



Food Systems in European Cities

Deliverable 5.4 - Implementation of the FoodE Label

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Authors	Pietro Tonini, Xavier Gabarrell Durany, Anna Petit-Boix, Valentina Córdoba
Contributors	Bernd Pölling, Claudia Wiese, Anna Niero, Valeria Musso, Agnès Lelièvre
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Project Consortium

No.	Institution Short name	Institution Full name	Country
1	UNIBO	ALMA MATER STUDIORUM – UNIVERSITÀ DIBOLOGNA	IT
2	APT	INSTITUT DES SCIENCES ET INDUSTRIES DU VIVANT ET DE L'ENVIRONNEMENT - AGRO PARIS TECH	FR
3	RMN	COMMUNE DE ROMAINVILLE	FR
4	SWUAS	FACHHOCHSCHULE SUDWESTFALEN	DE
5	ILS	INSTITUT FÜR LANDES- UND STADTENTWICKLUNGSFORSCHUNG GMBH	DE
6	FLY	FLYTECH SRL	IT
7	NOL	NOLDE ERWIN	DE
8	BOL	COMUNE DI BOLOGNA	IT
9	NAP	COMUNE DI NAPOLI	IT
10	UNINA	UNIVERSITA' DEGLI STUDI DI NAPOLI FEDERICO II	IT
11	HCA	HAGUE CORPORATE AFFAIRS BV	NL
12	LAN	GEMEENTE LANSINGERLAND	NL
14	WR	STICHTING WAGENINGEN RESEARCH	NL
16	POL	POLAR PERMACULTURE SOLUTIONS AS	NO
17	TAS	TASEN MICROGREENS AS	NO
18	MBI	ASOCIATIA MAI BINE	RO
19	ARC	ARCTUR RACUNALNISKI INZENIRING DOO	SI
20	BEE	DRUSTVO URBANI CEBELAR	SI
21	SBD	AJUNTAMENT DE SABADELL	ES
22	ISL	ORGANIZACION DE PRODUCTORES DE TUNIDOS Y PESCA FRESCA DE LA ISLA DE TENERIFE	ES
23	ULL	UNIVERSIDAD DE LA LAGUNA	ES
24	UAB	UNIVERSITAT AUTONOMA DE BARCELONA	ES
25	METAINST	STICHTING METABOLIC INSTITUTE	NL
26	NBL AS	NABOLAGSHAGER AS	NO



Document Control Sheet

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Abbreviation

AF	Arable Farming
CRFS	City-Region Food System
GA	General Assembly
F	Fishery
HTH	High Tech Horticulture
IC	Impact Category
KPI	Key Performance Indicator
L	Livestock farming
LCA	Life Cycle Assessment
LCC	Life Cycle Costing
LTH	Low Tech Horticulture
NUT	Nomenclature of territorial units for statistics
S-LCA	Social Life Cycle Assessment
WP	Work Package

Executive Summary

The main objective of the FoodE project is to involve European local initiatives in the design, implementation, and monitoring of environmentally, economically, and socially sustainable City/Region Food Systems (CRFS). Deliverable 5.4 (D5.4) presents how the FoodE Label could be granted to relevant success stories, according to the certification standards defined in T5.4. In this context, D5.4 presents the definition of a new label targeting local and sustainable food initiatives in compliance with certification standards. By proposing this new certification scheme, the FoodE project aims to facilitate the recognition of sustainable CRFS. The certification is the result of a participatory co- design process that involved all the partners of the FoodE consortium. Explorative interviews were held with the municipalities to collect information about existing labels and certifications in their territories. In addition, two focus group discussions were organized during the FoodE General Assemblies held in Paris (France) and Bleiswijk (The Netherlands) aiming to set the target, system boundaries, and minimum criteria to obtain the FoodE Label. The certification standard has been designed for commercial initiatives as well as for projects carried out by non-profit initiatives such as research centers, NGOs, associations, schools, or public institutes that operate within at least one of the stages of the food supply chain. The geographical scope of the certification is the regional level. The certification standard is grounded in the three pillars of sustainability (environmental, social, and economic). The assessment is based on a qualitative approach to identify which and how many good practices are applied by the initiative to be certified. The first set of Key Performance Indicators (KPIs) that compose the certification label was elaborated for the horticultural sector and then expanded to other food sectors, excluding salt production. The sustainability assessment is based on the three pillars, which are consisting of several impact categories that are feed through multiple KPIs. The measurement of the KPIs is based on two different types of questions: binary (yes/no) questions and a 5-point Likert scale. The resulting scoring system allows CRFS practice to be categorised from less to more sustainable.

The FoodE consortium defined that all pillars must receive a positive assessment to award the certification to a CRFS. This means that at least 50% of the categories in a pillar must receive a score equal to or higher than half of the maximum score. For instance, if a category consists of 4 KPIs, the initiative must score at least 8 points out of the possible

16 to achieve a positive assessment in the category. In this way, the certification can identify which initiatives have a positive impact on the local food system, facilitating communication with their users as well as the development of tailored policies to pave the way for the replication and expansion of sustainable CRFS (WP6).

1. Introduction

The availability of food brands and products that claim to be sustainable is currently on the rise. Consumers are thus confronted with complex daily choices, as they must identify the food products or services that best align with their own environmental, economic, and social values and concerns. To make their own decisions, consumers typically rely on product labels, which usually provide information about a product's nutritional quality and safety standards, among others. However, recognizing which product or service providers are making actual efforts to meet sustainability criteria becomes a challenge. This barrier is particularly important in the case of local product or service providers in a city-region food system (CRFS). While the intrinsic sustainability benefits of local food systems, such as urban agriculture or local restaurants, have been demonstrated in scientific literature [1-5], the recognition of a CRFS initiative's efforts is still lagging. For this reason, **the FoodE project aims to facilitate the process of recognizing the sustainability efforts of European CRFS initiatives by developing a certification for sustainable CRFS.**

Following Starr and Roderick's definition of certification processes [6], the formal certification of a sustainable CRFS must identify to what extent the sustainability of the CRFS complies with a set of criteria and communicate the adherence to these standards. In fact, some of the existing food certifications (e.g. organic food) have resulted in higher levels of trust in the certified product among consumers [7]. However, building trust not only depends on the certification but also the trustworthiness of the food system [8]. Here, a critical issue can be the credibility of the certified results and the causal effects of the certification on sustainability [9]. Consequently, certifications need measurable indicators that can give an overview show their progress towards sustainability benefits [9]. The challenge here is to combine sustainability performance with the accessibility of the certification to both initiatives and consumers. Therefore, certification criteria need to be easily measurable by the interested CRFS and easily understood by the consumer or user of the CRFS initiative.

For all these reasons, **the FoodE project defined certification criteria for sustainable CRFS based on a science-based approach combined with citizen engagement methods.** This deliverable presents the methodology used to define a label for local and sustainable CRFS initiatives (CRFSI) as well as the resulting certification proposal.

1.1. WP5 Structure

The FoodE project aims to develop a robust, consistent, and science-based methodological framework to assess CRFSI and a dedicated analytical tool to facilitate participatory decision-making for the development of innovative business models and their replication beyond the setting of the project. The main objective of WP5 “Business models and validation of CRFS” is the classification of CRFSI and validation of the assessment tool and identification of standard KPIs of CRFSI sustainability measures.

To achieve this objective, the CRFS business models were initially identified, validated, and organized (T5.1). Subsequently, a simplified dataset of KPI tailored for the development of innovative business models was developed, primarily based on WP2 and WP4 data inputs (T5.2). This set of KPIs were then tested and validated through the implementation of a multi-survey tool aimed to assess the usefulness, ease of measurement/data collection, and comprehensibility for three target stakeholder groups such as owners/members of CRFS, users of CRFS and individuals from higher education and research centers, the public administration, and non-profit bodies (T5.3.). Based on the KPIs investigated in the online survey tool, this deliverable presents the definition of a new certification targeting sustainable CRFS in compliance with certification standards.

2. Methodology

To define the new certification for sustainable CRFSI, several steps and methodological approaches were followed (see Figure 1). First, a systematic review of peer-reviewed articles and grey literature was conducted to identify existing European food labels and certifications along with their main features. Following this initial screening, a participatory approach was adopted to engage stakeholders in the co-development of the methodology through focus group. The first focus group was held in April 2023 at the FoodE GA in Paris to gather information on existing certifications in relevant

geographical areas, while the second one was held at the FoodE GA in Bleiswijk. This last focus group aimed to collectively determine the principles and sustainability criteria of the proposed certification with the entire consortium (2.2).

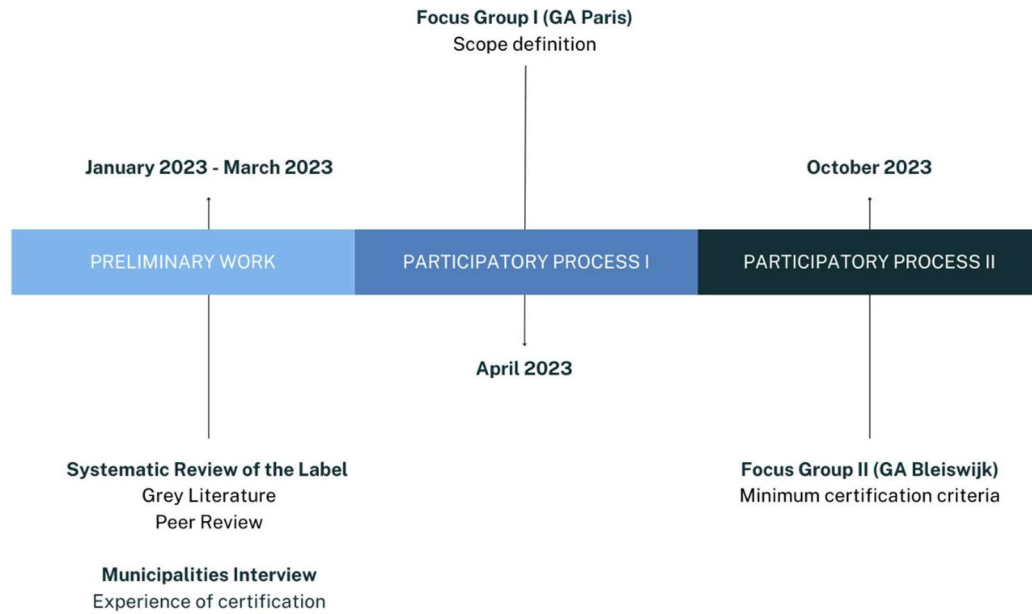


Figure 1. Timeline of the FoodE Label development process

2.1. Systematic Review of European Food Certifications

Using a comparative framework methodology, the first step to define the new certification was to evaluate the existing European food labels and certifications and their relationship to CRFSI. To compile a comprehensive list of food certifications and labels, environmental standardization bodies, such as the International Social and Environmental Labeling Alliance [10] and the International Federation of Organic Agriculture Movements [11] were consulted, focusing on European schemes. Moreover, official databases, websites, and directories, such as Ecolabel Index [12], Control Union [13], Verbraucherzentrale [14], Organic and Your Health [15] and the International Directory of Organic Food Wholesale & Supply Companies [16] were used. To ensure that the consistency of reviewed certifications with CRFSI scope, the search was filtered by food safety and related agricultural practices such as organic, biodynamic, extensive, urban agriculture, peri-urban agriculture, proximity agriculture, regenerative agriculture, traditional (preserving local food heritage and authenticity) and commercial horticulture in urban and peri-urban agriculture.

Particular attention was paid to food labels adhering to the European Union standards, as the FoodE certification needs to be built on existing regulations and standards. These include Regulation (EC) No. 834/2007, which pertains to organic production and labeling of organic products; Regulation (EU) No. 1151/2012, which safeguards geographical indications and designations of origin for agricultural and food products within the EU; and Regulation (EU) No. 1308/2013 that outlines measures for agricultural market management, farmer support, and supply-demand equilibrium. Adhering to ISO standards, eco-labels were evaluated as either regulated (Type I and Type III) or unregulated (Type II), depending on their third-party validation status.

To understand the potential applicability of existing schemes to CRFS, two main features were delved: (i) the value chain coverage and (ii) the certification framework. Since the definition of “local” varies depending on the geographical context, the scope was defined to include all processes or actors within the value chain of a CRFS. By doing so, three types of scopes we identified: 1) food production, 2) from food production to retail, and 3) from production to services. Figure 2 shows the number of labels included in each scope category along with illustrative cases.

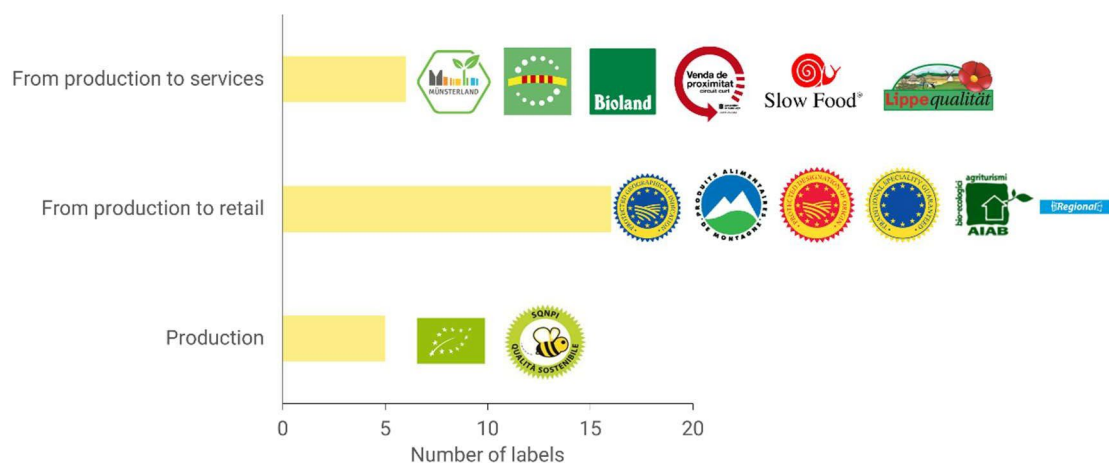


Figure 2. Number of certifications included in each scope category along with illustrative examples from the European Union, Spain, Germany, and Italy (n=23)

The second feature of interest was the certification model. The analysis of the certifications shed light on two different ways of certifying the value chain of a food system. In model I, the entire value chain is covered under a single certification, such as the “Slow Food” (Spain) or “Münsterland” (Germany) labels, which certify from production to services. In contrast, model II is based on an accumulation of certifications

along the supply chain. For instance, if a service provider such as a local restaurant aims to obtain the Catalan environmental quality certification (“Distintiu de Garantia de Qualitat Ambiental”), it must offer a certain amount of food products with the EU label for organic products and/or a protected designation of origin. Based on the certification model and value chain coverage, a set of participatory processes were conducted to discuss to adapt and apply existing schemes to sustainable CRFS.

2.2. Participatory Approach for the definition of the Characteristics of the Certification

During the elaboration of the FoodE certification, semi-structured interviews (2.2.1.) and focus group discussions were conducted to include the multiple perspectives and interests of the stakeholders (2.2.2).

2.2.1. Semi-structured Interviews

The semi-structured interviews were conducted in collaboration with the municipalities included in the FoodE consortium, such as the municipalities of Lansingerland (The Netherlands), Bologna (Italy), Sabadell (Spain), and Naples (Italy). The objective of the interviews was to identify certifications applicable to local and sustainable initiatives within the municipalities and assess the actors’ interest in the implementation of a new certification. The interviews, lasting between 30-45 minutes, were conducted online with one or more municipal representatives.

2.2.2. Focus Group Discussions

The focus group discussions took place during two General Assemblies of the FoodE project in Paris, France (April 2023), and Bleiswijk, The Netherlands (October 2023). These sessions were instrumental for delving into diverse perspectives, yielding valuable insights, and gaining a profound understanding of participants' attitudes, opinions, and experiences. They facilitated interactive dialogue, enabling the discovery of nuanced insights that may be challenging to capture through alternative research methods.

In the Paris focus group discussion, the objective was to delineate the life cycle stages (i.e., value chain coverage) to be certified by the FoodE Label, its target, and its territorial scope. The one-hour workshop commenced with key insights on the outcomes of the review of certifications (see Section 2.1). Subsequently, the FoodE consortium was

divided into four groups (three in person and one online) to deliberate on these aspects. Each group, comprising 7-9 individuals, discussed each question for 10 minutes. Following internal group discussions, participants voted for the most suitable answers through dot voting. Online participants utilized a [Google Form questionnaire](#) for their responses. The participatory process involved a total of 34 participants.

The conclusive outcome of the focus group discussion indicated that the FoodE Label needed to encompass all stages of the value chain, including primary production, processing, retail, and food service. The certification target was to cover commercial initiatives, projects endorsed by public and private institutions, and non-profit initiatives. Ultimately, the chosen geographical scope was the region, defined consistently across European countries as NUT2 territories according to Regulation (EC) No 1059/2003 of the European Parliament and of the Council, dated May 26, 2003. This applies accordingly to the countries' administrative units or divisions, e.g. territorial level corresponds to "provinces/provinces" in Belgium, "comunidades autónomas y ciudades autónomas" in Spain, "régions" in France, and "Länder" in Austria.



Figure 3. Discussion groups at the FoodE certification workshop in Paris.

The second group discussion held in Bleiswijk aimed to establish the threshold or minimum criteria for certification attainment. In preparation for this session, the Task leaders developed a comprehensive list of KPIs applicable to CRFS. This list was based on the outcomes of WP2 and Task 5.3. This means that the KPIs are the result of a consolidated sustainability scoring system (WP2) that follows a science-based approach to cover the three pillars of sustainability (environmental, economic, and social). The scoring system was refined to only include those KPIs that key stakeholders determined to be measurable and accessible (Task 5.3). The focus group discussion served to determine the minimum score that a CRFS should obtain in each KPI category to be

awarded the certification. To facilitate the process, the Task leaders provided an initial set of threshold criteria for the 34 indicators that the participants could evaluate in advance.

The activity spanned two hours and comprised three parts: introduction, determination of the minimum threshold for pillars, and determination of the minimum threshold for indicators. After a brief recap of decisions made in the Paris General Assembly and an overview of the scoring system, participants were asked how many pillars should surpass the minimum threshold to grant the FoodE Label to an initiative. Before voting, the pros, and cons of implementing a more or less restrictive certification were presented, followed by a brief debate. Voting took place through Mentimeter, utilizing a QR code or code input for participant engagement. This resulted in the decision to include all three pillars to restrict the certification to initiatives with high scores in the environmental, economic, and social pillars.

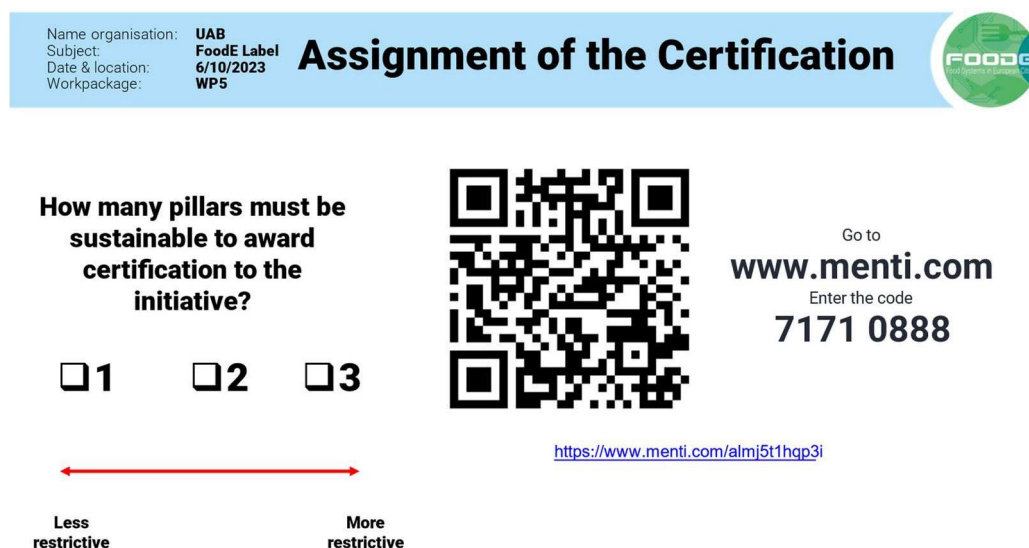


Figure 4. Mentimeter Votation to define the minimum number of pillars that exceed the minimum thresholds proposed by the FoodE Project

The decision regarding the minimum threshold in the different KPIs was made through a focus group discussion by dividing the consortium members into 4 groups (2 in-person and 2 online) of approximately 5-7 people. Two moderators were included in each group to ensure the contribution of all group members and to take notes for the final conclusions. To facilitate the discussion, each group discussed a specific pillar such as: (1) environmental KPIs for primary production stage; (2) environmental KPIs for processing, distribution, and food service stages; (3) social KPIs, and (4) economic KPIs. To collect information from each consortium member, an [online questionnaire](#) (also available in

PDF format in **Annex 1**) was circulated. Survey participants were asked to express their opinion on the minimum standards required to obtain the certification, specifically indicating whether the standards should be less strict (-1), stricter (+1), or if they agreed with the current threshold (0).



Figure 5. Focus group discussion regarding the minimum certification criteria in Bleiswijk.

3. Results

This section outlines the characteristics of the certification developed within the FoodE project. It covers the description of the objective (3.1), introduction of terms and definitions (3.2), presentation of KPIs (3.3), explanation of the scoring system (3.4), and details on the certification process (3.5). Finally, successful stories validating the FoodE Label are shown (3.6).

3.1. Objectives

The FoodE Label aims to identify local and sustainable CRFS initiatives that are generating positive impact at a regional level. Sustainability is assessed by considering the environmental, social, and economic pillars of sustainability. The certification standard has been designed for both commercial initiatives, and projects carried out by non-profit initiatives such as investigation centers, NGOs, associations, schools, and public institutions involved within local food systems. The FoodE Label is particularly designed for small-scale initiatives producing, handling, processing, distributing, and serving at the regional level.

3.2. Terms and Definitions

Element	Definition
Food system	The entire range of actors and activities involved within the production, aggregation, processing, distribution, consumption, and disposal of food, and the broader economic, social, and natural environments in which they are embedded.
Small scale	Refers to a system or operation that is characterized by limited scale, scope, or production capacity. In the context of agriculture, small- scale farming typically involves lower quantities of output and a focus on local markets.
Value chain	The primary production segment includes the production of food staples destined to processing or directly to final consumption; (2) The processing of agricultural staples segment refers to the first processing of agricultural staples producing ingredients mainly destined to further processing in the food industry; (3) The food processing and packaging segment is concerned with production and packaging of food products for consumers; (4) The wholesale and logistics segment relates to the activities of wholesaling of food products, including storage and transportation; (5) The retail and markets segment embraces the selling of food to consumers in supermarkets, shops and marketplaces; (6) The food services segment is related to the preparation of meals and dishes consumed outside the home; (7) The households segment refers to the preparation and consumption of food at home.
Horticulture	Describes the activities necessary for cultivating fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds. Horticulture involves the entire process of plant growth, from planning and planting to nurturing and harvesting.
Horticulture (Low Tech)	Involves traditional and less technologically intensive methods of cultivation. Examples include urban allotment gardens, extensive farms, and urban community gardens. These approaches often rely on manual labor, basic tools, and natural environmental conditions for crop production.
Horticulture (High Tech)	Involves advanced and technologically sophisticated methods of cultivation to optimize efficiency and resource use. Examples include vertical farms, rooftop farms, and greenhouse farms. High-tech horticulture incorporates innovations such as controlled environments, precision agriculture, and advanced automation to enhance productivity and sustainability.

Cereal	A plant cultivated for its edible components, primarily the starchy seeds known as grains. Common cereals include wheat, rice, maize (corn), barley, oats, and rye.
Oilseed	Crops primarily grown for edible oil for human consumption, livestock feeds, pharmaceuticals, biofuels, and other oleochemical industrial uses. Common oilseeds include soybean, rapeseed, sunflower seed, peanuts, palm tree and cotton.
Animal Husbandry	The branch of agriculture that involves the breeding, care, and management of domesticated animals, particularly livestock. It encompasses practices related to breeding, feeding, healthcare, and the overall well-being of animals.
Fishery	The industry or activity of catching, processing, and selling fish or other aquatic organisms for human or animal consumption. It includes both marine and freshwater environments and involves various methods such as fishing and aquaculture. a diversity of gears and techniques. Conventionally it is divided between small-scale and large scale.
Aquaculture	The breeding of aquatic organisms, such as fish, shellfish, and aquatic plants, in a controlled environment or in the natural environment. Aquaculture is conducted for commercial and conservation purposes.
Beekeeping	Also known as apiculture, it is the maintenance of bee colonies, usually in hives, by humans. Beekeeping is primarily practiced to produce honey, beeswax, and other bee-related products and services, as well as for pollination purposes in agriculture.
Sustainability assessment	The sustainability assessment adopts a hierarchical framework. At the primary level, the three dimensions of sustainability—environmental, economic, and social—are delineated as foundational pillars. Each pillar, in turn, comprises distinct impact categories that encapsulate specific facets of the overarching dimension. Moreover, these impact categories are further subdivided into key performance indicators. This hierarchical structure facilitates a comprehensive and nuanced evaluation of the initiatives' impact on sustainability across its dimensions.

3.3. FoodE Vision

FoodE's key vision is to accelerate the growth of citizen-led CRFSI and create related innovative and inclusive job opportunities at local level. It builds on a multi-stakeholder approach, bringing together local technological and social innovation initiatives across Europe, co-developing, and disseminating a range of practices and tools, including an online device-friendly app, fostering international and open actions for co-design and co-implementation, and initiating a series of participatory events across EU cities.

Within this vision, the FoodE Label seeks to help consumers make informed decisions about the products they purchase and to support the implementation of policies to develop local food systems. The certification scheme outlined in WP5 not only involves the classification of CRFS and validation of the assessment tool but also sets objectives to identify, validate, and classify innovative business models, select KPIs for sustainability, and create a multi-user online survey tool. Building on the WP2 sustainability assessment, the FoodE label further defines compliance with certification standards derived from the T5.2 online survey tool's KPIs.

3.4. Certification Framework

CRFS initiatives sustainability refers to on environmental, social, and economic dimensions. Each pillar comprises a series of impact categories (IC) derived from the state-of-the-art sustainability assessment and the results of the WP2 Extended LCA, LCC, and S-LCA. These ICs remain consistent across initiative types, while the KPIs composing them vary to ensure a sector- and stage-specific assessment. In this way, the certification enables the inclusion and comparison of diverse initiatives characterizing the local food system.

Table 1, 2, and 3 show the IC, KPIs, and units of measure for the three pillars, divided by value chain stage and product type. The value chain steps included in the certification encompass primary production, food processing (e.g., the transformation of agricultural products into food), food distribution (e.g., wholesale, retail, community-supported agriculture), and food service (e.g., catering, cooking, restoration). The primary production types are categorized into animal products and plant products. Among animal products, livestock farming (L), e.g. meat, eggs, and milk, honey production, and fishery

(F) have been considered. Regarding plant products, cereal, and oilseed production, also called Arable Farming (AF), and horticulture production for human consumption were included. Due to differences in resource usage, a further distinction was made in the plant production group, categorizing them into low-tech systems (LTH), i.e. soil-based and open-air farming such as organic farms and community gardens, and high-tech systems (HTH), i.e. soilless production with the use of sensors, such as vertical farms and integrated rooftop agriculture.

In the environmental pillar, ICs pertain to i) food production supply and resource use efficiency (EnvIC1), ii) waste management and circularity (EnvIC2), and iii) logistic (EnvIC3). KPIs and units of measurement can be found in the three parts of Table 1 for plant production (Table 1a), animal production (Table 1b), and supply chain (Table 1c). EnvIC1 for plant production involves indicators related to resource utilization for biodiversity conservation. For resource use in soil-based systems like LTH and AF, indicators encompass crop rotation and soil management, while HTH systems focus on energy type and practices to reduce energy use. Additionally, all plant-product initiatives include water usage indicators. Biodiversity conservation indicators involve reducing pesticide use and practices for wild species and genetic heritage preservation. On the other hand, EnvIC1 for animal production considers feed origin, husbandry type, and local breed use for L and fishing gear type, fishing area, feed composition, and protein origin for F. EnvIC2 addresses waste production and measures for waste reduction or reuse. Plant production and supply chain initiatives include indicators related to organic biomass management. Indicators for using strategies to reduce food waste are included in supply chain initiatives. An indicator assessing the composting degree or recyclability of packaging is included for all initiatives. Lastly, EnvIC3 focuses on food logistics from suppliers to consumers, including indicators related to the distance between producer and customer/consumer and the type of transport used by both the supplier and the customer.

In the economic pillar, ICs concentrate on i) overall profitability and the outlook of the business (EcoIC1), ii) customer focus (EcoIC2), and iii) the integration of CRFSI into the local economy (EcoIC3) (Table 2). EcoIC1 involves indicators concerning liquidity planning, business profitability disclosure, and equity ratio usage. EcoIC2 considers factors such as customer loyalty and the initiative's offerings. EcoIC3 applies only to initiatives involved in processing, commercializing, and distributing products, focusing on product origin and the type of relationship with suppliers.

Finally, for the social pillar, ICs focus on i) job creation at the CRFSI level and ii) Community outreach, engagement & education (Table 3). SocIC1 considers workforce composition and gender equality. SocIC2 examines the direct social impact, including stakeholder engagement, volunteer involvement in activities, and the frequency of events throughout the year.



Table 1. Impact categories related to the Environmental pillar.

Table 1a presents the Environmental Impact Categories (EnvIC), and their Key Performance Indicators (KPI) with its unit for the Arable Farming (AF), Low tech horticulture (LTH), and High-tech horticulture (HTH) initiatives.

Impact category	Code	Key Performance Indicators	Code	Description	Unit	LTH	AF	HTH
Food production and resource efficiency	EnvIC1	Crop rotation	EnvKPI1	Number of rotations higher than that defined by the Common Agricultural Policy(i.e. rotation every two year)	Y/N	x	x	
		Soil organic matter	EnvKPI2	Best practices used to increase soil organic matter	List of best practices	x	x	
		Energy use in the production system	EnvKPI3	List of best practices to reduce energy use	List of best practices			x
		Energy source	EnvKPI4	Typology of energy used	Renewability degree			x
		Water saving practices	EnvKPI5	Best practices used to decrease the use of water	List of best practices	x	x	x
		Reduce impact of pesticides	EnvKPI6	Best practices used to reduce the use of pesticides	List of best practices	x	x	x
		Preserve wildlife	EnvKPI7	Best practices used to preserve wildlife	List of best practices	x	x	x
Waste management and circularity	EnvIC2	Biomass management	EnvKPI15	% of biomass composted/ energy valorized	Degree of biomass composted/energy valorized	x	x	x
		Packaging and materials recyclability and compostability	EnvKPI16	The usage of composable and recyclable packaging and materials.	Recyclability and compostability degree	x	x	x
Logistic	EnvIC3	Distance from clients/customers	EnvKPI18	The distance between the initiative and key clients/customers	Range of distance(Km)	x	x	x
		Type of transport to clients/customers	EnvKPI20	Use of no-electric fossil fueled vehicles	Y/N	x	x	x



Table 1b presents the Environmental Impact Categories (EnvIC), and their Key Performance Indicators (KPI) with its unit for the Animal Husbandry(L) and Fishery and aquaculture (F) initiatives.

Impact category	Code	Key Performance Indicators	Code	Description	Unit	L	F
Food production and resource efficiency	EnvIC1	Composition of feed	EnvKPI8	Integration of natural food in the composition of the meal	Y/N		x
		Origin of the protein	EnvKPI9	Use of alternative protein origin	Y/N		x
		Fishing Gear types	EnvKPI10	Gear types used for the fish produces, managed or sold	Typologies of gear types		x
		Fishing area	EnvKPI11	Declare that the size of the boat is less than 12 metres	Y/N		x
		Feed origin	EnvKPI12	Declare that the animal feed comes from the region	Y/N	x	
		Typology of animal husbandry	EnvKPI13	Declare that the animal are bred using the free-range method	Y/N	x	
		Ancient/local breed	EnvKPI14	Use of ancient/local breed	Y/N	x	
Waste management and circularity	EnvIC2	Packaging and materials recyclability and compostability	EnvKPI16	The usage of composable and recyclable packaging and materials.	Recyclability and compostability degree	x	x
Logistic	EnvIC3	Distance from clients/customers	EnvKPI18	The distance between the initiative and key clients/customers	Range of distance(Km)	x	x
		Type of transport to clients/customers	EnvKPI20	Use of no-electric fossil fueled vehicles	Y/N	x	x



Table 1c presents the Environmental Impact Categories (EnvIC), and their Key Performance Indicators (KPI) with its unit for the initiative related to the processing (PR), commercialization (R), and distribution (FS) of the product.

Impact category	Code	Key Performance Indicators	Code	Description	Unit	PR	R	FS
Waste management and circularity	EnvIC2	Biomass management	EnvKPI15	% of biomass composted/ energy valorized	Degree of biomass composted/energy valorized	x	x	x
		Packaging and materials recyclability and compostability	EnvKPI16	The usage of composable and recyclable packaging and materials.	Recyclability and compostability degree	x	x	
		Food waste	EnvKPI17	Best practices used to reduce food waste	List of best practices	x	x	x
Logistic	EnvIC3	Distance from clients/customers	EnvKPI18	The distance between the initiative and key clients/customers	Range of distance(Km)	x	x	
		Type of transport of the supplies	EnvKPI19	Use of no-electric fossil fueled vehicles	Y/N	x	x	x
		Type of transport to clients/customers	EnvKPI20	Use of no-electric fossil fueled vehicles	Y/N	x	x	



Table 2. Impact categories related to the Economic pillar and their Key Performance Indicators (KPI) with its unit for the initiative related to the cereal and oilseed production (AF), Low tech horticulture (LTH), and High-tech horticulture (HTH) initiatives, the Animal Husbandry(L) and Fishery and aquaculture (F) initiatives, and the processing (PR), commercialization(R), and serving (FS) of the product.

Impact category	Code	Key Performance Indicators	Code	Description	Unit	LTH	AF	HTH	L	F	PR	R	FS
Business sustainability	EcoIC1	Liquidity planning	EcoKPI1	Realize a liquidity planning once a year	Y/N	x	x	x	x	x	x	x	x
		Balance sheet	EcoKPI2	Declare that the revenue been grater than cost in the last three year	Y/N	x	x	x	x	x	x	x	x
		Equity ratio	EcoKPI3	Knowledge of equity ratio	Y/N	x	x	x	x	x	x	x	x
Customer orientation	EcoIC2	Target audience	EcoKPI4	Use of customer retention strategy	Y/N	x	x	x	x	x	x	x	x
		Unique selling proposition	EcoKPI5	Having a unique selling proposition	Y/N	x	x	x	x	x	x	x	x
Supply chain sustainability	EcoIC3	Type of supplier	EcoKPI6	% of products coming from the region(Kg)	Degree of product coming from the region						x	x	x
		Relationship with supplier	EcoKPI7	Declare that they do not carry out grey unfair practice with suppliers	Y/N						x	x	x



Impact categories related to the Social pillar and their Key Performance Indicators (KPI) with its unit.

Impact category	Code	Key Performance Indicators	Code	Description	Unit
Job (quantity, quality, diversity)	SocIC1	Contract typology	SocKPI1	The prevalent typology of contracts within the organization	Degree of fixed term contracts
		Gender equality	SocKPI2	Share of female waged employees over the total number of employees	% of females waged
Community outreach, engagement & education	SocIC2	Volunteering activities	SocKPI3	Involvement of community people in volunteering activities	Y/N
		Frequency of events	SocKPI4	Frequency of events organised by the initiative for the local community.	Frequency /year
		Target of the events	SocKPI5	Typology of the stakeholder involved in the events	List of stakeholders

3.5. Sustainability Scoring System

The Sustainability scoring system resulting from the described process is detailed below. The requirements for the scoring system are both to allow a rapid quali-quantitative appraisal for the evaluation of CRFSI, and to develop it both for the use by experienced practitioners and by non-practitioners for a generic analysis and understanding.

This scoring system is consistent with the one used in WP 2 for assessing the sustainability of food system initiatives and published by Cirone et al. 2023[17]. This choice was made in order to maintain the same framework for analyzing the impacts of food system initiatives.

To move each KPIs into metrics these were translated into two types of questions:

- Binary question (yes/no), where the no option corresponds to the least sustainable working practice (0 points), and the yes option to the most sustainable one (4 points).
- 5-points Likert scale with 5 options as answers. The options correspond to a score going from the least sustainable solution (0 point) to the most sustainable solution (4 points).

Given the necessity to build a scoring system applicable to a large set of CRFSI, active in very different segments of the food supply chain, were included among answer the option of 'I do not produce, manage or sell'. The KPIs with the different responses per step of the value chain and product type are included in an [online survey](#) (PDF version also available in **Annex 2** (Plant production), **Annex 3** (Animal Livestock and Fishery), **Annex 4** (Processor, Retail and Food Service)).

The FoodE consortium defined that all pillars must receive a positive assessment to award the certification to a CRFS. A favorable evaluation of the pillar occurs when a minimum of 50% of the ICs surpass the threshold established by the FoodE project. The minimum threshold for the ICS is determined by ensuring that the cumulative scores of KPIs reach or exceed half of the maximum score. The maximum score is calculated based on the questions the initiative can answer, excluding those indicating the option "I do not produce, manage, or sell". For instance, if a category consists of four indicators, the

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maximum total is 4x4 points, 16 points, and the initiative must score at least eight points to achieve a positive assessment.

In cases where an initiative involves multiple activities along the value chain, such as production and sales, it is necessary to complete and demonstrate positive results for both production and sales activities to be eligible for certification. In this way, certification enables identifying individual initiatives and entire supply chains that generate a positive impact locally. Table 4 shows an example for the social pillar. For this case, the pillar is composed by two ICs such as Job creation and community outreach. Each IC is composed by several KPIs, in particular, Job creation is composed by two KPIs and Community Outreach by three KPIs. Finally, for each KPIs are indicated the different options eligible by the initiative.



Table 4. Example of sustainable Scoring system framework for the social pillar

Pillar	Impact Categories	Key Performance Indicators	0	1	2	3	4
SOCIAL	SocIC1	Which contract type have you arranged with your waged employees?	Less than 10% fixed term	Between 10-30% fixed term	Between 30-60% fixed term	Between 60-80% fixed term	More than 80% fixed term
		What is the share of female waged employees over the total number of employees?	<10%	11-20%	21-30%	31-40%	>40%
	SocIC2	Do you involve people from your communities in any volunteering activities?	No				Yes
		What's the frequency of events (either in person or online) organized for the local community?	Less than 5/year	6-10 /year	11-15/year	16-20/year	More than 24/year
		Does your initiatives organise activities for (1) disadvantaged people or at risk of exclusion(i.e.prisoners, immigrants, people with disabilities) of your community (2) kids (<18 years old) (3)Elders and retired people (4) household with children?	No	Yes for 1 of the target	Yes, for two of the target	Yes, for three of the target	Yes, for all of the target

3.6. Certification Process

The uniqueness of the FoodE certification lies in its evaluation approach. It considers the social, environmental, and economic impacts of a single or a group of initiatives operating within a specific food product or sector in a region. Therefore, this label will reward collaboration within the supply chain (that is, from producers to retailers or service-oriented activities) and will be accessible to all kinds of initiatives (for instance, small, medium, large, commercial, or non-profit initiatives). The members of Task 5.4, on behalf of the FoodE project consortium, will be responsible for the management and allocation of certification. In particular, the Task leader UAB will be responsible for the data collection and scoring calculation to determine whether an initiative can or cannot obtain the FoodE Label.

To initiate the certification process, an initiative must be registered in the FoodE App and participate in an exploratory interview with to collect the necessary data. To obtain and maintain the label, the initiative must provide up-to-date data to ensure the accuracy and reliability of the information throughout the certification period (see Figure 6). Subsequently, a thorough data analysis will be conducted, evaluating the criteria outlined within the label, leading to the subsequent certification.

Upon obtaining the certification, it will remain valid for three years, with an annual audit of the initiative and subsequent monitoring of sustainability indicators. As for the data collection and scoring calculation, the annual audit will be performed by the members of Task 5.4, on behalf of the FoodE project consortium. By promoting a certification system that values transparency within the food system, the FoodE Label will offer consumers valuable insights into the products they buy and empower them to make informed choices that align with their values and preferences. Further information related to the business model and exploitation intentions after the end of the project of the FoodE Label are available in the deliverable D7.20-FoodE Exploitation Plan.

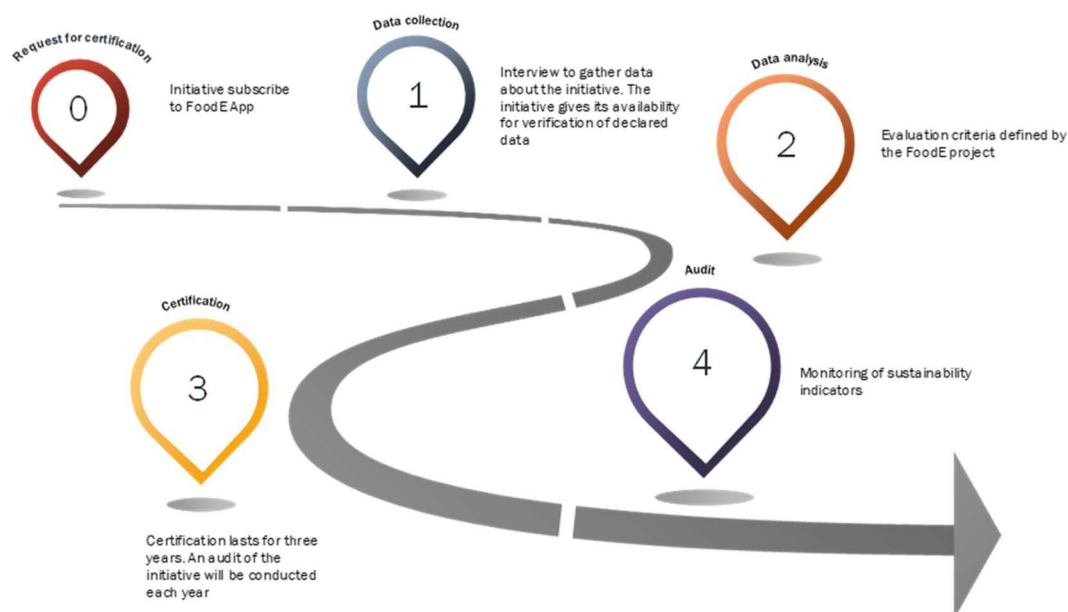


Figure 6. Description of the process to obtain the FoodE certification.

3.6. Successful stories certified by the FoodE Label

In line with the Grant Agreement objectives, the FoodE project's certification underwent different tests across diverse initiatives within the food system. Specifically, nine initiatives among the FoodE project pilots participated in the online survey. The UAB team, acting as Task leader T5.4, analyzed their responses and scores.

FoodE certification was awarded to ten initiatives out of which eight of primary production initiatives, one engaging in both production and sales, and one associated with the food service phase. Table 4, 5 and 6 displays scores across different KPIs for initiatives with the FoodE Label. Detailed results for the ICs and KPIs for individual initiatives are presented in **Annex 5**.

Among the primary production initiatives, six vegetable-producing endeavors received certification, including 4 HTH and 2 LTH initiatives (Table 4), along with two fisheries-related initiative (Table 5). High Tech vegetable initiatives include an experimental vertical farm in the University of Almamater Studiorum of Bologna (Alma VFarm, Italy), a vertical farm with natural light and smart climate control that selling the products to a restaurant in the same building(The Cité Maraîchère, France), and two aquaponic systems

for combined vegetable and fish production for educational and productive purpose (Metabolic Institute, Netherlands, and Serra Madre, Italy).

For Low Tech systems, two initiatives producing organic vegetables and traditional varieties in the peri-urban area were considered: Can Gambus, located in the Sabadell agricultural park, Spain, catering to small retailers, and Salus Space, Italy, an innovative project integrating refugees into local communities while producing and selling vegetables in the peri-urban area of Bologna, Italy. The production systems adhere to organic principles even without official certification and employ an integrated pest management approach to minimize the use of pesticides. Additionally, various practices are implemented to reduce water consumption, such as the use of resistant varieties, drip irrigation system, mulching, and cultivation using intercropping techniques. The Salus Space initiative has obtained certification not only for production but also for the sale of its products. Indeed, this initiative sells the product in bulk, without the use of packaging, to consumers within the province of Bologna. The product is primarily sold through the box scheme, a sales system where consumers pay a weekly fee to receive a variable quantity of product based on field availability, reducing waste within the chain. Additionally, numerous events are organized within the space, targeting both families and children, aimed at promoting sustainable and local productions, as well as the inclusion of individuals in volunteer activities.

In the fisheries sector, two different initiatives located in the Canary Islands, Spain, have received certification promoted by the FoodE project. ISLATUNA, focused particularly on tunas, and Pescaestinga, are two small-scale fishery initiatives that target local fish varieties. Thanks to the intervention of the ECOTUNIDOS initiative, promoted by the University of La Laguna, both organizations have expanded their local market by selling to school canteens situated in the Canary Islands. Lastly, CUIB, Romania, a restaurant selling local products, would obtain the certification for its integrated strategies focusing on zero waste, energy transition, and solidarity food services, in collaboration with food banks. This restaurant sources its ingredients both from an on-site garden and various local producers. Specifically, CUIB aims to minimize losses at the primary production level by purchasing products with non-commercial aesthetic characteristics and structuring its menu based on product availability in the field, thereby reducing the quantity of unharvested produce.



Table 5. Score of the KPIs for High Tech Horticulture and Low-Tech Horticulture initiatives that could be certified with the FoodE Label

Pillar	Environmental											Social					Economic				
IC	EnvIC1							EnvIC2		EnvIC3		SocIC1		SocIC2			EcoIC1			EcoIC2	
KPI	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 6	KPI 7	KPI 15	KPI 16	KPI 18	KPI 20	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5
<i>Alma VFARM</i>			2	4	4	4	4	0				2	4	0	4	3	4	4	4		
<i>Metabolic Institute</i>			0	4	4	4	4	4				4	4	0	4	2	4	4	4		
<i>The Cité Maraîchère</i>			2	0	4	2	2	0				4	4	4	4	3	4	4	4		
<i>Serra Madre</i>			2	0	4	4	2	0				2	2	0	4	3	4	4	4		
<i>Can Gampus</i>	4	3			3	2	2	4				2	0	4	4	4	4	4	0		
<i>Salus Space</i>	4	4			2	4	4	2	0	4	0	2	4	4	4	4	0	0	0	4	4



Table 6. Score of the KPIs for fishery initiative that validates the FoodE Label

Pillar	Environmental					Social					Economic				
IC	EnvIC1		EnvIC2	EnvIC3		SocIC1		SocIC2			EcoIC1			EcoIC2	
KPI	KPI 10	KPI 11	KPI 16	KPI 18	KPI 20	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5
<i>Islatuna</i>	4	4	0	4	0	4	0	0	4	2	0	4	4	4	4
<i>Pescarestinga</i>	4	4	0	4	0	2	0	0	3	2	0	3	2	4	4

Table 7. Score of the KPIs for food service (CUIB) and retail (Salus Space) initiatives that validate the FoodE Label

Pillar	Environmental						Social					Economic						
IC	EnvIC2			EnvIC3			SocIC1		SocIC2			EcoIC1			EcoIC2		EcoIC3	
KPI	KPI 15	KPI 16	KPI 17	KPI 18	KPI 19	KPI 20	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 6	KPI 7
<i>CUIB</i>	0		4	4	0		4	4	4	4	2	0	0	4	4	4	4	4
<i>Salus Space</i>	4		2	4	0	0	2	2	4	4	3	0	0	0	4	4	4	4

3.7 Certifying through the FoodE App

As an extension of WP3, we continued working in a parallel way on the improvement of the FoodE App. In this sense, the features that were included in the latest version (FoodE App v6), were developed, and implemented. Some enhancements from the previous version (v5) encompassed the addition of the functionality to remove administrators from the back-office, the resolution of issues on small-screen mobile devices related to pop-ups in the app, and the introduction of a reminder pop-up mechanism to prompt users to submit reviews after completing a visit, allowing them the flexibility to do so immediately or at a later time. The pop-up serves as a convenient reminder for users with pending visit reviews and provides guidance on how to access them. Furthermore, efforts were directed towards updating the privacy policy of the app, and preparations have also been made for the deployment of the updated FoodE App to various markets, ensuring compatibility with both Android and iOS platforms.

Concerning the FoodE Label, a new category for CRFS has been designed for the FoodE App, distinct from the established green (verified initiatives) and yellow categories (identified initiatives). This new category, termed "Certified Initiatives," can be directly activated by the app's administrator and it is specifically designated for CRFS that have obtained the FoodE Label. Integrated into the app's filters, it may also feature preferences. In the map view, the consideration of an alternative icon, different from the conventional drop-type icon, is underway, granting the FoodE logo to those CRFS that have the FoodE Label. Lastly, one of the features that has been designed is the integration of the FoodE Label within the FoodE App. This feature enables registered initiatives to complete the FoodE Label survey directly on the registration website. It streamlines the registration and certification process, providing easy access to the label.

4. Conclusion

The FoodE Label is based on a qualitative analysis to identify the adoption of best practices and implementing activities that positively impact CRFS. Consequently, the certification can pinpoint which CRFS positively impact the local food system, facilitating communication with users and helping in the development of customized.

policies to encourage the replication and expansion of sustainable practices. Through the development of the certification, sustainability thresholds have been identified to promote and recognize the efforts of local initiatives that positively contribute to the food system. These thresholds can be tailored according to the territory's characteristics and political interests, shaping the stringency of KPIs or certification attainment criteria. In this way, the certification can provide a solid foundation for developing targeted policies that can guide towards a more sustainable and resilient future.

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