REFOOTURE

from sustainability towards regenerative thinking

NAKURU LIVING LAB IN KENYA

Food system challenges and launch of the Nakuru Living Lab

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This report describes the challenges of the food system in the Nakuru County and presents the information on the official launch of the Nakuru Living Lab July 16, 2021.

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Contents

Introduction

This report is about the Nakuru Living Lab, facilitated by the Kenyan Egerton University and launched as part of the REFOOTURE project. This report first describes the identified challenges of the food system in Nakuru county. Consequently, goes into the positioning of the Nakuru Living Lab within this food system and lastly presents the key outcomes of the official launch of the Nakuru Living Lab on July 16, 2021.

1. The Nakuru county food system: current issues and opportunities for innovating toward RIFS

1.1 Introducing the Nakuru county food system

Nakuru county, found in the highlands of Kenya, is the centre of many economic activities. The county counts about 2.1 million people and covers 7495 km2. Agriculture is the main driver of the county's economy – about 70% of the land is arable and highly productive. The temperate climate creates favourable conditions for agriculture. Horticulture and dairy production are in the region and the fishery sector is growing extensively because of the available lakes. Nakuru has a large amount of high-end market consumers, with Nakuru's touristic places attracting substantial amounts of tourists as well as being a place where many Nairobi dwellers spend their weekend. The county has good transportation options, being located a few hours' drive from Nairobi and including railway transport and soon also an international airport. Furthermore, the county harbours Kenya's sustainable energy production, the Olkaria geothermal power station located near lake Naivasha. Agricultural production includes coffee, wheat, barley, maize, beans and potatoes, providing resources for processing companies in Nakuru and Nairobi (flour milling, grain ginneries). Dairy production, mainly by smallholder farmers, provides milk supply to various milk processors around the city. Several large retail supermarkets are based in Nakuru. Food sales go via both formal and informal channels.

1.2 Main issues in Nakuru County

30% of the Kenyan population is suffering from food insecurity and poor nutrition (Source). Food insecurity is widespread and is affecting the future of many children and youth in Kenya. This also is also the case for Nakuru county. Food insecurity is high because of small land sizes, high input and production costs and lack of capacity for value addition. Furthermore, there are also difficulties to find access to market and to avoid post-harvest losses. Food poverty rate of the county is about 30%. A large part of the population stays poor. New income generating activities would be needed to find a way out of the vicious circle of poverty and to be able to buy food, as was showed by the Nakuru county government.

There have been a lot of efforts to increase the productivity in African Agriculture. This is undergoing a change from extensive to intensive production over the past decades. The latter is characterised by increased mechanisation, mono-cropping and synthetic chemical use. Productivity is currently mainly affected by depleted soils, ecosystem erosion including collapse of soil structures, loss of micro-nutrients and crop genetic diversity and pollinators. These practices have culminated in soils up to 40% low in nutrient capital reserves, 25% suffering aluminium toxicity, and 18% with high leaching potential and low buffering capacity (Tully *et al*. 2015). Furthermore, there has been an increasing trend in the rate and extent of soil degradation. These problems of poor soil and soil degradation are also present in Nakuru county and are largely affecting the productivity.

Furthermore, land is increasingly being transformed into residential areas and there is hardly any control over it. The lack of land has resulted in dairy farmers depending on buying animal feed from outside the region, highly affecting the production costs. Due to the high production costs, Kenyan farmers struggle with competition of cheap Ugandan milk entering the local market. Geographical decoupling of feed and livestock production results in loss of nutrients at fodder production areas because local manure is not always used for fertilisation. In peri-urban areas there is little opportunity for applying manure and it is often disposed into the local environment, resulting in environmental pollution. Other issues are related to milk quality: contamination with foodborne pathogens, mycotoxins or antibiotic residues cause food safety issues. Enormous losses occur due to the inadequate quality of milk.

The horticultural sector and other agricultural subsectors struggle with small plot sizes, uncertain changes in water availability, driven by climate change. The substantial proportion of rainfed agriculture makes it vulnerable to climate change. Pests and diseases are also increasing risks for farmers, which are expected to increase further due to climate change. Food safety issues place another burden on the sector, mainly due to wrong use of pesticides. The horticulture sector is also struggling with overuse of fertilizers, having quite some proportions that end up in the waterflow, including the lakes. These lakes are affected with expanding infestation of water hyacinth, as for instance on lake Naivasha.

The fishery sector is growing significantly nowadays and is affected by risks of overfishing in certain lakes. New ways of collaborating to manage sustainable fisheries sector would be needed to benefit from this economic opportunity overall.

Kenya is emitting over 54,000 Gg CO2 equivalents. The agricultural sector is responsible for about 41% of the emissions and the LULUFC (37%) (UNFCCC, 2015). These emissions will have to be reduced in the following decade.

Climate change is already experienced in Kenya and is projected to continue in the future. Short rains are expected to become wetter by 2030. By 2060, both rains will be wetter and annual precipitation will increase by 13-19%. Average temperature is expected to increase by 1-3 degrees Celsius (Save the Children, 2012). However, the

weather conditions will not be the same for the whole area of Kenya. Some regions are expected to be more affected.

The farmers in Nakuru county have already shown to experience climate change as well as extreme events. Now, some lakes, including lake Nakuru are expanding, resulting in flooding a few months ago. Studies are taking place to explain the causes of the lake expansion. Surging lakes are displacing thousands of people, due to flooded houses.

Water scarcity and water quality. People in Nakuru county still must walk a distance to get access to drinking water. 21% of the population has immediate access to water. Over 70 % must walk less than 30 minutes to get access to water. Climate change is also affecting water availability. Now, there are issues about water quality in the lakes, especially lake Nakuru, affecting the quality and safety of the fish. Studies are taking place to assess the fish safety, but first results show that the fish from lake Nakuru is not safe due to industrial and sewerage waste being disposed in the lake, affecting the water quality.

The Country Development Plan shows that deforestation still takes place despite that this is illegal. Large areas of forest cover have been lost, affecting the water catchment and the available natural sinks for carbon dioxide. Deforestation is mainly caused by high demand for wood fuel and other timber products.

Nakuru county was also confronted with poor waste management approach but has recently cleaned up Nakuru's urban dumpsite. There is a need for more awareness on waste management and for expanding solid waste disposal sites to meet the growing needs of the urban population.

Energy provision is partly by electricity for lightening and firewood and charcoal for cooking. Other renewable sources are wind, solar and biogas. The county is also home of Africa's largest geothermal plant (CIDP). Issues with energy are power cuts and failure of energy provision, especially during rainy seasons.

Gender inequality and youth unemployment are pressing issues in the region. Many small farm households face the question that is framed as “to hang in, step out or step up” – to remain farming as they did but face increasing challenges, to quit farming and seek other livelihood, or to upgrade their farming methods. The inability of these small farms to produce a surplus result in a growing gap between demand and local supply, leading to increased imports of milk products. Over 70 % of the Nakuru county population is younger than 30 years. Many of them are confronted with unemployment.

Other issues in Nakuru county are related to lack of access to health facilities, illiteracy, unbalanced diets, poor road infrastructure, and poor drainage system, as well as too many severe traffic accidents, robberies and other security issues.

1.3 State-of-the-art: opportunities for innovation on regenerative and inclusive food systems in Nakuru county, Kenya

As the earlier section shows, there is a need for another way of food production, processing and consuming. Therefore, we aim to explore the opportunities for RIFS in Nakuru county. During the scoping study, existing RIFS practices were mapped, and we can cconclude that Kenya has many innovations on agricultural practices with the aim to improve productivity and food security. Regenerative and inclusive practices are taking place, but not at large scale and not throughout the food system. Also, they are not recognized as being 'regenerative'. Furthermore, inclusive aspects in agricultural innovation take place, though not in a systemic way and throughout the food system. This paragraph will dive into ongoing RIFS activities and will harness on lessons learned so far.

1.3.1 What RIFS activities are already taking place?

While regenerative and inclusive food system is not (yet) recognised as a term in Nakuru country, several regenerative practices can be found. Many of the interviewed initiatives aim to decrease impact on the environment, while some even aims to improve the environment and can therefore be considered as regenerative. The scoping study found that several regenerative practices and initiatives are already taking place in Nakuru region.

To improve soil fertility	• Use of legume crops (Desmodium, Lucern) and inoculants (biofix) in intercropping with food crops and fodder for nitrogen fixation, fertilizer, cover crops to control weeds and provisioning of fodder for livestock feeding • Soil testing to inform correct fertilizer application to check soil degradation • Agroforestry practice in fruit (mango and pawpaw) production. • Crop rotation and paddocking pastures to allow for regrowth of pasture • Organic fertilizer processed from human waste used in propagation of pyrethrum seedlings (Goodlife Global) • Tree nurseries and reforestation to save loss in forest cover
Biomass recycling	• Composting of crop residues and drying chick manure to use as organic fertilizer and as feed to ruminant animals and fish, • Biomass from waste used for compost making into fertilizer and feed to rear insects for animal feeds
Use of renewable energy sources	• Solar energy for water recirculation system to save water in fish farming • Use of solar energy in drying processing of tomatoes to save cost of energy • Biogas energy to save on using fossil fuel powered generator, wood fuel from forest and excessive cost of power supply

Water saving practices and practices to avoid declining water quality	• Drip irrigation to save water in vegetable production • Collection of plastics wastes to reduce contamination of water bodies and ground water • Exploring options to address high fluoride content in hotspring water

Practices and initiatives that encourage inclusivity	• Initiatives to improve youth and women employment:
	  ○ Income raising and job creation, through youth groups
	  ○ Government eased access to innovations and start-ups
	  ○ Reducing costs of access to inputs and services
	• Use of affordable and renewable energy sources
	  ○ Collective/cooperative approach in accessing markets
	  ○ Elimination of middlemen barriers in market access and price bargaining
	• Closing gaps between formal and informal markets:
	  ○ Empowerment of farmers in commercial potato seed production

Table 1: Regenerative, inclusive practices in Nakuru's food system

1.3.2 Learnings on innovation & living labs

While many innovations are taking place in the Kenyan agricultural sector, it is seen that they rarely reach the moment of scaling. Most of the time, it is about inventions from elsewhere that are applied in the Kenyan agricultural sector. For these inventions to be introduced, adopted and scaled, there is a need for complex interaction between different (f)actors, behavioural and social change. Rather than replicating the invention in a different situation, scaling requires an integrative and iterative process of finding out what works in one place and adapt these to another situation/location to ensure responsible scaling (Van den Berg et al, 2013). And many initiatives fail to do so. Therefore, rather than invention transfer, the pathway of inclusive innovation would be considered as having more potential to foster the food systems transformation (Klerkx and Coninx, 2019).

In Kenya, we observe already a strong evolution from top-down development projects, towards platforms and facilities to scale innovations. However, most of the times, the innovations are rather technologies that have been developed elsewhere and are transferred to the Kenyan context, which include a strong risk of failure because the technologies are not tailored to the specific Kenyan contextual characteristics. Secondly, we see many innovations supports that are oriented to financial support like the Water Finance Facility. Thirdly, many of these innovation support platforms and mechanisms are still found in Nairobi, capital city and are sometimes difficult to be accessed by entrepreneurs living in other regions.

We also explored lessons learned coming from earlier and ongoing innovations. The initiatives showed that:

Table 2: barriers and opportunities for innovation in Nakuru's food system

What hampers innovations	What would be needed to overcome/drivers for innovation	What are factors of success?
▪ Capacity to manage associated or inherent risks of the innovation ▪ Government regulations ▪ Lack of the right skills ▪ Cost of an innovation	▪ Enabling user testing of an innovation/experimentation ▪ Affordable and accessible credit ▪ Introducing competitiveness and rewards for the outcomes	▪ Good planning and communication ▪ Coaching and mentorship
▪ Reliable and trust in the input and output market services	▪ Identifying local champions to couch and mentor ▪ Ensuring incentives are clear for the innovations	▪ Strengthen farmer group institutional governance ▪ Build group capacity in resource mobilisation ▪ Build group capacity to raise visibility
▪ Limited knowledge of the market situation and investment decision making ▪ Poor corporate governance ▪ Inability to develop a workable business model	▪ Building resilience with willingness to learn and try new practices.	▪ Increased productivity ▪ Growth in membership ▪ Growth in income

While exploring living labs at the African continent, we observe that they have the potential to address Africa's socio-economic and developmental needs. In the African context, Living Labs have appeared primarily as outputs of action research with the key dimension of addressing challenges in relation to rural socio-economic development and sustainable quality of life (Cunningham et al., 2012). Living Labs Networks in Africa provide an important opportunity to collaborate, co-create, prototype and test new products and services, technologies, processes, business models or ideas.

Another relevant finding from literature is that the living lab fits to the Eastern African context and culture. Innovation spaces have gradually gained grip in African countries because of emergence in technology and growth in ICT entrepreneurship (Cunningham & Cunningham, 2016). Cunningham and Cunningham (2016) noted that the reality, in a developing country context, was that setting up and maintaining Living Labs was challenging and relatively expensive. The experience in Kenya is that most living labs fail before their aims are fully achieved, high rate of failure, thereby expected outcomes are not fully accomplished (Schumacher, 201.3; Veeckman et al. (2013). The failure can be attributed to poor project design and management (Ondiek and Monturi 2019). This explains why many Living Labs have proven to be unsustainable once seed or donor funding was no longer available.

The progress of the Living Labs is affected by various challenges. The most occurring challenges facing the living labs in Kenya are Funding (insufficient funding); Infrastructural (inadequate, slowness and poor maintenance); Technology (big gap between technology and education, slow internet connections); Design (poor communication, inefficiency, different criteria that do not use innovators profile, lack of programs for entrepreneurs); and Support (low government support, lack of awareness, outside interference from organizations).

The living lab should also consider the following do's and don'ts when fostering innovation:

Table 3: do's and don'ts by fostering innovations

The Do's	The Don'ts'
▪ Diagnose the priorities of the beneficiaries well priori, together with stakeholders ▪ Involve the target users of innovations at all stages from identifying the problem, evaluating workable options/innovations and validating is critical and ensure they have ownership ▪ Emphasis commercialization and entrepreneurship orientation ▪ Use external resources for kick starting initiatives and start implementing exit strategy early enough in the engagement with stakeholders	▪ Raising expectations high on external support to come

2. Shaping a Living Lab for regenerative, inclusive food systems in Nakuru region

2.1 Positioning the Nakuru living lab

The living lab is considered as a desirable organisational model in the region, mainly because it enables people in Nakuru region to design bottom-up solutions for the food system problems they meet. It supports the local co-innovation and co-creation processes and is therefore more preferred by the people themselves, compared to top-down approaches of many development projects.

The initiatives and stakeholders have been interviewed to explore the added value of the living lab. There is now a strong need for support regarding the following aspects:

- lack of technical capacity both human and technology
- lack of affordable quality inputs
- lack of raw materials
- support the scale of production
- improve weak corporate governance.

2.2 How can a Living Lab contribute?

… to RIFS

The scoping study was able to identify the regional issues that are present in the Nakuru region, which could be tackled via RIFS:

- Food insecurity and hunger
- Unsafe food
- High input costs
- Yield gaps
- Address soil acidity problem in Nakuru soils
- Restore degraded soils and soil infertility
- Fertilizer effluent in the (ground) water
- (Agricultural) Waste processing
- Water scarcity and water quality, in particular the high fluoride content of hotspring water
- High energy costs/non-renewable energy use
- Women and youth unemployment
- Lack of support to scale regenerative agriculture practices
- Climate change and poor environmental health of Nakuru region

The Living Lab can contribute by

- Co-creation of innovations that builds upon the existing regenerative and inclusive agriculture practices with potential for improving the social, economic and environmental benefits for the farming communities in Nakuru county.
- Co-creation of new innovations that improve food safety and food security while also positively contributing to the environmental issues like soil degradation, water scarcity, climate change, ...
- By providing new youth employment opportunities
- By providing source of incomes; more, healthier affordable foods and restoration of degraded environment
- Exploring opportunities that promote economies of scale (for instance through mass production and marketing) that will play a significant role in the Nakuru food system transformation

…to innovation

- Be a mechanism to enhance science-based bottom-up co-creation on RIFS innovations
- Through piloting and upscaling and for user testing of innovations to inspire confidence in innovations

- Providing or organising (seed) capital for innovation, may be competitively to install entrepreneurial thinking
- Facilitation of continuous skills development through research, training and reflection on experiences
- Design effective information sharing between the pilots and living lab initiatives

…to enhance the enabling environment

- Producing practice evidence informing policy direction and workable RIFS business models
- Lay the ground of a regional pathway for RIFS, designed by stakeholders in the region.
- A referral case and kick-starting the snowball effects of the innovations to the Nakuru community
- Forging and strengthening partnerships with other stakeholders (training institutions, local governments, financial institutions, input dealers and service providers, media) to create synergy and to support innovations that are expected to play a role in system transformation
- Identify for implementation **the conditions that** trigger and sustain co-creation in a LL built on RIFS.
- Provided coordination among stakeholders that play a role to enable innovations to play a role in food system transformation.

2.3 Desired living lab functionalities

The functionalities of the living lab were defined during the interviews with stakeholders and during the living lab design workshop. Table 4 lists all mentioned functionalities and needs, categorised according to the type of stakeholder: enabler, doer and thinker.

Table 4: Functionalities definition based on the needs of the Nakuru county enablers, doers and thinkers.

Enablers:	Doers:	Thinkers
▪ Improve, develop and implement policies and regulations that support the do-ers ▪ Capacity building of technical expertise ▪ Create synergies between ongoing initiatives to strengthen impact	**Knowledge** ▪ Support new research the pilots and practices to prove the benefits in terms of RIFS ▪ Develop technical expertise and building capacity needed for innovation	▪ Offer the doers and enablers: ○ Access to information ○ Skills and capacity building, to support innovation ○ Innovative ideas on technologies and new business ideas needed for them to achieve the aim of RIFS

▪ Resource mobilization via donors to find finances to support initiatives and the living lab
▪ Information and knowledge sharing to enable the development of bankable proposals for funding access
▪ Creating infrastructure to spur growth for the doers.
▪ Provide training and participatory research
▪ Funding research
▪ Training on finance and entrepreneurship
▪ Training of available products and technologies in true market that the doer can use to benefit them / achieve max productivity.
▪ Well-prices and quality product/services that will utilize available resources whose potential is untapped.
▪ Support market development and raise consumer awareness.
▪ Support horizontal and vertical integration
▪ Support expanding and scaling of businesses, for instance via market development.
	▪ Improve access to relevant information on RA, inclusive FS Technology
	▪ Create awareness among consumers and civil society on RIFS
	Inputs
	▪ Organise funds + capital resources
	  ○ Equity
	  ○ Grants
	  ○ Purchase of machines
	  ○ Credit accessibility / capital input
	▪ Provide quality inputs like seeds and breeds
	Outlets
	▪ Provide market support
	Enabling environment & partnerships
	▪ Partners 4 scale up to various locations
	▪ Properly working quality assurance mechanisms that guarantee safe products
	▪ Infrastructural development
	▪ Government support
	▪ Legislative support
	  ○ Regulation of import and export ag products to protect local markets
		Thinkers are supported:
		• Think more in a business way
		• To find required financial support for research and development

2.4 Who should be involved?

Doers

The scoping study has identified existing RIFS initiatives that are already taking place. These initiatives will be asked to be part of the living lab and will take up the role of doers. A brief introduction of the initiatives plus their needs is given in the table below. During the next phase of the project, these initiatives and their needs will be assessed more in-depth.

Greenthumb *Youth group CBO initiative*	Horticultural production and processing fish with organic spices using recycled water, affordable and sustainable energy via solar energy in recirculating and aerating water to enable higher fish stocking density with less water use; youth employment opportunities – affordable products. Need: Training farmers in aquaponics via demos. *Doers with* *Enablers: County government and IFAD.* *Thinkers: KEMFRI, IFAD, CTA for capacity building*
Wanyororo Dairy Cooperative *Farmer group initiative*	Collaboration at scale for access to input and output markets Farm waste for biogas though most were dysfunctional biogas plants Need: Collective aggregation of milk Pasture fodder production

	Doer role *Enablers: County government and IFAD and Project KAPAP* *Thinkers: Egerton University*
Ressect ***Private Virtual Platform initiative investment in bio waste business***	Building business on bio-waste management Produce high quality protein feed, organic fertilizer and manage organic waste in the environment Investment in mass rearing of black soldier fly larvae used to produce bio waste animal feeds Empowering pig, poultry and fish farmers by training on how to rear black solder fly used in digesting bio waste to produce protein for animal feed. Need: Mass rearing and marketing of Black Soldier Fly larvae Produce high quality protein feed, organic fertilizer and manage organic waste in the environment
	Doer role supported by A Swiss company *with* *Enablers: County government* *Thinkers: Egerton University*
Green vision ***Self-help farmer Group initiative***	Crop rotation to control bacterial wilt disease Training in sourcing fertilizer and pesticides for seed potato production Soil erosion control, Need: Seed potato production (apical bud cuttings); Training of farmers in seed potato production
	Doer role supported by *Thinkers: Egerton University, Baraka Agricultural college, Agricultural Development Cooperation*
Menengai CF ***CBO initiative***	Forest restoration with integrated crop and tree production Need: Integrated crop and tree production
	Doer role supported by *Enabler: Kenya Forestry Service and Community Development Trust fund* *Thinkers: Egerton University*
Lare-Njoro farmers ***Farmer group initiative***	Collaboration at scale for access to input and output markets Integration of crop and livestock mixed farming Feeding crop residues to animals Recycling animal manure as fertilizer Need: Pasture establishment, milk value addition
	Doer role supported by *Enablers: County government, Catholic Diocese of Nakuru (Mt Clara Mtakatifu), New Kenya Cooperative Creameries, Happy cow dairies* *Thinkers: Egerton University*
Grinncom waste management ***Self-help Group initiative***	Recycling agricultural waste into organic fertilizer Need: Organic fertilizer production from agricultural waste
	Doer role supported by *Enabler: County government*

Other doers that showed an interest in the Living Lab are:

- Seed savers organisation
- Hotspring SHG
- Unitport Youth Group
- Globe Gone Green Youth Group
- Veggies for Planet and People/IKEAF/WVC
- Karumumo Self-Help Group

Thinkers

Thinkers that are currently supporting RIFS practices and who will be asked for knowledge support, are:

- Egerton University, including the agro-science park (also in the role as enabler)
- KALRO: Has developed multipurpose variety of fodder crops used as cover crops, fodder trees and pasture grasses; Available affordable and accessible innovations for persistent challenges in food production
- World Agroforestry Centre
- Centre of Excellence crop rotation
- Wageningen University and Research
- ICIPE/CIAT
- Baraka Agricultural College: Educational and vocational experiential training in sustainable agriculture for knowledge and skills in application of regenerative principles in food systems; Farm and field demonstrations on intercropping, Zai pits, composting, cover cropping and forestry; Make innovation affordable, and sustainable
- Opening access to knowledge, skills and networks for regenerative food systems to farmers and youths

Enablers

The key enablers identified so far are:

- County government – department of environment and of agriculture
- National government
- Financial institutions that support food systems innovations
- NGO's like SNV, GIZ, Danida, World Food Programme

The living lab will be composed out strong local entities to coordinate the multi-stakeholder platform and lay the foundations for the Living Lab like:

- Egerton University, located close to Nakuru town, having extensive expertise regarding agriculture.
- COELIB, Centre of Excellence in Livestock Innovation and Business, aiming to incubate businesses and innovation.
- different dairy processors in the region (Brookside, nKCC, HappyCow).
- CUTS Consumer Unity & Trust Society which focuses on food quality
- County government

3. Kenya: Nakuru Living Lab, officially launched July 16, 2021.

The first Food Systems Innovation Platform that was launched was the Nakuru Living Lab, on 16 July 2021, at the Amani Conference Centre. This launch was a major achievement for the Nakuru team and for the REFOOTURE project. The event was streamed to make sure people from other regions, including the Netherlands, were able to follow. The event was attended by 62 people that were physically present and about 10 people that attend online.

3.1 Programme

Time	Event	
	Introducing the Nakuru Living Lab	Bebe, Jochen
	Video power messages from the innovation cases *Regenerative and inclusive practices, co-creation, business models* 1. Green Vision 2. Hotspring 3. Greenthump 4. Greencom 5. Ressect 6. Lare Dairy cooperative 7. Wanyororo Dairy cooperative *8.* Menengai Community Forestry Association	Prerecorded videos
	Interview dialogues about Living Lab Facilitation 1. Prof Paul Kimurto (Innovation opportunities) 2. Grace Karanja (Waste Management Policy in Nakuru) 3. Alfred Mutua (Financial Products) 4. Dr Geofrey Kamau (Building sustainable innovation platforms) 5. Director Fisheries (Youth in Aquaculture business)	Virtual and physical high pitches and interviews

	Health Break	
	Inspirational innovation stories 1. Elizabeth Kamau (Inclusive food systems) 2. Eng Musa Njue (green agricultural machinery) 3. Cyrus Mbugua (Consultant Circular cities) 4. Dr Mutai (institutional innovation: SUKA cooperative) 5. David Ruhiu (Aquaculture entrepreneur) 6. Dagmar Brahmaar (Rumen8 feeding innovation) 7. Joel Masobo (Queen bee rearing innovation)	Event master Virtual
	Awards presentation 1. Nakuru Living Lab Logo design 2. Voted most inspirational innovation case initiatives	Event master
	Closing remarks • Doer Representative • Thinker Representative • Private sector • Nakuru County government official	
	Dr Immaculate Maina (County policy of food systems)	

The launch of the Nakuru Living Lab by Prof. Bebe Bockline.

3.2 Livestream

https://www.youtube.com/watch?v=pIw8KPnLnPg

https://www.youtube.com/watch?v=gS_0oHdEfMQ&t=188s

3.3 Innovation agenda and innovation cases

At the core of the Nakuru Living Lab is the Innovation Agenda. The Innovation Agenda present the topics for innovation in the scope of the living lab:

INNOVATION TOPIC	**RELATED PRACTICES**
Improving soil fertility	• Use of legume crops (Desmodium, Lucern) and inoculants (biofix) in intercropping with food crops and fodder for nitrogen fixation, fertilizer, cover crops to control weeds and provisioning of fodder for livestock feeding • Soil testing to inform correct fertilizer application to check soil degradation • Agroforestry practice in fruit (mango and pawpaw) production. • Crop rotation and paddocking pastures to allow for regrowth of pasture • Organic fertilizer processed from human waste used in propagation of pyrethrum seedlings (Goodlife Global) • Tree nurseries and reforestation to save loss in forest cover • Using herbicides both at land preparation stages and weeding to reduced/minimized soil disturbance
Biomass recycling	• Composting of crop residues and drying chick manure to use as organic fertilizer and as feed to ruminant animals and fish, • Biomass from waste used for compost making into fertilizer and stick feed to rear insects for animal feeds
Use of renewable energy sources	• Solar energy for water recirculation system to save water in fish farming • Use of solar energy in drying processing of tomatoes to save cost of energy • Biogas energy to save on using fossil fuel powered generator, wood fuel from forest and excessive cost of power supply
Water saving practices and practices to avoid	• Drip irrigation to save water in vegetable production • Collection of plastics wastes to reduce contamination of water bodies and ground water

declining water quality	

Practices and initiatives that encourage inclusivity	• Initiatives to improve youth and women employment:
	  ○ Income raising and job creation, through youth groups
	  ○ Government eased access to innovations and start-ups
	  ○ Reducing costs of access to inputs and services
	• Use of affordable and renewable energy sources
	  ○ Collective/cooperative approach in accessing markets
	  ○ Elimination of middlemen barriers in market access and price bargaining
	• Closing gaps between formal and informal markets:
	  ○ Empowerment of farmers in clean quality potato seed production

There were already several innovation champions in Nakuru county that were active with regards to these key topics. The Nakuru Living Lab has aimed to support these innovation champions in order to enable them to grow and to bring their innovations further. These 8 innovation cases are:

i). Wanyororo Dairy Cooperative

Wanyororo Dairy Farmers' Cooperative Society started in 2009 with 30 farmers and has grown to 203 members in 2016. Dairy production is practiced in the semi-urbanized area, within 20km of the city of Nakuru. Farmers are mixed smallholder farmers producing crops (e.g., maize, beans and other legumes) and dairy, under both intensive and semi-intensive production systems.
Wanyororo Dairy Cooperative aims to introduce quality added-value products (flavoured yoghurt, thick yoghurt, mala, cheese) to the urban market under the registered trade name 'Nakuru Fresh'. The cooperative is at a tipping point to become a success; the necessary equipment is available, though challenges in production (feeding and housing), animal waste management and cooperative governance hamper further development.

Innovation goal

To create a sustainable dairy enterprise that generates income for farming households while promoting use of green energy and improving soil fertility

Innovation agenda

Soil fertility enriching and restorations
Renewable energy
Biomass recycling

Water saving
Institutional innovation
Inclusion for equitable livelihoods

RIFS orientation: Nutrient quality for soil, livestock and human

ii). LARE-NJORO FARMERS' COOPERATIVE SOCIETY

The LareNjoro Farmers' Cooperative Society was established in 2016 to enable small-holder farmers pull resources together towards enhancing livelihoods and wellbeing of membership from dairy farming. It has a membership of 137 (84 males and 53 females) out of which 20 are youths between the age of 18 years and 35 years. The coop society were beneficiary of WOTRO funding implemented by Egerton University and WUR. The Cooperative is investing resources in dairy development for milk production, value addition to increase sales and improve living standards for the membership.

Innovation goal

To grow a sustainable and profitable dairy enterprise that empowers farmers to increase productivity, value addition, and product sales to expand income streams for memberships

Innovation agenda

Soil fertility enriching and restoration
Renewable energy
Biomass recycling
Water saving
Institutional innovation
Inclusion for equitable livelihoods

RIFS orientation: Nutrient quality for soil, livestock and human

iii). GREENTHUMB CBO

Greenthumb Community Based Organization is a Youth group started in 2014 to create sustainable employment for youth who have passion for agriculture. The group currently has 10 members, and the membership criterion was pegged on an individual being involved in an agricultural activity. The group identifies suitable investment opportunities in agriculture and assigns responsibility to group members to group members to manage the investment and report to the group. The group is currently involved in aquaculture as well as in value addition activities (Bakery). The group has also benefited from funding opportunities from donors through competitive proposal writing.

Innovation goal

To grow a sustainable and profitable agro-enterprise that promote use of green energy and improve soil fertility to generate income for youth membership

Innovation agenda

Renewable energy
Soil fertility enriching and restoration
Water saving and quality preservation
Avoiding chemical use in crops
Inclusion for equitable livelihoods

RIFS orientation: Renewable energy and Nutrient quality for soil and human

iv). RESSECT

Ressect is an innovation platform with the drive on waste management that has two major products from the organic waste. The waste is used for black soldier fly for the production of black soldier fly larvae. The larvae have gained popularity as a cheaper source of animal protein used for the feeding of livestock and fish rearing. The second by product of the process is organic fertilizer with enormous potential for soil amendment and improvement of nutrient status.

Innovation goal

To grow SMEs on organic waste management solutions by processing affordable, alternative protein sources for animal feeds and an organic fertilizer

Innovation agenda

Biomass recycling
Livelihood and dietary (livestock) diversification
Soil fertility enriching and restoration
Inclusion for equitable livelihoods

RIFS orientation: Biomass nutrient recycling for soil and livestock

v). GRIINCOM SHG

Griincom community self-help group is active since 2015 and has eleven members, two gentlemen and nine ladies. The land around pipeline and MzeeWanyama area was fragmented into plots for people to settle. People were living in the small plots together with livestock especially dairy and poultry, waste management became an issue. Griincom worked on a solution to bio waste management, by producing organic fertilizer, foliar fertilizer and a natural pesticide. By so doing the human conflict that had started to heat up

was cooled down and the environmental pollution contained both from air pollution and decomposition gases. The innovation case is now aiming to scale up and out successes, to bring their activities and impact further.

Innovation goal

To add value to animal bio-waste by processing organic manure products to address pollution risks and social conflicts over waste and to open up income opportunities for women and youth in the peri-urban slums

Innovation agenda

Biomass recycling
Livelihood and dietary (livestock) diversification
Soil fertility enriching and restoration
Inclusion for equitable livelihoods

RIFS orientation: Biomass nutrient recycling for soil and livestock

vi). HOTSPRING

The Hot-spring Youth Group took to environmental conservation through tree seedling production and a forestation targeting the hot-spring catchment area. They got impressed with the progress and made a decision to start a fish farming project with partial sponsorship from the national government through economic stimulus programme (ESP) of 2009.The Hotspring youth group innovatively and deliberately ventured into aquaculture by excavating 38 fishponds to stock with the tilapia fish species. The area is semi-arid erratic and scarce rainfall, which worsens food security situation. Introducing a diversity of food enterprises was envisaged would improve the food and nutrition security situation by minimizing the overdependence on crop-based foods besides the spill over benefits.

Innovation goal

To conserve hot spring catchment area through a forestation and enhance household food security situation through diversification into fish farming with the involvement of youth and women

Innovation agenda

Ecosystem, biodiversity and landscape preservation and restoration
Livelihood and dietary (human) diversification
Soil fertility enriching and restoration
Inclusion for equitable livelihoods

RIFS orientation: Ecosystem and biodiversity restoration and preservation for the community

vii). Menengai Community Forest Association

Menengai Community Forest Association is an umbrella body in which members carry out different economic activities within the forest. It draws its membership from the community living 5km radius of the forest. Their vision is conservation of the Menengai forest while utilizing the non-timber forest resources to exploit economic opportunities. There are diverse groups within the community. There used to be a lot of discussion on cutting of forest for charcoal. By focusing on positive aspects of production and conservation in that area, the discussion can be turned into a positive direction. Through Kenya Forest Act – community is to conserve the forest. Main partner is Kenya Forest Service. Bee keeping (received hives from KFS).

Innovation goal

To conserve Menengai forest ecosystem while using the non-timber forest resources (seed bank, seedlings, honey, soil, medicinal herbs, pasture) for livelihood gains

Innovation agenda

Ecosystem, biodiversity and landscape preservation and restoration
Livelihood and dietary (human) diversification
Soil fertility enriching and restoration
Inclusion for equitable livelihoods

RIFS orientation: Ecosystem and biodiversity restoration and preservation for the community

viii). GREEN VISION: seed potato production

Green vision is a group of 16 smallholder farmers located in Elburgon, Nakuru County. The group was started in 2012 with the aim of environmental conservation. This entailed establishment of tree and fruit seedling nursery for sale. In 2017, the group ventured into seed potato production. This was necessitated by low seed potato production and challenging bacterial diseases. The unavailability and the excessive cost of clean seed motivated own seed production.

Innovation goal

To grow a commercial seed potato enterprise producing quality seed potatoes using regenerative and inclusive practices

Innovation agenda

Renewable energy
Soil fertility enriching and restoration
Water saving and quality preservation
Avoiding chemical use in crops
Inclusion for equitable livelihoods

RIFS orientation: Renewable energy and Nutrient quality for soil and human

3.4 Location of office

Egerton University Campus

3.5 Communication channels

Website: Nakuru Living Lab – Nakuru Living Lab https://nakurulivinglab.org/

Youtube: Nakuru Living Lab - YouTube

Facebook:
https://www.facebook.com/profile.php?id=100070653025151&sk=photos

Linkedin: https://www.linkedin.com/in/nakuru-livinglab-bb0715217/

Twitter: https://mobile.twitter.com/nakuru_lab

Media appearance/Free Publicity

- ⇒ *Kilimo News:* @KilimoNews drafted an article on the Launch. Link to the story: https://kilimonews.co.ke/counties/living-lab-launched-in-nakuru/
- ⇒ *Nakuru County Government Official*: They did a Facebook post on the event.
- ⇒ *Nation Africa*: They did 7.13 minutes video clip on the YouTube channel. The clip has 119 views. Here is the link: https://www.youtube.com/watch?v=gS_0oHdEfMQ&t=221s

Social Networks	Facebook	YouTube	Linkedin	Twitter
Followers/Subscribers	65	14	5	5
Posts	18	10	3	3
Reach/Views	1397	591		6
Clicks (Likes/Share)	25	16	6	38
Comments	5		2	18

3.6 Opportunities and areas of collaboration/partnership

	Focus area	Opportunities	Partner
1		• Welcome proposal and ideas for 2022 -2027 County Integrative Development Plan • Devolution Conference for various counties (August 2021)-open to submission from young innovators and academia to showcase their innovation during the conference e.g., Griincom developing organic fertilizer • Open to sponsorship and partnership with young innovators and academia in the areas of crops science and livestock • Policy formulation and structure development in financial and environmental enablers	**Public --**Nakuru County. Agriculture, Livestock and Fisheries (CEC Dr I. Maina)
2	• Trade-offs and Training with NEMA and Ministry of Environment • Acquire pieces of equipment on behalf of the communities e.g., Shredders for waste management • Reduction of costs (Tipping charges) • Good environment for conducting business	• Hold more Education and Training on waste management. • Technological advancement and green energy resources • Identify environmental champions for climate change	**Public --**Nakuru County. Environment and Waste Management (Kelvin Nderitu, representing Director)
3	• Young engagement in aquaculture farming and process	• Partnership in production of Black	**Public -** -Kenya Fisheries Services (Paul Mumina)

	• Collaborate with Learning institutions/centers through training and educating of the youth • Development of aquaponics in the educational center (Primary & Secondary schools) • Select key representatives in the various region for aquaculture	Soldier fly for waste management • Collaborate in marketing and access to fish feeds • Collaborate and partner in training and building capacity for the farmers' groups • Formation of lucrative marketing platforms for farmers production	
4	• SDG2 -Zero Hunger through better production, nutrition, environment, and life • Promote enabling environment for better production • Inclusive value chains and food systems • Resilient and inclusive food systems and livelihood • Natural resource management	• Currently Developing the Country Programme Framework (Strategic plan) for 2022 -2027, open to ideas/proposals that shape and be included in this framework. FAO is willing to partner and collaboration in the areas of inclusive, resilient, and sustainable food systems. • Open to ideas/proposals for the UN Food system summit that will be happening in September 2021. • Open to proposals in Fisheries/Aquaculture business development, through their existing program run in partnership with WFP	**International partnership--**Food and Agriculture Organization (Elizabeth Kamau)

		• Offer support to Capacity building and Knowledge sharing	
5	Financial products	• Develop business plans and proposals for financial support for the expansion of their enterprises • Create MoU with the Living Lab for farmers/individuals to get loans at friendly interests	**Financing institutions** - Faulu-Kenya Bank (Florence Njeri)
6	• Promotion of innovation in agriculture (move away from convention into new methods) • Partner with CBOs, Youth, and women to ensure organic farming • Promote export market through organic farming • Provide financial support through loans to green agriculture • Capacity building to graduates in environmental and waste management courses for the green agriculture projects	•	**Financing institutions -** Agriculture Finance Corporation (- Joshua Achieng)
7	•	• Develop a Nakuru Circular economy roadmap	**Private sector -** Circular Cities (Eng. Cyrus Mbugua)

		• Circular vision and strategy through innovation, summits, and training • Collaborate with other counties, institutions, and players outside the agricultural sector towards an innovative, resilient, and inclusive food system. (E.g., NAWASCO, Ministry of Trade, Transport, Hospitality sectors) •	
8	• Need to change of mindset • Need for good facilitation • Transparent leadership • Ownership by local stakeholders through involvement	• Partnership by bringing together partners for funding of different projects • Shared Experiences and knowledge sharing • Deliberate institutional arrangement to work with Nakuru Living Lab	**Research –**Kenya Agricultural Research organization (Dr. Geofrey Kamau)

3.7 Awards

Among the objectives of the launch event was to create publicity for the event as well as the Nakuru Living Lab and the activities of the innovation cases. To achieve this, two competitions were initiated, that is: i) a logo design competition and ii). a video challenge for the eight initiatives.

3.8 Logo design for the Nakuru living lab

The competition was open to all, and competitors had the liberty to present more than one entry and were given creative freedom. The design was expected to create a visual identity of the Nakuru living lab that also captures aspects of sustainable agriculture (people, profit, planet) which embed regenerative and inclusive food systems. The terms and conditions were that the winning logo would become the property of the Nakuru living lab with all copyright of use of the design. There were 19 entrants with multiple entries. The selection panel consisted of the Nakuru living lab team. The winning logo was picked, and the designer requested to make some adjustments. The accepted logo was as appears hereafter;

This logo additionally retained Egerton University's corporate identity in its colours.

The overall winner was Mark Nderitu and IT student at Kenyatta University with a cash award of 125 Euro. The runner-up and the 2nd runner-up were Steve Muturi (From Karatina in Central Kenya) and Kelvin Chege from Nakuru who each won 16 Euro. They were all awarded certificates for their designs.

3.9 Video challenge for the living lab innovation cases

All the 8 innovation cases were asked to create a video that articulates their group membership, vision, their challenges that hinder them achieving their vision and what partnerships they would be seeking to help them achieve their objectives. The innovation cases sent out a common online invitation for the launch event on various social media platforms. The videos and a voting link were uploaded on the invitation.

The public were asked to vote for just one video that best described to them an innovation (product/ technology/ practice/service) that:

a) Is a relevant solution to a growing concern about our planet, people or profit

b) Is highly likely to deliver tangible and intangible benefits to the society

c) Best articulates how the society will earn tangible and intangible benefits

d) Clearly identifies the partners they need to work together with to solve concerns in food production

The winner of the contest was Greenthumb Community Based Organisation (38%) followed by Ressect (36%) and third, Greenvision self-help Group (17%). The winning innovation cases each received a certificate. Greenthumb CBO will also receive a technical training package based on their capacity needs.

3.10 Outcome and lessons learnt

The two competitions stimulated a lot of interest from people in diverse fields and were able to create the publicity we desired. It was however noted that the invitations went out late and would have drawn higher participation if they had been sent out earlier.

Annex 1: The list of attendance to Nakuru Living Lab Launch

Amount	Organization
2	AFC
3	APA insurance
3	CGN
1	Circular cities
6	Coelib media
11	Egerton
1	FAO-Kenya
1	Faulu bank
3	Greenthumb CBO
3	Greenvision
3	Griincom
3	Hotspring
1	KALRO -Lanet
3	Lare-Njoro FCS
1	Media
3	Menengai CFA
1	MESPT
2	MoALF
2	Nakuru Living lab
1	Nation media group
2	Ressect
3	Wanyororo Dairy
2	WUR