



**RUNRES: The rural-urban nexus: Establishing a nutrient loop to improve city region food system resilience
(Phase II)**

Lessons Learned in RUNRES Phase 1



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Executive Summary

The Rural - Urban Nexus: Establishing a nutrient loop to improve city region food system resilience (RUNRES) is an eight-year development and research endeavor seeking to develop and scale innovations capable of supporting resilient and sustainable city region food systems. Operating in four regions of Sub-Saharan Africa, Bukavu, DRC, Arba Minch, Ethiopia, Kamonyi, Rwanda, Msunduzi, South Africa, the project was designed with two distinct phases. In phase I, the project team conducted a comprehensive transdisciplinary process that prioritizes authentic stakeholder participation to identify, implement, and assess innovations for their capacity to achieve the desired project impacts. RUNRES Phase I is now in its final stages, with the project team having conducted rigorous economic, quality assurance, and agronomic assessments of these innovations. Compiling these data into a multi-criteria visualization assessment, the project team and steering committee, together with the donor, evaluated the innovations for scaling potential. To support this critical process, the RUNRES team developed a scaling protocol designed to demonstrate clear and concrete pathways for scaling. In addition, to maximize the potential of the selected innovations, the project team developed three distinct “scaling models”. The first, or “A” scaling strategy, is focused on working with the existing Phase I consortia to continue expanding their piloted innovations. The second, or “B” strategy, will support new actors, located within a current city-region or within an area with a similar context, who want to replicate an existing pilot. The third, or “C” strategy, will involve indirect RUNRES support for those actors outside the project’s sphere of influence who want to replicate RUNRES innovations. Through this empirically based decision-making process, of the fifteen original pilot innovations five were selected for “A” scaling, five for “B” scaling, and four for “C” scaling. The focus of Phase II RUNRES activities will be on the “B” scaling. In Arba Minch, Ethiopia, one municipality that has shown a high level of commitment will be provided funding to replicate the model piloted by the Egnanew Mayet Association, which is producing compost from municipal waste. The production of animal feed derived from cassava peels and black soldier fly larvae has proven to be very successful in Kamonyi, Rwanda. Thus, the expansion of these innovations by new entrepreneurs in the region will be supported with direct funding from RUNRES. In the DRC, the three supported compost producers agreed to consolidate and relocate their efforts into one new business center to be in position to affordably meet the demand of Olam, a large coffee buyer interested in significantly increase the application of compost to support its coffee production. Finally, a hybrid innovation, co-compost production coupled with agroecological living labs to facilitate knowledge development will be supported by RUNRES in the second phase of the project. For each of these scaling initiatives, high priority was and will be given to identify and develop innovation leaders from within traditionally marginalized segments of the population to fulfill the mandate of SDC, which is to develop a project capable of inclusive development. In conjunction with this direct support to the innovation leaders, the RUNRES team will engage with potential upscaling partners such as political leaders, private investors, public sector agencies, and NGOs to facilitate further expansion of these innovations. In this manner, the project team intends to build on the demonstrated successes achieved during the first phase of the project to meet the impact objectives defined in the TOC at scale during RUNRES Phase II.

Acronyms and Abbreviations

AMU	Arba Minch University
Ball	Bishopstowe Agroecology Living Lab
Borda	Bremen Overseas Research and Development Association
BP	Business Plan
BSF(L)	Black soldier fly larvae
CBO	Community based organization
CGIAR	Consultative Group on International Agricultural Research
COGTA	Cooperative Governance and Traditional Affairs
COPEL	company for protection of environment and development
CU	Coordination Unit
DEWATS	Decentralized Wastewater Treatment Systems
DIOBASS	Démarche pour une Intégration entre Organisations de Base et Autres Sources de Savoirs
DFFE	Department of Forestry, Fisheries, and the Environment
DPW	Department of Public Works
DWS	Department of Water and Sanitation
EHD	Electrohydrodynamic drying
EMNCPA	Egna Ney Mayet
FID	Funds for Innovation in Development
GGGI	Global Green Growth Institute
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HEDF	Human excreta derived fertilizer
IITA	International Institute for Tropical Agriculture
IP	Innovation Plan
ISM	Innovation Scalability Matrix
ISPG	Informal Settlements Partnership Grant
KZNCC	Kwazulu-Natal Council of Churches
MCVA	Multi Criteria Visualization Aide
PI	Principle Investigator
PIQ	Pathway Identification Questionnaire
PPP	Public Private Partnership
QUAP	Quality Assurance Program
RAB	Rwandese Agricultural Board
RANAS	Risks, Attitudes, Norms, Abilities, and Self-Regulation
RBET	Reach, Benefit, Empowerment, Transform
SC	Steering Committee
SDC	Swiss Development Cooperation
SME	Small and Medium Enterprise
SSA	Sub-Saharan Africa
SSNUP	Smallholder Safety Net upscaling Program
TAAT	Technologies for African Agricultural Transformation
UDDT	Urine Diversion Dry Toilets
UKZN	University of Kwazulu-Natal
WASH	Water Sanitation and Hygiene Research & Development Center
WESP	World Economic Situation and Prospects Report
WRC	Water Research Commission
WSA	Water Services Authority
ZHAW	Zurich University of Applied Sciences

1. Results of RUNRES Phase I

1.1 Project Background and Approach

RUNRES: “The rural-urban nexus: establishing a nutrient loop to improve city region food system resilience” is a science-based development project funded by the Swiss Agency for Development and Cooperation (SDC). The purpose of RUNRES is to address two critical development challenges facing rapidly urbanizing countries across Sub-Saharan Africa: the sustainable and equitable production of food and the provision of dignified and sustainable basic sanitation. Currently, both the agricultural and sanitation sectors are dominated and connected by linear solutions that are heavily dependent on resource intensive inputs. These approaches have led to radical nutrient imbalances within rural-urban interfaces across the world. In rural areas, long-term nutrient mining has created a downward trend of agricultural productivity, which harms livelihoods and exacerbates food insecurity (Jones et al., 2013; Sanchez, 2002). Simultaneously, rapidly growing urban areas in lower income countries suffer from an accumulation of organic waste (wasted nutrients) due to insufficient collection and disposal of green, food, and human waste, which harm environmental and human health (Krütli et al. 2018; Kaza et al. 2018; Aryampa, et al., 2019). Most research and development approaches view these problems as disconnected (Kaza et al. 2018). In contrast, RUNRES views a circular model of resource use predicated on the capture, treatment, and reuse of food processing and urban organic waste streams as a viable alternative to linear systems (Figure 1.1). Thus, by reimagining the rural-urban relationship, RUNRES seeks to create a transformed local economy, which supports circular flows of resources and thereby improves rural and urban livelihoods within the following African city-regions: Bukavu, Democratic Republic of the Congo (DRC); Arba Minch, Ethiopia; Kamonyi, Rwanda; and Msunduzi, South Africa.

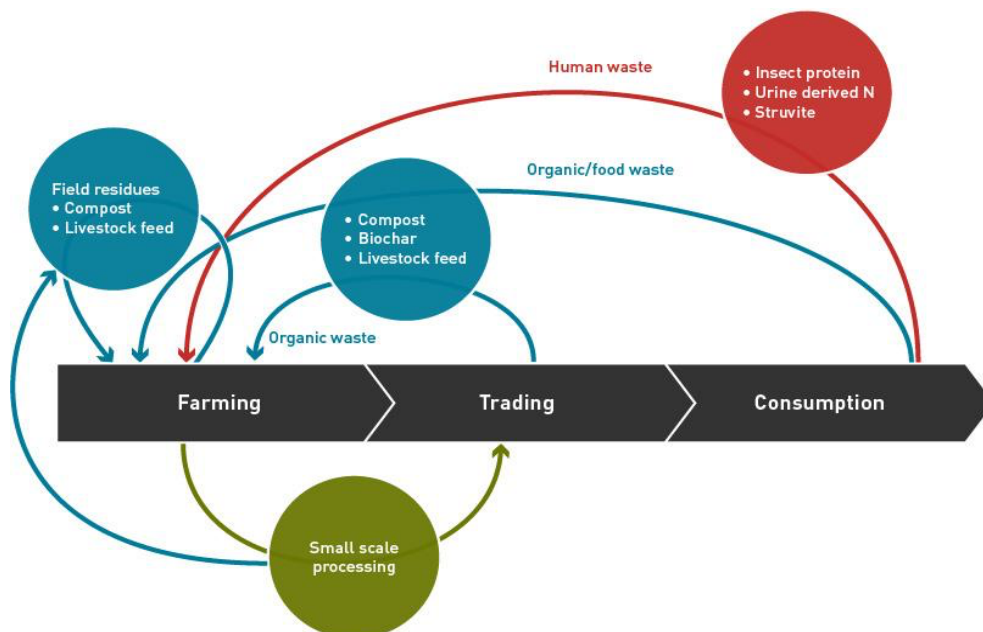


Figure 1.1: RUNRES conceptual diagram of restructured resource flows across a city-region food system.

The provision of innovative technologies that valorise waste streams and strengthen small scale processing and value addition can, in addition to reducing human health and environmental problems, provide new avenues of economic development for poor and disadvantaged people. However, a socio-technical shift towards a circular

food system predicated on recycled nutrients requires the development of a niche space (Geels, 2002; Fuenfschilling & Truffer, 2014), or an arena capable of providing the time, resources, and expertise necessary to allow an alternative model to take root. To guide the creation of this niche space, in the first phase of RUNRES, the project team developed and utilized a transdisciplinary innovation platform (TdIP) model, mixing a transdisciplinary research (Td) approach with the concept of innovation platforms (IP). Transdisciplinarity focuses on leveraging research institutions to address real world problems. To effectively address what are typically very complex challenges, it necessarily draws from multiple areas of expertise and places a premium on stakeholder participation (Pohl, 2011). To identify and organize effective stakeholder networks, as well as to create the conditions necessary for authentic dialogue and participation, the project team utilized a variety of methods (e.g. Rich Picture, Multi-Criteria Decision Analysis, Functional Stakeholder Analysis, etc.) developed by the transdisciplinarity science community (<https://tdlab.usys.ethz.ch/>) For example, in a series of workshops facilitated over the course of the first year of RUNRES, stakeholders were invited together to co-produce the knowledge and understanding necessary to achieve the overarching RUNRES objective of establishing circular food systems in the project sites, which led to the development of the project’s theory of change (ToC) (Figure 1.2).

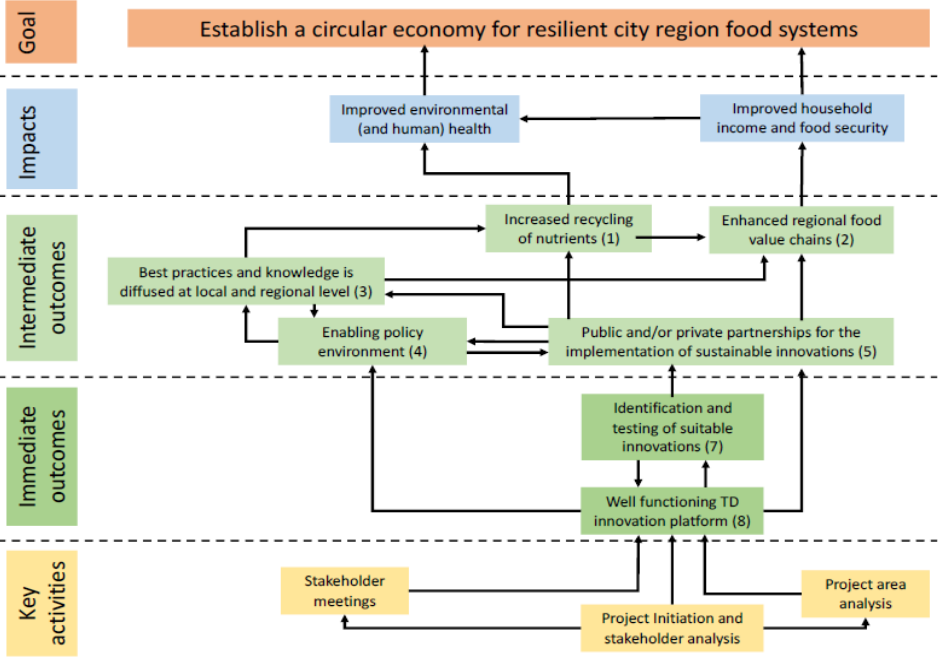


Figure 1.2: The RUNRES theory of change for Phase I. Developed in a participatory manner with project partners from each of the city-regions.

Through these initial efforts, local stakeholders from both the public and private sectors implemented the pilot, or demonstration, phase of the selected innovations in each of the RUNRES city-regions (Table 1.1). However, simply catalyzing restructured resources flows is insufficient to the long-term goal of the project. As with previous development efforts, a key challenge facing RUNRES is to secure sustainable impacts beyond the initial pilot sites. Here the question of how to ensure that the innovations scale up and out is critical and to address this, RUNRES draws on the innovation platform literature. IP scientists study the mechanisms that shape societal response to a new technology to support long-term uptake and sustainability. This approach makes the implementation of new

technologies actionable at a ground level, considering complex local constraints in a platform where different actors can exchange and coordinate activities (Schut et al., 2017). To do so effectively, the project aims to develop solutions that are robust and locally rooted through already established local actors and culturally appropriate innovations. Thus, the results of the first project phase will fully inform phase II, the purpose of which is to achieve scalable circular economy models that will continue beyond the initial development capital investment and thus the lifespan of the project. In this way, the project will contribute meaningfully to restructured rural-urban resource flows to increase the sustainability of agriculture and food systems.

Table 1.1: Transdisciplinary innovation platforms developed during the first year of RUNRES. Innovation focus colours: red = human waste innovation; blue = urban organic/food waste innovation; green = food processing innovation.

RUNRES COUNTRY	INNOVATION LEADER	INNOVATION FOCUS	DESCRIPTION
Bukavu, DRC	DIOBASS	Blue	Improved municipal scale solid waste collection and composting to produce soil amendments for coffee
	FESDD	Blue	Improved municipal scale solid waste collection and composting to produce soil amendments for coffee
	GASD	Red	Improved waste collection, provision of public sanitation facilities, and compost production for coffee farmers
Arba Minch, Ethiopia	ANJO-NUS	Green	Value addition of banana, and animal feed production of banana peel waste
	EGNAN NEW MAYET	Blue	Municipal scale composting to produce soil amendments for banana
	MASSP	Red	Struvite production via UDDT sanitation
	MUNICIPAL WASTE COLLECTION	Blue	Improved municipal scale solid waste collection
Kamonyi, Rwanda	AKANOZE	Green	Cassava peel processing for animal feed production
	CEFAPEK	Red	Tiger worm toilets
	COPED	Blue	Municipal scale composting to produce soil amendments
	MAGGOT FARM	Green	Black soldier fly larvae animal feed production
Msunduzi, South Africa	DUZI-TURF	Red	Municipal scale composting of urban green waste and sewage sludge to produce soil amendments for turf grass
	KZNCC	Green	Community-based agroecology training center.
	DEWATS	Red	Decentralized and resource-oriented sanitation system for a rural school to produce human-derived fertilizer

1.2 Phase I Context Analysis

A full context study for each of the four city-regions was conducted during the first year of RUNRES. This work provides background information on the following topics:

- Study area characterization
- Climate

- Vegetation
- Geology and soil classification
- Topography
- Historical Context and Land Tenure
- Current agricultural system and consumption patterns
- Crop and livestock production
- National policy and regulatory environments




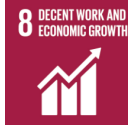
The full context study can be found in the RUNRES polybox:

(https://polybox.ethz.ch/index.php/apps/files/?dir=/RUNRES/RUNRES_DATA/Context%20studies&fileid=1658312827)

1.2.1 Alignment with international frameworks

The selected innovations align very well with international frameworks such as the United Nations Sustainable Development Goals (SDGs) and the 2030 agenda, with RUNRES innovations directly addressing seven of the seventeen goals (Table 1.2). Furthermore, RUNRES directly contributes to achieving many of the targets defined within these goals:

Table 1.2: Sustainable Development Goals and Targets directly addressed by RUNRES.

SDG	Directly Addressed Targets
	<p>By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.</p> <p>By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.</p>
	<p>Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.</p>
	<p>By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.</p> <p>By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.</p> <p>Support and strengthen the participation of local communities in improving water and sanitation management</p>
	<p>Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.</p> <p>Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.</p>

	<p>By 2030, empower and promote the social, economic, and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.</p>
	<p>By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.</p> <p>Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.</p> <p>By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.</p>
	<p>By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.</p> <p>By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</p> <p>Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.</p>

Universal Values espoused by the United Nations also align well with RUNRES. For example, principle two espouses the need to “Leave no one behind.” This principle of working to eradicate poverty in all its forms can be seen in the commitment of the project to work in even very challenging contexts such as Eastern DRC, an approach supported by SDC.

Below, we outline some of the specific elements of the past and current local context that form(ed) opportunities and constraints for Phase II of RUNRES by country:

DRC

During the first year of RUNRES, the core team conducted a series of workshops in Bukavu to bring together key stakeholders to co-identify major challenges facing the agricultural and waste management situation in Bukavu. Out of this process, it became clear that farmers in the region struggle to access enough soil inputs to maintain soil health and fertility. At the same time, solid waste management in Bukavu is completely inadequate, with only a small fraction of the generated waste being taken to the landfill. Sanitation is also a major sustainability challenge, with very little of the excreta generated in the city properly contained.

From this participatory process, community stakeholders selected compost production as a core technology that could simultaneously address both sectoral challenges. In addition, one of the three innovation teams planned to utilize human excreta, collected at a public sanitation facility constructed in a local market, as an input for the compost. These innovations, when taken together, addressed the needs of the communities in both the city and the outlying rural areas.

The successful implementation of the selected innovations was impacted, both positively and negatively, by several drivers and restrainers of change. For the proposed changes to the solid waste management program, key among these has been the municipality. In the first phase of the project, the municipality showed little enthusiasm

for the project, and provided little direct support. As the project progressed, this relationship changed, with RUNRES now having built strong relationships with key municipal solid waste management advisors. This relationship has directly impacted support for other circular economy initiatives. For example, Wa-Kongo is an organization seeking to support enhanced solid waste management in the city. They have received quite a lot of support from the municipality, and this can be attributed, in part, to the role RUNRES has played in sharing knowledge of circular waste management.

A key barrier to the success of the composting facilities has been the lack of demand for the final product. Initial discussions with farmers led the project staff to believe that a ready market existed for the sale of the compost produced by the innovations. However, this has proved not to be the case. As such, the reluctance or inability on the part of the farmers to purchase the recycled inputs can be viewed as a restrainer of change. That said, negotiations with large coffee producing entities, such as OLAM, are moving forward and present one solution to this challenge.

Ethiopia

The participatory process initiated during the first part of RUNRES yielded several innovations in Arba Minch, Ethiopia. Enhanced solid waste management, municipal scale composting, banana value addition, and struvite production were all tested during Phase I. As with the other countries, these innovations address critical needs of the community, and have the potential for significant upscaling. For example, youth unemployment is a crisis in the region. For this reason, Anjo Nus, despite struggling to develop significantly during the first Phase of the project, has generated enormous interest from influential stakeholders from Arba Minch all the way to Addis Ababa. Similarly, Eгна New Mayet is producing a high-quality compost while banana growers in the region are being told to switch to organic production and has generated huge interest across the country. These two innovations have a high potential for scaling.

As with the other countries, RUNRES experienced restrainers of change in Arba Minch. Of this, wavering municipal and public sector commitment is the most pressing. Compost production requires, in one way or another, subsidies. The public sector must be involved for compost production to be viable. Although the municipality in Arba Minch is now beginning to support Egnanew Mayet, this support is new and still modest. Furthermore, there seems to be great support by the BirBir municipality for scaling out the compost to their municipality during phase II of RUNRES; leaders of this community have already allocated land for a composting site and are in discussion about how to improve waste segregation. Furthermore, leaders of the innovation and RUNRES staff are working to secure external funding to be able to upgrade the available solid waste management equipment in BirBir.

Rwanda

As with the other countries, a comprehensive participatory process was undertaken during the first phase of RUNRES to co-identify community needs and to develop locally relevant innovations. Through this process, a diverse set of solutions was proposed and has been tested; animal feed production via BSFL and cassava peel processing, tiger worm toilets, and municipal scale composting were all piloted during this first project phase.

Regulatory hurdles have been a key barrier for RUNRES in Rwanda. Analytical work conducted by the Rwandese Agricultural Board (RAB) incorrectly measured very high concentrations of heavy metals in compost produced

by COPED, a solid waste management company and RUNRES partner. These results led to the facility being shut down. To date this issue has not fully been resolved, but promising steps have successfully been taken to address the issue. Nevertheless, this issue speaks to a larger need to develop regulations and policies that can facilitate a transition towards nutrient recovery and reuse in SSA; something that will be intensively addressed within Phase II of RUNRES.

Despite the great success of some of our innovations (BSFL and Cassava peel processing), some new technological limitations for scaling up have also been identified in Rwanda. For example, Akanoze Ltd., the company that is producing animal feed from cassava peels, can currently only process about 60% of the peels available to them. This is due to the current reliance on simple solar drying techniques; during the rainy seasons (March – May, September – November). Compounding this issue is the fact that cassava is typically harvested during these periods as the moist soil facilitates extraction of the tubers. Hence, in Phase II, the team will focus on identifying and developing efficient drying methods to allow for an effective scaling up.

South Africa

The RUNRES South Africa team has, in the face of very challenging community dynamics, been able to pilot a very successful innovation, and to develop a very promising concept linked to this innovation. A key lesson of Msunduzi is that, even when a project is started with a well-designed and promising participatory foundation, the situation can change and expected outcomes can fail to materialize. RUNRES SA originally planned to have several locally relevant innovations tested in Vlulundela, a rural community on the outskirts of Pietermaritzburg. However, due to a desire on the part of several community leaders to control the distribution of project funds, these innovations could not be built. As such, the team had to develop an alternative plan in other enthusiastic community.

From this situation, the idea of developing an agroecological living lab came to fruition. Using the expertise and inputs produced by the co-composting innovation, this facility, located just outside the city, could support smallholder farmers across the province. Given the industrial nature of food production in South Africa, and the challenges that small growers face in the country, this concept could prove to be very important as a driver of change during Phase II. It should also be stated that the project has secured the interest and support from the South African Department of Water and Sanitation (DWS). High level officials from this organization have attended RUNRES workshops and have invited project members to contribute to the creation of new regulations around the treatment and reuse of human excreta in the country.

1.3 Measurement, Evaluation, and Learning Phase I Results

In the monitoring, we continuously monitored a given set of project variables associated with the innovations and evaluated the absolute change between the start of the project and its endpoint. On top of this, we carried out two monitoring surveys, one in 2020 before the implementation of the innovations, and one in 2022 before the end of phase I.

An additional impact evaluation will also help us verifying whether a causal link between an intervention and an outcome exists. In the case of RUNRES, we wanted to test a new circular approach (phase I), to scale it up (phase

II), and finally replicate it in other places. This makes an impact evaluation necessary (see SDC, 2017), going beyond a simple monitoring of goals. Since conducting an evaluation study was not initially planned in the project, we only carried out in 2021 a “comparison” survey in areas similar to where we applied the different RUNRES innovations. A second comparison survey is planned for 2023.

Learning is multi-dimensional and interdisciplinary projects often aim to go beyond only “gathering the facts”. In RUNRES, the different activities, i.e. the interventions, are embedded in TdIPs, aiming to provide a coherent framework between reflection (Td-) and action (-IP). While there is a large body of literature on learning applied to transdisciplinarity (Bergmann et al., 2015; Pohl et al., 2017), we framed the concept of learning through three core conceptual elements (Schneider et al., 2019):

1. Learning of new knowledge on systems that can be used by actors to make decisions
2. Social learning helping actors to gain agency in their network
3. Self-transformative learning as an acquisition of new competencies

Thus, we combined different methods and approaches to evaluate the different aspects of the ME&L. This operationalization is rooted in different approaches: mainly a quantitative approach for the monitoring (M), a semi-quantitative approach for the impact evaluation (E), and a mainly qualitative approach for appraising learning (L).

1.3.1 Monitoring

The variables used for monitoring the project are defined in the logframe of the RUNRES project and can be revisited according to the constraints of the project in terms of relevance and feasibility (see RUNRES Phase I Prodoc). The logframe is already operationalized in a set of variables, which have corresponding targets depending on the different TdIPs. These thresholds have been defined when the different TdIPs have been set in the second half of 2020. Once the thresholds have been set, the different monitoring variables are reported through three different channels: the TdIP stakeholders, the RUNRES partners, and the ETH Zurich staff, see Figure 1.3.

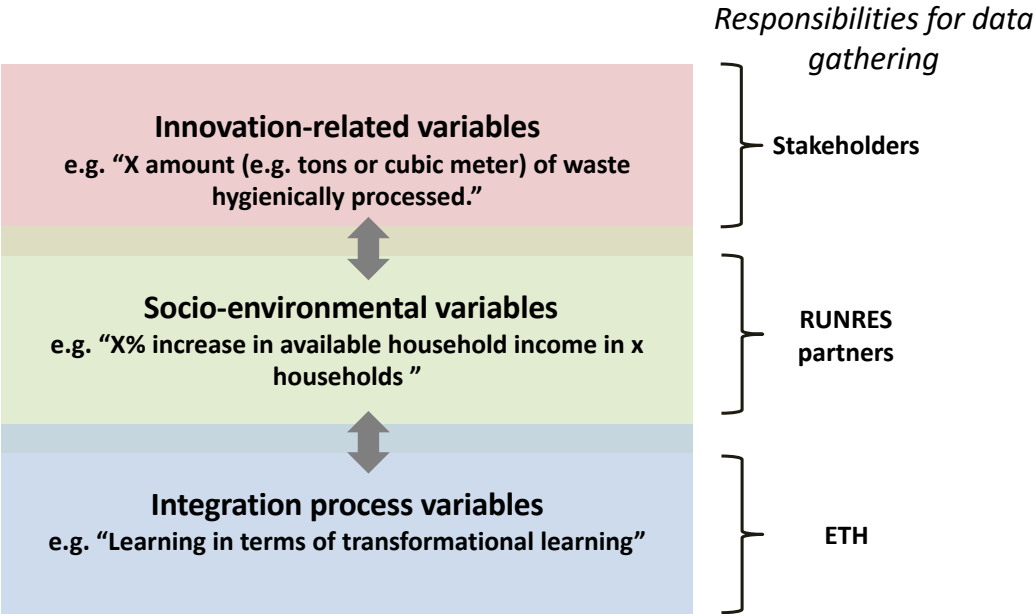


Figure 1.3: The different monitoring variables collected in the RUNRES project, and the different responsibilities for data gathering. Innovation-related data are reported by the TdIP-stakeholder on a regular base, mainly in form of accounting spreadsheets. Socio-environmental data are mainly collected by the RUNRES partners, mainly

in form of surveys. Integration process data are mainly collected by the ETHZ staff, mainly in form of workshops. The different categories of data are blended according to the constraints of the different TdIPs (vertical arrows).

The monitoring was continuous since the end of 2021, where we gathered data on the variables on a monthly base. The data gathered for the monitoring is forming an empirical base to formulate the way our intervention leads to a change (see ToC, see the examples below in Figures 1.4 and 1.5). While the different RUNRES innovations are already active since 2020, it took us about 18 months to have a functional reporting of the different variables of the project. This was due to several factors:

- An initial dilution of the monitoring scheme in newly built consortia (TdIPs)
- Difficulties in monitoring the different variables that were not initially planned in the logframe, for instance additional variables related to gender and youth.
- The addition of business-oriented variables to eventually assess the up-scaling bottlenecks for phase 2.

These three factors made visible the burden of “co-production” that a transdisciplinary project-approach needs. While the transdisciplinary nature of the project made RUNRES adaptable to the different challenges and specificities of the different countries where it is active, we did not fully consider the resources needed to formalize the co-design during 2020 and 2021. We jointly addressed this issue to generate the revised monitoring tables to capture all additional elements that came in the innovation along the way (see Annex 3).

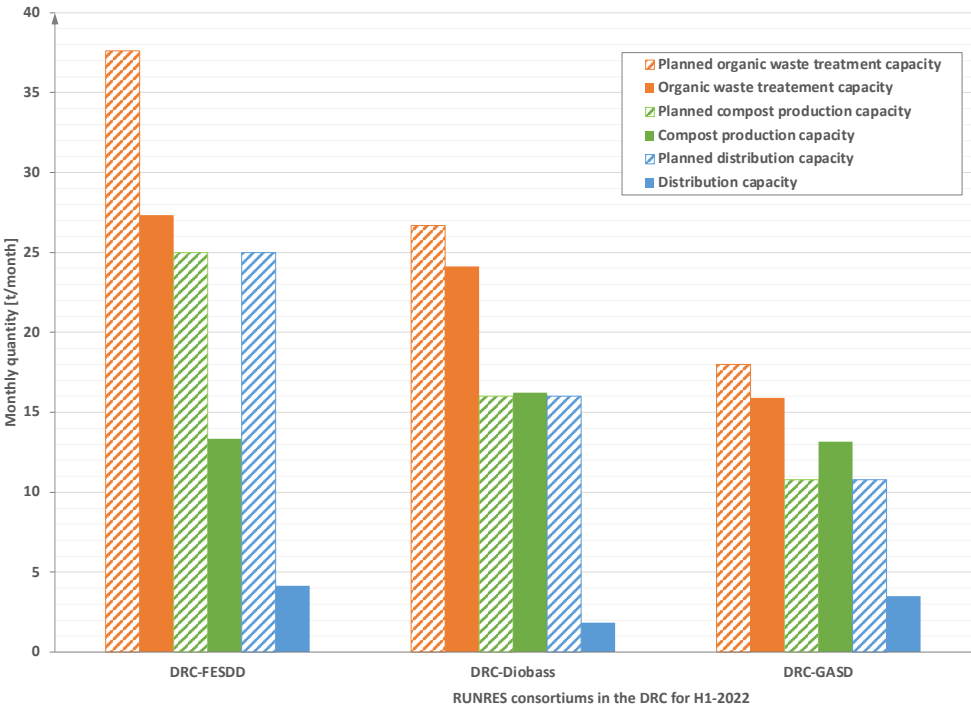


Figure 1.4: Example of the state of the current and planned organic-waste collection and treatment capacity in the RUNRES innovation implemented in the DRC. The data span over the first half of 2022. The complete results of the monitoring will be detailed in the final report for RUNRES Phase I.

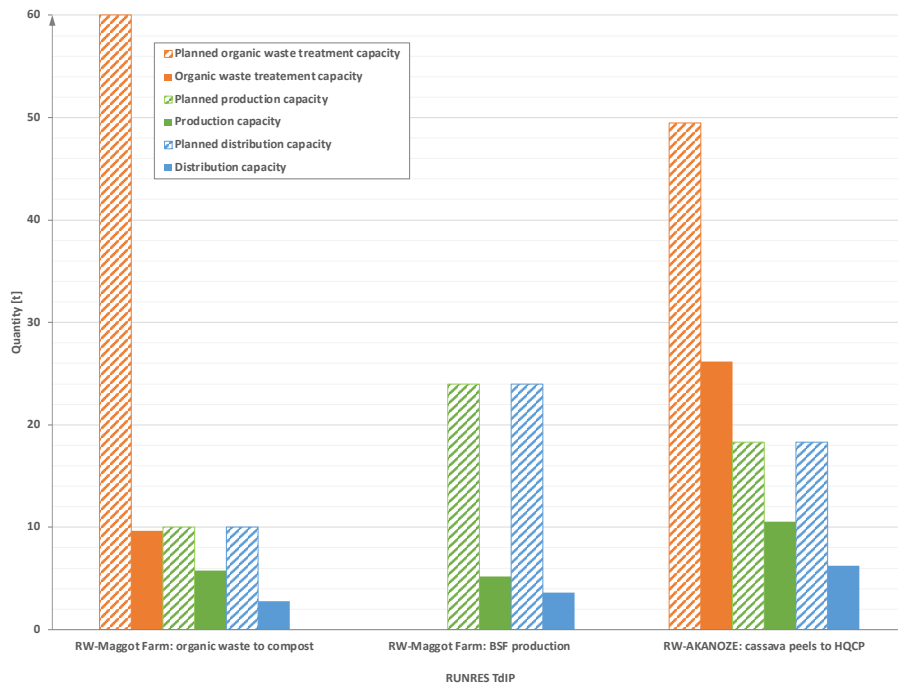


Figure 1.5: Example of the state of the current and planned organic-waste collection and treatment capacity in two of the RUNRES innovation implemented in Rwanda, focusing on black-soldier flies (BSF) and high-quality cassava peel flour (HQCP). The data span over the first half of 2022. The complete results of the monitoring will be detailed in the final report of RUNRES Phase I.

1.3.2 Comparisons (Evaluation)

In RUNRES, we focus on a formative evaluation through the monitoring, and a summative evaluation through a reduced impact evaluation (see Morra-Imas & Rist, 2009). Considering the available and limited means for the ME&L in RUNRES, a selection of the most relevant causalities for a circular economy model has been carried out by the RUNRES staff through a series of workshop-sessions during the second half of 2020. In these workshops, we selected a difference-in-difference design (see Roquet et al., 2019), spread over the two phases of the project, i.e. the second “difference” will be measured during the early steps of phase 2. The control group for the different innovations in RUNRES have been selected according to two criteria: their similarities to the zones where RUNRES innovations are applied, the feasibility of a comparison through the resources allowed for the ME&L. The second comparison survey is planned for 2023, and the last for 2026. These datasets will be useful on the longer term, beyond RUNRES phase 1, to establish the effects of a circular economy on the different actors involved in and along with it.

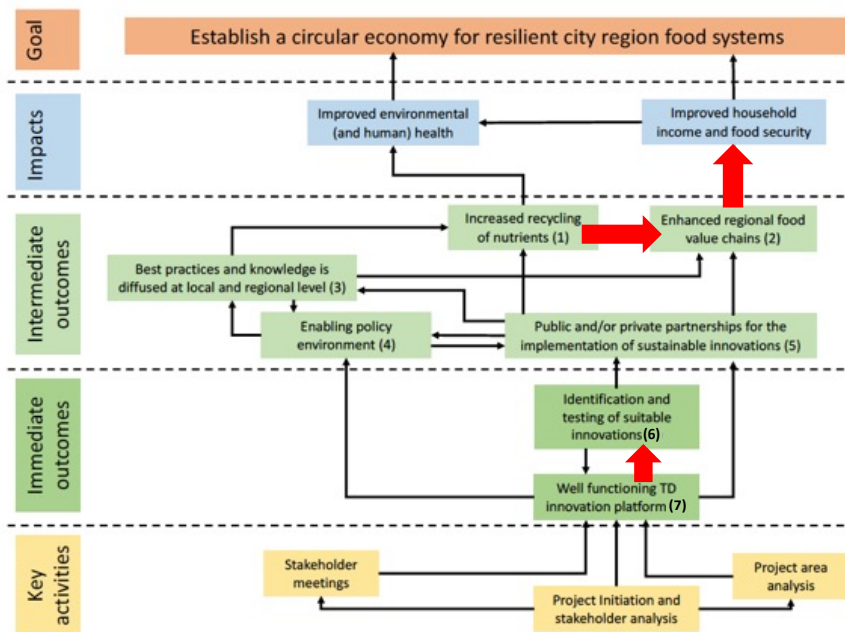


Figure 1.6: The three main relationship that are inquired through RUNRES in the Theory of Change, here illustrated through the red arrows. These relationships to be inquired have been identified through a series of workshops with the RUNRES team during the second half of 2020 and were mainly based on the circular economy approach and its transdisciplinary application.

1.3.3 Learning

Learning is a multi-faceted concept, which is difficult to capture into a single definition and for a broad field of applications. Scholars from different disciplines have therefore different understandings of what the concept of learning means, and the way it is usually defined and operationalized at project level (Zwart, 2017). In RUNRES, we combine disciplines and practices, from natural sciences and engineering to social sciences and humanities in a transdisciplinary way (see Pohl et al., 2017). Therefore, using a broader definition of learning going beyond the usual boundaries of disciplines has been necessary. In the field of transdisciplinarity, Schneider et al. (2019) boiled down the concept of learning into three core concepts, that were used in RUNRES as:

1. Learning of new knowledge on systems that can be used by actors to make decisions: The new knowledge is generated throughout the project through the different studies, e.g. context studies, QUAP, field trials, stakeholders' reports and student's theses, and was subject to the expectation of different stakeholders and RUNRES partners (see Figure 1.7 for an example).
2. Social learning helping actors to gain agency in their network: We operationalize the social learning in RUNRES through a Social-Network Analysis (SNA), carried out at the beginning of the TdIP projects and the end of phase I (Figure 1.8).
3. Self-transformative learning as acquiring of new competencies: Learning, as a transformational achievement, has been and is currently evaluated in a more reflective and retrospective way through various methods from the Td-net platform (2020), notably the method Most-Significant Change after significant project milestones. Towards the end of the project phase I, these methods took a stronger focus on what has been learned, and what has not been learned (see Belcher et al., 2019). The results will be detailed in the final report for RUNRES Phase I.

The learnings, categorized through the three dimensions formulated by Schneider et al. (2019) will be reported in the RUNRES final report for Phase I by mid-2023.

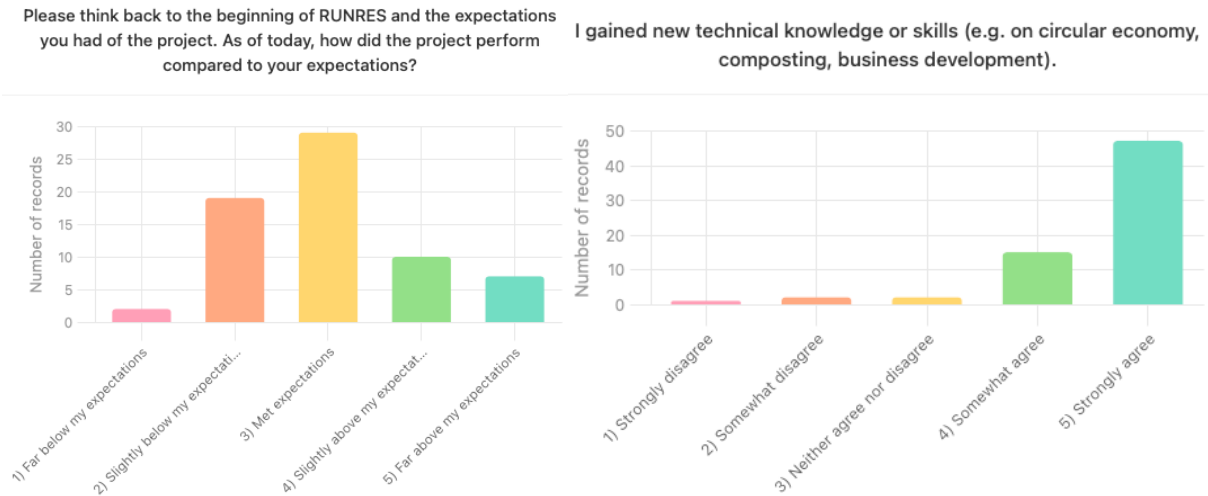


Figure 1.7: Example of feedback we received by the different RUNRES partners in the four countries (N=69), indicating how far they perceived RUNRES reaching their expectations, and indicating whether they gain technical knowledge during the project (credit: Rea Pärli).

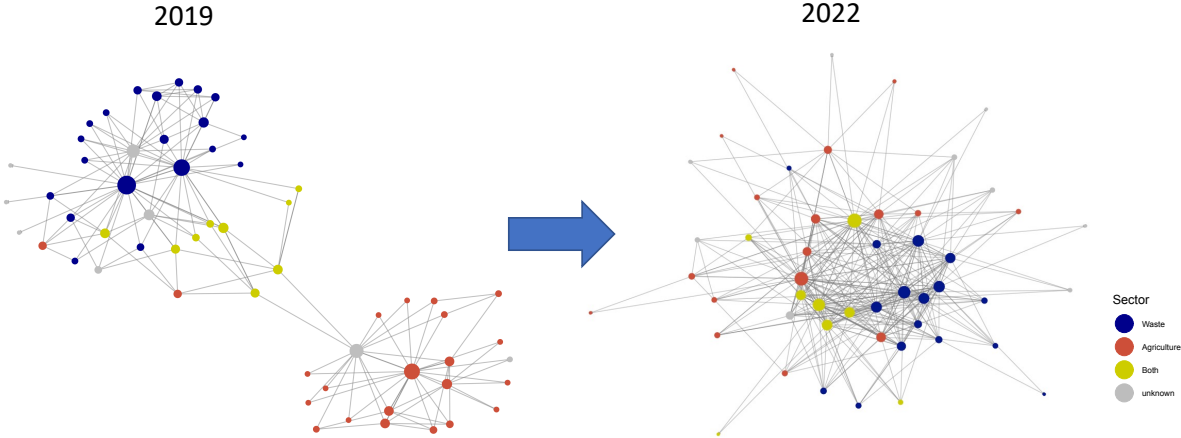


Figure 1.8: Comparison of the network-structure of the exchanged knowledge among the different actors involved in the RUNRES innovations in the DRC, for 2019, when Phase I started, and 2022 (credit: Rea Pärli). The complete results of the social-network analysis will be detailed in the final report of RUNRES Phase I.

1.4 Performance of Phase I Innovations

This section will provide an overview of the tested innovations. In addition to table 1.3 below, a comprehensive Multi Criteria Visualization Aide (MCVA) was conducted. The results of this work can be found in the appendix (10.3).

Table 1.3: Overview of the RUNRES innovations piloted during Phase I, including key successes and challenges faced. The green cells indicate those innovations that will continue to be supported during Phase II. Those in yellow will be phased out (in max 2 yrs). Those in red will be terminated.

RUNRES COUNTRY	INNOVATION LEADER	PHASE II	DESCRIPTION	SUCCESES	CHALLENGES	Innovation Output (data from 2022)
BUKAVU, DRC	DIOBASS		Improved municipal scale solid waste collection and composting to produce soil amendments for coffee	The composting initiatives have secured support from the municipality.	Quality issues have been a challenge for compost in DRC. Low N, high Al, and heavy metals. Sufficient demand for the product has also been a challenge.	27.3 t/mo of organic waste collected; 16.2 t/mo of compost produced, mostly distributed for agricultural use
	FESDD		Improved municipal scale solid waste collection and composting to produce soil amendments for coffee	Waste segregation efforts have helped influence other actors to support similar initiatives (Wa-Kongo).	Quality issues have been a challenge for compost in DRC. Low N, high Al, and heavy metals. Sufficient demand for the product has also been a challenge.	27.8 t/mo of organic waste collected; 13.3 t/mo of compost produced, only 31% of it distributed for agricultural use
	GASD		Improved waste collection, provision of public sanitation facilities, and compost production for coffee farmers	Although it took time, demand for compost is growing.	Quality issues have been a challenge for compost in DRC. Low N, high Al, and heavy metals. Sufficient demand for the product has also been a challenge.	16.3 t/mo of organic waste collected; 90 l/mo of urine collected, 100% redistributed; 13.2 t/mo of compost produced, only 27% of it distributed for agricultural use.
Arba Minch, Ethiopia	ANJO-NUS		Value addition of banana, and animal feed production of banana peel waste	A full banana processing line is operational and producing high-quality, value-added products.	Personal disputes among the innovation leaders have impeded growth. Power issues impede productivity. More marketing is required to promote the product.	About 100 kg of banana flour produced per month
	EGNAN NEW MAYET		Municipal scale composting to	A high-quality product is being sold to banana	The innovation leader has shown little willingness to	22 t/mo of organic waste collected; 15.5 t/mo of

			produce soil amendments for banana	farmers in substantial quantities. The innovation has garnered widespread recognition.	reinvest capital into the business. Technical bottlenecks- sieving- have not been addressed yet.	compost produced, 33% of it distributed for agricultural use
	MAS\$P		Struvite production via UDDT sanitation	Few successes can be noted for MAS\$P.	Insufficient access to the necessary chemicals, high transport costs, no market demand. All were factors for the failure of this innovation.	No achievements in term of collection, production, and distribution
	MUNICIPAL WASTE COLLECTION		Improved municipal scale solid waste collection	The municipality is subsidizing the cost of the collection vehicles.	Waste separation is still not occurring at scale. Low financial capital will make scaling difficult.	30 t/mo of organic waste collected
Kamonyi, Rwanda	AKANOZE		Cassava peel processing for animal feed production	Very high demand for the product. The innovation has high potential for scaling.	Technical challenges associated with drying of the peels currently inhibits business potential.	31.9 t/mo of cassava peels processed into 8.7 t/mo of cassava peels flour and 7.3 t/mo of cassava mash.
	COPED		Municipal scale composting to produce soil amendments	The company has been able to source segregate organic waste effectively.	Incorrect analytical results from RAB resulted in the closure of the facility. Given the resources of COPED, the composting process could be done better.	68.6 t/mo of organic waste collected; unclear amount of compost produced and distributed.
	MAGGOT FARM		Black soldier fly larvae animal feed production	The company is successfully selling its larvae and the leaders are working to expand their business. Youth entrepreneurs show a high level of interest In this innovation.	Securing enough low cost, high quality organic waste continues to be a challenge. The company has not invested in the equipment required to process the larvae.	15.6 t/mo of organic waste processed into 6.7 t/mo of BSFL and 8.3 t/mo of composted substrate. About 100% of the compost has been distributed, and about 80% of the BSFL
Msunduzi, South Africa	DUZI-TURF		Municipal scale composting of urban green waste and sewage sludge to produce soil amendments for turf grass	Duzi has created an economically viable model of compost production. The DWS has taken great interest in the work of RUNRES. Links with the BALL show potential to	Convincing the innovation leaders to invest in community outreach efforts is a challenge. Not all sludge from waste treatment facilities will be usable due to high heavy metal concentrations.	1070 t/mo of organic waste collected; 91.7 t/mo of sewage sludge collected, 100% redistributed; 671 t/mo of co-compost produced, only 18% of it distributed for agricultural use so far.

				support smallholder farmers.		
	RUSUS		Pyrolysis of pit latrine fecal sludge to produce biochar as a soil amendment	The relationship with Rusus produced no successes.	The organization demanded that they receive directly all funds associated with the innovations.	No achievements in term of collection, production, and production.
	DEWATS		Decentralized and resource-oriented sanitation system for a rural school to produce human-derived fertilizer	A company has been selected and construction will soon begin.	Negotiating UKZN procurement processes proved a very lengthy and complex task.	No achievements in term of collection, production, and distribution so far.

1.5 Gender and Youth outcomes and impacts

Through the RUNRES phase I, the gender aspects have been addressed through two main steps. Firstly, in the first half-year of the phase I, in 2019, a consultant scouted in the foreseen RUNRES countries the different aspects of gender in a circular economy (Buyana, 2019). Then, since 2020, we had a PhD student tackling gender aspects in the circular economy in RUNRES (see annex 1, 10.4). These steps led to a gradual mainstreaming of gender aspects in the RUNRES project and this is set to be continued and augmented during phase II.

From the first inquiry led at the beginning of the project, following main findings have been highlighted (Buyana, 2019):

1. **Numerical results needed through the project:** “To fully articulate and contextualize gender-based barriers and change pathways in a given value chain or innovation, it is important to compliment numerical results from surveys and randomized trials with dynamic frameworks for capturing qualitative information.”
2. **Circular economy to be considered as an integrated network:** “Since the circular economy is about ‘a network of people’ and ‘not just the physical flow of material resources from rural to urban areas and back’, innovation platforms that are age and gender responsive bring about inclusive collaboration mechanisms and technologies that are locally appropriate.”
3. **Co-design of gender-responsive policies with stakeholders necessary:** “Gender responsive policy options can be co-designed with stakeholders from municipalities, cooperatives and the private sector through policy seminars on emerging and scalable practices.

During RUNRES phase I, we addressed the three main points above through different measures. The first point has been addressed through a disaggregation of the monitoring variables through gender and age (these results will be part of the final report, see some preliminary results in Table 1.4 below). This makes possible to obtain a clear picture of how far the different innovations are involving different groups. The preliminary monitoring data show that the innovations in Ethiopia and Rwanda score around or above a desirable threshold of 30%. This is mainly due to the waste collectors (Ethiopia, EgnanewMayet) and the cassava peelers (Rwanda, AKANOZE). However, these numbers do not capture empowerment, and the second RUNRES phase will entail monitoring variables related to women and youth empowerment (see Section 2.3).

The second point above has partially been addressed through the PhD work ongoing in Rwanda (see Annex 1, 20.2). Finally, we started to address the last point above during 2022, when workshops and discussions on gender took a greater space in RUNRES. However, these discussions are still the beginning of a genuine dialog, and a greater focus on these aspects will be made through phase II.

Table 1.4: Direct employment generated through the RUNRES project in the different countries where the project takes place. These numbers do not differentiate between full and part-time, but give an indication of the number of persons working for the different innovations. These data are average values for the first half of 2022. Youth is defined as persons of less or equal to 24 years old.

RUNRES country	Total direct employees in the innovations	Percentage of women	Percentage of youth (men and women)
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DRC	53	6	8
Ethiopia	47	60	13
Rwanda	52	29	37
South Africa	16	6	0

1.6 Phase I Challenges, Strengths, and Lessons

1.6.1 Project wide reflections

RUNRES faced a number of challenges during Phase I. First, the Covid pandemic made it very challenging to meet stated timelines. Quite stringent lockdowns and travel restrictions made in person meetings and workshops difficult to organize and this unquestionably caused delays with the development of the innovations. Independent of the pandemic, the RUNRES team has faced other challenges. A key challenge faced was the collection of timely and accurate data. As described in the ME&L, data collection in RUNRES is the responsibility of the entire consortium, from the innovation leaders to the country teams to the ETH coordination unit. Developing a system capable of facilitating the flow of accurate, timely, and comprehensive data across these project partners is still an ongoing process. Furthermore, the team faced challenges finding analytical expertise capable of quantifying key QUAP parameters. In country labs tasked with quantifying heavy metals, pathogenic microorganisms, or agronomic parameters have frequently provided results that have been shown, often to a very large degree, to be incorrect.

Unsurprisingly, bureaucratic delays are another challenge that the project team faced. RUNRES is a development project with research support that is led by academic institutions. The pace at which universities operate with the needs of emerging businesses is not straightforward; complexities associated with the distribution of funds, approval from academic ethical boards, and the organization of various actors across multiple countries takes time. These logistical challenges have been optimized and streamlined, but this process has not happened overnight.

Intersectoral cooperation is another issue that requires constant support. Transdisciplinary processes seek to bring together actors from multiple sectors with the goal of achieving a shared outcome. In an ideal world these individuals and groups share a common vision and are willing to work together to achieve that objective. In a real-world context, the situation is often more complex. This is where our TdIP approach has been of great value, but it also requires a lot of time and effort to maintain.

Despite these challenges, the RUNRES team made great strides in achieving a successful and promising Phase I. The innovation leaders, with the support of the RUNRES core team, invested a great deal of work to make their pilots successful. Strong evidence for the potential of many of the innovations has been collected, and the project is well positioned to launch effective scaling efforts within each of the four city-regions in phase II. For country specific feedback please see annex 1.

1.7 Research Conducted

STUDENT	SUPERVISORS	TITLE
Bianca Clement (MSc)	Dr. Pius Krütli Melanie Surchat	A gendered lens on the processes of empowerment and social change through entrepreneurial urban agriculture in Kigali, Rwanda.

Adrian Fuhrmann (Msc)	Dr. Martin Hartmann Dr. Benjamin Wilde	Residues from black soldier fly (<i>Hermetia illucens</i>) larvae rearing influence the plant-associated soil microbiome in the short term (published 26 Sept 2022)
Delia Hasler (Msc)	Dr. Eva Lieberherr Dr. Benjamin Wilde	From sanitation back to agriculture: the role of nutrient recycling in agricultural development in Sub-Saharan Africa
Joa Kessler (Bsc)	Prof. Dr. Johan Six Dr. Benjamin Wilde	Organic waste and urine-based soil amendment in banana cultivation - Supporting a trial in Ethiopia
Manuel Mathis (Msc)	Prof. Dr. Johan Six Dr. Leonhard Späth Dr. Benjamin Wilde Dr. Kokou Kintche	Identifying behavioural factors influencing waste sorting at source in developing countries: A case study of the RANAS approach to recover organic waste for agriculture in Bukavu
Nqobile Nkomo (Phd)	Prof. Dr. Alfred Odindo Prof. Dr. P. Muchaonyerwa	Nitrogen enhanced biochar fertiliser and its contribution to the closed-loop nutrient system for increased crop productivity and improved environments.
Elias Pahls (Bsc)	Prof. Dr. Johan Six Dr. Matiyedou Konlambigue Dr. Leonhard Späth Dr. Benjamin Wilde	Economic Assessment of BSFL production in Kamonyi District, Rwanda
Rea Pärli (PhD)	Dr. Eva Lieberherr Prof. Dr. Manuel Fischer Dr. Leonhard Späth	Transdisciplinary Research for Sustainable Development
Camille Sammali (Bsc)	Prof. Dr. Johan Six Dr. Leonhard Späth Dr. Benjamin Wilde	Dealing with a lack of sanitation system Understanding the case of Bukavu through an expert elicitation and a material flow analysis
Melanie Surchat (Phd)	Prof. Dr. Michael Stauffacher Dr. Pius Krütli Dr. Johan Six	Gender dynamics in nutrient waste recycling in Rwanda
Stephanie Vogel (Msc)	Dr. Pius Pius Krütli Dr. Leonhard Späth Dr. Haruna Sekabira	The Role of Knowledge in the Acceptance of Organic and Human Waste Recycling: The Case of Rwanda's Food System

1.8 RUNRES Response to External Review

To assist RUNRES, the SDC commissioned an evaluation team to review the project, to identify areas of strength and weakness, and to provide recommendations on how to improve. This evaluation report, which was prepared by ECOPSIS, officially finished on 17 October 2022. Their team reached the following conclusions:

- RUNRES addresses relevant challenges facing the four project city regions.
- The first phase of the project, while delayed by COVID and unable to achieve all of its objectives, laid the groundwork for a promising 2nd phase.
- The project is likely too large and should be reduced in either scope or scale.
- Several of the RUNRES city-regions are secondary cities and focusing on capital cities would provide more potential for scaling.
- RUNRES should not “close the door” to companies with high potential innovations, even if they were not piloted during Phase I.
- The consultants identified the following innovations as having potential for Phase II: cassava peel and black soldier fly (Rwanda); co-composting (South Africa); banana flour (Ethiopia).
- The project team is missing business and marketing expertise, which will be crucial for the second phase of the project.

- To prepare for Phase II, the project should try to identify current gaps and support needs in each selected value chain.
- The project should map relevant policy, regulatory, capacity development, and financial, business and technical services available at country and regional level.
- Formal agreements with public authorities and private sector service providers should be developed in support of specific and concrete objectives.
- Capacity building for relevant authorities to understand and master new frameworks and tools that can enable sustainable scaling should be undertaken.

The RUNRES core team provided a detailed set of responses to the review committee (https://polybox.ethz.ch/index.php/apps/files/?dir=/RUNRES/RUNRES_DATA/Evaluation%20Phase%20I%20docs&fileid=2919787198). However, a brief description of the agreed upon conclusions, and steps taken to address them, can be found below:

REVIEW COMMITTEE CONCLUSION	RUNRES RESPONSE
The project is too large.	While RUNRES did not reduce the number of countries in which it operates, following the mandate of SDC to <i>leave no one behind</i> , the project has drastically reduced the number of innovations to be continued in Phase II.
The team is missing business and marketing expertise.	The RUNRES team fully supports this position and recognizes the need to bring aboard experts with a background and expertise in business development and marketing. To address this gap, the core team is currently identifying ideal candidates that can support the promising private sector innovations. Funding for these positions has been made available throughout the second phase of the project, and these experts will play a key role in scaling the selected innovations for Phase II. See also budget justification for financial commitment.
The project should try to identify current gaps and support needs in each selected value chain.	For each of the successful pilots. The core team is working hard to identify key gaps for scaling and to address these limitations. Project coordinators and scientists are working with actors within the selected value chains to build awareness of these innovations and to develop market demand for the resulting products.
The project should map relevant policy, regulatory, capacity development, and financial, business, and technical services available at country and regional level.	The core team agreed fully with this assessment. To realize this recommendation, the team is working to identify, contact, and gain the support of actors with expertise in each of these domains at the regional and country levels of every city region. Progress is being made. For example, in South Africa, the RUNRES team has developed a strong relationship with the Department of Water and Sanitation (DWS). Policy makers within this institution are supporting RUNRES in a variety of ways.
Formal agreements with public authorities and private sector service providers should be developed in support of specific and concrete objectives.	The RUNRES team supports this position and is working to realize this recommendation. For example, RUNRES is engaging with the DWS in South Africa, the Platform for Accelerating the Circular Economy in Rwanda, ALECI in Rwanda, COLEAD in Switzerland, etc.
Capacity building for relevant authorities to understand and master new frameworks and tools that can enable sustainable scaling should be undertaken.	The project team is working to achieve this suggestion. For example, analytical capacity among local labs has been proven to be problematic. To address this issue, RUNRES is developing a trial so that labs from multiple countries can test the same samples and improve analytical accuracy and precision. Policy expertise is also missing. To address this, the team is putting together a proposal to support policy knowledge building for state actors in South Africa.

2. Works Cited

- Aryampa, S., Maheshwari, B., Sabiiti, E., Bateganya, N.L., Bukenya, B. (2019). Status of Waste Management in the East African Cities: Understanding the drivers of waste generation, collection and disposal and their impacts on Kampala City's Sustainability. *Sustainability*, 11, 5523.
- Awumbila, M. (2017). Drivers of Migration and Urbanization in Africa: Key Trends and Issues. Background Paper prepared for UN Expert Group Meeting on Sustainable Cities, Human Mobility and International Migration
- Belcher, B. M., Claus, R., Davel, R., & Ramirez, L. F. (2019). Linking transdisciplinary research characteristics and quality to effectiveness: A comparative analysis of five research-for-development projects. *Environmental Science and Policy*, 101, 192-203.
- Belton, V., & T. Stewart. (2002). *Multiple criteria decision analysis: an integrated approach*. Boston: Kluwer Academic Publications.
- Bergmann, M., Brohmann, B., Hoffmann, E., Loibl, M. C., Rehaag, R., Schramm, E, & Voss, J.-P. (2005). *Quality Criteria of Transdisciplinarity Research: A Guide for the Formative Evaluation of Research Projects*. Institute for Social-Ecological Research (ISOE) GmbH, Frankfurt am Main, Germany.
- Bryson, J. M. (2004). What to do when stakeholder matter. *Public Management Review*, 6(1), 21-53.
- Checkland, P. (2000). Soft Systems Methodology: A Thirty Year Retrospective. *Systems Research and Behavioral Science*, 17, 11-58.
- Desmond, P., & Asamba, M. (2019). Accelerating the transition to a circular economy in Africa. *The Circular Economy and the Global South: Sustainable Lifestyles and Green Industrial Development*, 152.
- Escalante, S. O., & Valdivia, B. G. (2015). Planning from below: Using feminist participatory methods to increase women's participation in urban planning. *Development*, 23(1), 113–126.
- Eisenführ, F., M. Weber, & T. Langer. (2010). *Rational Decision Making*. Berlin: Springer-Verlag.
- Fuenfschilling, L., Truffer, B. (2014). The structuration of socio-technical regimes- Conceptual foundations from institutional theory. *Research Policy*. 43, 772 – 791.
- Geels, F.W. (2002). Technological transition as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*. 31, 1257 – 1274.
- Jahn, T., Bergmann, M., & Keil, F. (2012). Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics*, 79, 1-10.
- Jones, A., Breuning-Madsen, H., Brossard, M., Dampha, A., Deckers, J., Dewitte, O., Gallali, T., Hallett, S., Jones, R., Kilasara, M., Le Roux, P., Michéli, E., Montanarella, L., Spaargaren, O., Thiombiano, L., Van Ranst, E., Yemefack, M., Zougmore, R., (eds.), 2013. *Soil Atlas of Africa*. European Commission, Publications Office of the European Union, Luxembourg. 176 pp. ISBN 978-92-79-26715-4, doi 10.2788/52319
- Kaza S., Yao, L., Bhada-Tata P., Van Woerden F. (2018). *What a Waste 2.0. A Global Snapshot of Solid Waste Management to 2050*. The World Bank, Washington DC – USA. DOI: 10.1596/978-1-4648-1329-0
- Krütli P., Nef D., Zumwald M., Haupt M., Harlay J., Stauffacher M. [Eds.] (2018). *Waste Management in the Seychelles – Pathways for Systemic Change*. USYS TdLab Transdisciplinary Case Study 2018. ETH-Zurich, USYS TdLab. Switzerland
- Morra-Imas & Rist, 2009: Morra-Imas, L. G., & Rist, R. C. (2009). *The road to results: designing and conducting effective development evaluations*. The International Bank for Reconstruction and Development / The World Bank
- Pohl, C., Krütli, K., & Stauffacher, M. (2017). Ten Reflective Steps for Rendering

- Research Societally Relevant. *GAIA*. 26, 43-51.
- Quisumbing, A., Meinzen-Dick, R., Malapit, H. (2019). Gender equality: Women's empowerment for rural revitalization, In Global food policy report. Chapter 5, Pp. 44-51, International Food Policy Research Institute, Washington, DC.
- Roquet, H., Kudrzycki, B., Rom, A., Metzger, L., & Guenther, I. (2018). *Research Evidence and Impact Evaluations at Swiss Development Cooperation (SDC)*, ETH NADEL, Center for Development and Cooperation.
- Schut, M., Andersson, J.A., Dror, I., Kamanda, J., Sartas, M., Mur, R., Kassam, S., Brouwer, H., Stoian, D., Devaux, A., Velasco, C., Gramzow, A., Dubois, T., Flor, R.J., Gummert, M., Buizer, D., McDougall, C., Davis, K., Homann-Kee Tui, S., Lundy, M. (2017). *Guidelines for Innovation Platforms in Agricultural Research for Development. Decision support for research, development and funding agencies on how to design, budget and implement impactful Innovation Platforms*. International Institute of Tropical Agriculture (IITA) and Wageningen University (WUR) under the CGIAR Research Program on Roots Tubers and Bananas (RTB). pp 88. June 2017.
- Schneider et al., 2019: Schneider, F., Giger, M., Harari, N., Moser, S., Oberlack, C., Providoli, I., Schmid, L., Tribaldos, T., & Zimmermann, A. (2019). Transdisciplinary co-production of knowledge and sustainability transformations: three generic mechanisms of impact generation. *Environmental Science and Policy*, 102, 26-35.
- Swiss Agency for Development and Cooperation (SDC). (2013). *How-to-Note Stakeholder Analysis (SA)*. SDC Quality Assurance.
- SDC, 2017: Swiss Agency for Development and Cooperation (SDC). (2017). *What are Impact Evaluations?* SDC in collaboration with ETHZ, NADEL, Center for Development and Cooperation.
- The Springfield Centre (2015) *The Operational Guide for the Making Markets Work for the Poor (M4P) Approach*, 2nd edition funded by SDC & DFID
- Zwart, R. (2017), "Strengthening the results chain: Synthesis of case studies of results-based management by providers", OECD Development Policy Papers, No. 7, OECD Publishing, Paris, <https://doi.org/10.1787/544032a1-en>

3. Annex 1: Phase I Results

3.1 Country Specific Strengths, Weaknesses, Opportunities, and Lessons learned

Democratic Republic of the Congo

<p>Strengths</p> <ul style="list-style-type: none"> • Teamwork and involvement of all actors in the value chain (households, collectors, processors, and producers). • Accessibility of the treatment sites even during the rainy season favoring the regular evacuation of waste. • Existence of the raw material (waste) in large quantities in households and markets. • The subscription of households to collection services and the gradual adoption of the home sorting system by households
<p>Weaknesses</p> <ul style="list-style-type: none"> • Only organic waste is considered by the RUNRES project. • Target crop of the project: Only coffee was the target crop of the project • Target beneficiaries of the project: Limited number of beneficiaries (households and coffee farmers) • Conflicts of interest between stakeholders (collectors and processors) • Weak involvement of the competent authorities (Mayor of the city). • Donor requirements not considering the reality of the DRC compared to others project countries.
<p>Opportunities</p> <ul style="list-style-type: none"> • Existence of needs (soil infertility) of innovations end products. • The expertise and experience already acquired in Phase I of the project. • Existence of potential partners and projects that can facilitate the up-scaling of innovations. • Existence of a platform that works on the recycling of inorganic waste (plastic) in the region. • The credibility of IITA vis-à-vis to the DRC authorities and donors. • The possibility of having a second Phase of the project to disseminate the innovations.
<p>Risks</p> <ul style="list-style-type: none"> • The wait-and-see attitude observed among producers accustomed to receiving free inputs from development NGOs. • The inability to pay for the end products (compost) of the innovations by the project's target end users (crop producers). • Lack of necessary funds (funding) to support second phase activities. • The problem of lack of profitability of innovations. • Non-adoption and appropriation of innovations due to the lack of evidence on the added value of finished products.
<p>Lessons Learned</p> <ul style="list-style-type: none"> • The adoption and appropriation of innovations by end users are directly depended on the added value provided by the end products of these innovations. • The sustainability of the achievements of the RUNRES project in the DRC depends directly on the predisposition and the capacity of the end users to pay for the end products of the innovations. • The diversification of the end users (buyers) of the end products of the innovations would be essential for the up-scaling and adoption of the innovations. • To manage waste efficiently and sustainably in the DRC, it is essential to keep an eye on the inorganic (plastic) part while more emphasis is placed on recycling the organic part. • The involvement and commitment of the competent authorities for waste management and recovery remain a major asset for the success of the project. • Flexibility and adaptation of donor requirements can effectively contribute to project success. • Taking into account the particularity of the DRC situation is one of the keys to the success of the RUNRES phase II project in DRC.

Ethiopia

Strength	Weakness
<ul style="list-style-type: none"> ✓ Use of, integration and coherence of scientific findings to business activities ✓ Bottom-up planning approach of the project and focusing on beneficiaries' know-how for innovation selection, testing and scaling. ✓ Strong team spirit of steering committee, scientists and project coordinators. ✓ Flexibility of innovation installation to fit local context ✓ Inclusion of all RUNRES team ideas to protocols and other data collection questionnaires. ✓ Allocation of sufficient budget for proposed innovations. ✓ Complete evaluations (profitability, feasibility and social importance) of innovations for phase-II scaling. ✓ Conducting context study to know local set-up and existing gap 	<ul style="list-style-type: none"> • Delay in finalized protocol development and distribution for implementation • Late and miss understanding country team RUNRES project implementation model. • Focusing only in organic waste recycling and missing inorganic waste recycling • Fund disbursements delay and complex expenditure auditing guidelines. • Absence of commonly accepted employees benefits like per-diem, allowance and low monthly salary for full time staff member. • Poor data recording and transparency.
Opportunities	Threats
<ul style="list-style-type: none"> ☞ Price increment of chemical fertilizer created demand for organic soil amendments (compost) ☞ Waste recycling experience of Arba Minch city region due ROSA, CLARA, SPA etc intervention. ☞ Intervening on unexploited and public priority sectors like waste management and food processing ☞ Low industrialization of Arba Minch city region contribute for more organic waste generation ☞ Perennial crop cultivation experience of city region farmers 	<ul style="list-style-type: none"> ? Weak public support and absence of known budget for innovations scaling ? Low profitability business ventures and direct beneficiaries conflict interest. ? Office heads frequent turn-over and instability expertise at concerned sectors like municipality, agriculture office etc. ? Low laboratory facilities of the country

Rwanda

Strengths
<ul style="list-style-type: none">• VEERY COMMITTED STAKEHOLDERS• STAKEHOLDERS ALREADY ENGAGED IN THE BUSINESS• FAVOURABLE WORKING ENVIRONMENT• INNOVATIONS ADDRESSING EXISTING NEEDS
Weaknesses
<ul style="list-style-type: none">• TECHNICAL KNOWLEDGE• UNDERSTANDING THE TDiP APPROACH LEADING TO WEAK PLATFORMS• MENTORSHIP FROM COLLABORATING ORGANIZATIONS
Opportunities
<ul style="list-style-type: none">• VERY PROMISING INNOVATIONS FOR SCALING UP AND OUT• SOME INNOVATIONS ARE NOVEL IN THE COUNTRY
Risks
<ul style="list-style-type: none">• QUALITY ASSURANCE OF PRODUCTS• LEGAL FRAMEWORK FOR SOME INNOVATIONS• POLICY COMPLIANCE
Lessons Learned
<ul style="list-style-type: none">• TDIP APPROACH SET UP IS A LONG PROCESS, NEED TO START WITH THIS STEP BEFORE EMBRASSING THE PROJECT IMPLEMENTATION ITSELF• THERE IS A NEED TO GIVE MORE TIME TO NURTURE INNOVATIONS BEFORE STARTING SCALING UP. THE TIME ALLOCATED IN PHASE I WAS TOO SHORT (AT LEAST 4 YEARS RUNNING INNOVATIONS WAS NECESSARY TO DEVELOP INNOVATIONS, TEST THEM INCLUDING DEMO TRIALS FOR SEVERAL SEASONS IN DIFFERENT LOCATIONS, CONCLUDE, CONDUCT MARKET STUDIES,, ETC. LESS THAN 3 YEARS WAS THE TIME ALLOCATED TO STAKEHOLDERS TO GO THROUGH ALL THOSE STEPS.

South Africa

<p>Strengths</p> <ul style="list-style-type: none"> • The project managed to attract the attention of a national government department that deals with the sanitation value chain in South Africa which lays a good foundation for phase 2. • The project has managed to identify communities which are more stable and with less political interference to implement the innovations. • Having a stakeholder with strong business background and understanding of the regulations in Duzi Turf ensured swift implementation of the innovation despite government red tape. • Having a multidisciplinary country team allowed for diverse skills that contributed positively to handling challenges that came with implementation of the project.
<p>Weaknesses</p> <ul style="list-style-type: none"> • Due to Covid 19 and lack of regular face to face meeting the TdIP never became fully functional as envisioned. • The relevant authorities within the city region of Msunduzi Municipality are not committed to the project which made it difficult get support for accessing green waste from the municipality dumping sites. • Lack of cross-country information exchange and collaboration that will have led to learning and adoption of similar innovations where there is interest. • Lack of administrative support from the University of KwaZulu often led to delays in the project implementation and delayed reporting (audits) • The data reporting for the MEL often had delays because the stakeholders did not prioritize reporting and there were no enforcement measures in place. • The country innovations in phase 1 failed to properly address issues of transformation and food security.
<p>Opportunities</p> <ul style="list-style-type: none"> • Working with post-grad students presented a great opportunity for scientific data collection and reporting. • As RUNRES moves to phase 2 there is an opportunity to work previously disadvantaged groups to address transformation issues in South Africa and also empower women and youth. • Leveraging the existing relationship with government department like DWS to attract other important government departments.
<p>Risks</p> <ul style="list-style-type: none"> • The previously disadvantaged entrepreneurs who are youth and women might not have the prerequisite to participate as partners in RUNRES which is co-financing. • There are constantly existing risk of community dynamics impeding with the implementation of phase 2 as the project scales out to other city regions. • The RUNRES team has devised a strategy to bring more government departments into the TdIP but there is a risk of bureaucratic red tape still exists if the officials are not committed. • Implementation of phase 2 will involve moving to new city regions and there is a risk of lack of support for the project from local authorities (traditional leadership, mayors, etc) which will make implementation difficult.
<p>Lessons Learned</p> <ul style="list-style-type: none"> • Adaptive management was a critical lesson that helped team readjust to challenges faced during the implementation of the project. • The importance of reporting progress to stakeholders to keep them interested in the project. • The importance of presenting information about the project in government events and conference as tool of attracting interested parties and establishing synergies.

3.2 Piloting gender mainstreaming in Rwanda

The requirement in the call for proposal for gender and youth inclusivity in the innovation plans has resulted in RUNRES innovations to create jobs for women (especially in Rwanda and Ethiopia). In addition, funding a doctoral thesis specifically on gender, allowed to collect deep qualitative data on the experience and profile of the women employed specifically in the Rwandan bioeconomy context. Indeed, the methods (i.e., surveys, participatory photography (photovoice method) and semi-structured interviews) used within the doctoral thesis brought insights in the gendered realities of biowaste workers and entrepreneurs in Rwanda. Here are the key learning from the gender analysis in Rwanda concerning workers and agri-entrepreneurs.

Focus on workers from biowaste recycling companies:

An analysis of the decency of the jobs created by the sites concludes that the work is relatively decent compared to national standards. However, substantial improvements could be made in the compost production site, where workers are significantly less satisfied about their wage and their jobs. Worker safety is not guaranteed on compost sites where inorganic waste has to be sorted from inorganic waste (with insufficient or not sufficiently renewed protection material). See figure below.

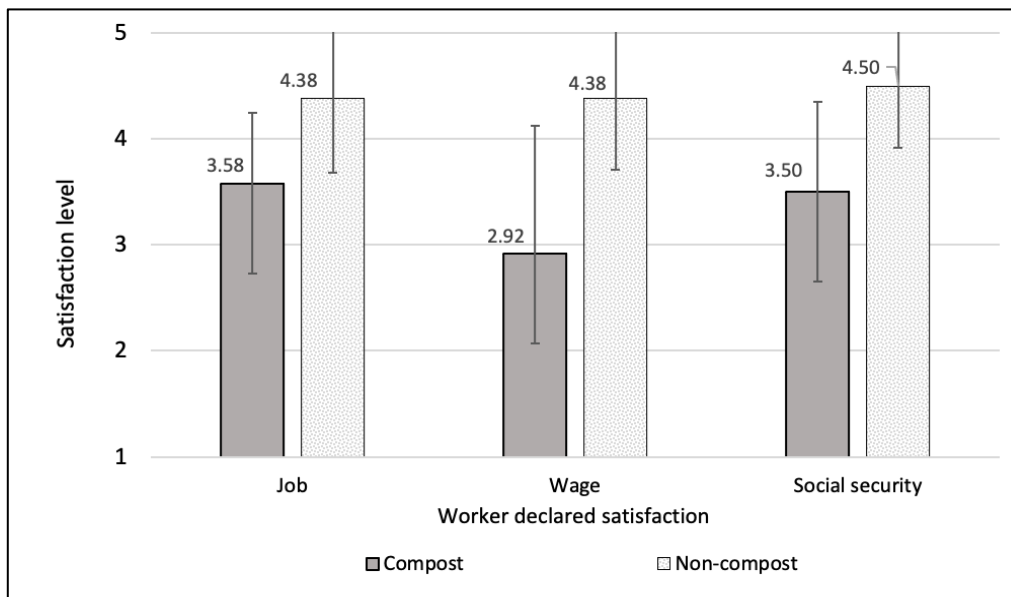


Figure 3.1: Compost versus non-compost workers' job, wage, and social security satisfaction. Variables were measured on a 5-point Likert scale: 1=very dissatisfied to 5=very satisfied, N=63.

- Tasks that require **machinery** were exclusively managed by male, and existing literature support the finding that when tasks are mechanized, they tend to become male-dominated. In that sense, RUNRES has to be aware of the risks of losing current female jobs when mechanizing tasks (e.g., sorting, peeling).
- Female and male employed by recycling companies were paid the same in the Rwandan case (**no gender wage gap**). However, there is no analysis currently for the other countries (Surchat et al., 2023).

Focus on agri-entrepreneurs:

- Female entrepreneurs in Rwanda are able to cover their practical needs as much as men do (access to inputs, credits, land, ...), in the sense that both genders face similar challenges in accessing credits for

example. However, when it comes to gender strategic needs, we learn that women face many challenges to be accepted in the society as agri-entrepreneurs.

- Female entrepreneurs explained that they face negative consequences from society for not respecting traditional gender roles as women. Many of them were single because they explained that men would not accept to marry them when they have such an important job.
- They explained they have to strategically perform their gender depending on the situation. In some cases, they have to “act as men” to gain legitimacy and respect from their male peers. In other cases, they have to “act as women” dismissive and fragile, to avoid irritating their peer.
- Women also mentioned that if it is accepted for them to work and gain an economic revenue, there are three conditions they have to follow:
 - The husband (if they are married) must approve and support the activity
 - They should earn enough money to justify their absence from home.
 - They should not earn more than their husbands.
- Women also mentioned lacking self-confidence. → Having more female role models could help women to gain confidence. They also mentioned that meeting and discussing their common issues was very empowering.

3.3 Multi Criteria Visual Analysis

Decisions on complex issues related to sustainability entail trade-offs between different alternatives, which depend on a broad spectrum of variables that we can use as selection criteria. These variables are not only technical in nature, but can also be of environmental, economic, and social nature. For making decisions and selecting suitable innovations among less suitable ones, decision-makers need to assess broad spectrums of variables —criteria— in a structured way. To generate a coherent structure with many different variables, Multi-Criteria Decision Analysis (MCDA) has proven to be a suitable approach to ease the decisional burden of decision-makers (Belton & Stewart, 2004). MCDA comes from the scientific field of decision analysis, which is split in two main approaches: descriptive and prescriptive (Eisenführ et al., 2010). On the one hand, theories following the descriptive approach attempt to explain how people make decisions. On the other hand, theories following the prescriptive approach attempt to help one or more decision-makers rather to find the best possible alternative(s) for a given issue, guided by a set of objectives. This approach, rooted in the field of business administration, aims to alleviate the decision burden by mathematically structuring a decisional issue.

In practice, MCDA addresses two different, but often interlinked purposes. First, MCDA makes it possible to analytically structure a decisional issue that is not easily solvable by using only intuition. Second, MCDA makes it possible to open the decisional “black box” to make visible how do different innovation achieve a given set of goals. For the transition from RUNRES phase 1 to phase 2, we focus on this second aspect, where we emphasize the visual and learning contribution of such a method, hence MCVA, which stands for Multi Criteria *Visual* Analysis. The use of the MCVA is thus restricted to illustrating how different innovations perform, and the method will not be exclusively used for deciding which innovation makes it to RUNRES phase 2.

In the case of the transition between phase I and phase II, we proceeded through the following steps:

1. Structuring the different objectives,

2. Gathering the information of the performance of the different RUNRES innovations, mainly through the QUAP and the Monitoring, and
3. Aggregating the different performances of the innovations, by using an already elicited set of weights from the MCDA study carried out in 2020.

For the structuration of the different objectives, we used a very similar structure as we had in 2020 in the context studies, where the objectives are ordered as:

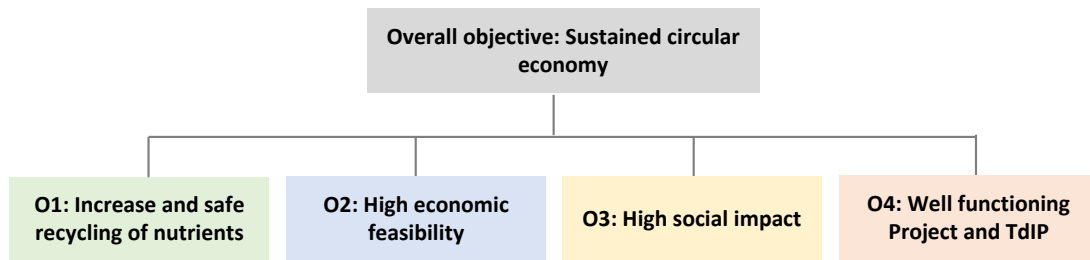


Figure 3.2: General structure of the objectives of the MCVA used to visualize how do different innovations perform at the end of RUNRES phase I.

For each objective of the MCVA, we operationalized a set of variables to give us the information on how the different innovations are doing, or potentially doing. These different indicators have not been designed directly for the MCVA, but are mainly provided through the QUAP and the ME&L. We computed the aggregation of the different objectives according to the formulation by Belton & Stewart (2004) and where we used the weights elicited in 2020 by the steering committee members through the Swing method (Eisenführ et al., 2010). The different weights can then be normalized for each objective, and for each criterion within these objectives, according to (Eisenführ et al., 2010):

$$w_r = \frac{t_r}{\sum_i t_i}$$

Where:

t_r is a given score stated by a respondent or a respondents' group.

w_r is the weight of a given criteria related to score t_r .

t_i are the continuum of different scores given by the respondent.

While the elicited weights may have slightly shifted during the last few years, we can assume that they have remained relatively similar. We can also make this assumption considering that across different types of actors, the weightings of the different objectives remained relatively uniform, with a higher emphasis on social aspects, and a lower emphasis on the functioning of the project (Figure 10.3).

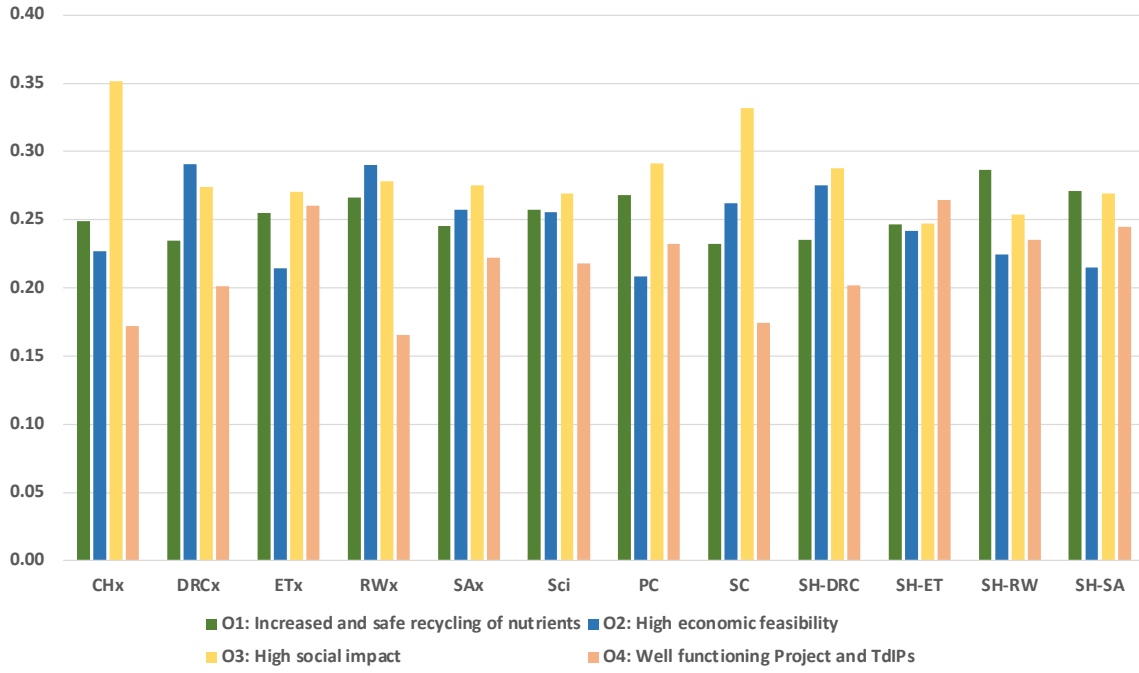


Figure 3.3: Weights of the four different objectives (O1-4) across different sets of actors for the MCDA surveys' round of 2020 (sum = 1): "Country-x" for each RUNRES countries (n = 5, 3, 3, 3, 5), "Sci" for the RUNRES scientists (n = 8), "PC" for the RUNRES project coordinators (n = 4), "SC" for the RUNRES steering committee (n = 6), and "SH-Countries" for the different stakeholders directly involved with the realization of the innovations, interviewed for each country (n = 10, 10, 13, 7).

Once the different stakeholder preferences for the weights are elicited and normalized, we could aggregate these values together with linearized value-functions through a score that gives an overall ranking of the different innovation plans (see Figure 10.5). The aim here is not about sorting out the different innovations through their aggregated score, but rather about making visible their different merits, since for instance, one innovation with high scores related to the recycling organic nutrients can earn lower scores on its social impact objective or any other objectives. Therefore, we keep the results not fully aggregated to keep visible the differences in how different innovations score within their objectives. For each RUNRES innovation, the different weights and values could be aggregated as (Belton & Stewart, 2002):

$$V(a) = \sum_i w_i v_i(a_i)$$

Where:

$V(a)$ is the overall performance of a given innovation a ,

$v_i(a_i)$ is the value function reflecting the performance of innovation a on criterion i ,

w_i is the weight elicited to reflect the importance of criterion i .

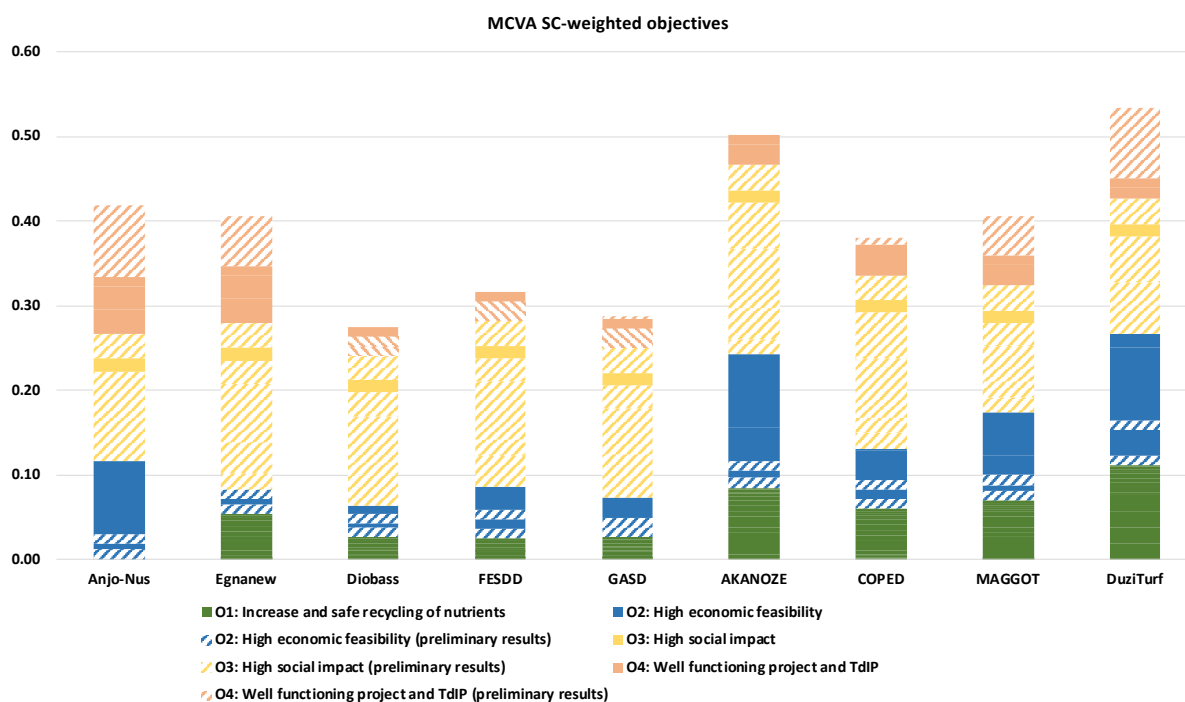


Figure 3.4: Preliminary MCVA scores weighted according to the steering committee (SC) members (weights from 2020). The different bars in the chart are segmented through the sub-scores of the innovations of the four main objectives: O1: Increased and safe recycling of nutrients (green tones), O2: High economic feasibility (blue tones), O3: High social impact (yellow tones), and O4: Well-functioning Project and TdIPs (red tones). The hatched colors are for data that are not definitive at the moment of the submission of the prodoc. The detail of the objectives, can be found in Annex 3.

At the moment of the submission of this prodoc, the MCVA data are still preliminary and will be shown in their definitive form in the final report for phase I. However, we can already observe some trends, where:

- There is an overall larger weighting of the social objectives from the steering committee. This is especially visible for the Swiss participants to the project, where we can also observe their “weight” in the weighting of the steering committee. However, the social objective is not over-proportionally weighted compared to the weights of the other objectives, by the different respondents’ groups. The values on social aspects, mainly in form of youth and women involvement in the innovations are still provisional. While these aspects were absent in the original logframe of RUNRES phase 1, they have been added to provide visibility on how the project is doing from that perspective.
- There is an overall smaller weighting on the project functioning objectives across the different groups (O4). However, this lower weighting is still relatively substantial compared to the weighting of the other objectives.
- Some innovations score well on the recycling of the nutrients (O1), mainly due high quantities and high quality, and some other are scoring less well due to either small quantity (AnjoNus, see Figure 10.5) or low quality (the composting innovations in the DRC). The scores on safe nutrient recycling are not only based on the quantity (tonnage), but also on the nutrients’ content (NPK+C quantity), and safety, mostly through pathogens’ deactivation (see the full criteria set in Annex 4). Therefore, these three aspects have to be achieved to have high scores on that objective.

- Economically, some innovations score high due to high projected return on investment (e.g. AKANOZE Nyamiyaga Ltd. or DuziTurf), while others are not economically viable at the moment although production takes place and the products are distributed (see Figure 10.5). However, at the time of submission, these economic values are projections, and the definitive values will be computed at the end of RUNRES phase 1.

As stated at the beginning of this section, the aim here is not to decide and pick only the innovations that score well. Rather, the aim is to visualize, and using this information to better design the different innovations in phase II. Based on these results, we can for instance make sure that the innovations of phase II provide compost of good quality, or that well and robustly performing innovations in economic terms may be channeled towards more business independence in the phase II through a setting shift, for instance from an “A” to a “C” setting.

The definitive MCVA results will be ready by the end of the phase I. However, the preliminary results provided here already give extensive information on where the emphasis should be made for each innovation to make a good upscaling in phase II. Eventually, the MCVA will be carried out again during the second half of phase II to visualize the success, based on the data generated through the QUAP, Monitoring, and the economic evaluations. We will also elicit the weights again, for us to see how far the weight preferences of the different groups in the RUNRES team and involved stakeholders might have changed.

3.4 Gender Phase I Challenges

The project has somewhat failed to mainstream gender through-out the RUNRES staff. Rather, "responsibility for gender" was delocalized on one single person (aka a white female student who has less authority and who is partially seen as representing the continued domination of Western perspectives in Africa). This has prevented that all country-teams engage themselves on tackling potential gender inequalities.

In addition, there is a common misbelief that “gender equals women” meaning that many men don't think that, they are the result of a gendered socialization and forget that gender topics concern men as well. Perhaps a basic introduction workshop to gender and diversity would have created interest and awareness on the fact that we are all gendered beings and influenced by racial dynamics. This introduction workshop could have also served the cause of highlighting - in numerical terms - why gender and diversity matter when it comes to the food system.

Finally, there has been quite some resistance experience from the doctoral student “responsible for gender” from the other country-team members. Gender as a topic is often polarizing between people, that involves many diverging value systems from different cultures. It has been somewhat difficult in phase 1 to talk about gender without inducing some tensions between the participants. Some conversations about gender did happen at some key moments in the project (e.g. South African meeting 2019 and DRC meeting 2021). However, it seems that there might be a need for more open spaces to discuss the uncomfortable topics and diverging views around gender/ diversity/ de-colonization/ etc.. Also, these discussions should be moderated by a senior Africa gender expert, who has the acceptance of the country teams, rather than “pushed” by a junior European doctoral student.

3.5 Cross city-region outcomes and engagement with external initiatives

A core rationale for why RUNRES operates in four city regions across Sub-Saharan Africa is the potential to foster “South-South knowledge transfer. As a transdisciplinary project, co-knowledge production is seen as a pre-requisite for sustainable development. Thus, having project team members, partners, and stakeholders learning not

only from the coordination unit, but from one another as well, is viewed as a major project outcome. With this background in mind, the project team is of the opinion that the cross city-region outcomes and engagements to be very valuable for the sustainability of the project.

Democratic Republic of the Congo

- Experience exchange visit to Burundi at APROSAN as part of technology transfer on ecological toilets
- Experience exchange visit to Rwanda with Maggot Farms Production Ltd. and Akanoze Nyamiyaga Ltd. respectively as part of technology transfer on the production of black soldier flies and the valorization of cassava peels.
- The visit of RUNRES sites carried out by the provincial authorities (Ministers and Mayor of the city) and local authorities (Territorial administrator and the King) for the promotion of the innovations being implemented within the framework of the RUNRES project.
- The collaboration between APROSAN of Burundi with the GASD consortium in the transfer of technology on ecological toilets (Acquisition of materials and expertise)
- The collaboration between the RUNRES-DRC team with the sanitation service of the municipality of Bukavu.
- The collaboration between the RUNRES-DRC team with OLAM and other local and international organizations which can lead to a partnership for the promotion of the end products of the innovations being implemented.

Ethiopia

- Unfortunately, AMU RUNRES beneficiaries did not involve in cross city-region knowledge transfer.
- The collaboration with Arba Minch City municipality office for organic waste recycling and Arba Minch city water supply and sewerage management enterprise office to realize source separated human urine recycling. Accordingly, Arba Minch City municipality office provided working areas (processing sites) for beneficiaries, while water supply and sewerage management enterprise office technically supporting our beneficiaries.
- The Ministry of Agriculture delegates visited twice the RUNRES innovations to explore how the Ministry can replicate them in other regions of Ethiopia.

Rwanda

- Collaboration with TAAT project: training of stakeholders around animal feed in Rwanda, organized by RAB and IITA under TAAT, using cassava peels as a case study from AKANOZE Nyamiyaga Ltd. under RUNRES
- Initiated collaboration with NICE project (sister project to RUNRES funded by SDC), working on nutrition. We are exploring how BSF and composting of organic waste from HH in Rusizi and Rubavu towns can duplicate what COPED is doing in Kamonyi (sorting at source basically). RUNRES Rwanda facilitated their initial workshop with possible stakeholders in different value chains identified to explore constraints and possible solutions, the validation workshop is planned for soon.
- RUNRES Rwanda initiated dialogue with the Global Green Growth Institute (GGGI) on municipal waste management in Kigali.

- The project is in regular communication with the Rwanda Agricultural and Animal Resources Board (RAB) to discuss analytical procedures, regulatory compliance issues, and the bottlenecks facing the construction of a more enabling regulatory environment.

South Africa

- During the annual meeting in South Africa, the entire team had the opportunity to visit a company that manufactures UDDT systems. In addition, each team was able to bring this sanitation technology to their respective city regions to explain UDDT.
- The work that RUNRES has done has attracted the interest of national government. RUNRES PI was invited by the national Department of Water and Sanitation to sit in a committee looking at the Draft National Faecal Sludge Management for Non Sewered Sanitation, where RUNRES has already contributed to introducing the idea of a circular economy as part of the nutrient recovery strategy and sanitation solution for government.
- The Department of Water and Sanitation has also established a partnership with RUNRES-UKZN to develop a protocol document focusing on development of the guidelines for financial mechanisms and economic models to facilitate circular economy in the provision of faecal sludge management services. This partnership will involve piloting some RUNRES innovations in other city regions to test their effectiveness.
- On 26 November to 02 December 2022, RUNRES-SA invited two DWS officials namely (Mr. Andre Van de Walt and Ms. Lusanda Agbasa) attended the RUNRES Phase 2 planning meeting in Naivasha Kenya.
- On 15 November 2022 RUNRES-SA attended and presented at the Department of Water and Sanitation National Stakeholder's Consultation Workshop on the draft National Faecal Sludge Management Strategy for Onsite Sanitation Systems.
- On 28-30 RUNRES-SA attended and presented RUNRES work at the WISA 2022 Biennial Conference and Exhibition: Navigating the Course.
- On 13 September 2022, the RUNRES South Africa attended the combined KwaZulu-Natal Sanitation Task Team (PSTT) and Stakeholder Consultation Workshop held at Southern Sun-Elangeni Hotel in Durban, South Africa.
- On 18-19 February 2022 the RUNRES project represented by Simon Gwara attended and presented the RUNRES project outputs to the Minister at the National Water and Sanitation Summit (NWSS) at Gallagher Convention Centre in Pretoria, South Africa.