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Swiss Agency for Development and Cooperation SDC

External Evaluation of the RUNRES Project (Phase 1)

FINAL EVALUATION REPORT

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ECOPSIS SA

REDD
Sharing knowledge for ethical and tasty food

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List of Abbreviations and Acronyms

AMU	Arba Minch University
AMS	Department of Human Security
B2B	Business to business
BSF	Black soldier flies
CGIAR	Consultative Group for International Agricultural Research
DEZA	Swiss Development Cooperation (SDC)
DRC	Democratic Republic of Congo
DWS	Department of Water and Sanitation of South-Africa
ETH	Ethiopia
ETHZ	Swiss Federal Institute of Technology Zurich
FS	Faecal Sludge
FSTP	Faecal Sludge Treatment Plant
FSM	Faecal Sludge Management
GiZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
H&S	Health and Safety
IITA	International Institute of Tropical Agriculture
MoU	Memorandum of Understanding
NWMS	National Wate Management Strategy
OPEX	Operational Expenditure
PPP	Public Private Partnerships
PS	Primary School
RAB	Rwanda Agriculture Board
RSA	South-Africa
RWA	Rwanda
SDC	Swiss Development Cooperation
SECO	Swiss State Secretariat for Economic Affairs
SME	Small and Medium Enterprise
UDDT	Urine Diverting Dry Toilet
UDFT	Urine Diverting flush Toilet
UKZN	University of KwaZulu-Natal
UNIDO	United Nations Industrial Development Organization
UW	Umgeni Water

TdIP	Trans-disciplinary Innovation Platforms
ToR	Terms of Reference

1 EXECUTIVE SUMMARY

The "rural-urban nexus – Establishing a nutrient loop to improve city region food system resilience" (RUNRES) Project was launched in 2019 with the aim to co-design, test, implement and scaled safe, (cost-) efficient, and socially acceptable innovations to valorise urban and rural waste resources and enhance food value chains in order to enhance circular economies and thereby improve the resilience of city region food systems. To achieve this objective, RUNRES works with transdisciplinary innovation platforms in Arba Minch, Ethiopia; Bukavu, eastern DRC; Kamonyi, Rwanda; and Msunduzi, South Africa.

RUNRES was designed to be implemented in two phases. This external evaluation focuses on Phase 1 (2019-2023). Its results are expected to feed into the preparation of Phase 2 (2023-2027).

The reason for the evaluation is to provide the project partners including SDC with an external and objective assessment of the achieved results and provide additional independent information for designing the Phase 2 of this RUNRES Project.

The Consultant relied on the data available at the time of the evaluation. As not all activities were completed at that time, the evaluator used his own experience to fill in these gaps where possible.

For this mission, ECOPSIS mobilized a team of four Consultants, two international and two national. This team was supported by an international expert in food systems from the CGIAR. The Consultant conducted his investigations on site in Rwanda and Ethiopia. For Congo and South Africa, the Consultant's investigations were conducted remotely.

In conclusion, RUNRES has tackled a relevant challenge that represents a significant opportunity for impact. Also due to external factors, it is unlikely that all objectives will be achieved by the end of Phase 1. Thanks to the numerous innovations tested, this first phase allowed to outline promising potential for a 2nd phase.

See the detail of the main evaluation outcomes in Appendix 7

However, **significant changes will need to be made to this 2nd phase due to the different nature of the objectives and the services required to achieve them**.

Reducing the number of countries would, for example, focus efforts. The four countries have distinctive characteristics that may serve different purposes to SDC. In addition, SDC may have an interest in refocusing in countries where it has staff to follow up.

South-Africa, with its co-composting innovation can serve as a mentor for other countries. This lead can also be justified by the stronger capacities of Duzi Turf (co-composting innovator) and its partners Umgeni Water and UKZN.

In **Rwanda**, although innovation in composting still seems fragile, there are innovations with interesting potential based on agro-businesses, which are not isolated with markets and competition starting to emerge. In addition, the country is showing a willingness to progress in the field of the circular economy. The size of the country and the almost permanent relative proximity to the capital city also makes it possible to work relatively efficiently.

The context of Bukavu (**DR Congo**), which is far from the capital city in a huge country, would make progress on framework conditions needed for a scaling-up not impossible but more difficult to achieve than in other countries. However, focusing on agro-industries (e.g. coffee) could have potential and have the advantage of offsetting the currently limited engagement of the public sector.

Arba Minch (**Ethiopia**) is a secondary city and refocusing activities toward the capital would offer more potential for scaling. It would also be possible to focus on agro-industrial parks, but there are none in Arba Minch. These shifts would however be a real disruption and not easy to implement. But the main risk is that it is difficult to estimate now to what extent the framework conditions, which are currently not as favorable to private sector development as in the other three countries, with greater control and constraints on the private sector, can be rapidly improved.

It is also recommended to refocus efforts on **a limited number of value chains with high potential and limited risks** and try to capture larger scale market demand in specific commercial sectors with private agro-businesses. Assumptions about potentials and risks of the tested innovations are given in the main text of this evaluation report, but they will need to be confirmed by detailed business plans and in-depth market assessment, which should recenter the focus on demand rather than technology. It is also recommended not to close the door to companies with new high-potential, low-risk innovations that have not been tested in Phase 1 of RUNRES.

From the evidence available to the evaluation, section §3.3.8 provides an assessment of the potential and risk, strengths and weaknesses of Phase I innovations. Based on this assessment, the following innovations tested in Phase 1 could be implemented in Phase 2:

- Rwanda: **Cassava peel (Akanoze), Black Soldier Fly (Maggott Farm).**
- South Africa: **Co-composting (Duzi Turf).**
- Ethiopia: **Banana flour (Anjo-Nus).**

Composting in DR Congo could be added if a change of strategy is achieved with a focus on agro-industries.

The implementation of the biochar innovation (South-Africa) as well as the struvite innovation (Ethiopia) are not sufficiently advanced to be ready for inclusion in a Phase II.

If not yet possible within Phase I, exit strategies or phasing out of partnerships with Phase I innovators could be integrated to the start of the Phase II.

Giving more weight to improving framework conditions of these value chains will be important, as these are prerequisites for sustainable scaling up. To be effective, it is recommended to take a structured approach to engagement with national policies, strategies, regulations and the financial and business services sector.

In preparation of Phase II, the Project should undertake an identification exercise of current key gaps and support needs in each selected value chain as well as a mapping of relevant policy, regulatory, capacity development, and financial, business & technical services available at country and regional level.

Based on these analyses, formal agreements with public authorities and private sector service providers can be developed in support of specific and concrete objectives and outputs to be pursued during Phase II. In particular, the implementation of financial tools allowing for leverage effects cannot be improvised at the risk of encountering limits or blockages during the project.

Because these challenges are of a different nature than in those of the 1st phase of RUNRES, they require the application of other types of resources, i.e., **a different combination of implementing and supporting partners**. It seems that the need for scientific and academic resources will be secondary in a 2nd RUNRES phase, as technology and science will become of marginal importance. Priority needs would be for policy (including clear strategy), regulation, financing, for the development of the private sector by market analysis of the targeted waste and food value chains. To ensure effectiveness, it is recommended that long-track international experience, with adequate references, in these fields and in developing countries be used for coordination, guidance and expertise; and, secondly, that competent national partners and/or experts are identified to provide support services.

Given the need for and importance of framework conditions for sustainable scaling, it is recommended to foresee capacity building for the relevant authorities to understand and master these new frameworks and tools.

Customize the interventions of Phase II according to the needs, which depends on:

- the countries (the level of maturation of the framework conditions and capacities) and
- the innovations (their level of maturation of the businesses for the scaling).

2 INTRODUCTION

2.1 Description of the evaluation assignment

Background

With declining facilities and possibilities to maintain satisfactory livelihoods, rural communities are finding it increasingly difficult to survive. African farmers are hindered by a lack of financial capital and have limited opportunities to invest in production factors necessary to grow sufficient and competitive yields, forcing them to search for economic opportunity elsewhere [1].

Consequently, informal settlements, or unplanned urban zones marked by unclear property rights, are growing rapidly (UN, 2015). These underserved communities rarely have access to running water or municipal sanitation services and suffer from chronic food insecurity. Together, these developmental challenges make the urban poor amongst the most vulnerable populations in the world today [1].

Currently, numerous urban waste streams are not being adequately addressed. Food waste and urban green waste is produced at vast volumes and is either not disposed of at all or taken to an ever-growing landfill [1].

For regional food systems in Africa, this has led to a radical nutrient imbalance; local farmers, suffering from a chronic lack of nitrogen, phosphorus, and other elements, especially critical micronutrients, often reside within a few kilometres of urban centres poisoned by the uncontrolled release of these nutrients. Thus, efforts that seek to improve livelihoods across the rural-urban nexus are critical to socially equitable and ecologically sustainable development in Africa [1].

The "rural-urban nexus – Establishing a nutrient loop to improve city region food system resilience" (RUNRES) Project was launched in 2019 with the aim to co-design, test, implement and scaled safe, (cost-) efficient, and socially acceptable innovations to valorise urban and rural waste resources and enhance food value chains in order to enhance circular economies and thereby improve the resilience of city region food systems.

To achieve this objective, RUNRES works with transdisciplinary innovation platforms in Arba Minch, Ethiopia; Bukavu, Eastern DRC; Kamonyi, Rwanda; and Msunduzi, South Africa (see the overview in the Appendix 1).

RUNRES was designed to be implemented in two phases:

- Phase 1 (2019-2023): the phase that has been implemented and is the subject of this evaluation
- Phase 2 (2027-2027)

As indicated by the ToR for this external evaluation, the main outcomes[1] the project aims at reaching during this Phase 1 are:

- Improved control of nutrient flows and recycling of nutrients across the rural-urban nexus.
- The development of locally suitable solutions- private enterprise, public investment, public/private partnerships, and civic science that will enable sustainable sanitation and waste-recycling innovations.
- Increased access and use of locally sourced soil amendments that will improve local agriculture.

[1] to be differentiated from the formal logframe outcomes that are more detailed

- Facilitate an enabling policy environment for the scaling of and diffuse selected innovations in partnership with policymakers and practitioners.

To reach those outcomes with the involvement of all relevant actors, RUNRES has established Trans-Disciplinary Innovation Platforms (TdIPs) in each of the four city region food systems.

Aim of the assignment

The reason for the evaluation is to provide the project partners including SDC with an external and objective assessment of the achieved results and provide additional independent information for designing the Phase 2 of this RUNRES Project.

The objectives of this evaluation are:

- To evaluate RUNRES phase 1 according to the DAC/OECD criteria against the planned objectives and outputs.
- To draw recommendations for the RUNRES Phase 2:
  - Assess how far systemic changes were triggered by the project and if impact results, susceptible to be sustainable and replicable can be identified, and are ready for scaling up and out.
  - Recommend to the project partners, including the SDC on the selection of promising approach(es) along a logic of circular economy in food systems for the scaling-up in Phase 2.
  - Draw recommendations for the planning of and the support required for the scaling up and diffusion phase of this project.

The evaluation itself was carried out along the following lines, which represent the 6 DAC criteria:

2.2 Methodology

2.2.1 Preparatory work

Desk study

Considering the number of sub-projects implemented in the 4 countries, a large number of documents were established since the start of the RUNRES Phase I in 2019.

Not all documents carry the same level of importance. Therefore, the ETH Zurich (ETHZ) has made a selection of a limited number of project documents available via its online platform *polybox*. This selection has been made to focus on the key documents.

The documents were reviewed and categorized as shown in the Appendix 3 . The categories are the following:

- Preliminary documents: the Prodoc but also the “Context Studies Summary Report” illustrating the context and the baseline situation.

- Context study report
- Innovations: documentation illustrating the dozen of innovations selected to be developed under this Project, including the preliminary selection process of the innovations.
- Monitoring and Evaluation: log frames with indicators.
- Progress Reporting:
  - Periodical reports showing the progress of the activities (half-year and annual reports).
  - Reports showing the financial progress will be requested from the Principal Investigator of the RUNRES (Mr. Johann Six) upon his return from his mission in DR Congo.
- Intermediate / Final Report: a summary of the RUNRES Project at this time (the Project is not yet over and a Final Report is not available).

Preliminary interviews

Preliminary interviews took place in July and August 2022 with the RUNRES Team based in Switzerland (ETHZ) to clarify the importance and comprehensiveness of the documentation. The objective was also to identify and liaise with the RUNRES staff based in the 4 countries that eventually supported the organisation of the Consultant's field missions and interviews.

This has helped to get a clearer picture of the project and the organization. Stakeholders also were keen to raise issues from their point of views.

Inception Report

Based on the collected information and the preliminary interviews, ECOPSIS drafted and submitted the Inception Report on 29 July 2022.

2.2.2 Meetings and collection of information

Remote evaluation

The safety situation in Bukavu did not allow the Rwandese Consultant to conduct a field mission.

The investigations on the activities carried out by RUNRES in this area were conducted remotely as in South-Africa. A remote evaluation was foreseen for South-Africa in the ToR of the Consultant.

Field missions

As foreseen, the Consultant carried out a 1st field mission in Ethiopia (Arba Minch) and a 2nd field mission in Rwanda.

Interviews and site visits

The conducted programme of interviews, site visits and field missions is shown in the Appendix 2 . The Consultant carried out a total of approximately 50 interviews or meetings which allowed him to talk to most of the several stakeholders.

3 EVALUATION

3.1 RELEVANCE: "Is the Intervention doing the right things?"

3.1.1 Of the RUNRES Project in General

Does the RUNRES (rural-urban nexus) address a fundamental need?

There is no doubt that rapid urbanization increases the need and (over time) the economic demand for circular economy approaches and management practices. Depending on the size of the agglomeration and particularly its density, the challenges that RUNRES aims to address may vary.

In low density small agglomerations, waste streams may be frequently managed on site, including forms of recycling and limited opportunities for organic waste management services. For example, in Kamonyi, outside of the agglomeration of Kigali, the innovation leader (COPED) struggles to collect organic waste in sufficient quantity.

When agglomerations grow and reach sizes such as Bukavu, for example, the principle of rural-urban nutrient transfers becomes more meaningful.

What opportunities and relevance for waste/nutrient loop?

The relevance and opportunities for circularity on organic waste & nutrients are reinforced by the increasing demand for nutrients and the rising prices of synthetic fertilizers or animal feed.

This is true regardless of whether the waste/nutrient loops are between rural and urban areas or not (rural-rural, rural-urban or urban-urban). The *principle* of the circularity on organic waste and nutrients has more strength and potential if it is not restricted to urban rural transfers.

3.1.2 Of the designed Approach

Is the linear innovation-led approach relevant?

The project design is **"linear innovation-led"**, i.e., starting with the selection of specific technological innovation ideas, it then supported the development, validation, and early piloting of these innovations along a linear pathway.

Progress and success along this pathway differ between innovations. The contributing factors were multiple and not always easy to pin down; but they included country institutional context, market (supply and demand) context, capacity and competencies of the innovation teams, technical support from within the RUNRES project from linkages, and logistical challenges related to the pandemic.

The linear pathway approach de-emphasized attention to the innovation environment or framework conditions at city-region and national levels. This resulted in common design and implementation gaps across several innovations.

For example, a detailed market segmentation analysis would have helped to determine at an early stage the relative 'fit' and targeting strategy of specific local innovations in broader markets such as for organic fertilizers or animal feeds. During implementation, stronger and more diverse links with potential service providers and external expertise at country level (e.g., private business consultancies, market research firms, or specialized technology experts) could have helped bridge some of the gaps in good time and start laying a foundation for continued technical and business support beyond the project duration.

The larger point for project design is to be aware of and articulate where the innovations enter the nutrient loops, and the related value chains, and how these loops area structured, as this would need to inform the scaling and sustainability strategy.

Are the principles and the process of identifying and selecting the innovations adequate?

This above described situation is reinforced by the principle of supply-driven innovation/project selection in contexts of rather weak business capacities, which seemed to have narrowed and scattered the innovations / projects and the RUNRES project activities.

Innovations were selected through a competitive process, which is in principle considered a good approach as it boosts commitment and responsibility from the participants.

The advertisements of the request for proposals were using the channels of the national RUNRES national partners, which are universities and research institutes. Diversifying these channels (e.g., through ongoing SME development programmes or by focusing on well-developed companies, even if they are not yet directly involved in the sector) may have increased the number of applicants. However, the situation differs from one country to another, depending on the entrepreneurship environment.

The bidders of this tendering process were using a standardized proposal format. The selected innovation plans included a "*business plan*" section but this was limited in quality and scope, drawn up by the applicants who were mainly technology-focused entrepreneurs or social groups with limited expertise in business planning.

Many candidates had to be supported by the RUNRES team already at the proposal preparation. In Ethiopia and South Africa, only two "*innovation leaders*" (private companies) had already significant business experience. In Rwanda and DRC, some companies had a very long standing experience in waste collection and to certain extend in circular economies. Some "*innovation leaders*" would have needed additional business skills to start and run a business. It is likely that this was due to the limited number of candidates, itself depending on the business environment and the advertisement channels, and that trade-offs had to be made by prioritizing the ability of innovation leaders to technically develop the innovations before developing a business.

It is questionable whether in contexts where the development of the circular economy sector and business environments are still at an early stage, and with the limited capacities mentioned above, it is appropriate to use standard competitive selection processes.

A targeted search for potential champions and mentors combined with a preliminary phase of business capacity building would have been an option. It is important for a next phase to facilitate linkages with business planning expertise, such as is available in the private business advisory sector, to address this gap.

Was the planned TdIP an adequate tool to reach the RUNRES objectives?

In principle, the establishment of "**Trans-disciplinary Innovation Platforms** (TdIP)" is meant to provide a framework and set of practical tools for linking different stakeholders in specific innovations and across related innovations with each. As such, TdIPs can facilitate linking "linear innovation-led" design to the wider innovation environment. In the case of RUNRES, project reports demonstrate the use of the TdIP approach in project planning and to some extent in reviewing progress, and this was corroborated by country implementation teams who found this a very helpful methodology.

On the other hand, practical follow-up action through stakeholder engagement, either for specific troubleshooting or for exploring new market or support opportunities, was not evident at field level but may have been implemented to some extent. This may have been hampered by overall delays and disruptions due to the pandemic but should be kept in mind for the future given the general need for stronger engagement with alternative service providers and supply & demand partners.

Is the "2-phased" Project approach sufficient to address business development risks?

"RUNRES' ambition is to – over time – have impact beyond the initial municipalities where innovations are developed and tested. […] Two potential scaling pathways have been identified: 1) outscaling, […] and 2) upscaling […]."

As indicated in the ProDoc, the ambition was not to achieve out- or upscaling immediately, i.e., during phase 1. This could be achieved in a second phase of RUNRES.

A certain percentage of business failure is inherent to innovations or private sector development, because their development from scratch is risky. Simply splitting the programme in two is not necessarily sufficient to adequately address this risk.

It is therefore relevant to embed the progressivity of the approach already within this first phase. To further mitigate this risk, projects should invest time and effort during the early project phase to understand and learn (i) how to "navigate" the innovation environment (framework conditions) to avoid blockages and identify any potential enablers and (ii) how to drive its services and products according to the demand or potential demand. This can be done through a combination of assessment studies and stakeholder workshops as well as by pro-actively linking selected innovations during this first phase with services and markets that might prove important for future sustainability.

In the case of RUNRES, it seems that the innovation teams focused on a narrower context as laid out in their initial sub-project proposals. The broader opportunities and threats – both laterally in the local arenas and vertically linked to the national level – would have benefited to be integrated in the drafted "*innovation plans*" at this time.

For this reason, it would be important for the project to take a step back at this stage and consider how the tested technologies and the business capacities built during the first phase can best be applied and further supported in future. This might include, for example, linking with wider or different waste supply chains and product markets, and engaging with service providers in financial, business, or technology/equipment sectors operating in the four countries but not yet connected to the innovations.

What is the relevance of selecting 4 countries? What is the relevance of doing 3 to 4 sub-projects in each country?

To implement innovations in 4 countries is a challenge of coordination. Not all the countries have the same framework conditions, the same history and culture, the same opportunities and challenges.

In a logic of innovation, increasing the number of countries and innovations increase the chances of finding innovations that may have potential for future development.

The coordination challenge can be handled with adequate coordination efforts and resources, using for example the TdIP and working with national partners that were already known by the ETHZ and competent in their domain of expertise.

The selection of the four countries and of cities within these, provides an adequate sample of different institutional, market, ecological, and social conditions of secondary cities in Eastern and Southern Africa.

- In some cases, the selection of cities and of proposed innovations without the ability to make major adjustments along the way, limited their relevance, such as in Arba Minch, Ethiopia, where urban waste management seems to have alternative solutions in place or under development, and the nationally important banana production sector demand for organic fertilizer or for processed products still needs to be demonstrated.

It would be helpful, in a review analysis, to map these locations within the broader framework of urbanization in the region and identify what has been

learned about patterns of urbanization and how these affected nutrient loops. This could then inform intervention strategies at larger scale in future. For example, by pursuing links beyond the localized circularity perhaps envisaged at the start of the project (such as markets for compost or animal feed in different parts of the country), innovations might have greater impact.

Is the decentralized approach with significant activities carried out from national actors relevant?

A decentralized approach allows to reach more ownership and more sustainability. Given the heterogeneous capacities of national actors of the 4 countries, it was necessary to strengthen them.

This capacity gap was partly filled by the TdIP to address scientific related issues. To complement these scientific capabilities of the academic and research sector, it seems that the business aspects would have required the support of external resources from the private sector.

Are gender aspects relevant and considered in the designed approach?

Gender aspects are relevant, because of the driving role played by woman in the waste management at household level as well as in the agriculture.

Gender and more generally inclusiveness were part of the RUNRES innovation selection criteria.

As a result, most of the innovations gave a role to women. For example, in Ethiopia it was planned that the 4 waste collection and transport associations would be managed by women.

3.1.3 Of Public Private Partnerships

Are project investments in private companies and in PPP adequate?

It is recalled here that the relevance of the section principles of the innovations and their implementation companies, as well as the related risks, are already discussed in the section above.

Project investments in private companies were handled quite differently in the four countries. To some extent, this reflects different institutional contexts and types of "*companies*" in each country, and to some extent also different approaches by the project country teams:

In Ethiopia, for example, the emphasis of investment has been on equipment. During field visits and interviews with innovation teams, there appeared to be a risk of underutilization of large food processing and composting equipment recently imported. At this stage at least, this equipment seems to be far in excess of current or historical business volumes and the anticipated business growth is not well supported by either market or supply chain analysis. To maybe a lesser degree, this also applies to waste collection trucks, urine collection and struvite processing equipment, though these investments are much smaller in monetary terms.

By contrast, in Rwanda the project has not significantly invested in equipment. In fact, the question here is rather whether the incremental investment approach could perhaps reduce the effectiveness of the innovation and limit demand. This is clearly seen in the case of Akanoze (cassava peel processing) where the limited drying capacity is an immediate constraint that could be resolved through technologies available in the country.

In conclusion, the adaptation of public financial support should be based on a sound market-driven business plan that takes into account the growth potential of the company as well as the risks.

How is the share of the risks between public and private in PPP?

It is generally relevant for the public hand to support innovation leaders so as not to restrict but to release their potential. The support of RUNRES is therefore basically relevant. The share of funding by funders is shown in Appendix 5 for each innovation, according to the available MoUs.

In general, RUNRES planned to slowly reduce its funding in order to move toward financial independence for innovation leaders after the end of Phase 1, which is adequate. The financing plan could have been extended to at least 1 year after the end of the RUNRES, in order to fully plan the exit of the financial support of RUNRES Phase 1.

The level of self-financing by an innovation leader is a good indicator of its capacity, its trust in its innovation and the risk. This was confirmed by the comparison of the initial investment and the success of the innovations.

With the exception of one innovation (RUSUS in South Africa for biochar production from faecal sludge), all innovation leaders were expected to co-fund the start-up of the innovation, with Duzi Turf (in South Africa for co-compost production) having the highest initial investment level (63%).

The local community that was supposed to lead the RUSUS innovation as well as a second innovation showed the lowest real commitment to co-fund and both MoUs for these two innovations had to be cancelled during the Project implementation.

How do you assess the risk of public investment on market distortion?

This question will become relevant as soon as the markets are sufficiently developed and the competition between the suppliers will be high enough. This was not yet the case because markets were in most of the cases not or hardly existing. This is one of the reasons why very few companies only responded to the tender, and the few that did respond were mostly of limited capacity. Therefore, there is no risk of market distortion at this stage.

It is when the markets grow and the competition begins that public investment need to be carefully designed to prevent market distortion.

This question is relevant, not only between competitors of the same value chain, but also between different value chains competing for the same waste (e.g., agro-industrial organic waste as a form of animal feed or as a form of soil amendment). The latter must be then addressed by adequate policies, which are part of the framework conditions, that establish the necessary arbitrations.

MoUs were used in this Project as agreement instrument. The accountability mechanisms are more fragile than formal agreements, which are legally binding documents binding.

Is a MoU the right PPP agreement instrument?

MoUs were used in this Project as agreement instrument. The accountability mechanisms are more fragile than formal agreements, which are legally binding documents binding.

Formal agreements require stronger parties to be implemented effectively, but if these conditions are met, the efficiency gain can be significant.

3.1.4 Of the Innovations

Are the innovations adequately addressing the value chains and food systems?

As indicated earlier, a linear innovation-led approach that was applied.

These innovative services fit into, or create, new value chains in food systems. It would have been relevant to draft a plan based on a value chain approach and systematically illustrate it with value chain diagrams in the innovation plans or business plans, since most innovations are broadly aware of the value chain context and have invested effort into establishing immediate backward and forward linkages within the scope of the technology-focused first phase.

Sourcing of the needed quantities of waste of adequate quality at the most convenient period is one of the critical bottlenecks for several innovators. It is the case in Rwanda where the quality of BSF larvae is function of the type of waste used in the process. Considerable progress was made in securing new and alternative supplies (including, for example, Rwanda's

main fruit processing company *Inyange*) and exploring markets for their product in the aquaculture feed sector.

The waste sourcing is also an issue for all companies using organic waste collected from households, where waste separation is always challenging to achieve. As a result, additional separation process has to be performed by the innovators causing increased labour costs. To facilitate control of the waste supply, it is usually appropriate to integrate collection with treatment and recovery.

In other cases, such as Anjo-nus in Ethiopia, this awareness and fit within value chains is less apparent. It is not clear, for example, how the value chain for green banana flour will be structured. The activities so far seemed to be ad hoc responses to demand from one or two retailers in Addis Ababa for small volumes of flour and relied on purchase of fresh bananas at regular (and very high) farm gate prices. To operate the large new equipment procured by the project profitably, the company will require a different approach that is cognizant of more robust supply and marketing options. Similar limitations apply to most of the compost innovations.

Are the targeted beneficiaries of the Project well defined?

During the evaluation many interviewees spontaneously referred to the innovation leaders or even the national RUNRES teams as the Project beneficiaries. This confirms that the supply-driven vision may be anchored in some actors, side-lining the users of innovations' services, without whom, however, these services would be irrelevant.

The very nature of circularity implies that innovations can connect multiple beneficiary groups along value chains, nutrient loops, or similar conceptual structures.

If the beneficiaries along the value chains are generally well identified and defined, care should always be taken to prioritize the beneficiary groups to adequately guide the development of innovations.

Do the innovations address the <u>need</u> and the <u>demand</u>[2] of the innovation leaders' customers?

In absence of comprehensive market assessments for all innovations, the Consultant is basing the following assessment on the available information collected during its mission and its experience.

The innovation plans of the innovation MoU identify and demonstrate more or less strongly and clearly *needs* for the proposes products and services. As indicated further below, this is particularly true for the animal feed and soil amendment produced by the innovations, which are needed by farmers.

Generally, in order to better ensure their impact and especially their sustainability on the market, it would have been beneficial if the innovation plan contained more information on market assessment including an assessment of the demand (What product? At what price? What quantity? When? etc.). Alternatively for innovations bringing new products on the market and for which it was more difficult to assess the demand at the start, it would have been beneficial if the innovation plan contained more information on how it is planned to assess the demand within the innovation implementation timeframe.

As one would expect given the number of innovations and the fact that they were carried out in 4 different countries, the situation varies depending on the innovation. For example:

[2] With regards to markets, the *need*, the *wish* and the *demand* are different concepts. The need can be expressed by the person/firm concerned or established by a third party who judges the need of this person/firm. They can wish something different than what is needed. The demand refers to a wished product/service that can also be afforded. For the realization of a market, it is therefore the demand that is important.

- The UDFT foreseen in South-Africa may be needed from an environmental perspective. It remains to be seen if there is a real demand from pupils and the school. But they also address the need for more toilets.
- In Kamonyi, the collection and processing of organic waste takes place in a rural area. It is not clear whether residents prefer to keep their organic waste and manage it themselves on site or whether there is a demand for disposal.
- The struvite innovation in Ethiopia intends to produce a product that may be needed. The question of whether there will be a demand for struvite versus other organic fertilizers, in particular the willingness to pay, could have been more explored in the innovation plan.
- For Anjo-Nus (banana flour production in Arba Minch, Ethiopia), it doesn't add income opportunities for local banana farmers as their incomes from sales of fresh bananas to the Addis Ababa market are already growing strongly; the demand for the flour will need to be verified (the price of the product will place it in the highest-income consumer segment).
- In South-Africa, communities represent a form of local authority with local leaders. Two innovations (DEWATS and bio-char) were supposed to be implemented in the Vulindlela community but their implementation had to be stopped. This community had an inadequate leadership and a culture of receiving but not of doing. There was probably little cohesion; the community seems to be loosely knit with inadequate leadership.
- The Maggot Farm in Rwanda, which intended to produce and sell animal feed in the form of black soldier flies larvae (BSF), already identified and even agreed with customers before the innovation plan submission.
- Another good example is Duzi Turf in South-Africa, which could rely on his long track experience and knowledge of the compost market because they were in the business for about 10 years.

Regarding organic domestic waste collection and transportation, which concern the majority of the innovations, the need and demand for these services usually vary according to the density and type of the agglomeration zone. In popular low or medium density areas within cities, residents may practice small scale agriculture themselves and/or produce little organic waste quantities. As a result, the demand is low.

This was for example confirmed for the cases of a small area in Arba Minch (Ethiopia) and Kamonyi (Rwanda) during the field mission of the Consultant. The innovations plans could have more clearly show this market segmentation and how it was addressed.

In addition, for services of organic waste collection and transport, the demand is usually lower than for the supply of products. This is confirmed by the revenues' projections of waste collection and transport showing globally much less added value potential than the supply of the products processed from the organic waste.

Some innovations include more links in this value chain, by including collection, transport and treatment of waste, in order to increase the overall added value, compared to innovation leaders offering only collection and transport services. In circular economy, it is always

important to identify the where the value is within the chain/loop and what is triggering the chain.

Do the innovations address the need and the demand of the farmers?

Making available locally fertilisers and animal feed meet the needs and expectations of many small-scale farmers.

The need for an alternative to chemical fertiliser and animal feed available on the market that are often imported, pricy and not always affordable by small scale-farmers was confirmed. This was reinforced during the project for external reasons (COVID19 and war in Ukraine).

Farmers users of the products supplied by RUNRES innovation leaders systematically expressed their satisfaction of having this new offer of inputs.

The generation of this demand seems to be rather independent of the quality of the compost or the animal feed versus other sources, but essentially driven by availability and price. It would be interesting to better establish this in order to better guide and prioritize actions of RUNRES and the innovation leaders.

3.1.5 Of the Logical Framework

Is the overall goal relevant (impacts 1 & 2)?

The impacts 1 and 2 ("*Improved environmental (and human) health*" and "*Improved household income and food security*") are the overall goals of the RUNRES programme. As described in the ProDoc, the goal of the RUNRES phase 1 is not the same as the overall goal of the RUNRES Phase 2.

At the time of this evaluation, the metrics for the impact indicators were not yet available, but it can be assumed that it would have been more relevant to limit them to the Phase 1 of RUNRES and to include a measurement of the intended *preparation* for the long-term scaling-up and scaling out of innovations.

Are the developed impact logic and result chains adequate?

The impacts 1 and 2 are achieved via two main outcomes ("*Outcome 1: Increased recycling of nutrients*" and "*Outcome 2: Enhanced regional food value chains*"). The other five outcomes of the logframe were of lower level.

Reclassifying the seven outcomes according to their level in the theory of change diagram (see ProDoc) could have simplified the logical framework and its use during the monitoring, especially since this monitoring was based on the self-assessment of national actors, some of whom had limited capacity. Moreover, the MoUs of the innovations themselves included indicators that had to be matched with the logframe.

The complexity is also naturally inherited from the variety of the innovation fields.

Taking this into account, the rationale of the logframe and the theory of change is adequate.

Is the rationale for the main outcomes 1 and 2 relevant?

The outputs were well linked to the outcome 1 ("*Increased recycling of nutrients*") and the outcome 2 ("*Enhanced regional food value chains*").

They were very comprehensive and accurately established and monitored.

Is the rationale for the outcome 3 and its outputs relevant?

The selected outputs for the outcome 3 "*Best practices and knowledge is diffused at local and regional level"* can objectively be measured. It would have been interesting to add a mores qualitative assessment, for example to assess the potential sustainability of the outcome.

Is the rationale for the outcome 4 and its outputs relevant?

For outcome 4 '*Enabling policy environment'*, the indicators are related to activities to improve the environment.

The use of more tangible indicators assessing the enabling level of the environment would have allowed to assess the reality of the improvements.

Is the rationale for the outcomes 5 and its outputs relevant?

The sustainability of the innovations as per outcome 5 “Public and/or private partnerships are established for the implementation of sustainable innovations” did not seem to be measured.

It may have been assumed by RUNRES that the selected innovations are sustainable or incorporated in the measurement the outputs of the outcome 5.

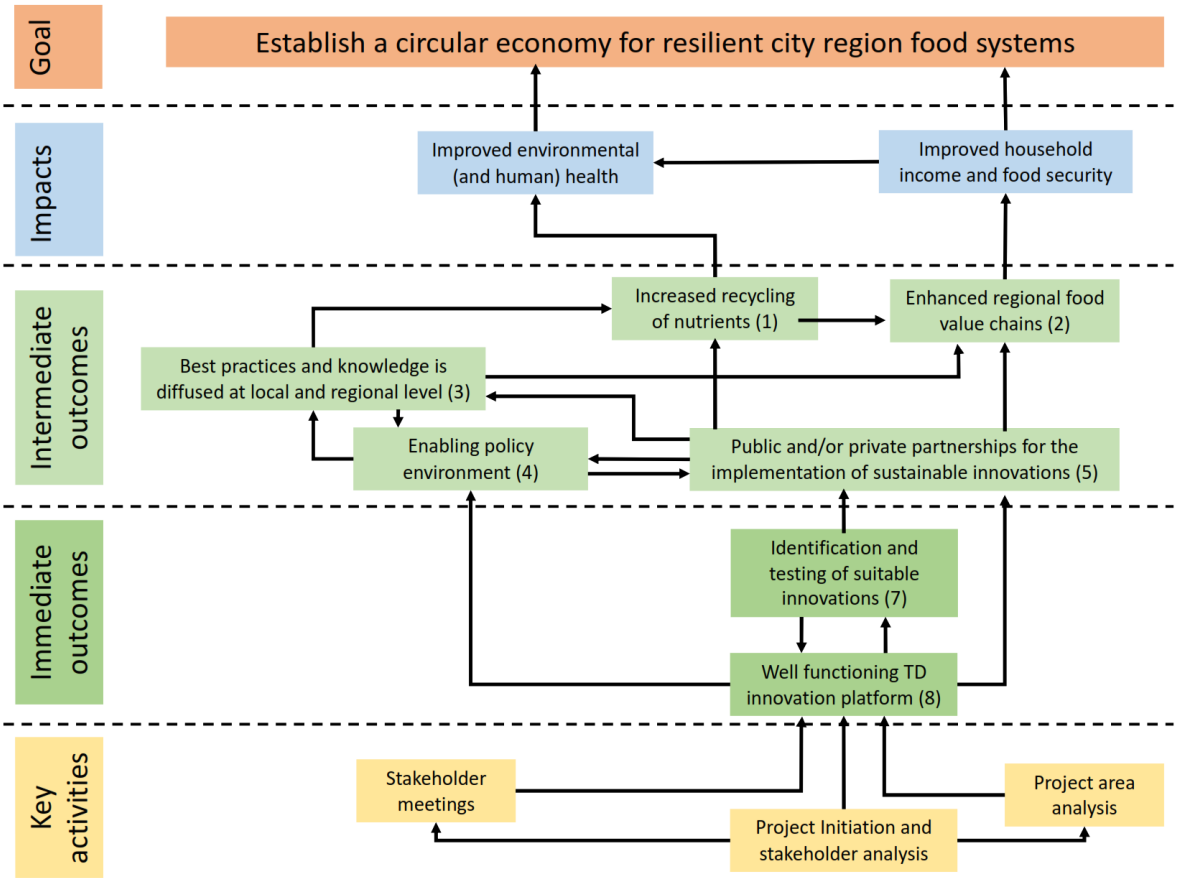
The logframe would have benefitted to have a separate measurement of the sustainability. It is understood that sustainability cannot not measured at the end of the project, but can only be estimated.

Apart from this remark, the outputs of the outcome 5 are well defined and easily measurable.

Is the rationale for the outcomes 6 and 7 and its outputs relevant?

The same conclusion as for the outcome 5 applies apply to the outcome 6 ("Identification and testing of suitable innovations”) and the outcome 7 ("Well-functioning transdisciplinary innovation platform”).

Theory of change diagram (ProDoc [2])



3.2 COHERENCE: "How well does the Intervention fit?"

3.2.1 With Policies and Strategies

Were the authorities responsible for the relevant policies and strategies identified?

The national partners of the RUNRES are institutional partners that are well network and it was easy for them to identify and engage these public authorities.

Through their country team structure, the project has involved stakeholders form both government and, to a lesser extent, private sector in the selection and oversight of the innovations.

Are the national policies and strategies aligned to the goals of RUNRES?

In Rwanda, the Policy environment is rather conducive for the development of initiatives in the field of circular economy. The country has taken different measures over the past 15 years has played an important role in leading the way towards a circular economy. It was one of the first countries to ban single-use plastic bags in 2008.

In 2021, Rwanda collaborated with Peru to draft the international resolution adopted at UNEA 5 that aims to end plastic pollution. The country is a founding member of the African Circular Economy Alliance (ACEA) and the Global Alliance on Circular Economy and Resource Efficiency (GACERE).

In that respect, RUNRES is fully in line with the Rwandan Government commitment and policies, and support can be expected in the upscaling phase.

The Consultant tried to collect information about the other 3 countries during his interviews. For example, South Africa's Sanitation Policy (2016) promotes the "circular economy of waste" and a new faecal sludge management strategy is under preparation in coordination with the RUNRES. This may lead to public sector commitment to the support of nutrient recycling of human waste (faecal sludge) and further align with the RUNRES.

In Arba Minch (Ethiopia), the new urban master plan of the city is under preparation and some RUNRES innovation leaders are consulted. The location of the struvite innovation was also coordinated with the Arba Minch municipality according to their recent sanitation strategy.

Generally, in Ethiopia, the Government has a significant control on the economy. Recent increases in the price of imported feed and animal feed as a result of the COVID19 pandemic and the war in Ukraine, among other things, have spurred the government to implement a policy of increasing the production and use of organic fertilizers. This resulted in an unforeseen stronger public sector support to the RUNRES than it was the case at the start of the project.

In DRC, the size of the country, the lack of policies in the agriculture and other sectors, marginalise the central government. In theory, this could give local authorities more leverage to define strategies and adopt measures in the field of waste management and food systems. However, social instability and ethnic tensions shape priorities, limit public funding and action. Bukavu authorities made it clear that they welcome RUNRES innovations, but expected the "private sector" to solve waste issues by fully self-financing all activities. This could for example be the agro-industrial sector of coffee production.

It should be noted that policies and strategies usually do not create barriers but can facilitate. Scaling-up and scaling-out innovations can be achieved without the public support, but this goal can be greatly facilitated with public sector support.

What form did this alignment and support with national and local policies and strategies take in practice?

The extent to which this involvement has provided advice and support differs between countries and innovations.

In Ethiopia and Rwanda, local authorities have provided space and facilities to innovation teams as well as institutional support to the project. Specifically, local authorities make available sites for composting and access to public waste utilities. As one would expect, there are some practical bottlenecks in funnelling this support into the operations of the project.

For example, while Kamonyi District, Rwanda provides strong planning and extension service support, there is still a main constraint from lack of water supplies to the composting site which compromises the compost process and quality.

In Ethiopia, the Project is linking with the Government scheme for youth employment. This collaboration has strengthened the project's alignment and contributions to Government priorities and may provide a vehicle for sustainability and expansion of benefits for larger numbers of youth groups into the future.

On the other hand, the project experience also demonstrated that the business support will not come through the Government youth scheme and the project would have needed to consider how to link enterprises to technical and business support services.

In addition, the case of the Arba Minch struvite enterprise also illustrates the risk of misalignment and delays in public infrastructure procurement. The site allocated to the enterprise at the newly constructed faecal sludge plant is meant to facilitate future easy access to sludge (co-posting of FS being foreseen as a complementary revenue generating activity).

In order to be implemented during the project, the innovation would have required the plant to be in operation (requiring the construction of a new bridge to connect the access road).

3.2.2 With Norms and Standards

How does the project comply with norms and standards?

Many innovations are in regulatory gaps, because they are per definition new in the country or region. In some cases, this has required significant efforts on the part of RUNRES to dialogue with the relevant public authorities.

For example, in South-Africa, an environmental license is required to run a FS co-composting facility or to apply sewage sludge on land for turf grass growing. For the later, it took about almost 10 years to get this license.

For the RUNRES co-composting innovation, the licensing is still under process. Authorities are cautious and restrictive when faced with innovations that are not yet well regulated. However, analyses have shown that the quality of the compost is good.

In Rwanda, standards on organic fertilizer exist but the COPED (RUNRES Innovation leader for compost production) so far failed to comply with them, because of high heavy metal contents measured by a Rwandese laboratory. This may be due to laboratory measurement inaccuracies and counter-analyses were to be carried out by RUNRES at the moment of the evaluation. However, as a consequence, COPED have been prevented for several months to produce and sell compost.

The animal feed is also controlled by the Rwanda Standard Board that performs checks of the cassava peel feed produced by Akanoze twice a year.

In the DRC and in Ethiopia there is no standard known for organic fertilizer. Nevertheless, analyses in Ethiopia and field trials in DRC have shown that

the quality of the produced composts is good. The production process in particular seems better mastered than in Rwanda.

In Ethiopia, regarding the production of human food, the authorization from the food authority for the operation of the Anjo-Nus banana flour was just initiated during the Consultant's field mission. In this case, the resulting constraints on the development of this company are not expected to be too great. However, the Consultant's site visit showed that more stringent hygiene measures might be appropriate to prevent contamination risks that may have health impact on human consumers.

In Rwanda, the Rwanda Agriculture Board (RAB) tested the BSF feed produced by Maggot farm over the last two years. The RAB substituted soya-based feed used in their hatchery in Kigembe to produce tilapia fingerlings. The positive results obtained has encourage the RAB to test the BSF feed in other regions to verify how this feed performs in different conditions (water quality, climate). The RAB who certifies private hatcheries sees in the BSF larvae a great opportunity to replace soya and fishmeal. RAB's objective is to scale up tilapia volumes and become self-sufficient to prevent imported viruses.

Workers' security and safety standard should be verified and as needed improved either to prevent injuries or health damages on respiratory system for instance) and comply with the labour laws in each country (e.g., the Labour law in Rwanda and in particular the chapter on H&S at work). Some aspects of regulations should of course be considered with care and insight, should the regulation prove to be inadequate and endanger the sustainability of the business. This remark on H&S is basing on some observations of the Consultant during its field missions. For example, some basic recommendations are listed below:

- Work premises must be kept in a permanent state of cleanliness and to satisfy security and health conditions necessary for the staff's good health.
- The employer is to inform its workers on H&S and to post in the work premises H&S instructions to comply with.
- The employer is bound to put at the workers' disposal all necessary and appropriate protection equipment and to look after their correct use.

How does the project contribute to improve norms and standards?

In South-Africa, the RUNRES is provide support to the national Department of Water and Sanitation (DWS), which was currently drafting a new National FSM strategy at the time of the evaluation. The DWS showed interest to the implemented RUNRES innovations, including the FS co-composting.

In Ethiopia, the issue of norms and standards was not addressed. In DRC, a similar situation pushed IITA to insist to perform quality controls of the compost to provide the needed guarantees to farmers.

In Rwanda, discussions were initiated between the RUNRES and the Government to ease the use of human waste in circular systems and address the compliance issue encountered by COPED (exceeding heavy metal content in their compost). So far, no results could be achieved at the moment of this evaluation.

Generally, concrete improvements would require more time and perhaps a dedicated approach.

3.2.3 With other Interventions

How far did the project coordinate / cooperate locally with other and thematically affiliated interventions or organisations?

First phase of RUNRES 1 the TdIP opened the exchanges with stakeholders that were mainly within the networks of the RUNRES national partners.

Some coordination activities occurred informally (e.g., IITA had contacts with other agencies to exchange information) or occurred on a as-needed basis (like for instance approaching jointly authorities to address the issues of standards or licensing, see above).

Generally, it allowed for the inclusion of most of the potential relevant institutions, with only a few exceptions. These may be partly due to the regional limitations of these networks of the national RUNRES partners.

Some experiences and partners active in other regions of the countries may provide additional relevant partners. In Ethiopia for example following stakeholders may have been engaged:

- From its own, Anjo-Nus (banana flour production) applied and won a GiZ public tender for a grant to receive national consultancy services to improve their marketing in August 2022. The GiZ is supporting the agriculture / food sector and the private sector: synergies with the RUNRES may have been found.
- UNIDO is supporting the industrial parks, including agro-industries.
- The Ethiopian Investment Commission plays an important role in the development of the private sector.

In the first phase, TdIPs were mostly centred on RUNRES operations and involved primarily consortium partners and local authorities. Other private actors engaged in similar initiatives may have been perceived as competitors or simply not identified, but could have provided relevant contributions and more competition for the RUNRES innovation leaders.

Overall, collaborations with related technical programs and organizations appear to have room for improvement. It is not apparent whether the project has a partnership strategy that would identify potential partner programs and organizations in technical or business-related sectors and outline an engagement plan to integrate innovations as well as for the Project at country and global levels. Given the increased policy, research and investment attention on circular economy in at least some of the countries, it would be important for a second phase to develop such a plan, linked to a scaling strategy.

3.2.4 For the SDC

What is the coherence of RUNRES with SDC current strategy and the Global Programme themes

RUNRES objectives were in line with the priorities of "*SDC International Cooperation Strategy 21-24*" aiming at decent local job creation and climate change, as well with the geographical focuses of the same strategy.

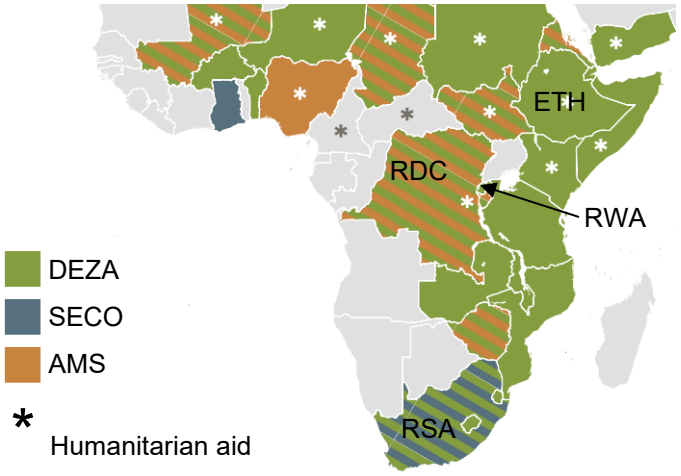


Figure 1: Swiss cooperation and aid in Africa[3]

RUNRES was implemented under the SDC Global Programme (1) "*Food Security*" but it also addresses themes of two other Global Programmes that are managed by the SDC, out of a total five: (2) "*Water*" and (3) "*Employment*.

What is the coherence of RUNRES with country and regional priorities of the SDC?

RUNRES that was run under the Global Programmes scheme was implemented in 4 countries and three regions (Great Lakes, Horn of Africa and Southern Africa). The global programmes "*Health*" (Great Lakes region and Horn of Africa), "*Food Security*" (in both region and South Africa) and "*Climate Change*" are the SDC priority or transversal themes in the RUNRES countries. Employment and economic development is an additional theme that is being prioritised for the Great Lakes region, and that relates to RUNRES objectives.

Nevertheless, while food security and employment are themes that have been systematically prioritised in all regions, priorities at country level sometime diverge from the ones of RUNRES. This is particularly the case in Rwanda where the SDC strategy gives more attention to employment and economic development than to food security in the strict sense and agriculture sector development. As a result, RUNRES is being implemented separately from other projects and the involvement of the SDC country offices was limited.

Another difficulty to reach converging objectives of different programmes is the current trend in the Great Lakes region of the shift from a regional approach to the nationalisation of strategies. This new approach is the result of the combination of two factors: (i) the increase of activity volume per country and (ii) the different paths of development between the countries of the region.

[3] https://www.eda.admin.ch/deza/en/home.html

3.3 EFFECTIVENESS: "Is the Intervention achieving its objectives?"

3.3.1 Preliminary Remark

The effectiveness should be assessed according to the logframe monitoring by the RUNRES. The results of this monitoring were at the time of this external evaluation not yet available because this first phase of the RUNRES was not yet completed.

The measurements of the impacts of the Phase 1 of the RUNRES Project were to be measured by the RUNRES before the end of the Project through the Project logframe. The results of these measures were not yet available at the time of this external evaluation. However, forecasts were made available and are shown in the Appendix 6 .

At the time of the external evaluation, it is therefore too early to fully assess the effectiveness impact. On the other hand, technical shortcomings and unclear market perspectives for most of innovations it is still difficult to measure the RUNRES outcomes. It is however possible to assess the assumptions made so far by RUNRES.

3.3.2 External Factors

What were the main external factors that had impacts on achievements of the project?

The following main external factors, which could not be foreseen, emerged from the global situation and impacted the Project implementation:

- The COVID19 pandemic between 2020 and 2021.
- The invasion of Ukraine by the Russian Federation that started in early 2022.
- The war in Ethiopia between 2020 and 2021.

What unforeseen external factors did negatively affect the project implementation?

The Project implementation approach was hampered by the COVID19 (and for Ethiopia, combined with the war), which prevented site visits from the lead coordinating staff of ETHZ, in particular at the key moment such as the starting periods of most of the innovations, when the need for coordination and support is potentially the highest. However, the impact of a reduced presence of ETHZ staff is difficult to quantify.

In addition, the production and shipping of equipment was delayed (for example a composting machine arrived in Arba Minch only a few months before this external evaluation).

In Ethiopia, it was even the combination of COVID19 and the civil war, which started in 2020 that affected the implementation of the Project. In addition to the difficulties of travelling, such a situation of instability is by definition challenging for trade and business development.

The delays impacted the effectiveness, because the level of development of the innovations at the end of the phase 1 of RUNRES will be negatively impacted.

What unforeseen external factors did positively affect the project implementation?

Between early 2020 and mid-2022, prices of agricultural inputs have increased drastically. Soybean prices have practically doubled and are expected to further grow. Fertiliser prices have risen year after year to reach levels 4 to 5 times higher than at the beginning of the pandemic.

The invasion of Ukraine by the Russian Federation has added more uncertainty on availability and prices of agricultural inputs, and in turn encouraged farmers to find alternatives to imported fertiliser and animal feed.

Beside the negative short-term impact on food security, this dramatic situation in Ukraine motivated the public authorities to draft policies and strategies on circular economy for agriculture, and more specifically for organic fertilizers and alternatives to conventional animal feeds.

3.3.3 For the Outcome 1: Increased recycling of nutrients

Are collection, transport, and processing of waste streams improved?

The implemented waste collection services and processing services are assumed to be carried out correctly. During the field mission in Ethiopia and Rwanda, the health hazards were controlled when handling of waste.

Information about the waste collection rates and waste streams improvement were not available. At this stage, it can be assumed that only Duzi Turf (RSA) will significantly improve waste collection and processing streams.

Are pathways to increase local agricultural production with waste-recycled input products established?

Markets for organic fertilizers already exists with various forms and origins of inputs. So far only Durzi Turf seems to have found a place in these markets and commercialized.

Other innovation leaders are still producing and commercializing no or too small quantities to have entered even in a pre-commercial phase. For them, reservations on the demand cannot be lifted at this stage.

3.3.4 For the Outcome 2: Enhanced regional food value chains

Are small-scale processing units implemented and resulting in improved high-quality products?

The quality of the processed waste for soil improvement was controlled by selected laboratories and is good[4]. It does not seem likely and realistic in the short term that regular self-monitoring will be carried out. These requirements do not seem to be explicitly formulated by the regulations either.

Further research may be conducted in the future to better market these inputs on and to optimize their use. However, if the good analysis results of these agricultural inputs already show that their use be effective to support the agricultural production.

Are farmers using the processed waste and are the food value chains enhanced?

In Ethiopia, Anjo-Nus' innovation creates a new food value chain, with the objective to replace fresh bananas with banana flour as human food. It is not clear whether this improves the food value chain. The processing and sale of the process waste (banana peels) is finally not intended as initially planned for the fertilization of banana plantations, but is intended for animal feed. It is still necessary to wait for the commercialization of these new products to know if they will meet a demand in accordance with the expectations of the company.

The BSF innovation in Rwanda seems on good track to develop and find a place in the animal feed markets with improved high-quality products. Similar assessment can be made for Akanoze (production of cassava and recycling of the peels as animal feed).

The co-composting of sewage sludge and other organic waste by Duzi Turf in South-Africa is well developed. Duzi Truf may in the near future be able to continue diversifying the sourcing of their waste and their portfolio of clients. The enhancement of the food value chains would require extending the share of fertilizer sold for crop production.

3.3.5 For the Outcome 3: Best practices and knowledge are diffused at local and regional level

Were best practices defined in each city region for food systems?

With the support of the ETHZ, in all countries, best practices for waste collection and composting were defined.

Improvements regarding H&S of some agro-industrial process would need to be improved.

[4] Except for COPED compost, but further analysis is needed to confirm the hypothesis of laboratory inaccuracies to explain the results obtained so far.

Were the best practices diffused at local and regional level

Exchanges between innovation leaders from different countries did not seem to occur. If they did take place, it was through the national RUNRES teams.

However, it was for example noticeable that Akanoze kept a poorly performing drying system while Anjo-Nus used two more efficient solutions. Similarly, the composting companies in DRC explained that their composting technique was different and more effective than in Rwanda (COPED).

Dissemination of best practices at local and national levels seem to have been more effective.

In South-Africa, the co-composting activities aroused the interest of the national ministry in charge of sanitation. Whereas in Rwanda the Maggot farm (BSF) is working closely with the Rwanda Agriculture and Animal Resources Development Board (RAB), which is has high hopes for this technology.

In DRC and Ethiopia, evidence of dissemination results could not be identified, although it was said in Ethiopia that the project has aroused interest at the regional and national level. In DRC, best practices were aligned in the 3 innovations that were implement the same type of innovation (waste collection and composting).

Dissemination at national and even regional level seem to have been limited because of the linear bottom-up approach (innovation-led through research institutions) with limited parallel national public authorities.

The dissemination of best knowledge is a process that can continue after the end of the project. The actors involved in the project and whose capacities have been strengthened are future vectors of diffusion.

3.3.6 For the Outcome 4: Enabling policy environment

Were the stakeholders identified?

Within the context studies, the RUNRES did identify and analyse the main stakeholders in each country and city region.

Meetings, research results and publications were used to lobby for policy shift.

Were the mains policy issues identified?

The most direct problems of business environment seem to have been identified ad-hoc, innovation by innovation, like for example, the health or environmental licensing (e.g., Anjo-Nus in Ethiopia applied for a license/inspection only a few days before this external evaluation).

This prevented to addressed more fundamental and deeper issues, such as having arbitrations carried out between different ministries or public authorities in competition or with overlapping mandates. These limitations may be resulting from the implemented linear innovation-led approach.

Were needed policy shifts achieved?

As indicated in section §3.3.5, the main results seem to have been achieved in South-Africa and in Rwanda.

Achieving policies shift in developing countries with frequently vertical organized governmental structures requires to engage adequately the top structures, which may not have been implemented in a planned and systematic way.

Depending on the case, it can be effective and efficient if combined with practical pilots or more generally an evidence-based approach.

3.3.7 For the Outcome 5: Public and/or private partnerships are established for the implementation of

sustainable innovations

How far is the private sector involved in the activities? And how could its engagement be enhanced for a greater impact in future?

Innovations were implemented by private companies. However, the private sector engagement can be limited by the existing business environment. In Ethiopia, companies are supported and controlled but this limits their entrepreneurship. For example, the waste collectors questioned the appropriateness and sustainability of using trucks to collect and transport their waste, but the equipment was purchased for the municipality nonetheless. Efforts need to be made to improve the business environment as well as the business culture.

In South-Africa, the Dewats innovation foresees the wastewater treatment with a nature-based wastewater treatment facility and the valorisation of the effluent and collected urine for a plant nursery. It aims a school, with limited role of the private sector for the innovation implementation. The financing scheme of this innovation, with high public funding, gives little space for a business case and thus a business model. This would have been a good opportunity, because at national level, there does not appear to be a broad and impactful sustainable sanitation financing scheme for schools despite the significant sanitation gaps.

How far were local and municipalities authorities involved and how do they assess their role in the processes, taking into account local conditions?

Generally local authorities have expressed a real satisfaction of having those innovations initiated in the territories they administrate. But the level of involvement varies from country to country:

- In DRC, the local authorities could have been more active.
- In South-Africa, the Municipality is struggling to fulfil its mandate and responsibilities. As a mitigation measure, the composting innovation is therefore finally basing on B2B relations[5].
- The Arba Minch Municipality (Ethiopia) is subsidizing the waste collection and the waste process, but would need more understanding of the waste collection value chain and the PPP models and opportunities.
- Unlike Ethiopia, Rwanda's waste collection system subsidizes demand, which requires high administration resources to be effective, and carries the risk of inequality in the distribution of subsidies.

How is their engagement strengthened for an active and decisive role in the processes, and what could be improved?

In the Project, the PPP are formalized with the RUNRES via MoU.

Partnerships between municipalities and the service providers are still ruled very informally.

Securing their sustainability would require formal institutional and legal mechanisms to better define the role and obligation of public and private partners, as well as securing financial instruments, especially from the end of the Project.

3.3.8 For the Outcome 6: Identification and testing of suitable innovations

Were key innovations are selected to be implemented, tested and scientifically assessed?

All waste collection / composting and animal feed innovations could be implemented, tested and scientifically assessed.

The innovations still pending on implementation are the struvite production, the bio-char production via pyrolysis, the Dewats and the agro-ecological hub.

Anjo-Nus started the production but had not yet been able to start marketing its product.

[5] Considering Umgeni Water as a corporate.

Regarding the countries and the tested innovations, what are the strength and weaknesses?

The following tables summarizes the main assessment results at this stage of the Project implementation, with respect to scalability.

Risk and potential have been estimated at this stage based on available information. These assumptions must be verified based on the assessment of the detailed business plans and in-depth market assessments.

Country	Innovation	Strengths	Weaknesses	Risk category	Potential category
Ethiopia	Compost	Equipment procured offer scope for expanding production. Composting site is close to the city.	Demand for compost is still unclear – there is no demand among local banana producers, but potentially in urban farming? No experience using the equipment or operating business at a scale to break even. Lifespan and maintenance costs of the equipment is unknown. Quantities currently produced are very limited, also since organic waste is difficult to source.	High	Low
	Waste collection	Provides additional income for poor women waste collectors	Business model is unclear and do not yet allow to confirm the sustainability It is not effective in collecting significant volumes of organic waste, due to alternative uses of this waste and fragmented accumulation Demand for waste collection is unknown	High	Low
	Banana flour and peels (Anjo-nus)	Equipment procured offer scope for expanding production. Supply of green banana is very reliable	No experience using the equipment or operating business at a scale to break even. Lifespan and maintenance costs of the equipment is unknown. Demand for the product is unknown. Supply of green banana is very expensive.	Medium	Medium
	Struvite (MASIP)	Youth group enterprise with strong links to local authorities. Location at FSTP offers an advantage (additional revenues of co-composting).	Collection of urine is ineffective at this time. Requires per definition additional processing and costs compared to direct urine valorization Market assessment and business plan remains to be carried out No visibility on FSTP commissioning period	High	Low
Rwanda	Cassava peel (Akanoze)	Strong links with suppliers of cassava peel, including through links with cassava flour mill under the same ownership/ management. Good location in cassava zone.	Limited production capacity due to lack of (relatively affordable) drying equipment. Efficacy/effectiveness of product as (ingredient or final) animal feed is not well established, and no feeding recommendations for livestock keepers available.	Medium	High
	BSF (Maggot Farm)	Strong and diverse supply chains of food waste and black soldier flies. Reliable and probably growing	Fit within the overall feed protein production sector not clear; there are larger competitors.	Medium	High

Country	Innovation	Strengths	Weaknesses	Risk category	Potential category
		demand in animal feed, specifically fish feed sector.			
	Waste collection and compost (COPED)	Strong business record in related urban waste collection sector, with around 100 staff.	Separation of organic waste and sourcing from a fragmented catchment continue to be challenging. Business model for waste collection is unclear and do not yet allow to confirm the sustainability Technical challenges at composting site (water supply is not available). Compost quality analysis issue is to be clarified.	High	Low
DR Congo	Waste collection and compost (3) (Diobass, FESDD, GASD)	Diverse sources of waste and diversified market targets (large coffee growers and smaller-scale horticulturists)	Challenging transportation to the site. The current scale of operation makes the product to pricy and not affordable by many farmers though the need of fertilizer is important. Absence of perspective of public finance support.	High	Low
South-Africa	Co-compost (Duzi Turf)	Experience of the company, including its formal agreement with UW, as main waste source. Business capabilities. Advanced stage of innovation development.	Poor visibility regarding of the date on which the environmental license will be issued.	Low	High
	Dewats (UW, PS)	Schools offer good prospects of scaling-up	Demand for the selected technologies remains to be verified. No public investment scheme Business model remains to be found Financial sustainability remains to be verified.	High	Medium
	Bio-Char (RUSUS)	Alternative to conventional FS processes	Requires per definition additional processing and costs compared to more conventional solutions Market assessment and business plan remains to be carried out	High	Low
	Agor-ecological hub (NCEDA)	NCEDA potential network of co-religious people Duzi Turf is a partner and is co-financing	NCEDA is unexperienced in the sector (very small network of famers) Financial sustainability is to be established	High	Medium

3.3.9 For the Outcome 7: Well-functioning transdisciplinary innovation platform

Are TdIPs functioning in each city region food system?

In each country and city region, the stakeholders were identified (academia, public sector, private sector and NGOs) and participated to the TdIP activities.

What were the main achievements of the TdIP?

Eventually, some stakeholders committed to co-participate and co-fund the RUNRES innovations.

It allowed to exchange experiences and knowledge at between the innovation stakeholder of each country and between the national RUNRES teams. It also helped to align the visions of the RUNRES teams on how to implement the Project.

The relations set up allow to initiate discuss with public authorities with regards to policies, strategies and standards.

3.4 EFFICIENCY: "How well are resources being used?"

3.4.1 External Factors

What unforeseen external factors did negatively and positively affect the project implementation?

Please refer to section §3.3.2 related to the assessment using the Effectiveness criterion.

The external factors are the same and they impacted the effectiveness and the efficiency for the same reasons.

3.4.2 Of the Organization and Approach

How did the selection of the national partners impact the Project efficiency?

The selection of the three national partners (UKZN, AMU and IITA) was made for partners who were already known to the ETHZ, with past relationships between the organisations and the team members.

These links have naturally led to more fluid and efficient working relationships, which were important because of the large coordination needs due to the high number of innovations that were implemented.

How were the resources allocated within the planned decentralized approach?

Consolidated budget data was provided by the ETHZ to the Consultant. The RUNRES budget is summarized below. The global financial progress is about 80% with no deviation to be noticed for each country.

The share of ETHZ, which ensures the general coordination is about 34%. Considering the large number of innovations and in four countries, this share seems reasonable but a minimum to carry out the ETHZ task.

Partner	SDC contrbution (CHF)	*in kind contribution (CHF)*	Total (CHF)	*Share of in kind contribution*	*Share Vs. total RUNRES*
ETH Zurich	1 466 717	722 788	2 189 505	33%	34%
Arba Minch University	514 110	113 738	627 848	18%	10%
IITA DRC	1 024 763	335 474	1 360 237	25%	21%
IITA Rwanda	1 001 927	335 474	1 337 401	25%	21%
University of KwaZulu-Natal	650 485	298 950	949 435	31%	15%
TOTAL	**4 658 002**	**1 806 424**	**6 464 426**	**28%**	

Figure 2: Planned budget shares (derived from [11])

It must be noticed that national partners claimed after the first year of implementation more independence and responsibility. The amounts communicated for the "personnel" are indicated to cover the financing of the own staff. Given the sometimes limited effectiveness, the shifting of national resources to external support would have led to efficiency gains. While ownership is important, it is also important to identify and fill resource gaps as needed. The use of external resources can also be used to train and transfer capacity.

How efficiently were the innovations developed in each country?

From the previous table, the personnel cost of the IITA for the DRC are about thrice those of the UKZN and the AMU, even though there are no less innovations to coordinate.

The following table shows the average budget by innovation coordinated by each RUNRES partner.

Partner	*Number of innovations*	SDC contrbution per innovation (CHF)	*in kind contribution per innovation (CHF)*	Total per innovation (CHF)
ETH Zurich	14	104 766	51 628	156 393
Arba Minch University	4	128 528	28 435	156 962
IITA DRC	3	341 588	111 825	453 412
IITA Rwanda	3	333 976	111 825	445 800
University of KwaZulu-Natal	4	162 621	74 738	237 359

Figure 3: Planned contribution according MoUs ([6])

The results of this comparison, together with the change in personnel that had to be made during the project, indicates a potential for resource optimization in DRC and RWA.

3.4.3 Of Synergies and Partnerships

What were the connections between innovation leaders and between the RUNRES national partners?

Exchanges between the innovations leaders of a same countries took place to some extent. The following figure extracted from the RUNRES Summary Report, show links within the same sector but the lack of intersectoral connections in Bukavu.

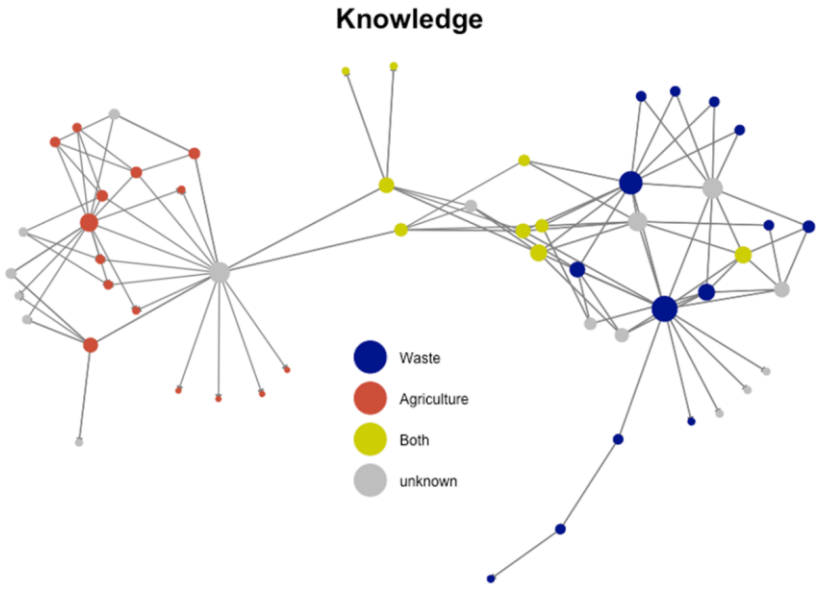


Figure 7: Social Network Analysis (SNA) of the waste and agricultural sectors in Bukavu at the beginning of R results clearly indicate a lack of connection between actors in these sectors.

Figure 4: Social Network Analysis of the waste and agricultural sectors in Bukavu ([12])

This situation may vary in other countries, where for example the innovation leaders are part of the same value chain (e.g., Ethiopia) and have naturally more exchanges.

The connections between the innovation leaders of different countries did not or hardly occur. These communications took mainly place between the RUNRES national partners (ETHZ, IITA, AMU, UKZN).

Did the project played a positive role mutualising the experiences within and across the 4 countries?

RUNRES, with its 12 innovations developed in 4 different countries, has accumulated a body of lessons and knowledge over 4 years that can feed into a global reflection and help local innovators to refine or review their operations. During this first phase of RUNRES, some innovation leaders exchanged their experiences or explored possible synergies between companies.

TdIP of same countries have from the start or in the course of the project explore joint collaboration, combining their strengths to improve processes or achieve attractive final products. In Rwanda for instance, COPED, Maggot farm and Akanoze do explore join business initiatives like combination of sub-product outputs (casava peel and BDF larvae) complementary functions (domestic waste collection and BSF larvae production).

In RDC, the 3 innovations are related to compost production, which limits complementarities but could be an advantage or at least a factor to be taken into account in the up-scaling strategy.

As indicated above, exchange and capitalisation across the countries are less tangible, but innovation leaders from Rwanda and DRC have communicated on the applied technologies. However, little has happened between other countries. Part of the explanation could the geographical and cultural distances, including the language factor, but also the perception of certain stakeholders that their countries context differs too much from the others to make this capitalisation possible.

In terms of efficiency, it would for example have been valuable to actively let the most successful innovation leaders exchange with innovation leader of other countries producing the same type of services, as a form of mentoring.

Are the innovations and the related PPP investment efficient?

Connected to the variable procurement approaches, there might be a significant difference in efficiency between countries

During field visits and interviews, it appeared there might be an over-investment in equipment in Ethiopia (food processing, composting) with uncertainty about when a break-even point for these significant investments might be reached.

By contrast, there appears to be an under-investment in equipment and facilities in Rwanda. Cassava peel drying is severely limited by the lack of drying racks and larger drying areas; and the peel milling equipment looks dated, inefficient, and potentially unsafe.

On the other hand, Maggot Farms for example seem to have a clear plan for gradually upgrading and expanding their operations and are in the process of improving their greenhouses and racks, and adding fishponds for vertical integration. They are able to do this by drawing on external expertise, staff development, and good relations with local authorities for access to land and water.

Although other factors come into play, investments are good when the leading innovators are experienced and have entrepreneurial expertise. This can be done without necessarily formalizing a business plan.

In other cases, it seems that the establishment of good business plans would be formative and would allow for better management of the investments.

3.4.4 In meeting the Timetable

Was the global timetable respected?

The Project, which started in 2019, last 4 years and ended as foreseen in 2023. Some targets still need to be reached.

Did the innovations' implementation their schedule?

As a result of the external factors mentioned above, many innovations have been held back. In addition, other reasons have also led to delays. For example, the misalignment between the expectations of the Vulindlela local leaders and the RUNRES, which was not initially detected, led to cancel the MoU and to restart with other partners (dewats and agroecological hub).

On the other hand, the following situations have been noted:

- The COPED composting facility is on hold since several month due to the compliance issues with the national standard.
- The Anjo-Nus factory had to wait until beginning of the year to start again the production because its packaging was not compliant with the national regulation and the products had to be withdrawn until adequate modification is made.
- The reactor for the struvite production was not yet built and the struvite production did not start.

It must be noticed that two of these three situations are linked to the business framework conditions.

3.5 IMPACT: "What difference does the intervention make?"

3.5.1 Preliminary Remark

The measurements of the impacts of the Phase 1 of the RUNRES Project were to be measured by the RUNRES before the end of the Project through the Project logframe. The results of these measures were not yet available at the time of this external evaluation. However, forecasts were made available and are shown in the Appendix 6 .

At the time of the external evaluation, the future impact can only be estimated.

3.5.2 For the Impact 1 – Improved environmental (and human) health

Did the RUNRES improve the soil fertility?

Only Duzi Turf (sewage sludge co-compost production) achieved significant compost production (more than 1,000 m^3 per month) that can have significant impact on soil fertility.

Assuming an application rate of for example about 10 tons per hectare per year, this compost production could amend the soil of about 1,000 hectares per year.

Did the RUNRES improve the reduction of pollution loads into the environment?

Duzi Turf reached co-composting capacities absorbing about 500 m^3 per month of dewatered sewage sludge, which was previously not always adequately managed.

It represents the production of between about 50,000 and 100,000 population equivalents.

Did the RUNRES impact differently women and men as well as the youth?

Among the context studies, the RUNRES carried out a comprehensive gender study at the beginning of the Project. The following table summarizes the roles of these group categories in the waste management chain.

Nature of waste-related work and material	Men	Women	Youth
Collection of solid waste from homes and commercial places		**	**
Disposal of liquid waste	*	**	
Transportation of solid waste to landfill/dump site	**	*	**
Sorting/Separation at landfill or recycling centers	*	**	*
Recovery of reusable plastics, metal, paper, glass and rubber	**	*	**
Recovery of organic waste	*	**	
Processing organic waste into compost	**	*	**
Marketing compost	**	*	**
Management of waste collection and recycling companies	**		*
Use of compost and plant residues in farms	*	**	

Source: aggregation of data from interviews, focus groups, field observations and photos across city
Key: **= dominant gender group; *= present but not dominant gender group.

Figure 5: Nature of work in the waste management according to the gender ([3])

It is noticeable that women play a key role in the implementation of most of the manual tasks but are still to play a role in the management tasks.

A comparative study to assess the impact on gender was not available at the moment of this evaluation. However, it was noticed that all MoU with innovation leaders contained a section indicating the planned strengthening of the women and the youth roles.

Even though they seemed to be dependent on the municipality and their associations provide services of low added value, the associations of waste collection in Ethiopia were chaired by women. It would have been desirable to have more women managing and leading the selected innovations.

3.5.3 For the Impact 2 – Improved household income and food security

Did the RUNRES improve the household income?

Assessing quantitative impact on income would have required measuring at the beginning and at the end. It would also need a detailed economic study in order to eliminate external effects and extract only the impacts of the project.

However, based on the available information and given the progress of the innovations' development, it is assumed that their impact was probably negligible.

Did the RUNRES improve the food security?

Based on the available information and given the progress of the innovations' development, it is assumed that the impact on food security was probably negligible.

3.5.4 Readiness for RUNRES Phase 2 (scaling-up)?

Are there documented examples showing that the overall RUNRES project has influenced policies in the countries (local and national)?

The RUNRES Project influenced national policies in South-Africa. RUNRES provided support for the preparation of the national FSM strategy.

Attempts have been made in Rwanda to improve compost standards, but progress are still to be made.

Further efforts need to be made to achieve more impact on the framework conditions.

Is the knowledge on the implemented

Knowledge about the innovations implemented has increased among academics, innovation leaders and public authorities.

innovations improved?

This knowledge has mainly increased on the technical and scientific level.

3.6 SUSTAINABILITY: "Will the benefits last?"

3.6.1 Via the Framework Conditions

Are the policies, and strategies, contributing to build an environment that enables to sustains the RUNRES achievements?

Policy documents are important in particular for a scaling-up or -out after the Phase 1 of RUNRES. They are important to establish some basic principles, such as encouraging or prioritising nutrient recycling and circular economy or making the link with the food security.

In DRC, the set of national policies and strategies still needs to be updated in order to become comprehensive and the country size implies that local strategies can have more weight and impact, even if the impact of the public authorities is less significant than the private sector, especially the informal private sector. The current policies and strategies may therefore have limited on the sustainability of RUNRES innovations in DRC.

In Ethiopia, the availability of national policies and strategies is similar to DR Congo, but the federal state and the public authorities have much more control than in DR Congo. This, coupled with the political situation, gives little visibility and makes the implementation of long-term strategies challenging.

However, the policy applied at the time of the evaluation fostered the recycling and production of organic nutrient, thus the RUNRES innovations. It is however unclear how long this policy will remain in place.

In addition, one of the Ethiopian core policies is the support for job creation, which is described as support for the private sector (SME). The SME are very closely supervised and the creativity left for SME seems limited. Moreover, the value added by the support of this public sector seems low.

For example, after 2 or 3 years of support to Anjo Nus, the business plan is still pending to be updated. On the own initiative of Anjo-Nus, the company won a tender for the support of a private marketing company based in Addis Abeba. The results of this study, carried out in a few weeks at the end of the Project, are much more important than those achieved before. They could even have been more significant if the scope of the study would have involved a more detailed market assessment.

In Rwanda, there is a comprehensive set of sectorial national policy documents that is complemented by a "*National Environment and Climate Change Policy (2019)*", which includes for example a "*Policy statement 2: Promote the circular economy to advance sustainable consumption and production patterns*". If this policy as well as the sectorial policies and strategies are implemented as it is foreseen, this would significantly contribute to the sustainability of the RUNRES innovations.

In South-Africa with the National Sanitation Policy (2016) and the National Waste Management Strategy (2020), the positions adopted provide for recycling, including of nutrients, and are aligned with the objectives of RUNRES. For example, according to the *Waste Management Strategy* states "*diverting waste from landfill is a key imperative for the country's NWMS. South-Africa's strategy for diversion of waste from landfill is based on building a secondary resources economy around the beneficiation of waste as part of the circular economy. This is through among others, […] the treatment and recovery of soil nutrients and energy from organic waste by composting and energy recovery*". *[…]*

"Advance organic waste as a resource in the form of:

Composting – large scale commercial operations and community level initiatives that can be linked to job creation and food security initiatives. […]"

The link between the circular economy and food security is mentioned but only as one objective among others (e.g., energy) or indirectly. Moreover, the very large number of sectors and possibilities of the circular economy often makes it difficult for public authorities to grasp and to efficiently implement strategies.

For nutrient recycling, continuous or regular political advocacy is therefore probably necessary to further reach and sustain its given priority. The South-African National FSM strategy, which was under preparation during the evaluation, with the participation of RUNRES is an opportunity to help sustaining the RUNRES achievements. In this case, it was the activities of RUNRES that aroused the interest of the authorities and provided the opportunity for advocacy.

Are the standards and norms and more generally the regulations, contributing to build an environment that enables to sustains the RUNRES achievements?

The challenges of sustainability can arise if norms and standards are too high. The other risk is the lack of standards, which can expose innovation leaders to the good will of public authorities, thus increasing their risks and reducing their visibility. This varies from one country to another.

In DRC, the RUNRES innovation leaders are rather facing regulatory gaps, which may expose them.

In Rwanda, regulations are enforced rather strictly, but standards and norms are very high and create a challenge the sustaining of innovations.

For example, so far COPED was prevented to process and commercialise its compost because of strict standards on heavy metals contents after the compost analysis revelled excess of cadmium.

Are the public authorities committed to enable the sustainability of the RUNRES achievements?

In DRC, there is no particular support but no obstruction either. This may evolve with time.

In Rwanda, policies are globally reflecting the government commitment to address waste management with the circular economy and related innovations. Authorities at local level are also very supportive and satisfied that their district benefit from the three innovations promoted by RUNRES.

However, in Rwanda the lack of coordination between national and local levels or between the bodies in-charge of the different sectorial policies can lead to create situations not favourable to the development of innovations. The request of the Rwanda Environment Management Authority (REMA) to carry out an audit of COPED site to assess the environmental impacts of waste processing, while COPED had received the official authorisation to establish their unit on the location.

In Ethiopia, the authorities expressed their commitment to further support the innovations, for example through the provision of land to accommodate innovation leaders or through the co-financing the operation of the motorized waste transport tricycles. This may evolve with time.

With regards to the waste collection and compost value chain, which involves the Municipality as it has the mandate of waste management, its strategy seems unclear. It was mainly relying on the expectation for granting new tricycles for the transport of the waste, which is also a vision supply and infrastructure driven, instead of being demand driven.

Moreover, the waste collections associations were surprisingly still considering themselves as employees of the Municipality, and overall giving the impression of being dependant on the Municipality. The sustainable self-financing of waste collection and sorting is a challenge and usually requires forms of subsidies: the financing scheme of these waste collectors would need to be clarified by the Municipality.

In South-Africa the DWS and the DOE expressed their interest in RUNRES. Their commitment however seems to be limited to coordination, where for example, the schools (DEWATS innovation) would need strong financial commitments to better ensure the sustainability of the innovation.

It would have been interesting to interview a representative of the Musundzi Municipality, but they were not available during the assessment. According to the information collected, it appears that the Municipality struggles [6] to fulfil its mandate for waste management, with waste separation probably being the biggest challenge[7].

On the other hand, the Umgeni Water seems to be quite an experienced and committed public partner, with responsibilities and successful investments carried out and for sewage sludge and faecal sludge management, and skilled staff. This provides a significant sustainability guarantee of the DuziTurf innovation (co-compost of FS), e.g., starting with the sourcing of the FS.

Do the increased capacities in each country contribute to sustains the RUNRES achievements or to build an environment that enables to sustains the RUNRES achievements?

The RUNRES contributed to increase the knowledge and especially the scientific feasibility of the innovations. This however needs to be completed in order for some innovations to become financially self-sufficient and not rely on the RUNRES funding to finance their OPEX (e.g., waste collectors in Ethiopia).

Beside the strengthening of scientific capacities, additional strengthening of the business capacities during the RUNRES would have allowed to better contribute to sustain the innovations.

If the increased scientific knowledge may allow to improve the regulatory framework, some challenges encountered during the project by innovation leaders helped to highlight additional barriers for innovations (for example, the excessive duration of the environmental licensing of Duzi Turf in South-Africa). The improvement of the framework, which may contribute to the sustainability of the innovations, would require to be addressed much more from a business perspective.

3.6.2 Of the Value Chains and the Business Models

What maturity level did the innovations reach?

Given the large number of innovations, the Consultant proposes the following classification of the assessment of the maturity of each innovation at the current stage of RUNRES.

- Planning phase: the innovation is planned but still to be implemented
  - Biochar (RSA)
  - Agroecological hub (RSA)
  - Struvite (ETH)
- Preparation phase: the innovation planning is completed but it is under preparation and getting ready to start.
  - DEWATS (RSA)
- Pre-commercial phase: only a few units of product / service are traded:
  - Waste collectors (ETH)
  - Compost (ETH)
  - Compost (DRC)

[6] https://www.timeslive.co.za/news/south-africa/2021-06-17-it-is-unacceptable-judge-rebukes-municipality-over-landfill-fiasco/

[7] Sourcing of organic waste to Duzi Turf for their co-composting had to be stopped.

- Compost (RWA)

- Phase I Pioneering: new product/service is introduced into the market; it is relatively unknown and still pending to gain the trust of consumers.
  - Anjo-Nus / Banana flour (ETH)
  - Duzi-Turf / FS co-compost (RSA)
  - Cassava peel (RWA)
  - BSF (RWA)
- Phase II Expansion: As the product gains popularity, the turnover and grows quickly and new competitors enter the market.
  - None (not foreseen in the phase 1 or RUNRES).
- Phase III Maturity: Demand is not growing at such a high rate anymore, and product prices drop.
  - None (not foreseen in the phase 1 or RUNRES).
- Phase IV Saturation: The competition for market shares becomes even harder.
  - None (not foreseen in the phase 1 or RUNRES).

Are the developed business models sustainable?

Innovations logically begun by verifying and ensuring their technical feasibility in the local context. At the end of the Phase 1 of RUNRES, most of them are able to process waste and obtain an output that can be used as fertiliser or animal feed. For the other innovations still pending for a start, the technical feasibility is nevertheless also confirmed.

To ensure the sustainability, economic sustainability of the developed innovative services is required. Economic sustainability can be reached by analysing the market and targeting some of its segments with ready to use products that are demanded (adequate product, price, quantity, location). At the current stage, only few of the *innovation leaders* have started this process (see the above assessment of the business maturity).

As formal market analysis and updated business plans are still pending to be drafted, the Consultant is issuing the following assumptions according to the interviews, site visits and secondary data.

- Bio-char and struvite:
  - Both innovations are rather unconventional and demanding technologies, which convert waste that could already be used as organic fertilizer to another form of organic fertilizer.
  - Evidence that the resulting products generate sufficient added value to compensate the additional CAPEX and OPEX may be difficult to collect as long as the products will be in competition with other cheaper organic fertilizers.
- Waste collection and transport:
  - Transport over distances that require a motorized vehicle is challenging to sustain. The value that can be potentially recovered from the waste must be high enough to finance the transport. It is by defining sound

waste collection zones, processing sites and the related transportation needs that the efficiency of the business model can be improved.

- Considering the low demand and willingness to pay, the services rely on subsidies from the public hand and the sustainability **remains fragile**. In Ethiopia, the subsidies are direct to the service supplier, whereas in Rwanda subsidies are directed to the demand side in order to increase the demand.
- To sustain these businesses, it is important to sustain the subsidy schemes. Improving the efficiency of the subsidy schemes may also contribute to it. It may also be relevant to question the market targets: it is recommended to target easy markets with high demand and low operation costs. Merging the waste collection service and the waste process and valorisation service may be an efficient solution to the financing issue.

- Composting:
  - The waste sourcing is an issue, because unlike Duzi Turf, this is a collection of domestic waste. The lack of adequate sorting causes quality problems and the sometimes low collection rates pose problems in terms of quantity. It is needed to produce large amounts in order to amortize investments (e.g., equipment) and reach economies of scale.
  - The composting process is well managed in Ethiopia, but is challenging in Rwanda because of the non-availability of water (needed for the process during the dry season) at the composting site and the inadequate protection from rain during the rainy season.
  - There is probably a need and demand for compost, but this needs to be clarified. This will also help to develop adequate commercialization methods. For example, the Arba Minch region (Ethiopia) is characterized by the prevalence of banana plantations, but the farmers who supply Anjo-Nus for their banana flour production stated during the evaluation mission that they did not need fertilizer for their plantation. The need for organic fertilizer in the Arba Minch area was reported by local authorities.
  - All compost businesses seem to be **fragile** and still depending on the support and strategies of the public sector regarding. Opportunities of co-composting of agro-waste and domestic organic waste, which would be driven by the private agro-businesses generating the agro-waste show more potential.

- FS co-composting (Duzi Turf):
  - Before the start of RUNRES, Duzi Turf was already a mature company with a long collaboration experience with Umgeni Water (production of turf grass by using the sewage sludge of the Darwill WWTP operated by Umgeni Water).

- The waste sourcing and the co-composting process is well managed.
- The compost commercialization is using the existing network of turf clients as well as clients delivering waste.
- An **expansion** of their co-compost business seems possible in the near future.

- Banana flour as human food (and banana peel as animal feed):
  - A quicker solving of the packaging issue, which implied to withdraw all products from the supermarkets during almost the entire duration of RUNRES Phase 1, would have allowed to generate the valuable information on the market and the demand.
  - New processing machines were bought from Asia ad commissioned a few weeks ago. There is no reliable information on the reliability and lifespan of the equipment. It is not clear whether the company has set aside sufficient amounts for maintenance and renewals of this equipment.
  - The preliminary market assessment basing on FGD and desk studies, indicates **interesting potential**. Additional quantitative estimates would be needed to update the business plan. This would also secure and development and the sustainability of the company.

- Cassava peel:
  - Like Duzi Turf, the innovation is not the core business of the company that implements it. It is producing cassava flour and valorizes its own and local small-scale agro-waste (cassava peels) as animal feed.
  - The peel drying before the grinding is still rudimentary and offers good opportunities of productivity improvement that will contribute to sustain the activity.
  - So far, because of the limited volumes due to the difficulties faced for drying the peels during the rainy season, Akanoze is still struggling to match the demand.

- BSF:
  - Maggot farm management emphasized the importance of the quality of the waste for producing larvae. Their experience suggests that the household waste and fruit and vegetable processing waste are the one producing the best quality feed. As household waste is not available in sufficient quantities, Maggot farm sources the one third of the raw material from Inyange Ltd, that produce the largest volumes of fruit juices based in Kigali.
  - The process is well managed and the product is demanded, the demand being well supported by the price increase of imported animal feed products. Sale contracts were already signed before the signature of the MoU for this RUNRES innovation.

- The Government intention to boost fisheries and the collaboration with the RAB offers interesting market perspectives for BSF larvae. On the other hand, the poultry sector which in other countries a great market for this type of feed is still very limited in Rwanda.

How do you assess the risk of public investment on scaling readiness / feasibility of the innovations?

When it comes to innovations requiring significant investments, the risk cannot be insured at reasonable cost by conventional banking institutions. It is appropriate for the public sector to cover this risk and to support the start-up of these innovations. But the innovation must allow for a quick return on investment, so as to allow for self-financing of new investments.

The scaling readiness and feasibility don't necessarily depend on the level of public funding, but rather on the market assessment (demand, supply and framework conditions) and the business plan of the innovation leader.

A generally significant indicator of risk is the level of initial co-funding of the innovation leader: the higher the level of co-funding, the more risk is shared by the innovation leader, encouraging to first seriously assess the risks and then to succeed.

However, it is recalled here that private sector participation implies that some losses will occur, especially when it comes to innovations.

4 LESSONS LEARNED AND RECOMMENDATIONS

4.1 Five Key Lessons Learned

High potential of nutrients circular economy on food security

The Project confirmed the important potential of circular economy of nutrients and the links with food security.

Loops outside the rural urban nexus

Extending these loops outside the framework of a strictly defined rural urban nexus would offer important scaling opportunities

Complexity of the challenge addressed by RUNRES

The linear innovation-led approach implemented with local research institutions automatically narrows the results.

There are so many opportunities in the circular economy sector today with several possible business models. It is often a nascent industry with little experience. Not all opportunities are good ones.

To limit the risks and identify the most relevant opportunities, it is important to first have or carry out diagnostic studies beforehand, including an assessment of the market (supply, demand and framework conditions).

Framework conditions to be improved

Business environments and more generally the framework conditions are to be improved and represents important pre-conditions to the development of sustainable nutrients circular economies aiming at food security.

A piloting phase as it was included in the Phase 1 or RUNRES, often mask these weaknesses but they come to light at the latest when it comes to scaling up.

Importance of the private sector

The innovations showed that innovations involving B2B operations were the most performing. But the public sector can also play a useful role. However, its intervention should be better framed with clarifications of the roles and responsibilities between public and private entities. This often starts with the establishment of framework conditions (policies, regulations, tariffication, etc.).

4.2 Recommendations

4.2.1 To SDC

The need of strong role for the private sector

Public entities intervene mainly in business models where domestic waste management is concerned. Their implementation requires the fulfilment of numerous preconditions, other than technological ones, which are challenging to meet.

Highest potential for innovation was shown for business models including waste valorisation as animal feed[8] because of higher added values in the related value chains compared “waste to soil amendment” value chains. These business models are usually implemented with B2B operations and rarely involve public entities.

The Phase 1 therefore confirms the importance of the private sector to implement core services of nutrient circular economies and the constitution of circular economy market of significant scale: these markets cannot be decreed, they happen with service providers and customers/users.

“Waste to soil amendment” business models could with the best potential are those favouring B2B operations. There seems to be a relevant potential in agro-industries that could implement themselves sustainable nutrient loops: they

[8] With the exception of Duzi Turf’s co-composting business

control and have large organic waste quantities and they have the resources to invest and implement.

Moreover, to support these private service providers, while the Phase 1 of RUNRES, which involved piloting innovations, naturally required significant contributions from academic and research organizations, their skills will be less necessary in a 2nd phase aiming at scaling up or out. To support this private sector, there should be a natural shift or swap in a 2nd phase with then major inputs coming from private advisory entities and support as needed from academic and research institutes.

Focus on the framework conditions and market assessments

Although RUNRES Phase 1 has already initiated a discussion on necessary improvements ad hoc, it is required to identify the needs and address them in a more systematic and comprehensive way.

In addition to the necessary market or potential market assessments (supply, demand and framework conditions), it should be considered whether, in order to be more effective, it would be necessary to involve the relevant public authorities more directly and from the beginning via formal agreements. Changing the framework conditions requires political will, which can be achieved more effectively if public authorities are owning more the process.

Given the significant impact of the framework conditions, these tasks are of high value and it must be made sure that they are implemented with adequate resources.

More selectivity to scale up/out more effectively and efficiently

The 1st phase aimed at piloting and exploring was naturally quite open on loops and business models.

Without restricting the business models and value chains (for example to rural urban exchanges), it is nevertheless recommended to focus on a more limited number of value chains and sectors. The (economic) sustainability and the relevance with regard to food security could for example be the key selection criteria.

This could lead to support business models involving companies with higher capabilities (e.g., Duzi Turf, Maggot Farm, COPED) that will bring in new markets and pull up potential weaker competitors. It might also lead to not support anymore all four countries involved in the 1st phase of RUNRES. However, in this case, an exit solution should be provided.

It is also recommended to support if possible multiple actors of a same value chain to improve the efficiency of the support.

The importance of financial approaches possible leverage effects

If the development of the framework conditions and the necessary diagnostic studies are straightforward and fairly easy to plan, the support towards a scaling up/out of private business models and the related value chains are more difficult to forecast.

Introducing forms of progressiveness in the 2nd phase could help limit the risks. This could mean reducing the 2nd phase volume and focusing on the market prerequisites outlined above as well as on the “capacity to scale for circular economy”.

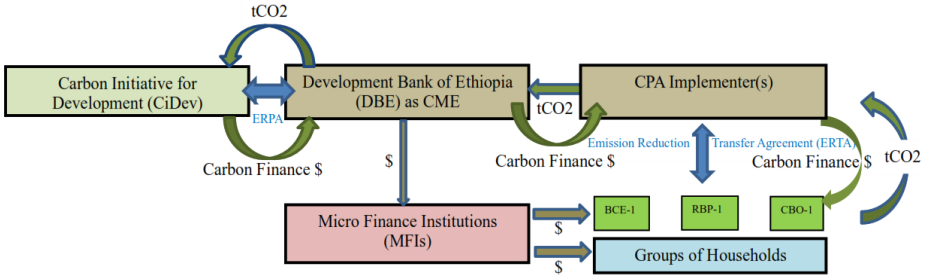
If scale-up or scale-down targets are maintained, a focus on private sector development and a more conservative approach to private sector financing are recommended. Requiring significant self-financing share from the private companies to be supported, like Duzi Turf provided it for example, would limit the risks and also provide leverage on the public financing.

To further extend this leverage effect and the potential impacts, it is recommended to investigate the possibility to work with financial facilities, with targets of access facilitation and risk minimization, in order boost existing businesses and attract new businesses via credit services.

To cope with the high risk of private sector financing in developing countries, private financing institutions usually require high collateral and charge high fees.

As a result, access to financing for innovative companies through private banks is generally difficult. To solve this type of problem, the public sector can set up credit guarantee schemes (CGS [9]) implemented by private lenders: the investment risks are shared between the private lenders and the public hand via the shared financing of a credit guarantees. Efforts required to implement such solutions can be significant as they are frequently innovative solutions, but the potential is high.

It is also relevant to mention that new financing policies and tools emerged after the 21st Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris in 2015. So called "Results Based Climate Finance" (RBCF [10]) mechanisms like the Carbon Initiative for Development (Ci-Dev, https://ci-dev.org/) were reinforced or emerged. The following figure shows an example of implementation in Ethiopia: carbon credits are purchased by Ci-Dev in exchange for proof of greenhouse gas emission GHG reductions.



Therefore, it must be large enough to allow for economies of scale and it must be well designed.

4.2.2 To implementing partners

Ensure the scope of expertise meets all needs

The first phase did address the scientific objectives to test technologies. Considering the limited business capacities of many innovation leaders, it would have been recommended to seek the needed and adequate private sector expertise to better develop business plans complying with minimum standards.

The interest of cooperation projects is to pool the specific expertise of national and international partners. It is therefore important to ensure that the partners understand and accept this mode of operation before starting the project by clarifying the roles and responsibilities of each and making sure all needed expertise can be made available.

Applied R&D and further R&D networking

Research and development are a key-element in any innovative technologic economic process. Though a lot has been achieved during Phase 1 of RUNRES, additional research and/or information to users is needed in particular on the way to optimise the use of organic fertiliser and animal feed obtained from the different sources of waste. The users of products supplied by innovation leaders should be better advised with clear guidelines.

The search for experiences and research results from around the world could already provide a lot of information to be communicated to innovators and farmers.

[9] https://documents1.worldbank.org/curated/en/576961468197998372/pdf/101769-REVISED-ENGLISH-Principles-CGS-for-SMEs.pdf

https://ec.europa.eu/info/sites/default/files/economy-finance/dp002_en.pdf

[10] https://openknowledge.worldbank.org/bitstream/handle/10986/26644/115053-WP-PUBLIC-111p-RBCFinPracticeFinalMay.pdf?sequence=1&isAllowed=y

This information could be complemented by field trials to measure nutrient uptake or amounts of compost per area per crop.

Establishing links with public research organizations can also be beneficial in terms of credibility and indirect publicity made by these public institutions, and widen the circle of potential clients, as was the case with the Rwandan Agriculture Board which tested BSF larvae for two years and is now going to multiply the tests in 4 different regions.

Exit strategy

The exit strategy for innovation leaders is still to be identified. It is recommended to foresee the linking with business advisory groups, financing facilities or ongoing SME supporting programmes.

4.2.3 To local authorities

Improve the understanding of the nutrient circular economies

The value chain for organic waste still needs to be better understood at local or national level.

This usually concerns the management of solid waste and human waste. It is still necessary, in some cases, to change the paradigm and abandon visions guided by the implementation of infrastructures towards visions centred on services addressing a demand and value chains.

Single technological innovations need to be complemented with a vision to create this understanding and establish the institutional and business conditions to support such a value chain.

In a 2nd phase, the project might want to support a more systematic mapping and economic, ecological and social assessments of the organic waste value chains in the participating countries and cities. This will be useful for charting out the options for scaling and diversifying the application of the current innovations, as well as for strengthening policy and investment support. In countries like Rwanda, where recent policy commitments to circular bioeconomy are strong but perhaps lacking practical tools for implementation, such analyses and guidelines would be very timely.

Identify the share of responsibilities between authorities

Circular economy value chains involve many authorities from different sectors. Coordination is required so to promote the development of the circular economy sector.

For example, sanitation at a school that valorise its waste to produce its own crops, may involve authorities of the city, of the Ministry of Education, of the Ministry in charge of sanitation and of the agriculture.

This should typically be clarified by clear policies and regulations.

The risk of too high regulatory standards

A common risk in country starting to develop new sector is to adopt standards and norms that are above the actors' capacities and therefore hinder even the start-up of the sector. It often happens that certain regulatory decisions are taken without first measuring their impact on the development of the sector, in the belief that implementation will be automatic.

It is therefore recommended that the authorities are made aware of the role of these regulatory tools and that they understand that they are development tools.

Financial incentives

Circular economy adds value in waste management value chains. Some value chains still need a very efficient financing system to sustain themselves or sometimes need external public financial inputs because it contributes to common good and the private sector cannot solve everything.

This was already the case for example in Ethiopia and in Rwanda for the waste collection with two different approaches (subsidizing the supply side and the demand side).

It is therefore recommended to consider public financial incentives for the future. This relates also with the legal framework and the institutional setup: it might be necessary to consider building up the capacity of local authorities and adapting the legal framework in order to open the door for financial incentives.

These incentives can be of several forms of tax exemption, soft loans, green credit lines, carbon credit lines and so on. Some of such incentives can be offered in partnership with specialized private institutions, e.g., local banks that can play a more active role in the support of circular economy initiatives.

In many countries some commercial banks have decided to open "green credit lines" with lower interest in order to specifically attract circular economy businesses - and boost the sector and develop a new business line. They have a commercial interest in doing that and can access "green money" from the international financial system.

4.2.4 To Businesses

Market information and analysis

Up-scaling will imply an overview of the entire markets, entailing demand analysis, prices, competition, segmentation in order to better target customers. Though some analysis was conducted during phase 1, much deeper and finer analyses need to be conducted.

Successful entrepreneurs are not always those having the best technical skills and producing the best products, but those understanding the market and taking the right business decisions.

The Phase 1 of RUNRES showed that many companies should seek the support of adequate business advisory services.

Complete the product development process

Business success implies a clear positioning of the product on the targeted markets. Most of the RUNRES operators need to consolidate the results achieved during phase 1 by completing the development of the product to supply the market with a ready to use branded product.

Look for partnerships and professional associations

To make their voices heard and strengthen the position of the private companies in the sometimes difficult business environment, it is important for business working in the same sector to partner.

For example, it has become very common that companies emptying pit latrines and septic tanks associate to join their forces to make their claims heard and to defend themselves against the sometimes unfair practices of certain authorities.

Promote certification "labels"

For emerging alternative products (e.g., compost vs. synthetized fertilizers) it may sometimes be relevant to create labels as branding and part of marketing actions.

Use of the experiences of all innovations when planning the up-scaling

When planning the up-scaling phase, businesses shall consider their own and other businesses experience made during the phase 1.

This might result in an expansion or change of activities or on the contrary on operation reduction or refocus.

Inspired by Rwanda results, DRC composting businesses have already indicated their intension to shift part of their production of BSF larvae. In Rwanda different companies might partner to operate in the field where each of them has comparative advantages.

Appendices

Appendix 1 Overview of the Innovations

Country	City region	Innovation leader	Short description	Input	Output	Long description	Status*
DRC	Bukavu	Diobass	Composting	Domestic solid waste	Soil amendment	Municipal scale solid waste collection and composting to produce soil amendments for coffee	Production started
DRC	Bukavu	FESDD	Composting	Domestic solid waste	Soil amendment	Municipal scale solid waste collection and composting to produce soil amendments for coffee	Production started
DRC	Bukavu	FGASD	Composting	Domestic solid waste	Soil amendment	Municipal scale solid waste collection and composting to produce soil amendments for coffee	Production started
ETH	Arba Minch	Anjo-Nus	Agro-processing	Fruit	Human food, animal feed	Production of bana flour (human food) and banana peel as animal feed	Production started, no commercialization yet
ETH	Arba Minch	MASIP	Struvite	Urine	Struvite	Urine collection via mobile urinals and struvite production	Production has not started yet
ETH	Arba Minch	Egnan New Mayet	Composting	Domestic solid waste	Soil amendment	Muncipal scale composting to produce soil amendments for banana	Production started, no commercialization yet
ETH	Arba Minch	Waste collection associations	Waste collection	Domestic solid waste	n.a.	Municipal scale solid waste collection	Collection stared
RWA	Kamonyi	Akanoze	Agro-processing	Vegetable	Animal feed	Cassava peel processing for animal feed production	Production started
RWA	Kamonyi	COPED	Composting	Domestic solid waste	Soil amendment	Municipal scale solid waste collection	Production started
RWA	Kamonyi	Maggot farm	BSF	Green waste	Animal feed, soil amendment	Balck solider flies larvae production for animal feed	Production started
RSA	Msunduzi	Duzi turf	Co-composting	Sewage sludge, green waste, food waste	Soil amendment	Co-composting of sewage sludge and municipal organic waste	Production started
RSA	Msunduzi	Umgeni Water / School	Dewats	Human excreta	Soil amendment, nurseries	Decentralised and resource-oriented sanitation system for a rural school to produce organic fertlizer	May be implemented soon
RSA	Msunduzi	Rusus	Pyrolisis	Human excreta	Soil amendment	Pyrolisis of faecal sludge to produce bio-char for soil amendment	Not implemented
RSA	Msunduzi	NCEDA	Ago-ecological hub	Sewage sludge, green waste, food waste	Soil amendment, else	Co-composting FS and green waste, agric. demo fields, small scale agro-processing, training.	May be implemented soon

* at the time of this external evaluation

Appendix 2 Programme of the Data Collection

ETH Zurich

Names available upon request

Ethiopia

The RUNRES evaluation in Ethiopia took place from Friday August 12th to Friday Thursday 18th 2022. It was carried out by Mr. Frédéric Koehl as the team leader of ECOPSIS, Mr. Simon Heck from CGIAR, Mr. Yared Getaneh a national Consultant of ECOPSIS.

Names of interviewees available upon request

South Africa

The RUNRES evaluation for South-Africa took place from remote and the interviews were led by Mr. Frédéric Koehl as the team leader of ECOPSIS

Names of interviewees available upon request

Rwanda

The RUNRES evaluation in Rwanda took place from Monday August 22nd to Friday August 26th 2022. It was carried out by Mr. Pascal Bernardoni as the team leader, Mr. Simon Heck from CGIAR, Mrs. Emmanuella Uwamahoro, a national Consultant working with REDD and Mrs. Speciose Kantengwa, IITA staff and RUNRES Project Country Coordinator.

Names of interviewees available upon request

D.R. of Congo

A 4-day mission from the national Consultant was planned to collect data in DRC was supposed to take place. Because of security reason, the mission could not be conducted and replaced by 4 videoconferences with respectively the 3 consortium and IITA Bukavu. The same members of the evaluation team that conducted the mission in Rwanda participated to the videoconferences.

Names of interviewees available upon request.

Appendix 3 Documentation

Preliminary documents

[1] Terms of reference for the RURNES Evaluation, SDC, June 2022

[2] RUNRES Prodoc, April 2019

[3] Context studies summary report, 2020

Context studies

[4] RUNRES City- Region Context Studies, RUNRES core team

Innovations

[5] Report on “decision aiding on the innovation plans through a MCDA”, July 2020

[6] Memoranda of Understanding (15 no. in the 4 countries) with the selected innovation partners, including for each the innovation plan, 2020

Monitoring and Evaluation

[7] Initial log frame, April 2019

[8] Updated log frame, 2022

Progress Reporting

[9] Annual reports (minutes of the annual steering committee meeting), 2020, 2021 and 2022

[10] Half-yearly reports, 2020-H2, 2021-H1, 2021,-H2 and 2022-H1 (one report per country and per half-year)

Financial Information

[11] Budget forecasts and budget spending until end of June 2022 (excel file)

Intermediate / Final Report

[12] RUNRES Phase I Summary Report, July 2022

Appendix 4 Checklist for the data collection

Preliminary remarks:

Not all questions were not meant to be asked to interviewees, but there should be answers via information collected during interviews or desk review of documentation. Not all questions had the same level of priority.

- Grey questions: lowest priority, nice to have but not mandatory.
- Black questions: intermediate priority
- Red questions: highest priority

During the interviews, questions may have been reformulated and their order may change, in order to have smooth conversations. This checklist was therefore a guide to help the evaluators structuring their data collection and to check that all high priority questions can be answered.

The Checklist was sorted according to the draft table of contents of the evaluation report, which is itself sorted according to the 6 DAC criteria.

Interviews were recorded if the interviewee accepted it. The interview content remained anonymous.

Potential sources of information / interviewees:

SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Michel Evequoz (as former lead of the RUNRES phase I on SDC side)	Johann Pius Ben Léon				Municipality or equivalent depending on the national administrative context (authorities in charge of planning, funding and sometimes regulating)	Public utilities		National level relevant for scaling up and issues of higher level (regulations, standards, etc.) Local level relevant for implementation of the regulation, policies, etc.			As needed (e.g., other interventions in parallel of RUNRES)

Small and capital x were used for the preliminary targeting of the information sources. This targeting was refined during the field mission and data collection.

1 RELEVANCE "Is the Intervention doing the right things?"

1.1 Of the RUNRES Project in General

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Which of the needs and priorities initially identified have eventually been confirmed (e.g., via the Context Studies)? (need ≠ demand)?	x	X	x									
Have additional needs and priorities been identified that could or could not be taken up by the current phase?	x	X										
Do you think that it is worth implementing a second phase of RUNRES? Why?	X	X	x				x		x	x	x	
Do you think that the development challenges of food insecurity and inadequate sanitation provision have been adequately addressed by the sub-projects? (how well targeted are the sub-projects to the development challenges)	x	X	x									

1.2 Of the designed Approach

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
How far were project design, scope, implementation modalities and budget adequate to reach the planned objectives and outputs? Can be answered by the below questions												
How suitable is the 2-phase programme structure of 4 years each for co-developing and scaling innovations? Why? Strengths and risks of this approach. until scaling-up relevant?	X	X										
Is the decentralized approach with significant activities carried out from national actors relevant? Why? Should it continue in Phase II?	X	X										
Was the transdisciplinary Approach helpful for addressing needs and priorities of stakeholders? Demand by the actors?		x	x	x	x		X		x	x	x	

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Is the choice of implementing the RUNRES Phase I in 4 countries in parallel relevant?	X	X										
Why 4 countries? Why these countries? How was the approach and the design adapted to each context of each country?	X	X										
What is the relevance of doing 3 to 4 sub-projects in each country?	X	X	x									
Are project investments in private companies and in public-private partnerships addressing a need? A demand?		X	x	X	X							
At the planning/design phase, how did you assess the risk of public investment on market distortion and on scaling readiness/feasibility of the innovations?	X	X	x	x								
How is the approach adequately addressing gender issues and how does it enhance the outcomes and impacts?		x	x	X								

1.3 Of the Innovations

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
How were the specific innovations identified and how was their need and demand assessed?		X	X	x								
Do the innovations introduced actually already exist in one form or another? If yes, what value does the intervention add, and how does it engage with local innovation systems? Is each of the following innovations relevant? Do they address a need? A demand?		X	x	x	x		x		x	x	x	
1) DRC1 – Diobass – Improved municipal scale solid waste collection and composting to produce soil amendments for coffee.												
2) DRC2 – FESDD – Improved municipal scale solid waste collection and composting to produce soil amendments for coffee												
3) DRC3 – GASD – Improved waste collection, provision of public sanitation facilities, and compost production for coffee farmers												
4) ETH1 – Anjo-Nus – Value addition of banana, and animal feed production of banana peel waste												

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
5) ETH2 – Municipal Waste Collection – Improved municipal scale solid waste collection												
6) ETH3 – Egnan New Mayet – Municipal scale composting to produce soil amendments for banana												
7) ETH4 - MASIP – Struvite production via UDDT sanitation												
8) RWA1 – Akanoze – Casava peel processing for animal feed production												
9) RWA2 – COPED – Municipal scale composting to produce soil amendments												
10) RWA3 – Maggot Farm – Back Soldier Fly larvae animal feed production												
11) RSA1 – Duzi Turf – Municipal scale composting of urban green waste and sewage sludge to produce soil amendments for turf grass												
12) RSA2 – Rusus – Pyrolisis of pit latrine faecal sludge to produce bio-char as a soil amendment												
13) RSA3 – Dewats – Decentralized and resource-oriented sanitation system for a rural school to produce human-derived fertiliser												

1.4 Of the Logical Framework

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Is the overall goal relevant?	X	X										
Are the targeted impacts in line with the overall goal?		X										
Are the targeted outcomes in line with the targeted impacts?		X										
Are the targeted outputs in line with the targeted outcomes?		X										
Is the monitoring system well designed to be effective? To be efficient?		X	x	X	x							

2 COHERENCE: "How well does the Intervention fit?"

2.1 With Policies and Strategies

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Were the authorities responsible for the planning and implementation of *policies and strategies* (at national, regional and/or municipal levels) identified? Is there a stakeholders matrix with responsibilities?		X	x	X								
Did the intervention consult the relevant authorities? How and when?		x	X	x					X	X	X	
I the RUNRES phase I in line with policies and strategies ***on nutrients for agriculture***?		X	x	X					X			
on nutrients for animal feed?		X	x	X						X		
on nutrients for human food?		X	x	X						X		
on solid waste and liquid waste management?		X	x	X							X	
on circular economy (3R or 4R)?		X	x	X					X	X	X	

2.2 With national norms and standards

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Are the products resulting from the innovative processes planned to be in line with the national norms and standards?		x	x	x	X		X		x	x	x	
Did the intervention benchmark the norms/standards with other countries? Are these national norms and standards relevant? Why?		X	X	X								

2.3 With other Interventions

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
What other interventions that are running in parallel and are relevant for RUNRES were identified?		x	X	X					x	x	x	
How is the coordination and/or cooperation with the other interventions? Why?		x		X								

2.4 For the Targeted Beneficiaries

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
To what extent is the RUNRES in line with need and/or demand of the **population**? Why ? What demand?		X		X								
of the **farmers**? Why ? What demand?		x		X	X				x	x		
of the **businesses**? Why ? What demand?		x		X	X				x	x		

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
of the **public utilities**? Why ? What demand?		x		X			X					
of **actors and stakeholders in the innovation system**? Why ? What demand?		x		x								

2.5 For the SDC

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Is it in line with the strategy of the SDC in this sector and in the targeted region? Is a strategy paper available?	X											

3 EFFECTIVENESS: "Is the Intervention achieving its objectives?"

3.1 For the Outcome 1: Increased recycling of nutrients

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.2 For the Outcome 2: Enhanced regional food value chains

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.3 For the Outcome 3: Best practices and knowledge is diffused at local and regional level

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.4 For the Outcome 4: Enabling policy environment

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.5 For the Outcome 5: Public and/or private partnerships are established for the implementation of sustainable innovations

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.6 For the Outcome 6: Identification and testing of suitable innovations

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.7 For the Outcome 7: Well-functioning transdisciplinary innovation platform

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon Späth).

3.8 External factors

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
What main unforeseen external factor affected the RUNRES Phase I?		X	x	X								
How was the approach modified during the		X	x	X								

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
implementation to adapt to unforeseen external factors?												
Have the risks been well identified, analysed and anticipated at the start of the RUNRES Phase I?	X	X	x	x								

4 EFFICIENCY: "How well are resources being used?"

4.1 Of the Organization and Approach

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
What person(s) was(were) the driver(s) of the RUNRES phase I? Why?	x	X	X									
Is there an organogram? Kept up-to-date? By? Available for?		X										
Were MoUs the right tool? Any issue with signed MoUs?		X	X									
Were the MoUs well designed? Are the responsibilities well assigned in the MoUs? Were the contracts/MoUs within RUNRES time based? Lump sum & deliverable based?		X	X									
Were the national RUNRES staff efficient? Why?	x	X										
Were the several consultations (workshops) efficient? Why?		X	x									
Any significant deviations in the financial planning observed? Why?		X										

4.2 Of the Sub-Projects' Implementation

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Was the selection process of **innovation actors** efficient? Did the selection process of allow to select efficient **innovation actors**?		X	X	x	X							
Were the MoUs well designed? Are the responsibilities well assigned in the MoUs? Were the contracts/MoUs with the **innovation actors** time based? Lump sum & deliverable based?		x	X	X	X		X					
Any significant deviations in the financial planning observed? Why?		X	X	x								

4.3 Of Synergies and Partnerships

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
What synergies/partnerships?	X	X		X								
What resources could be saved thanks to these synergies?		X		X								
How much does it represent?		X		X								

5 IMPACT: "What difference does the intervention make?"

5.1 For the Impact 1 – Improved environmental (and human) health

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon SPäth).

5.2 For the Impact 2 – Improved household income and food security

Check using the log frame. Latest measurements to be provided by the ETHZ (Léon SPäth).

5.3 Readiness for RUNRES Phase 2 (scaling-up)?

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Differences in the **framework conditions**: Is the environment for private		X	X	X	X				X	X	X	

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
businesses and public utilities improved for the services targeted by RUNRES? Has this environment improved, country-by-country? Policies, strategies, regulatory framework, authorities' capacities & commitment												
Which innovation(s) were sufficiently successful to allow scaling-up in the existing environments in each country?		X	X	X			x		x	x	x	
What differences on the supply side?		X	X	X			X		x	x	x	
What differences on the demand side on the developed nutrient products (Value? Quantity? Trust? Understanding? etc.)? Farmers, businesses, households		X	x	x			X		x	x	x	

6 SUSTAINABILITY: "Will the benefits last?"

6.1 Of the Framework Conditions

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
Will the commitment (incl. funding) of the public authorities allows to sustain the achievements ? if yes, which ones?		X	x	x	x		X					
What threatens the sustainability of the achievements for the private sector?		X	X	X	X							
Is the regulatory framework (e.g. norms and standards) realistic? Slowing down or enhancing the development of the targeted services?		X	X	x	x				x	x	x	
Will the knowledge gained be sustained? How will it be sustained?		X	X	X			X					
Will the networks created by RUNRES and its TiP sustain? How? On what does it depend?		X	X	X			X					

6.2 Of the Value Chains and the Business Models

Questions / Checklist	SDC	RUNRES – ETHZ	RUNRES SC Member – Each of 4 countries	RUNRES National Coordinator – Each of 4 countries	RUNRES Scientist(s) – Each of 4 countries	Municipalities – Each of 4 countries	Utility (sanitation / waste)	Innovation actors (15 no)	Agriculture (regulation, planning)	Animal feed & human food (regulation, planning)	Environment (regulation, planning)	Other
What evidence is there for market uptake of innovations initiated or supported by RUNRES?		X	x	X	x				x	x		
Did the RUNRES help to improve existing value chains? Have they become sustainable?		X	x	X	x		X					
Did the RUNRES help to create new value chains? Have they already become sustainable?		X	x	X	x		X					
Did the RUNRES help to create new perspectives of value chains and business models?		X	X	x			X		x	x		

Appendix 5 Funding share for the Innovations according to the MoUs

Data available upon request

Appendix 6 Logframe – Measurement Previsions

Impacts (Overall Goal)	Impact Indicators	External Factors	Monitoring Method	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Impact 1 – Improved environmental (and human) health	Increased x% in soil organic matter and soil microbial biomass in...	Assumption: Soil inputs derived from local waste streams are utilized by farmers.	Measurment				
	...x farmer fields.		Counting				
	X less fecal pathogens released in the environment of the city region food systems.	Assumption: Households in the community are willing to consume food grown with fertilizers derived from recycled waste.	Simulation				
	X more food groups in diets of communities.	Risk: Too strong taboos regarding human waste to adopt human waste derived products.	Survey				
Impact 2 – Improved household income and food security	X% increase in available household income...	Assumption: Uptake of innovations in the value chains is widespread	Survey				
	...in x households	Assumption: Innovations lead to increased revenue and employment.	Survey				
	Increased availability, access, stability and utilization of food. Specific indicators will be based on the FAO Food Security Indicators.	Risk: Some innovations are too expensive to make profit.	Survey				

Impacts (Overall Goal)	Impact Indicators	Monitoring Method	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Impact 1 – Improved environmental (and human) health	Increased x% in soil organic matter and soil microbial biomass in...	Measurment	40	40	NA	40	62	31	93	62		Increased 5.7% in soil organic matter and soil microbial biomass in…	% increase in soil organic carbon and other soil health measures e.g. improvement in soil chemistry and physical characteristics-electric conductivity	
	...x farmer fields.	Counting	400				2500	1000	1000	500		85 farmer fields.	30	30
	X less fecal pathogens released in the environment of the city region food systems.	Simulation		350	NA	50	N/A	N/A	N/A	N/A		$47.7x10^{11}$ viruses, $47.7x10^{9}$ bacteria, $47.7 x10^{7}$ parasite cyst,$47.7x10^{5}$ parasite eggs	NA	
	X more food groups in diets of communities.	Survey	2	NA	2	NA	6	1	3	2		N/A	Crop Production Diversity and impact on food security as measured using HDDS and FCS. (*How many food groups)*	
Impact 2 – Improved household income and food security	X% increase in available household income...	Survey	20	20	20	20	19	7	7	5		20%	% increase in HH Income from HHIX mean to HHIY	
	...in x households	Survey	100	45	40	15	2500	1000	1000	500		10	...in x households (30 per group time 2-3 community groups	
	Increased availability, access, stability and utilization of food. Specific indicators will be based on the FAO Food Security Indicators.	Survey											Increased Food Consumption and Nutrition Security as measured using HDDS and FCS. (Report?)	

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 1: Increased recycling of nutrients	Output 1.1	Improved collection, transport, and processing of waste streams.	X amount (e.g. tons or cubic meter) of waste hygienically processed.	Continuous measurements/annual reports.	Assumption: Waste collection and processing are done correctly. Risk: Health hazards not enough controlled during handling of waste.	Accounting	2460t of organic waste and 2,8t or urine	1128 tons of organic waste 1228	800t organic waste 800	540t organic waste, 2767liters of urine 3307
	Output 1.2	Pathways are established to increase local agricultural production with waste-recycled input products	# of suppliers of waste-recycled input products to farmers.	Annual reports after Y4.	Assumption: A local market exist and farmers are interested to buy and use waste-recycled input products. Risk: Waste-recycled input products are too expensive.	Counting	3	1	1	1
	Output 1.3	NEW: Improved collection	X amount (e.g. tons or cubic meter) of waste hygienically collected.	Continuous measurements/annual reports.	Assumption: Waste collection is done correctly. Risk: Health hazards not enough controlled during handling of waste.	Accounting	4420t of organic waste	1540	1440	1440
	Output 1.4		X amount (i.e. tons or cubic meter) of usable product from hygienically processed waste (e.g. compost).				1554t of composted waste	749	480	325
	Outcome 1.0	MODIFIED: Similar as Outcome 1	X amount (i.e. tons or cubic meter) of hygienically processed and redistributed waste (e.g. compost) to support agricultural production.	Monitoring of the volume of waste captured, transported, hygienically processed and redistributed.	Assumption: Processed waste is of interest to farmers and adequate quality control measures in place to facilitate best practice processing. Risk: Quality of processed waste products is not high and consistent enough for selling.	Accounting	1554t or composted waste and 2.8t of valorized urine	749 749	480t of compost produced and distributed 480	325t of compost produced and distributed, 2767l of urine valorized 3092

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 1: Increased recycling of nutrients	Output 1.1	Improved collection, transport, and processing of waste streams.	X amount (e.g. tons or cubic meter) of waste hygienically processed.	3040t of organic waste and 13,2t of urine	3'040 ton organic solid waste	NA	12,960,000 m^3 urine
	Output 1.2	Pathways are established to increase local agricultural production with waste-recycled input products	# of suppliers of waste-recycled input products to farmers.	8	1	NA	1
	Output 1.3	NEW: Improved collection	X amount (e.g. tons or cubic meter) of waste hygienically collected.	3200t of organic waste and 13,2t of urine	3,200 ton solid organic waste	NA	12,960,000 l urine
	Output 1.4		X amount (i.e. tons or cubic meter) of usable product from hygienically processed waste (e.g. compost).	2'888t of compost and TBDt of struvite	2,888 ton compost	NA	12,312,000 liters urine
	Outcome 1.0	MODIFIED: Similar as Outcome 1	X amount (i.e. tons or cubic meter) of hygienically processed and redistributed waste (e.g. compost) to support agricultural production.	1500t compost and 31.1t struvite	1500 ton	NA	31.104 ton

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 1: Increased recycling of nutrients	Output 1.1	Improved collection, transport, and processing of waste streams.	X amount (e.g. tons or cubic meter) of waste hygienically processed.	1485t of cassava peels, 7300 of organic waste	2.7 tons of sorted peels processed per day	10 tons of sorted waste composted per day	60 ton crashed per month
					1485t @ 220d/y for 2.5y	5500t @ 220d/y for 2.5y	1800t @12m/y for 2.5y
	Output 1.2	Pathways are established to increase local agricultural production with waste-recycled input products	# of suppliers of waste-recycled input products to farmers.	22	4	11	7
	Output 1.3	NEW: Improved collection	X amount (e.g. tons or cubic meter) of waste hygienically collected.	1650t of cassava peels, 1800t or organic waste, and 11000t of unsorted organic waste	3tons of peels per day, 1650t	20 tons per day unsorted waste, 11000t	60 ton per month, 1800t
	Output 1.4		X amount (i.e. tons or cubic meter) of usable product from hygienically processed waste (e.g. compost).	550t of animal feed, 8220t of compost, and 300t of BSF	1 ton of animal feed ingredient per day, 550t	7,500 tons over 3 years	10 tons of BSF larvae and 24 tons of compost per month, 300tBSF and 720t of compost
	Outcome 1.0	MODIFIED: Similar as Outcome 1	X amount (i.e. tons or cubic meter) of hygienically processed and redistributed waste (e.g. compost) to support agricultural production.	550t of animal feed, 5220t of compost, and 300t of BSF	1ton of animal feed ingredient per day sold	4,500 tons sold to farmers	Assumption: all production sold

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 1: Increased recycling of nutrients	Output 1.1	Improved collection, transport, and processing of waste streams.	X amount (e.g. tons or cubic meter) of waste hygienically processed.	1350t faecal material, 330t timber, 1925t organic waste, 2200t or grey water, 53.9t urine, and 619m3 of sewage (without urine)	45 cubic meters/month of feacal matter and 11 tons/month of timber waste hygienically processed. 1350m3 FM and 330t T	1925 tons of green waste and 2200 tons of water treatment residue collected and hyginenically processed.	21240 L/yr of urine, 247505 L/yr feces and water hygienically processed 53.9t U and 619m3 SW
	Output 1.2	Pathways are established to increase local agricultural production with waste-recycled input products	# of suppliers of waste-recycled input products to farmers.	4	2 suppliers of waste-recycled input products to farmers.	1	1
	Output 1.3	NEW: Improved collection	X amount (e.g. tons or cubic meter) of waste hygienically collected.	1350t faecal material, 330t timber, 1925t organic waste, 2200t or grey water, 53.9t urine, and 619m3 of sewage (without urine)	45 cubic meters/month of feacal matter and 11 tons/month of timber waste hygienically processed.	1925 tons of green waste and 2200 tons of water treatment residue collected and hyginenically processed.	21240 L/yr of urine, 247505 L/yr feces and water hygienically processed
	Output 1.4		X amount (i.e. tons or cubic meter) of usable product from hygienically processed waste (e.g. compost).	315 tons of enhanced biochar,5142.5 tons of co-compost and an equivalent of 4625 kg of 2:3: fertilizer over the pilot phase (2.5 years)	315 tons of enhanced biochar produced over the pilot phase (2.5 years)	5142.5 tons of cocompost produced over the pilot phase (2.5 years)	Equivalent of 4625 kg of 2:3:2 fertilizer and 375 kg of urea fertilizers are produced over the pilot phase (2.5 years)
	Outcome 1.0	MODIFIED: Similar as Outcome 1	X amount (i.e. tons or cubic meter) of hygienically processed and redistributed waste (e.g. compost) to support agricultural production.	315 tons of enhanced biochar,5142.5 tons of co-compost and an equivalent of 4625 kg of 2:3: fertilizer over the pilot phase (2.5 years)	10.5 tons timber enhanced biochar/month being hygienically processed and redistributed to support agricultural production. 315t	2057 tons of compost to be produced from waste and redistributed to support agricultural production.	Per year: Equivalent of 37 bags (50kg) of 2:3:2 fertilizer and 3 bags (50kg) of urea fertilizers are produced from treated urine and redistributed to support agricultural production.

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 2: Enhanced regional food value chains	Output 2.1	Improved availability and quality of locally processed food products.	X tons of high-quality processed food products supplied by small scale food processing units.	Annual reports after Y3 and Y4.	Assumption: Small-scale processing units are implemented and result in improved high quality products.	Accounting	NA	NA	NA	NA
			X% of high-quality products (according to crop specific quality score cards e.g sellable tuber vs not for cassava, size of coffee beans etc.) Scorecards will be defined for each crop based on existing quality control mechanisms.		Risk: Small-scale processing units are not profitable. Risk: Small-scale processing units do not supply high-quality products.	Comparison	NA	NA	NA	NA
	Outcome 2.0	Same as Outcome 2	# of small-scale food processing units installed and operating.	Yearly reports from partners, focus on specific case studies that demonstrate implementation of improved food processing activities.	Assumption: Innovations related to food processing show benefits and are therefore adopted.	Counting	NA	NA	NA	NA
			# of farmers that increased their... ...production by x%.	Yearly reports from selected farmer groups.	Assumption: Supply and demand exist for products from food value chain innovations.	Survey	855	430	100	325
				Impact assessment of RUNRES in Y4 in each city region food system.	Risk: Private sector does not engage in alternative food processing activities.	Survey	58% (ponderated average over the amount of farmers)	25	67	100
					Risk: Agricultural productivity is not high and regular enough to ensure a constant supply of raw materials that matches demand of processed food products.					
					Risk: Insufficient affordable and accepted inputs based on locally recycled waste products.					
					Risk: Farmers cannot sell agricultural products that have been produced with waste-recycled agricultural inputs.					

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 2: Enhanced regional food value chains	Output 2.1	Improved availability and quality of locally processed food products.	X tons of high-quality processed food products supplied by small scale food processing units.	105t of high-quality processed banana products supplied by small scale food processing units	NA	105 ton	NA
			X% of high-quality products (according to crop specific quality score cards e.g sellable tuber vs not for cassava, size of coffee beans etc.) Scorecards will be defined for each crop based on existing quality control mechanisms.	98% of high-quality banana products deliverd to final consumer	NA	98%	NA
	Outcome 2.0	Same as Outcome 2	# of small-scale food processing units installed and operating.	1 one small scale banana processing small scale enterprise installed and operating	NA	1	NA
			# of farmers that increased their... ...production by x%.	400 banana producer farmers	350	NA	50
				...increased their organic banana production by 40%	40	NA	40

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 2: Enhanced regional food value chains	Output 2.1	Improved availability and quality of locally processed food products.	X tons of high-quality processed food products supplied by small scale food processing units.	2750t of fresh (peeled) cassava	5t cassava per day, 2750t	NA	NA
			X% of high-quality products (according to crop specific quality score cards e.g sellable tuber vs not for cassava, size of coffee beans etc.) Scorecards will be defined for each crop based on existing quality control mechanisms.	7	7	NA	NA
	Outcome 2.0	Same as Outcome 2	# of small-scale food processing units installed and operating.	3	3	NA	NA
			# of farmers that increased their...	2500	1000	1000	500
			...production by x%.	NA	NA	NA	NA

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 2: Enhanced regional food value chains	Output 2.1	Improved availability and quality of locally processed food products.	X tons of high-quality processed food products supplied by small scale food processing units.	N/A	N/A	NA	NA
			X% of high-quality products (according to crop specific quality score cards e.g sellable tuber vs not for cassava, size of coffee beans etc.) Scorecards will be defined for each crop based on existing quality control mechanisms.	N/A	N/A	Field trials	NA
	Outcome 2.0	Same as Outcome 2	# of small-scale food processing units installed and operating.	N/A	N/A	NA	NA
			# of farmers that increased their... ...production by x%.	145 34%	85 48%	30 30%	30 0%

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 3: Best practices and knowledge is diffused at local and regional level	Output 3.1	Best practices and knowledge are defined and scaling partners are engaged to diffuse them at local and regional level.	# of best practices defined in each city region food system. Identifiable benefits of best practices include: locally processed products (waste and food), high quality (international standards), affordability (local) and availability (local and non-local)	Annual reports after Y3 and Y4.	Assumption: After Y3, some innovations emerge to become best practices that can be shared with stakeholders outside of RUNRES. Risk: Innovations do not show enough benefits to stakeholders outside of RUNRES.	Coutning	4	1	1	2
			# of interactions with scaling partners at local and regional level.			Counting	9	3	3	3
	Outcome 3.0	Same as Outcome 3	# of interactions with scaling partners at local and regional level.	Yearly reports from partners.	Assumption: Stakeholders are enthusiastic enough about the best practices to disseminate them. Risk: Best practices do not show enough benefits to the stakeholders.	Counting	9	3	3	3

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 3: Best practices and knowledge is diffused at local and regional level	Output 3.1	Best practices and knowledge are defined and scaling partners are engaged to diffuse them at local and regional level.	# of best practices defined in each city region food system. Identifiable benefits of best practices include: locally processed products (waste and food), high quality (international standards), affordability (local) and availability (local and non-local)	4 best practices (waste collection, composting, urine treatment and food processing)	2	1	1
			# of interactions with scaling partners at local and regional level.	12 interactions with scaling partners at local and reginal level	6	4	2
	Outcome 3.0	Same as Outcome 3	# of interactions with scaling partners at local and regional level.	12 interactions with scaling partners at local and reginal level	6	4	2

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 3: Best practices and knowledge is diffused at local and regional level	Output 3.1	Best practices and knowledge are defined and scaling partners are engaged to diffuse them at local and regional level.	# of best practices defined in each city region food system. Identifiable benefits of best practices include: locally processed products (waste and food), high quality (international standards), affordability (local) and availability (local and non-local)	12	4	3	5
			# of interactions with scaling partners at local and regional level.	12	4	4	4
	Outcome 3.0	Same as Outcome 3	# of interactions with scaling partners at local and regional level.	12	4	4	4

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 3: Best practices and knowledge is diffused at local and regional level	Output 3.1	Best practices and knowledge are defined and scaling partners are engaged to diffuse them at local and regional level.	# of best practices defined in each city region food system. Identifiable benefits of best practices include: locally processed products (waste and food), high quality (international standards), affordability (local) and availability (local and non-local)	12	3	4 of Good Agricultural Practices (such as, co-composting (1) and its application (2), methods, amounts, time, crop types, entry level business skills (3), nutrition education, gender education (4), //gained agency learning-how do we measure this scientifically-Most-Significant Change, Toolbox Dialogue Approach-Td.net, Kirkpatrick evaluation model**) defined. Are we still doing impact	There are five best practices defined in this innovation: 1. Proper use and handling sanitation facilities, 2. onsite treatment of waste streams from sanitation facilites, 3. Use of treated human waste for ornamental plants, 4. Job creation and food security for the poor, youth and women, 5. Sustainable innovation platform in partnership with stakeholders at local and regional level
			# of interactions with scaling partners at local and regional level.	30	4/y	4/y	4 times a year (Quarterly)
	Outcome 3.0	Same as Outcome 3	# of interactions with scaling partners at local and regional level.	30	4/y	4/y	4 times a year (Quarterly)

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 4: Enabling policy environment	Output 4.1	Supporting activities and policies for key innovations of RUNRES are adopted by public and/or private sector organizations at local and regional levels.	# of full engaged public stakeholders in tdIPs.	Annual reports after Y2, Y3 and Y4.	Assumption: Stakeholders in tdIPs engage with authorities and policymakers to attract political and financial support for the implementation and scaling-up of innovations related to RUNRES.	Counting	12	4	4	4
			X CHF of co-investment by national/regional partners in *piloting* activities including funding of innovations.	Local and regional strategies for waste recycling and food value chain enhancement.	Risk: Authorities and policymakers are not interested in supporting the implementation of RUNRES innovations.	Accounting	374409	26332	303332	44745
				Annual levels of investment by national/regional partners in each city region food system.						
	Outcome 4.0	Same as Outcome 4	# of meetings held and...	Yearly reports from partners.	Assumption: Support from partnering cities and regional institutional bodies for RUNRES innovations.	Counting	120	30	30	60
			…# of briefs written to promote policies for the implementation and scaling of key innovations together with public stakeholders.			Counting	TBD	20 (too high, has to be corrected)	20	30
			# of full engaged public sector stakeholders in tdIPs.		Risk: Innovations do not show enough benefits versus challenges to instigate supporting policies.	Counting	6	3	1	2

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 4: Enabling policy environment	Output 4.1	Supporting activities and policies for key innovations of RUNRES are adopted by public and/or private sector organizations at local and regional levels.	# of full engaged public stakeholders in tdIPs.	Annual reports after Y2, Y3 and Y4.	3 fully engaged public stakeholders in TdIPs	1	1	1
			X CHF of co-investment by national/regional partners in *piloting* activities including funding of innovations.	Local and regional strategies for waste recycling and food value chain enhancement.	160 698	105 460,23	49987,62	5250
				Annual levels of investment by national/regional partners in each city region food system.				
	Outcome 4.0	Same as Outcome 4	# of meetings held and...	Yearly reports from partners.	9	3	3	3
			…# of briefs written to promote policies for the implementation and scaling of key innovations together with public stakeholders.		3	1	1	1
			# of full engaged public sector stakeholders in tdIPs.		7 (manucipality, Agriculture, Health, cooperative and union office, Industry development office, Trade office and Water supply and sewarage0 full engaged public sectors stakeholders in tdIPs.	7	7	7

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 4: Enabling policy environment	Output 4.1	Supporting activities and policies for key innovations of RUNRES are adopted by public and/or private sector organizations at local and regional levels.	# of full engaged public stakeholders in tdIPs.	Annual reports after Y2, Y3 and Y4.	7	2	3	2
			X CHF of co-investment by national/regional partners in *piloting* activities including funding of innovations.	Local and regional strategies for waste recycling and food value chain enhancement.	82000	22000	25000	35000
				Annual levels of investment by national/regional partners in each city region food system.				
	Outcome 4.0	Same as Outcome 4	# of meetings held and...	Yearly reports from partners.	12	4	4	4
			…# of briefs written to promote policies for the implementation and scaling of key innovations together with public stakeholders.		6	2	2	2
			# of full engaged public sector stakeholders in tdIPs.		7	2	3	2

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 4: Enabling policy environment	Output 4.1	Supporting activities and policies for key innovations of RUNRES are adopted by public and/or private sector organizations at local and regional levels.	# of full engaged public stakeholders in tdIPs.	Annual reports after Y2, Y3 and Y4.	8	2	3	3
			X CHF of co-investment by national/regional partners in *piloting* activities including funding of innovations.	Local and regional strategies for waste recycling and food value chain enhancement.	TBA	$121 234	R10 333 353. 95 CHF of co-investment by the Duzi Turf Cluster in scaling-up activities including funding of innovations.	R 3 245 265,00
				Annual levels of investment by national/regional partners in each city region food system.				
	Outcome 4.0	Same as Outcome 4	# of meetings held and...	Yearly reports from partners.	30	4/y; 1/y for the tdIP	4/y for the IP; 1/y for the TdIP	4/y for the IP; 1/y for the TdIP
			…# of briefs written to promote policies for the implementation and scaling of key innovations together with public stakeholders.		9	1/y	1/y	1/y
			# of full engaged public sector stakeholders in tdIPs.		8	2	3 of fully engaged public sector stakeholders in tdIPs. (NDODA)	3

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 5: Public and/or private partnerships are established for the implementation of sustainable innovations	Output 5.1	A network among agri-food system actors is established to implement food value chain innovations.	# of food processors involved in # of meetings to discuss opportunities and challenges to implement and scale-up food value chain innovations. # of implemented units of food value chain innovations.	Annual reports after Y2, Y3 and Y4.	Assumption: Some of the food processors will be interested to meet separately to discuss technical, financial and legal matters related to the implementation of food processing innovations.	Counting	NA	NA	NA	NA
					Risk: Financial and legal matters related to food processing are too complex to handle.	Counting	NA	NA	NA	NA
	Output 5.2	Public-private partnerships are formalized to co-invest in designing and testing of sustainable sanitation and waste recycling innovations..	# of public-private partnerships established in each city region food system to implement waste-related innovations. A private partnership is established if a formal relationship exists and joint activities are being implemented.	Annual reports after Y2, Y3 and Y4.	Assumption: Some of the stakeholders committed to the tdIPs will be interested to form partnerships to implement selected innovations after Y1. Risk: Waste-related innovations can only be successful if the public sector provides legal and/or financial support.	Counting	3	1	1	1
	Output 5.3	Public-private partnerships are established to promote waste-derived fertilizers and the food products grown with waste-derived fertilizer.	# of public-private partnerships in each city region food system to promote food products grown with waste-derived fertilizer.	Annual reports after Y2, Y3 and Y4.	Assumption: Public and private actors will be interested to form partnerships to promote food products grown on waste-derived fertilizer. Risk: Consumers are too apprehensive versus food products grown with waste-derived fertilizer.	Counting	NA	NA	NA	NA
	Outcome 5.0	Same as Outcome 5	# of private and public stakeholders that participate regularly in tdIPs. # of public-private partnerships established to implement sustainable sanitation, waste recycling, and food value chain innovations.	Yearly reports from partner	Assumption: Mutual benefits exist among private and public stakeholders to engage into partnerships. Risk: Goals/interests of public versus private sector stakeholders differ too much regarding innovations.	Counting Counting	16 3	4 1	6 1	6 1

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 5: Public and/or private partnerships are established for the implementation of sustainable innovations	Output 5.1	A network among agri-food system actors is established to implement food value chain innovations.	# of food processors involved in # of meetings to discuss opportunities and challenges to implement and scale-up food value chain innovations.	1 food processor invplved in 12 meetings to discuss opportunites and challenges to impliment and scale-up banana value chain innovations	NA	1	NA
			# of implemented units of food value chain innovations.	2 implimented units of food value chain innovations.	NA	2	NA
	Output 5.2	Public-private partnerships are formalized to co-invest in designing and testing of sustainable sanitation and waste recycling innovations..	# of public-private partnerships established in each city region food system to implement waste-related innovations. A private partnership is established if a formal relationship exists and joint activities are being implemented.	4 public-private partnerships established in Arba Minch city region food system to implement waste related innovations.	2	1	1
	Output 5.3	Public-private partnerships are established to promote waste-derived fertilizers and the food products grown with waste-derived fertilizer.	# of public-private partnerships in each city region food system to promote food products grown with waste-derived fertilizer.	3 public-private partnerships established in Arba Minch city region food system to promote food products (banana products) grown with waste-derived fertilizer.	1	1	1
	Outcome 5.0	Same as Outcome 5	# of private and public stakeholders that participate regularly in tdIPs.	20 private and public stakeholders that participate regulary in tdIPs	10	8	2
			# of public-private partnerships established to implement sustainable sanitation, waste recycling, and food value chain innovations.	7 public-private partnerships established to implement sustainable sanitation, waste recycling and food value chain innovations.	4	2	1

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 5: Public and/or private partnerships are established for the implementation of sustainable innovations	Output 5.1	A network among agri-food system actors is established to implement food value chain innovations.	# of food processors involved in # of meetings to discuss opportunities and challenges to implement and scale-up food value chain innovations.	3	3	NA	NA
			# of implemented units of food value chain innovations.	1	1	NA	NA
	Output 5.2	Public-private partnerships are formalized to co-invest in designing and testing of sustainable sanitation and waste recycling innovations..	# of public-private partnerships established in each city region food system to implement waste-related innovations. A private partnership is established if a formal relationship exists and joint activities are being implemented.	4	1	1	2
	Output 5.3	Public-private partnerships are established to promote waste-derived fertilizers and the food products grown with waste-derived fertilizer.	# of public-private partnerships in each city region food system to promote food products grown with waste-derived fertilizer.	3	1	1	1
	Outcome 5.0	Same as Outcome 5	# of private and public stakeholders that participate regularly in tdIPs.	34	9	14	11
			# of public-private partnerships established to implement sustainable sanitation, waste recycling, and food value chain innovations.	4	1	1	2

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 5: Public and/or private partnerships are established for the implementation of sustainable innovations	Output 5.1	A network among agri-food system actors is established to implement food value chain innovations.	# of food processors involved in # of meetings to discuss opportunities and challenges to implement and scale-up food value chain innovations.	N/A	N/A	NA	NA
			# of implemented units of food value chain innovations.	N/A	N/A	NA	NA
	Output 5.2	Public-private partnerships are formalized to co-invest in designing and testing of sustainable sanitation and waste recycling innovations..	# of public-private partnerships established in each city region food system to implement waste-related innovations. A private partnership is established if a formal relationship exists and joint activities are being implemented.	3	1	1 between Duzi-Turf and Msunduzi and Umngeni Water (MoU)	1
	Output 5.3	Public-private partnerships are established to promote waste-derived fertilizers and the food products grown with waste-derived fertilizer.	# of public-private partnerships in each city region food system to promote food products grown with waste-derived fertilizer.	2	1	1 Duzi _Turf and Zilimele Sobantu Community Gardening	NA
	Outcome 5.0	Same as Outcome 5	# of private and public stakeholders that participate regularly in tdIPs.	10	3	3 (Umngeni Water, Duzi Turf and Msunduzi Municipality	4
			# of public-private partnerships established to implement sustainable sanitation, waste recycling, and food value chain innovations.	3	1	1	1

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 6: Identification and testing of suitable innovations	Output 6.1	Key innovations are selected to be implemented and tested in Y2 and Y3.	# of key innovations with scientific evaluation report.	Annual report after Y1.	Assumption: Outputs 10-14 are completely available. Assumption: Alignment with municipal operations to ensure integration of innovations into the local development. Risk: Tasks for output 10-14 cannot be accomplished within the first year.	Counting	4	1	1	2
	Output 6.2	The potential of possible innovations is scientifically assessed and outlined for each city region food system.	# of possible innovations for which a scientific report exists. The scientific reports have to consist of an analysis of its cost and benefit, social acceptability, gender considerations,	Intermediary report after six months of project start and annual report after Y1. Interactions with CU.	Assumption: Postdoc in each city region food system leads the scientific assessment of innovations. Assumption: Postdocs closely interact with CU to ensure scientific rigor and alignment with other city region food systems. Risk: Postdoc is not up to the task.	Counting	4	1	1	2
	Output 6.3	Project area analysis is conducted for each city region food system.	Yes/No one project area analysis report exists for each project area that includes a mapping of waste streams and current food value chains, an analysis of the legal and policy framework and an in-depth gender and youth study related to the possible	Intermediary report after six months of project start. Interactions with CU.	Assumption: Postdocs in each city region food system successfully leads the project area analysis. Assumption: External consultant conducts thorough gender study. Assumption: All needed information for studies is available in each city region food system Risk: Postdoc and external consultant cannot access and/or gather all needed information.	Verifying	Yes	Yes	Yes	Yes
	Outcome 6.0	Same as Outcome 6	# suitable innovations to support the establishment of a circular economy in each city region food system.	Y1 report and intermediary report after 6 months of project duration from partners. Suitable innovations will be identified based on a cost-benefit analysis, social acceptability study and resource needs reported for each potential innovation.	Assumption: Stakeholders in tdIPs participate (data sharing, discussions) in an iterative process of design and test of potential innovations. Assumption: Potential innovations are thoroughly tested based on social, economic and physical criteria. Risk: Stakeholders are not willing to invest time, resources and energy in the tdIPs Risk: Market challenges, such as inadequate supply of resources and demand of products from innovations.	Counting	4	1	1	2

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 6: Identification and testing of suitable innovations	Output 6.1	Key innovations are selected to be implemented and tested in Y2 and Y3.	# of key innovations with scientific evaluation report.	4 key innovations(waste collection, composting, urine treatment and food processing) with scientific evaluation report.	2	1	1
	Output 6.2	The potential of possible innovations is scientifically assessed and outlined for each city region food system.	# of possible innovations for which a scientific report exists. The scientific reports have to consist of an analysis of its cost and benefit, social acceptability, gender considerations,	4 possible innovations for which scientific report exists	1	1	1
	Output 6.3	Project area analysis is conducted for each city region food system.	Yes/No one project area analysis report exists for each project area that includes a mapping of waste streams and current food value chains, an analysis of the legal and policy framework and an in-depth gender and youth study related to the possible	Yes	Yes	Yes	Yes
	Outcome 6.0	Same as Outcome 6	# suitable innovations to support the establishment of a circular economy in each city region food system.	4 (organic waste treatment(composting), organic waste source separation, urine treatment and food processing) suitable innovations to support the establishment of circular economy in Arba Minc City region of Ethiopia.	2	1	1

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 6: Identification and testing of suitable innovations	Output 6.1	Key innovations are selected to be implemented and tested in Y2 and Y3.	# of key innovations with scientific evaluation report.	6	2	1	3
	Output 6.2	The potential of possible innovations is scientifically assessed and outlined for each city region food system.	# of possible innovations for which a scientific report exists. The scientific reports have to consist of an analysis of its cost and benefit, social acceptability, gender considerations,	3	1	1	1
	Output 6.3	Project area analysis is conducted for each city region food system.	Yes/No one project area analysis report exists for each project area that includes a mapping of waste streams and current food value chains, an analysis of the legal and policy framework and an in-depth gender and youth study related to the possible	Yes	Yes	Yes	Yes
	Outcome 6.0	Same as Outcome 6	# suitable innovations to support the establishment of a circular economy in each city region food system.	6	2	1	3

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	South Africa - Total	SA - RUSUS	SA - DUZITURF	SA - DEWATS
Outcome 6: Identification and testing of suitable innovations	Output 6.1	Key innovations are selected to be implemented and tested in Y2 and Y3.	# of key innovations with scientific evaluation report.	4	1	1	2
	Output 6.2	The potential of possible innovations is scientifically assessed and outlined for each city region food system.	# of possible innovations for which a scientific report exists. The scientific reports have to consist of an analysis of its cost and benefit, social acceptability, gender considerations,	3	1	1	1
	Output 6.3	Project area analysis is conducted for each city region food system.	Yes/No one project area analysis report exists for each project area that includes a mapping of waste streams and current food value chains, an analysis of the legal and policy framework and an in-depth gender and youth study related to the possible	Yes	Yes	Yes	Yes
	Outcome 6.0	Same as Outcome 6	# suitable innovations to support the establishment of a circular economy in each city region food system.	3	1	1	1

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Data Sources Means of Verification	*External Factors (Assumptions & Risks)*	*Monitoring method*	DRC - Total	DRC - FESDD	DRC - DIOBASS	DRC - GASD
Outcome 7: Well-functioning transdisciplinary innovation platform	Output 7.1	Commitments of stakeholders to co-implement solutions are secured.	Yes/No existing list of participants in tdIP with signed co-investment agreements and MoUs containing concrete commitments to co-design and co-implement potential innovations.	Annual report after Y1.	Assumption: Project coordinator (and postdoc) successfully map-out and identify potential stakeholders and outlines forms of engagement (knowledge transfer, funding of innovations, etc.) with stakeholders.	Verifying	Yes	Yes	Yes	Yes
	Output 7.2	A theory of change is developed for each city region food system.	Yes/No existing theory of change (figure and detailed description) for each city region food system.	Intermediary report after six months of project start.	Assumption: Local stakeholders are engaged in the development of a theory of change.	Verifying	Yes	Yes	Yes	Yes
			Structure of theory of change needs to include: 2-3 impacts, 5-8 outcomes, 5-15 outputs and numerous activities.	Interactions with CU.	Risk: Local stakeholders are not willing to share needed information that enables the identification of relevant innovations.					
	Output 7.3	The stakeholders for a transdisciplinary innovation platform are identified in each city region food system.	Yes/No existing list of participants in tdIP with signed term of reference by each participant. A tdIP is considered to be "established" if it includes committed stakeholders from academia, public sector and civil society and private sector.	Intermediary report after six months of project start.	Assumption: Local stakeholders are attracted by the RUNRES project idea and are willing to contribute to its goal.	Verifying	Yes	Yes	Yes	Yes
			Yes/No existing stakeholder analysis identifying the potential role of each stakeholder in implementation (knowledge, pledged funding, physical implementation) for each city region food system.	Interactions with CU.	Risk: RUNRES is viewed as a too complex project by the stakeholders.	Verifying				
	Output 7.0	Same as Outcome	tdIPs are functioning in each city region food system. A tdIP is considered to be "established" if it has committed stakeholders from academia, public	Intermediary reports after 6 months of project duration will show the # of committed stakeholders and the # of stakeholder meetings.	Assumption: Local stakeholders are willing to participate in meetings that lead towards the establishment of tdIPs.	Verifying	Yes	Yes	Yes	Yes
					Risk: Stakeholders want financial compensation to participate in tdIPs.					

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Ethiopia - Total	ET - EGNANEW	ET - Anjo-Nus	ET - MASSP
Outcome 7: Well-functioning transdisciplinary innovation platform	Output 7.1	Commitments of stakeholders to co-implement solutions are secured.	Yes/No existing list of participants in tdIP with signed co-investment agreements and MoUs containing concrete commitments to co-design and co-implement potential innovations.	Yes	Yes	Yes	Yes
	Output 7.2	A theory of change is developed for each city region food system.	Yes/No existing theory of change (figure and detailed description) for each city region food system. Structure of theory of change needs to include: 2-3 impacts, 5-8 outcomes, 5-15 outputs and numerous activities.	Yes	Yes	Yes	Yes
	Output 7.3	The stakeholders for a transdisciplinary innovation platform are identified in each city region food system.	Yes/No existing list of participants in tdIP with signed term of reference by each participant. A tdIP is considered to be "established" if it includes committed stakeholders from academia, public sector and civil society and private sector. Yes/No existing stakeholder analysis identifying the potential role of each stakeholder in implementation (knowledge, pledged funding, physical implementation) for each city region food system.	Yes	Yes	Yes	Yes
	Output 7.0	Same as Outcome	tdIPs are functioning in each city region food system. A tdIP is considered to be "established" if it has committed stakeholders from academia, public	Yes	Yes	Yes	Yes

Outcomes	Outputs (per outcome)		Output/Outcome Indicators	Rwanda - Total	RW - AKANOZE	RW - COPED	RW - MAGGOT
Outcome 7: Well-functioning transdisciplinary innovation platform	Output 7.1	Commitments of stakeholders to co-implement solutions are secured.	Yes/No existing list of participants in tdIP with signed co-investment agreements and MoUs containing concrete commitments to co-design and co-implement potential innovations.	Yes	Yes	Yes	Yes
	Output 7.2	A theory of change is developed for each city region food system.	Yes/No existing theory of change (figure and detailed description) for each city region food system. Structure of theory of change needs to include: 2-3 impacts, 5-8 outcomes, 5-15 outputs and numerous activities.	Yes	Yes	Yes	Yes
	Output 7.3	The stakeholders for a transdisciplinary innovation platform are identified in each city region food system.	Yes/No existing list of participants in tdIP with signed term of reference by each participant. A tdIP is considered to be "established" if it includes committed stakeholders from academia, public sector and civil society and private sector. Yes/No existing stakeholder analysis identifying the potential role of each stakeholder in implementation (knowledge, pledged funding, physical implementation) for each city region food system.	Yes	Yes	Yes	Yes
	Output 7.0	Same as Outcome	tdIPs are functioning in each city region food system. A tdIP is considered to be "established" if it has committed stakeholders from academia, public	Yes	Yes	Yes	Yes

	Output 7.1	Commitments of stakeholders to co-implement solutions are secured.	Yes/No existing list of participants in tdIP with signed co-investment agreements and MoUs containing concrete commitments to co-design and co-implement potential innovations.	Yes	Yes	Yes	Yes
	Output 7.2	A theory of change is developed for each city region food system.	Yes/No existing theory of change (figure and detailed description) for each city region food system. Structure of theory of change needs to include: 2-3 impacts, 5-8 outcomes, 5-15 outputs and numerous activities.	Yes	Yes	Yes	Yes
Outcome 7: Well-functioning transdisciplinary innovation platform	Output 7.3	The stakeholders for a transdisciplinary innovation platform are identified in each city region food system.	Yes/No existing list of participants in tdIP with signed term of reference by each participant. A tdIP is considered to be "established" if it includes committed stakeholders from academia, public sector and civil society and private sector. Yes/No existing stakeholder analysis identifying the potential role of each stakeholder in implementation (knowledge, pledged funding, physical implementation) for each city region food system.	Yes	Yes	Yes	Yes
	Output 7.0	Same as Outcome	tdIPs are functioning in each city region food system. A tdIP is considered to be "established" if it has committed stakeholders from academia, public	Yes	Yes	Yes	Yes

Appendix 7 Summary of main evaluation outcomes

Criteria	Outcome	Comments
RELEVANCE: *Is the Intervention doing the right things?*		
Of the RUNRES Project in general	Very high with increasing importance of nutrient circular economy and food security	Opportunities also extend beyond the framework of a "rural-urban" nexus (can also be urban-urban or rural-rural)
Of the designed approach	Linear innovation-led approach driven by the innovation / technology narrows and fragments the outcomes to those from individual technological research	A market-driven approach including the framework conditions would have increased the relevance
	Competitive and open selection of innovation leaders assessed the capabilities of the supply side	Capabilities are variable but generally still limited, especially for business management and development
	Two-Phased approach can better manage the risk inherent to innovations	Further risk mitigation could have been achieved with broader and deeper analyses of business environment, opportunities and threats, thus allowing more tangible business plans
	The four countries and the several sub-projects are relevant to test different innovations in different contexts. Their implementation was well supported by a decentralized approach and the TdIP.	External business development expertise would have complemented the scientific expertise Systematic and targeted stakeholder engagement beyond the local arena would have enhanced the outcomes, especially with regard to business environment
	Relevance of the diversity of the roles given to women and youth	More *management* roles for women, would have strengthen the potential impact of this gender approach
Of Public Private Partnerships	Very relevant for the objectives of innovations	Most promising opportunities have shown to be with the private sector
	At this stage of the market development for the innovations, no risk of market distortion	Market distortion risks also include the trade-offs between competing uses of organic waste (e.g. energy) More tangible business plans can mitigate the risk of inadequate public investments
	MoU signed to formalize the collaboration	Formal agreements would better secure the public investment and bind the parties
Of the innovations	Relevance depends on the country and the innovation	A value chain approach could have been systematically followed. Innovations generally meet needs, but strength of economic demand, which builds sustainability, often remains to be demonstrated.
Of the logical framework	Very relevant to address the ToR	Simplification would have allowed a better utilization by all partners
COHERENCE: *How well does the Intervention fit?*		
With the policies and strategies	All stakeholders were identified and involved	Selected national RUNRES partners were well networked
	RUNRES is generally well aligned to policies and strategies	Comprehensiveness and soundness of policies and strategies, vary from country to country. Gaps and inadequacies have hampered Project progress.

Criteria	Outcome	Comments
		Policy shift needs time and persistent implementation of dedicated approaches.
With norms and standards	Innovations are by definition often not covered by existing standards	Efforts were made to comply with existing standards. Opportunities to raise the needs for adequate standards. Modifying or creating new standards needs time and dedicated approaches.
With other interventions	Collaborations with related technical programs and organizations can still be strengthened	Coordination with business development actors involved in supporting SMEs would have added value Circular economy involves so many different actors that it is difficult to keep the overview and efficient coordination
For the SDC	Very relevant both for geographic and thematic coherence with the SDC strategy	Increasing importance of circular economy in the SDC strategy With multiple thematic areas intersecting with the circular economy, it is important to maintain a clear vision of the links and coherence between these areas
EFFECTIVENESS: *Is the Intervention achieving its objectives?*		
Preliminary remark	At the time of the external evaluation, it is still difficult to measure the RUNRES outcomes. It is however possible to assess the assumptions made so far by RUNRES.	
External factors	Travel constraints have caused delays and prevented missions at crucial times in the Project cycle	The COVID19 pandemic between 2020 and 2021. The invasion of Ukraine by the Russian Federation that started in early 2022. The war in Ethiopia between 2020 and 2021.
	Increase of prices for synthesized fertilizers and animal feed increased the demand for alternative products, such as from circular economy	
Outcome 1 *Increased recycling of nutrients*	Collection, transport, and processing and commercialization of waste streams for agricultural production are improved.	Only Duzi Turf (RSA) achieved significant improvement
Outcome 2 *Enhanced regional food value chains*	Small-scale processing units are implemented and resulting in improved high quality products. Enhancement of food value chains vary from innovation to innovation	Further research needed to better market these inputs on and to optimize/guide their utilization. E.g. black soldier flies' innovation improves the food value chain, while it is less evident for banana flour production
Outcomes 3 *Best practices and knowledge are diffused at local and regional level*	Best practices for waste collection and composting were defined and applied	Improvements for health and safety practices of few innovations are needed Linear innovation-led approach limits dissemination at national and regional scale
Outcomes 4 *Enabling policy environment*	Some policy gaps were identified and ad hoc efforts were made to address these	No fundamental policy shift yet achieved. Policy shift needs time and dedicated approaches. Ownership by the authorities may not yet be sufficient.
Outcomes 5 *Public and/or private partnerships*	Partnerships with private and public actors were formalized through MoU	Public sector understanding of PPPs and circular economy stakes should be improved, need for clarifications of responsibilities and engagements

Criteria	Outcome	Comments
are established for the implementation of sustainable innovations	Effective innovations are led by the private sector	Most effective and promising innovations are led by the private sector
Outcomes 6 Identification and testing of suitable innovations	All waste collection and composting and animal feed innovations could be implemented, tested and scientifically assessed.	Innovations awaiting implementation are the struvite production, the bio-char production via pyrolysis, the Dewats and the agro-ecological hub.
Outcome 7 Well-functioning transdisciplinary innovation platform	The TdIP was effective in stakeholder participation, co-funding and exchange of experiences and knowledge.	The relations set up allow to initiate discussions with public authorities with regard to policies, strategies and standards.
EFFICIENCY: *How well are resources being used?*		
External factors	The external factors are the same as above, and they impacted the effectiveness and the efficiency for the same reasons.	
Of the organization and approach	RUNRES implementation partners already knew each other and included already locally installed partners in each country.	
	SDC generated leverage for funds from the public partners and from the private sector	At the time of this evaluation CHF 0.8 Mio were provided as in-kind contribution from public partners. (of which 75% was salary), i.e. 18% of the total amount. Public investments with private companies can become more efficient if they are based on more advanced business plans
Of synergies and partnerships	Exchanges took mainly place between the RUNRES national partners and between innovation leaders in each country. Connections between the innovation leaders of different countries may have occurred in few occasions	Connections within the same value chains occur more naturally Some companies market their products and services independently without help from RUNRES Considering the variance of capacities and levels of achievement between innovations, customized mentoring approaches could have been valuable Language and cultural factors might have limited inter-countries exchanges
	Public private partnerships' efficiency varies and depends on the innovation	The level of self-financing by the private sector is a good indicator of the risks and the potential efficiency of the public investment The assessment of the business plans is of course another good indicator
In meeting the timetable	The Project will end as scheduled	It will probably not be possible to achieve all objectives
	As a result of the external factors mentioned above, many innovations have been held back	Other factors impacted the schedule. However their origin is difficult to determine.
IMPACT: *What difference does the intervention make?*		
Preliminary remark	At the time of the external evaluation, it is too early to assess current or future impact because the Project is not completed and monitoring results according to the magical framework were only partly available.	
For the Impact 1	At the time of the external evaluation, impacts are mainly	Other innovations are still at a pre-commercial phase with low production levels

Criteria	Outcome	Comments
Improved environmental (and human) health	achieved by Duzi Turf (RSA) which produces and commercialize at compost at significant scale	
For the Impact 2 Improved household income and food security	Measurement of income increases are not yet available	Income impact is generally difficult to measure because of external factors
	It is assumed that the impact may not yet be significant	As with income, it is difficult to measure the impact on food security.
Readiness for RUNRES Phase 2 (scaling-up)?	Knowledge has increased among academics, innovation leaders and public authorities.	The main knowledge gains are on technical and scientific aspects of the innovations
	Framework conditions need to be improved to scale up/out. RUNRES initiated ad hoc efforts to contribute to shifts in Rwanda and South-Africa	Further efforts need to be made to achieve more impact on the framework conditions, which are important prerequisites of scaling up/out
SUSTAINABILITY: *Will the benefits last?*		
Via the framework conditions	The situation is very variable from one country to another. There are generally still gaps and potential for improvements of policies and strategies.	The circular economy is a new concept for many countries. It takes time to grasp and implement. For nutrient recycling, continuous and regular political advocacy is therefore necessary to sustain the priority policy attention it is starting to receive
	Innovations frequently encounter regulatory gaps	Innovations bring in new products and services. There is the risk of adopting inadequately high standards that may hinder sector development
	There are again variations between the countries but also within each country in term of commitment by authorities.	For example, DRC authorities are neutral. In South-Africa, Umgeni Water seems more committed than the Municipality. There is a need to clarification the roles and leadership between public authorities
Of the value chains and the business models	A few innovations reached an advanced level of maturity	Innovations introduced new products / services into the market; they are relatively unknown and still pending to gain the trust of consumers. For some of the new products/services by less advanced innovations, it is not yet evident which specific demand they are targeting

Purpose / Recipient	Recommendation	Comments
LESSONS LEARNED AND RECOMMENDATIONS		
Five Key Lessons learned	High potential of nutrients circular economy for improving food security	The Project confirmed the important potential of circular economy of nutrients and the links with food security.
	Loops outside the rural urban nexus	Extending the loops outside the framework of a strictly defined “rural-urban” nexus (i.e. to rural-rural or urban-urban) would offer important scaling opportunities

Purpose / Recipient	Recommendation	Comments
	Complexity of the challenge addressed by RUNRES It is a nascent industry with little experience	To limit the risks, preliminary diagnostic studies, including an assessment of the market (supply, demand and framework conditions) are needed
	Framework conditions to be improved (policies, regulations, tariffication, etc.).	Important pre-conditions to the development of sustainable nutrients circular economies aiming at food security.
	Importance of the private sector	Innovations involving B2B operations were the best performing. The public sector can also play a useful role if roles and responsibilities are clear
Recommendations to SDC	The need of strong role for the private sector	High potential (added value) of animal feed outputs For waste to soil amendment loops, the highest potential is for agro-industries Scaling up/out will require much less scientific expertise and much more business expertise
	Focus on the framework conditions and market assessments	Given the significant impact of the framework conditions, these tasks are of great importance and it must be made sure that they are implemented in the right sequence with other activities and with adequate resources. High need and relevance for scaling up/out Dedicated policy approaches looking for more ownership by targeted authorities are recommended
	More selectivity to scale up/out more effectively and efficiently to limit the risk and increase the efficiency	Use adequate selection criteria: economic sustainability, market evaluation, self-financing share, etc. This could mean reducing the 2nd phase volume (e.g. scope of activities, no. of innovations) and focusing on the market prerequisites outlined above as well as on the “capacity to scale for circular economy”. If scale-up/out targets are maintained, more conservative approach to private sector financing is recommended.
	The importance of financial approaches to enable leverage effects	Requiring significant self-financing share from the private companies to be supported. Investigate the possibility to work with financial facilities (e.g. participation in a guarantee for private banking, carbon credits, etc.).
Recommendations to implementing partners	Ensure the scope of expertise meets all needs	There seems to be a need to complement scientific expertise with ither types of expertise like business development.
	Applied R&D and further R&D networking	Produce information to develop guidelines for the use of the produced agricultural inputs (i.e. feed and fertilizer application) Improve the networking with research any relevant institution

Purpose / Recipient	Recommendation	Comments
	Exit strategy	Linking with business advisory groups, financing facilities or ongoing SME supporting programmes
Recommendations to local authorities	Improve the understanding of the nutrient circular economies	This is part of developing adequate framework conditions (financing schemes and tools, regulations, etc.).
	Identify the sharing of responsibilities between authorities	Overlapping mandates or gaps must be clarified and clear leaderships must be defined
	The risk of too high regulatory standards	Standards should not hinder the development of the sector and can be raised progressively
	Financial incentives	Waste management may need public incentives that can take several forms.
Recommendations to businesses	Market information and analysis	Market assessments will limit business risks and increase likelihood of success
	Complete the product development process	There is still potential for improving product quality and the productivity.
	Look for partnerships and professional associations	Better linkage improves resilience and competitiveness in difficult business environments
	Promote certification "labels"	Labels as branding and part of marketing actions.
	Use of the experiences of all innovations when planning the up-scaling	Inspired by Rwanda results, DRC composting businesses have already indicated their intension to shift part of their production of BSF larvae.

Appendix 8 Comments on the Evaluation Report by the RUNRES Team

AGREED UPON MAJOR CONCLUSIONS

REPORT SECTION 3.1.2

The advertisements of the request for proposals were using the channels of the national RUNRES national partners, which are universities and research institutes. Diversifying these channels (e.g. through ongoing SME development programmes or by focusing on well-developed companies, even if they are not yet directly involved in the sector) may have increased the number of applicants.

We fully agree with the evaluation team that the diversity of applicants contacted to submit innovation proposals could have been improved. THE RUNRES team attempted to conduct a rigorous network chain referral process during the initial workshop phase of the project. Unfortunately, this process was not implemented as effectively as we hoped and is partially responsible for the narrow pool of candidates that provided input during the initial workshops.

A targeted search for potential champions and mentors combined with a preliminary phase of business capacity building would have been an option. It is important for a next phase to facilitate linkages with business planning expertise, such as is available in the private business advisory sector, to address this gap.

As stated, the initial network chain referral procedures we attempted to implement were not executed effectively. We agree with the observation by the evaluation team that it will be critical to build business planning expertise as we plan for Phase II. Our team is prioritizing this need and has already begun to identify potential collaborators with this expertise who would be willing and able to support this critical component of Phase II.

Projects should invest time and effort during the early project phase to understand and learn (i) how to "navigate" the innovation environment (framework conditions) to avoid blockages and identify any potential enablers and (ii) how to drive its services and products according to the demand or potential demand.

While we agree with the logic of this comment, we believe that the novelty of the innovations required that we navigate the innovation environment by constructing the innovations and testing these framework conditions by stimulating them. We argue that this was a key objective of Phase I. Given the novelty of many of the innovations in the city-regions, we argue that it is premature to expect answers to these questions within Phase I. Now, as we plan to expand the innovations deemed scalable, we fully agree that we must be in a position to understand the points raised by the evaluation team.

Evaluator's response: The relative novelty of the innovations will indeed make it difficult to find "answers" and achieve a perfect fit within the first phase. However, our comment was more on the need to "navigate" and to learn the innovation and uptake environment during the innovation design

already, rather than subsequentially. It's often a two-way iterative process that will need to continue in phase II.

It seems that the business aspects would have required the support of external resources from the private sector.

We support the position that the Phase II planning strategy should seek private sector expertise and support. And we believe that, through the efforts made during Phase I of the project, we have gained the knowledge and understanding of which innovations will be able to attract private sector investment. However, we also ask whether the evaluation team places too great a focus, and perhaps undue faith, on the desire and capacity of the private sector to support the pilot phase of RUNRES; especially because the private sector (related to waste management) is not always very well-developed in the city regions.

Evaluator's response: Our comment was less about expecting the private sector to invest in these nascent innovations, and more about capturing experiences from successful private sector entrepreneurs in related sectors in the target countries as well as other international private sector experience.

In Ethiopia, for example, the emphasis of investment has been on equipment. During field visits and interviews with innovation teams, there appeared to be a risk of underutilization of large food processing and composting equipment recently imported.

This is an accurate observation made by the evaluation team; the innovation leaders of Egnanew Mayet and Anjo Nus are not taking full advantage of the benefits provided by the equipment imported into Arba Minch to support their innovations. We believe that this underutilization of new equipment is due to a lack of business knowledge, in this case about how to optimize business efficiencies. We believe that these two innovations have potential to scale, if the innovation leaders are willing to work within the TdIP scaling strategies to improve their processing efficiencies and leverage their new equipment to the greatest degree possible. We must admit that it is unclear at this time whether these leaders will be willing to accept this criticism and invest time and resources to enhance their production.

The limited drying capacity is an immediate constraint that could be resolved through technologies available in the country.

Drying capacity is a limitation for many of the innovations. In Rwanda, both animal feed innovations, Maggot Farm and Akanoze, would benefit from enhanced drying technology. We argue that the scaling strategies developed as part of Phase II must focus on improving this technical bottleneck to effectively scale these innovations.

It is when the markets grow and the competition begins that public investment need to be carefully designed to prevent market distortion. This question is relevant, not only between competitors of the same value chain, but also between different value chains competing for the same waste (e.g. agro-industrial organic waste as a form of animal feed or as a form of soil amendment).

We also anticipate increased competition for organic waste as knowledge of the profitability of some nutrient recycling innovations (animal feed production) becomes more widely known. Indeed, during initial efforts to strategize animal feed scaling opportunities in Rwanda, it has become clear that several very large organizations are planning efforts that are very similar to those RUNRES has piloted. Given this, the suggestion given by the evaluation team to ensure that we give adequate focus to navigate the innovation environment becomes even more meaningful.

Evaluator's response: For the design of RUNRES Phase II, one might consider adding a component that will facilitate interaction between the Phase I innovators and the expected larger new entrants into this sector. It is understandable that RUNRES wants its Phase I innovators to be competitively successful as markets grow, but as a project, RUNRES Phase II should perhaps also take on a role as a technical platform to enable dialogue and (through Government) sectoral planning for the circular economy that harnesses both RUNRES SMEs and larger private investments.

It is not clear, for example, how the value chain for green banana flour will be structured. The activities so far seemed to be ad hoc responses to demand from one or two retailers in Addis Ababa for small volumes of flour and relied on purchase of fresh bananas at regular (and very high) farm gate prices.

As stated, the concern expressed by the evaluation team regarding the business model of Anjo Nus is shared by our team. The innovation leaders have not made full use of the new machinery and continue to produce banana products in an "ad hoc" and poorly executed manner. The scaling strategy developed for this innovation must show commitment to improve the business model of this innovation.

Information on market assessment including an assessment of the demand (What product? At what price? What quantity? When? etc.)

A key focus of the scaling strategy being developed by every country team is to identify product demand. This is true both for innovations that show private sector promise, and those that we believe will need to be supported by the public and/or private sector.

The need for an alternative to chemical fertiliser and animal feed available on the market that are often imported, pricy and not always affordable by small scale-farmers was confirmed. This was reinforced during the project for external reasons (COVID19 and war in Ukraine). Farmers users of the products supplied by RUNRES innovation leaders systematically expressed their satisfaction of having this new offer of inputs.

We agree completely with this statement. However, we also would like to note that this finding directly contradicts two other findings made by the evaluation team. First, that farmers in Ethiopia and the DRC see no need for organic fertilizers and are unwilling to purchase inputs such as compost. Second, the evaluation team suggested that the only beneficiaries of the innovations are the RUNRES team members and innovation leaders. We ask how this is possible, given that in the above statement the evaluators make clear that "*farmers users of the products supplied by RUNRES innovation leaders* ***systematically expressed their satisfaction*** *of having this new offer of inputs."* Nevertheless, the

definition of "beneficiaries" will be emphasized in Phase 2 towards the actors beyond the RUNNRES innovations.

Evaluator's response: We cannot find statement in the report on DRC farmers unwillingness to purchase organic fertilizer. In Arba Minch (Ethiopia), the banana farm that supplies banana to Anjo Nus for their banana production, does not need and does not buy fertilizer: this was observed on site in the banana plantation and stated by the farmer. It remains true that the *clients supplied* with compost systematically expressed their satisfaction. This banana farmer is simply not one of the clients supplied or concerned by this new offer of compost and this statement does not apply for him. It applies to other farmers that could be demanding compost and eventually be supplied.

The evaluators raise the attention that interviewed people perceive the innovators and RUNRES team as the beneficiaries ("*During the evaluation many interviewees spontaneously referred to the innovation leaders or even the national RUNRES teams as the Project beneficiaries*"). However, the priority of RUNRES is to scale-up businesses and markets that respond to demand from clients/users who then *benefit* from these new services. Clients / users of these innovative services should be the first beneficiaries; however, they are expected to be proactive and demand services to ensure the sustainability of services rather than being passive beneficiaries. Service providers (innovators) and public authorities should feel more like actors who provide services or help to provide services, instead of seeing themselves as beneficiaries.

REPORT SECTION 3.2.3

It is not apparent whether the project has a partnership strategy that would identify potential partner programs and organizations in technical or business-related sectors and outline an engagement plan to integrate innovations as well as for the Project at country and global levels.

We know that this was not clear from the info provided during the evaluation, but we can assure that our team has made this a focus of the scaling strategies being developed. Every innovation deemed scalable will outline an engagement plan with organizations that can provide business related expertise.

REPORT SECTION 3.3.3

At this stage, it can be assumed that only Duzi Turf (RSA) will significantly improve waste collection and processing streams.

While we agree with this statement, we also maintain that other composting innovations (COPED, DIOBASS, GASD, FESSD, and EGNANEW MAYET) show potential to produce compost at a meaningful scale. In several of the city regions, and especially in the DRC, the composting innovations are envisioned to be linked to other innovations (e.g., BSF, animal feed from cassava peels) and larger private entities (e.g., OLAM) in order to increase the viability of the innovations within a PPP framework. Our partners are currently working hard to develop a convincing plan of this potential; we believe that the necessary components can be developed to ensure this scaling to occur.

REPORT SECTION 3.4.4

The Anjo-Nus factory had to wait until beginning of the year to start again the production because its packaging was not compliant with the national regulation and the products had to be withdrawn until adequate modification is made.

This is the first time that the ETH team was informed of this situation, and it speaks to the challenge of effective communication with AMU. In our opinion, the team dynamics within the RUNRES AMU team represent the biggest threat to the success of the innovations. It remains to be seen whether these dynamics will improve and create conditions that will enable the innovation leaders to succeed in the long-term.

REPORT SECTION 3.6.2

*All compost businesses seem to be **fragile** and still depending on the support and strategies of the public sector regarding.*

This is true. However, we argue that compost production generally requires some level of public sector support and that it is simply unrealistic to expect that compost production can occur entirely as a private sector venture. While it seems clear that the evaluation team views this negatively, we do not agree. We do not believe that public sector investment is inherently bad or an indication of a lack of scalability. Several of the innovations supported by RUNRES could contribute significantly to the idea of a common good but are not profitable enough to be managed by the private sector alone. Rather than cast these innovations aside, we believe that we should continue to work to build a policy environment and a cost transparency that will support these innovations conducted by the public sector in collaboration with the private sector.

Evaluator's response: the Evaluator has no negative opinion on the suitability of the public sector supporting the private sector. Composting services based on municipal waste are by definition a public service, for which the public sector has primary responsibility, but which can be implemented by a public or private utility.

The waste sector usually needs public funding because of the low demand for the services and the low value of the products. Sustainable financing mechanisms does not yet appear to be fully established: e.g., there is not yet a sustainable financing mechanism for the municipal waste collection in Arba Minch. While local and national governments financial support is already a reality in Rwanda, the situation in DRC is more critical.

Beyond the municipal waste sector and in general, the private is the key actor to *implement* the target services to be scaled up. Again, this does not mean that the public sector does not have an important role to play. In particular, it is responsible for establishing the framework conditions for the successful development of relevant service markets that meet a need and a demand.

REPORT SECTION 4.2.2

The exit strategy for innovation leaders is still to be identified. It is recommended to foresee the linking with business advisory groups, financing facilities or ongoing SME supporting programmes.

This is a very important point and one that our team had not discussed in detail until reading through this report. Our team will work to develop an exit strategy for all the innovations, also with focus on a fair and acceptable strategy for those that will not continue to be supported as Phase I ends.

DISPUTED MAJOR CONCLUSIONS

REPORT SECTION 3.1.2

The linear pathway approach de-emphasized attention to the innovation environment or framework conditions at city-region and national levels. This resulted in common design and implementation gaps across several innovations.

The evaluation team characterize the project design as "linear innovation led," by which they mean starting with specific technologies. They then assert that this resulted in a de-emphasis of the innovation environment or framework conditions at city-region and national levels. The RUNRES team would like to dispute this position. The selection of the innovations was made by the network of stakeholders brought together through the transdisciplinary process during the first year of the project. Given the novel and even delicate nature of the project objectives, our team felt that the only viable project approach had to prioritize participatory and community-based input and even leadership. The single most important criterion for the selection of the innovations was that there existed a powerful stakeholder mandate for that technology. Furthermore, the evaluation team admits that in certain instances, the innovations deal with an innovation environment that simply does not yet exist. The team could therefore not have ignored conditions that have not yet developed. Finally, we request further details about what the evaluation team means when they state that this approach resulted in "common design and implementation gaps across several innovations."

Evaluator's response: we commend the project on the strong community participation and ownership that has been evident throughout the evaluation exercise.

Our recommendation is that this should be accompanied by a much stronger analysis of the technological and market environment so that the selected innovators can be linked to supportive technological and business services or available inputs (whether private sector, government research, or donor-funded programs). A more systematic coordination and / or partnership with high level public authorities (e.g., Ministry of Agriculture) would have been beneficial.

Examples include the drying technologies that are available in the wider food sector in target countries and could have adopted & adapted to the circular economy innovations with some foresight and more lateral thinking and connections. In other words, the design and piloting process was perhaps unnecessarily limited to the limited capacity of the individual innovator.

For example, a detailed market segmentation analysis would have helped to determine at an early stage the relative 'fit' and targeting strategy of specific local innovations in broader markets such as for organic fertilizers or animal feeds.

The evaluation team places a great deal of emphasis on the lack of market analyses conducted by the project team. While we agree that this aspect of the project could have been better, we also argue that the initiation of novel innovations predicated on a circular flow of nutrients derived from waste streams often do not have existing markets to analyze. The evaluation team themselves admit this reality: when asked to "assess the risk of public investment on market distortion," their reply is that it is not relevant because "markets were in most of the cases not or hardly existing." We see a tension between the evaluation team pointing out the lack of market segmentation analysis on the one hand, while on the other stating that current markets for RUNRES innovations/products are so underdeveloped that any questions about market distortion are premature. In our perspective, the issue of potential market-distortion will grow along with the development of the different RUNRES innovation that do not have a market yet. In that sense, the evaluators were right to point out this potential issue and we will also address it in phase 2.

Evaluator's response: as indicated earlier, the fact that a process to obtain a product is novel does not mean that the product itself is completely new. The new product nature might be slightly different from products on the market, but its usage, function and contribution in the farming activities is analogue to the ones of the inputs (fertilizer or feed) it substitutes. The lack of marketing strategy appears very clearly by the lack of market targets and pricing policy. In Rwanda for instance, the producer of organic fertilizer has not yet approach organic producers who could become steady clients and paying higher prices.

The larger point for project design is to be aware of and articulate where the innovations enter the nutrient loops, and the related value chains, and how these loops area structured, as this would need to inform the scaling and sustainability strategy.

In many instances, the RUNRES innovations are producing novel products for which no value chains exist. As stated, we agree that the project could have given more emphasis to market realities, but we also believe that the evaluation team overstates the degree to which a "demand side" approach would have been viable. Here again, the project is criticized for adopting a "principle of supply-driven innovation/project selection." We argue that, for innovations seeking to provide organic soil inputs and especially those innovations dealing with human excreta, it is difficult to envision what a demand side approach could have looked like; any suggestion on how this would look like would be greatly appreciated.

Evaluator's response:

We realize that the innovation push in circular economy requires supply of new prototype technologies and management models, and the project rightly emphasized this can be an entry point for technical support. Our comment concerns the need for a better balance with understanding demand for these innovations and segmenting this demand in such a way that the innovators can target specific markets (or public goods) and design the innovation accordingly.

Regarding excreta, if the target is to address a nutrient cycle and value chain, it could have been possible to:

1- assess the demand for the possible products that can be generated from this type of waste (dewatered sludge, co-compost, urine), and then

2- assess the demand of the toilet users for certain types of toilets and sludge management system that allow to produce the type of waste/product demanded.

For example, a small scale and poor farmer could prefer and demand compost or dewater sludge because it is easier and cheaper to transport and apply on the field than liquid sludge or digestate. For that targeted product, there can be many sanitation technologies used (sludge co-composting or else). Moreover, innovations do not necessarily need to be a technology, but should rather be considered as a *service* (e.g., a single service provider that provides the construction of onsite sanitation technology, the desludging of the onsite sanitation facility and the sludge valorization).

More generally, as indicated previously, the starting/entry point should ideally be the demand for the nutrient products as well as the possible value chains and market. The technology can then be selected accordingly and markets assessment related to the selected product, technology and value chain can be investigated more in detail. The starting/entry point *can* be the technology but a better balance with market consideration is needed.

Innovations were selected through a competitive process, which is in principle considered a good approach as it boosts commitment and responsibility from the participants.

While we agree with the evaluation team that the competitive nature of the innovation plan selection process boosted commitment and responsibility from the participants, it has also created tension within the larger principles of a transdisciplinary approach. Initially, the RUNRES team invited disparate stakeholders from each city-region community together to jointly contribute to solving several community challenges. The core team worked hard to be as inclusive as possible, to use language intended to foster an atmosphere of cooperation and solidarity. While we feel that this approach succeeded in building an environment of authentic participation and cooperation, the innovations themselves were selected in a competitive process. Upon reflection, these philosophically conflicting project stages have created tension in the larger project dynamic and should be a focus of reflection as the project ends phase I.

Evaluator's response: tensions can be a problem if they start impacting significantly the project implementation. As mitigation measure, it is important to specify by writing comprehensive and transparent participation rules beforehand. Failures can occur but exit procedures should be foreseen. Upfront financial commitment (even if symbolic) can secure the seriousness of candidates: more generally form of result-based approaches can be foreseen. It is also important to make it clear that they are not beneficiaries but actors. This goes hand in hand with the need to clarify the roles and powers of each party. Finally, it is reminded here that it is important to have experienced staff with the right profile for coordination. If necessary, staff should know how to exercise authority, how to do so in local contexts and be put in a position where they can easily exercise it.

Many candidates had to be supported by the RUNRES team already at the proposal preparation.

It is certainly true that many of the organizations that submitted innovation plans had to be supported during the innovation proposal preparation phase. However, we are surprised that this is viewed by the evaluation team negatively. RUNRES is a development project, which is necessarily about building community capacity, knowledge, and resilience. As such, we do not share the opinion of the evaluation team that the need to support innovation proposals is an indication that the "wrong" organizations submitted plans. Rather, we believe that by supporting motivated stakeholders interested in pursuing innovations capable of contributing to a circular bioeconomy, we are fulfilling the mandate of RUNRES and thereby SDC.

Evaluator's response: it is not necessarily a problem, but the approach to selecting and supporting them cannot be the same as if the candidates are already competent and experienced.

It is questionable whether in contexts where the development of the circular economy sector and business environments are still at an early stage, and with the limited capacities mentioned above, it is appropriate to use standard competitive selection processes.

RUNRES did not select the innovations using a standard competitive selection process. Our team developed the TdIP approach to support motivated actors to develop successful innovations. While it is true that within this larger transdisciplinary process the team had to decide which innovations to support during Phase I, and that this process was competitive, it was not done with a standard competitive selection process.

Evaluator's response: what is meant here is that given the poor capacity of the private sector, it would have been worth in some case to deviate more transparently from a standard competitive selection processes and provide upfront capacity building on most promises businesses, which would not have been shortlisted on the basis of their business plan but on other criteria first (e.g. commercial, marketing ability). Technical skills often play a secondary role as they can be acquired more easily than commercial skills.

On the other hand, practical follow-up action through stakeholder engagement, either for specific troubleshooting or for exploring new market or support opportunities, was not evident at field level.

We are very surprised that the evaluation team reached this conclusion. Every country team has provided support to the innovation leaders through stakeholder engagement, especially to improve innovation processes and support troubleshooting efforts. A few, not at all exhaustive, examples are given below to illustrate this:

In RUNRES Bukavu, the project team-initiated compost training workshops to improve the management of the composting at each of the three innovation sites.

In Ethiopia, the RUNRES team travelled to banana growing areas outside Arba Minch to speak with farmers about the need to provide compost to their soils and to inform them of the work Egnanew Mayet is doing. The team also invited farmers to a banana trial to demonstrate the potential of compost and urine to improve banana yields. Both efforts were intended to develop a market for the compost activities of Egnanew Mayet. To increase the volume and quality of the compost produced by Egnanew Mayet, the AMU team devoted considerable time and resources to identify a compost turner that could be imported to Arba Minch to support the innovation, an effort that has raised the profile of RUNRES enormously https://www.youtube.com/watch?v=6loz9jpfvYE, which is assisting in the creation of an enabling policy environment.

In Rwanda, the innovation team participated in preliminary workshops to explore new national sanitation guidelines. After analytical results conducted by the Rwandese Agricultural Board necessitated the closure of the COPED compost innovation, the country team facilitated the transport of COPED samples to SAE ETH, an action that ultimately led to evidence refuting the results by RAB.

In South Africa, the country team is conducting rigorous quality assessments of the compost produced by Duzi Turf. These analyses focus on both heavy metal concentrations and pathogen loads and is being done in collaboration with the WASH center at UKZN. At the Bishopstowe agroecology living lab (BALL), the country team is in daily communication with the leaders of that innovation and has taken a lead in the purchase of infrastructure, facility upgrades, and farm management strategies.

To reiterate, our team is surprised that the evaluation team concluded that "practical follow up action through stakeholder engagement… was not evident at field level."

Evaluator's response: what the Evaluator was referring to are issues found out during the field visit. It does not exclude that issues not identified during the evaluation were addressed as indicated above.

In some cases, the selection of cities and of proposed innovations without the ability to make major adjustments along the way, limited their relevance, such as in Arba Minch, Ethiopia, where urban waste management seems to have alternative solutions in place or under development, and the nationally important banana production sector has little or no demand for organic fertilizer or for processed products.

Our team is unclear about what the evaluators mean when they state that Arba Minch "seems to have alternative (urban waste management) solutions in place or under development." While it is true that the municipality is developing initiatives to improve urban waste management within the city (sludge drying bed program), RUNRES is in regular dialogue with these actors to ensure that synergy is developed between these efforts.

The position that the Ethiopian banana production sector has little or no demand for organic fertilizer is incorrect. After reading this statement, the ETH team spoke directly with the RUNRES AMU members and learned that this opinion was informed from a discussion held between the evaluation team and one banana farmer. The AMU team asserts that many cooperatives in the area are purchasing the compost, and that Egnanew cannot keep pace with the demand.

Evaluator's response: this sentence of the draft report was modified for the final report. The indication that little or no demand exists is based on the practice of *the* farmer supplying bananas to Anjo Nus and whose plantation was in very good condition during the visit. Although he is informed, being an indirect party to the project, he considers the use of fertilizer unnecessary. Furthermore, it was indicated during the field visits that the current client of the composting company was *designated* by the public authorities. These elements were considered serious enough to question the need for fertilizers for banana farmers of the region, as well as the potential size and the real demand of this market segment.

Finally, evidence of demand or potential for fertilizer sales for banana plantations near Arba Minch has been requested but could not be provided to the Evaluator.

The UDFT foreseen in South-Africa may be needed from an environmental perspective. They also address the need for more toilets. It remains to be seen if there is a real demand from pupils and the school.

The pupils are not in a position to demand dignified sanitation in their schools. As anyone would, they obviously wish and hope for a better solution than pit latrines, but they have little agency to demand this change. In contrast, the government of South Africa is highly motivated to improve school sanitation across the entire country. This is not only because of the environmental problems associated with a lack of sanitation. Sanitation, or lack thereof, was weaponized in the past in South Africa, and access to dignified and equitable solutions for this basic human need is a major policy priority. The Department of Water and Sanitation and the Department of Education have a mandate to eliminate pit latrines in schools and they are allocating significant resources to identify the best solutions to make this policy objective a reality. We believe that, despite the slow progress made with the DEWATS, this innovation has enormous potential to scale given this policy environment.

Evaluator's response: the question of the *demand* is about the type of toilet chosen and not about the dignity of the toilets. There are many types of dignified toilets that are not UDFTs.

An interview was requested with the Department of Education via RUNRES RSA to assess the actual commitment, including financial commitment, of the Ministry, but in the end the minister could not be available during the evaluation window. The gaps in adequate toilet coverage are assumed to be large on a national scale and will require investment of the same magnitude. It remains therefore still questionable if the Department of Education has sufficient funds to fill these gaps in a short time.

It is therefore assumed that more *basic sanitation* facilities according to the definition of the Joint Monitoring Programme of WHO/UNICEF to be built and used. Regarding the scaling target of RUNRES, this assumption would offer big opportunities. But depending on the school size and the context, different technologies complying with the WHO / UNICEF standards must be considered to fill this gap. This can include pit latrines in some cases, pour flush toilets in some other cases, etc. It is important to leave choice to schools according to their specific contexts and demands. A national assessment could be made to estimate the potential demand for dewats systems versus other options, which may be more competitive and better placed for scaling up.

As is regularly pointed out, financing mechanisms (many options are possible), which are part of the framework conditions, play a key and almost more important role than technology for scaling.

REPORT SECTION 4.2.1

The Phase 1 therefore confirms the importance of the private sector to implement core services of nutrient circular economies and the constitution of circular economy market of significant scale: these markets cannot be decreed, they happen with service providers and customers/users. "Waste to soil amendment" business models could with the best potential are those favouring B2B operations. There seems to be a relevant potential in agro-industries that could implement themselves sustainable nutrient loops: they control and have large organic waste quantities and they have the resources to invest and implement.

We disagree with this all or none position articulated by the evaluation team. While it is certainly true that private sector investment can provide enormous support for efforts seeking to move towards circular food systems predicated on recycled nutrients, it is not the only pathway for scaling. The public sector can, and should, play a role in this socio-technical transition. Most operations focused on "waste to soil amendments" typically involve some type of public sector support; the margins are simply too small to allow for a purely "B2B" approach. While it is ideologically in vogue to promote the private sector as a panacea for every sustainability challenge we face, our team asserts that this position ignores reality. Rather, a flexible and pragmatic approach that stimulates private sector development with targeted public sector support where necessary can and should be cultivated. Finally, while we completely agree that agro-industrial waste provides a logical and very feasible entry point for projects like RUNRES, we argue that a more ambitious effort is not only possible, but necessary if the concept of a circular food system supported by recycled nutrients is to achieve impact at any meaningful scale.

Evaluator's response: the reason for this recommendation is the current fragile framework conditions and the public sector. B2B solutions are therefore a pragmatic way to develop services until the capacity of the public sector and the framework conditions are strengthened. The experience shows that there is good potential for agro-industries (between 2 agro-industries or between 1 lead agro-industry and small-scale farmers or enterprises), because of their higher resources: human resources (marketing, technical) and financial resources. To some extent, this is for example already the case for the Anjo-Nus innovations, even though this is a small agro-industry.

Appendix 9 Recommendations for Innovations

Phase I generated a diverse set of relevant innovations that reached different levels of achievement according to the project results framework and targets.

If the strategy for Phase II is to maximize the value of Phase I progress and learning across the innovations and countries, taking into account different types of opportunities for achieving impact through circular economy innovations, it is proposed following recommendations for all innovations of Phase I. Generally, it is needed to update or implement market assessments and business plans. It does not aim to be fully comprehensive and to fill the gaps in the framework conditions but to address more specifically the gaps in innovations.

These recommendations are not valid as ToR for a Phase II. In particular, it is recommended to reduce the scope, to select countries and innovations, to define objectives and activities to improve the framework conditions that are coherent with the selected innovations and value chains.

Innovation	Starting point	Phase II scaling approach	RUNRES intervention emphasis
ETHIOPIA			
Compost	Equipment operational on suitable site. Supply of waste and compost produced are very limited. Demand and market to be confirmed. Business sustainability not yet established.	Diversify sourcing of waste. Broaden customer base beyond banana farmers (marketing). Demonstrate effectiveness in selected food production systems. Integration to municipal waste management strategy to be defined (incl. financing). Business plan to be established.	**Facilitate upstream and downstream linkages** to capitalize on Phase I investment. Provide business advice. **Technical support** to municipality to update their waste management strategy with a view of strengthening organic waste capture and reuse and the financial mechanisms. **Share lessons and operational models** from other Ethiopian and regional cities of similar size, and other countries.
Waste collection	Provides additional income for poor municipal women waste collectors. Not really a private company. Non-sustainable financing/business.	Link with innovation above into one intervention. Business plan to be established. Municipal waste management strategy to be updated.	
Struvite (MASIP)	Youth group enterprise with strong links to local authorities. Location at FSTP offers a potential advantage once FSTP operational.	Seems unlikely to be successful at this time; not ready for a phase II. Consider dropping this innovation.	
Banana flour and peels (Anjo-nus)	Equipment procured offers scope for expanding production. Capacity to finance the O&M to be confirmed. Market to be confirmed.	Requires external business management support, including market research. Consider diversifying product range. Establish a business plan	**Facilitate access to business management support**. Exposure to successful similar business ventures in Ethiopia and region. Consider teaming up with other food

Innovation	Starting point	Phase II scaling approach	RUNRES intervention emphasis
			processing programs in Ethiopia.
RWANDA			
Cassava peel (Akanoze)	Strong links with suppliers of cassava peel, including through links with cassava flour mill under the same ownership/ management.	Linkages with improved equipment to increase efficiency. Demonstrate effectiveness of feed and develop credible user guidelines.	Consider **replicating this successful innovation** in other districts. Link SMEs to Government funding and technical support schemes.
BSF (Maggot Farm)	Strong and diverse supply chains of food waste and black soldier flies. Reliable and probably growing demand in animal feed, specifically fish feed sector.	Consolidate business model. Facilitate linkages to specific large feed customers.	Position this SME vis-à-vis the national priority for animal feed. **Advocate for Gov support** for local protein production and mobilize additional SMEs.
Waste collection and compost (COPED)	Strong business record in related urban waste collection sector. Reality and sustainability of the demand for organic waste collection in this rural area to be confirmed.	Improve access to organic waste supply from Kigali City. Rectify water and compost quality problems on site. Develop marketing plan.	Technical support to Gov for compost **standards** and to Kigali City for **organic waste management**. Consider providing a **technical platform** for compost production and use in Rwanda.
DR CONGO			
Waste collection and compost (3) (Diobass, FESDD, GASD)	Diverse sources of waste and diversified market targets (large coffee growers and smaller-scale horticulturists)	Diversify sourcing of organic waste (agro-industrial waste, etc.) Develop contracts with larger customers (coffee sector). Consider moving site if transport problem insurmountable (where the waste is produced/valorized).	**Facilitate/advocate for access** to organic waste. Facilitate/advocate for use of compost in coffee sector. Provide **specific technical support** once demand quality is established.
SOUTH AFRICA			
Co-compost (Duzi Turf)	Experience of the company, including its formal agreement with UW, as main waste source. Advanced stage of innovation development.	Improve the marketing to improve the sales. Improve the sourcing.	Provide **business development support** Set adequate standards, agree on licensing procedure
Dewats (UW, PS)	Schools offer good prospects of scaling-up Started late on Phase I.	D. of Education to set up financing mechanisms for sanitation facility improvements	**Advocate for public investments** Provide evidence for applicability and competitiveness of this innovations to fill the sanitation gaps in schools

Innovation	Starting point	Phase II scaling approach	RUNRES intervention emphasis
Bio-Char (RUSUS)	Alternative to conventional FS processes	Seems unlikely to be successful at this time; not ready for a phase II. Consider dropping this innovation.	
Agor-ecological hub (NCEDA)	NCEDA potential network of co-religious people Duzi Turf is a partner and is co-financing Financial sustainability to be confirmed.	Can be used as marketing tool for the co-compost	