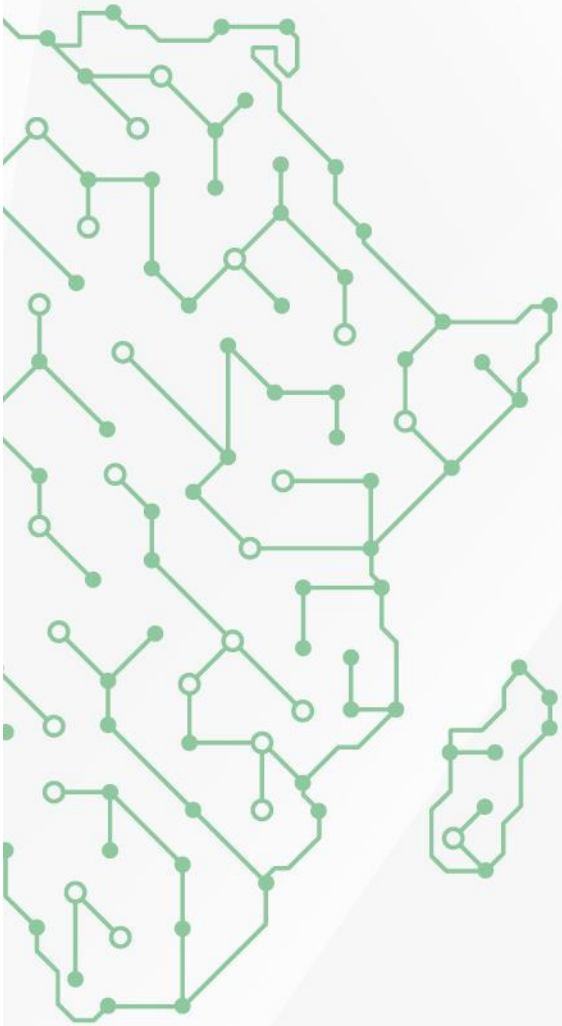
INCITIS FOOD



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21	**African Rural and Agricultural Credit Association**	**AFRACA**	**Kenya**
22	**BEN-GURION UNIVERSITY OF THE NEGEV**	**BGU**	**Israel**

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Food systems analysis for circular technologies in aquaponics, hydroponics, RAS and insect farming

1 Introduction

The InCiTiS project develops scientifically underpinned circular agri-food technologies and practices suitable for African cities. The context specific socio-technological use cases address the prevalent deficiency of animal sourced foods, vegetables and fruits. The Covid-19 pandemic has taught us that there is an increasing urgency to create more local available healthy food alternatives. InCiTiS meets the challenges of providing African citizens with affordable, safe and nutritious food in a more equitable system through integrated circular technologies.

The food systems analysis evaluates the peri-urban food system, protein intake of the citizens, the sustainability and resilience of businesses to provide safe, diverse, healthy and affordable food to all people in a human rights-based framework. It integrates 6 categories of guidelines ranging from governance, sustainable diets and nutrition, social and economic equity, food production, urban-rural linkages, food supply and distribution and food waste reduction and management. The analysis serves a dual purpose. It tests the hypothesis that African food systems are characterized by a current shortage of protein rich healthy food and thus provides reasons for living lab interventions and it maps the landscape of food providers and consumers to help identify bottlenecks and challenges that can be addressed by the living labs.

Hydroponic, aquaponics, RAS and insect farming hold great promise because they require limited land, water, energy, wealth and reduced waste. Hydroponics and aquaponics infer soilless, circular vegetable and fish farming enterprises with major implications for the livelihoods of small scale farmers (including women and youth), entrepreneurs, businesses in the various sub-sectors, market players, as well as rural and urban consumers. The sector has been identified as a critical component for mutual learning between the European and African business and science community.

The 8 local living labs, which are currently in its start-up phase, address local needs regarding animal proteins and vegetables. To realize the full potential of the living labs individual actions, these activities need to be embedded in a larger framework to strengthen relevant agri-sectors, not only in the production areas and markets where they operate, but also for sector governance and the creation of an enabling environment. In this regard, conducting a rapid assessment of the relevant sector actors is believed to be the first stepping stone in this EU-AU research innovation action. Its purpose is to gain a better understanding of the challenges; engage with partners in transforming these challenges into ambitions that contribute to sector transformation; reinforce their relationships with relevant stakeholders; inform local and regional stakeholders in this process of strategic development and embed the LL actions in the cities' peri-urban food system.

The food systems approach is increasingly used as an interdisciplinary conceptual framework to better understand transitions in the supply of healthy food, sustainable resource use and social inclusion. Moreover, food systems are widely used to drive sector transformation in agri-food and is closely linked to food security and nutrition, socio-economic and environmental outcomes (Borman et.al 2018).

Rapid assessments have been developed and used by WUR since May 2020 in collaboration with partners across Africa for different purposes, such as providing valuable insights into how the COVID-19 pandemic affected the functioning of various agri-food sectors and in evaluating the consequences of the Ukrainian grain crisis for African countries. (@sources). The rapid assessments result in concise, actionable documents referred to as 'Alerts' (e.g., Ethiopia sesame alert, Rwanda horticulture alert, The series of rapid assessments can be accessed through this link.) that can be taken up upon to prioritize action and inform and guide public and private stakeholders on collective action in the living labs. For the purpose of this project, the rapid assessment methodology is adjusted towards the peri-urban food systems context and the relevant aquaponics, hydroponics, RAS and insect farming sector stakeholders.

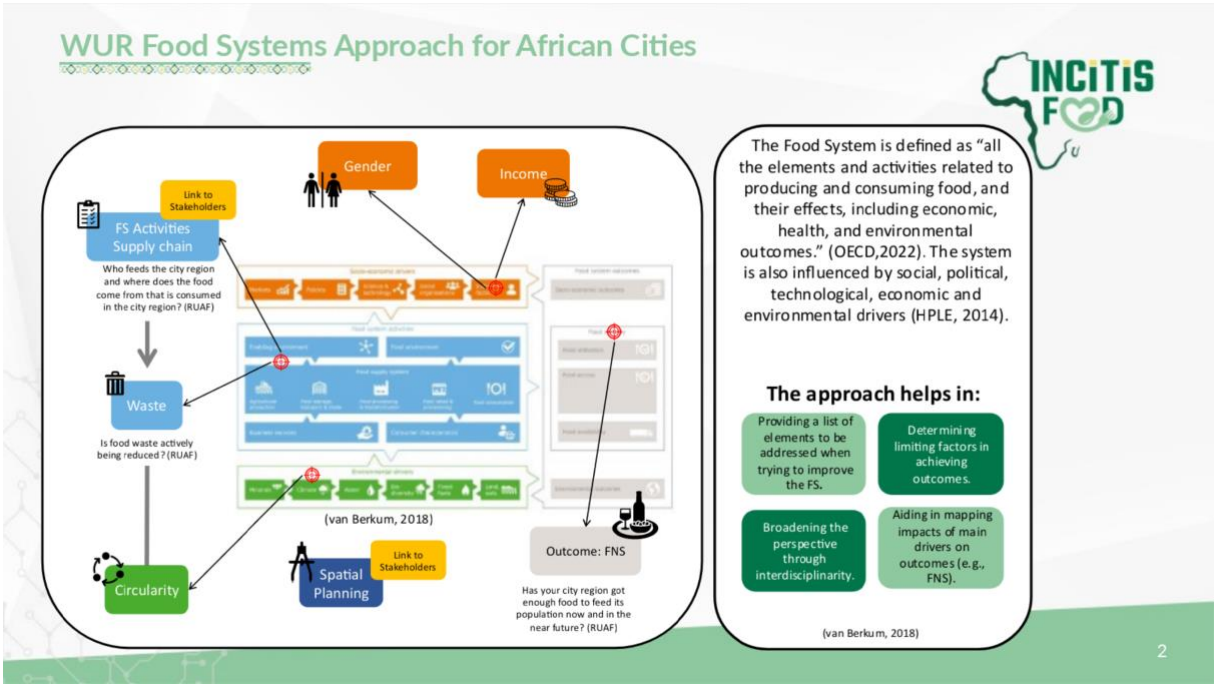
2 Methodology

A. Defining boundaries and institutional settings

For each city living lab and production area, the leading project partners, in collaboration with WUR, define the most appropriate institutional setting for conducting the rapid sector assessment – i.e., which organization/institution is best positioned to 'host and own' the assessment process. There should be clear linkages to a formal or informal producer or market association, a cluster or aggregation of producers and companies; depending on the situation, local governments or NGOs concentrating on vulnerable groups should also be involved. This step results in defining the boundaries for conducting the rapid sector assessment, in terms of crops, animals, markets and geographical coverage in the city. It requires therefore the involvement of WUR and partner organizations, including the local living lab lead. This step sets the scene for the living lab enabling environment. If the links to producers/farmers, producer organizations, aggregations of producers, markets and/or platforms are not viable, the partners may consider diverting to another geographical or production area.

B. Defining sector activities and designing the survey

The methodology for the rapid sector assessment uses the integrated sector and food system framework (Figure 1).



A brainstorming session is held by the assessment team, which includes some key sector experts, experts on gender and informal sector approaches and key local informants with an in-depth knowledge of the local peri-urban food system joint in an export platform. During this session, sector activities are identified. The team assesses the sector's performance in terms of sustainability, competitiveness, transition to healthy diets, sustainable resource use, circularity and social inclusion. The resulting questions are then transformed into a survey questionnaire, guided by - but not necessarily structured along - sector activities. The survey questions link and rate each activity to the living lab activities. Responses range from 'severely negative performance' to 'highly positive performance', including 'neutral in terms of performance'. Respondents can also indicate if a question is not applicable, or if they are unaware of the impact. The survey should comprises a max of 30 questions in total, of which no more than 20 questions should be selected for each stakeholder group. A detailed logic is being developed regarding the questions given to each stakeholder group.

Since the project was developed during the Covid pandemic, all activities will take place in online /hybrid meetings.

C. Establishing a panel of experts

A panel of 10 to 25 experts and respondents is established to validate the survey and interpret the results. The panel comprises relevant stakeholders representing local producers and local influencers of informal settings, producers, private sector actors, including input supply companies, processors, traders, exporters, commercial service providers, financial intermediaries; research and educational organizations, civil society organizations and (maybe) development organizations. The living lab lead plays a critical role at this stage in ensuring the proper composition of the panel. A minimum of six people from each stakeholder group are included in the panel, allowing for an adequate degree of representation. The geographic and sector distribution of the experts (relevant production area) can be taken into consideration. For example, if two distinct producer groups are considered as sub-groups within a production area, subsampling by stakeholders covering two groups is included in the design, creating further options to gain insights into geographic variations among the responses.

	Total	female	male	<35
Commercial farmers				
Processors/ marketers				
Extension officers				
Financial intermediaries				
Research				
Smallholder producers				
Informal local influencers				

D. Running the survey

The project coordination would like to use students for running the rapid assessment surveys. Students receive information on the rapid sector assessment through the leading organization and its partners. Subsequently, the leading organization shares a link to an online survey questionnaire, which respondents can fill out either on a smartphone or on a different device. The software allows for adaptation of the questions to the stakeholder profile of the respondent. In case of no internet access, the survey can also be conducted by telephone interview. For the software to run, only downloading of the survey is necessary after which surveys can be answered and stored offline. Completion of the survey takes a maximum of 15 minutes. The survey is managed online by WUR, which also provides the leading organization with the link. The team can monitor the number of participants as well as each participant's response in real time. The survey is open for a limited period - from 48 to 96 hours.

E. Analysing data, developing a dashboard, and identifying key challenges

The results of the survey are processed, transforming the level of impact into numeric scores; for each question, the frequency of the various scores is calculated. This is complemented by the calculation of a stakeholder-weighted average score, meaning that the average score of respondents in each stakeholder group is computed, and subsequently the average of the stakeholder group concerned is calculated. Considering that the number of respondents is not equal for each stakeholder group, it is important that each stakeholder group and not each respondent is given an equal weight in the calculation of the average score. The WUR and LL lead team then develop a dashboard based on the outcomes of the survey (colour coded "heat map"). Where possible, questions and responses are grouped together and structured along sector activities, allowing for the dashboard to give an overview of the situation. The results presented in the dashboard are based on

individual questions and topics, and inform the identification of challenges. Questions with many respondents indicating a high negative performance are identified and grouped into specific challenges. Challenges can be linked to individual activities in the value chain, or to more general operations within the sector activities. The team identifies key challenges; if required, key informants are consulted.

F. Conducting focus group discussions to elaborate ambitions

Each FGD brings together six to eight experts, who are selected from the panel of experts based on their key expertise and their practical experience in the sector and facilitated by living lab participants. The multi-stakeholder composition of the FGDs ensures insights into and ownership of the challenges. The composition, combined with the triangulation of responses from key informants and sector specialists, prevents a bias in favour of the interests of individual stakeholders or stakeholder groups. The FGDs are organized virtually or in a hybrid setup (where in-person and virtual participation is supported). The meetings are usually organized in 45-60-minute virtual meetings through teams, facilitated by one or two members of the local living lab. The sessions are recorded and transcripts can be provided. Ahead of the meeting, participants receive the information on the rapid sector assessment, the dashboard, and outcomes of the survey. The meeting starts with a brief introduction, presenting the key challenges, and the ways in which they can be transformed into ambitions. The core of the meeting is to brainstorm on refining ambitions and identifying stakeholders responsible for taking the initiative and driving actions to achieve the ambitions. For each ambition, the participants define their time horizon (short-(<1 year), medium (duration of project)- or long-term (>project)). To structure this, FGD participants are split up into smaller discussion groups, making use of the break-out facilities of the digital meeting platform. Parallel break-out sessions comprise 3-4 participants representing different stakeholders. Each discussion group delves deep into one or two key challenges/ambitions and discusses actions required to achieve the ambitions, which will contribute to increasing the performance of the cities food system. They identify relevant stakeholders and their level of operation (local, production area, value chain, specific market, state or national), and the drivers/catalysts for the action. Outcomes of the separate discussion groups are presented and validated in a plenary session. The final outcomes are briefly summarized by the facilitator before closing the meeting.

G. Composing the rapid sector-assessment document

Based on the outcomes of the survey and FGDs, the team composes the rapid sector-assessment alert (5-10 pages). Each challenge includes a description of the challenges and ambitions, and details the actions proposed to achieve the ambitions. Copy-editing of the English text ensures quality in information sharing locally and nationally. The document is well designed, and pictures support and document the messaging.

H. Validating the rapid sector-assessment document

In some cases, an additional expert consultation is organized at the end of the process, in which key stakeholders are invited to validate ambitions and associated actions, and arrive at a consolidated position among stakeholders to recognize and assume responsibilities driving actions. The outcomes of the verification meeting are used to finalize the document.

I. Sharing the local alert document

The final document is published and used for awareness-raising and advocacy efforts, and possibly is shared through local relevant traditional and social media. The leading organizations follow-up activities and interaction with stakeholders using digital platforms is to raise awareness on the challenges, and to urge government bodies and others to take immediate actions. These include briefings to EU and AU sponsors of the project.

J. Using the document in LL

The document should support the local living lab in activating its' support network and wider enabling environment.

K. Stakeholder list

Survey responds will be selected according to stakeholder groups, ensuring at least 6 respondents, male and female and different age groups, per city for each group:

Table 2: Survey respondents

Commercial farmers			
Processors/ marketers			
Extension officers			
Financial intermediaries			
Consumers/ household heads			
Smallholder producers			
Informal local influencers			
Waste/recycling operators			

During the design phase, WUR developed a questionnaire consisting of a set of XXXX questions with

Borman, …..Van Berkum, S., J. Dengerink, R. Ruben, 2018. The food systems approach: sustainable solutions for a sufficient supply of healthy food. WEcR, the Hague, https://doi.org/10.18174/451505 (2018).