, as a result will ease a smoother transition and usage of their platform. Through using HYLO, the amount of farmers and the work done in the regenerative field can be visualised, which creates more transparency and an estimate on the amount of ecosystem restoration. Challenging could be the language barrier, as in Uganda most of the small-stakeholder farmers speak in their native language. Also, this would demand, literacy with smartphones and the online platform HYLO in general which might be a challenge as access to a smartphone or laptop is a precondition (HYLO.com, 2021).

SEEDs:

Another tool identified is SEEDs, a cryptocurrency which rewards the build of permagardens, permaculture projects, the build of kitchen gardens and food forests and everything along the lines. Decentralised economical systems would benefit the communities and the money could be allocated to the people. SEEDs is such a movement that is transforming the economy into a more cooperative economy, initiates local marketplace platforms, direct and decentralised governance and especially rewards regenerative activities. The coins can be used to exchange for resources depending on the partnerships made. An example could be that SEEDs coins can be exchanged with a biogas digesters, school fees, food, tools and so on, if the stakeholders agree on certain conditions and criteria. A new form of sustainable economy through cryptocurrency, could give more opportunity to small-scale farmers and regenerative practitioners, that have less access to resources, by rewarding them for doing regenerative agriculture. Herein, ecosystem services such as the increase in biodiversity, soil regeneration and watershed restoration can be valued through SEEDs, as these services are not accounted for in our current social and economic structures. It could be a way in into regenerative agriculture, for young Ugandans, which are more technology and economy interested. Also, it has the capacity to involve other niche actors, such as renewable energy technology creating opportunities for coupled innovation. As the consortium is part of the SEEDs network, the working group is collaborating and developing with an African focused group, the integration of SEEDs into the project design phase, in our case the school project, where possibly solar energy might play a significant role. Here, the concept is to build permagardens on the school ground by using unused spaces. Planting and maintenance, and other

ecosystem services activities would then be rewarded through SEEDs. As a result, the cryptocurrency could then be used to pay off the schoolfee for the pupils. Additionally, the goal is to build a way for the pupils to ensure 1 meal per day, minimising food insecurity and school dropouts. After joining the SEEDs movement consisting of around 150 members, we made a post in the network where one of the founders showed interest in collaborating with the UPC:

"rieki — 17.07.2022

This is epic!! Would love to see you showcased in an upcoming Regen Civics Season where we can help you set up your Bioregional economic system!

Epic work so far and would love to weave in the future!" (joinseeds.earth, 2021).

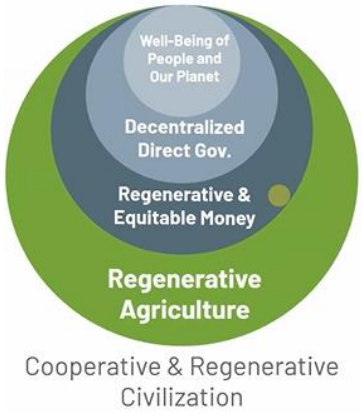

Figure 11 SEEDs Value System

Agroecological Criteria Tool (ACT)

In the collective impact methodology, we identified that a shared measurement is important. Alignment and a standardisation of the assessment tool, would give us more agency as a group in which projects and farms could be compared, analysed, optimised and rewarded after being graded through the assessment tool. Shared measurement results across the consortium, ensures accountability, collective measuring and aligns the network. The tool evaluates how much influence the consortium has when it comes to agroecological systems transformation. It is based on 10 agroecological principles divided into 5 different levels where change can be seen either on agroecosystems level or food system level. The tool is complementary to SNM, as it implies systems transformation assessment of regenerative and agroecological activities. ACT also provides transparency in between the projects, hence the usage in the first pilot project will be critical, as this will give the working group a better understanding of the tool, its effect and possible optimisation needed. Assessing the impact would justify funding as well as holding the UPC accountable for the projects done.

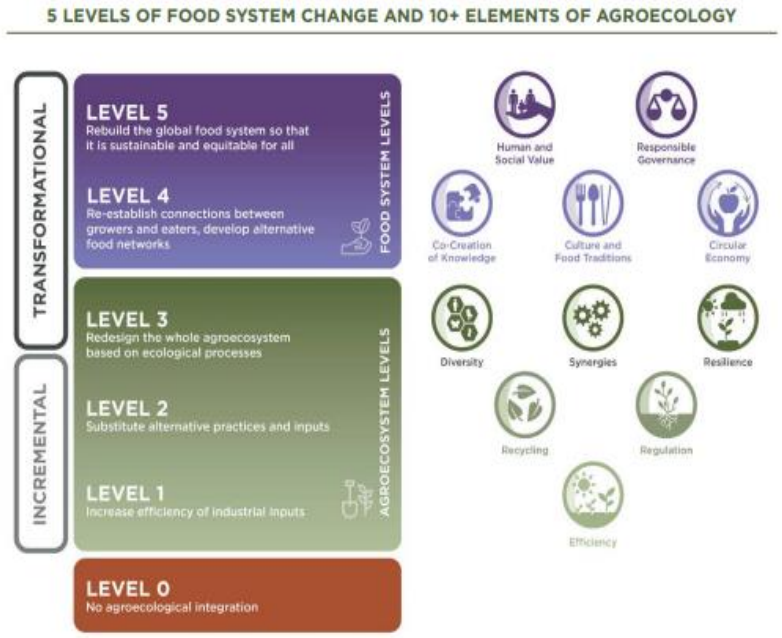

Figure 12 Five Levels of the Agricecological Criteria Tool and 10 Agroecological Principles Biovision (agroecology-pool 2019)

Figure 13 Biovision Agroecolgical Criteria Tool components (F-ACT User Guide 2022)

regenerative agriculture, would need to be measured in order to get the financial return for the impact generated. The working groups strategy lies in a standardisation of impact measurement of regenerative activities done across the consortium so that the consortium can serve as an umbrella organisation for allocating financial resources. This would mean clear documentation of measurements of projects which leads to more transparency as well as less corruption due to assessments from outside parties. Impact funding would go hand in hand with the collective impact methodology and is considered to be a fair and just funding scheme. Partners identified are for example Artha impact, which support sustainable agricultural projects.

Twinamasiko Permaculture Trainer from Uganda www.GOADreamVillage.org is stating: "*I think the tool is okay*🙏

These 5 levels provide a clear view of what we shall do👍 *[Through Permaculture] is the best way for us to achieve the 5 levels of the food chain [that we] are going to create*👍*".*

Network broadening:

Through enlarging the network, we gained an opportunity to collaborate with non-regenerative actors, such as the Ghetto Research Lab, the Ugandan biogas alliance, schools, HYLO, SEEDs, open-future collective and others which are part of the extended network. Currently, as we are still developing the innovations in the consortium, we are waiting for the right timing to involve regime actors into the project. Although in the beginning stages we are trying to involve hybrid actors, which are connected to the agricultural sector but would support a green transition and the development in the UPC as they are critical in the early stages (Lamine, 2012). Hybrid actors are natural allies which support the niches innovations while reinforcing the pressure on the regime (Lamine, 2012, Diaz et al. 2013). Broadening the network, ensures support, protection, multiple perspective on the innovation and more opportunities to develop the project in favour of the consortium (Raven 2012).

In the following paragraphs I will elaborate on the school projects and the transition pathway used for the pilot project of the Consortium.

School Project as Transition Pathway

Through having a MLP , the UPC working group identified several windows of opportunities. These windows or also called transition pathways which can ultimately lead to the transformation of the agricultural sector - incubating the initiatives and innovations, by initiating pilot projects, nurturing, sequencing the project in different places and gaining insights to support similar projects in the future. At the same time, enlarging the network for support and knowledge broadening, mobilisation of stakeholders and embedding the project into society can lead to systems transformation. Down below you can see a list of transition pathways identified in the working group.

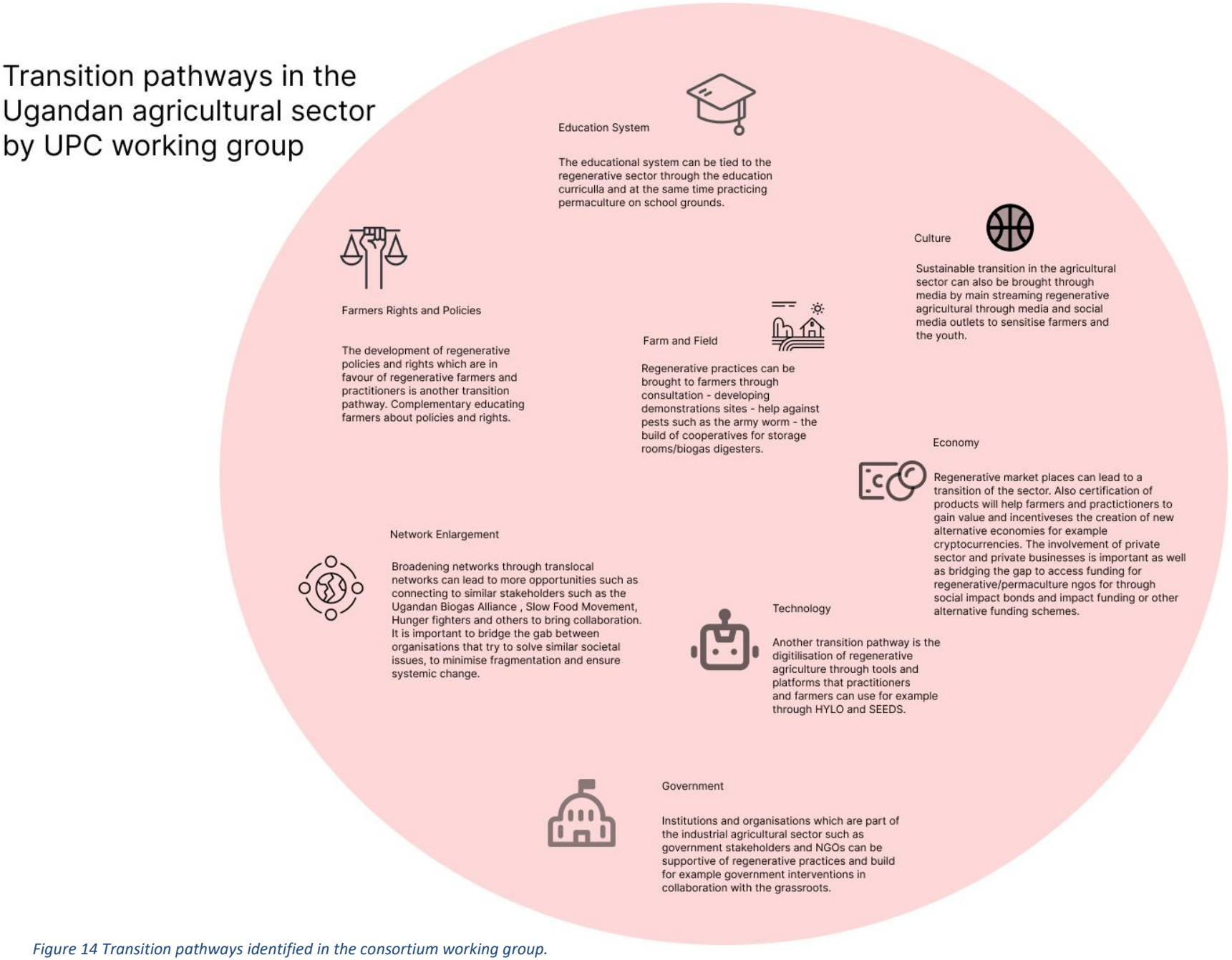

Figure 14 Transition pathways identified in the consortium working group.

The Education Sector as Transition Pathway

In the working group, we decided to focus on using transition pathways, narrowing down on the educational sector. Here, school curricula, working material and books, as well as a practical approach through teaching permaculture and regenerative agriculture could be done on the school grounds. This would ensure building of regenerative agricultural knowledge in schools and possibly educate a generation of pupils about permaculture. Schools in Uganda, have been adopting permaculture in the curricula since 2020. It would be apparent to scale it up and promote permaculture in other schools across the country. Furthermore, this was one of the first projects, at the start of developing the consortium, the UPC working group seized the opportunity to engage with stakeholders in the field. We were lucky enough to have experienced consultants in the working group which have done permaculture projects in schools in Kenya for example, as well as another member who was part of developing a plan together with the late Vice President of Uganda. During the World Food Day celebration in Hoima District on the 16th October 2019, the vice president H.E Edward Kiwanuka Ssekandi launched a national wide campaign for the establishment of school gardens of half an acre. They formulated a strategy with multistakeholder network of the regime such as the Members of Parliament, Ministry Of Agriculture Departments and Agencies , Ministry Of Education And Sports , Top Management Officials, Religious Leaders and other Prominent Institutions/ Bodies, Non Government Organizations/ Civil Society Institution that champion agribusinesses in communities, the Uganda National Farmers Federation, the Uganda Young Farmers Federation, Uganda Local Governments Association, Ministry Of Local Government Officials, Economic Development, National Planning Authority, Uganda seed companies and development partners like FAO, USAID, JAICA, UNDP, Uganda private sector foundation and others. Unfortunately, the project phased out, after the ascension of the Vice president, although the member, Hudah, from the working group is confident enough, that the project can be taken up again, especially with the UPC (Babirye, 2019). Here the distinction is the inclusion of regenerative agriculture and other innovations. The educational system can be tied to the regenerative movement through formulating curricula, providing educational material, practicing permaculture on school grounds as well as coupling regenerative activities in schools with SEEDs and other technologies.

Currently it is not as common as it used to be in Uganda to have kitchen gardens in schools, where most of the education shifted indoors.

A major problem, is that 90.000 schoolchildren drop out of school every year in Uganda, leading to a rise in illiteracy. The current economic crisis as well as the pandemic, perpetuate food insecurity because market prices are rising. As a result, parents lack financial resources to support their children's school fees and instead let them work to support their families. In the context of MLP, those problems can be seen as pressures, which open up pathways for the regenerative agricultural movement in Uganda to connect with the regime.

Regenerative agriculture in the school can be used to find solutions for food insecurity as well as mitigating high school dropouts. With the school project, school yards and potential unused spaces around the schools, are turned into permaculture gardens, which can ensure 1 or 2 meals per day. At the same time, the design of the project allows the integration of SEEDs. Using SEEDs, would be used in order to pay off the education of the pupil, by rewarding regenerative activities on the school ground. As this has been already done, in a school in Uganda, the consortium working group tries to find ways how to integrate the alternative economy into the project for example through establishing a local multistakeholder network. The impact of the project would be assessed through the ACT to assess social and environmental impacts of the project. Other key step is, to sensitize the communities and schools about regenerative agriculture. Currently, we are establishing 3 school projects in 3 different regions in Uganda: in Kabale region, Kitgum region and the capital Kampala. From the perspective of strategic niche management, those different projects can nurture each other. Here, replicating the project could help to mitigate challenges as well as knowledge shared in between the projects.

It is important to understand that each of these projects are different from one another. Such as weather conditions, climatic risks, available place-based networks, the needs of the community and environmental conditions have an impact on how the project is being conducted.

Kampala-slum project

The Kampala project is being developed in Karamoja slum, on the outskirts of the capital. Here, swamp areas are the main biotope, although it has been covered in plastic throughout the years, almost leaving no space to do agriculture. Additionally, due to heavy rain, water from the upper part of the city flows down into the slum, bringing along plastic as well as floodings the houses. Here the approach is to include the local communities and find solutions for their needs such as food, medical care, shelter, a clean sanitary system and clean water. As there are multiple issues, it is important to understand and narrow down the project as well as build a network around the project, to mitigate some of the issues which can possibly be solved with the multistakeholder network and regenerative agriculture. Here the outlook is to create an agroecosystem with several schools, churches and other stakeholders, which possess land in the slum. As food security is also one of the major issues in the slum, the UPC is developing a pilot project together with the Ghetto Research Lab. This lab is already working on innovations such as the upcycling of plastic into bricks, the build of compost toilets as well as promoting urban gardening through recycling of canisters for planting. The Ghetto Research Lab has been working for more than 10 years on the ground in Kampala building community capacity as well as empowering youth and community members through entrepreneurial opportunities. Together with the Ghetto research lab, in planning are the expansion of the network and involvement of stakeholders such as the local council, Kampala City Authority, National Environmental Management Authority among other more community-based groups. Only 10% of the children in the slums get lunch and 50% of the children cannot pay their school fees, hence consequently drop out of schools. Here the concept is to build an agroecosystem among the schools where unused land will be transformed into kitchen gardens ensuring food security, and the integration of SEEDs in order to provide pupils with cryptocurrencies to pay off their school fees. Community based agriculture will be closely tied as a way to ensure an agroecosystem in the slum area through permaculture. The goal is to ensure at least one nutritious meal per day for the pupils. At first the project group decided to build a demonstration site at a UPC working group members place which is approximately half an acre.

Figure 15 Biaruhanga from the UPC working group (Munansi green initiative) building a permaculture demonstration site in Kampala 2022

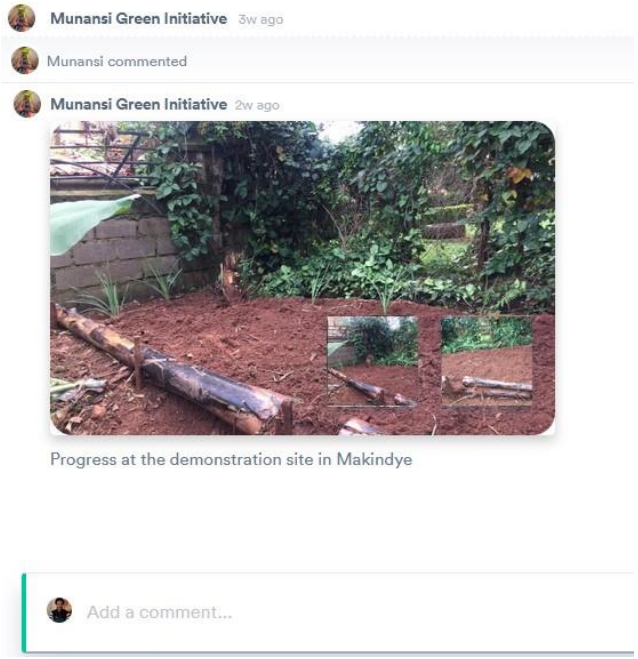

Figure 16 Showcasing of demonstration site on HYLO discussion thread

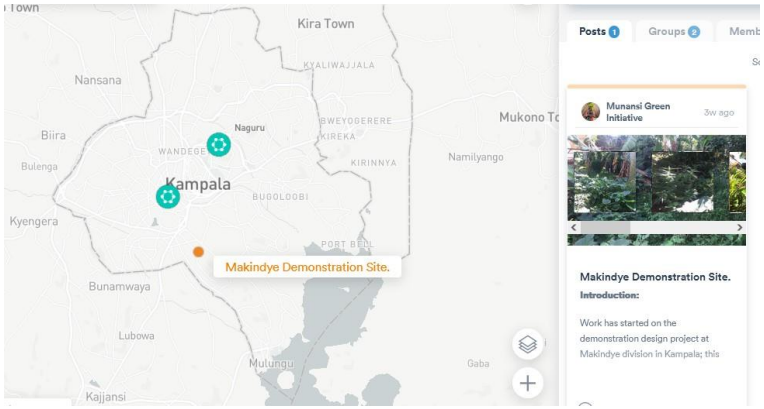

Figure 17 Map on HYLO of the demonstration site Kampala 2022

Kabale Sustainable Food Network project

Major challenges in Kabale region are hunger, limited finance and support, a hilly topography and others. Here UPC members such as the Youths Initiative Foundation, which are located in Kabale already established a network to promote food security in the region, called Sustainable Food Network. They emphasise, that each child should have food and kitchen gardens are a must in every household. As their goal is to create permaculture demonstration sites in schools, there is a need for equipment and storage. There is 10 schools identified where the UPC are going to create the projects in the region. One of the major issues are the hybrid and unreliable seeds, which led to diminished harvests, hence, we discussed a different approach where the schools could also serve as seed banks, saving indigenous and more resilient seeds. Important here is the

integration of the local community, the understanding of the core challenges through interviews and the creation of a supporting network. The project allowed to connect the Youth initiative, St. Ignatius University and goadreamvillage.com (Permaculture practitioner from Kabale) to collaborate. Together with students from the University they are building a demonstration site (6 acres) at the University with the guidance of the permaculture practitioners. The site will be used by the teachers and committees in order to learn and practice permaculture and climate smart agriculture. This pilot project example showcases collaboration between grassroots organisation and a public institution.

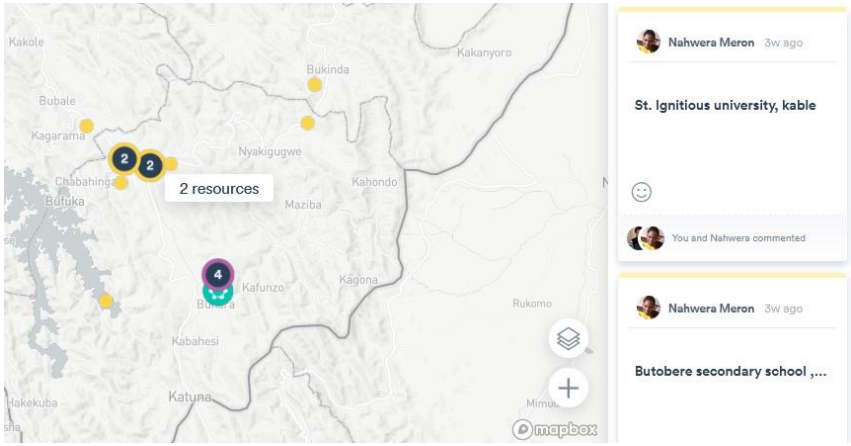

Figure 18 Kabale food project locations of 9 Schools and 1 University St Ignatius Permaculture Demonstration site in HYLO (Dec. 2022).

Figure 19 Workshop at St. Ignatius University December 2022

Figure 20 At the Demonstration site St. Ignatius University Kabale (Dec. 2022)

Figure 21 Ignatius University 6 acres provided to the UPC pilot project Dec. 2022

YOUTH INITIATIVE FOUNDATION (YIF)

Kabale , south Western Uganda
Tel +256 789093463/+256-706714639
Email: youthsinitiativefoundation@gmail.com

Date 19/12/2022

RE: **MEETING ON SUSTAINABLE FOOD NETWORK**

AGENDA

First Session. (09:00 am -11:00am)

1. Prayer
2. Introduction
3. Communication from Project coordinator.
4. Reactions
   I. Giving out roles to the project staff
   II. Choosing of team leaders in the sections of Education, Community, Market /Canteens and Vendors, Eco restoration.

Health Break/Refreshment (11:00am-11:30am)

Second Session (11:30am-1:00pm)

5. Discussion about the Network in Schools, University, small scale farmers, Market/Vendors, Value Addition and waste management.
6. Discussion about concept development in the above departments i.e. in multidisciplinary teams
7. Training about HYLO lead by technology team.

Lunch Break (1:oopm-@=2:00pm)

Third session (2:00pm-4:00pm)

8. Visiting Demonstration site.
9. Closure.

By YIF Team

Figure 22 Youth Initiative meeting agenda Kabale Kigezi St. Ignatius December 2022.

Kitgum School Project

Kitgum is located in the northern part of Uganda. Here the approach is, to focus on the schools while including the communities. Emphasis, lies on the build of a system where the schoolchildren can have at least one nutritious meal per day and regenerative activities can be rewarded through SEEDs. The project will be developed through some of the consortium members which are located in Kitgum, which have years of experience designing opportunities such as the school permagarden project. Planning of the project is being done through the build of a WhatsApp group and consecutive meetings where the consortium working group serves as co-creator of the project. Local community elders, community-based organisations, schools, communities and the local councils are being enrolled into the projects network. Here it is important to stabilise the network.

As these three projects are quite similar it is essential that we establish a way how we can share knowledge and insights between one another although there are different challenges and problems, hence the development of the projects will differ. Openfuture coalition (impact.openfuturecoalition.org), a community online

platform, provides a tool which can showcase the development of similar projects on a global level. This is one way to enable knowledge sharing between the projects. In the beginning of the project, Patrick from Refarmers, took the initiative to train some of the members in Kitgum about permaculture.

Figure 23 Refarmers UPC member training October 2022

In total there are 7 pilot projects which are being developed by the UPC members which will share the same funding, shared assessment and HYLO platform. In the appendix you can read one of the project drafts which are created in alignment of the UPC strategy. *In the following chapter I will lay out the project management approach.*

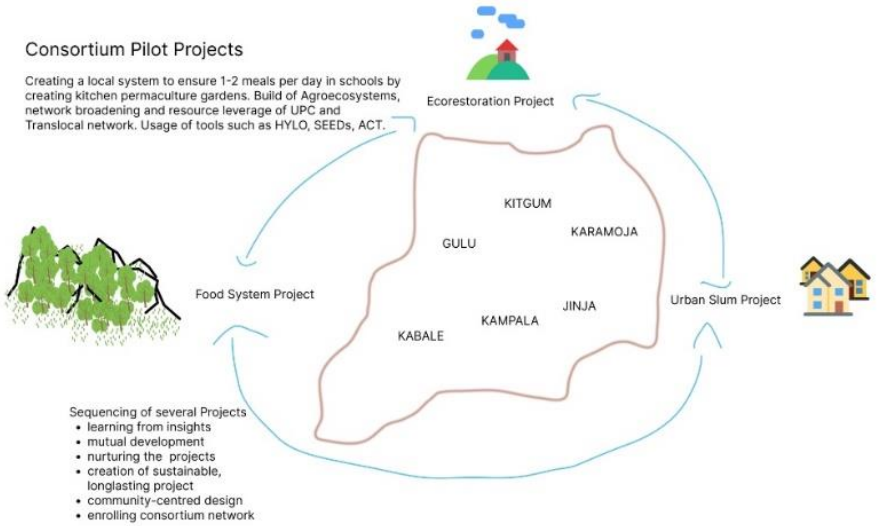

Figure 24 Consortium Pilot School Project 2022

Project Management

During the development of the project the consortium working group emphasises a sustainable and long-lasting project design approach. Here it is important that the values and principles, such as accountability and transparency, discipline, effective communication, of the consortium are integrated into the design. Also, during the design of the project, the group as well as the consortiums roles are being defined clearly in order to engage the consortium more effectively. Other factors are finding out the needs, challenges, constraints, risks and understanding the future impact the projects might have to the communities and enrol the right networks and groups at the right time. According to Cseshin (2014), readjustments

are important and made possible when adopting a flexible and dynamic approach to the projects vision. This allows space for nurturing the social experimentation as well as managing adaptations of possible societal embedding processes.

In the past chapter you got to know the strategy of using the transition pathway of the education sector in UPC and the formation of several pilot projects which have the potential to bring about a green transition in the agricultural sector. Introduced were different innovations coming from the permaculture niche such as HYLO, SEEDs and ACT which are being used as tools in the different projects. When it comes to the formation of the project a shared value system, responsibility roles and a sustainable project design are aspects which all the pilot projects integrate. This allows for nurturing the socio technical experiment through comparison, collective impact assessment. Another aspect of nurturing is the broadening of the network which is important for upscaling the innovation. In the next chapter I will elaborate on the state of the network after 1 year of project implementation, its difficulties which ultimately led to formulating a design solution for a stable network creation.

Assessment of the Network

Introduction

Before outlining the UPC network and its problems, I would like to describe what a network is. After, I will portray how a stable network can be formed through specific elements such as empowerment, trust, translocalism, collaboration and autonomy which lead ultimately to the design solution.

Through networks current crisis can be mitigated jointly and more impactful results can be realised (Scearce 2011; Avelino 2020). They provide multiple benefits where the flow of power between private institutions and grassroots movements can be equalized which is important in the context of nurturing socio-technical experiments (Avelino 2020). Networks can provide resources develop new and diverse perspective necessary for innovative outcomes (Scearce 2011). Also, new social bonds and relationships across different stakeholders can be weaved in order to mobilise collective action (Scearce 2011). Herein awareness is being cultivated amongst oneanother for potential collaboration and cooperation (Röbke 2022). As a consequence, deep learning and insights can be enabled

(Röbke 2022). Putting it into the context of the UPC members had the opportunity to specialise and take on roles such as project manager or project coordinator. Benefits can be seen as collective understanding as well as cultivating awareness of network members for mutual collaboration and potential cooperation (Scearce 2011; Röbke 2022). Funding opportunities also lead to more opportunities in the network to initiate projects and other activities which contribute to the networks goals (Scearce 2011). Other significant aspects of networks are leveraging and pooling resources such as land, seeds, manpower or knowledge, which might be relevant in the context of the UPC (Röbke 2022). Furthermore, collective impact, resource sharing, space for collaboration and widespread engagement

Networks can be lose or on the other hand strong bonds between network members can be realised to create long lasting impact and mutually benefitting activities (Scearce 2011). An important aspect enforcing bonds, are financial resources which ensure ongoing work (Scearce 2011). In the illustration down below you can find the lyfe cycle of a network to better understand networks.

Figure 25 The diagram outlines the typical life cycle for networks and the ways in which participants (including funders) can help a network increase its effectiveness (Scearce 2011).

Creating a stable network

In the following chapter I will elaborate on the UPCs different networks, the consortium, the working group and the project networks and their value and limitations. It is important to

understand that out of the UPC network subnetworks emerged which are mutually complementing each other (Scearce 2011).

Network issues in the UPC (Ugandan Permaculture Consortium)

The analysis was done through self-assessment and a workshop among the working group members. According to (Scearce 2011) the UPC can be described as an action network in which the action space is regenerative agriculture and the focus area sustainable transition. The UPC adopted a broad target which is a sustainable transition in the agricultural sector where the current transition pathway is the education sector. Members in the organisation are encouraged to take initiative and seizing opportunities to develop projects and small actions. The value lies in the creation of potential collaboration among different niche organisations which have all different focus areas as described in earlier chapters and for example the pilot projects. As it is a broad grassroots network a formation of a niche sector could be feasible, because actors are focusing on politics, circular economy, regeneration, optimising smallholders, indigenous seeds a focus on marginalised groups and sustainable food networks and others. Other advantages are resource sharing across some of the members and the opportunity for collective funding. Another important aspect is openness of co-creating the pilot projects and the supervision and support by the working group. Although there might be a lot of potential for bringing about a change in the sector, the network needs to be optimised. There is no clear exchange of resources among consortium members and knowledge about each others activities are hard to have access to. Also expectations from network members are quite unclear as it was developed informally. In the current state (December 2022) the UPC network is inactive due to a lack of engagement from its members and low resonance because of ineffective communication. Another attribute is that the network is scattered which imply lose connections between network members especially the ones which are not partaking in the pilot projects. Fragmentation can also be seen physically due to long distances between the organisations and the projects. An important aspect, which is also included in the design solution is the lack of an agreement between consortium members and projects. As a result, the network might be easy to fall apart if the working group and myself were not in the centre of it.

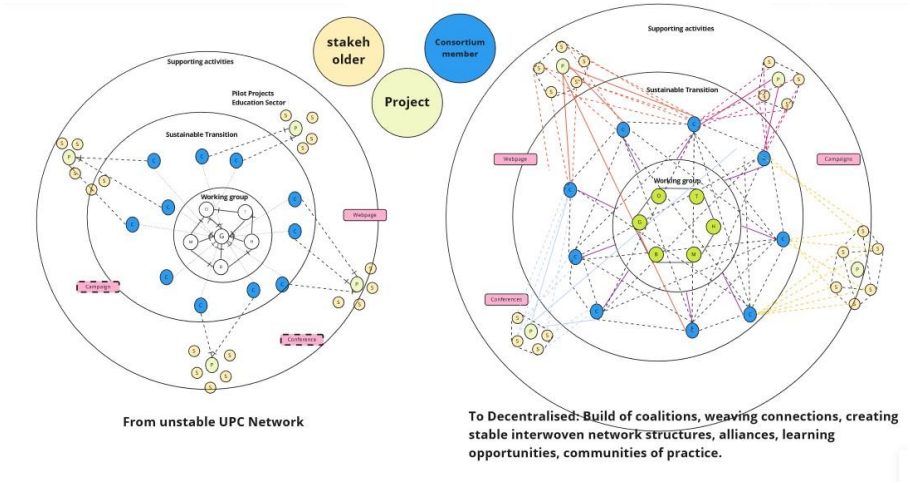

Figure 26 Illustrations from a network workshop – showcasing to come from an unstable network to a stable network in UPC.

Working Group Network

In the past 6 months after establishing the UPC a working group was formed as a support to navigate the networks activities and strategize ways how the UPC can bring about a sustainable transition. More than 40 meetings have been held during these 6 months showing high interest and motivation in the working group itself. The working group can be seen as a community of practice:"*[I learned a lot throughout the time that we have been working together and some of the knowledge and experiences I am already applying in my own organisation fliptown (Muhangi)]*". At the moment all of the working group members have been dedicating their time and volunteering for the same shared vision. During the first couple of months the motivation was really high letting us have 3 meetings per week. As of today (December 2022) the motivation quieted down because the main focus shifted onto the pilot projects. As resources are scarce for some of the members personal daily issues, their own work, internet connection issues and studies were working against partaking in meetings. Also, another important factor is that currently I am in the centre of the working group. On the one hand which can be seen as a leadership role on the other I am dominating the responsibilities in the working group. Hence, if I would take myself out of the working group, it would easily fall apart most of the responsibility lies on me. As a result, the network structure is unstable.

Project network

After finding several transition pathways in the working group, we decided to initiate projects tied to the education sector. Herein the

focus from the UPC was shifted towards project conceptualisation and development. Stakeholders from the UPC were asked if they would like to partake in the ideation processes of design a collaborative project. Stakeholder from the network were asked which were close by oneanother for better physical meet ups, engagement and collaboration opportunities. In each of the projects WhatsApp groups have been established with the amount of members ranging from 10 - 23 members. The projects were designed to create a space so that UPC members could collaborate on activities, which are mutually benefitting the networks long term goals. This opportunity has been seized by 7 member organisation from the consortium. Here, we can argue that the level of collaboration is strong as the projects facilitate that cooperation and the exchange of resources. Along the development of the projects, stakeholders such as schools, university, farmers and communities which are not part of the UPC are being invited to cocreate the projects in their place based environment. Each of the projects are unique hence they need to be designed tailored according to the actors involved in the project. Improvement areas are better communication, feedback loops among the projects to establish nurturing.

In the next chapter I will elaborate how stable networks can be formed as several issues of small engagement, low resonance, ineffective communication, poor resource exchange and feedback loops. These problems will serve as a basis for the design solution. Followingly I will describe what constitutes a sustainable network.

Creating a stable long lasting impactful network

As sustainable transitions take time it is important to nurture the socio-technical experimentation in the context of SNM. Ideally this can be done through creating stable, long lasting and impactful networks. In regards to, the UPC, the working group and the project's networks have to be improved substantially. Therefore, I conducted research how to build sustainable networks in order to create a design solution for the problems mentioned in the aforementioned chapter.

Trust and six components

According to Nooteboom: Trust is an expectation that things or people will not fail us, or the neglect or lack of awareness of the possibility of failure, even if there are perceived opportunities and incentives for it (Nooteboom 2002). Contrasting to this selfish behaviour, there is goodwill and benevolence, which can contribute in order to develop a stable relationship of trust and commitment (Nooteboom 2011). Fostering trust among network members is essential to create lasting networks (Röbke 2022). Interconnected is also the aspect of co-creation which can lead to an interweaving of people, objects and processes in relation to networks (Björgvinsson 2012). A network that creates a nourishing social field becomes more attractive for people to join, where bonds can be deepened and struggles, project failures and difficulties, members concern and needs shared (Röbke 2022). Holley (2018) depicts trust as having five components: "Values and behaviour that support trust, Framing and valuing trust building, Activities that help people build trust, Weavers that coach people in building trust and deal with misunderstandings, systems of reporting and accountability" These will be elaborated in the design solution. Trust can enable to build bridges among divides and diverse teams or cultures (Holley 2018).

Table 4 Five components of trust by June Holley (2018)

Component	Description
Values and behaviour that support trust	○ Reliability doing what we say we will do ○ Reciprocity: helping each other out and allowing ourselves to be helped ○ Openness: sharing what we are doing and thinking ○ Honesty: telling the truth, clearing up misunderstandings ○ Acceptance: accepting others as they are ○ Appreciation: noticing what others do and appreciating it
Framing and valuing trust building	○ Investing in time to build relationships which foster trust ○ Openness and transparency helps us building trust ○ Sharing resources and knowledge creates trust ○ Knowing each others strength and weaknesses is important for trust building - making use of their strength ○ Appreciating each other - we need to appreciate each other more
Activities that help people build trust	Relationship building activities
Weavers that coach people in building trust and deal with misunderstandings	before they become conflicts
Systems of reporting and accountability	○ Having transparency in the network ○ Anyone in the network can access meeting notes, reports and agendas ○ Making task lists and deadlines open / milestones and roadmaps -transparency make people more accountable.

Translocal networks and empowerment:

As Avelino (2020) is stating, local networks are as important as transnational networks. A combination of the two, translocal networks, can lead to social change and innovation. Creating translocal networks are an important step when nurturing the socio-technical experimentation as discussed in aforementioned chapters. Herein network members have access to resources which are defined as monetary, artefactual, human and natural resources (Avelino 2020). Initially translocalism can lead to upscaling, normalising the social innovation (Avelino 2020) which complements SNM and nurturing the socio-technical experiment very well (Ceshin 2014). Also, the lack of institutional support can be compensated by establishing relationships with local or transnational stakeholders, which leads to the broadening of the network and the increase of leveraging and gaining access to resources (Avelino 2020). At the same time, those connections can be seen as an opportunity to upscale and embed the social innovation into societal structures (Avelino 2020). Complementary to SNM and a sustainable transition in the agricultural sector is that niche organisations which are engaged locally and connected transnationally are more likely to persist challenges and have the potential to replace dominant institutions (Avelino 2020). As a result, transformative agency can develop which minders the pressure from the regime and unfavourable power dynamics, grassroots movements are confronted with in socio-technical systems (Avelino 2020). This is an important factor, because niches struggle to gain a sense of impact and access within dominant societal structures which can be seen as disempowerment through a loss of sense of autonomy, competence, unintended consequences, internal or external hierarchies and inequalities (Avelino 2020).

Opposed is the understanding of empowering translocal niche networks through social innovation to enforce sustainable transition in socio-technical regimes (Avelino 2020). Also, the notion of incubating the socio-technical experiment is an important way to ensure the development of the innovation, through diffusing, mainstreaming and upscaling (Ceshin 2014). Through empowerment actors gain an increased capacity and willingness to mobilize resources to realise the networks' goal (Avelino 2020). Niche empowerment is deepened in local initiatives and in translocal networks empowerment is expanded (Avelino 2020). According to

Avelino (2020) empowerment is intertwined with three basic need 1) autonomy 2) competence 3) relatedness which will be elaborated and used in the Design solution.

Table 5 Dimension of empowerment in relation to local and translocal mechanism (Avelino 2020)

Values and Principles	Description
Openness	spaces where we can share, see and be witnessed are important (Holley 2018).
Autonomy:	processes which support self-organisation of networks are highly effective (Holley 2018).
Accountability	creating systems of reporting and accountability for different responsibilities (Holley 2018).
Conflicts:	Mediation of conflicts for social and safe space creation (Holley 2018).
Roles:	Distribution of decision making through establishing and sharing responsibilities (Scearce 2011).
Modelling:	Visualising changes that one would like to see and tracking the progress (Scearce 2011).
Transparency	making activities open and accessible (Holley 2018)
Communication:	It is important for network members to understand their role and ongoing activities in the network such as the strategy and avoid miscommunication (Kraaijenbrink 2021)
Reciprocity	helping each other out and allowing ourselves to be helped (Holley 2018)
Honesty:	telling the truth, clearing up misunderstandings (Holley 2018)
Acceptance:	accepting others as they are (Holley 2018)
Appreciation:	noticing what others do and appreciating it (Holley 2018)

Table 6 In the following you can see a list of values and principles which are important to create a stable network and will be used in the design solution.

Dimension of empowerment	Individual & collective sense of empowerment	Local mechanisms for deepening	Translocal mechanisms of expanding
Relatedness	*We are related to each other*	Creating conditions to renew relations in ways that support wellbeing (e.g. face to face contact, spontaneous interactions).	Meeting and relating to others in other places.
Autonomy	*We can determine what we do*	Creating local contexts that facilitate doing things differently in line with one's values.	Creating larger supportive contexts for autonomous action – e.g. by pooling resources and creating alternative markets.
Competence	*We are good at what we do*	Developing & sharing local skills & expertize through hands-on experimentation and learning	Developing and sharing translocal skills and expertize, through becoming part of a larger movement and developing strategies for wider transformation
Impact	*We can make a difference*	Changing local circumstances and expanding ideas to local communities.	Increasing access to resources and legitimacy, based on evidence that there is local and global impact.
Meaning	*We believe in what we do*	Local sense-making and collective identity.	Confirming the broader existence of certain shared values (e.g. shared narratives).
Resilience	*We can adapt & recover*	Drawing on local networks created to survive crises/ pressures.	Sharing & learning from each other's failures & challenges; drawing on the resources of a larger movement.

Design solution

Through the different pilot projects the UPC got to engage with several stakeholders and create relationships between for example Universities and other organisations which support a green transition in the agricultural sector. One of the main concerns, is that the networks which are being created in the context of the UPC are unstable, hence I created a design solution, through research, a survey and a network workshop with the UPC working group. As a result, I came up with a strategic roadmap and elements which could possibly make the network more stable. One of the main elements is that members in the working group have been allocated responsible roles such as: finance, working group manager, evaluation officer, public relations, secretary and network weaver. Here the aspect is to share responsibilities in the working group with different focus areas, which allows gaining experience through roles. Especially the role of the network weaver, which main task is to stabilise networks related to the UPC, working group and the pilot projects, is essential in the core group. The weavers main task is to knit connections across different groups, stakeholders and form relationships by introducing actors to one another. Also he will be responsible to find best practices for onboarding and encouraging new members to join and broker connections. Another important aspect are the creation of cross project groups, which allow bonding across the different pilot projects and leave space for social interaction. The groups are meant to be communities of practice so that each pilot project will be updated on newest findings and knowledge generated in the groups. As a result, a space for interaction between consortium members was build, which allows for trust build and active engagement in the network. Another important aspect is that, one group is specifically responsible for network engagement and weaving, as a consequence can stabilise the networks even further. Practical documents which

are shared across the pilot projects are for example an agreement, where shared measurement, shared values such as transparency, shared tools, shared reporting mechanisms will be signed by each of the projects to create shared accountability. Other important aspects in the strategy are the build of interessement devices such as the project catalogue, a document which will be mutually created by the different project coordinators. Furthermore, the project profile, the main interessement device, is created by all the different cross-project groups, where their knowledge and findings are condensed in a document. Also, the agreement and other documents will be gathered in the profile, which builds an identity with collective values and the achievement a common goal, embedding regenerative agriculture and permaculture into society. As a result, the profile will be used in order to gain funding, in a form of a shared funding pool and interesse other stakeholders into the different projects and the UPC. As it is only a conceptual framework, in order for it to be successful, it needs to be acted upon and the strategy needs to be refined along the way. Other important aspects and a more detailed description of the roadmap can be find in the illustration 27 down below and the table 7.

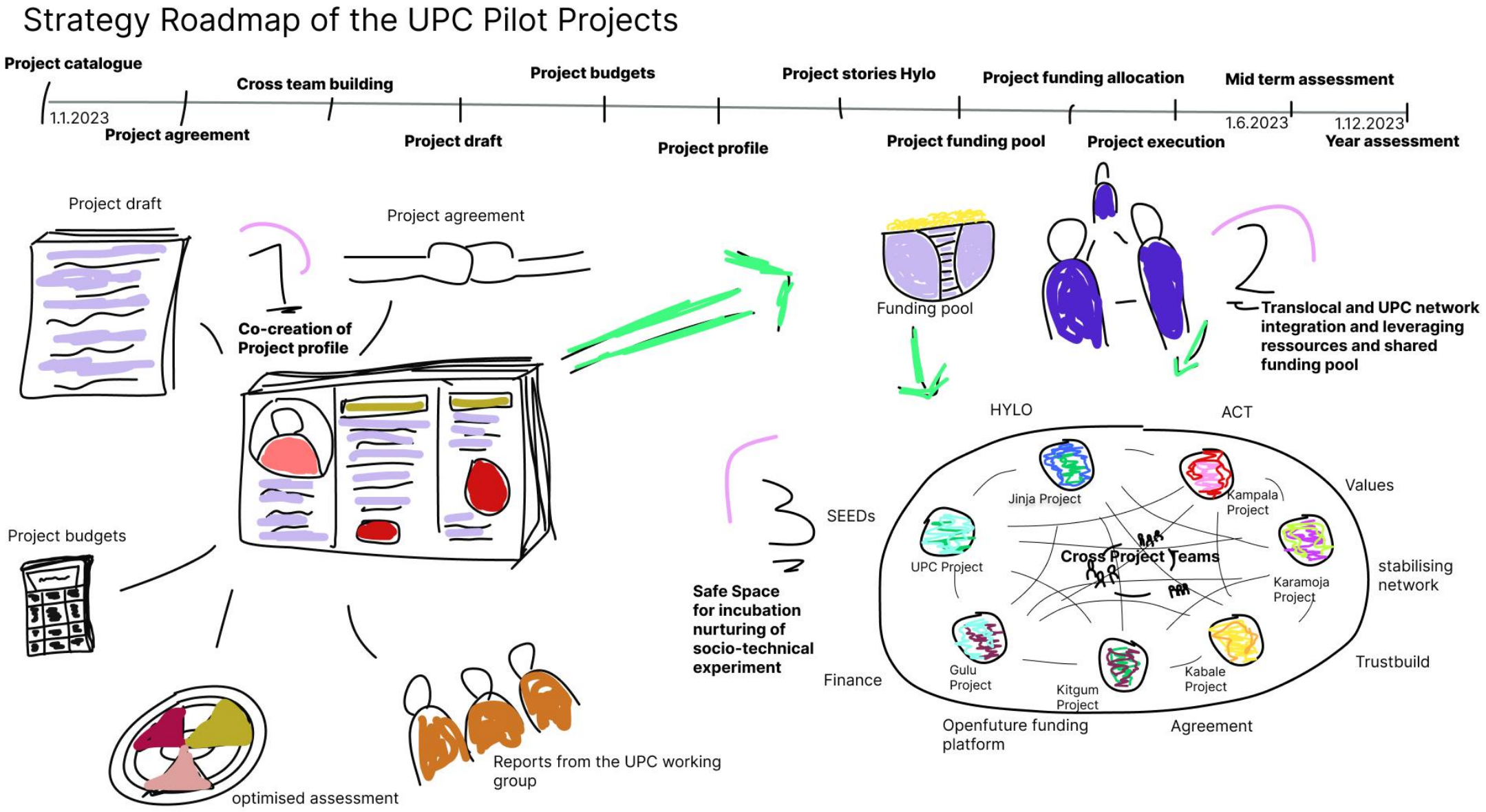

Figure 27 Strategy roadmap for the pilot projects of the Ugandan Permaculture Consortium as a design solution and stabilising the UPC network. A detailed description can be found in Table 7.

Table 5 Strategy roadmap elements of the UPC pilot projects.

Strategy Elements	Description	Network elements and values	Responsibles	Visibility
Cross-Project Teams	The cross-project teams are working across the different projects - in which communities of practices are being created. They serve as a way to share knowledge across the different projects which goes along with developing and learning from each others projects simultanouesly. This would ensure nurturing of the socio-technical experimentation by engaging with one another and developing shared documents, reports, drafts, valuation of the project, a project draft, an agreement. Empowering different people in the projects and putting them into leadership roles. While at the same time sharing responsibilities across projects. Creating the teams allows trust building among consortium members across different projects and a social engagement.	Regular meetings - from once to twice a month	Coordination by UPC working group	On Hylo - Shared google documentation Videoformat streaming platforms - onboarding of new organisations and people onto the projects - giving them an understanding of the UPC and the different tools that are being optimised throughout the project
HYLO group	Creation of a HYLO group to include interoparability between the projects and share learning, findings, discussions and create social activities online. HYLO is meant for onboarding new participants into the projects and platform which connects like minded practitioners in the region. The group will be responsible to understand best practices when onboarding new members onto HYLO and finding ways suitable for local communities and farmers to use the tool. Ideally the group is meant to optimise the usage of HYLO as well visualise and map the places where the projects, farmers, ressources and stakeholders are located. Also they will be responsible for creating a news outlets on HYLO so that the UPC will be updated of the different projects, for more transparency and visbility.	Meeting twice per month or more if needed	Autonomous working group	Reports and minutes which will be published on HYLO and the Webpage for open transparency and visibility.
ACT Evaluation officers group	The Evaluation officers group will be evaluating the different projects from start to finish through ACT, interviews, and other data collected from communities, schools and other stakeholders. The group is meant to optimise the tool ACT and make it suitable for the different projects to assess the impact based on agroeological values. Also the group can support whenever problems arise, in order to make the tool better. As the tool is also meant for farmers, accessibility and a smooth transition of usage will be developed in the team. From start of a project to finish of a project, the success of the project and its impact will be monitored by the group.	Meeting twice per month or more if needed	Autonomous working group	Report and minutes
Coordinator/management group	The management and coordinators in the project are the leading members of each of the projects. Their role is to organise, plan and strategise the projects and will be the focal person of the UPC. The group is build in order to facilitate workshops, knowledge sharing across the projects and create important documents such as the project agreement.	Meeting twice per month or more if needed	UPC working group	Reports, presentations, workshops, official documentation
Network weaver group	The Project network weaver group will be care takers of the different networks. They are responsible for stakeholder relationship, building relationships and deliberately connecting others in an effort to strengthen social ties and broadening the opportunities to have access to resources across the projects. They facilitate gatherings in-person and online, engaging new participants and capture shared learnings. The group knits together networks by introducing people to one another, encouraging new people to join, brokering connections across differences and help participants identify and act on opportunities. Other tasks are for example stakeholder analysis and onboarding through defining new entry points into the network and the projects. The group builds connections between the translocal network and the UPC as well create bridges, among the cross project groups.	Meeting twice per month or more if needed	Autonomous working group	Reports and minutes
SEEDs group	The SEEDs group is responsible for creating systems in reltation to a cryptocurrency which is rewarding regenerative activities such as creating permagardens, agroecosystems and others. The group will serve as a working group which can support oneanother and optimise SEEDs integration into the place based projects, ranging from schools to ecosystem restoration.	Meeting twice per month or more if needed	Autonomous working group	Reports and minutes

Finance group	The finance group is responsible for writing complementary budgets across the projects and finding sustainable ways to allocate project budget among the projects. They will be responsible for monitoring of open and transparent cashflows. www.openfuturecoalition.org as well as www.opencollective.com, will be used across the projects. Also they are responsible for creating feedback loops between projects and the procurring of ressources throughout the UPC and Transclocal network.	Meeting twice per month or more if needed	Autonomous working group	Reports and minutes
Ugandan permaculture consortium	Involvement of the UPC to create more opportunities in order to leverage resources. Nurture the networks and provide more agency.	Meeting once every 3 months	Network weavers	Reports, conferences, presentation
Translocal network	Involvement of transnational stakeholders to create more opportunities in order to leverage resources. Nurture the network and provide more agency.	Project related meeting	Network weavers	Report
Ugandan Permaculture Consortium Webpage	The webpage can serve as one of the entry points in the consortium - and is meant for visibility and gives a short understanding of the consortium for stakeholders and other organisations which would like to connect. Also on the webpage: https://consortiumregen.wixsite.com/ugandan-permaculture, the different organisations are portrayed as well as links to the HYLO pages used by the consortium. Reports are also published on the page.	Webpage which can be optimised -	Technology group	Opensource webpage.
Project catalogue	The project catalogue will be a one pager document of each of the projects which are being done - It is a shared framework with problem statement - solution - description - and summary of the project. It is a shared document which serves for a fast overview of all the projects being done in relation to the UPC.	Shared google document	Project managers and coordinators cross group	On webpage - google folder
Project funding pool	The funding pool serves as a joint funding proposal by all consortium members, which are going to develop the several projects. A joint funding proposal will give more opportunity to connect stakeholders throughout the projects, as well give opportunity for small activities which support the project such as meetings and other resources.	Shared google document	Project finance-cross group	google folder.
Project agreement	The project agreement is a shared document which is going to be signed by all the project coordinators. The agreement consists of shared practices such as the usage of ACT and HYLO, and reporting. It is a document which is co-created by all the project coordinators and the UPC working group. Here values such as openness, autonomy, accountability, honesty, trust, acceptance, appreciation, empowerment, sustainability, resilience, resource allocation and the mitigation of corruption are essential values, which in order to support weaving and stabilising the network. Another important factor is that signing the document will allow members to be eligible for funding. Also, breaching of the agreement will lead to consequences. All the project coordinators will abide to the shared document.	Shared google document: HYLO, ACT, Openfuture Values Project Teams and meetings Deadlines Report format Documentation and communication Funding: corruption - allocation Breaching Attendance of meetings in the UPC, official licences(international), registration	UPC working group + cross - project coordinators + cross - project managers	Webpage - Hylo - google folder
Project drafts	The project draft is a shared document which outline the different projects. Here the intention is to give a deeper perspective on the different projects. It will be used either as a seperate document and also is part of the project profile.	Shared google document	Project coordinators + project managers	google folder
Project profile Interessement Device	The project profile will serve as an interessement device - which creates a common identity among the Ugandan Permaculure Pilot Projects. Also it serves as an interessement device for funding and enlarging the network through interessing local and transnational stakeholders. Building it together among the different cross-project groups, it can be seen as a boundary object between the several cross project groups - where budgets, build of the HYLO platform as well the agreement are opportunities for the cross-project teams to co-create and the opportunity to achieve a common goal.	Co-creation of the interessement device can lead to trust-building	Cross project coordinators + cross project managers + cross hylo group + cross act group +	Webpage - HYLO - google folder.

In the last chapter, the discussion, I will analyse and argue for regenerative agriculture as a nature-based solution which can help the UPC to create opportunities in order to bring about a sustainable transition in the agricultural sector.

7Discussion

Hypothesis: Through a socio-technical system design approach, radical sustainable change in the agricultural sector in Uganda can be potentially initiated through the regenerative grassroots movement in Uganda.

Summary

Throughout the thesis the UPC was built with the aim to enable sustainable transitions in the agricultural sector through regenerative practices. One of the main issues is that conventional agriculture is damaging nature, contaminating the environment through fertilizers, making the soil more susceptible to erosion and dryness as well as competing with small-scale holder farmers.

As a result, NGOs and other organisations have been trying to enforce regenerative agricultural practices which can be seen as a holistic solution to tackle issues mentioned above.

In that regard, the UPC was formed of multiple local grassroots NGOs, from the northern part of Uganda and across, which align on permaculture practices as a way forward, to make systemic changes as well as sustainable environmental, social, and economic impact. Target groups are small-scale farmers, refugees, handicapped people, women, marginalised people, nature, and biodiversity.

Consortium

The group was built after having several ”bonding activities” (Agger et al. 2015) networking events and conferences with Ugandan permaculture practitioners which then developed into an informal

alliance, the UPC. Interesting is that the group consists of diverse actors from the niche sector, which have different focus points. Some of them develop policies which support small-scale farmers, teach smallholder farmers about their land ownership rights, focus on marginalised groups such as refugees, create projects with public institutions such as schools and do research on regenerative agriculture. Some have media outlets where they invite young farmers, create online market places for regenerative products, reuse and upcycle organic waste into fabrics, enable entrepreneurial trainings and work on infrastructural projects among others.

All of these different activities complement one another which can promote a green transition through regenerative agriculture and permaculture. As these activities are diverse, they can be reflected in MLP as its own niche sector. Herein, the regenerative niche sector in Uganda work on policy, rights, the environment, media, entrepreneurship, marginalised, advocacy, youth, fashion, community, infrastructure and small-scale farmers and technology.

This lays a good foundation to engage in the network with these diverse actors. Collaboration could lead to the creation of innovations which could play a role in transforming the agricultural sector. As the group is diverse and already consists of actors from several sectors, SNM and collective impact methodology were conceived as the most suiting strategies, as they incorporate a diverse perception on the agricultural sector as well as working as a collective would make a green transition more feasible.

Strategy of the consortium

SNM and collective impact

The Strategy lies in using SNM, socio-technical experimentations as well as collective impact as methodologies with the help of MLP. Through MLP as well as the niche sector understanding the working group could identify transition pathways and get a deeper knowledge

of the agricultural sector in Uganda. Here a workshop was being used in the consortium working group about the MLP. As we build on the foundation of knowledge, we could identify several open windows to transform the regime. As a result, several projects were created in the domain of the educational sector, where regenerative agriculture can play a significant role. Other transition pathways were identified, enhancing as well as legitimising the work that the consortium members are already doing. Through socio-technical experimentation, the transition pathway of the educational sector is being used to develop projects in schools. The steps are from incubation, to nurturing and lastly embedding the innovation from the experimentation into the regime.

Incubation

It is important to protect the innovation from selection environments as they might not be able to compete against them in the beginning stages of their initiation (Smith and Raven, 2012). When the regime gets more diverse, innovations are more likely to be able to be adopted. This is only possible, when transformation of the regime has been taken place, after embedding niche developments into the rigid system, of the agricultural sector. As the UPC is a diverse group of actors, multiple innovations could feed into the regime initially transforming the sector in favour of the regenerative agricultural niche. As a result, the need for protection would fall away and innovations from the niche become more competitive and stable against selection environments (Smith and Raven, 2012). In the context of the UPC, the build of the alliance is a space, where networking and the development of innovations are perpetuated. Herein, we set up a pilot project where technological innovations such as HYLO and SEEDs are conceptualised into the project design. Using these novel technologies in the context of the consortium,

would allow for protection while such a project coming from the government would be harder to implement due to restrictions when using for example cryptocurrencies. According to Smith and Raven (2012), it is important to protect the socio-technical innovation from multiple-dimensions such as in the case of the UPC registering the Consortium as an official organisation and writing agreements which would substantiate the relationships between the consortium members. In the context of the UPC, we try to create an active protective space, where the school project can be shielded from outside pressures, as a lot of projects in Uganda are also done unofficially, hence licenses play also an important role. Connecting and engaging with for example St. Ignatius University and Copenhagen University, where the establishment of a relationship is still in progress, would allow passive protection from the selection environments, as the socio-technical experimentation can be seen as research. Although, this case is dependent on negotiations which are ingrained in political processes. Those negotiations, take time and are complex, especially when funding is needed, or the organisational structure not yet established (Dawson 2000). When the niche is being protected, innovations can be made more robust against selection environments, by improving the developing and broadening of the network (Smith and Raven, 2012).

Nurturing: An analyst interested in nurturing would emphasise how the program enables the further growth of the niche, such as how it enables learning, or draws in new entrants (Smith and Raven 2012).

Nurturing is the second phase in socio-technical experimentation where the niche innovations can be developed, structured and

stabilised through enlarging the network, building up knowledge and sequencing the innovation.

Collective impact is one of the main methodologies used in the beginning stages of establishing the UPC. As the name already mentions, important are the accumulation of collective activities which can be accounted, for the regenerative agricultural sector. Moreover, this would create more agency for the consortium, whereas working in isolation, the impact will be minimal. Also, through collective impact a standardised system to measure the impact is a precondition. This would allow for more accountability and transparency amongst the consortium members and alignment of the network. The agroecological criteria tool ACT serves as the standardised impact measurement tool, which complements the notion of collective impact. Herein, environmental as well as social dimensions are being measured on project, farm and policy level. It is based on 10 agroecological principles, which are similar to permaculture principles and values. Depending on the impact done, the tool assesses the amount it contributes to a transition of the food system in 5 different levels. As the tool focuses on project, farm as well as policy level a variety of projects and activities could be measured in the diverse UPC. Furthermore, the tool measures the degree, regenerative activities contribute to transform the system, which is highly complementary to strategic niche management, as the focus is on sustainable systems transitions. The tool has not been used yet in the consortium, hence the evaluation cross project working group which consists of members of the pilot projects will be an opportunity to test, refine and optimise the tool. Another important factor which complements the impact assessment tool, is the embracement of impact funding in the consortium. Assessing the impact would justify funding. The impact done on the environment

and on social dimensions such as the regeneration of dry soil, increase in biodiversity, enhancing food security and possibly other ecosystem services could be financially rewarded. These financial resources could then be allocated to the consortium members, if a standardised measurement is in place. Here, the consortium would serve as an umbrella organisation which could allocate funding to its members, supporting regenerative projects and their organisations, possibly stabilising income, which could lead to job creation. As it is considered a fair and just funding scheme, corruption could be mitigated due to documentation, transparency and accountability by reporting to an obligatory third party. Artha impact is one of the organisations which the UPC established a relation with. They fund projects through philantropist networks in the global south. Also they invest in impact done in sustainable sectors such as upcoming niche regenerative activities (arthaimpact.com). Another important factor is the recent increase in investments for regenerative agriculture, which makes receiving funding for collectives more feasible (Fig.26).

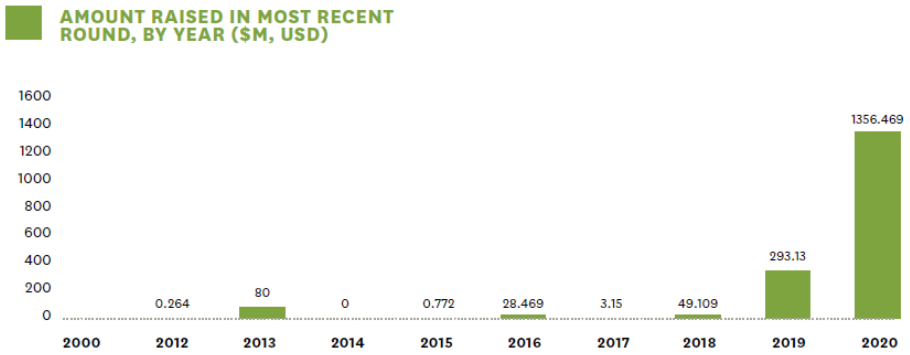

Figure 28 CREO Investment Report Release: Regenerative Agriculture 2020.

Consortium working group

Another important aspect of collective impact methodology, is the formation of a backbone support group, which guides the entire collective by organising events, facilitating workshops, management, networking and strategizing the direction of the initiative. This group can be reflected in the working group of the UPC. All the members of the working group have a background or high interest in promoting

regenerative agriculture. As some of them already have experience with policy change, consulting small-scale farmers, managing projects in regenerative agriculture, the working group has a good foundation of skills which are needed to develop as well strategize plans for the consortium to create transition pathways, in regard to strategic niche management. Important is that the working group enables the further growth of the consortium by providing knowledge sharing to the consortium members. Here first-order learning is taking place through sending worksheets and reports to the consortium members. This allows for the consortium group to be kept up to date with the developments which can be seen as feedback loops between the working group and the consortium. Nurturing in the consortium also takes place through identifying tools such as regenerative technologies, the assessment tool and others which equip the consortium. Although here it is important that these tools need to be tested, as they have only been identified and understood, but not practically used.

Herein, second order learning processes are important where the inclusion of knowledge accumulated is being embedded into the project design (Shot and Geels, 2008). In the working group this can be seen firstly in the identification of several tools which are then being inserted into the first pilot project. Mostly relevant is the planning of SEEDs, ACT and HYLO as tools which are in itself new innovations. Those can be tested out during the first pilot project and then further developed. As these tools have not been applied yet, it is difficult to say to what degree they will be useful. This is because farmers might not be able to have access to laptops or smartphones which is a precondition for using SEEDs. Hence, the community and those involved must be integrated into the design process so that these tools can be beneficial for the ones involved. Another

important aspect is broadening of the network. Especially in the case of SEEDs it was helpful to join the PAN-African Regen group, as the development and integration of SEEDs into project is being discussed on a weekly basis. The PAN-African group is clearly a support for the working group, as they already have experience with the usage of the cryptocurrency. Also discussing allows for learning processes and knowledge sharing and makes the integration of the cryptocurrency more feasible. Another important aspect in nurturing is the sequencing of the school projects in several parts of Uganda. These pilot projects integrate SEEDs, ACT and HYLO in their concept stage. As soon as the projects are launched and evolve, they can be used to support each other in their development. Because the projects are quite similar their goal to enable 1 or 2 meals per day for school kids, as well as create a system in which SEEDs can be used in order to pay off the school-fee can be refined over time. Although, it is important is to mention that the local communities, the networks and the landscapes are all different from one another hence they all have to be tailored to each case scenario. In order to make a successful sustainable transition feasible, niche advocates have to find solutions for challenges which are not being resolved with the current regime. A successful niche would imply the integration of the developments into the regime and finding ways to institutionalise these. In the case of the UPC, it would be done through the usage of transition pathways and the integration of regenerative agriculture projects. Ultimately this has the potential to contribute to food sovereignty, stop ecosystem collapse and restoring health and wellbeing as well a reconnection and symbiosis with nature. According to Lamine et. al, (2012) it is important to involve third parties which bring in new perspectives, enable second order learning processes to deepen the knowledge and the cooperation with regime actors, which allows

embedding processes into the agricultural sector in order for successful niche development.

My role as a Sustainable Design Engineer in the UPC

In the context of my studies, sustainable design engineering, I have been developing a network of regenerative practitioners, which have the capacity to transform the agricultural sector. As these groups are from the grassroots movement, I decided to use the methodology of SNM where we collaboratively designed the creation of socio-technical experimentation in the UPC working group. Here problem-based learning, was one of the main approaches in the project in which we identified ways on how to tackle food insecurity by first understanding a MLP of the agricultural sector. As the network developed throughout time, it was important to design ways how to actively strengthen the bonds between the consortium members and make them engaged. Herein a shared vision and defining a mission statement was important as well planning meetings consecutively. Another aspect is the broadening of the network. Designing interessement devices were an important tool to gain the attention of multiple kinds of stakeholders. Some of which were, networking events, documents outlining the narrative of the UPC, as well as a short movie which described the strategy of MLP and strategic niche management, where the stakeholders of the consortium were put into the role creating a transition pathway. Another important factor was the establishment of the consortium working group. Here I am mainly facilitating discussions, workshops, brainstorm sessions, managing and creating space for co-creation.

As the consortium is still in the development, it makes it open for continuous refinements and adjustments so that it can be improved. For example, the refinement of the project vision which was then turned into an actionable strategy as well as the development of the

pilot projects with the focus to use windows of opportunities by seizing transition pathways. A strong emphasis lies on community centred approach, sustainable and longlasting project outlook. In the context of further research, leaving the consortium and the socio-technical experimentation open for development, universities and other research institutions could seize that opportunity, in order to further the agenda of the consortium and use it as a case study for strategic niche management and socio-technical experimentation. The pilot project gives a great opportunity for higher institutions and other stakeholders, to connect and involve for examples students for practice oriented learning experiences. Another aspect is the concept of using a roadmap as a design solution which would stabilize the network through different elements. As the solution is only a concept, it needs to be acted upon and refined for it to be successful. As a sustainability designer, I would argue that the project has great potential to bring about a change in the agricultural sector, when the network is stable, resources made accessible throughout the network accessible, impact clear and visible and the usage of the innovations such as HYLO, ACT and SEEDs successful. As a result, would provide the UPC more agency and make the network and its niche organisations more eligible for funding. Being a sustainable design engineer I was able to apply skills and the knowledge acquired during my studies. Motivating was especially to work for a cause where communities well being and nature based solutions are used, in order to mitigate wicked problems such as the food crisis and ecosystem decline.

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9 Appendix

Working Group

MUHANGI MUSINGA – Public Relations

Currently based in his hometown Mubende, Uganda, is the Founder and Head of Operations at Fliptown, a community based initiative that promotes local collaborative ingenuity, talents, artisans and regenerative green practices. He has used an integration of technology and vast real life experiences and networks to create a reliable data banking community system.

Muhangi Musinga has a thorough understanding of GPS and Security technologies and worked as the Head of IT and Technical operations at Versatile Tracking and Precisions LTD. He corresponded in research and development of accurate remote ultrasonic fuel monitoring systems with recommendations from Vepamon Fuel Telematics in Russia, Oner Electronics Technology Limited and Jointech in China. As a self-managed technical expert with a Diploma in Telecommunications Engineering, he has worked extensively in software, electrical and electronics with a number of companies, organizations and communities.

He is also a long time community activist using his intelligent imagination, arts and skills to promote local ingenuity and environmental pride and regeneration. He volunteered to train locals in clean energy solutions at Children and Wives of Disabled Soldiers Association (CAWODISA) a Uganda People's Defense Forces NGO and Rural Development Action and Training Consult (RUDATCO). Additionally championing local health fitness programs, tropical tree planting campaigns and other real life and mindset strategies.

HUDAH BABIRYE – General Secretary

In regards to regenerative Agriculture. I do trainings on regenerative farming especially to young people in schools and also empower them to transit this knowledge to communities they come from to ensure that everyone is not just food secure but also taking care of the environment and others.

CRISPUS BYARUHANGA – Finance

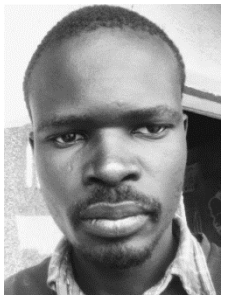
is a Social/Environmental Activist currently serving as an advisor to Mubende Municipality on social and environmental issues. He holds a BBA in International Business and more than 8 years of experience in strategic planning, formulating, implementing, evaluation of youth adventure based projects like cycling, mountaineering, hiking, camping. Main planning themes currently are climate change adaptation, biodiversity protection, waste management, alternative energy and lobbying. Crispus has gained his experience through collaborating with the East African Community, Uganda Wildlife Educational Centre, Uganda Wildlife Authority, Red Cross, Munansi Green Initiative, Sosolya Undugu Family, Tress For The Future, CampFire Logs Guild. He's lived in South-East Asia and East Africa and has travelled the region extensively. He believes that learning is a continuous process, and he seeks knowledge through his activism. His objectives are to increase social advancement and public service.

GEOFFREY KWALA – Working group manager

I have a Bachelors in Environmental Management and Masters in Sustainable Design Engineering. I am interested in nature based solutions and sustainable design. Also I initiated the Ugandan Permaculture Consortium with and kickstarted several projects when it comes to facilitating a green transition. When it comes to deisgn my focus is on facilitating workshops and spaces for co-creation, sustainable design, involving empowering local communities and niches into the design process. At the moment my main focus area is regenerative agriculture as a nature-based solution, although I am open and interested in other ways how sustainability can be embedded into society.

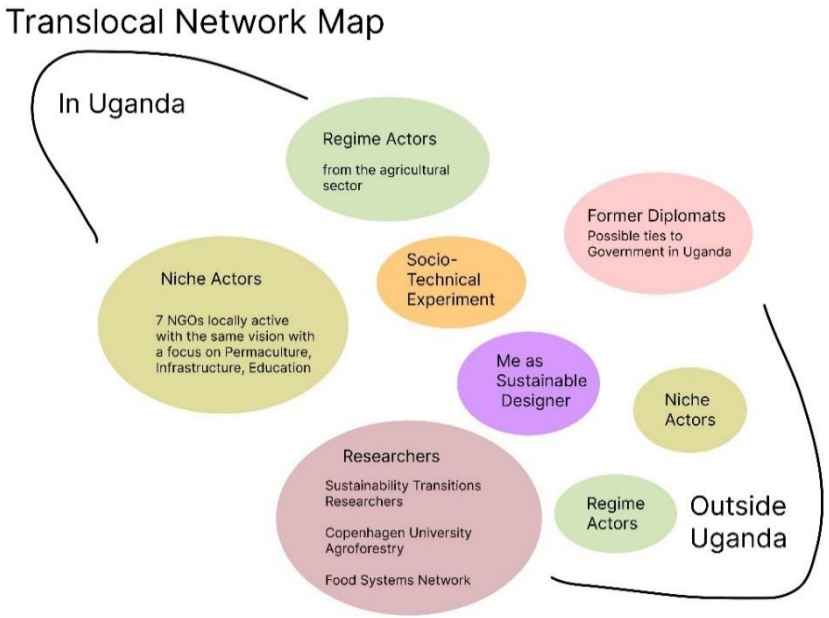
OLA TOM LAKERE – Network weaver

is a twenty three-year-old from Kitgum, Northern Uganda, where he runs permaculture trainings and regenerative agriculture projects in post-insurgent communities of northern Uganda. With little over two years experiences in permaculture project designs and implementations, Ola has worked in communities in South Sudan, Uganda, Kenya, Malawi and Tanzania in facilitating food insecurity mitigation and regenerative projects using permaculture and syntropic agroforestry as tool to empower these grass-root communities to help themselves.

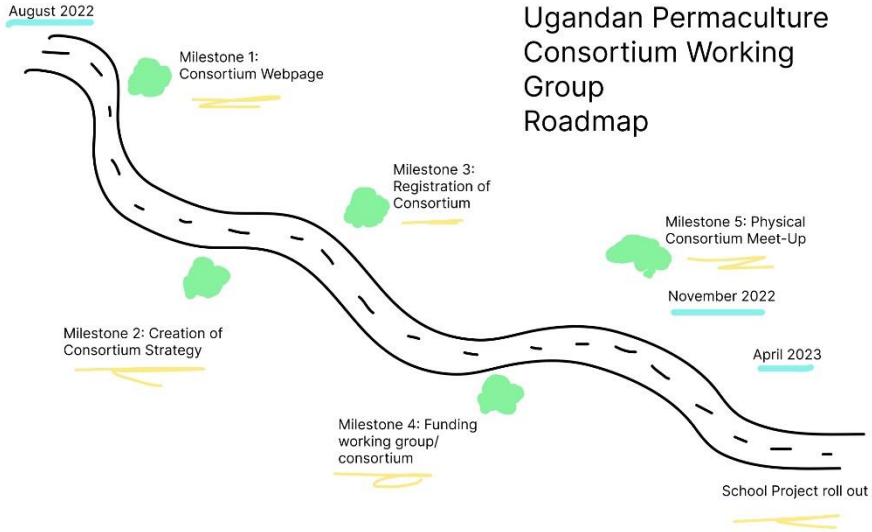


OPIRO FRED – Evaluation officer

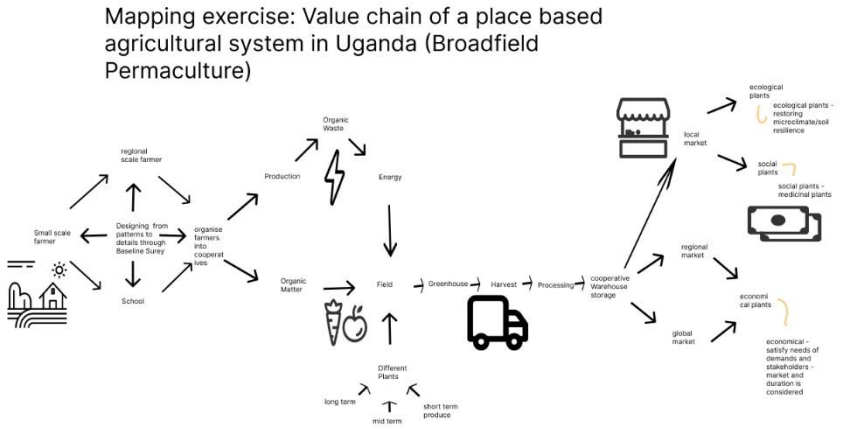
I am a graduate of Agribusiness of Nkumba University. I have 4 years of professional and technical experience in the private and NGO sector; with extensive expertise in farm, agribusiness and finance management yet with ability to work in a pragmatic and flexible way. During my previous assignments, I have played a central role in agronomic, marketing, logistics coordination, support to the finance and human resource functions. Among the areas I have proficiency in include: - management of agribusiness operations and procedures, contract management, crop management and protection, permaculture and syntropic forestry, asset and stores management as well as managing logistics and procurements in a cost-effective way, on and off board management, performance management, leave and timesheet management, supporting payroll process as well as recruitment among others.



Appendix 1 Translocal network map 2022



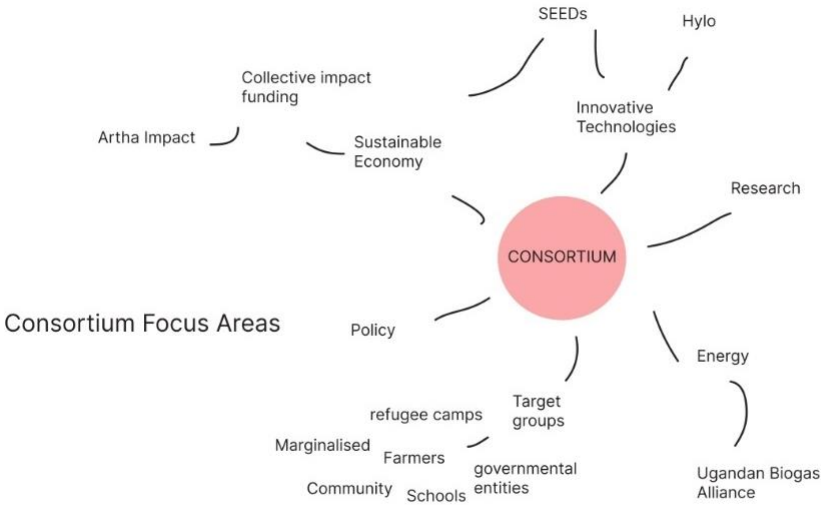
Appendix 3 Ugandan Permaculture Consortium Roadmap August 2022.



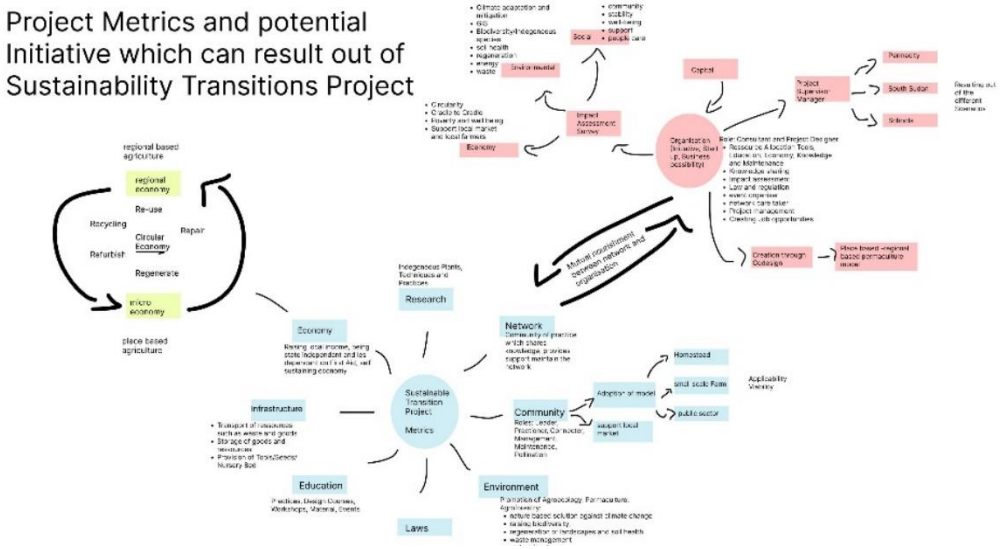
Appendix 2 Mapping exercise with broadfield permaculture - place based agricultural system. 2022

Organisation	Vision for Consortium	Focus Area	Link
African Women Rising	[..]To be the leading practitioner in agroecological promoter in the whole nation [..]	Focusing on empowering rural communities and women through place based permaculture design ex. Homesteads and refugee settlements.	https://www.africanwomenrising.org/
Northern Uganda agriculture extension foundation	[..]To build a network of system thinkers with the purposes to create a healthy culture and ecosystem To be the global linkage between the farmers practicing regenerative agriculture and the government[..]	Extension, research and policy development	https://nuri.ag/
Seeds and Stories	[..] Where members effectively collaborate to achieve common goals. An organisation that promotes permaculture and other nature-based solutions in Uganda through training, research and skill sharing.	Empowering women to build their own business around regenerative agricultrue and upcycling of organic waste into fashion products.	https://www.seedsandstories.org/
Permayouth Kitgum	Supported the growth and implementation of numerous regen projects in uganda	Building of permagardens in rural areas with a youth focus point.	https://www.permayouthkitgum.org/
RWAMWANJA RURAL FOUNDATION LTD.	I envision inclusive communities built upon our collective wisdom and in which all people feel a sense of belonging. These communities are thriving based upon a shared commitment to social justice, the power of personal choice, and equitable access to supports and ressources.	Food security and Nutrution, environment and education	https://rwamwanjarural.website2.me/
Mirembe Green Park	Implementing work in ecological and social restoration[..] to provide needs of their families	Local farm work and awareness build	https://www.ayaplatform.org/members/11163502
Eastern and Southern Africa Small-scale Farmers' Forum (ESAFF) Uganda	Contributing to food sovereignty in Uganda	Networking and supporting local farmers through policy and rights.	https://www.esaffuganda.org/
Munansi Green Initiative Ltd.	-	Climate change adaptation, biodiversity protection, waste management, alternative energy, sustainable development and solutions	https://www.facebook.com/Munansi.Ug/
Fliptown	-	promotes organic farming practices, tropical tree planting provides agricultural research and technological integration amongst local farmers	https://www.facebook.com/FlipTownHometown/
Paulinho MUZALIWA	-	Regenerative agriculture,Entrepreneurship(Business and leadership), Woman empowerment build of new economies through SEEDs	https://www.facebook.com/67311565308426 9/posts/pfbid0op9Vj5HQFK8bJcA7kzx1FNGjjcboaPxf5WEbt9ZcVJxAXygg6e8A5gFvBNcS5tGZl/?app=fbl
Refarmers	-	Training and installation of small scale farms and school gardening	https://refarmers.org/
Tebandeke Ali, Permaculture Initiative Uganda Limited Butambala	-	PIU is a non-profit organisation that aims to bring about peace via affordable permaculture education	https://permacultureuganda.org/
Nature Africa Foundation for sustainable development (NAFSD)	-	To support Poverty Reduction programs and projects focusing on breaking the cycle of poverty in communities through sustainable conservation; education, and healthcare	-
Akanyijuka Bruno, Tumuheise Agnes Youth Initiative Foundation	-	Organising Permaculture projects mitigating food insecurity and building sustainable food systems emphasising on school gardening	-

Appendix 4 Vision of consortium members 2022



Appendix 5 Consortium focus areas 2022



Appendix 6 Project metrics and potential initiative which can result out of sustainable transitions project.

Successes of the current Agricultural Sector in Uganda

Successes of the current Agricultural Sector in Uganda?

Uganda experiences Multiple crop harvests per year due to low temperature variability, fertile soils, two rainy seasons

Agricultural sector in Uganda accounted for about 23.7% of GDP, 31% of export earnings , the sector employs about 70-75% of Uganda's population.

The sector is currently driving agro industrialisation agenda of the whole country.

Contributes over 25 percent of GDI to the economy, source of raw material for many industries, responsible for food, income and nutritional security
Increased food supply.
Reducing food prices and creating new income employment opportunities.

Increased adoption of new farming technologies increase in exports.

The coffee sector has greatly improved.

People are now slowly adjusting to commercial agriculture.

Very few Ugandans fail to get food

Extension training to farmer's

Barriers for a succesful Agricultural Sector

Limited use of fertilizer and quality of seeds, lack of irrigation infrastructure, lack of post harvest handling methods and infrastructure.

High levels of Aflatoxins, limited knowledge of modern agricultural practices, poor land tenure system, limited agro ecology practices, shortage of affordable agricultural credit

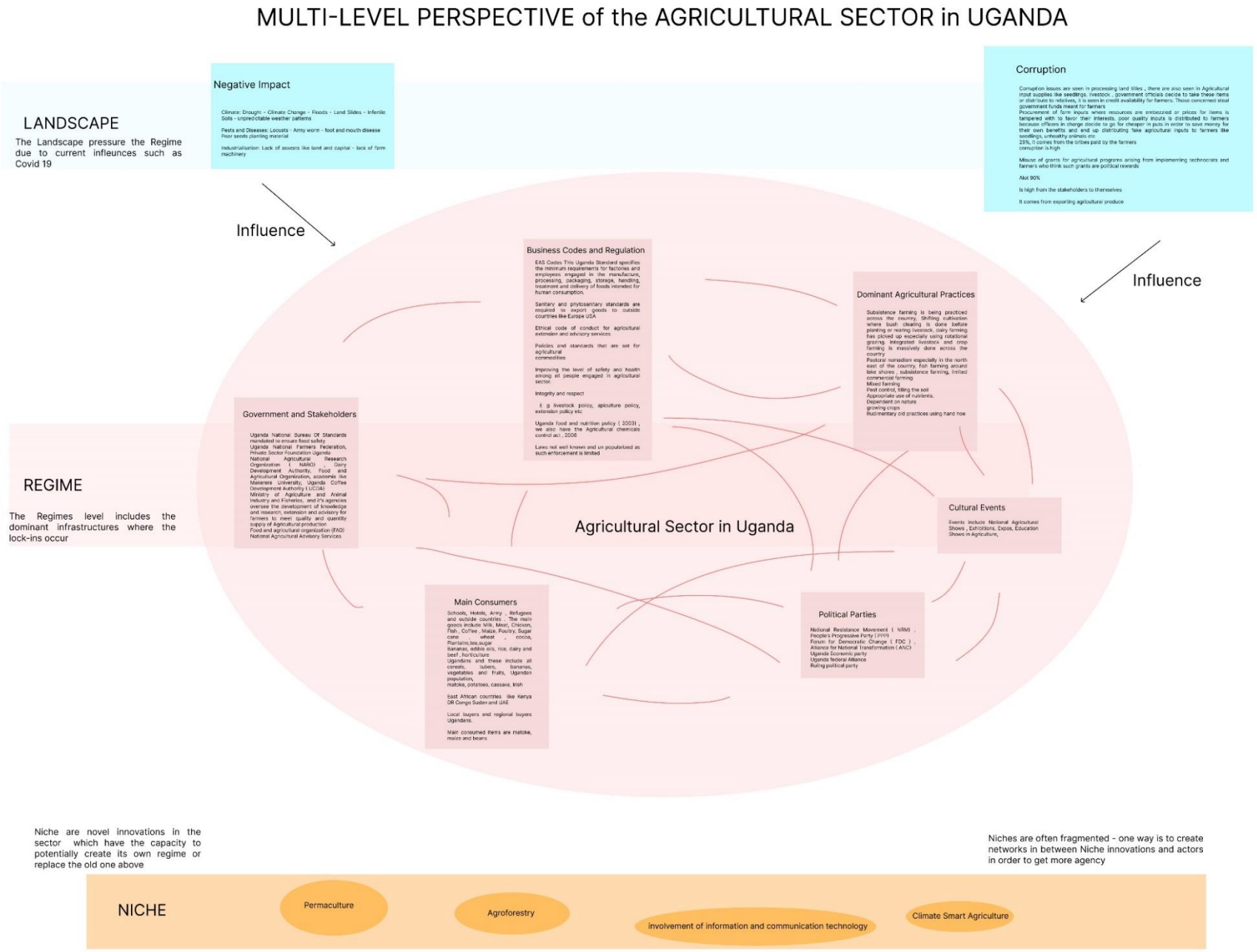
Lack of finance, knowledge and research, water for production, markets, poor technology for value addition, climate change and related challenges

Inadequate land, harsh weather conditions, Pests and diseases,Poor agricultural practicing methods, Poor technologies, Pre and post harvest handling losses due to lack of knowledge, lack of financial resources and support

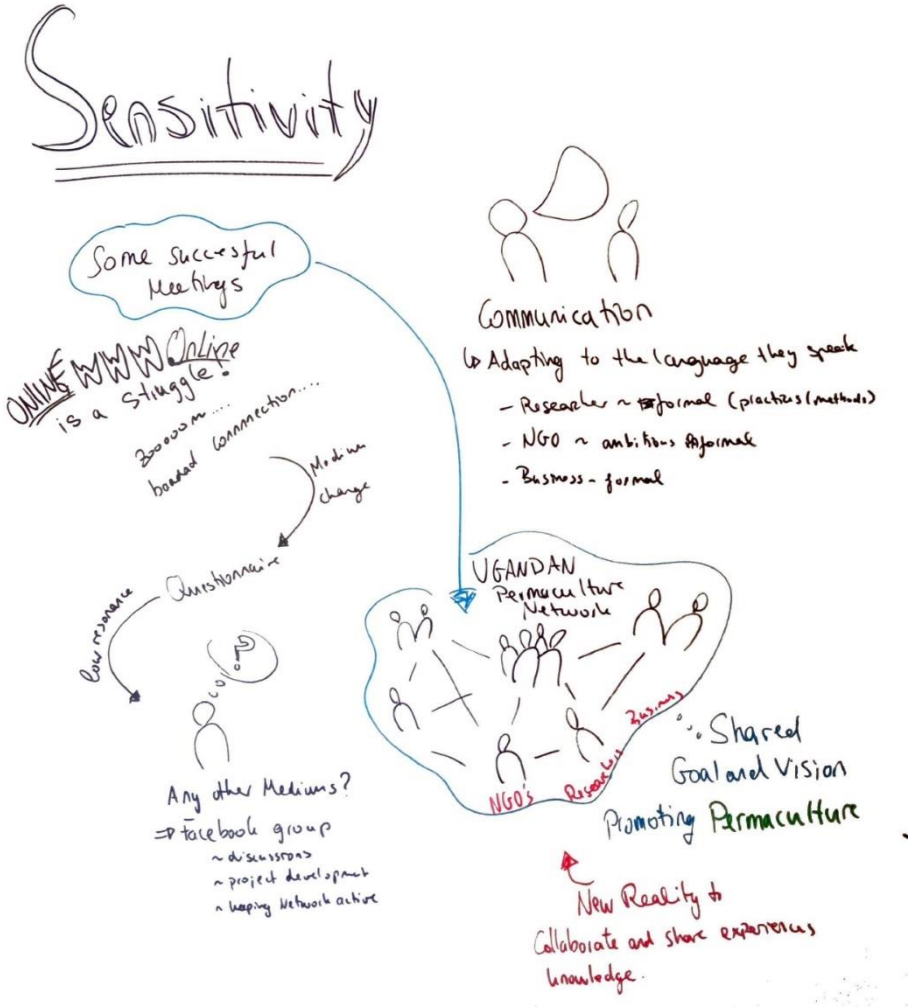
Taxes

Depending on rain fed agriculture
Lack of access to timely market and market information as well extension services
Capital, disorganized markets, outdated agriculture practices

Appendix 7 success and barriers from the agricultural sector Uganda 2022.



Appendix 8 MLP from the agricultural sector Uganda.



Appendix 9 Presentation at service design course 2022 sensitivity.

Ugandan Permaculture Consortium - Karamoja Project Area - Project Coordinator – Boniface Okello Ojas
Executive Director-Karamoja Go Green
Email: bonitoojas@gmail.com
Email: consortiumregen@gmail.com
Mobile: +256701283975
20th December 2022

The Ugandan Permaculture Consortium

Karamoja Integrated Permaculture, Food Security, Ecosystems Restoration and Livelihood Project Concept Note

1. Introduction

The Ugandan Permaculture Consortium is a network of organizations working on regenerative agriculture in different sectors in Uganda with a resilient outlook. We build strategic linkages with stakeholders for potential partnership and collaboration, in which we support the growth and implementation of numerous locally designed and led projects.

Our strategic focus is to improve and increase agricultural productivity, sustainable systems, ecological restoration and the quality of lives of all people through a community engagement approach in balance with nature. We address key challenges faced by all stakeholders in the agricultural sector through building a network that promotes policy and practice change in regenerative agriculture.

Our mission is *to tailor regenerative practices within communities through skills and knowledge development***.**

Our vision is to promote resilient farming communities, through sustainable food systems, as well as empower them with skills, knowledge and resources to create healthy ecosystems.

Currently we are looking for individuals, entities, organizations, companies and private sector enterprises among others who will support us technically, materially and financially in designing and implementing a ten year project on food security, ecosystem restoration and livelihoods for the marginalized and vulnerable people of Karamoja Sub Region, North Eastern part of Uganda.

2. Background to the project:

Karamoja Sub Region North Eastern part of Uganda is one of the most ethnically diverse part of East Africa and highly associated with food insecurity. It covers about 27,528 kilometers of land, with a population of about 1.2 million people and comprising of the districts of Abim, Amudat, Kaabong, Karenga, Kotido, Napak, Nabilatuk, Nakapiripirit and Moroto.

3. Problem statement:

Karamoja sub region is characterized by harsh climatic conditions of aridity and semi aridity and most areas is known for severe unreliable rainfall patterns making rain-fed agricultural crop production a challenge. The region is also known for severe environmental degradations due to the widely practiced nomadic pastoralism, harsh climatic conditions; an extension of the arid conditions in North Western Kenya, South

Sudan and Somalia with dry wind blowing into the region from as far as Yemen. Poor human activities like indiscriminate cutting down of trees, bush burning during hunting seasons, charcoal burning, overstocking and unsustainable utilization of natural resources in and around protected areas due to encroachment and illegal entry has led to severe ecosystems degradation. The region is also characterized by the prevalence of extreme poverty and poor living standard characterized by most people living far below the poverty line, poor water, sanitation and hygiene facilities. The region is also characterized by severe food insecurity partly due to failures in rain-fed agricultural food production because of unreliable rainfall patterns, harsh weather conditions of strong winds in the dry seasons and destructive hailstorms and thunder in the rainy seasons. As a consequence, nearly 2000 people died of starvation in 2022 in Karamoja. Poor farming methods characterized by reliance on unreliable rainfall, use of rudimentary tools, lack of modern farming methods and system, high prevalence of pests and diseases. The region is also known for high level of illiteracy amongst all age brackets, low enrollment and retention in schools due to severe hunger, primitive and restrictive culture forbidding for example girls from going to school and adopting new ways of living. Lack of sustainable alternative livelihoods and production skills as nomadic pastoralism is becoming increasingly hard to practice due to increase in population and conflicts for resources like water and pastures for live-stocks. The region is also characterized by poor service delivery partly because of historical biasness and exclusion. The region receives very little budget allocation as compared to other part of Uganda; something which have made service delivery stands at a very poor scale. The region is also plagued with intra and extra ethnic conflicts characterized by raids and counterraids amongst the different communities. This have made the region to experience seasonal insecurity due to internal raids and cattle rustling which is partly fueled by cultural norms such as high demands for cattle for cultural marriages inform of dowry where men are expected to marry with about 30 herds of cattle and above to be considered real men. These have fueled cattle rustling amongst indigenous communities and their neighbouring communities like the Turkana from North Western Kenya and the Dinkas from South Sudan. The commercialization and politicization of the traditional cattle rustling into a booming business where even military personnel are a part of have exacerbated the conflicts.

These conflicts makes the region peace less most parts of the year thus negatively affecting service delivery, development initiatives and interventions. The region in some parts is characterized by primitive cultures rigid to change which have made uptake and absorption of development initiatives a challenge. Generally the mindset and attitudes of some communities are not pro development but immediate selfish gains. These have made sustaining development initiatives a challenge as they immediately die the moment the project comes to an end. The region is also characterized by lack of knowledge and information on key basic necessities of life. Lack of knowledge on the dangers of environmental degradations partly due to challenges in translating the scientific messages into the local dialect. There is also poor accountability structures and mechanism within the lower and upper local governments, something that have made corruptions and poor service delivery go unchecked.

4. Main Project Objective:

To build resilient food systems, livelihoods and ecosystems through permaculture and regenerative agricultural practices, the build of agroecosystems and mitigating food insecurity by empowering local communities and grassroots organizations.

5. Specific Project Objectives:

To build resilient food systems in schools and among the local community in Karamoja by setting up permagardens and regenerative agricultural sites and gardens.

To build resilient ecosystems in Karamoja through ecosystems restorations and promotion of sound ecosystems governance and management among the locals.

To build resilient livelihoods and production skills among the local people of Karamoja.

6. Solutions and development interventions/project inputs and tasks

These are solutions or interventions that can be put in place to address the above development challenges faced in Karamoja sub region

a. To tackle severe environmental degradations challenges:

Restorations of critically endangered ecosystems through building up greenbelts, setting up hydrological corridors, greening up greenbelts. Promotion of Farmer Management of Natural Regeneration to help tree stumps regenerate into

grownup trees and aiding forest ecosystems to bounce back. Setting up greenbelts by raising, planting and growing indigenous trees species in places that they used to be. Setting up hydrological corridors in the arid and semi-arid areas through digging semicircular bunds known as earths smile to capture rain water and promote infiltrations into the ground to help kick start mother nature to re-green by allowing seeds present in the soil to sprout into trees and vegetation covers. This can be supplemented by tree planting and controlled grazing. Greening up greenbelts can be done through Farmer Management of Natural Regeneration and intentional planting of indigenous tree species on bare or degraded lands. This will require seed banks and nursery bed management.

Creating awareness on the dangers of environmental degradations. Carrying weekly campaigns, talk shows, drama and teaching students and pupils on environmental conservation, climate change and sustainable development through school clubs and permagardens.

Facilitating the enactment and development of stricter environmental laws and regulations in the lower and upper local governments.

Promotion of agroforestry as a form of livelihoods and other best practices in livestock keeping. Enhance the cultural institutions knowledge and capacity to administer judgement in local traditional cultural courts.

b. To tackle poverty, lack of alternative livelihoods and production skills:

Training the locals on alternative livelihoods and production skills through technical and vocational education on marketable skills especially among girls, youth, women and persons living with disabilities.

Training the locals on financial literacy and investment trainings through Village Savings and Loans Associations (VSLA), saving associations, credits and cooperative organizations (SACCOs) and Investment clubs.

Provisions of basic necessities like water points, access roads, power and strengthening government service delivery units like schools, health centers, sub counties and town council infrastructures and through capacity building trainings, financial and material support.

c. To tackle food insecurity:

Train farmers on climate smart agricultural practices. Establish small scale irrigation schemes in the communities most vulnerable to food insecurity. Train farmers on best practices in farming, management of pests and diseases, introducing, training and promotion of cultivation of fast maturing and drought resistant crop varieties. Training farmers on commercial crop production, post-harvest handling, market linkages and constructions of value addition facilities.

d. To promote enrollment and retention in schools:

Setup and maintain school gardens and perma-gardens and encourage resilient food production in school to provide continuous food supply to students and staffs.

Setup vegetable gardens to provide nutrients rich food stuffs to pupils and stuffs.

Carryout back to school and stay in school campaign to promote enrolment and retention in schools. This will create awareness on the values of education.

Provide bursary and scholarships for bright but needy persons to study and complete reasonable and professional standards of education.

Promote functional adult literacy teaching adults basic literacy and numeracy skills to promote these skills among adults. These will encourage parents to send and keep their children in school.

e. To tackle challenges of service delivery and corruption:

Train the local people especially the youth on governance and accountability mechanisms for the local lower and upper local governments. Train the local people on inclusion and gender practices. Provide financial and material support to institute service delivery infrastructures and facilities like latrines and water points among others in schools and health centers.

f. To tackle the challenges of peace and insecurity:

Promote peace talks and dialogues among the warring communities.

Organize and promote sport for peace tournaments among communities to promote inter communities' peace and harmony.

Create awareness on the importance of peace and development to the local people and their communities.

Task the government to provide security for its people, deploy security personnel on porous border with other countries and among the warring communities.

Carryout campaigns against harmful and degrading cultural practices like charging exorbitant prices in dowry, forbidding girls from going to school.

g. To tackle challenges of attitudes and mindset:

Carryout mindset and behavioral change campaigns through talk shows, advertorials, drama, community dialogues and debates on key mindset challenges.

h. To tackle challenges of water sanitation and hygiene (WASH):

Carryout WASH campaigns against open defecations, poor waste and water management. Carryout competition on sanitation and hygiene. Form and train water use committees. Construct water points and sources in vulnerable remote places. Strengthen healthcare and education institutions to deliver services.

7. Methodology of appraisal and implementation

The specific needs of every community is different; the project for each community will be identified through Participatory Rural Appraisal and Community Engagement as a mean of involving the local people in the design and further implementation of the project. This will promote local ownership and successful implementation of the project. The project will be implemented through trainings, workshops, visits, demonstration sites and incentivized actions.

8. Key project stakeholders:

These are people who will be involved in the project or will be affected by the project

a. Schools and institutions of learning

These will provide labor force, land and trainees for establishing school permagardens. Act as ground for teaching permaculture and regenerative agriculture for food security in schools and institutions of learning to school age going persons, staffs and the neighboring communities.

Universities might also play an important role in the project, as they could use the project as training ground to do research on

for example: eco-restoration, creating sustainable food systems, sustainable farming practices.

b. Local communities

Creating opportunities for local people, to create kitchen gardens and restore the ecosystem. Build of healthy communities and enroll them in the projects as stakeholders through community centered design approaches.

c. Grassroots organizations

Niche stakeholders ranging from regenerative organizations, startups, green and social entrepreneurs, small-holder farmers, eco-restoration organizations, humanitarian groups and likeminded organizations which emphasize on green transitions. One of the main stakeholders is the Ugandan Permaculture Consortium as collaboration partner.

d. Transnational networks

Transnational organizations and grassroots organizations and networks which focus on a green transition and would like to support the project through resources such as funding, tools, knowledge, practice, experience, management, design, development and other ways.

e. Lower and upper local government authorities

These will help in giving technical inputs, prioritizing where the project should be implement in their localities, help in mobilizing, training and creating awareness among the locals on the project.

f. Groups

These will comprise of youth, women and girls, persons living with disabilities and other vulnerable categories of people. They will be responsible for providing labor and workforce in carrying out the project activities.

g. Security personnel

These will provide security for the staffs and their property, help restrict movement in project sites among other things.

h. Government and public sector of Uganda

The Government of Uganda and the line ministries and parastatals will act as monitors in the implementation of the project.

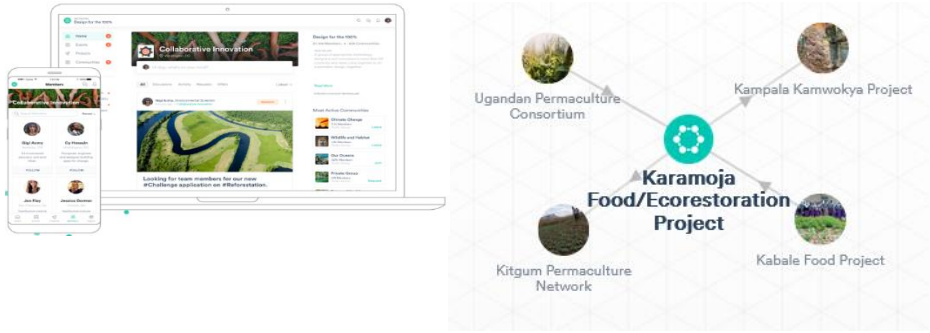
Uganda Wildlife Authority will provide access to restoration project sites in the protected areas and also monitor the implementation of the projects there.

National Environmental Management Authority and National Forestry Authority shall supplement the implementation of the project, provide technical input and monitor the implementation of the project in line with their mandate.

National Agriculture Research Organization. This will provide avenue for research in agriculture.

9. Technology HYLO

Hylo is a community-based platform that helps individuals, groups and networks to build community and also find solutions to the challenges of our era. Hylo was created to support people coming together to work on different challenges within the communities. Hylo's mission is to empower communities to build a world that works for everyone. The platform envisions a world where farmers can share resources, knowledge, and find solutions together, to create more just, resilient, and sustainable communities.



With the use of Hylo farmers will be able to share and get access to the much needed resources like seeds, tools, machines, that would otherwise not be readily, cheaply available to them. This requires the Place based community approach characterized by partnering, shared design, stewardship, accountability for impact and results.

Hylo is an open-source code platform which will provide the project with transparency and visibility. The interoperability of the platform contributes and creates open standards and protocols and work to integrate with as many existing platforms and networks. This gives the ability to tailor the platform to the exact needs and aims of the Consortiums projects.

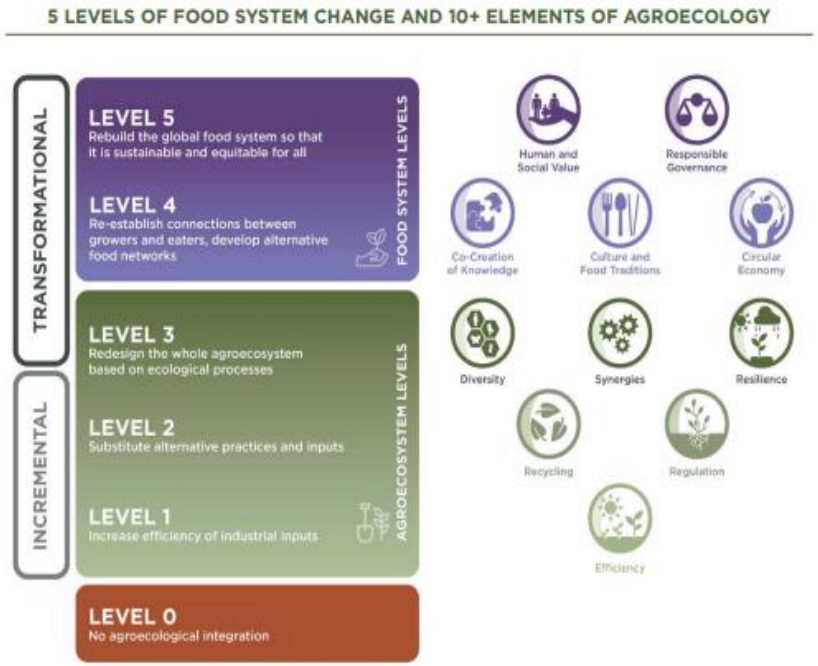
The use of technologies like Hylo in communities will provide opportunities for youths and young students in the tech field, the

youth will be beneficiaries of this technology directly or indirectly. The platform presents a rare and much needed aspect in our communities and can in combination with regenerative agriculture, be a tool to shift the interest to the younger generation fitting for our current technological era.

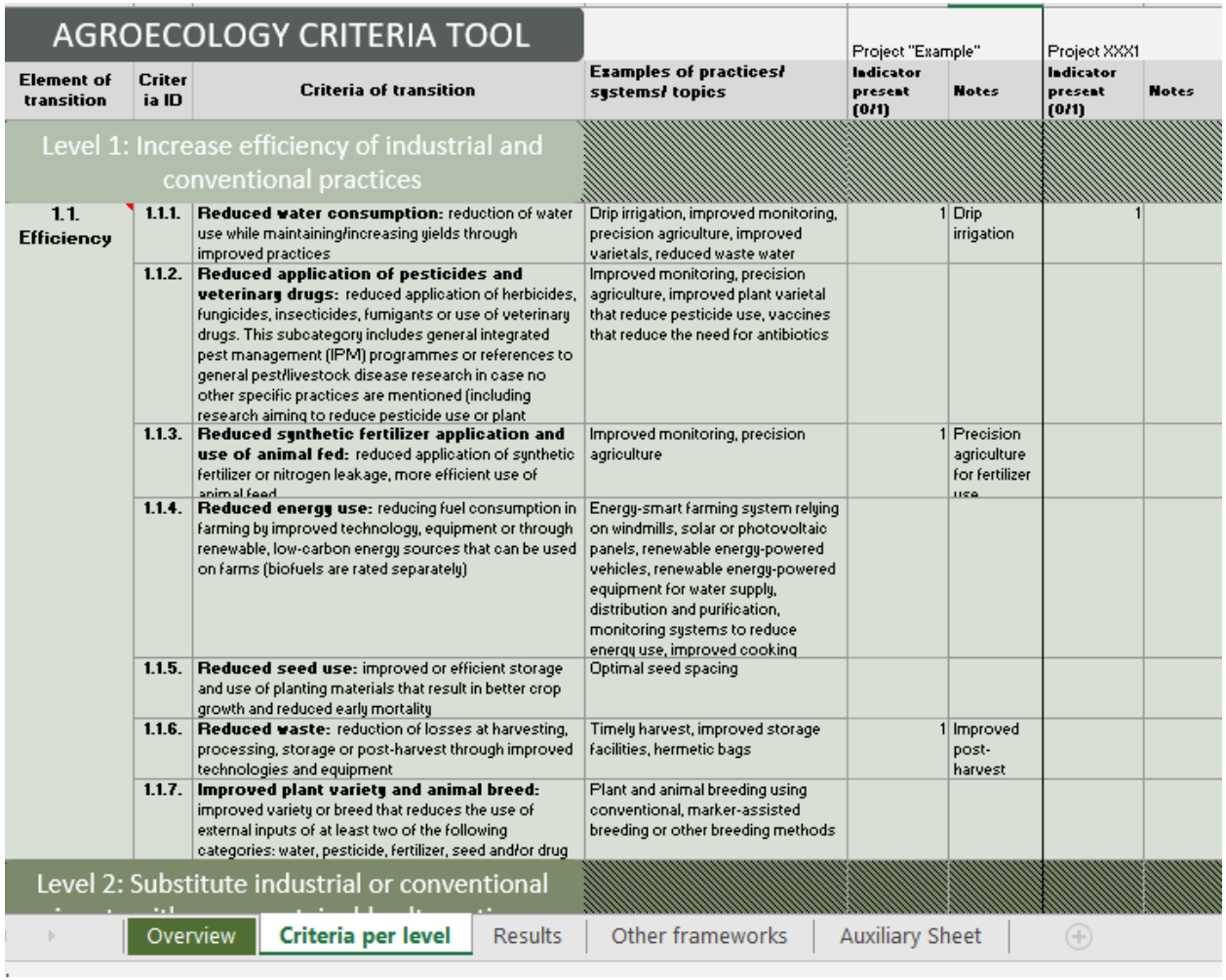
Source: https://www.hylo.com/

10. Impact Assessment through the Agroecological Criteria Tool

ACT enables the Consortium to analyze to what degree regenerative agricultural programs, projects, and policies support agroecological transitions. The ACT methodology is based on the analytical framework on the 5 levels of food system change and is embedded within the 10 Elements of Agroecology. This tool aims to assess a project, an initiative or a policy through the lens of Agroecology. The first three levels describe the steps farmers can take on their farms for converting from industrial systems to more ecological ones. Two additional levels go beyond the farm to the broader food system and the societies in which they are embedded.The ACT provides a structured way to identify the focus and agroecological character of a project, initiative or policy.



Using ACT in this way enables accountability, increases efficiency and can be used as a baseline to determine to what extent the project is supporting agroecological transitions through its regenerative agricultural efforts. As a monitoring and evaluation tool, ACT will be used to identify to what extent the Consortium is supporting various dimensions of agroecological change throughout the different projects. Beyond identifying activities, the tool highlights which levels of food system transformation the Consortium is engaged with and can be used to identify areas for future development.



AGROECOLOGY CRITERIA TOOL

Element of transition	Criteria ID	Criteria of transition	Examples of practices/ systems/ topics	Project "Example" Indicator present (0/1)	Project "Example" Notes	Project XXX1 Indicator present (0/1)	Project XXX1 Notes
Level 1: Increase efficiency of industrial and conventional practices							
1.1. Efficiency	1.1.1.	**Reduced water consumption:** reduction of water use while maintaining/increasing yields through improved practices	Drip irrigation, improved monitoring, precision agriculture, improved varietals, reduced waste water	1	Drip irrigation	1	
	1.1.2.	**Reduced application of pesticides and veterinary drugs:** reduced application of herbicides, fungicides, insecticides, fumigants or use of veterinary drugs. This subcategory includes general integrated pest management (IPM) programmes or references to general pest/livestock disease research in case no other specific practices are mentioned (including research aiming to reduce pesticide use or plant	Improved monitoring, precision agriculture, improved plant varietal that reduce pesticide use, vaccines that reduce the need for antibiotics				
	1.1.3.	**Reduced synthetic fertilizer application and use of animal fed:** reduced application of synthetic fertilizer or nitrogen leakage, more efficient use of animal feed	Improved monitoring, precision agriculture	1	Precision agriculture for fertilizer use		
	1.1.4.	**Reduced energy use:** reducing fuel consumption in farming by improved technology, equipment or through renewable, low-carbon energy sources that can be used on farms (biofuels are rated separately)	Energy-smart farming system relying on windmills, solar or photovoltaic panels, renewable energy-powered vehicles, renewable energy-powered equipment for water supply, distribution and purification, monitoring systems to reduce energy use, improved cooking				
	1.1.5.	**Reduced seed use:** improved or efficient storage and use of planting materials that result in better crop growth and reduced early mortality	Optimal seed spacing				
	1.1.6.	**Reduced waste:** reduction of losses at harvesting, processing, storage or post-harvest through improved technologies and equipment	Timely harvest, improved storage facilities, hermetic bags	1	Improved post-harvest		
	1.1.7.	**Improved plant variety and animal breed:** improved variety or breed that reduces the use of external inputs of at least two of the following categories: water, pesticide, fertilizer, seed and/or drug	Plant and animal breeding using conventional, marker-assisted breeding or other breeding methods				
Level 2: Substitute industrial or conventional							

Overview | Criteria per level | Results | Other frameworks | Auxiliary Sheet