Interreg Alpine Space | Co-funded by the European Union | CEFoodCycle | LAMORO AGENZIA DI SVILUPPO

MONITORING REPORTS ON CEFOODCYCLE PILOTS

D.3.2.1

Related WP: 3

Related Activity: 3.2 Monitoring and tailoring of regional closed food cycles

Deliverable date: October 2025

Status: V1

Collected on behalf of the project partners by: LAMORO Development Agency (PP7)

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

Table of contents

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

1. Introduction

This consolidated monitoring report summarizes the monitoring framework and findings from the CEFoodCycle pilot actions focused on developing regional closed food cycles to reduce food waste, support circular economy practices, and improve stakeholder collaboration. The report examines seven regional pilot experiments, analysing the monitoring objectives and methodologies used in each case. It further explores synergies and shared features across the different monitoring strategies, highlighting achievements, challenges, and recommendations for future replication and scaling.

2. Summary of Pilot Actions and Monitoring Approach

2.1 Piemonte, Italy (LAMORO)

The pilot demonstrated the viability of a closed-loop food system in the Piemonte region, converting unsellable food into insect-based poultry feed using black soldier fly larvae. Engagement activities revealed greater-than-expected stakeholder interest, creating additional opportunities for dissemination and potential replication.

The monitoring framework was designed to provide a comprehensive assessment of progress, effectiveness, and impact in establishing a fully operational closed food cycle. This process not only enabled real-time tracking of activities but also generated valuable insights to inform future replication and scaling efforts. The key monitoring objectives focused on stakeholder engagement, pilot implementation, waste reduction, scalability, and the promotion of circular economy practices.

2.2 Slovenia (E-zavod)

Slovenian partners have explored business models for converting organic waste or by-products into high-quality animal feed and fertilizer.

The FlyUp-Cycle pilot in Slovenia demonstrated a closed food cycle using BSF larvae to convert organic waste into animal feed and fertilizer. The project successfully brought together multiple stakeholders to demonstrate how organic food waste can be converted into high-protein animal feed and organic fertilizer.

Key stakeholders included bakeries, breweries, pet shops, and a technology provider. The pilot processed 90 kg of organic waste, yielding 11 kg of larvae and 2.76 kg of dried protein. Monitoring showed strong

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

stakeholder engagement and growing interest in future collaboration, providing key insights to support replication and scaling.

Despite regulatory and logistical challenges, the pilot validated the technical feasibility and stakeholder interest. Recommendations include regulatory reform, financial incentives, and infrastructure support.

2.3 Gorenjska, Slovenia (BSC Kranj)

The UpCycle pilot showcases a circular design pathway for the Ho.Re.Ca. sector by transforming unavoidable residues, specifically apple pomace and coffee grounds, into high-value products. Apple pomace is converted into biodegradable “apple leather” for jewellery and book covers, while spent coffee grounds are repurposed as natural exfoliants, replacing microplastics in zero-waste shampoos and soaps. Alongside product development, the pilot advances stakeholder education, cross-supply-chain collaboration, and policy advocacy to promote sustainable alternatives to plastics and animal leather and to reframe food residues as industrial resources.

The monitoring framework tracks stakeholder reach and collaboration quality, progress of the two-core closed-loop cycles (apple pomace → leather; coffee grounds → cosmetics), and indicators on waste diversion, product prototyping, and replication potential. It also captures capacity-building outcomes (training delivered, knowledge gains), awareness metrics (case studies, social media engagement), and policy traction (draft recommendations to reclassify organic residues as resources).

Key challenges relate to EU waste classifications that restrict industrial reuse, data-sharing and IP governance across diverse partners, and logistical coordination. Mitigation measures include structured governance and data stewardship, standardised waste accounting, near-market demonstrations to build demand, and targeted advocacy to enable scale-up and replication across the region.

2.4 Nice, France (CCI NCA)

CCI NCA implemented a pilot focused on biowaste collection from cafés, hotels, and restaurants (CHRs) using an electric cargo bike.

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

Stakeholders included Veolia, Transcan, UMIH, and local authorities. The pilot engaged 20 CHRs and tested logistics and awareness-raising strategies. The pilot was subsequently redirected towards awareness-raising activities for CHRs.

The monitoring activities aimed to map and engage key stakeholders and to guide the pilot implementation: the monitoring approach combined qualitative and quantitative methods to track stakeholder participation, pilot execution, and achieved outcomes.

The process highlighted several challenges, including limited awareness, weak enforcement, and financial constraints, which were addressed through educational outreach, cost-sharing mechanisms, and targeted regulatory advocacy.

2.5 Salzburg, Austria (FHS)

The pilot has focused on redistributing unsold bakery products from five Resch&Frisch shops in Salzburg to social institutions such as food banks, soup kitchens, and social supermarkets. The initiative involved Resch&Frisch as the surplus generator, several social organizations as redistributors, the Austrian Institute of Ecology for technical support, and FH Salzburg as the project coordinator. During the pilot phase, over 800 kg of surplus and more than 7,200 individual items were analysed, with 346 crates handled. Nearly 800 kg of baked goods were donated to charities. The pilot tested over 10 revalorization strategies and identified more than 30 potential cooperation partners.

The pilot monitoring focused on assessing stakeholder engagement and identifying key actors, tracking the progress of closed local food cycles, evaluating collaboration with external partners, measuring food waste reduction, and examining the potential for scaling successful models.

2.6 Bavaria, Germany (HM)

The HM pilot in Bavaria aimed to valorise schnapps distillation by-products, especially Vorlauf and Nachlauf, by mapping local stakeholders and exploring reuse pathways across other sectors. Despite initial outreach and concept development with regional distilleries and innovation networks, the pilot did not move to implementation because engagement from SMEs was low, perceived risks and limited short-term incentives reduced willingness to participate, and the available timeframe was too short to build trust and operational

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

alignment; strict regulation of alcohol residues further constrained potential reuse without permits or additional treatment.

Monitoring followed the project's common framework and focused on outreach, high-level external collaboration, and feasibility assessments, with no collection of operational data. The main issues identified were the limited seasonal capacity of small distilleries, the absence of an intermediary coordination role between businesses and research, regulatory barriers, and an overly compressed timeline. Recommended actions include allowing more time for preparation and co-design, providing dedicated facilitation and technology matchmaking, offering targeted incentives for SMEs, adopting simple, low-risk pilot formats, and raising awareness through existing regional networks to enable replication of circular practices across the sector.

2.7 South Tyrol, Italy (IDM)

The Circular Food Hub South Tyrol advanced two complementary pilots: a Coffee Ground Pilot valorising spent coffee grounds and coffee silver skin into cosmetic applications, and a Black Soldier Fly (BSF) Pilot implemented with Solos and Reploid to transform organic residues into protein feed and soil conditioner. Stakeholders include Caroma, the Free University of Bozen-Bolzano, cosmetic labs, local cafés and restaurants, and Solos/Reploid with the Circular Food Hub.

Monitoring targets stakeholder engagement, pilot implementation, external collaboration, waste-reduction metrics, scaling potential, circular-economy promotion, and training/research impact. Methods combine surveys and interviews, project dashboards and site visits, waste tracking, and the IDLCASS platform, with monthly reviews, visits to Solos and Caroma, and SWOT/LCA assessments. Key challenges, such as material variability, research-to-market gap, BSF process optimisation, and cross-disciplinary coordination, are addressed via standardised drying and storage, dedicated R&D funding, iterative testing with real-time monitoring, and shared coordination tools. Recommended next steps are to continue coffee R&D to TRL 6, document BSF as best practice, integrate digital monitoring, enhance dissemination, and plan replication.

3. Monitoring Objectives

The monitoring activities were designed to ensure a robust evaluation of the pilot actions, focusing on both process and impact.

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

The objectives shared by all participating regions were defined as follows:

- **Assessing stakeholder engagement** to understand involvement and collaboration levels.
- **Tracking the implementation progress** of closed food cycles to monitor pilot activities and outcomes.
- **Measuring waste reduction** to quantify environmental benefits and resource efficiency.
- **Evaluating the potential for scaling and replicability** to identify opportunities for broader application and policy support.

These goals reflect the project's commitment to promoting circular economy principles, fostering collaboration, and generating evidence for policy and operational improvements.

4. Methodology

The CEFoodCycle pilots implemented various closed food cycle models, each tailored to its regional context. Despite thematic differences, common methodological pillars emerged, enabling cross-comparison, knowledge transfer, and policy alignment.

Across pilots, synergies emerged in stakeholder engagement strategies, use of participatory design, and commitment to circular economy principles. All pilots demonstrated adaptability to local constraints while maintaining alignment with CEFoodCycle's goals. Unique contributions include full-cycle implementation and scientific validation (LAMORO), micro-scale economic modelling (E-Institute), social redistribution framework (FHS, HM), design-led co-creation (IDM, BSC Kranj), and regulatory advocacy (CCI NCA). These diverse methodologies offer a rich foundation for policy recommendations and future replication. The integration of insect bioconversion (LAMORO, E-Institute), biowaste logistics (CCI NCA), product upcycling (IDM, BSC Kranj), and food redistribution (FHS, HM) showcases the versatility of closed food cycle models.

Across all pilots, several methodological elements were consistently applied:

- **Stakeholder engagement**: all pilots prioritized stakeholder engagement as a foundational element. Stakeholders – including food producers, redistributors, technology providers, local authorities, and research institutions – were identified through mapping exercises and engaged via workshops, bilateral meetings, interviews, and co-creation sessions. Participatory methods such as Innovation

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

Labs (LAMORO), Ideation Workshops (IDMs), and mock-up testing of FoodCycle.ai (FHS, IDM, LAMORO) facilitated inclusive design and iterative feedback. CCI NCA and HM also used information meetings and direct outreach to engage local businesses and authorities.

- **Data collection methods**: all pilots combined qualitative tools (interviews, focus groups, stakeholder feedback sessions) and quantitative monitoring (tracking waste volumes, conversion yields, redistribution metrics, and engagement indicators). Project dashboards and OKRs (Objectives and Key Results) frameworks were used to monitor progress and milestones. LAMORO and E-zavod tracked insect biomass yields and waste diversion, while FHS focused on surplus sorting analysis and redistribution metrics.
- **Digital tool**: FoodCycle.ai was tested or referenced across several pilots to support data analysis, stakeholder coordination, and lifecycle monitoring. The digital platform was actively used in FHS and IDM for stakeholder coordination and data visualisation, while its analytics functions were referenced in CCI NCA and HM templates as a prospective tool for lifecycle assessment and resource efficiency tracking. Actual usage varied according to local readiness and pilot focus.
- **Monitoring Frameworks**: monitoring frameworks were aligned with shared objectives: stakeholder engagement, pilot implementation progress, external collaboration, waste reduction, scalability, circular economy promotion, and training impact. These were tailored to local contexts but maintained consistency through the use of common indicators and reporting templates.

Despite these commonalities, the monitoring approaches also reflected the specific characteristics and needs of each territory. Pilots in Piemonte and Slovenia placed strong emphasis on biological conversion processes and scientific validation, leveraging partnerships with research institutions to monitor insect farming and protein yields. In both cases, LAMORO and E-zavod focused on insect bioconversion using Black Soldier Fly larvae, employing methodologies such as substrate optimisation, breeding cycle documentation, and yield analysis. E-zavod emphasised low-cost infrastructure and manual data logging, while LAMORO integrated scientific monitoring through UNISG and developed a scalability roadmap. In Nice, the methodology was shaped by the need to address behavioural change and regulatory compliance among hospitality businesses, with a focus on awareness campaigns and operational logistics. CCI NCA piloted biowaste collection from the Ho.Re.Ca. sector using an electric cargo bike. Its methodology included

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.

stakeholder mapping, participatory design of logistics, and awareness campaigns, while monitoring focused on behavioural change, regulatory compliance, and operational feasibility. The Salzburg-Bavaria pilot prioritised social impact and redistribution efficiency, adapting its monitoring to the constraints of confidentiality and the realities of surplus management. FHS implemented a redistribution model for bakery surplus, combining surplus sorting analysis, stakeholder interviews, and field collaboration. Confidentiality agreements limited data publication, but qualitative insights were captured through staff feedback and operational adjustments. Moreover, in South Tyrol and Slovenia, the approach was oriented towards co-creation and product innovation, involving design prototyping and interdisciplinary collaboration. Finally, IDM developed a circular model for upcycling coffee grounds into cosmetic products. Its methodology emphasised co-creation, design prototyping, and interdisciplinary collaboration, with visual tools and thematic working groups supporting stakeholder engagement.

5. Conclusions

The monitoring of pilots has been important for demonstrating the adaptability and potential of closed food cycle models across diverse Alpine regions.

Continuous monitoring, combined with strong stakeholder engagement and innovative methodologies, has yielded crucial insights into the challenges and opportunities of reducing food waste and valorising resources.

By tracking progress and outcomes, the pilots have enabled knowledge sharing, policy alignment, and informed local adaptations driven by territorial characteristics, regulatory environments, and operational needs.

These experiences highlight how systematic monitoring supports collaboration, context-sensitive solutions, and the effective scaling up of circular food systems, providing a solid foundation for future replication, policy development, and the transition towards more sustainable regional food chains.

The project is co-funded by the European Union under the Interreg Alpine Space Programme.
The stated opinions reflect the opinions of the authors and not the opinion of the EC.