



Food Systems in European Cities

Deliverable D4.5 - Monitoring of the sustainability performances for each pilot

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Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

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1.0	December 15, 2023	Final version submitted	UNIBO
2.0	June 10, 2024	Revised version after project review	UAB



Contents

Project Consortium	3
Document Control Sheet	4
Executive Summary	7
1. Introduction	8
1.1 WP4 structure.....	9
2. Methodology	10
2.2 Evaluation of sustainability and impact of the pilot projects through the FoodE App.....	10
2.1.2. Definition and revision of KPIs within the 3 pillars of sustainability.....	12
2.2 Data Collection	15
2.2.1. Pilot Sample	15
2.2.2. Pilot Training.....	17
3. Results.....	21
3.1 Citizen Engagement with the Pilots	21
3.2 Perception of CRFS Sustainability	23
3.3 FoodE App Dashboard	24
4. Conclusions.....	25
5. References	26

List of Figures

Figure 1. Visual representation of WP4's main tasks from the pilot project perspective. In brackets the deadline for the completion of the activity, expressed in project months.....	9
Figure 2. Screenshot of the Sustainability Score details within the FoodE App.....	11
Figure 3. Screenshot of the initial user rating details within the FoodE App version 4.0.0.....	11
Figure 4 Reformulation of the user rating indicators in the FoodE App.....	13
Figure 5. Screenshot of the revisited user rating details within the FoodE App v5.....	14
Figure 6. Screenshot of the FoodE App v5 tutorial pop-up.....	15
Figure 7. FoodE App download QRs and screenshot of the user rating details.....	17
Figure 8. Screenshot of the online EU survey version.....	18
Figure 9. Personalized on-paper survey for the Cité Maraîchère pilot (French version).....	18
Figure 10. Personalized FoodE App Flyer.....	19
Figure 11. Visitors of the Cuib restaurant pilot (Romania) enjoying an event in the terrace with the FoodE App Flyer hanging in the back.....	20
Figure 12. Email template image to send to pilot projects' users.....	20
Figure 13. Personalized FoodE App Flyer for the ICTA-Integrated Rooftop Garden.....	21
Figure 14. FoodE App users' evolution portraying the number of new users joining the app per month (from March 2022 to November 2023).	23
Figure 15. Collection of users' reviews of different initiatives within the FoodE App from the backoffice at https://foode.sostenipra.cat/	24
Figure 16. Screenshot of the FoodE App Dashboard (December 11, 2023).....	25

List of Tables

Table 1. Initial user rating KPIs developed in WP3.....	12
Table 2. Integration of new indicators for the user experience.....	14
Table 3. The 15 FoodE pilot projects implemented in EU cities and related functions (Table taken from FoodE Deliverable D4.4).	16
Table 4. Number of app and survey reviews for each pilot (reviewed by December 11, 2023).	22
Table 5. Sustainability score and user experience score for each pilot (November 21, 2023).	24



Executive Summary

The main objective of FoodE is to involve European local initiatives in the design, implementation and monitoring of environmentally, economically and socially sustainable City/Region Food Systems (CRFS).

Work Package 4 (WP4) aims to implement newly designed pilot projects or improve and integrate already existing projects in the City-Region Food System landscape with innovative food production systems, technologies, business models, and social innovations. In the first phase, FoodE launched open “calls for ideas” (or “FoodE challenges”, D4.1) where the civil society and relevant food-chain stakeholders were asked to actively contribute to the co-design, improvement and/or integration of local food system projects identified in EU cities (pilot case studies). Based on the successful outcomes of the co-creation process (D4.2), each local FoodE partner proceeded with the executive design of the final pilot project to be implemented (D4.3).

A total of 19 pilots were involved for part or all of the duration of the FoodE project, with a comprehensive analysis focusing on 15 of them. A monitoring process was initiated for each one of these 15 pilots (T4.4) with the primary objective of generating new data and indicators for the validation and enhancement of the initial sustainability framework assessment (WP2). The introduction of the FoodE App (WP3), facilitated the integration of this monitoring process, not only for the pilot projects, but also for all CRFS interested in joining the platform. The present deliverable highlights the outcomes of the pilots’ sustainability performance monitoring, engaging with active participation from both FoodE partners and citizens (D4.5) through a defined protocol of observations and data processing. Leveraging the FoodE App as a citizen engagement tool, this assessment includes feedback from at least 20 visitors per pilot (a total of 387 reviews to date¹), from the 15 pilot projects, aiming to contribute to the delineation of pivotal sustainability indicators and business models (WP5) intended at facilitating the replication and expansion of sustainable CRFS across various European contexts (WP6).

This report is based on the former deliverables (D4.3 and D4.4), elaborated by the task leader (UAB) with the collaboration of the respective pilot teams and supervised by the WP leader (WR).

¹ By December 11, 2023

1. Introduction

The development of resilient and sustainable food systems within urban centers and rural areas surrounding cities is vital to foster food security and nutrition, as well as economic development and sustainable natural resources management (Dubbeling et al., 2016). In this context, the enhancement of citizen-led city region food systems (CRFS) emerges as a promising choice. In the face of complex social, economic, and ecological challenges, a resilient CRFS aspires to enhance sustainability across scales and sectors by increasing the access to food within cities, generating job and income opportunities, improving urban resilience and self-sufficiency, fostering the linkages between rural and urban areas, promoting the management of ecosystems and natural resources, and supporting a participatory governance (Blay-Palmer et al., 2018). The main objective of FoodE is to accelerate the growth of CRFS by bringing local initiatives across Europe together, as well as co-developing and disseminating a range of tools, co-designed with citizens, academia and relevant CRFS stakeholders, to ensure that the most up-to-date cross-sectorial knowledge is applied. While numerous innovative CRFS are found in the different corners of Europe, their replicability and adaptability to the different contexts is hindered by the lack of critical mass of studies and business cases. The study of CRFS can be approached from many perspectives, as they have an impact on the 3 pillars of sustainability (environmental, social, and economic). Previous studies (e.g., Ilieva et al., 2022; Muñoz-Liesa et al., 2021; Orsini et al., 2014; Sanyé-Mengual et al., 2019; Toboso-Chavero et al., 2023) have predominantly focused on conducting comprehensive scientific assessments to study CRFS, leveraging a range of qualitative and quantitative methodologies. These assessments have laid a strong foundation for comprehending the multifaceted nature of CRFS throughout the FoodE project (e.g., WP2, 3 and 5). However, they often fall short in capturing the subjective aspects that can influence the overall **sustainability perception**, which can be determinant for an active citizen-led participation in the co-design of innovative CRFS initiatives and, in general, for their persistence. More importantly, citizens are an essential pillar to generate stable CRFS communities, support networks and successful projects. For this reason, securing their engagement through active participation and incentives is needed.

In this sense, the more subjective perception of users might deviate from the rather objective assessment of a CRFS' sustainability. Their perception is likely to determine the engagement of users with one initiative or another, much in the same way as any other system, product, or business generates different degrees of customer loyalty. Following this prospection, within the framework of the FoodE project and its pilots, **Task 4.4 has concentrated on assessing this perception of sustainability through the active involvement of citizens and the utilization of innovative and user-friendly tools like the FoodE App (WP3) to create stronger user networks**. This initiative is built upon participatory procedures, engaging civil society and pertinent stakeholders within the food chain to establish priorities and ideal functionalities to be integrated across all partner regions. This assessment aims to contribute to the delineation of pivotal sustainability indicators and

participatory tools intended at facilitating the replication and expansion of sustainable CRFS across various European contexts.

1.1 WP4 structure

Work package 4 is structured in four stages, that include the launch of the “FoodE challenges” for the co-design of innovative pilot projects in pre-selected locations, on both established or newly implemented CRFS projects (T4.1); the finalization of the executive projects of the best selected ideas (T4.2); the timely implementation of the pilot project in EU cities (T4.3) and the citizen-driven monitoring and assessment of the project outcomes (T4.4). **Errore. L'origine riferimento non è stata trovata.** is a visual representation of WP4’s main tasks.

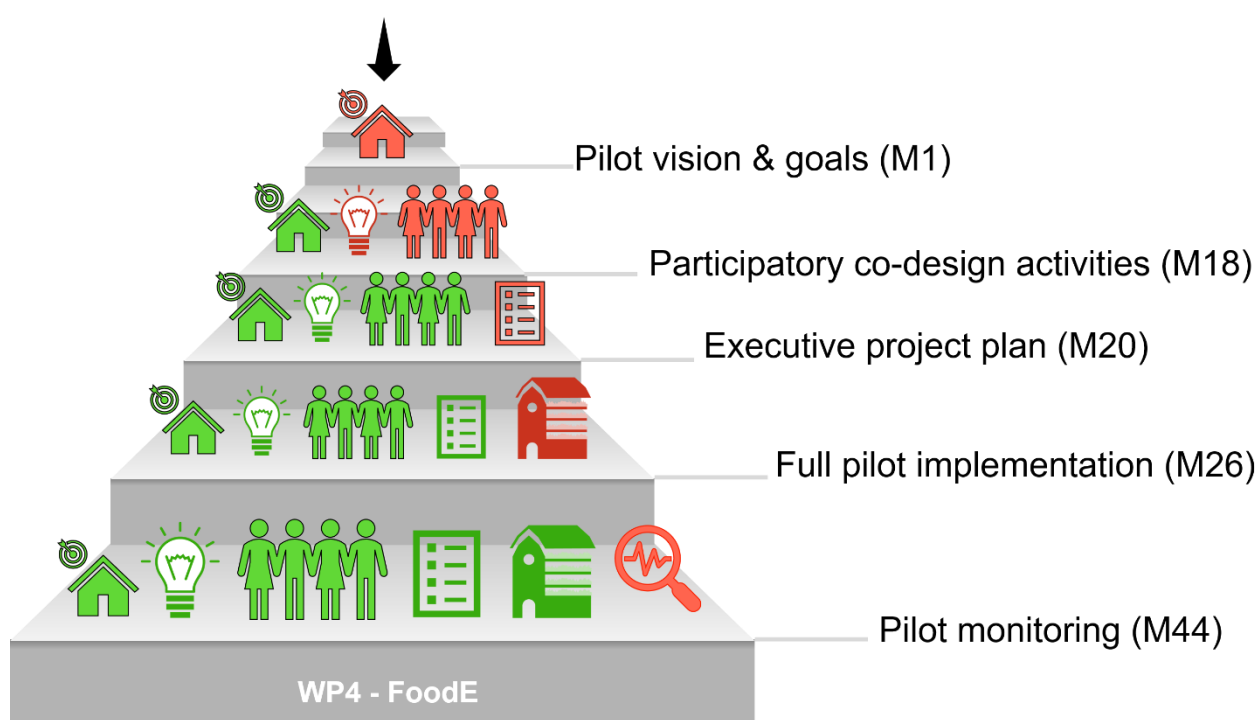


Figure 1. Visual representation of WP4’s main tasks from the pilot project perspective. In brackets the deadline for the completion of the activity, expressed in project months. (Figure taken from FoodE Deliverable D4.4)

The current deliverable is the depiction of T4.4, focusing on the participatory pilot monitoring process. The report presents the monitoring results of the CRFS sustainability performances, involving both FoodE partners and citizen participation, while defining **user-experience indicators** and actively monitoring the results.

2. Methodology

2.2 Evaluation of sustainability and impact of the pilot projects through the FoodE App

To assess the perception of sustainability of the FoodE pilot projects and extend it to other CRFS users, T4.4 has focused on the development and improvement of the FoodE App as a key monitoring tool (<https://foode.sostenipra.cat/>). The FoodE App, available in Google Play (for Android) and in the App Store (for iPhone and iPad)², has played a pivotal role in the advancement of T4.4, which can be attributed to: (i) the platform's advanced development stage, (ii) the active engagement of pilot projects in the app, and (iii) its potential to serve as an innovative channel connecting initiatives and their users. In this sense, T4.4 expands the FoodE App's primary endeavor to bridge the gap between users and the CRFS' assessments.

To enhance user evaluation accessibility, the contents of the FoodE App had to be adjusted. To do so, one must understand the structure of the app's scoring system (WP3) and how sustainability key performance indicators (KPIs) were integrated into version 3.0.0 of the app (available until July 2023). Within T4.4, these indicators were categorized into two functions: the sustainability score and the user experience.

On one hand, the sustainability score is calculated by the CRFS owners as they are encouraged to evaluate their own initiatives by responding to a survey (<https://foode.sostenipra.cat/>, access for initiatives) based on the three pillars of sustainability (see Figure 2). The social pillar focuses on the process of creating sustainable wellbeing-oriented communities. It provides an overview of the initiative's size, employee diversity, key product characteristics, food labels, sales channels, community outreach and engagement, and food quality and safety. The economic pillar is based on a broad interpretation of ecological economics, examining corporate and financial structures, cost structures, and revenue streams. Finally, the environmental pillar addresses the human impact on the environment, employing data concerning resource use, waste management, and transportation. It aims to minimize non-renewable resource use and waste generation while enhancing ecosystem services.

The sustainability score is computed based on the outputs generated by WP2 - Methodological framework development and case study sustainability assessment. The integrated computing engine within the app's database enables the calculation of the sustainability score based on raw data provided by CRFS owners through the back-office website, resulting in a rating on a scale of 1 to 5 that benchmarks the CRFS against others.

² There might be an information delay of 1-2 days between the Google Play and App Store markets.

Sustainability score details



Figure 2. Screenshot of the Sustainability Score details within the FoodE App.

On the other hand, the user rating was tailored for the assessment of CRFS by its users (see Figure 3). However, its applicability to participatory actions had yet to be tested. This user-rating function also covers the three pillars of sustainability, but it must do so in an accessible manner in order for the general public to easily understand the questions and to be willing to engage in the rating process. Like any other app or service asking for a rating to display the degree of satisfaction of their users (e.g., Google Reviews, Booking, Trip Advisor), the FoodE App asks users to rate their experience at a CRFS and their perception of the CRFS sustainability. To do so, the questions must resonate with the reality of users and CRFS owners. Otherwise, the engagement of users and CRFS in the use of these tools would be low. For this reason, the indicators available in the app version 4.0.0 were revisited. See the revision and definition of the final KPIs in section 2.1.2.

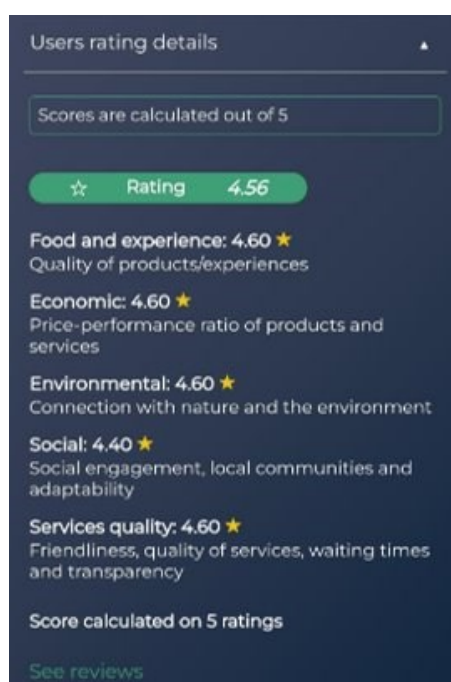


Figure 3. Screenshot of the initial user rating details within the FoodE App version 4.0.0.

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

2.1.2. Definition and revision of KPIs within the 3 pillars of sustainability

The original indicator set presented in the FoodE App version 4.0.0 was based on WP2 and WP3 and proposed 5 initial indicators, including long-hidden specifications (see Table 1). These indicators were specifically tailored for users within the CRFS, based on benchmarking of existing tools and a collaborative assessment involving the pilot participants.

Table 1. Initial user rating KPIs developed in WP3.

Food and Experience
Subtitle: Quality of products/experiences
Quality of food
Quality of the overall experience with the initiative.
Satisfaction according to what was previously advertised.
Economic
Subtitle: Price-performance ratio of products and services
Affordability of the products and experiences offered by the initiatives compared to their overall quality.
Availability of a range of products with different prices.
Environmental
Subtitle: Connection with nature and the environment
Measures to reduce the environmental impact of the initiative.
Eco-building materials.
Measures and strategies for avoiding waste and packaging to contribute to a circular economy.
Animal welfare.
Social
Subtitle: Social engagement, local communities, and adaptability
Family friendly.
Facility adapted for disabled people.
Level of engagement of local communities.
Connection to local culture and gastronomy.
Service quality
Subtitle: Friendliness, quality of services, waiting times and transparency
Staff disposition/attitude towards visitants and customers.
Service speed or waiting times to be attended.
Information and transparency policy.

In T4.4, a new set of KPIs within the three pillars of sustainability (economic, environmental, and social) has been developed for the improvement of the user experience, building on the FoodE App's original indicator set. To establish a comprehensive evaluation framework, a broader basis of assessment was sought to ensure

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

that the KPIs were accessible to a diverse audience extending beyond academia. Emphasis was placed on the simplicity of measurement for prospective users, ensuring relevance and applicability beyond the production aspect of the CRFS.

After the initial proposal, resulting from the results of WP2 and WP3, a revision of user-experience indicators was undertaken due to the lack of explicit and concrete definitions within the 5 existing indicators (Figure 4). In the FoodE App, the detailed specifications of these indicators were shown within a "+ info" tab, which resulted in a non-intuitive user experience. In Task 4.4, the existing user rating indicators were initially reframed using the most recent results of the multi-user online survey (Task 5.3, WP5), as it provides an overview of the usefulness, ease of measurement and comprehensibility of the indicators proposed in WP2 and WP3. This initial procedure culminated in the proposal of 9 comprehensive indicators by the task leaders, as opposed to the initial 5.

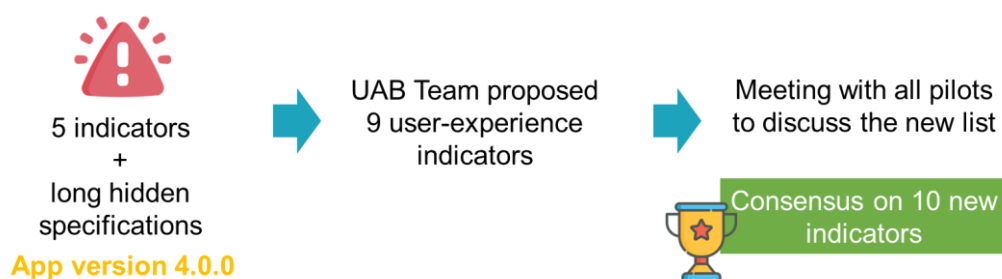


Figure 4 Reformulation of the user rating indicators in the FoodE App

Subsequently, a meeting was arranged with the representatives of the pilot projects to facilitate an in-depth discussion on the newly proposed indicators. Although the formulation of the new indicators was informed by the research developed in Task 5.3, deliberations with the FoodE pilots were essential in ensuring that the reformulated indicators were indeed intelligible to the average user and that they could be applied to all types of initiatives. This comprehensive assessment was a challenging task, considering the divergent nature of the pilots. For instance, some of them are non-profit and have difficulties with the application of the economic assessment (i.e., the evaluation of the adequacy of the price of the products, or the variety of prices), while others display varying degrees of attention to local culture, which did not necessarily define their social engagement. Additionally, the categories “Food and Experience” and “Service Quality” were merged into a single “Quality of the Experience” category to avoid redundancy.

As a result of the discussions, the original 9 indicators were further refined and expanded, ultimately leading to the formulation of 10 new indicators. The new formulations still mirror the results of WP2 and WP5, but the deliberations with the pilots ensured that the wording and structure were clear enough for the general public. For example, whereas education and training activities were implicit in the social indicators, the pilots suggested a separate indicator for the sake of clarity. In addition, special considerations were made to allow for a neutral rating of certain questions that might not be applicable to all initiatives (for questions 3, 4 and 5). Despite the availability of a neutral option, it is important to take into account that some users may still assess a question positively or negatively, even if it is not directly applicable to their initiative, potentially influencing

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

the overall rating. However, this risk can be mitigated by the initiative itself, through a clear communication of its scope and limitations.

The process of reaching a consensus required substantial deliberation and negotiation among the pilot representatives. The final 10 indicators are presented in Table 2 and Figure 5.

Table 2. Integration of new indicators for the user experience.

Quality of the Experience
1. Level of satisfaction with the overall experience.
2. Likelihood of returning to the initiative in the future.
Economic Dimension
3. Price of the products or activities with respect to their quality.
4. Willingness to pay for similar products and/or activities.
Environmental Dimension
5. Availability of products with environmental certifications, safety, or traceability labels.
6. Implementation of measures to reduce the impact on natural resource use.
7. Preservation of biodiversity.
Social Dimension
8. Engagement of disadvantaged social groups.
9. Availability of education and training activities.
10. Connection to local culture, including international cultures present in the area.

Users rating details

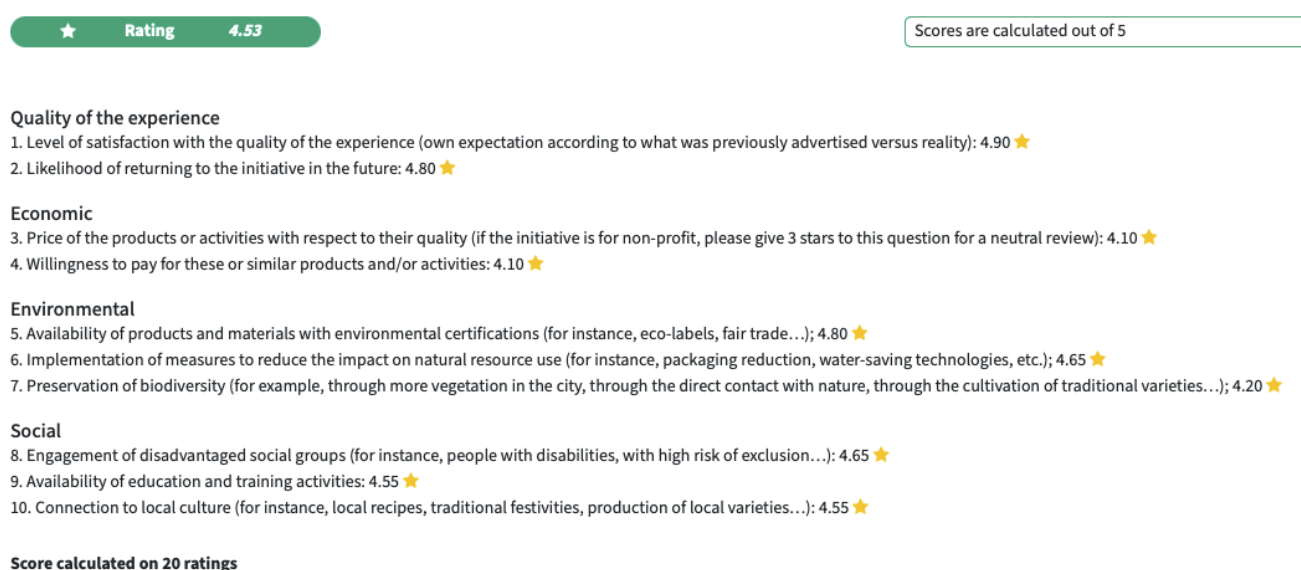


Figure 5. Screenshot of the revisited user rating details within the FoodE App v5.

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

The final new 10 indicators were included in the FoodE App. To do so, the 5 original indicators were matched with their new counterparts so that the existing user scores available in the app could be transferred to this new evaluation system (see Figure 5). The score for each indicator remains consistent on both the webpage and the FoodE App for pilots and participant CRFS (see Figure 5). Each question and category is assigned its individual score, while an additional inclusive overall user experience score is calculated for each CRFS, consolidating the user ratings into an aggregated average value that represents the overall user experience (see Figure 5). Additionally, all individual user ratings are publicly displayed in the FoodE App alongside the users' names.

Moreover there were other additional updates in the app, such as an app tutorial pop-up designed to facilitate the user experience (see Figure 6) and the Terrix gamification to engage users to collect their reviews in exchange for points, this process led to the release of the FoodE App version 5.0.0. This new version was launched on September 21, 2023.

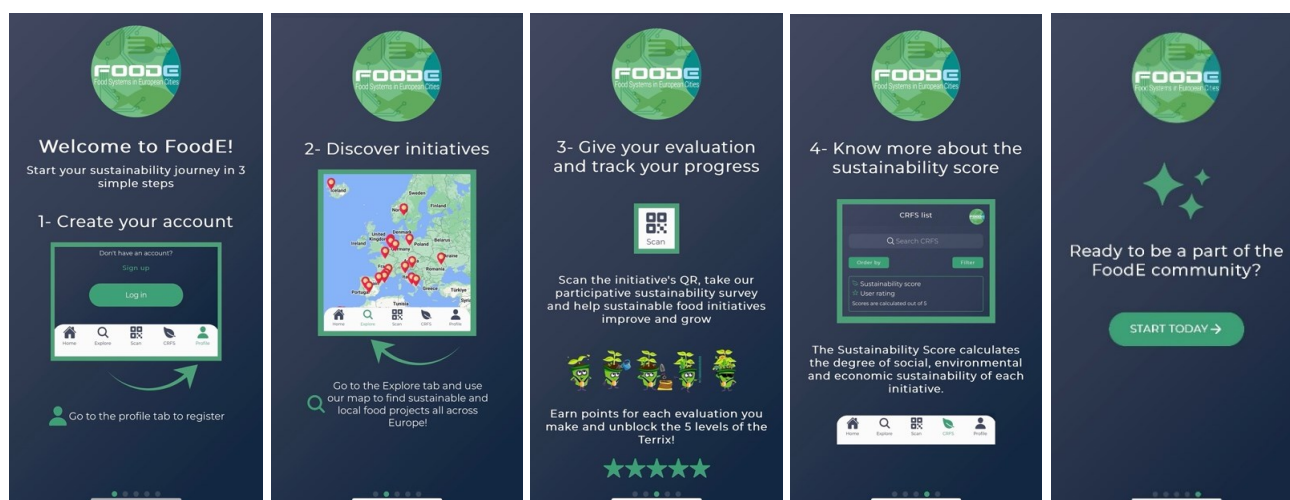


Figure 6. Screenshot of the FoodE App v5 tutorial pop-up.

2.2 Data Collection

2.2.1. Pilot Sample

The participatory monitoring process presented has been applied to a comprehensive set of **15 pilot projects**. Identified by the FoodE consortium, these 15 City-Region Food System (CRFS) were strategically selected within 11 European cities as pilot case studies (an overview of the pilot projects and their primary functions, as indicated by the respective participant teams, is displayed in Table 3). Cities to host the pilots were intended to be representative of the socio-cultural and geographical diversity of European regions and were identified based on both the availability of space and equipment and the level of technological readiness (TRL), as well as the existence of previous initiatives to be integrated. However, these initiatives had to be designed or improved by integrating technological solutions, environmental innovations, business models and social structure.

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

Within the CRFS initiatives, food constitutes the central dimension of urban and rural linkages in the aspects of ecology, socio-economy, and governance. As CRFS, the selected pilot projects represent both profit and non-profit entities involved in the food system, which can have one or more functions along the food chain, namely:




















































-  to produce food (e.g., agricultural, fish products);
-  to process food into food products (e.g., transformation of agricultural products into food etc.);
-  to distribute food and/or food products (e.g., wholesale, retail, direct selling, community supported agriculture);
-  to serve or cater food (e.g., catering, cooking, restauration, etc.);
-  to prevent, redistribute, or valorize food waste;
-  to provide food-related services (e.g., beekeeping, education, research, rehabilitation, raising-awareness);
- others (e.g., produce high quality service water for food production from wastewater, housing, rooms' rental).

Table 3. The 15 FoodE pilot projects implemented in EU cities and related functions. (Table taken and adapted from FoodE Deliverable D4.4)

City (country)	Pilot project name	Functions
Napoli (IT)	Urban agricultural park with farmers and fishery market	   
Napoli (IT)	Orto dei Vesuviani	   
Bologna (IT)	Serra Madre: A food hub for education, leisure, and urban farming innovation	   •••
Amsterdam (NL)	CleanTech Playground	  
Berlin (DE)	Urban farm with hydroponic greenhouse and greywater pilot plant	 •••
Romainville (FR)	The Cité Maraîchère: vertical farm, educational gardens, sustainable and social food, market gardening and short food chain	     •••
Iasi (RO)	CUIB: Restaurant with local products	    
Bologna (IT)	Urban Farming at SALUS Space	  •••
Sabadell (SP)	Urban agricultural park for participatory agricultural test spaces	   
Sabadell (SP)	Hort de la Ceba: urban social garden managed by associations of Sabadell	   
Sabadell (SP)	River orchard: a municipal garden dedicated to self-production crops	   
Lansingerland (NL)	Plant factory for demonstrational purposes	
Bologna (IT)	AlmaVFarm: An Indoor Vertical Farm for growing Food, Competences, and Innovation	
Ljubljana (SL)	"Prison Honey" - Urban beekeeping for rehabilitation and social inclusion	
Tenerife (SP)	Sustainable small-scale fishery in school canteens	  

2.2.2. Pilot Training

In July 2023, a meeting was held, gathering the representatives of all the pilot initiatives for an intensive training session. The primary objective of this training was to actively involve the pilots in the monitoring process, striving to achieve an initial goal of **20-40 reviews per pilot by October 15, 2023** (with a further extension until October 20, 2023). In this sense, the training was designed to grant the projects the autonomy to independently collect the reviews by themselves during this time period, as well as to reach out to new app users within their local area or community.

Some project members had previously expressed concerns about users' reluctance to rate the pilot projects through the FoodE App, due to a lack of time or lack of immediate internet connectivity. To address this issue, the pilots were given two options to collect the reviews. The preferred option involved using the FoodE App to scan each initiative's QR code and directly complete the corresponding questionnaire (see Figure 7). Yet, an alternative option was also given for cases where visitors or users did not have immediate access to the FoodE App (i.e., suppliers or visitors without direct internet connectivity). This second option was facilitated through the creation of an online survey (<https://ec.europa.eu/eusurvey/runner/UserRating>) in their respective local language (see Figure 8).

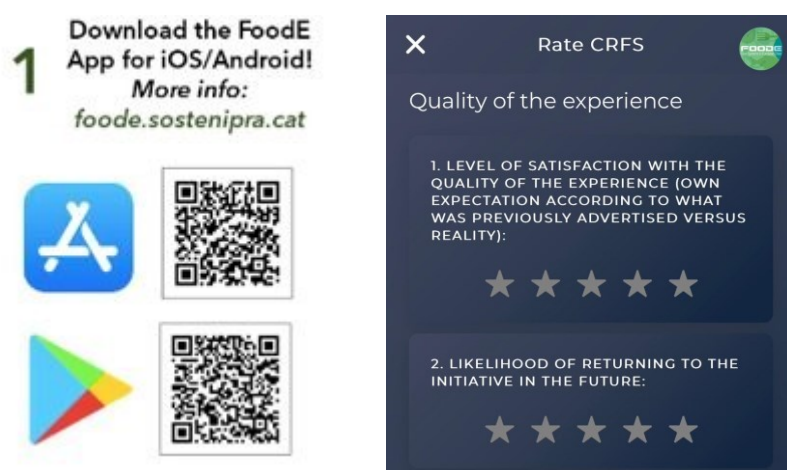



Figure 7. FoodE App download QRs and screenshot of the user rating details.

The online survey was also presented in a personalized paper version, for specific on-site visits, where it was easier for participants to respond in a written format (see Figure 9). The results from the paper format had to be subsequently transcribed into the online form for digital record-keeping. While this online survey was exclusively intended for the pilots, the user experience of the FoodE App is accessible to the entire FoodE community.

USER EXPERIENCE RATING IN A CRFS

Disclaimer

The European Commission is not responsible for the content of questionnaires created using the EUSurvey service - it remains the sole responsibility of the form creator and manager. The use of EUSurvey service does not imply a recommendation or endorsement, by the European Commission, of the views expressed within them.



The FoodE Project

The objective of the FoodE project is to accelerate the growth of citizen-led City Region Food Systems (CRFS) by bringing local initiatives across Europe together, as well as co-developing and disseminating a range of tools co-designed with academia, citizens, and food systems start-ups to ensure that the most up-to-date cross-sectorial knowledge is applied.

Through this experience rating, you are taking part in a participatory evaluation of the value of CRFS initiatives, both from a customer and sustainability perspective.

This survey is quantified in a 1-5 scale, which evaluates the extent to which the activities of every initiative included are sustainable, for all three pillars of sustainability (economic, social and environmental).

Funding: This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 862663.

Choose your initiative:

- ☐ CleanTech Playground - Amsterdam (Netherlands)
- ☐ Prison Honey - Ljubljana (Slovenia)
- ☐ Alma VFarm - Bologna (Italy)
- ☐ Water House - Berlin (Germany)
- ☐ Plant Factory - Lansingerland (Netherlands)
- ☐ CUIB Restaurant - Iasi (Romania)
- ☐ Serra Madre - Bologna (Italy)
- ☐ Orto dei Vesuviani - Naples (Italy)
- ☐ ECOTUNIDOS. Sustainable small scale fishery in school canteens - Tenerife (Canarias)

Figure 8. Screenshot of the online EU survey version.

Survey Link: <https://ec.europa.eu/eusurvey/runner/UserRating>

LA CITÉ MARAÎCHÈRE DE ROMAINVILLE

LE PROJET FOODE

L'objectif du projet FoodE est d'accélérer la croissance des systèmes alimentaires urbains régionaux gérés par les citoyens en rassemblant les initiatives locales à travers l'Europe, ainsi qu'en développant et en diffusant une série d'outils conçus conjointement avec les universités, les citoyens et les jeunes entreprises de systèmes alimentaires afin de garantir l'application des connaissances intersectorielles les plus récentes.

Grâce à cette évaluation participative, vous contribuez à évaluer la valeur des initiatives des systèmes alimentaires urbains régionaux. Cette enquête est réalisée sur une échelle de 1 à 5, permettant d'évaluer le degré de durabilité des activités de chaque initiative incluse, en prenant en compte les 3 piliers de la durabilité: économique, social et environnemental.

QUESTIONS	ÉVALUATION				
	1	2	3	4	5
1 Niveau de satisfaction par rapport à l'expérience (attentes par rapport à ce qui était annoncé versus réalité)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 Probabilité de revenir dans le lieu dans le futur	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 Prix des produits et/ou activités par rapport à leur qualité (si l'initiative est à but non lucratif merci de mettre un 3 pour un avis neutre)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 Êtes-vous prêts à payer pour ces produits et/ou activités ou d'autres similaires?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Disponibilité de produits ou matériaux avec une certification environnementale (ecolabel, équitable, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 Mise en œuvre de mesures pour réduire l'impact du lieu sur les ressources naturelles (par exemple diminution des emballages, économie d'eau, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 9. Personalized on-paper survey for the Cité Maraîchère pilot (French version).

Deliverable 4.5 - Protocol of observations and their processing to be executed for each pilot.

The training also included the explanation of three ways in which pilots could promote the FoodE App and its use for collecting reviews. This proposal aimed to address the concerns raised by certain pilot members regarding the scarcity of app users, attributed to factors like the absence of future planned on-site events, the reliance of some projects on the school calendar, or the limited number of customers or visitors of some initiatives. The options presented were as follows:

- (i) The FoodE App promotion at events and visits: Pilots were encouraged to allocate some time during project events and visits to show users how to download the app, register an account and rate the initiative. To help with this process some materials were made available, including a flyer with each initiative's QR code (see Figure 10) translated into each initiatives' local language, to hang or distribute at the respective events (see Figure 11).



Figure 10. Personalized FoodE App Flyer.



Figure 11. Visitors of the Cuib restaurant pilot (Romania) enjoying an event in the terrace with the FoodE App Flyer hanging in the back.

- (ii) The reconnection with previous visitors/users via Email: In this case, an email template was prepared for each pilot to send an email to their former users that had previously agreed to be contacted for updates, in order to engage people who had already visited the initiative in the past to download the app and rate the initiatives (see Figure 12).



Figure 12. Email template image to send to pilot projects' users.

- (iii) The social media and poster advertising of the FoodE App: Pilots were encouraged to share promotional content about the app on their social media platforms, as well as to hang posters featuring the initiative for offline promotion. Alongside the provided flyers, initiatives were encouraged to personalize their own flyers to foster increased user engagement (see Figure 13).



Figure 13. Personalized FoodE App Flyer for the ICTA-Integrated Rooftop Garden

3. Results

3.1 Citizen Engagement with the Pilots

Throughout the data collection process, it became apparent that engaging users and fostering their active participation and commitment posed significant challenges. However, both the FoodE App and the online survey have proven to be helpful tools in effectively monitoring the sustainability of CRFS. As observed in Table 4, the introduction of the online form served as a particularly valuable instrument for gathering user feedback, especially during project events, where users can provide direct responses to the survey without needing to download or register in the app. Several pilots reached a substantial number of reviews throughout this method, with some recording as high as 50 reviews during these events. It is also worth mentioning that almost all the projects gathered close to the target of 20-40 reviews, with a total of 371 reviews by the initial deadline of October 20, 2023, with some surpassing it, and even continuing to attract users and reviews beyond this date (see Table 4). Nevertheless, some pilots were not able to reach the target reviews as they rely on guided tours and open events to engage with their users and new events were not planned at this stage of the project. Even so, their engagement still shows in the scores awarded by their users (Table 5).

Table 4. Number of app and survey reviews for each pilot (reviewed by December 11, 2023).

Pilot	Reviews FoodE App	Online form	Total
CleanTech Playground (Amsterdam)	20		20
Prison Honey (Ljubljana)	10		10
AlmaVfarm (Bologna)	29	6	35
Nolde's Water House (Berlin)	12	3	15
Plant Factory WUR (Lansingerland)	9	4	13
CUIB (Iasi)	20		20
Serra Madre (Bologna)	8	44	52
Orto dei Vesuviani (Naples)	21	22	43
Ecotúnidos (Tenerife)	25		25
Parc Agrari (Sabadell)	22	1	23
Hort de la Ceba (Sabadell)	16		16
Horta Riu (Sabadell)	7	1	8
Parco Troisi (Naples)		51	51
SALUS Space (Bologna)	10	35	45
Cité Maraîchère (Romainville)	9	2	11

The overall usage of the FoodE App has demonstrated a clear correlation with the coordination of various events. For instance, a significant spike in the app users was observed subsequent to the General Assembly gatherings held in Paris and Bleiswijk during April and October 2023, with an increase of 37 and 108 new users respectively (see Figure 14). Additionally, the user engagement has shown consistent growth from March 2022 to November 2023, with the current active participation reaching a count of 350 users (see Figure 14). This trend shows that the FoodE App is growing and has the potential to be a useful tool in the future, especially considering that the pilots have received thorough training and now have the knowledge and materials to continue to work on this progress autonomously. Additionally, their continued collection of reviews after the set deadline reflects the sustained momentum of the app's development.



Figure 14. FoodE App users' evolution portraying the number of new users joining the app per month (from March 2022 to November 2023).

3.2 Perception of CRFS Sustainability

Table 5 presents the average results of the sustainability score and the user experience score (which includes the indicators regarding the quality of the experience, and the economic, environmental, and social pillars) for both the FoodE App and the online survey responses of each initiative. In terms of user experience, it is noticeable that the evaluation reflects a highly positive trend, averaging a score of 4.3 out of 5, and consistently surpassing the sustainability score. This overall positive user score is correlated with the introduction of a subjective evaluation which is in every case higher than the science-based sustainability score. Additionally, the user experience feature enables users to leave comments about their experiences, which are predominantly positive and offer valuable feedback for projects seeking to grasp how users perceive their services and gather ideas for further improvements (see Figure 15). However, higher engagement in some of the pilots that collected fewer reviews would strengthen the reliability of these results.

Table 5. Sustainability score and user experience score for each pilot (November 21, 2023).

Pilot	Sustainability score	User experience score	Quality of the experience	Economic	Environmental	Social
CleanTech Playground (Amsterdam)	3.21	4.53	4.85	4.10	4.55	4.58
Prison Honey (Ljubljana)	3.28	4.43	4.45	4.50	4.93	4.67
AlmaVfarm (Bologna)	2.85	4.30	4.7	3.89	4.26	4.33
Nolde's Water House (Berlin)	2.76	4.15	3.88	3.34	4.69	4.47
Plant Factory WUR (Lansingerland)	2.73	3.28	3.89	3.06	2.96	3.33
CUIB (Iasi)	3.79	4.76	4.73	4.88	4.9	4.97
Serra Madre (Bologna)	3.64	4.30	4.62	3.92	4.29	4.37
Orto dei Vesuviani (Naples)	3.84	4.31	4.29	4.17	4.41	4.38
Ecotúnidos (Tenerife)	3.04	4.47	4.72	4.43	4.38	4.34
Parc Agrari (Sabadell)	3.94	4.43	4.55	4.10	4.56	4.44
Hort de la Ceba (Sabadell)	3.78	4.37	4.67	3.42	4.50	4.67
Horta Riu (Sabadell)	3.96	4.44	4.72	3.65	4.62	4.62
Parco Troisi (Naples)	3.27	3.77	4.05	3.64	3.57	3.82
SALUS Space (Bologna)	3.44	4.52	4.60	4.33	4.45	4.70
Cité Maraîchère (Romainville)	3.68	4.46	4.83	4.45	3.9	4.67

reviewed - Cleantech Playground Aquaponics Farm

5★ super inspiring and informative project in a great location

reviewed - L'Orto dei Vesuviani

4.4★ Bellissima esperienza fatta con la scuola [See details](#)

reviewed - Isla Tuna

5★ Fabuloso! [See details](#)

reviewed - CUIB - Centrul Urban de Inițiativă Bune

5★ A beautiful place with great people and great food . Good prices

reviewed - Ajuntament Sabadell (Parc Agrari)

4.4★

Hope to see this kind of projects around in other open spaces in our city/surroundings.

reviewed - Urban Beekeeping Association

4.9★ the best honey we ever had! [See details](#)

reviewed - Cleantech Playground Aquaponics Farm

5★

Such a great initiative! The results help people understand and see what circularity means and its benefits. I hope to see more of these projects.

Figure 15. Collection of users' reviews of different initiatives within the FoodE App from the backoffice at <https://foode.sostenipra.cat/>

3.3 FoodE App Dashboard

One positive trend to highlight is the steady growth in the user base of the FoodE App, which has now reached a total of 414 active users, encompassing both pilot and non-pilot users, and recorded 539 visits and 383 reviews to date (December 11, 2023). Moreover, the project has effectively integrated 201 CRFS initiatives, among which 15 are the pilot projects (see Figure 16). The remaining number encompasses those CRFS that have voluntarily registered (which has been designed as "certified CRFS"), as well as "potential CRFS", which represent initiatives that fit within the project but have yet to formally engage in the registration process. These data collectively underscore a reference for the potentiality of growth of the app.

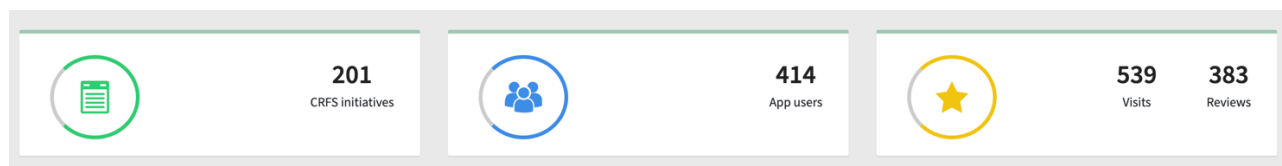


Figure 16. Screenshot of the FoodE App Dashboard (December 11, 2023).

Yet, we must acknowledge the limitations of the app at present. The relationship between the number of visits (539) and the number of users (414) shows that new users may only engage in the rating process once. This poses a challenge to consolidate the user base of the app. However, the FoodE App is still a very young tool and users have yet to uncover the many uses it can have beyond the sustainability ratings of initiatives in their immediate area of action. Gamification was implemented for this reason, and it is expected that further promotion of the app will take advantage of the Terrix loyalty points to increase the user base and its effective interaction with the registered initiatives around Europe. With the most recent update, the integration of the FoodE label (WP5), initiatives may also find an additional incentive to communicate their engagement with sustainability and the FoodE App.

4. Conclusions

Task 4.4 has focused on evaluating the sustainability perception of 15 pilot CRFS projects through the active involvement of citizens and the utilization of innovative and user-friendly tools like the FoodE App to create stronger user networks. The FoodE App allows to extend this process to the FoodE community, including all its CRFS. This monitoring process, has evidenced the challenges associated with user engagement in participatory processes, emphasizing the need to enhance the user experience when designing participatory tools, adapting, and broadening the access of these processes to a diverse audience extending beyond academia.

Throughout this assessment, the diverse range of materials available, including the FoodE App, has not only facilitated the bond between the CRFS and the users, but also given initiatives the autonomy to use these resources to maintain users' engagement and build their loyalty. Additionally, the consistent growing number of users in the app and the initiatives' engagement beyond the project deadlines emphasizes the project's potential for future expansion. The highly positive feedback from users suggests that more people might become interested in joining, influenced by previous users' experience. Moreover, the addition of a business plan, especially one that includes ways to motivate users (e.g., rewards, discounts), could be a driving force in getting more people involved and interested in the app, encouraging long-term participation.

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