COSTS AND BENEFITS OF FOOD SHARING IN BARCELONA

Voytenko Palgan, Yuliya; Sadovska, Vera; Mont, Oksana; Plepys, Andrius

DOI:
10.5281/zenodo.15006302

2025

CULTiVATE

COSTS AND BENEFITS OF FOOD SHARING IN BARCELONA

TABLE OF CONTENTS

1. TECHNICAL REFERENCES

Project Acronym	CULTIVATE
Project Title	CULTIVATE: Co-Designing Food Sharing Innovation for Resilience
Project Coordinator	Trinity College Dublin Anna Davies **daviesa@tcd.ie**
Project Duration	January 2023 – January 2026 (48 months)
Deliverable No.	N/A
Dissemination level*	
Work Package	WP 3 - Cost-benefit analysis of food sharing initiatives
Task	T3.1 - Costs, investments, challenges, drivers, and success factors to establish and maintain FSIs
Lead beneficiary	Partner number 11 (ULUND)
Contributing beneficiary/ies	N/A
Due date of deliverable	N/A
Actual submission date	N/A

*PU – Public, fully open, e.g. web (Deliverables flagged as public will be automatically published in CORDIS project's page)

SEN – Sensitive, limited under the conditions of the Grant Agreement

Classified R-UE/EU-R – EU RESTRICTED under the Commission Decision No2015/444

Classified C-UE/EU-C – EU CONFIDENTIAL under the Commission Decision No2015/444

Classified S-UE/EU-S – EU SECRET under the Commission Decision No2015/444

1.1. LIST OF TABLES

1.2. LIST OF FIGURES

2. INTRODUCTION

2.1. CULTIVATE PROJECT AND THIS REPORT

This report presents findings from the case study on food sharing in the city of Barcelona, Spain, which was performed as part of the project CULTIVATE: Co-designing Food Sharing Innovation for Resilience: https://cultivate-project.eu/ in December 2023 - May 2024. CULTIVATE (2023-2027) is a solution-based project funded under the European Union's Horizon Research and Innovation Programme, which seeks to create resilient and healthy urban and peri-urban (UPU) food systems under Grant Agreement No. 101083377. The CULTIVATE project involves 20 consortium partners: research institutes, municipalities, food sharing initiatives, communication specialists and art collectives.

The CULTIVATE project (Voytenko Palgan and Sadovska 2023) defines *food sharing* as collective acts around food across the food system, namely:

- growing or composting together,
- cooking and eating together,
- redistributing surplus food,
- sharing seeds, tools, food space and knowledge (see section 1.4).

This report contributes to Task 3.1 in Work Package (WP) 3 of the CULTIVATE project, which aims to investigate costs, investments, challenges, drivers, and success factors to establish and maintain urban and peri-urban food sharing initiatives (FSIs). This investigation builds on the conceptual framework, developed from a systematic literature review on food sharing and enriched with topics from several compatible disciplines (Voytenko Palgan and Sadovska 2023).

The framework contains six research themes around which this report is structured: food sharing business models, evolution and experience of FSIs, costs and investments, benefits and perceived value, challenges and risks, and drivers and success factors of food sharing. It was applied during the mobile research lab (MRL) in Barcelona to collect and analyse data on food sharing. An MRL is an innovative research method with roots in ethnography (Mont 2018). It is a collaborative process of conducting in-situ analysis by a research team that allows analysis of a study object – in our case, food sharing – in its context. The research protocol for the CULTIVATE project describes the MRL methodology for tracing costs, investments, challenges, drivers, and success factors to establish and maintain FSIs (Voytenko Palgan and Sadovska 2023). The methodology for the MRL in Barcelona is presented in Chapter 2 of this report.

The following sections set the scene on food sharing in Barcelona, providing an overview of the city, its food sharing profile and summarising core policies that affect food sharing in Barcelona.

2.2. OVERVIEW OF BARCELONA AND ITS FOOD SHARING PROFILE

Barcelona is the second largest city in Spain, hosting 1.6 million people in the city (Wikipedia 2024) and 3.3 million people in the metropolitan area (AMB, n.d.). Its population density is 16,000 inhabitants per square kilometre, making it one of the most densely populated cities in Europe (Wikipedia 2024). Barcelona is also the capital city of the autonomous community of Catalonia, one of 18 autonomous communities in Spain, which contributes nearly 19% to Spain's total Gross Domestic Product (GDP) (Davies 2017). It is a major seaport of Spain and an important centre of commerce, tourism, art, architecture, sports, science, and culture (Davies 2017).

The manual mapping of FSIs in WP2 of the CULTIVATE project resulted in 221 FSIs in Barcelona, of which FSIs redistributing surplus food dominated (77 FSIs or 35%) followed by growing FSIs (71 or 32%), multifunctional FSIs (41 or 19%), and cooking and eating FSIs

(32 or 14%) (CULTIVATE 2023). The average density is 7 493 inhabitants per FSI, with more populated districts Eixample and Gracia hosting a higher number of FSIs (Wu 2024). Among all FSIs, food (71%) and knowledge (54%) were the most shared resources, followed by sharing of skills (38%), land (28%), meals (21%) and compost (13%) (Wu 2024). The most popular modes of sharing included gifting (58% of all FSIs) and selling (51% of all FSIs), followed by bartering (11%) and collecting (5%) (Wu 2024).

2.3. POLICY LANDSCAPE AFFECTING FOOD SHARING IN BARCELONA

The coordination between the Barcelona City Council and the Metropolitan Area of Barcelona is organised through a non-profit association, the Barcelona Metropolitan Strategic Plan (Pla Estratègic Metropolità de Barcelona or PEMB) (PEMB, n.d.-b), which approves metropolitan strategic plans for the development of Barcelona metropolitan area. PEMB's current plan is ***Metropolitan Commitment 2030: A Strategy for the City of 5 Million*** (PEMB, n.d.-a). It envisions the development of the area based on eight missions. One of them is "healthy food", which aims "to ensure access to healthier and more sustainable food for everyone, everywhere", with a commitment to deliver 60% of the diet of the metropolitan population from local food by 2030 (PEMB, n.d.-a). The healthy food mission foresees three strategic actions (PEMB, n.d.-a): protected and managed agricultural areas (e.g., agricultural parks), local food exchange centres, and public purchase and incentives for collective dining facilities.

The City of Barcelona, in collaboration with PEMB and based on a wide participatory process, developed ***Barcelona Healthy and Sustainable Food Strategy for 2030*** (City of Barcelona 2022a) (Figure 1), which is a roadmap for the city's food policies containing nine goals grounded in 54 lines of action and 264 initiatives (City of Barcelona 2022b). The main objective of the strategy is to develop a food system based on more sustainable production and consumption and healthier diets. Its development included the participation of 1 053 representatives from the public administration, the private sector, academia, the public and the media (City of Barcelona 2022b).

Another policy relevant in the context of food sharing in Barcelona, developed in collaboration between the City of Barcelona and the city's social and solidarity economy community, is the ***2030 Social and Solidarity Economy Strategy*** (City of Barcelona 2022a). The Strategy was approved on 16 September 2020, followed by the City Agreement on 23 June 2021, which established the Joint Participation Space and the shared governance of the social and solidarity economy theme among the urban stakeholders (City of Barcelona 2021). The strategy builds on the principles of the UN 2030 Agenda and Sustainable Development Goals and outlines a roadmap for municipal policies and work by local actors on social and solidarity economy in Barcelona (City of Barcelona 2021).

Finally, the policy relevant to growing food together in Barcelona is the ***2019-2030 Urban Agriculture Strategy*** (City of Barcelona 2020). It promotes public and citizen initiatives to increase and improve urban agricultural areas and advance agroecology (Abril Janer 2023). Urban gardens are seen to bring nature to the city to benefit people's physical and mental health, support biodiversity conservation and maximise socio-environmental services, thereby creating a healthier, fairer and more sustainable city (Abril Janer 2023). The strategy promotes a shared governance model and seeks to establish municipal mechanisms to support urban agriculture in Barcelona (Abril Janer 2023).

2.4. FOOD SHARING INITIATIVES AND ACTORS IN FOCUS

To study food sharing in Barcelona within this project, the researchers employed a variety of social science methods (see Chapter 2 for details). Interactions in the form of online and in-person interviews, site visits and in-situ observations, workshops and reflexive discussions with key food sharing actors in Barcelona formed the core of the field research, documented in this report. Specifically, the researchers interacted with FSIs that facilitate different ways of food sharing following the CULTIVATE definition as described below. Many of these FSIs are also involved in sharing food space, tools, knowledge, and seeds, for instance:

- ***FSIs that grow and/or compost together:*** municipal urban gardens at Bosc de Turull; municipal rooftop gardens Hort al Terrat; community urban gardens Comissió de Jardins i Horts Comunitaris in Can Batlló, and squatted community gardens in the Hole of Shame (Forat de la Vergonya);
- ***FSIs that promote cooking and eating together:*** a community kitchen at Sant Antoni market; a community kitchen Cuina de barri in Prat de Llobregat; a community kitchen Comissió de Cuina in Can Batlló; a social integration company and production kitchen Es Imperfect by Espigoladors; and a planned community production kitchen for start-ups in the BLOC4BCN project by the City of Barcelona;
- ***FSIs that support (surplus) food redistribution:*** a community food bank (Xarxa d'Aliments) in Can Batlló; a private FSI Foodback, which rescues unsold fruits and vegetables from the wholesale market Mercarbarna; a non-profit FSI Espigoladors, which organises gleaning of fruits and vegetables from peri-urban farms and rescues unharvested produce as well as redistributes other surplus food; a charity network organisation Aurea collecting and redistributing food surplus from supermarkets, restaurants, hotels and farms; a non-profit association and food bank People Affected by the Crisis (P.A.C.); and a non-profit FSI Barcelona Food Bank collecting and re-distributing food to vulnerable people in Barcelona.

In addition, the researchers interacted with ***organisations in the retail sector*** that support food sharing and sustainable and just food consumption in Barcelona. These included Terra Pagesa, an online platform to market and consume local and seasonal produce in Barcelona; cooperatives Foodcoop BCN and La Garrofera de Sants, which sell organic and locally produced food; a social supermarket La Botiga selling food to families in need; and a small local shop El Tastet in the suburb of Barcelona Cerdanyola del Valles, which sells local and sustainable products. The researchers also visited a large wholesale market for fruits and vegetables Mercabarna to learn about their work with sustainability and food waste reduction, and the covered mainstream ***city markets*** Sant Antoni and Santa Caterina.

Apart from FSIs, retailers and food markets, the MRL team also interacted with ***researchers*** from three local universities (the University of Barcelona, Universitat Autònoma de Barcelona and Universitat Oberta de Catalunya), ***representatives from the City of Barcelona*** and

Figure 1. Learning about Barcelona Healthy and Sustainable Food Strategy at the Urban Food Policy Office of the City of Barcelona

PEMB office who work on the issues related to food sharing and visited two "zero kilometre" ***restaurants***, which source their ingredients locally.

Further details on the MRL approach and methods to collect and analyse data are presented in Chapter 2.

3. MOBILE RESEARCH LAB APPROACH

Mobile research lab (MRL) to collect and analyse data on food sharing in Barcelona was conducted by four researchers from Lund University (Yuliya Voytenko Palgan, Vera Sadovska, Oksana Mont, and Andrius Plepys) in December 2023 – May 2024. An MRL is an innovative research method with roots in ethnography. It is a collaborative process of conducting in-situ analysis by a research team that allows analysis of a study object – in our case food sharing – in its context. The research protocol for the CULTIVATE project describes the MRL methodology for tracing costs, investments, challenges, drivers, and success factors to establish and maintain FSIs (Voytenko Palgan and Sadovska 2023). The methodology for the MRL in Barcelona included four steps: desktop research, online interviews, field research and data analysis. These are described in detail in the following sub-sections.

3.1. DESKTOP RESEARCH

The initial phase of the MRL involved extensive desktop research to gather background information and context about food sharing in Barcelona. This phase included:

Identification of key FSIs and food sharing actors: First, the research team utilised the map of 221 FSIs in Barcelona performed in WP2 of the CULTIVATE project in autumn 2023, and contacts and preliminary findings by WP3 researcher performing sustainability impact assessments of FSIs in CULTIVATE Hub cities (i.e. Barcelona, Milan and Utrecht). Second, CULTIVATE partners PEMB, FSI Espigoladors and University of Barcelona informed the identification of key food sharing actors. Third, the research team utilised academic databases such as Scopus, Web of Science, and Google Scholar, and conducted keyword searches related to food sharing, urban commons, and sustainability. Official documents, municipal policies, and grey literature were also reviewed to identify key food sharing actors in Barcelona.

Literature review: A systematic review was conducted to synthesise existing knowledge on costs, investments, challenges, drivers, and success factors of FSIs. This review informed the conceptual framework guiding the MRL.

Document analysis: Municipal and regional strategies and roadmaps on sustainable and healthy food, social and solidarity economy, and urban agriculture were analysed to understand the regulatory and policy environment impacting FSIs.

Web and social media analysis: Online platforms, blogs, press releases, and social media pages of FSIs and key actors provided additional data on current activities, community engagement, and public perception.

3.2. ONLINE INTERVIEWS

The second phase involved online interviews to gather qualitative data from key stakeholders. This phase was critical to understanding the nuanced experiences and perspectives of those directly and indirectly involved in food sharing. The procedures included:

Participant selection: Key actors were selected based on their roles in FSIs and their knowledge of English (since translation was not available for online interviews). These included researchers, municipal and PEMB representatives, FSI leaders and volunteers. Snowball sampling was used to identify additional relevant participants.

Interview guide development: Semi-structured interview guides were created, focusing on themes identified in the conceptual framework. Questions were tailored to each participant's role and expertise.

Interview process: Each interview lasted between 60 and 90 minutes and was conducted via video conferencing platforms. With consent, interviews were recorded and transcribed for analysis. Participants were briefed on the research objectives and their rights, including confidentiality and the option to withdraw at any time.

Data management: Transcripts were anonymised and stored securely in accordance with ethical guidelines and data management protocols outlined in the CULTIVATE project.

3.3. FIELD RESEARCH

Field research constituted the core of the MRL, involving sense making experiences through in-situ observations, site visits, workshops and reflexive discussions with key food sharing actors in Barcelona during six days in March 2024. This immersive approach aimed to gather rich, contextual data on food sharing in Barcelona. The schedule and activities were meticulously planned to maximise data collection within the available timeframe.

Site visits and participant observation: Researchers visited various FSIs that grow and/or compost together (Figures 2, 4), those that promote cooking and eating together (Figure 5), and those that support (surplus) food redistribution (Figures 6, 9 and 10). Many of these FSIs also share food space, tools, knowledge, and seeds. Researchers visited organisations in the retail sector that support food sharing and sustainable food consumption in Barcelona (Figures 3, 11), city markets and "zero kilometre" restaurants, which source their ingredients locally, as well as the offices of the City of Barcelona and premises of the University of Barcelona. Detailed field notes, photographs, and video recordings were taken, documenting the operational practices, challenges, and community interactions.

Workshops and seminars: Two collaborative workshops (one online and one onsite) were organised with local partners and the representatives of Dublin-based FSI FoodCloud and ICLEI – Local Governments for Sustainability network, providing a platform for knowledge exchange and co-creation. These events facilitated discussions on preliminary findings and allowed for triangulation of data collected through other methods.

Engagement with stakeholders: The field research involved direct engagement with a wide range of stakeholders, from grassroots actors to municipal officials. In addition, the representatives from the PEMB office and Espigoladors FSI joined the research team on several visits and provided inputs and reflections during the immersive activities. This multi-perspective approach ensured a comprehensive understanding of the food sharing ecosystem in Barcelona.

The schedule for the onsite fieldwork is provided in Table 1. Throughout the week, the researchers' interactions with diverse stakeholders provided a comprehensive understanding of Barcelona's food sharing landscape. The immersive field research not only enriched the data but also strengthened the collaborative network, setting the stage for further analysis and dissemination of the findings.

3.4. DATA ANALYSIS

The final phase focused on systematically analysing the collected data to derive meaningful insights and conclusions and included:

Coding and categorisation: Transcripts, field notes, and other qualitative data were coded using NVivo software. Initial analytical categories from the conceptual framework were used as a starting point, with additional codes emerging inductively from the data.

Thematic analysis: Themes related to business models, evolution and experiences, costs and investments, benefits and perceived value, challenges and risks, and drivers and success factors were identified and analysed.

Triangulation: Data from different sources (desktop research, interviews, field observations, workshop reflections) were triangulated to validate findings and ensure reliability.

Report writing: The analysed data were synthesised into report sections, structured according to the MRL research protocol. The sections included an introduction to the city's food sharing profile, policy landscape affecting food sharing, FSIs and actors in focus, mobile research lab approach, detailed findings on each research theme, and summarising conclusions with implications and recommendations.

Figure 2. Study visit to municipal building with rooftop gardens Hort al Terrat, Barcelona

Figure 3. Study visit to Barcelona Food Coop

Table 1: Schedule for the onsite fieldwork during the Mobile Research Lab in Barcelona

Colour legend	Growing food together	Cooking and eating together	Redistributing surplus food	Food retail	Third party actor (city, university)

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
March 18, 2024	March 19, 2024	March 20, 2024	March 21, 2024	March 22, 2024	March 23, 2024
9.30-11.00 Meeting with the City of Barcelona	8.00-9.00 Visit a rooftop garden Hort al terrat	9:30-12:30 - Gleaning activity with Espigoladors	9.00-10.30 Visit to Barcelona Food Bank Warehouse	9.30-11.00 BLOC4BCN community production kitchen project	10.00-10.30 Visit to the Hole of Shame
Urban Food Policy Office and Sustainable Consumption Office, City of Barcelona	Hort al terrat is a municipal rooftop garden for people with disabilities	Espigoladors is an FSI organising gleaning of fruits and veg in peri-urban areas of Barcelona	11.00-13.00 Reflection session on food sharing in Barcelona	Municipal project by the Office of Social and Solidarity Economy; a production kitchen for citizens to use	A squatted urban plot, which has a community garden
11.30-13.00 Visit to Community Kitchen, Sant Antoni market	10.30-11.30 Visit to Mercabarna wholesale market for fruits and vegetables	Meeting FSIs Aurea and P.A.C., which redistribute the gleaned food to food banks and vulnerable people	Lund University, University of Barcelona, FoodCloud, ICLEI and Espigoladors	11.00 -12.30 Meeting at la Cantina, Can Batlló	10.30-11.00 Visit to Santa Caterina food market
An FSI in a municipal space run by volunteers who cook and redistribute meals to vulnerable population in the neighbourhood	Introduction to sustainability projects at Mercabarna wholesale market	13:00-14:00 Visit to Cuina de barri and lunch	14.00-15.30 Visit to and lunch at Comissió de Cuina Can Batlló	Meeting an activist from Can Batlló and learning about the history of the buildings and the area	
14.00-15.00 Working lunch with PEMB representatives	Walking tour at the wholesale market and biomarket for organic produce	A grassroot FSI cooks local products to make lunchboxes for community in the neighbourhood	A community kitchen at Can Batlló	13.30-14.30 Visit to La Garrofera de Sants	
16.30-18.00 Visit to urban gardens at Bosc Turull	12.00-12.45 Visit to the logistical hub of Terra Pagesa	14:30-15:30 Visit and interview with La Botiga	17.00-18.00 Comissió de Jardins i Horts Comunitaris	food cooperative shop at Can Batlló sells local and sustainable products to member households	
Municipally owned urban gardens, which offer permit-based access to residents	online platform with seed funding from the City of Barcelona that connects consumers with local food producers	A municipally supported social supermarket focusing on food security and reducing food poverty	Visit therban community garden at Can Batlló	15.30-17.00 Reflection session	
A local household cooperative food bank in Can Batlló, which does urban food gleaning from local shops in the evenings	An FSI at Mercabarna wholesale market collects surplus of fruits and vegetables from market and redistributes it to food banks in Barcelona	Production kitchen of Espigoladors that uses gleaned fruits and vegetables	A small shop in Cerdanyola del Valles, which sources local and organic products		
	14.00-15.30 Lunch with CULTIVATE partners	18.00-18.30 Visit to Foodcoop BCN	20.30-23.00 - Dinner at a "zero kilometre" restaurant that uses locally sourced ingredients		
	Lund University, PEMB, Espigoladors, FoodCloud, ICLEI Local Governments for Sustainable Development	A food cooperative shop that focuses on selling sustainable, organic and locally sourced products			
	16.30-18.30 Reflection session				
	20.00 - Dinner with CULTIVATE partners at a "zero kilometre" restaurant that uses locally sourced ingredients				

4. RESULTS

4.1. BUSINESS MODELS, EVOLUTION AND EXPERIENCES OF FOOD SHARING INITIATIVES

4.1.1. FOOD SHARING BUSINESS MODELS AND ORGANISATIONAL FORMS

FSIs in Barcelona have evolved significantly over the past few years, employing various business models and organisational forms to adapt to the changing socio-economic landscape. The mapping of FSIs in WP2 of the CULTIVATE project showed that co-operatives and associations were the most common organisational forms in the food sharing with 28% and 27% of FSIs, respectively, followed by 20% non-profit, 14% public sector and 7% for-profit FSIs (Davies 2024). In the previous mapping of food sharing landscape in the SHARECITY project in 2015, 32% of FSIs in Barcelona were reported to use more than one form of organisation in their operations (Davies 2017). The mapping in the CULTIVATE project demonstrates a doubling of FSIs in Barcelona in 2023 compared to 2015. While the absolute number of FSIs using more than one organisational form may have changed, many hybrid FSIs remain in the city (BA2.1).

4.1.2. FOOD SHARING INITIATIVES THAT GROW AND/OR COMPOST TOGETHER

FSIs that grow and/or compost together are represented by urban gardens. In Barcelona, Calvet-Mir and March (2019)urban gardening in central and northern Europe as well as in North America has received a great deal of academic attention. However, the recent proliferation of urban gardening in other geographies, such as southern Europe in the aftermath of the economic crisis of 2007–2008, remains underexplored. The economic crisis put on hold urban developments in many southern European cities, leaving idle plots of land waiting to be urbanized. The crisis also triggered radical political demands, such as those of the Indignados, as well as fuelling narratives revolving around social entrepreneurship and social innovation. Barcelona emerges as a laboratory of urban gardening initiatives in vacant lots mobilizing either radical urban demands or embedding new post-crisis rhetoric around social entrepreneurship. Through a combination of qualitative methods, including participant observation, a literature review, semi-structured interviews, informal conversations and field diaries, we present a characterization and evolution of the three most prominent urban gardening initiatives in the city of Barcelona (including 54 gardens at the end of 2016 identified three principal types of urban gardens:

- ***municipally led gardens*** on public land (mainly for retired people, e.g., Bosc de Turull (BA12), but also for people with disabilities, e.g., Hort al terrat (BA4.1, BA4.2) (Figure 2);
- ***community gardens*** on squatted land as a result of social movements (e.g., community gardens at the Hole of Shame (BA5) (Figure 2) and in Can Batlló (BA26ab) (Figure 4); and
- ***social entrepreneurial gardens*** on public land developed under the 2012 policy Urban Vacant Lots with Territorial and Social Involvement (“Pla Buits”) as a response to economic and real estate crises when construction of public facilities was cancelled due to budget cuts (e.g., three gardens island “Illa dels 3 horts”, the Espai Germanetes) (BA 8).

4.1.3. FOOD SHARING INITIATIVES THAT PROMOTE COOKING AND EATING TOGETHER

FSIs that promote cooking and eating together are represented by community kitchens, which often operate in municipally owned spaces and serve food to local communities at a reduced cost (e.g., Cuina de barri in Prat de Llobregat (BA20), Comissió de Cuina in Can Batlló (BA25) (Figure 5) or donate meals to vulnerable people in their neighbourhoods (e.g., a community kitchen at Sant Antoni market (BA10ab). There are also social integration companies with production kitchens converting fruits and vegetables gleaned from peri urban farms into soups, sauces and jams for sale while offering employment opportunities to people having difficulty entering job markets (e.g., Es Imperfect brand of Espigoladors (BA2.1, BA2.2). The City of Barcelona plans to provide access to a production kitchen for business start-ups wishing to increase their food production for sale (BA28). Several home-based restaurants sell meals and offer home dinner experiences via online food sharing platforms, e.g. Eat With, BonAppetour.

4.1.4. FOOD SHARING INITIATIVES THAT SUPPORT FOOD REDISTRIBUTION

FSIs that support food redistribution in Barcelona are foodbanks, network organisations, charities and social integration companies that redistribute food to vulnerable population groups suffering from food poverty. Often it is surplus food that is redistributed, but sometimes these are food donations from various actors. Many of these FSIs are non-profit organisations that rely on volunteer labour. Examples include FSI Espigoladors, which organises gleaning of fruits and vegetables from peri urban farms to valorise unharvested produce (BA2.1, BA2.2) (Figure 7); a charity network organisation Aurea collecting and redistributing food surplus from supermarkets, restaurants, hotels and farms (BA19); a non-

Figure 4. Squatted community gardens at the Hole of Shame, central Barcelona

profit association and food bank People Affected by the Crisis (P.A.C.) (BA17); and a non-profit FSI Barcelona Food Bank (BA23). There are also informal community food banks, such as Xarxa d'Aliments in Can Batlló, a cooperative of households rescuing surplus food from local stores and assembling food boxes for member families. The mainstream wholesale market Mercarbarna runs its own FSI Foodback to redistribute unsold fruits and vegetables from the market to vulnerable population groups through food banks in Barcelona (BA16) (Figure 6).

Figure 5. Community kitchen at Can Batlló, Barcelona

4.1.5. EVOLUTION AND EXPERIENCES OF FOOD SHARING INITIATIVES IN BARCELONA

Initially, there was little to no clear understanding of the food sharing concept in Barcelona, but this has changed as the city adopted ***2030 Social and Solidarity Economy Strategy*** (City of Barcelona 2022a). Today, the evolution of FSIs is deeply embedded in the notion of the social and solidarity economy, which encompasses both small neighbourhood groups

Figure 6. Foodback – FSI to redistribute unsold fruits and vegetables at Mercabarna market

and larger cooperatives (BA1), and which is integral to the municipal governance of food sharing in Barcelona:

> *"When talking about social and solidarity economy, in the latest years there has been a strong support from the city to develop… programmes but also funds related to that." (BA1)*

FSIs in Barcelona benefit from favourable legislation and collaboration with public institutions. In Catalonia, for instance, supportive governing structures and funding programmes help sustain these initiatives (see also Section 1.3). Barcelona Health and Sustainable Food Strategy for 2030 (City of Barcelona 2022a) foresees coordination among various social services and external entities to guarantee the right to food (BA1).

When it comes to the evolution of food sharing in Barcelona, the experience of FSI Espigoladors is particularly notable. It was born in 2014 as an idea of social entrepreneurship to address challenges, such as access to food and food waste, many of which had roots in the economic crisis 2008 with high unemployment rates. The FSI aimed to provide healthy and sustainable food, create job opportunities, and reduce food waste.

This model involved volunteers collecting surplus food from warehouses and redistributing it to food banks and other entities.

Over time, FSI Espigoladors expanded to include other activities and adopted new organisational forms. In 2018, it transformed into a foundation to facilitate food redistribution, and by 2021, it had established a central kitchen as a social integration company. This kitchen, employing around 50 workers, including 20 people at risk, demonstrates the FSIs commitment to social inclusion and sustainability (BA2.1, BA2.2). This example of an NGO's evolution from an association to a foundation and then to a social integration company highlights ***the adaptive nature of FSIs***.

Another aspect of FSIs is their ability ***to integrate with educational institutions and community activities***. For example, rooftop gardens Hort al Terrat engage people with disabilities in gardening activities (Figure 2). These gardens, located on municipal office buildings and schools, provide therapeutic benefits and foster a sense of community. The project has developed over time, making the gardens accessible to people with physical disabilities and expanding to include hydroponic systems suitable for rooftop environments (BA4.1) (Figure 7).

When it comes to food sharing experiences in Barcelona, all of them address one or more ***sustainability issues***. The dominant contribution of FSIs is to ***social sustainability***, e.g., by improving food security and inclusivity. For instance, a community project La Botiga operates similarly to a supermarket but focuses on redistributing bulk products and engaging volunteers of all ages and abilities. This project is part of a more extensive programme on sustainable development and circular economy, offering participatory activities like workshops and training sessions (BA21).

The business models of FSIs often involve innovative solutions for ***environmental sustainability*** and ***economic self-sufficiency***. For example, the central kitchen of Espigoladors transforms surplus food harvest into jams and other products, which are then sold under the Es Imperfect brand Figure 8. This not only reduces food waste but also provides economic opportunities for farmers, who can sell these value-added products.

The kitchen charges for the transformation service and offers customised labels according to the farmers' preferences (BA2.2).

4.1.6. SUMMARY

To conclude, FSIs in Barcelona exhibit diverse organisational and business models, which depend on the type of food sharing. All types of food sharing are represented in Barcelona: growing and composting eating and cooking, and redistributing surplus food. The evolution of food sharing showcases a dynamic interplay of social entrepreneurship, community engagement, and innovative business models. It is deeply rooted in the notion of social and solidarity economy. FSIs contribute not only to social but also to environmental and economic sustainability in Barcelona.

The development of many FSIs is highly politicised and rooted in the resistance movement reclaiming the right of people to the city, particularly in relation to the community gardens on squatted plots of urban land. Many FSIs have adapted to addressing food security, food waste reduction, and social inclusion issues in the city, demonstrating a resilient and sustainable approach to urban food systems. The experiences of FSIs highlight the importance of supportive policies, community involvement, and continuous adaptation to changing socio-economic conditions.

4.2. COSTS, INVESTMENTS AND SOURCES OF FUNDING OF FOOD SHARING INITIATIVES

4.2.1. GENERAL COSTS OF FOOD SHARING INITIATIVES

Despite their status as non-profit organisations, FSIs are subject to a range of expenses associated with their operational activities. A review of Barcelona-based FSIs revealed

that space is a crucial factor for all types of initiatives. FSIs that facilitate growing food and composting food residues are reliant on land, with respective costs for its maintenance. FSIs that promote cooking and eating together necessitate the provision of equipped kitchens and canteen space. FSIs that support food redistribution require storage and sorting facilities for surplus food, with the added benefit of refrigeration. All such spaces incur running costs, including rent and utilities.

The logistics of food represent another cost category encountered by the majority of FSIs. The collection, sorting, cooking, and redistribution of surplus food are essential for the functioning of food redistribution initiatives. Similarly, no FSI can exist without the input of human labour. Even when relying on unpaid voluntary labour, the volunteers themselves require training and education from more experienced personnel, who are often paid employees. Moreover, all FSIs studied in Barcelona reported indirect costs, exemplified by the time invested in personnel.

The interviewees demonstrated an understanding of the continuous nature of costs. The initial phase of an FSI is often characterised by the need of significant capital investments, including the provision of physical space, equipment, soil, plants and seeds. Furthermore, the advancement of activities is also a costly endeavour. It was thus highlighted that there is a need for the continuity of funding.

Figure 7. Hydroponic system of Hort al terrat rooftop garden, Barcelona

Figure 8. Es Imperfect production brand by Espigoladors, Barcelona

4.2.2. FOOD SHARING INITIATIVES THAT GROW AND/OR COMPOST TOGETHER

The initial establishment of an urban garden is associated with a substantial one-time investment. The estimated cost of establishing an urban garden in Barcelona is approximately 10,000–15,000 Euros (BA4.1). This figure might not be excessive for an organisation, but it is beyond the financial capabilities of an individual. The municipality can cover the cost of acquiring land, as in the case of one community garden in the study (BA26ab).

> *"When the garden is established, you may need money to buy seeds or a greenhouse to grow your own seeds or compost. You need material constantly. And many of them do not have much support for their continuity." (BA5)*

Installing a garden may necessitate acquiring a service from an external provider with expertise in horticulture. This is especially the case for municipal-led gardens situated on the roofs of public buildings. Following the specifications outlined in the initial request, a competitive bidding process may be initiated, wherein enterprises with expertise in horticulture present their proposals. Moreover, prior to the establishment of a municipal rooftop garden, regulations require to assess, e.g. its bearing capacity, moisture protection or the safety of public access, including access for people with disabilities. For instance, in the example of roof-top gardens on one of Barcelona municipal office buildings (BA4.2), an external gardening company was commissioned to plan and install a garden in accordance with safety and wheelchair accessibility regulations. The garden was designed as a hydroponic soil-less installation with an automated fertiliser and water dosing using a drip system (Figure 7). This, in turn, requires regular maintenance services from a professional external technician.

Although such systems showcase water saving and are valuable for educational purposes, these adaptations increase the costs in the initial development phase and require planned budget allocations for running costs. For the longevity of such roof-top gardens, the question of funding is crucial. While not a significant expense, water, electricity, soil, and seeds are recurring costs.

4.2.3. FOOD SHARING INITIATIVES THAT PROMOTE COOKING AND EATING TOGETHER

For FSIs engaged in cooking and eating together, the costs associated with space and equipment are among the most significant. It is essential to identify a space that is adequately equipped for cooking activities and that meets all the sanitary and safety requirements (BA28). In certain instances, it may be necessary for an FSI to renovate the space in question prior to the commencement of any cooking activity (BA2.2). Once the space has been prepared, the next step is to consider the associated running costs. The monthly costs include those for electricity, water, and waste disposal.

> *"The city will buy the equipment and provide a space. It will be a leasing contract. You pay rent, and you can use the infrastructure as you wish. Whatever you want to do, it is your own space." (BA28)*

The labour and food costs are implicit in the cooking and eating FSIs. Labour costs are to cover the salaries of employed staff. To illustrate, in one community kitchen, one individual was employed part-time, working 25 hours per week, while a full-time cleaning staff member was also employed (BA10). As is the case with other FSI types, the cooking activities depend on volunteers' input. In the same kitchen (BA10), ten volunteers (some with disabilities) were engaged in culinary activities and the distribution of meals to vulnerable people in the neighbourhood. The volunteers contribute with their time and labour without seeking direct compensation, although the initiatives do require them to undergo training. The financial outlay associated with training can be quantified in terms of the time an employee invests in performing the tasks.

Despite the best efforts of community kitchens to utilise surplus food in their meals, there are occasions when they require additional ingredients, which they must purchase (e.g. BA25). These costs can fluctuate considerably, depending on available ingredients and planned recipes.

4.2.4. FOOD SHARING INITIATIVES THAT SUPPORT FOOD REDISTRIBUTION

The redistribution of surplus food can be conducted in various ways, each incurring different costs. FSIs that collect unsold surplus from grocery shops can be highly localised, with as few as three to eight shops in the immediate vicinity collaborating (BA13) (Figure 9). In this instance, all expenditures can be categorised as follows: the collection and transportation of food; the provision of a facility for sorting food, including washing equipment; and human labour for the collection, sorting, and distribution of food to end users. Additionally, communication about the initiative can be a cost factor. However, in some cases, communication is unnecessary as certain initiatives prefer to remain relatively small, relying on word-of-mouth to attract new participants.

FSIs that support food redistribution can operate on a larger scale, extending beyond one neighbourhood and collaborating with larger retailers (e.g. BA23). For such organisations, the cost structure is comparable with a more local initiative, but costs can be larger. Furthermore, the necessity for refrigeration units is even more acute since not all food items might be collected by the ultimate consumers on the same day and may require cold storage. Should an FSI expand to a regional or national scale, it would be necessary to have access to professional storage and sorting facilities, equipped with the relevant machinery, including forklifts, pallet jacks, and conveyor systems. For large FSIs of this nature, implementing software to monitor stock and financial operations becomes imperative due to the considerable volume of food that is collected and redistributed. This may also require personnel with specific skills. Such skills might also be available among volunteers, but FSIs often need to engage paid external professionals.

The practice of gleaning, which involves the redistribution of surplus food, necessitates a considerable labour input for manual harvesting in the fields. While the current practice is to engage volunteers without remuneration, an employed representative of the FSI is always present and provides instructions, supervises and coordinates the logistics of activities. Such is the organisational form of Espigoladors (Figure 10). Before gleaning the volunteers also must undergo a brief training session regarding proper ways of collecting the produce including basic safety rules, since the FSI coordinating the gleaning also assumes responsibility for the insurance coverage of all participants.

4.2.5. SOURCES OF FUNDING

The non-commercial nature of most FSIs in Barcelona constrains the potential sources of income available to them. As they operate as not-for-profit organisations, many initiatives do not engage in selling products or services. However, as evidenced by the interviews, several initiatives have indicated that they are funded by public grants, which in recent years have been reaching up to 75% of cost coverage (in cases of BA2.1 and BA21). In addition to public grants, private organisations also provide financial support through donations. For private companies, donations are tax-deductible. Some donations are contingent upon the performance of a specific activity by an FSI, whereas others are unconditional. Donations may be provided through financial contributions, food products or access to surplus produce. For instance, a retailer may donate unsold surplus items for redistribution, while farmers may permit gleaning volunteers to collect remaining produce in the fields after harvesting.

In periods of crisis, such as during the COVID-19 pandemic, numerous FSIs employed crowdfunding, though this declined once the pandemic-related restrictions were lifted. In instances where profit generation is permitted by the organisational form and business model (for example, in the case of a social supermarket La Botiga) (Figure 11), bank loans constitute a viable source of funding, often combined with public grants.

FSIs that have existed for a longer time and have a larger scope of operations may engage in providing consultancy services related to food waste management to private and public sector organisations. These organisations can also offer cooking classes for a fee. A distinctive feature of the cooking classes provided by FSIs is their incorporation of a sustainability agenda, with a particular focus on food waste and supporting vulnerable population groups.

Some FSIs can cover the salaries of their employed personnel with financial support from local authorities. Although typically limited to three to twelve months, this financial assistance enables the recruitment and retention of a stable workforce with the requisite qualifications and training.

4.3. BENEFITS AND PERCEIVED VALUE OF FOOD SHARING INITIATIVES

4.3.1. GENERAL BENEFITS AND PERCEIVED VALUE OF FOOD SHARING INITIATIVES

FSIs generate substantial social, economic and environmental value. FSIs provide job opportunities and promote social inclusion through various learning and inclusion programmes (BA21). Some employ vulnerable individuals, helping them gain work experience and skills, which facilitating their integration into the job market (BA2.1, BA21). Besides providing food to people who struggle to make ends meet, FSIs also valorise food surpluses and recover agricultural produce that otherwise would not enter the food chains. This brings multiple environmental benefits.

Figure 9. Urban food gleaning from local shops by the food bank of Can Batlló

Community building and support are very important aspects of FSIs, as they foster a sense of community among participants. For example, communal spaces like supermarkets, where members interact and support each other, create strong community bonds (BA6). Initiatives involving joint activities, such as gardening (including squatted gardens) (BA5), cooking and eating together, were reported to help combat loneliness and integrate migrant populations (BA10):

> *"The main goal is to combat loneliness, which was identified as one of the core challenges during the analysis done in 2016 by the district government along with the challenge of housing (high rents, many neighbourhoods become non-liveable for locals, and they are forced to move). Another goal is to create a space for the integration of the migrant population and give them the opportunity to learn the Catalan language." (B10)*

FSIs contribute to environmental sustainability and better health. By valorising surplus food and leftover agricultural produce, FSIs help combat waste and reduce climate impacts. Roof-top gardens allow growing extra food in the middle of a mega-city and improve biodiversity by providing habitats and nourishment for bees and other insects. Smart solutions, such as hydroponic roof-top gardens, do not require soil and use a lightweight substrate. They are low-weight and do not compromise the structural integrity of buildings

Figure 10. Gleaning of fava beans with Espigoladors on the fields in Prat de Llobregat, Barcelona

Figure 11. Social supermarket La Botiga, Barcelona

and water leakages due to surface degradation. Automated water and fertiliser delivery through a drip system can significantly reduce water use (e.g. just 100-200 L/week for a 150-200 m^2 garden with only minimal maintenance (BA4.1).

Participating in food sharing activities is also beneficial for health. As one participant described, he usually joins gleaning activities with Espigoladors at least once per week, and does it "*to keep healthy and fit, to move and spend time outdoors*" (BA18). Moreover, educational programmes within FSIs raise awareness about healthy lifestyles and environmental sustainability, fostering a culture of learning and responsibility (BA10).

FSIs also bring additional benefits once they engage in policy advocacy and development. FSIs tend to often advocate for policies that promote better food, improve the food waste management and support vulnerable populations. One participant highlighted their role in policy:

> *"Social integration and food waste, work more with vulnerable people, policy advocacy and developments" (BA3).*

4.3.2. BENEFITS AND PERCEIVED VALUE OF FOOD SHARING FROM THE MUNICIPAL PERSPECTIVE

FSIs offer significant social benefits for municipalities. These projects create opportunities for social integration, particularly for vulnerable populations. For example, initiatives that employ people at risk, such as migrants or those with long periods of unemployment, help them re-enter the labour market (BA2.1). Additionally, municipalities benefit from food sharing by creating spaces that support the well-being of their citizens (Figure 12). Social canteens, for instance, receive high-quality donated food from rooftop gardens, enhancing food security for those in need (BA4.1).

Urban development and innovation are also key benefits for municipalities. Urban gardens and food sharing projects improve the quality of life in cities by providing green spaces and fostering community engagement:

> *"All citizens benefit from having more greenery in the city in general. The principal benefit is to have... two benefits: the ecological, the biodiversity, keeping CO2 low, avoiding contamination, and the social, reconnecting among people" (BA12).*

Moreover, these initiatives reclaim underutilised urban spaces, promoting a sense of community and environmental stewardship (BA8).

Environmental sustainability is another significant benefit. FSIs may contribute to reducing greenhouse gas emissions by promoting local consumption and supporting the local economy and farmers (BA6). Projects that transform surplus food into preserves and other products not only reduce food waste but also provide sustainable food options (BA2.2).

4.3.3. BENEFITS AND PERCEIVED VALUE OF FOOD SHARING FROM THE ACADEMIC PERSPECTIVE

Academic institutions benefit from FSIs through research and knowledge development. These projects provide rich research opportunities, as universities collaborate with food sharing initiatives to study food waste and social integration (BA3). Academics also engage in public policy discussions, contributing to the development of supportive legislation for FSIs (BA2.1).

FSIs offer valuable educational opportunities. They provide practical learning experiences for students and researchers, fostering an understanding of sustainable practices and social responsibility (BA3). These projects can serve as living laboratories where students observe and participate in real-world applications and testing of their studies, enhancing their educational experience (BA8).

Community engagement is another significant benefit for academia. Universities play a crucial role in raising awareness about the benefits of food sharing and promoting community participation. By partnering with FSIs, they help inform the public and encourage broader engagement (BA2.1).

Figure 12. Lunch at a community kitchen and social canteen Cuina de barri, Barcelona

4.4. CHALLENGES OF FOOD SHARING INITIATIVES

4.4.1. GENERAL CHALLENGES OF FOOD SHARING INITIATIVES

For a significant number of initiatives, the challenge of maintaining the existence of an initiative is considerable. Should an FSI expand, the consolidation of its activities, employed staff and volunteers becomes increasingly complex and resource demanding as the staff is rotating and work tasks are demanding. The potential for scaling up and expansion beyond the boundaries of Barcelona is accompanied by several challenges, including the necessity to align with other regional policies related to food and to establish a reputation as a reliable organisation in new environments.

> *"...[T]he challenge to maintain the team, the workers that you engage, because as for any social entity the rotation is high, and*

> *stress, the work is hard. In academia, the funding cycles are longer. Here, subsidies are 6-12-18 months. Very rarely 4 years in advance are funded. The stabilisation of the team is a challenge." (BA2.1)*

Furthermore, FSIs are confronted with financial challenges, as they lack economic models that can generate profit, given the nature of their activities that should not inherently yield financial gains. For the FSIs that share for money, it is problematic to set a price for their product that covers expenses and demonstrate the social value of the product. For FSIs sharing for free, securing grants, subsidies, and other forms of funding is also a significant challenge. The future challenges include the lack of a clear direction for the development of the initiatives and the necessity for policy advocacy at the local and state levels. FSIs acknowledge that creativity and imagination are essential to overcome these challenges.

4.4.2. FOOD SHARING INITIATIVES THAT GROW AND/OR COMPOST TOGETHER

For the community gardens situated on the roofs of municipal buildings, a clear strategy regarding their objectives and the population they aim to assist proved pivotal. In agreeing to support the gardens on several roofs, the municipality stipulated that different vulnerable population groups should benefit from this activity. Considering this, the FSI was tasked with identifying and engaging retired individuals and those with disabilities interested in gardening. During the implementation, it became apparent that not all roofs were wheelchair accessible and that gardening was challenging for older people due to the heat. To reduce the weight of soil on the roof and to avoid leakage in the building, the garden employs a hydroponic growing system that does not require soil (Figure 7). The specific conditions in question limit the population that can be addressed, narrow the variety of plants that can be grown, and create barriers to replicating such gardens on other municipal roofs. Another significant obstacle to replicating these gardens is the lack of funding.

Garden work is physically demanding and often requires specific skills and knowledge, for instance, for selecting required fertilisers or planning the timing of planting. Therefore, community gardens sometimes experience a lack of volunteers or skilled experts for specific tasks. Furthermore, legal restrictions on selling agricultural produce grown in the city limit the potential business model diversification for community gardens. As the sale (and for municipal urban gardens, even the donations) of garden-raised produce is illegal (BA4.1), community gardens may distribute the produce solely amongst their members or donate it to social services, as disposal in any other manner conflicts with the values of the gardens.

> *"It is not allowed to sell the locally grown produce of the city. This has been an obstacle. It does not help to expand the project. Initially, we were not thinking of giving away the food, but rather giving it to people who grow it. But then it was too much food. People working in the same facilities became the first recipients, giving food away to them. It can happen once a year, and we cannot always give it to public servants. Then, we started giving it away to social services. This is how we managed to solve this problem." (BA4.1)*

4.4.3. FOOD SHARING INITIATIVES THAT PROMOTE COOKING AND EATING TOGETHER

The initial stage of establishing a community kitchen is knowledge and resource demanding. FSIs report that they must collect information on how to start and run the kitchen. There is also an urge to search for skilled people. Acquiring funds to buy equipment is complicated for FSIs (Figure 13). Educational campaigns in the community where a kitchen would be established are needed to inform about the benefits of food sharing. While sometimes such campaigns help create a community of supporters, it is challenging to involve people in the initiative as active participants. In one case, the lunch kitchen had to triple its monthly fee for lunches, increasing it from EUR 11 to EUR 35. This resulted in a significant drop in customers.

4.4.4. FOOD SHARING INITIATIVES THAT SUPPORT FOOD REDISTRIBUTION

Scaling up is essential to certain FSIs, as they acknowledge the considerable volume of food waste and the necessity for increased capacity to facilitate its redistribution. In parallel, FSIs recognise the responsibility to educate the public about the issues surrounding food loss and food waste. From FSIs' perspective, some individuals are not in favour of food waste redistribution and in some cases, actively oppose it. This situation necessitates the identification of additional resources to support the implementation of diverse forms of knowledge-sharing activities.

Activities related to transporting and sorting surplus food pose operational challenges for FSIs. Keeping food fresh and in acceptable hygienic conditions is a part of everyday concerns for FSIs dealing with surplus food. To be efficient, space and equipment are needed. Some FSIs admit that they want to process larger volumes of food waste but currently lack the capacity. The regulations governing food aid are perceived as restrictive, as it is not permitted to leave food on the streets for collection by homeless individuals.

4.4.5. CHALLENGES FOR FOOD SHARING FROM THE MUNICIPAL PERSPECTIVE

City government representatives engaged in promoting sustainable food systems in Barcelona perceive the definition and contextualisation of food sharing in the Catalan context to be a significant challenge. Historically, citizens have been extensively involved in various activist movements designed to support each other and exercise their power. However, even when addressing issues related to food, these activist movements do not identify themselves in narrow terms as food sharing initiatives. Instead, they are frequently positioned as social integration or social economy initiatives. For local government seeking to support food sharing, this positioning presents a challenge in identifying and working

with relevant FSIs. The distinction between FSI types necessitates the development of tailored policies and actions for each, given the differences in their business models and needs. A clear definition of the activities, solutions, and contributions an FSI aims to provide is crucial for determining the level of governmental support.

It is widely acknowledged that FSIs are dependent on external financial support. However, municipal representatives face a challenge in defining criteria and deciding on how to distribute this support. The amount and direction of this support depend on the political situation in the country and region. Therefore, the unit working with sustainable food systems in the city must adjust to the broader political context that is not stable.

The municipality also recognises knowledge-related challenges among FSIs. Many are willing to address food waste problems, yet few are trained in project management, professional cooking, funding acquisition, communications strategies, and other relevant areas. Furthermore, the integration of sustainability criteria into all activities that FSIs perform requires targeted training that is not yet available.

4.4.6. CHALLENGES FOR FOOD SHARING FROM THE ACADEMIC PERSPECTIVE

Researchers engaged in the study of Barcelona's food sharing scene have observed that not all FSIs in the city are interested in engaging with the city council due to concerns that this connection may limit their activities. The low level of coordination between the initiatives and the absence of an FSI register at the city level present significant challenges in targeting communication with the initiatives, particularly in the context of policy development. From the researchers' perspective, policy makers encounter difficulties in identifying suitable representatives of the FSI landscape. It has been suggested that the municipality can reach initiatives that are within its network, whereas independent actors, e.g., squatted urban gardens and small grassroots activities, remain unreachable. The decision-making process, particularly regarding the distribution of support and the purposes of land allocation by the city authorities, is opaque to researchers.

Figure 13. Equipped community kitchen Cuina de barri in Prat de Llobregat, Barcelona

> *"Social solidarity economies, buying groups, and coops work around their activities and do not necessarily coordinate. This is how the policies are made. It is difficult to have a person or a group to speak to." (BA3)*

The public image of those who utilise food sharing services is problematic, as the inability to feed oneself is perceived as an individual failure. This assigns responsibility for the situation to the individual in need. In instances of more commercialised sharing, where the objective is to connect local farmers with consumers in urban areas, the challenge is to identify a viable business model that allows for the balancing of social goals with operational costs. The affluence of the city of Barcelona, coupled with the phenomenon

of tourist gentrification, limited land availability and an unstable economic situation in the country, has made the financial survival of FSIs extremely challenging. This has left them vulnerable to the influence of external forces. The prevailing view is that food safety regulations are excessively strict. Food-related regulations present the most significant challenge for urban gardens, as they are not permitted to sell their produce (Figure 14).

The temporality of all FSIs represents a greater challenge than the availability of resources for their establishment. An initiative can be established with a relatively modest financial investment and the enthusiastic involvement of a dedicated team. For an initiative to remain operational, it is necessary to have a constant input of human resources, favourable political climate, access to facilities and other factors.

4.5. RISKS FOR FOOD SHARING INITIATIVES

4.5.1. GENERAL RISKS FOR FOOD SHARING INITIATIVES

Certain societal, environmental and political changes affect FSIs to a great extent. Fears are that new political powers will radically change how immigrant question is treated and how climate change is addressed. As the immigrant population is high in Barcelona, with many close to or beyond the poverty threshold, food support provided through FSIs plays a big role in many households and individuals. New political powers expressed negative sentiments towards immigration, which, for FSIs, translates into problems of not performing their work and having the same level of impact. The same applies to the work with food waste, as climate change is not the priority under the new political environment.

> *"Because of the political power in Barcelona, which has been more left, there was a high priority. Now in May [2023] during the elections there was a shift. The priority is not high, but many projects are still running." (BA1)*

Risks to the development of FSIs arise from the constant lack of people and the absence of needed skills and competencies. The activities that FSIs need to perform are multifunctional, and while anyone can volunteer to support FSI's functioning, qualifications in, e.g. accounting, cooking, grant application writing, advocation for policies, etc. are required. Knowledge of the topic of food waste and how to address it is lacking among many potential participants, according to FSIs. The risk of not finding people with relevant skills is addressed by engaging in internal staff training. In this way FSIs empower themselves and grow professionals inside their organisation. This option of internal training is available to established middle-sized and big organisations. The inability to retain trained staff in the long term is another risk that FSIs face. This is closely linked to the short periods of funding that FSIs can obtain. Grants are usually available for 6 to 18 months, with no longer funding available (BA2.1).

Figure 14. Vegetables in urban community garden of Can Batlló, Barcelona

4.5.2. FOOD SHARING INITIATIVES THAT GROW AND/OR COMPOST TOGETHER

Weather conditions with prolonged droughts and extreme heat are not only challenging at present, but also pose a threat to the survival of community gardens. City bans on using water for plants make it impossible to grow vegetables that require regular watering (Figure 15). Plants die or do not grow sufficiently. People working in the gardens must adjust their working hours to avoid the heat. In the summer, gardening is only tolerable in the early morning or late at night. As many participants in community gardens are either elderly or

have health problems, the heat makes their participation very difficult. Rooftop garden FSIs see risks in the future related to space availability as buildings are required to produce their own energy and more solar panels are installed on rooftops. To address this risk, FSIs suggest finding a way to work with the municipality and construction companies to redesign buildings to promote energy efficiency and provide space for growing.

4.5.3. FOOD SHARING INITIATIVES THAT PROMOTE COOKING AND EATING TOGETHER

Members of community kitchens are affected by the image of such facilities - people feel stigmatised if they use the kitchen for the poor. This creates a risk that FSIs will not be able to reach all those in need, as people may prefer to avoid any association with community kitchens. For example, the annual holiday cycle makes participation unstable as many leave the city for Christmas holidays.

4.5.4. FOOD SHARING INITIATIVES THAT SUPPORT FOOD REDISTRIBUTION

FSIs redistributing surplus food are closely linked to, and even dependent on, food donors such as retail chains and producers. Anything that can damage these relationships is a major risk for FSIs. A contaminated product delivered as food aid poses health risks to users and reputational risks to donors. In such a situation, a donor may prefer not to donate food. To avoid this, FSIs look at storage conditions and efficient transport to keep food fresh (Figure 16).

4.5.5. RISKS FOR FOOD SHARING FROM THE MUNICIPAL PERSPECTIVE

Municipal representatives possess a comprehensive understanding of the city's economic and social landscape, enabling them to identify and assess many potential risks. In recent times, the country has experienced a high level of inflation, which resulted in a reduction in food affordability for a significant proportion of the population, particularly those with low incomes. The purchasing power of the population decreased while living costs increased. This created unfavourable conditions for a significant share of the population, emphasising the crucial importance of food accessibility.

The stability and continuity of financial support is a universally acknowledged risk that FSIs face. In the context of an evolving political climate in Barcelona with recent elections, the trajectories of governmental monetary resources are undergoing modifications. Financial support for FSIs is at risk of being redirected to alternative avenues by the new political leaders. According to municipal representatives, the change will not be immediate, with current programmes retaining their funding. However, the long-term picture may change unfavourably for FSI support.

Figure 15. Urban community garden in Bosc Turull, Barcelona

The existing food aid programmes to vulnerable groups of the population connected to the entire European Union system are undergoing a process of transformation. This has implications for food banks and their users. There is a fear that the new card-based food assistance system may result in the exclusion of up to 80-90% of the current recipients of food support. The reasons for these concerns are twofold. Firstly, the overall amount of funding is reduced. Secondly, the criteria for participation become stricter. Those who are not deemed sufficiently 'poor' will not receive support. As of March 2024, the changes were not implemented yet. Another consequence of this change is that the decisions regarding the distribution of cards will be made by municipalities independently of social entities, whereas currently social entities have a voice in this process. This may result in a disconnect between the needs of the users and government decisions.

4.5.6. RISKS FOR FOOD SHARING FROM THE ACADEMIC PERSPECTIVE

Worries related to the implementation of the new card-based food aid system are shared by researchers as well. They identify potential risks, such as conflicts and contestations between different societal groups, including the working poor, unemployed, and immigrants, due to the distribution principles. As the card is intended to be used in regular retailer chains, the discussion about this system revolves around social justice, the right to food, agency and the potential reinforcement of capitalist principles.

With regard to urban gardens, two broad categories can be identified within the city. One category of urban gardens is those that are legally sanctioned or otherwise legally recognized. These gardens have the requisite land rights, whether in the form of ownership or a lease agreement and have received the approval of the relevant authorities. A second category comprises illegally squatted gardens, which lack any land rights. While the social

value of urban gardening is widely acknowledged, the risk of eviction is significant for these gardens. This is equally applicable to legal gardens, whose lease for land may be terminated by the city at any time, and to illegal gardens, which may be evicted at any moment. Concurrently, not all garden communities aspire to legalisation, as this implies integration into the system, which may result in the loss of autonomy.

Furthermore, there are health-related risks associated with the practice. While legal gardens often undergo soil testing for contamination and dangerous substances, squatted gardens do not engage in any testing. The situation is analogous regarding water. The researchers have identified a lack of soil and water control as a significant concern.

The potential risks associated with activities within the social context are acknowledged. As FSIs depend on voluntary participation, the relationships between individuals within the group are of paramount importance. Interpersonal conflicts, which may arise from differing expectations regarding commitment, effort, and availability, are common and may result in the inefficient functioning of FSIs. In terms of the social use of street space, other groups of the population are also affected. The competition for space on the ground between gardens and buildings, and on the terraces between rooftop gardens and solar panels,

Figure 16. Storage in the Food Bank of Barcelona

involves the local population beyond the members of the initiatives. While not directly involved in the initiative, residents of the neighbourhood may nevertheless appreciate green spaces, and the potential loss of such areas could have a negative impact on the local community. In addition, the phenomenon of densification is accompanied by a trend of gentrification, whereby older neighbourhoods are converted into expensive areas where community gardens' land becomes occupied by buildings.

4.6. DRIVERS FOR FOOD SHARING IN BARCELONA

4.6.1. FOOD WASTE

Combating food waste is a significant driver for many FSIs (BA13). Reducing food waste resonates with many other stakeholders involved in these activities too. For example, some grocery shops are motivated to participate in FSIs, because it helps them to reduce waste management costs and increases their awareness of waste management (BA3). There is also a "feel-good" driver for small-scale neighbourhood shops when helping the local community initiatives (BA13).

4.6.2. KNOWLEDGE AND AWARENESS

Awareness of global challenges, such as climate change, growing inequality, economic disruptions, political instability, displaced communities and residents, and other, forms an important driver for engaging in food sharing activities. Moreover, individuals participating in FSIs often seek to educate others and create opportunities for learning and development. This also includes other actors, including the City of Barcelona (BA1), providing financial support to projects that create platforms for developing and sharing knowledge and experiences.

The perception of environmental responsibility often drives local initiatives to promote sustainable consumption. For example, there is a push at the regional level to increase local

food consumption and change commercial distribution patterns. This reflects a broader understanding of the environmental impacts of food distribution and a commitment to making sustainable choices:

> *"At the regional level, there is a lot of push for local product consumption, and we are the door to consume on a larger scale" (BA6).*

Social and economic drivers

Among important drivers for FSIs are societal challenges, such as addressing inequalities and relying on and strengthening the sense of community (BA1). FSIs often aim to improve the quality of life for vulnerable population groups. For instance, activities targeting the disabled community aim to enhance their quality of life by providing accessible and inclusive opportunities at times of shrinking purchasing power among vulnerable social groups:

> *"The primary goal of activities is to increase the quality of life for people with disabilities". (BA4.1)*

Similarly, assisting older people who live alone, have little social contact and could even forget to eat sometimes is an important driver for FSI volunteers (BA23).

Some FSIs rely on community support systems with a strong religious focus. An interviewee highlighted the importance of the long-standing tradition of religious charity:

> *"We have a long tradition of Christian Catholic people and organisations from all religions doing that thing in the frame of religious charity. Helping each other and neighbours." (BA3)*

Personal moral principles and altruism also play an important role in driving FSIs. Local councils' support for urban agriculture and community gardening is often rooted in a transformative vision of changing the food system. One interviewee mentioned that the city council favours urban gardens (BA7). These moral imperatives guide efforts to create a more equitable and sustainable food system.

Food sharing also functions as a corporate social responsibility (CSR) activity, where businesses and other organisations engage in sustainable and ethically responsible practices. These efforts demonstrate a commitment to sustainability and community engagement. Municipal support, such as providing spaces for food-related activities, exemplifies this:

> *"The city is supporting a lot, e.g., creating co-working spaces, where the kitchens can start their work." (BA1)*

Economic drivers can be reflected in the attempts by FSIs to improve the efficiency of their operations and, in this way, reduce food costs and make food sharing economically viable (BA2.1).

4.6.3. PROGRESS IN DIGITAL TECHNOLOGY

While digitalisation is mentioned in the literature as a driver for food sharing, none of our interviewees highlighted this as an important supporting factor. This suggests that while digital tools and platforms might facilitate food sharing, they were not a primary focus or perceived as significant by the participants in our study.

4.7. MOTIVATIONS FOR FOOD SHARING IN BARCELONA

4.7.1. MOTIVATIONS FOR USERS TO CONSUME SHARED FOOD

4.7.1.1. ACCESSING CHEAPER OR FREE FOOD

One of the primary motivations for users of food sharing is the availability of cheaper or free food (BA3). Many participants in FSIs seek to alleviate their financial burdens by

accessing food at reduced or no cost (BA21). This is particularly relevant in contexts where economic challenges and high living costs make food affordability a significant concern. For example, FSIs often provide products that are difficult to sell in regular supermarkets, thereby offering a more affordable alternative (BA6).

4.7.1.2. REDUCING FOOD WASTE

The environmental impact of food waste is a growing concern, and many individuals participate in food sharing to contribute to waste reduction efforts. Many interviewees highlighted the importance of food sharing in reducing food waste (BA2.1, BA2.2, BA3, BA18, BA19). For some users of shared food, preventing food waste is also a motivating factor (BA3), although primary drivers are often economic and related to social integration (BA10).

4.7.1.3. BUILDING RELATIONSHIPS LOCALLY

Building local relationships is another significant motivation for users. Food sharing initiatives often create opportunities for community members to connect and support each other (BA3, BA23). These activities foster a sense of community and belonging, as seen in the creation of co-working spaces and neighbourhood kitchens:

> *"There is an element to create space to be together, in a sense for community." (BA8).*

Supporting local farmers in selling their produce on a smaller scale is also a motivating element (BA6). These spaces encourage social interaction and cooperation among the residents.

4.7.1.4. ESCAPING LONELINESS

Food sharing provides many individuals an opportunity to escape loneliness and build social connections. Participating in communal activities, such as gardening or cooking, allows people to interact and form meaningful relationships. This aspect is particularly important in urban settings where social isolation can be prevalent (BA8). This is especially relevant for elderly people living alone and lacking social interaction and support (BA23).

4.7.1.5. FEELING POSITIVE EMOTIONS

The emotional benefits of food sharing also play a crucial role in motivating users. Providing job opportunities and reducing food waste brings joy and hope to vulnerable individuals by helping them reintegrate into the job market (BA2.1). The satisfaction volunteers feel from gleaning activities (Figure 10), which not only keep them healthy and fit but also contribute to reducing food waste (BA18). The fulfilment derived from social interactions within the community when receiving food from the food bank is also an important motivator (BA13).

Engaging in these activities fosters a sense of belonging and empowerment, contributes to a larger cause, and enhances emotional well-being by enabling individuals to learn new skills, share knowledge, and exchange experiences with others. One participant highlighted this by noting the importance of creating arenas for sharing experiences and learning:

> *"What people are asking for and what we think we can contribute with apart from financing is giving money to the projects so that they can develop to create arena for sharing experiences and for learning new things" (BA1).*

4.7.2. MOTIVATIONS FOR MEMBERS OF FOOD SHARING INITIATIVES TO PARTICIPATE IN FOOD SHARING

4.7.2.1. BELONGING TO A GROUP

The desire to belong to a group significantly motivates participants to engage in food sharing activities. Being part of a food sharing initiative provides a sense of community and collective identity. This motivation is especially strong when community strength and mutual support are valued. For instance, BA2.2 emphasised the sense of community created through collaboration with farmers and other organisations to transform surplus food, fostering a collective identity. Shared food retail related initiatives create a welcoming environment where members can interact, chat, and build relationships, enhancing their

sense of belonging (BA6) (Figure 3). Urban gardens serve as positive areas for integration and co-creation, where people, including migrants and local residents, feel comfortable and motivated to participate (BA7). Additionally, collective eating and cooking activities bring people together, promoting social integration and cooperation (BA10). These activities not only address practical needs but also fulfil the participants' emotional and social desire to be part of a supportive and engaged community (Figure 17).

4.7.2.2. FEELING POSITIVE AND NEGATIVE EMOTIONS

The emotional spectrum of hope and frustration also drives participation in food sharing. Members often feel a mix of positive emotions, such as hope for positive change, and negative emotions, such as frustration with existing food systems. These emotions motivate them to engage in food sharing activities to address these feelings and work towards a better system. One interviewee noted the importance of creating learning opportunities and sharing experiences to foster these positive emotions (BA1).

Providing job opportunities to vulnerable individuals instils hope by aiding their reintegration into the job market, while also preventing food waste (BA2.1). Some people are motivated by the frustration felt due to the perceived failure of the state, which drives people to engage in food sharing to address these shortcomings (BA3). Gleaning volunteers experience satisfaction through their activities, contributing to food recovery and providing a sense of purpose (BA18). Some participants in urban gardening are motivated by the frustration about the lack of green spaces in Barcelona, which drives them to create and/or defend urban gardens as a reclaiming of city space for citizens (BA7).

Another motivation for members is the moral satisfaction of doing good or having a "clear conscience". Participating in food sharing allows individuals to feel they are contributing positively to society and helping those in need. This motivation is powerful in FSIs that emphasise the ethical aspects of food sharing, such as reducing food waste and supporting community gardens (BA7). Similar was observed among people engaging in gleaning (BA18) (Figure 10), volunteers in food banks (BA13) (Figure 9) or FSI activities supporting vulnerable individuals (BA2.1) and lonely older people (BA23). Engaging in food sharing activities thus brings a complex mix of hope, moral satisfaction and frustration, driving participants to work towards meaningful change while navigating the challenges they face.

4.7.2.3. STRIVING FOR SOLIDARITY WITH OTHERS

A strong sense of community and solidarity with others is a key motivator for FSI members. FSIs provide a platform for members to work together towards common goals, creating a sense of unity and shared purpose. This is evident in collaborative efforts to create neighbourhood infrastructures and support local producers:

> *"We are supporting these activities; we are following the services that social departments are doing, but they have the main funds to work with food redistribution" (BA1).*

Retail initiatives in the food sharing domain encourage community interactions, where members engage in meaningful conversations and build relationships (BA6). Employing vulnerable individuals, FSIs can also foster mutual support and a sense of belonging (BA2.1). For instance, collective cooking and eating help combat loneliness and promote social integration (BA10). Urban gardens can serve as a hub for learning and supporting each other, promoting agroecology and social bonds (BA7).

4.7.2.4. REDUCING FOOD WASTE

FSI members are also driven by a desire to prevent food surplus and ensure that excess food is used efficiently, which aligns well with the broader goals of sustainability and resource management. Projects that focus on efficient food distribution and waste prevention reflect this motivation. For instance, BA2.2 highlighted the transformation of misshapen and surplus food into preserves, soups, and jams, ensuring that imperfect produce is utilised rather than wasted (Figure 18). Initiatives encouraging the sale of difficult-to-sell products in alternative markets demonstrate a commitment to reducing food surplus (BA6). An important role in redistributing surplus food is for food banks who play a central role in food sharing activities on a large scale (BA13) (Figures 6, 10, 16). Additionally, FSI, which sells products in loose form and reduces packaging, contributes to

promoting local consumption and supporting local farmers while also addressing the issue of food surplus (BA6).

4.7.2.5. RESISTING NEO-LIBERAL AGENDAS AND CONSUMERISM

Figure 17. Urban gardeners at Can Batlló, Barcelona

Some FSI members are motivated by political beliefs, particularly those opposed to private ownership of land. These individuals view food sharing as a way to challenge existing land ownership structures and promote more equitable and sustainable land use. This motivation is evident in the support for urban agriculture and community gardening projects, which are seen as transformative efforts to change the food system:

> *"They worked in this system and have very radical in a positive way thinking, transformative vision on how to change the food system in Barcelona and how to promote urban agriculture" (BA7).*

These gardens not only provide green spaces but also foster community interaction, knowledge exchange, and political engagement.

Similarly, BA8 highlighted how occupying empty spaces for urban gardening is a form of resistance against the hostile urban environment, promoting a more inclusive and participatory approach to land use. These initiatives demonstrate a transformative vision for the food system in Barcelona, where urban agriculture and community gardens become tools for promoting social equity and sustainable land practices.

Anti-consumerism convictions also drive participation in food sharing. Members who hold these beliefs view food sharing as a way to resist consumer culture and promote alternative, sustainable practices. This motivation aligns with efforts to promote urban agriculture and local food production as opposed to mainstream commercial distribution systems. For instance, urban gardens not only provide green spaces but also serve as centres for agroecological education, encouraging people to rethink their food sources and consumption patterns (BA7). Another interviewee underscored the importance of consuming organic products and supporting a participatory economy rather than a capitalist one, illustrating a clear resistance to consumerist values (BA30). Meanwhile, different food sharing retail initiatives foster community interactions and support local producers, reducing reliance on commercial distribution systems and promoting a more sustainable, community-focused approach to consumption (BA6). These examples demonstrate how anti-consumerism beliefs drive members to engage in food sharing activities that support sustainable practices and challenge mainstream consumer culture.

4.7.3. MOTIVATIONS FOR ORGANISATIONS TO ESTABLISH AND DEVELOP FOOD SHARING

For organisations, the motivations to establish and develop FSIs are multifaceted, driven by various social, economic, and environmental goals.

4.7.3.1. SERVING ECONOMICALLY DIVERSE COMMUNITIES

Organisations are motivated to establish and develop FSIs to serve economically diverse communities. These projects aim to provide access to affordable food for all community members, regardless of their economic status. This is exemplified by projects, where local consumption and direct relationships with farmers are promoted to make high-quality food accessible (BA6). The creation of neighbourhood-level infrastructures, such as co-working spaces and community kitchens, exemplifies this motivation:

Figure 18. Cream produced from surplus carrots in Es Imperfect community kitchen

> *"The city's infrastructure has been involved in funding and creating. It will be a neighbourhood organisation of activities, but the city will be the main funder" (BA1).*

4.7.3.2. COMBATING SOCIAL ISOLATION AND SUPPORTING COMMUNITY BUILDING

Combating social isolation is another key motivation for organisations. By providing spaces for social interaction and community building, FSIs help reduce loneliness and promote social cohesion. This is particularly important in urban areas where social isolation can be a significant issue:

> *"There is an element to create space to be together, in a sense for community" (BA8).*

BA10 also highlighted the role of activities such as collective cooking and eating, which combat loneliness and create a supportive environment.

Establishing a sharing culture is a significant motivation for organisations. FSIs aim to create a culture of cooperation and mutual support within communities. By providing shared resources and opportunities for collaboration, FSIs help build a sense of community and collective responsibility.

4.7.3.3. REDUCING ENVIRONMENTAL IMPACTS

Environmental concerns are a major driver for organisations involved in food sharing. FSIs often aim to promote sustainable practices and reduce the environmental impact of food production and consumption. For example, regional efforts to increase local food consumption and change commercial distribution patterns reflect a commitment to environmental sustainability:

> *"At the regional level, there is a lot of push for local product consumption, and we are the door to consume on a larger scale" (BA6).*

There are FSIs seeking to reduce packaging and selling products in loose form, thereby minimising waste and supporting local farmers (BA2.2, BA6). Establishing roof-top gardens is also driven by environmental benefits, such as greening urban spaces and absorbing CO_2 emissions while providing high-quality food to social canteens in Barcelona (BA4.1). Community gardens also increase biodiversity and reconnect people with nature (BA12). Similarly, reclaiming empty urban spaces for guerrilla gardening (Figure 4) turning otherwise unused areas into productive green spaces fosters community engagement and environmental stewardship (BA8). These examples illustrate how food sharing organizations integrate environmental concerns into their core missions, promoting sustainability through innovative practices and community-focused initiatives.

Organisations are also motivated by an understanding of the inefficiencies of conventional food chains. FSIs provide a way to address these inefficiencies by promoting more sustainable and equitable food distribution methods. This motivation is evident in projects that offer alternative markets for difficult-to-sell products, thereby reducing waste and improving resource use (BA6).

4.7.3.4. CHANGING BEHAVIOURAL PATTERNS THROUGH PRACTICE

Finally, organisations are motivated to change behavioural patterns through practice. FSIs allow individuals to engage in sustainable practices and learn new skills. This hands-on approach helps promote long-term behavioural change and fosters a more sustainable and equitable food system.

> *"They were motivated by the need for space where people could interact with what they could imagine as nature and where they could garden, and also gather and have events" (BA8)*

4.8. SUCCESS FACTORS OF FOOD SHARING IN BARCELONA

4.8.1. INFRASTRUCTURE

A robust infrastructure is fundamental to the success of FSIs. Furthermore, higher levels of city-based innovation and experimentation provide an environment conducive to developing and scaling food sharing, as evidenced by consolidating a regional model and establishing the ecosystem for Espigoladors (BA2.1).

Supportive governing structures, such as legislation and policies, significantly bolster food sharing efforts. In Catalonia, for instance, the regulation of gleaning and the requirement for companies to report food loss and waste have provided a supportive legislative framework (BA2.1). Furthermore, affiliation with or integration into public institutions strengthens FSIs by providing legitimacy and additional resources. This integration facilitates research, the formulation of food loss definitions, and the involvement of various stakeholders, including academia and public administration (BA2.1).

City-level support is also crucial to facilitate needed infrastructures. The city of Barcelona has been actively involved in funding and creating neighbourhood-level infrastructures like co-working spaces, community kitchens, and urban gardens, which are vital for supporting economically diverse communities (BA1, BA7). These spaces not only offer physical venues for food sharing activities but also foster social interaction, community building, and local engagement (BA6).

4.8.2. KNOWLEDGE AND LEARNING

Knowledge and learning are pivotal success factors in food sharing. Participants' relevant skills and previous experience with food sharing enable them to navigate challenges effectively. For instance, having different responsibilities and being flexible have benefited some FSIs (BA5). Inter-organisational networking and strategic partnerships foster collaboration and resource sharing, as seen in the agreements with major farmers and cooperative federations in Catalonia (BA2.1).

The existence of platforms that facilitate collaboration is also vital. These platforms create opportunities for learning and professional growth, as highlighted by the organic growth of networks and the exchange of professional expertise (BA1). Shared information spaces, such as participatory forums, allow participants to share insights and advice, which enhances collective learning and problem-solving (BA2.1). For example, Espigoladors arranges meetings with different organisations, farmers, and farmers' associations to explain the value of surplus food transformation (Figure 18) and discuss product ideas, fostering a collaborative learning environment (BA2.2). Similar educational activities, including the provision of community space, are supported by La Botiga (BA21).

Learning from other food-sharing communities and engaging in mutual learning among participants drive continuous improvement and innovation. The organic development of networks where participants learn from each other exemplifies this (BA1). Active participation in international city networks also provides valuable insights and best practices that can be adapted locally (BA2.1). For instance, Hort al Terrat's recognition and award for its innovative approach to managing rooftop gardens show the importance of continuous learning and adaptation (BA4.1).

> *"This project got good recognition for its innovative and efficient approach to public sector practices. It won the European Public Sector Award (EPSA) in 2019 among 160 projects from 18 European countries." (BA 4.1)*

Informing the public about the benefits of food sharing is essential for garnering broader support and participation. It is important to share information about good examples of projects, which educate school children about healthy lifestyles (BA10). However, participants must take personal responsibility for understanding and managing risks, ensuring the safety and reliability of food sharing systems. Trust between actors is fundamental, as it underpins successful collaboration and support. For example, participants who were flexible in their activities and earned farmers' trust demonstrated the importance of trust in addressing challenges (BA2.1). BA13 highlighted how trust builds over time with local shops encouraging consistent food donations, illustrating the importance of reliable relationships in sustaining food sharing efforts.

4.8.3. ORGANISATION

Effective organisation is critical for FSIs. Stable internal governing structures, clear definitions, and communication of organisational goals ensure smooth operations and alignment among participants. Consolidating a specific law and strategy in Catalonia highlights the importance of stable governance (BA2.1). Clear organisational goals, such as the aim to be self-sufficient and independent of subsidies, guide participants' efforts (BA6).

Identification with the initiative's goals, values, and moral standards fosters participants' commitment and motivation. This identification is evident in the recognition and support from farmers who initially doubted the initiative but eventually believed in its mission (BA2.1). Exploring key rules, norms, and tasks enhances transparency and accountability, facilitating effective collaboration. For example, the structured approach to managing surplus food and involving various stakeholders, including academia and public administration, ensures clear communication and effective operations (BA2.1).

> *"You have to be very patient and comprehensive. We persuaded farmers' leaders and reached an agreement with the biggest farmers' federation in Catalunya, the biggest cooperative federation in Catalonia. It is also an inflation point, once you have an agreement with the farmers union, the rest is easy." (BA2.1)*

Collaborative behaviour is crucial for the success of food sharing projects. Engaging users in gleaning and cooking classes fosters a collaborative environment (BA2.1). The availability of volunteers is indispensable for the sustainability and effectiveness of FSIs. Volunteers contribute to various activities, including gleaning and food redistribution, thereby ensuring that these projects operate smoothly (BA2.1).

Multifunctionality, where FSIs serve multiple purposes, enhances resilience and impact. Additionally, transparency in operations builds trust and credibility among participants and stakeholders, as seen in the agreements with various federations (BA2.1). BA13 also underscored the value of consistent and transparent operations in building long-term partnerships with local shops, ensuring a steady flow of food donations and community support.

4.8.4. ENABLING FACTORS

While technology and behaviour change due to the COVID-19 pandemic are recognised as enabling factors in the literature, our empirical data have not indicated these factors as very important. Nevertheless, technology plays an important role in facilitating communication and coordination of FSIs. It helps organising volunteers, track food donations, and manage logistics efficiently (BA2.1).

The pandemic had an important impact on behavioural changes that favour community-based and sustainable food sharing practices. The shift towards local consumption and the emphasis on community resilience during the pandemic have potentially enhanced participation in these initiatives (BA6). The need for local, reliable food sources during crises has underscored the importance of FSIs.

Pre-existing social ties and personal relationships among participants play a crucial role in fostering trust and collaboration:

> *"We know each other and we know which one of us has more influence, we know how to organise ourselves" (BA6).*

This intrinsic trust and familiarity facilitate smoother coordination and a stronger sense of community.

In addition, personal commitment and shared values contribute to the success of FSIs. Participants often share a common goal of reducing food waste and supporting vulnerable populations, which drives their engagement and sustained effort (BA2.1). BA13 highlighted how the long-term relationships and trust built with local shops have led to consistent food donations, demonstrating the importance of strong personal relationships in the success of FSIs.

Moreover, the involvement of local institutions and the support of public policies create an enabling environment. For example, regulatory frameworks that mandate reporting food loss and waste, as seen in Catalonia, provide a structured approach to addressing food waste (BA2.1). This regulatory support, combined with grassroots community efforts, creates a robust framework for FSIs to thrive.

By leveraging technology, fostering strong social ties, and benefiting from supportive policies, FSIs can effectively enhance their reach and impact, ensuring sustainable and resilient community practices.

5. CONCLUSIONS

Barcelona showcases diverse FSIs, including growing and composting, eating and cooking, and redistributing surplus food. These initiatives combine social entrepreneurship, community engagement, and innovative business models, ranging from small neighbourhood groups to social integration companies and large cooperatives. They are now integral to the city's food governance landscape. Supportive legislation, collaboration among public institutions, and various funding programmes have aided these efforts, with a significant boost from Barcelona's 2030 Social and Solidarity Economy Strategy.

Food sharing is deeply rooted in the social and solidarity economy in Barcelona. Many FSIs have evolved from resistance movements reclaiming community rights, especially urban gardens on squatted land. FSIs in Barcelona help address the challenges of food insecurity, waste generation, and social inclusion, demonstrating a more sustainable approach to urban food systems. The experiences of FSIs highlight the importance of supportive policies, community involvement, and adaptability to changing socio-economic conditions.

FSIs in Barcelona generate substantial social, economic, and environmental value. They provide job opportunities, promote social inclusion, help vulnerable individuals gain skills and work experience, and valorise food surpluses from retail and agriculture, leading to multiple environmental benefits. FSIs complement larger food support initiatives, such as food banks, while fostering community building and social inclusion. Participation in FSIs promotes health and raises awareness about healthy lifestyles and environmental sustainability. Additionally, FSIs advocate for policies that enhance food management, support vulnerable populations, and engage in policy development, emphasising their role in social integration and food waste management.

FSI activities incur various costs. Access to space and facilities is crucial, involving expenses for maintenance, rent, and utilities. Food logistics, including collection, sorting, cooking, and redistribution, also represent significant costs. Human labour is essential, with

expenses for training and educating volunteers. Initial phases often require substantial capital investments, and ongoing activities need continuous funding. Scaling up FSIs may require professional storage and sorting facilities, software for operations monitoring, and personnel with specific skills, highlighting the financial considerations involved.

FSIs rely on diverse funding sources. Public grants can cover up to 75% of costs. Private organisations contribute through tax-deductible donations of money, food products, or surplus produce. During crises like the COVID-19 pandemic, crowdfunding has been employed. Some FSIs use bank loans combined with public grants, especially if profit generation aligns with their business model. Established FSIs may offer consultancy services related to food waste management and cooking classes for a fee, promoting sustainability. Local authorities also support FSIs by covering personnel salaries for limited periods, and facilitating workforce recruitment and retention.

FSIs face significant challenges maintaining operations, mainly as they grow and consolidate activities and resources. Scaling up introduces challenges, including aligning with regional food policies and establishing a reliable reputation in new environments. Financial challenges include securing funding for free-sharing activities and pricing products to cover expenses while demonstrating social value. FSIs must develop clear strategies and engage in policy advocacy to overcome these obstacles creatively.

FSIs also face risks from societal, environmental, and political changes. Shifts in immigration policies and climate change priorities can impact their operations and effectiveness. Weather conditions threaten growing FSIs, with city bans on water use and extreme heat affecting plant growth and participant involvement. Stigmatisation can limit the reach of FSIs promoting communal cooking and eating. FSIs dependent on food donors risk disrupted relationships if contaminated products are delivered. These complexities and challenges highlight the need for adaptability and resilience.

Despite these challenges, FSIs are motivated by the drive to reduce food waste, address social inequalities, alleviate poverty, and combat shrinking purchasing power. They aim to build community, provide shared resources, and make food more affordable, combating social isolation by fostering social interaction and community building. While digitalisation

is recognised as a driver for food sharing, interviewees in Barcelona did not highlight it as a primary focus. Users of FSIs are motivated by accessing cheaper or free food, reducing food waste, building local relationships, escaping loneliness, and experiencing joy, hope, and satisfaction. FSI members seek a sense of community and solidarity, aiming to prevent food waste and resisting neoliberal values orchestrated in private land ownership and consumerism.

Looking ahead, the future of FSIs in Barcelona will likely involve developing robust and sustainable infrastructures, including dedicated spaces for food-sharing activities and integration into urban environments. Successful development requires knowledge and learning through structured training, knowledge exchange platforms, and widespread use of digital tools. Stable organisational structures, formalised governance, volunteer management strategies, and a focus on long-term financial stability are crucial. FSIs that adapt to political changes, economic conditions, and environmental challenges are more likely to remain stable.

Based on these conclusions, several recommendations can be made. Firstly, advocating for supportive policies and community involvement is crucial for the development and sustainability of FSIs. Policymakers should recognise the social, economic, and environmental value of FSIs and provide supportive frameworks. Secondly, FSIs must continuously adapt to changing socio-economic conditions by developing strategies to address economic crises, secure funding, manage costs, and scale up if it aligns with their goals. FSIs must explore various funding sources, manage costs effectively, and maintain their social and environmental objectives.

Lastly, FSIs should develop strategies to mitigate risks and ensure long-term sustainability. This includes adapting to political changes, economic conditions, and environmental challenges and managing risks related to personnel, funding, and relationships with food donors. FSIs should also consider the potential impacts of societal changes, such as shifts in immigration policies and climate change priorities, on their operations and effectiveness. Technology and behavioural change can facilitate communication and promote sustainable food practices.

6. REFERENCES

Abril Janer, Mireia. 2023. “Barcelona Urban Agriculture Strategy 2019-2030. Advancing the Edible City: Ideas, Practices and Systems.” Presented at the The 2nd Edible Cities Network Conference, Barcelona, March 16.

AMB. n.d. “Population - L’àrea Metropolitana - Àrea Metropolitana de Barcelona.” L’àrea Metropolitana. Accessed June 24, 2024. https://www.amb.cat/web/area-metropolitana/coneixer-l-area-metropolitana/poblacio.

Calvet-Mir, Laura, and Hug March. 2019. “Crisis and Post-Crisis Urban Gardening Initiatives from a Southern European Perspective: The Case of Barcelona.” *European Urban and Regional Studies* 26 (1): 97–112. https://doi.org/10.1177/0969776417736098.

City of Barcelona. 2020. “Urban Agriculture Strategy | Urban Planning, Ecological Transition, Urban Services and Housing.” 2020. https://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/green-city-and-biodiversity/urban-agriculture-strategy.

———. 2021. “What Is the 2030 Strategy?” Economia Social i Solidària. 2021. https://ajuntament.barcelona.cat/economia-social-solidaria/en/essbcn2030-strategy.

———. 2022a. “Barcelona Healthy and Sustainable Food Strategy for 2030.” City of Barcelona (Ajuntament de Barcelona) and PEMB. https://www.alimentaciosostenible.barcelona/sites/default/files/2023-10/Barcelona%20Healthy%20and%20Sustainable%20Food%20Strategy%202030.pdf.

———. 2022b. “The 2030 Barcelona Healthy and Sustainable Food Strategy: A Road Map for Transforming the City’s Food System.” Ajuntament de Barcelona. Citizen Participation. 2022. https://ajuntament.barcelona.cat/participaciociutadana/en/he-2030-barcelona-healthy-and-sustainable-food-strategy-a-road-map-for-transforming-the-citys-food-system_1233964.

CULTIVATE. 2023. “Barcelona Manual Map.” Google My Maps. 2023. https://www.google.com/maps/d/u/0/edit?mid=1xT_h-VAqlKsT5opmM7t3o8_0_cL8W9U&ll=41.37472954284672,2.1274540153684462&z=12.

Davies, Anna. 2017. “Barcelona SHARECITY Profile.” Trinity College Dublin, Ireland. https://sharecity.ie/wp-content/uploads/2017/02/Barcelona-final.pdf.

———. 2024. “CULTIVATE: WP2 - Executive Board Meeting 2.1.” Presented at the CULTIVATE Executive Board Meeting, Online, February 6.

Mont, Oksana. 2018. *Mobile Research Lab: Methodological Underpinnings*. IIIEE, Lund University. https://portal.research.lu.se/portal/en/publications/mobile-research-lab(2cf031b4-e9ff-4f5a-a429-a63167a82261).html.

PEMB. n.d.-a. “Metropolitan Commitment 2030: A Strategy for the City of 5 Million.” Pla Estratègic Metropolità de Barcelona. Accessed June 24, 2024. https://compromismetropolita.cat/modules/custom/pemb_utils/templates/assets/CompromisMetropolita2030_ca.pdf.

———. n.d.-b. “What Is the Plan?” What Is the Plan? Accessed June 24, 2024. https://pemb.cat/en/static/what_is_the_plan/2/.

Voytenko Palgan, Yuliya, and Vera Sadovska. 2023. “Research Protocol for Mobile Research Labs on Food Sharing: Tracing Costs, Investments, Challenges, Drivers, and Success Factors to Establish and Maintain Food Sharing Initiatives.” *Research Protocol for Mobile Research Labs on Food Sharing*. https://lucris.lub.lu.se/ws/portalfiles/portal/170297796/Research_protocol_for_Mobile_Research_Labs_on_Food_Sharing_CULTIVATE.pdf.

Wikipedia. 2024. “Barcelona.” In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Barcelona&oldid=1229995544.

Wu, Hao. 2024. “CULTIVATE - Work Package 2: Mapping, Tracking and Monitoring Food Sharing Initiatives. T 2.2 Manual Mapping of Food Sharing Landscapes in Hub Locations.” Presented at the CULTIVATE General Assembly, Utrecht, May 15.

Authors:
Yuliya Voytenko Palgan (ULUND);
Vera Sadovska (ULUND);
Oksana Mont (ULUND);
Andrius Plepys (ULUND)

Graphic design:
Nicoletta Gomboli (ICONS)

All photos taken by the authors

LUND UNIVERSITY

iiiee

THE INTERNATIONAL INSTITUTE FOR
INDUSTRIAL ENVIRONMENTAL ECONOMICS

Funded by the European Union

This report was developed within the CULTIVATE project funded under Horizon Europe (Grant Agreement No. 101083377).