



Evolving foodscapes: Tracing trajectories of urban and peri-urban food sharing initiatives for just food transitions

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ABSTRACT

Urban and peri-urban (UPU) area food systems need reconfiguration to support just transitions towards sustainability. Collaborative acts around food – food sharing for brevity – have been mooted as a potentially productive arena for enacting such a transition, with research exploring the location, goals, and activities of individual food sharing initiatives (FSIs) internationally. Situated conceptually at the intersection of diverse economies approaches and critical mapping, with an overarching concern for achieving just transitions to sustainable food systems, this paper advances understanding of FSIs by adopting a novel longitudinal lens and focusing on the UPU scale. Implementing a co-designed and collaboratively translated system for identifying and categorizing FSIs that have a digital presence in two European cities: Milan and Barcelona, we contextualize and compare the results uncovered, contrasting these with findings from earlier research to establish evolutionary trajectories for urban FSI landscapes. The expanded mapping process offers significant empirical insights tracing the often invisible but dynamically evolving location, form, and function of UPU FSI landscapes. These methodological and empirical insights are interrogated to identify what contribution critical mapping of FSIs at the UPU scale makes to allied efforts for just and sustainable food systems. In conclusion, while the approach outlined has limitations in terms of resource intensity and explanatory power, we see the approach as one vital component in furthering comprehensive understanding of UPU food systems, providing opportunities to: document diverse food geographies; create new spatial imaginaries; support efforts for greater food democracy, and advocate for more equitable distribution of sustainable food sharing initiatives.

1. Introduction

More than half the world's population already resides in urban and peri-urban (UPU) areas, consuming over two-thirds of all food produced globally. However, UPU areas also contain over two-thirds of the world's food insecure population despite a third of food being wasted before consumption (HLPE, 2024). This places UPU areas at the centre of intense debates about shifting food systems onto more sustainable pathways (FAO, 2023, FAO et al., 2023, Moragues-Faus et al., 2024, Moragues-Faus, 2022) and has resulted in a suite of visions, agendas and action programmes seeking more sustainable, resilient, integrated, and inclusive urban food systems (FAO, 2019, 2023, MUFPP, 2024). In this context, the Food and Agriculture Organisation (FAO) defines a

sustainable food system as one that “delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised” (FAO, 2016:1). Meanwhile, in its Urban Food Agenda – a flagship initiative to enhance sustainable development, food security and nutrition in UPU areas – the FAO argues that a sustainable UPU food system is one able to feed its population whilst also providing for environmental health, economic viability and social equity (FAO, 2019).

The trend towards UPU areas in global food governance organisations resonates with extensive academic research demonstrating the need for system change for sustainability; this is often expressed as calls for food system transitions or transformations (see Hinrichs, 2014; McDermid et al., 2023; Sonnino, 2023). While these two terms are used

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interchangeably in policy and practice, transition is more allied with gradual, incremental shifts, whereas transformation generally connotes more radical changes, including in underlying values, power and governance structures (West, 2024). Moreover, calls to ensure such changes are ‘just’ are increasingly reiterated in national and international policy contexts (Tribaldos & Kortetmäki, 2022). While the framing and application of just transitions policy is the subject of much deliberation (see Bouzarovski, 2022), the ‘just’ element is typically interpreted to mean systems which are fair and inclusive, creating decent work opportunities and leaving no one behind.

The FAO’s Urban Food Agenda clearly identifies UPU areas as key drivers for essential food systems change towards sustainability and efforts are being made to include urban government actors in global fora such as the Committee for Food Security (CFS). To this end, the CFS included “strengthening urban and peri-urban food systems” as one of seven emerging and critical areas prioritized in their 2024 annual report (HLPE, 2024:1). However, while engaging policy makers at this scale is a significant and positive development, they rarely have a full picture of the UPU food systems they govern, often prioritising mainstream commercial actors while underplaying diverse food economy actors and activities (Davies et al., 2019; Davies, 2019; Dixon, 2011; Jackson et al., 2021) including food sharing initiatives (FSIs) such as community gardens, community kitchens and surplus food redistribution initiatives, which are the focus of this paper.

Within broader debates on sustainable UPU food systems, the location, form, function, and impact of FSIs are not sufficiently understood in food or sustainability policies. This is, in part, due to their diverse form and focus, operating across the food chain (Davies et al., 2019) and including activities from collective growing: such as seed sharing (Davies et al., 2022), and community gardens (Raneng et al., 2023; Rut and Davies, 2018), through to cooking and eating activities embodied by neighbourhood lunches and community kitchens (Marovelli, 2019), and distributive activities including surplus food redistribution or food rescue (Davies, 2022), right through to community composting (Morrow and Davies, 2022). A key feature differentiating FSIs from mainstream commercial food activities is their dominant mode of exchange and the organisational structure of their initiative. Food sharing initiatives typically employ multiple modes of exchange, sometimes selling some goods and services for money, albeit largely within a not-for-profit business organisational model, whilst also gifting some goods and services for free, or employing activities such as gleaning (gathering left-over crops post-harvest) and foraging (termed collecting), and bartering.

For FSIs that leave a digital trace through their online social media profiles, websites, or Apps, motivations for the establishment and operation of FSIs are generally stated in mission statements or ‘about’ sections of digital profiles (Davies, 2019). While the motivations of an individual initiative can be highly localised, research examining the mission statements of over 4000 FSIs internationally found that the primary motivation articulated was social, with the terms ‘community’, ‘local’, and ‘people’ all appearing in the top ten most common terms. Broadening the analysis to include impact areas identified by FSIs reveals 78 % refer to economic benefits, 77 % social benefits and 61 % environmental benefits. Around a third of all FSIs explicitly sought impacts across all three dimensions (see Davies et al., 2017). However, FSIs and their activities often remain invisible to UPU officials and wider citizens, despite supporting and promoting food sustainability and resilience, reducing food waste, enhancing access to nutritious food and supporting food security, fostering community engagement, and encouraging local food production and consumption (Mackenzie and Davies, 2019; 2022; Egli et al., 2016; Koay & Dillon, 2020; Marovelli, 2019).

Formative mapping of FSIs that leave a digital trace¹ in that they have a website, an App, or a profile on an interactive social media platform such as Facebook, was undertaken in 2015–2016 of 100 urban areas across the globe, including Milan and Barcelona, the locational focus for this paper. This resulted in the construction of the publicly accessible and interactive SHARECITY100 Database, which detailed and categorised more than 4000 initiatives across 100 cities around the globe (Davies et al., 2017a, Davies et al., 2017b). The SHARECITY mapping process provided an engaging snapshot of the diverse food sharing economies in these locations, with website analytics conducted in 2019 revealing the database was accessed more than 17,000 times from 93 countries since its launch in 2017. However, the approach was constrained linguistically, temporally, and in terms of human resources. This paper reports on subsequent efforts made to mitigate these constraints and make the approach more ‘critical’. Such critical mapping emphasises the importance of what spatial information is presented in maps, how it is collected, and by whom. Proponents argue that more expansive mapping with marginalised actors gives them greater visibility and voice, potentially destabilising uneven power relations (Delsante and Orlandi, 2020).

Specifically, the central research question guiding this paper is: “How does critical mapping of diverse digitally mediated FSIs contribute to just urban food transitions in Barcelona and Milan?” These two cities are considered because they are both European cities and therefore subject to the same overarching European Union legislation, and both have experienced common challenges in relation to the COVID-19 pandemic, the Ukrainian conflict, and a cost-of-living crisis. However, they also have specific national policy trajectories and histories. Italy developed a food donation law in 2016 (Grant and Rossi, 2022), while Spain enacted its Law on Food Waste and Loss Prevention only in 2023. While Milan has become a global leader on urban food policy with the development of the Milan Urban Food Policy Pact (FAO, 2018), Barcelona has focused more broadly on supporting a robust solidarity economy (Giovannini, 2020).

To address the central research question, we initially identify key debates at the intersection of diverse food economies and critical mapping for just and sustainable food system transitions that underpin the mapping of FSIs. Then we outline the mapping methods, highlighting advancements made in that area since the SHARECITY mapping exercise was undertaken. The main body of the paper provides a contextual overview of Milan and Barcelona, covering geography and economy, politics and society, food and food culture, environment, and sustainability policies, noting key policy changes and major disruptive events experienced in both locations over the past decade. This is followed by an overview of the data revealed through FSI mapping, with a focus on evolution (change over time) and transformation (change in composition) of the FSI urban landscape in Milan and Barcelona individually and comparatively. The benefits and limitations of the improved mapping process are then interrogated in terms of their practicality and efficacy for supporting just transitions to more sustainable UPU food systems. We conclude by placing the study in a wider context, identifying avenues for future research and broad applications in documenting and advocating for just and sustainable food systems, identifying how the mapping approach adopted contributes directly to global calls for just transitions to more sustainable urban food systems.

2. FSIs, diverse economies, and just urban food sustainability transitions

Attention to food sharing has experienced a renaissance over the past decade following the impact of commercial digital platforms and

¹ Not all FSIs leave a digital trace and it is acknowledged that urban actors may wish to understand off-line FSI activities as well, however for ethical and practical reasons these were not included in this analysis.

technologies on exchange practices in other sectors, such as car or accommodation sharing, and the adoption of digital media channels and tools by FSIs within urban areas (Davies, 2019, Herrero and Moragues-Faus, 2024, Sadovska et al., 2024). However, the celebratory zeal in relation to commercial 'sharing' or platform economies in other sectors has dulled following their failure to demonstrate the kinds of positive social, economic, and environmental benefits envisaged (see Davies et al., 2017a). For example, while the concept of reducing waste by exchanging under-utilised assets (such as cars, rooms, or food) through platforms was a prime argument used to promote these commercial practices, the negative impacts on the vitality of local places for local people have emerged, and not least due to the precarious employment such platforms often provide (Schor et al., 2020, Buhalis et al., 2020, Davies et al., 2023). While it is the case that consumer-facing commercial platforms have emerged in the food sector, focused predominantly on social dining (Davies et al., 2022) and surplus food redistribution (Michellini et al., 2018), these have not yet led to the scale of disruption caused in other sectors. Instead a landscape of diverse digitally-mediated FSIs has emerged dominated by social enterprise and not-for-profit organisational models, with research identifying the many ways that such food exchanges take place across space and time (Evans and Davies, 2019), why particular exchange mechanisms are adopted (Kaplan and Gurven, 2005) and how those systems of exchange evolve (Julier, 2013).

FSIs are commonly bundled together in academic discussions under the banner of alternative food networks (AFN) or diverse food economies (Cameron and Wright, 2014, Gibson-Graham, 2006, Gritzas and Kavoulakos, 2016, Sarmiento, 2017). Research has already demonstrated that FSIs, like other organisations typically considered part of a diverse AFN, tend to be mission-driven initiatives with environmental, social, political and/or economic goals around food. Indeed, preliminary sustainability impact assessments demonstrate how their contributions align with these goals (Mackenzie and Davies, 2019, 2022). They also exhibit diverse organisational forms (from informal networks and association through to charities, co-operatives and social enterprises), seek to create value beyond financial returns (Knezevic, 2021) and often adopt a 'more-than-food' focus for their activities where food is a catalyst for other social and political interactions (Marovelli, 2019).

While committing to the agenda of diverse economies approaches – to make visible aspects of economies which commonly fly under policy and popular radars – we acknowledge the extensive academic critique of AFN from a semantic definitional perspective (Sarmiento, 2017) as well as scepticism that AFN activities, from Fair Trade (Wilson, 2010) to farmers markets (Alkon, 2008), can move from niche activities to disrupt the global food system. In brief, concerns exist that AFN are often small-scale, exclusive, and exclusionary, providing limited food only for those on higher incomes (Alkon and McCullen, 2011; Guthman, 2008), and critics challenge assumptions that only local food provides sustainable options (Born and Purcell, 2006). However, and in agreement with Mikkelsen (2011), it seems premature to discount emergent sectors, such as FSIs, in advance of full knowledge of their activities and evolution. Indeed, creating a rich picture is central to the diverse economies approach in that it seeks rather than reviles 'mere description' – that is it sees value in describing a more comprehensive food system – and allows attention to different forms of labour, work, and care and to diverse forms of exchange common in FSIs, from gifting and bartering to foraging and gleaning (McLain et al., 2014, Morrow and Davies, 2022, Rut and Davies, 2018, White, 2013). Building on the work of Drake and Lawson (2014), we are able to read for difference (not dominance) at scale through our mapping endeavours of FSIs across two locations and to elevate the visibility of marginalised activities considering their location and contribution to UPU food justice transitions (Certomà and Martellozzo, 2019).

Drilling down into research on urban food justice (Heynen et al., 2010) and just urban food transitions (Moragues-Faus et al., 2024) reveals particularly vibrant themes around matters of food security and

democracy (Davies et al., 2019). While these terms are interlinked and notoriously hard to bound, in this paper we see urban food justice as an overarching social movement and a set of principles that seek social justice around food in urban areas through access to healthy and sustainable food for all (distributional justice), including opportunities to engage and shape food systems at the urban scale (procedural justice), as well as recognising past and present inequities and seeking to address these (recognition justice). Urban food security focuses more specifically on physical, social, and economic access to sufficient, safe, and nutritious food that meets the preferences and dietary needs of urban dwellers. The study of this phenomenon has expanded, and while remaining predominantly focused on food supply, for example, through urban gardening (Murray et al., 2023), rather than food access, there are indications that urban food security activities are increasingly aligning with broader urban sustainability agendas beyond purely agricultural paradigms. While proponents of food democracy similarly centre rights to access and control the food that is eaten, they also advocate for a more inclusive, participatory and equitable processes shaping food policies and practices (Hassanein, 2003) and the importance of an urban lens for such work has recently emerged (Bornemann and Weiland, 2022, Davies et al., 2019). Beyond distribution and procedural justice research, there is an established stream of work recognising inequities across the entire food system which calls for diverse identities, cultures and voices to be acknowledged, respected and validated through an intersectional lens in any transitions of the food system (Mares and Peña, 2011, Sbicca, 2018).

Urban food justice work has expanded beyond a focus on race, gender, and poverty to link food justice with environmental and spatial justice in the urban context. However, existing research in this area tends to focus on one sector or mode of action, with urban growing a major focus (Tornaghi, 2017). For example, Horst et al. (2017) focus on urban agriculture and its potential to enhance food justice through greater access to food whilst also creating positive health impacts, possibilities for learning new skills, and developing connections, creating both personal and policy impact. Similarly, Certomà and Martellozzo (2019) conclude their study of urban gardening in Rome by suggesting that it is as much a political gesture as it is a way to cultivate food. While acknowledging the potential for social benefits through urban growing, this literature does caution that these cannot be assumed to meet all the goals of food justice, linking up with concerns about green gentrification – a process by which environmental improvements, such as parks, community gardens, and nature-based infrastructures, leads to increased property values, higher rents, and the displacement of lower-income and marginalized residents – reinforcing or deepening inequities (Gould and Lewis, 2016, Jelks et al., 2021). Horst et al. (2017) also flag the precariousness of access to space for urban agriculture activities, which has been found to be a challenge across the FSI sector (Davies et al., 2019). Further work on broader collective activities around food, as exemplified by FSIs is required for a more holistic view of UPU food justice and just transitions to more sustainable UPU food systems.

While much literature takes a retrospective analysis of food systems at a variety of scales from the global to the local, identifying inequities and injustices, there is also an emergent body of work which is explicitly focused on how to use insights from these analyses to enact more just food transitions (Clapp and Isakson, 2018, Kaljonen et al., 2023, Patel and Philippon, 2018). Here, matters of procedural, distributional, and recognition justice coalesce in efforts to understand contestations around sustainable food transitions and the power imbalances which shape both current practices and future possibilities. While the territorial foci of this stream of research differ, all call for systems change to achieve just and sustainable food systems transitions. However, all elements of the existing food system need to be made visible for this work to have impact, which will require mapping that moves beyond mainstream food system structures and actors.

3. Mapping diverse food economies for Just Urban Food Transitions

Maps play a crucial role in shaping how people perceive and relate to their environment (Crampton and Krygier, 2005), but they are often partial in coverage, designed from a particular perspective, foregrounding some elements over others (Bergmann and Lally, 2021, Haraway, 1988, Kurgan, 2013, Kwan, 2007). As a result, attempts have been made to recognise less visible activities articulated through critical and counter mapping practices in the field of geography (Delsante and Orlandi, 2020, Joyner and Parnell, 2013, Olsson, 2019). Critical mapping questions traditional mapping practices and explores new ways to represent spatial data (Mahmoudi and Shelton, 2022). By mapping for difference, an approach which emphasises plurality, inclusivity, and the diverse experiences of marginalised communities (Crampton, 2010), it aims to reveal hidden power structures, inequalities, and inequities. Meanwhile, counter mapping has emerged as a form of critical mapping that involves the creation of alternative maps by communities to represent their perspectives, interests, and experiences (Collective et al., 2015, Dalton and Stallmann, 2018). It is often used to challenge official narratives and to empower marginalized groups.

As Crampton (2014) notes, mapping is a powerful tool to show patterns and relations at the urban scale, providing greater clarity over previously invisible inequalities. For example, Joyner and Parnell (2013) demonstrated the use of GIS in lawsuits that challenged institutionalised racial inequalities shown through urban patterns, and Mahmoudi and Shelton (2022) visualised the concentration of vacant properties in black neighbourhoods, revealing hidden power relations between different social groups. In that context, Pettygrove and Ghose (2016) suggest that critical mapping can be methodologically useful, particularly for marginalised sections of urban populations and for making connections between different elements of food justice. As mentioned above, urban-scale food insecurity studies frequently focus on the quantity and quality of food without considering experiences of deprivation and accessibility concerns (Leroy et al., 2015). Critical mapping approaches can bring threads of food justice analyses together by identifying and visualising geographic patterns of food access, food democracy, and historical inequities, enabling the identification of demographic associations with geographic distributions (Walker et al., 2010).

Digital developments have themselves transformed all mapping endeavours, including those concerned with food systems (Davies et al., 2017a, Davies et al., 2017b). The use of digital data in mapping practices has, as a result, become more prevalent in critical and diverse economies research in a range of areas from planning and data justice (Cooper et al., 2018, Heeks and Shekhar, 2019) to Airbnb activities and gentrification (Rabiei-Dastjerdi et al., 2022). The ability to layer multiple data sets and create complex maps a key benefit, allowing more nimble tracking of intent and outcome in relation to policy initiatives (Borowiak, 2020, Moreira and Canha, 2023). This work has also elevated concerns about data justice and the right to data as a key component in critical mapping practices (Currie, 2022, Gillespie, 2014), with proponents cautioning against treating citizens as ‘data subjects’ (Bigo et al., 2019, Redden, 2018) which may lead to misrecognition of individuals identity, status or needs (Fraser, 2006, 2008). Certainly, more attention needs to be paid to the social, environmental and political dimensions of the digital data revolution (Taylor, 2017).

More specifically focused on mapping and food systems, the work of Bingham et al. (2022) and Feagan (2007) target the concept of localness in food systems, while Cervigni et al. (2020) use open, crowdsourced data to establish different zones of food access at the urban scale in Perth, Australia. Using feminist GIS in combination with observation and participatory action research, Hoinkle and Klosterkamp (2023) narrow their focus to map public food provision within state-funded public catering sites in Germany arguing that their critical mapping approach amplifies discussions about distributional injustices around access to

food and that this is significant in terms of how producers, food supply actors and consumers perceive food justice. In a similar vein, Ahmed et al. (2019) use participatory GIS tools, including food mapping with mobile apps and high-resolution community aerial views, to establish the geography of food vendors in low-income informal settlements in Nairobi. In this case, community mappers collected data on hundreds of vendors across multiple villages creating multi-layered synoptic food-scape maps for each site intersecting this data with information on hazardous areas and infrastructure provision, concluding that “these multiple visual representations of foodscapes make local food vendors and the risks they face, visible for the first time” (Ahmed et al., 2019, p. 1).

In sum, three principles are important for situating digital data-based critical mapping as a method to promote a just and sustainable urban food transition: first, acknowledging the potential gaps and misrecognition issue through data gathering and identification; second, including diverse actors in data collection procedures to minimise this misrecognition; and third, utilising resultant maps for revealing and addressing distributional, procedural and recognition injustices. In the following section, we outline the mapping methods developed to identify FSIs across Barcelona and Milan that adhere to these principles.

4. Mapping urban FSI landscapes

Building on insights from diverse economies and critical mapping research, we seek to make visible the activities of FSIs that leave a digital trace, contextualising their incidence and activities over time and space to shed light on their form, function, and evolution. The resultant picture illustrates the FSI infrastructure available to different populations (Elwood and Leitner, 1998, Pettygrove and Ghose, 2016). Adhering to principle 1, it is acknowledged that not all FSIs leave a digital trace and therefore the mapping results are likely to under-estimate the number of FSIs within each UPU area. Pragmatic and ethical reasons underpin the decision to focus only on ICT-mediated FSIs. Pragmatically, targeting FSIs with a digital trace allowed a common approach to be developed and applied across multiple UPU areas, thereby facilitating comparison. Ethically, there were concerns about documenting FSIs without a public profile and without their explicit consent, whereas those already leaving a digital trace through their public profiles on websites, social media and apps had chosen to make their initiative public. The increasingly low barriers to entry with respect to creating digital profiles, particularly through free-to-use platforms such as Facebook, gave assurance that where FSIs seek a public profile through such channels, they could do so, even if time and resources were limited.

In terms of principle 2, the development of a comprehensive mapping protocol for identifying and categorising FSIs began with the identification of core terms used to describe food sharing activities. These were initially drawn from co-designed terms underpinning the SHARECITY100 Database (Davies et al., 2017a, Davies et al., 2017b) and were expanded in collaboration with multistakeholder partners involved in the European Union Innovation Action CULTIVATE (<https://cultivate-project.eu/>). These include FSIs from across Europe, municipalities, academic researchers, communication specialists and social innovation actors. This generated a predefined list of 158 terms (see Phelan and Davies (2023) for the full list), which were translated professionally into 24 official languages of the European Union (plus Catalan) and then sense checked with native speakers and disseminated through social media to garner feedback on the terms and translations used. FSIs and their participants were invited to validate these terms and propose additional terms, and the translations were collated into the European Food Sharing Dictionary (Davies and Phelan, 2023). Once the Food Sharing Dictionary was completed, core terms were entered into Google Search alongside location-specific terms, for example ‘Milan’ and ‘Barcelona’, to narrow down results. Identified FSIs were cross-checked with the adopted definition of food sharing, and eligibility queries were discussed in weekly research team meetings, taking

approximately three months. Eligible FSIs were then geolocated and organised into structured categories (see Table 1).

Following principle 3, that is, using the resultant maps to highlight distributional, procedural, and recognition injustices, the manual mapping process was then tested within several UPU areas across Europe, including Milan and Barcelona, the focus of this paper. Significant advancements were made in the 2024 mapping of FSIs. In particular, the expansion, translation, and verification of search terms vastly improved accuracy. Including data collection on the spatial incidence of FSIs meant that distributional analysis could be conducted. Geolocation was an important refinement of the mapping approach from the 2015–16 mapping exercise. However, this process was complicated by the fact that some FSIs operate in multiple locations, which may not align with their headquarters, and other initiatives had no physical location within an UPU area despite operating there, so no geolocation could be provided.

The two UPU areas considered here, Barcelona and Milan, have been central to progressing sustainability and solidarity economy actions in relation to food and demonstrate both commonalities (e.g. both EU member states) and differences in relation to social, political, economic, and environmental conditions. Additionally, both were mapped previously in 2016, allowing longitudinal evolutionary analysis to be undertaken for the first time. To understand the changes in food sharing landscapes in these two areas, the analysis refers to contextual impacts such as COVID-19 and growing poverty between 2016 and 2024, along with key policy changes in sustainable agendas, food policies, and solidarity or diverse economy policies. The major changes during this period are described, focusing on each city in turn, and discussed, drawing insights from diverse economies and critical mapping approaches.

5. Evolving FSI landscapes in Barcelona

Barcelona – a municipality long committed to supporting the social and solidarity economy which seeks decent work, inclusive and sustainable economies, social justice and sustainable development – has leveraged its rich food heritage and culture as well as local organisations to address growing poverty amongst its residents (Artis et al., 1991, Cano-Hila and Argemí-Baldich, 2020, Eizaguirre Anglada, 2021). This section sets out the trends and developments in Barcelona's food sharing initiatives, highlighting the impacts of local policies and the broader socio-economic context.

5.1. Key Trends

While the city's population has remained steady at around 1.7 million people, with a consistent population density of around 16,000 people per square kilometre, during the period 2015–2024 (Ajuntament de Barcelona, 2024), there have been significant demographic changes. Since 2016, there has been a 5.5 % rise in the proportion of immigrants comprising Barcelona's population (Ajuntament de Barcelona, 2024, Statistical Institute of Catalonia, 2024). Many of these are between the ages of 25 and 39 (ACN, 2024).

The most significant events affecting Barcelona from 2016 to 2023 were the COVID-19 pandemic and the subsequent Ukraine conflict, which have impacted food poverty and contributed to a cost-of-living crisis for many. During this period the level of energy poverty, calculated as the percentage of homes unable to maintain an adequate temperature, has more than doubled from 10.2 % to 21 %, while housing poverty defined as the percentage of homes unable to pay housing expenses, increased from 12.5 % to 17 % (Garcia-Muniesa and Porcel, 2023). This is significant as research has shown that when energy and housing costs rise, food budgets are often squeezed (Fry et al., 2023). Due to rising living costs, households unable to afford a meal containing meat or fish at least every other day more than doubled, increasing from 2.9 % in 2016 to 6.7 % in 2023 (Garcia-Muniesa and Porcel, 2023).

Barcelona is a signatory of the United Nations Global Compact Cities Programme and the Milan Urban Food Policy Pact (Moragues-Faus et al., 2024). Since 2015, Barcelona's municipality has prioritised environmental and social sustainability, implementing various policies to address these concerns (Herrero et al., 2024). Policies have included: expanding urban agriculture, enhancing community gardens, promoting biodiversity and agroecology, and addressing climate change through aligned municipal actions (Ajuntament de Barcelona, 2013, 2019, 2020a, b). In 2021, Barcelona was named the capital of Sustainable Food, in recognition of its activities to reduce food waste, promote food redistribution, and develop urban and peri-urban agriculture for a more transparent, resilient, and equitable food system (Ajuntament de Barcelona, 2022).

Efforts to build sustainable urban governance have included City Council collaborations with social and solidarity economy stakeholders between 2019 and 2021 to develop the 'Barcelona 2030 Strategy for Social and Solidarity Economy', which includes food-related activities (Ajuntament de Barcelona, 2020a). Public sector funding and resources reflect the social and environmental benefits of food-related activities, with FSIs eligible for funds to improve the social and solidarity economy, combat climate change, and enhance social cohesion (Herrero et al., 2024).

5.2. Comparative Analysis – FSI landscapes in Barcelona

The most notable finding from comparing data on FSIs from 2016 and 2024 is the marked increase in the number of initiatives identified. In 2016, there were 106 food sharing initiatives identified in Barcelona. By 2024, the number of initiatives had more than doubled to 221. Notably, only six initiatives from 2016 are still present in the 2024 data, indicating significant turnover and the emergence of many new initiatives over the years. Note that, in the following analysis, percentages may add up to more than 100 % as FSIs often focus on more than one activity area (e.g. growing, and cooking and eating), and use multiple modes of sharing (e.g. selling and gifting).

Alongside the absolute increase of FSIs, the most notable growth has been observed in initiatives sharing food products, particularly through food banks and food surplus redistribution programs (Fig. 1). In 2016, there were 53 initiatives sharing food, but by 2024, this number had grown to 156, representing an increase of nearly 200 %. Within this cohort some initiatives share multiple elements alongside food, such as plants, seeds, and knowledge. While the already identified increase in food poverty is likely to be a significant driver of this change, it is also likely that the numbers identified in 2016 were constrained by the limited linguistic contextualisation which has been embedded in the 2024 mapping approach.

FSI activities are mapped into broader categories of: Cooking and eating, growing, and redistributing. In 2016, out of 106 FSIs, 54.7 %² focused on cooking and eating, 46.2 % on redistributing, and 21.7 % on growing. In 2024, among the 221 initiatives identified, 35.7 % focus on redistributing, 36.7 % on growing, and 14.5 % on cooking and eating. The decline in communal eating initiatives is likely to be linked to the impact of the COVID-19 pandemic, which prohibited large gatherings and communal dining activities during periods of lock down.

As food sharing can involve different modes of exchange from gifting and bartering to collecting (e.g. foraging, gleaning, skip surfing and dumpster diving) and selling, a modal analysis of FSI activities was conducted. The proportion of FSIs engaged in gifting increased from 42.5 % in 2016 to 58.4 % in 2024. Bartering activities also grew, from 6.6 % to 11.3 %, most likely in response to increasing food poverty. Meanwhile, the proportion of FSIs engaged in selling remained relatively stable, from 50 % to 50.7 %. It should be noted that selling here often adopts a not-for-profit model with below market charges or

² Figures rounded to one decimal place.

Table 1
Search term classifications.

Common Data Categories (2015 and 2024)			New Data Categories 2024			
What is Shared	Mode of Sharing	ICT use	Organisation Structure	Types of activities	Geolocation	Goal
Plants & Seeds; Meals; Food; Kitchen Space & Devices; Space; Land; Compost; Knowledge & Skills	Gifting; Bartering; Selling; Collecting	Webpage; Meetup; Facebook; Twitter/X; Instagram; App	Nonprofits; Social Enterprises; For-Profit; Cooperatives; Associations; Network	Cooking and Eating; Growing; Redistributing	Physical address of each FSI	Vision statements of their webpage

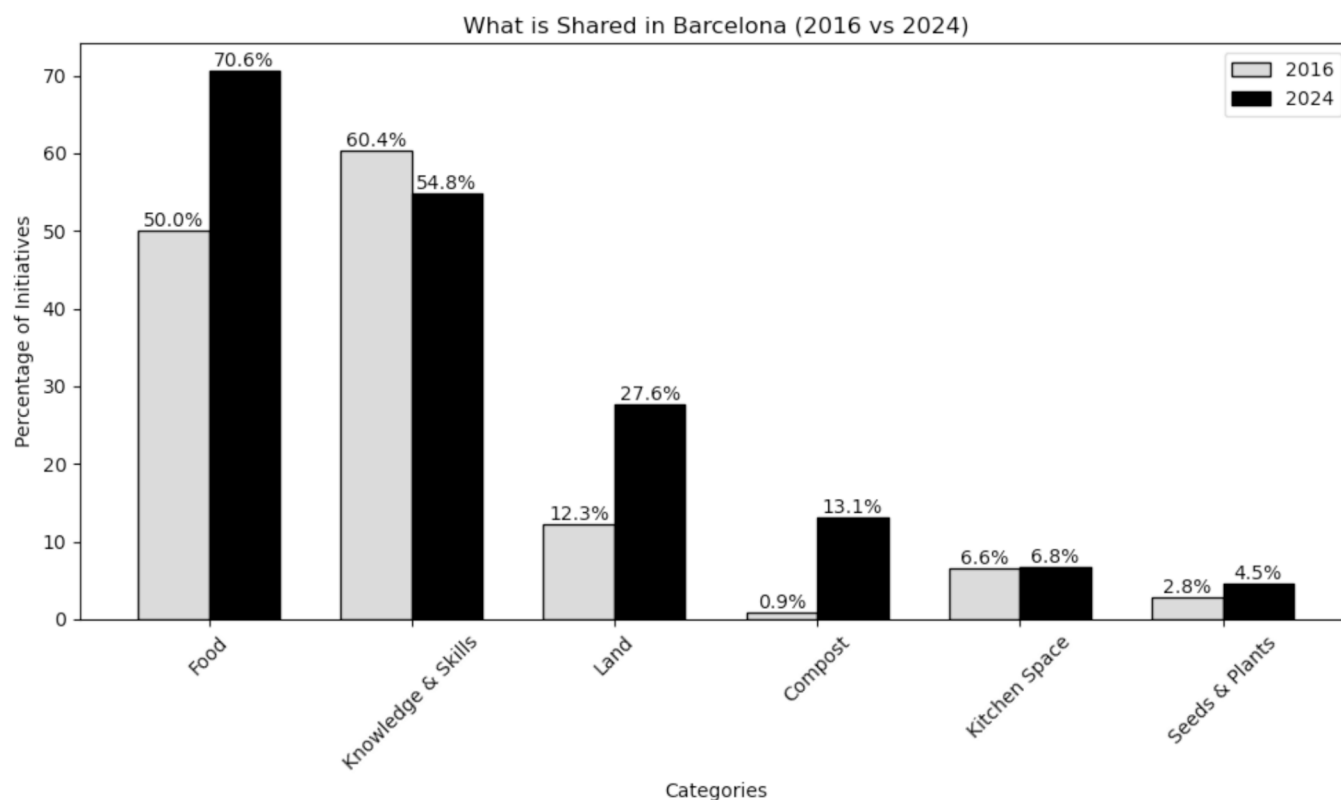


Fig. 1. Comparative analysis of ‘what is shared’ by FSIs in Barcelona, 2016 and 2024 (total number of counts are more than the total number of initiatives due to multifunctionality).

differential rates for particular consumers, members, or clients. The rise in gifting and bartering, without a corresponding decline in selling, appears to result from more FSIs adopting multiple modes of sharing to diversify their income and resource base. In contrast to 2016, when no FSIs utilised multiple modes, 20.4 % employed multiple sharing modes in 2024.

In terms of the digital mediation employed by FSIs, the majority still utilise websites, although in 2024 this figure was 98 % compared with 2016, when 92 FSIs (86.8 %) had websites. In terms of social media usage, Instagram has emerged as the dominant platform by 2024, with 47.1 % of FSIs utilising it, while the use of Twitter/X and Facebook slightly declined since 2016. App-based FSIs, which constituted 10 % of all FSIs in 2016 and were primarily focused on social dining, had all ceased to exist in Barcelona by 2024, possibly due to pandemic-related disruptions to their commercial activities alongside platform mergers (e. g. Eat With and Viz Eat) which have consolidated these activities.

5.3. Spatial analysis – Barcelona 2024

The mapping process in 2024 included a geolocation element for the first time. This provides useful information on the distribution of FSIs across the municipality, but it does mean that no comparative analysis can be conducted with the 2016 data. Among 221 FSIs, 9 % were only

present online, mostly related to knowledge sharing, while 6 % have more than one location in the city and 8 % have headquarters locations outside but serving the UPU.

The resulting FSI location map shows a higher concentration of FSIs in central districts, with the lowest concentration in the north-western district. This is positively correlated with population density (Fig. 2). We found that growing FSIs are rather evenly distributed across the city, with a relatively stronger presence in the northern districts along the Collserola mountain range, where there is more space available for urban agriculture. In contrast, other FSIs, and particularly those focused on redistribution, are highly concentrated in densely populated central areas such as Ciutat Vella, Gracia, and Eixample. Cooking and eating initiatives are more concentrated in the southern districts of the city, where there is higher population density and likely greater demand for social initiatives to support vulnerable groups.

Examining the geolocated data on FSIs alongside income levels of the population, it is observed that wealthier neighbourhoods such as Sarrià-Sant Gervasi and Les Corts have fewer FSIs. These areas also have the lowest levels of non-EU foreign population, the highest levels of education, and the least unemployment. However, apart from these two wealthy neighbourhoods, FSI incidence tends to be more associated with population density rather than income level. For example, one of the most deprived areas, Nou Barris, which has the lowest income and

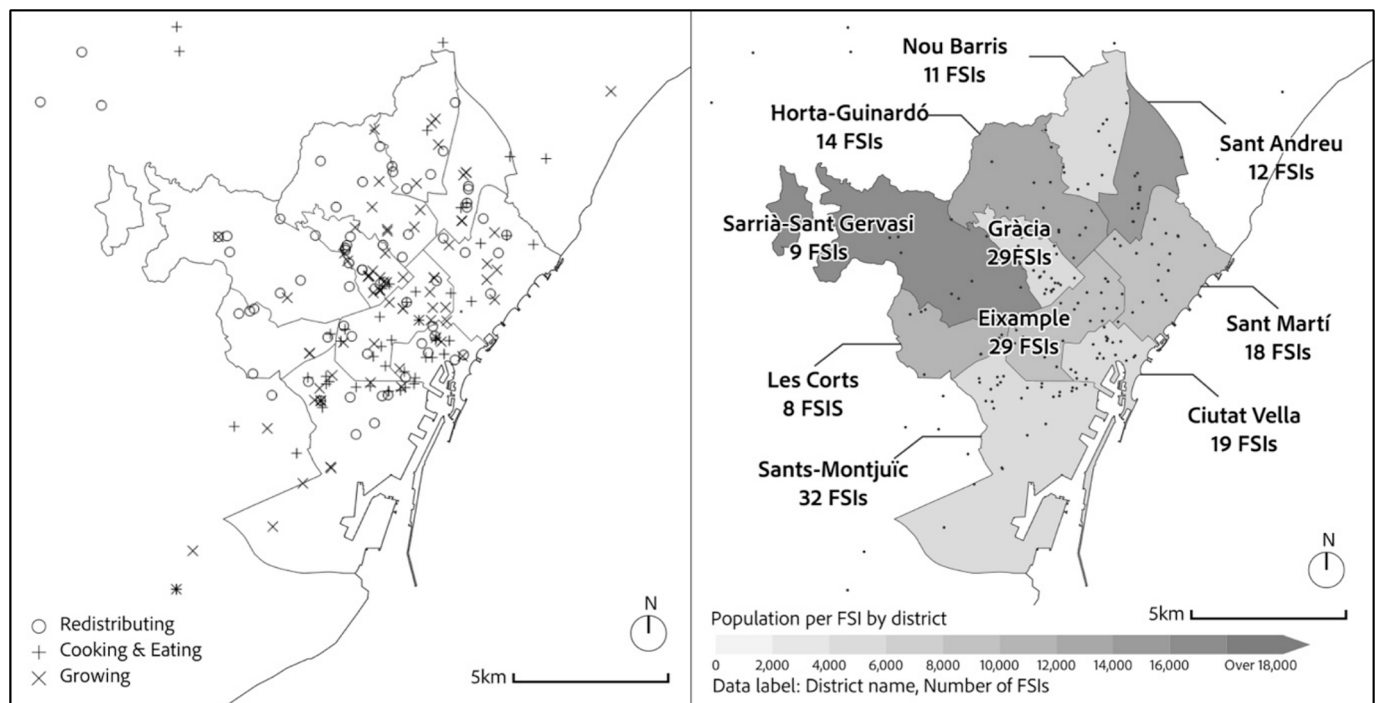


Fig. 2. Food sharing activity types of FSIs in Barcelona (left), Population per FSI by district (right).

lowest population in higher education levels, does not show a significantly higher concentration of FSIs compared to Gràcia or Eixample. This may be due to the limitations of the official census data, which is collected only at the district level and not at the more granular neighbourhood level, making it difficult to identify statistically significant relationships. Additionally, since the research focused on the FSIs present online, the lack of local capacity to utilise online tools in areas with significant poverty might contribute to the absence of a clear correlation, although there are very low barriers to entry for the development of social media profiles across Europe. International research suggests that an absence of such initiatives is more likely due to a lack of capacity amongst the most vulnerable to self-organise into FSIs (Davies & Mullin, 2011).

Overall, Barcelona's FSI landscape has developed a particular focus on food redistribution with a growing number of cooperatives controlled and run by members seeking to realise common goals in a democratic fashion, which aligns with the social and solidarity policy drivers at the municipal level. These initiatives, and the FSI sector more broadly, therefore play a crucial role in addressing increasing food poverty in the municipality.

6. Evolving FSI landscapes in Milan

Milan, a leading municipality in terms of progressive urban food governance through its central role in the formulation of the Milan Urban Food Policy Pact in 2015 (Martín and de la Fuente, 2022), has leveraged its strong connections with surrounding agricultural areas and local organisations over the past decade to address persistent unsustainability in the urban food system (Corsi et al., 2023). This section explores the key trends shaping the evolution of Milan's FSI landscape between 2015 and 2024, examining the influence of local policies and the broader socio-economic environment.

6.1. Key Trends

The COVID-19 pandemic and the Ukrainian conflict have contributed to a rise in the cost-of-living across Italy. While the population

living below the poverty threshold slightly decreased from 7.8 % to 7.6 % during the pre-pandemic period (2016–2019), this rate sharply rose to 9.1 % in 2020 and reached a peak of 9.8 % in 2023 (ISTAT, 2024).

Lombardy – the region in which Milan is located – experienced the highest increase in terms of food aid recipients between 2019 and 2022 in Italy (Bozzi et al., 2023). Though there are no official data available at the municipal scale, food sharing organisations have reported a significant increase in the number of families and individuals receiving food aid since COVID-19 (COOPI, 2022, Emergency, 2024, FattoQuotidiano, 2023). Furthermore, an increase in the number of 'working poor' – people with jobs who struggle to afford housing and food expenses – has been documented in Milan. In 2023, housing costs comprise 51.6 % of the average net salary within Milan due to rent increases of 40 % over the last decade, which is far higher than the estimated 5 % increase in salaries, contributing to the growing number of people experiencing food poverty (Bricocoli and Peverini, 2023, Econopoly, 2023).

Milan's food system, an important part of the city's history, has become even more vital in recent years due to increases in food poverty. Milan municipality retains strong relations with its surrounding rural areas which produce much of the dairy products, wheat, and rice that are integral to Milan's traditional dishes. These relations have been further cemented by planning policies which aim to create agricultural parks in a belt around the city. Additionally, Milan has led efforts to make urban food systems more sustainable through the Milan Urban Food Policy Pact established in 2015 focusing on five key priorities: ensuring healthy food and water for all citizens, promoting the sustainability of the food system, enhancing food education, reducing food waste, and supporting scientific research in agri-food sectors.

As part of its Urban Food Policy, Milan's City Council launched the Local Hub Against Food Waste programme in 2018 to develop an urban-scale model for storing and redistributing food surplus. Moreover, the Food Policy Office, part of Milan's City Council, acts as a facilitator, which has involved stakeholders from different sectors and levels, such as universities, other Municipal Departments, NGOs, and private foundations and companies, in recent years (Matteini et al., 2024).

6.2. Comparative Analysis – FSI landscapes in Milan

The landscape of Milan's food sharing initiatives (FSIs) has evolved significantly during the period 2016–2024. The absolute number of FSIs more than doubled during this period, from 42 identified in 2016 to 107 in 2024. Only one initiative appears in both the 2016 and 2024 datasets, indicating that the majority of FSIs were newly formed during this time. Annual checking of FSI lists between 2017–2020 revealed that, on average, only 5 % of FSIs became inactive each year so the COVID-19 pandemic and subsequent spikes in cost of living seem to have been a major disrupter to the pre-existing FSI landscapes. While this disruption decimated pre-existing FSIs it has also clearly stimulated many new entrants. In terms of the elements shared, initiatives focusing on knowledge and skills, such as developing healthy eating habits and gardening, have grown (Fig. 3). Note, as with Barcelona, in the following data, percentages may add up to more than 100 % as FSIs may focus on more than one activity area (e.g. growing and cooking and eating) or use multiple modes of sharing (e.g. selling and gifting).

Results show an increase across almost all categories of FSIs by 2024. Redistribution activities, already prominent in 2016 with 45.2 %, became even more dominant, with 47.7 % by 2024. FSIs focusing on cooking and eating saw the most substantial increase, from 26.2 % to 40.2 %. The number of growing initiatives remained relatively steady, from 23.8 % to 22.4 %. Cooking and eating initiatives often work with disadvantaged citizens, offering education on healthy diets and sustainable consumption. The growth in these initiatives likely reflects the influence of the Milan Urban Food Policy Pact emphasising sustainable diets through relevant education and promotion. The consistent interest in collective growing initiatives shows the ongoing importance of urban agriculture within Milan's food sharing ecosystem.

Gifting remained the most common mode of exchange used by FSIs in Milan, increasing slightly from 66.7 % in 2016 to 68.2 % in 2024. Bartering, which was absent in 2016, saw a notable rise by 2024, with 18.7 % of FSIs adopting this mode of sharing. The proportion of FSIs engaged in selling remained relatively stable, with a slight decrease from 38.1 % in 2016 to 37.4 % in 2024. While selling continues to be a key mode of exchange for many FSIs, other modes like gifting and bartering have increased to better meet community needs. A significant change observed was the increase in FSIs utilising multiple modes of sharing. In 2016, only 4.8 % of FSIs employed multiple modes, but by 2024, this figure had risen to 23.4 %. This suggests that FSIs are increasingly taking a more flexible approach to sharing and exhibit a growing interest in non-monetary exchanges, likely driven by the need for more accessible and inclusive sharing practices in response to economic challenges. The enhanced language sensitivity in search terms developed in 2024 may explain some of these rises, along with the more tailored vocabulary able to more accurately identify relevant organisations.

Websites dominate the digital mediation adopted by FSIs in Milan, rising from 85.3 % in 2016 to 94.4 % in 2024. Facebook usage has slightly decreased from 88.2 % to 74.8 %, while Instagram usage expanded significantly, with 51 initiatives (18.7 %) adopting it by 2024. Twitter/X usage decreased from 47.7 % to 18.7 %. No initiatives were using dedicated apps in 2024, with five detailed in 2016 mostly relating to social dining which would have closed during the pandemic.

6.3. Spatial analysis – Milan 2024

As with Barcelona, geolocation of mapped FSIs was only conducted in 2024 so no evolutionary analysis can be presented. Out of the 107 FSIs mapped, Milan has four without a physical location, seven operating in more than one location, and 14 located outside the administrative border of Milan but operating within it. Nonetheless, the geospatial analysis provides some interesting findings, such as FSIs in Milan tending to concentrate in more densely populated areas such as Municipio 1 and 2 (see Fig. 4). However, there are different patterns in particular sectors. Growing FSIs in Milan are typically situated on the

periphery, where agricultural belt parks have fostered the creation of urban community gardens over the last few decades. Meanwhile, central districts (e.g. Municipio 1) have the most initiatives focusing on cooking and eating, and redistribution. This suggests that the historical context of land use and related urban planning in Milan has significantly influenced the spatial location of certain sectors of FSI activities, with growing initiatives predominantly located in peri-urban areas. This spatial distribution reflects the city's longstanding emphasis on integrating agricultural practices within its urban framework, but suggests more needs to be done to ensure inner city residents have sufficient access to growing spaces.

In Milan, only population density provides a significant correlation with the location of FSIs. There are no clear links between demographics such as education level, foreign population, income, and aging level, and the incidence of FSIs. However, this is likely due to data granularity, as demographic data is mainly collected at the district rather than the neighbourhood level.

Throughout the period from 2016 to 2024, Milan has consistently maintained a high number of FSIs focused on redistributing food through the gifting mode of sharing. A key development during this period is the increasing multifunctionality focusing on education and training. Milan now shows a significant number of FSIs that combine food sharing with food education and job training.

7. Comparative Analysis of Barcelona and Milan

The number of FSIs more than doubled in both UPUs between 2016 and 2024, rising from 106 to 221 in Barcelona and from 42 to 107 in Milan. Both areas faced significant food security challenges during this period, with rising food poverty and deprivation.

The expanded mapping process provides empirical insights into the evolving UPU FSI landscapes. First, FSI mapping reveals spatial patterns of food sharing activities in relation to local demographics. One notable trend through the spatial analysis was the correlation between the number of FSIs and population density. This correlation is most significant for surplus food redistribution initiatives, due to their explicitly social focus and the limited edible life of surplus food. Second, the urban scale patterns of FSIs indicate that local activities are significantly influenced by governmental policies and funding, highlighting the importance of mapping in monitoring policies and governance. The municipality has demonstrated its commitment to local initiatives and the solidarity economy, and this has led to an increased number of FSIs focusing on supporting food poverty. In Milan, agri-food policies have influenced urban planning and the provision of agricultural green spaces, leading to concentrations of growing initiatives in peri-urban areas.

Regarding methodological implications, the increased number of FSIs captured by the improved mapping process indicates that using online data enables meaningful analysis, such as identifying spatial patterns of food sharing activities. The rise of online engagement, driven by the COVID-19 pandemic and the increased accessibility of technology, has likely contributed to the increased number of FSIs using online profiles to mediate their activities. Additionally, the use of local language in manual searches through the Food Sharing Dictionary has likely contributed to the increased number of FSIs mapped in 2024. Clearly, appropriate translation and ground truthing of search terms with local actors are essential for accurate data collection.

However, despite capturing many previously invisible local activities, gaps remain in the mapping approach. The mapping process is limited to FSIs with a digital trace, resulting in partial coverage. For example, while low-income and densely populated areas tend to have more FSIs, the number of FSIs in most vulnerable communities, such as Nou Barris in Barcelona, is relatively low. This might be due to significant poverty in the area, leading to a lack of local capacity to undertake additional activities, or it could be that FSI activities are taking place but are informal or highly targeted in a local area and therefore do not need,

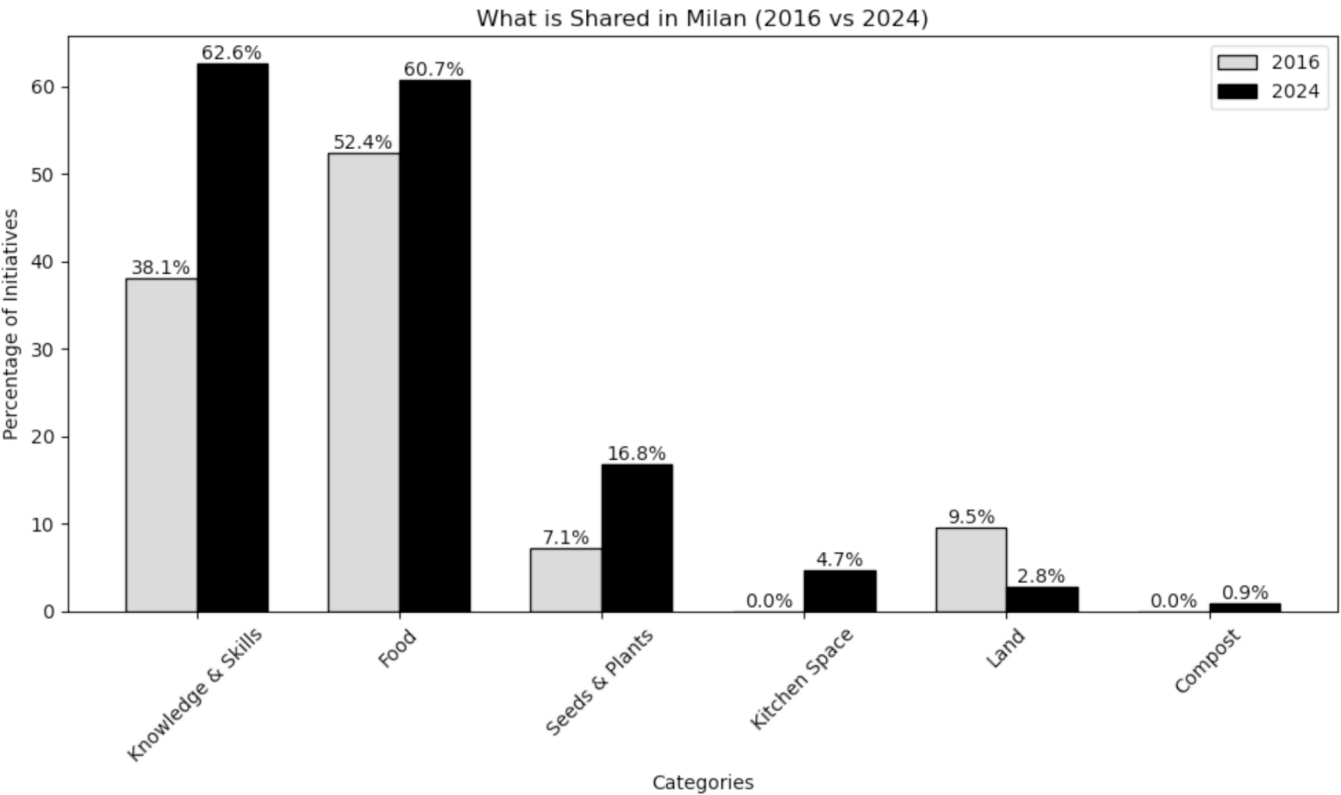


Fig. 3. Comparative analysis of ‘what is shared’ by FSIs in Milan, 2016 and 2024 (total number of counts are more than the total number of initiatives due to multifunctionality).

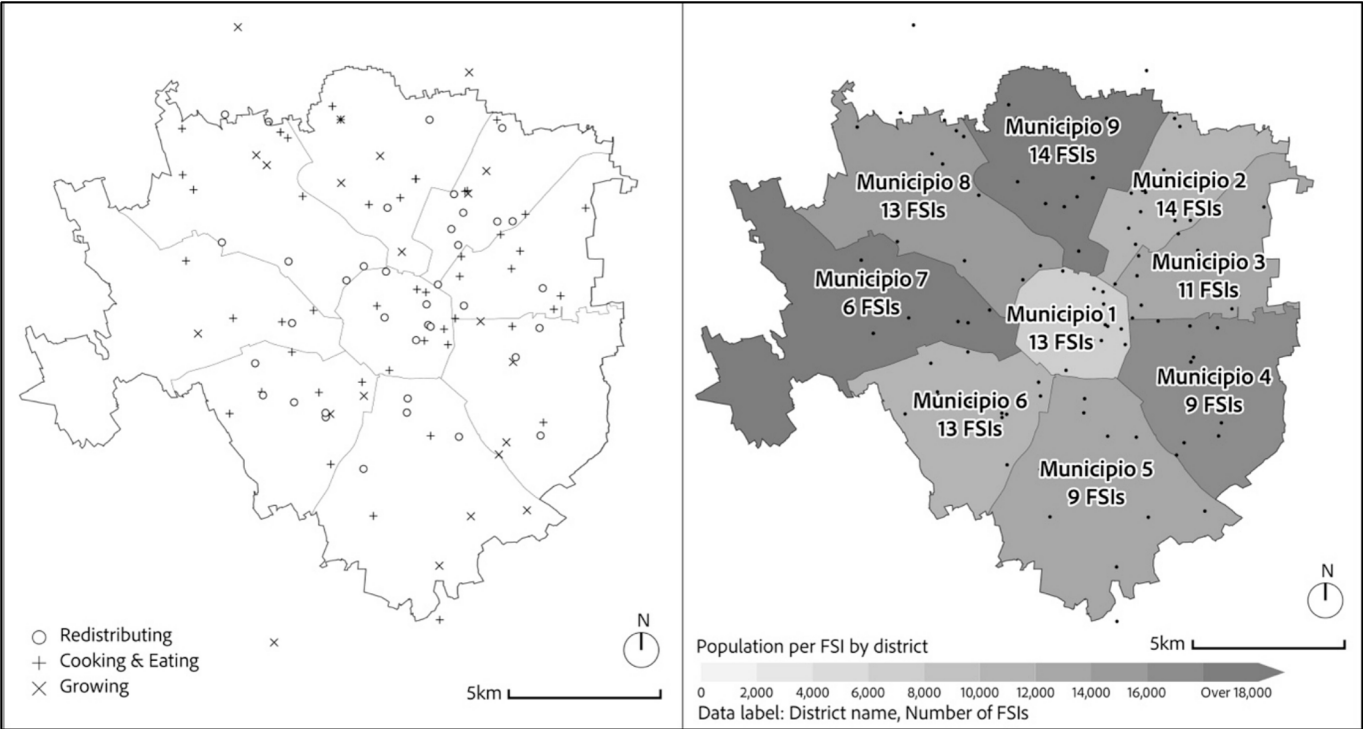


Fig. 4. Food sharing activity types of FSIs in Milan (left), Population per FSI by district (right).

and potentially do not want, a public digital presence. Moreover, the mapping process only counts the number of FSIs and their activities. Online data rarely documents the scale or incidence of activities, such as the total amount of food redistributed, food redistributed, or numbers of

meals shared — crucial information for assessing sustainable impact. Additionally, aspects of culture, policy, and social norms, as well as the influence of wider political events such as COVID-19, are not fully captured by mapping alone. Nonetheless, the approach provides the

foundations for vigilance regarding processes of green gentrification, where well-intentioned sustainability initiatives inadvertently lead to the displacement of vulnerable populations over time (Gould and Lewis, 2016).

8. Discussion

The previous sections outline the results of FSI mapping that took place in Barcelona and Milan, considering policy developments, major world events, and the impacts of the enhanced methodological approach co-designed in 2024. That these empirical findings have been collated across time and compared at the municipal scale is novel. In terms of the “mere description” (Gerring, 2012, p. 721) called for by the diverse economies approach, this is a substantive finding. We argue, following Holmes et al. (2024), that such work aimed at answering the who, what, when, where, and how questions is an essential element of social scientific enquiry in relation to food justice at the UPU scale. Certainly, the work presented in this paper is the result of both a creative and analytic process involving choices in the categorisation, sense-making, and management of data. This has expanded coverage of a previously data-poor environment and provides a means to challenge existing biases in knowledge, which impacts policy making and implementation.

However, it is our goal to push analysis beyond this description to consider how mapping the diverse economies of FSIs – that is, the processes of identification, classification and representation – may contribute to food justice transitions in the two municipalities. As already outlined, we see UPU food justice as a set of principles that seek social justice around food in UPU areas in terms of *distribution* e.g. access to healthy and sustainable food for all, *procedures* e.g. including opportunities to engage and shape food systems at the UPU scale, and *recognition* of past and present inequities around food with a view to addressing these. These broad framings are used to structure this discussion.

8.1. Distributional justice

Perhaps the clearest contribution to UPU food justice of the enhanced FSI mapping approach conducted in 2024 is its ability to reveal the spatial distribution of these initiatives. By adhering to diverse economies approaches, that argue for reading for difference rather than dominance in economies, previously marginalised aspects of UPU food systems (Certomà and Martellozzo, 2019), along with additional actors and organisations, become visible on maps for the first time (Mahmoudi and Shelton, 2022). The FSI mapping process reveals hidden structures, inequalities, and inequities across space. While municipalities may have records of state-led activities, such as allotments and public parks, activities led by non-state actors are rarely captured consistently or comprehensively. Even where activities are captured, fragmentation of responsibilities for food governance within municipalities (Davies et al., 2019) means that information about growing, cooking, eating and redistribution activities rarely flows easily across departmental siloes.

Geolocated mapping of FSIs amplifies distributional knowledge, providing important spatial data identifying deserts or oases of activity. This is significant in terms of how food actors perceive food justice. Collating growing, cooking, eating, and redistribution activities together under the banner of FSIs ensures that UPU food security responses can support access to sufficient, safe, and nutritious food. Considered alongside small area statistics on density and population demographics, this information can identify fertile ground for additional FSIs to emerge or for existing FSIs to be expanded. Conducting regular geospatial mapping of FSIs would lead to a more holistic picture of UPU food environments – that is, the institutional, economic, and social context in which UPU consumers make decisions about food (HLPE, 2024) – and their dynamics over time (Widener et al., 2011).

Although not manifest yet, as the results of mapping were only shared with municipalities in 2024, the existence and future

dissemination of such maps may have an impact in terms of engaging wider actors, in this case the FSIs, in forthcoming food policy formation and implementation. Allied to work being conducted on the sustainability impacts created by FSIs (Mackenzie & Davies, 2019; 2022), an upgraded online and interactive map of the initiatives will be made freely available online for anyone to access in 2026. However, this will only be productive if the information is considered in decision-making fora. For such maps to have an impact on distributional UPU food justice, they must be communicated, disseminated, and ultimately utilised to shape policies, investments, and activities in ways which rectify distributional injustices. As a result, the impact of mapping FSIs on distributional UPU food justice will be intimately related to planning and policy procedures and hence procedural justice.

8.2. Procedural justice

Procedural justice in relation to food encompasses various dimensions, but central to it is the opportunity for individuals and communities to actively engage in the development and implementation of food policies. While intimately related to regional, national, and supranational governing scales, procedures underpinning UPU food governance can transform lives, cities, and the wider environment (Moragues-Faus et al., 2024) and so “decisions must involve all the actors of the food systems, including informal ones” (HLPE, 2024, p. 2). This aligns with wider calls from food democracy advocates for more inclusive, participatory, and equitable processes shaping UPU food policy (Bornemann and Weiland, 2022; Davies et al., 2019).

Evaluating impacts on procedural justice requires consideration of who is involved in making decisions and on what terms, as well as assessments of transparency and respect in relation to contributions made by participants through the data and insights they bring to discussions. However, for all actors to be considered, they must first be identified. Mapping FSIs assists in this endeavour, particularly in the collaborative way that the process was conducted, including FSIs themselves in developing parameters of what initiatives should be included. The collaborative counter-mapping approach outlined in the methods section of this paper sets out how FSIs themselves, as well as other local actors, were involved in shaping search terms and relevant vocabulary for the FSI mapping.

Additionally, the rigorous rule-based geolocated mapping provides clear criteria for inclusion, providing robust protocols and certainty over coverage and coherence.³ Such information is essential for those mandated with co-ordinating all food actors in urban spaces to ensure procedural justice. Therefore, while the FSI mapping undertaken itself does not guarantee procedural justice is enhanced, it can be considered as one essential precursor to establishing more procedurally just UPU food systems, provided the maps themselves are accessible to, and used by, those making decisions.

As a dynamic sector, with landscapes of FSIs completely transformed in both UPU between 2016 and 2024, such mapping would need to be a recurrent activity for accuracy. Results of the 2016 mapping generated significant public interaction, although this dropped off over the years as the data became obsolete and resources to raise awareness of the maps ended. Exploration of automation via large language or generative AI models is being undertaken to establish whether this could provide a resource saving intervention (Wu et al., 2024), although such automation does come with additional technical and energy demands as well as ethical concerns about the business models on which AI models are constructed (Stahl and Eke, 2024). Beyond this, the efficacy of mapping

³ It is worth reiterating here that only FSIs leaving a digital trace were included in the search for two reasons: 1. to ensure consistent mapping processes were undertaken by diverse mappers, and 2. Due to ethical concerns of including initiatives that had, for whatever reason, elected not to create a public profile for their activities.

for procedural justice will ultimately rest on how those charged with UPU food governance involve the actors that the mapping identifies.

Of course, it is not only state actors who may wish to know about FSI activities. As documented in relation to counter-mapping activities more generally (see Dalton and Stallman, 2018), FSI maps may also be utilised by individuals and communities to organise, collaborate, and share perspectives, interests, and experiences. Although such impact is hard to track, if it occurs it can be used to inform, or challenge, official narratives around UPU food environments, potentially building a FSI community of practice. Specific online spaces to support collaboration amongst FSIs across Europe are currently being developed and populated through an Innovation Action supported by the European Commission.⁴

8.3. Recognition justice

Although a multidimensional framing for justice in transitions scholarship is increasingly commonplace, Kaljonen et al. (2023) note that the recognitive justice component has received relatively less consideration. Nonetheless, and linked to matters of procedural justice detailed above, there are persistent calls for greater attention to be paid, through an intersectional lens, to diverse identities, cultures, and voices in food system transformations (Mares and Peña, 2011, Sbicca, 2018), recognising enduring power imbalances and inequities.

While existing research centring recognition justice in food systems has tended to focus on mainstream groups, such as farmers (Kuhmonen and Siltaoja, 2022), and broad categories such as gender (Valverde et al., 2022), the arguments made in those contexts are also relevant when considering matters of recognition justice and FSIs in UPU contexts. These include matters of capacity and resilience of both the FSIs themselves and the sections of society they work with. As FSIs are typified by precarious non-commercial actors often supporting marginalised sections of society, mapping and categorising what they share and the organisational forms and modes they adopt provides a foundational dataset on which further understanding and accommodation, of vulnerable populations can be built. While the enhanced mapping and categorisation have not, to date, included demographic details of those involved, such nuanced analysis could be developed by researchers on the ground in the municipalities, or indeed by municipal actors seeking to understand the contributions made by the sector.

In addition to supporting vulnerable populations around food, FSIs themselves are currently marginalised voices within UPU food systems, with the impacts of their work rarely recognised by policy makers and shapers. As noted with respect to peripheral farmers (Kuhmonen and Siltaoja, 2022), such marginalisation can affect FSI resilience and their ability to respond to wider UPU food transitions. Certainly, precarious land and space tenure, and unpredictable funding streams limit FSI options for long-term, transformative action. As with procedural justice, the contribution of FSI mapping to recognition justice is foundational, on which additional mechanisms can be constructed, such as sustainability impact assessments sensitive to FSI activities. Preliminary work in this field has linked FSI activities to the Sustainable Development Goals (Mackenzie and Davies, 2019; 2022).

9. Conclusion

The mapping approach, and its findings, demonstrate the rapid increase in the number of FSIs, the radical transformation of landscapes over the period 2016–2024, and the importance of using geolocation and native language search terms for accurate and meaningful data collection. These are all significant empirical advances. The research conducted in 2016 and 2024 reveals a dynamic landscape, with the number of FSIs more than doubling in Barcelona and tripling in Milan.

This growth reflects the impact of global crises, such as the COVID-19 pandemic and the Ukraine war, as well as local policy initiatives like the Milan Urban Food Policy Pact and Barcelona's emphasis on the social and solidarity economy. While no formal evaluation of these policies has been conducted in either UPU area to date, the findings highlight the importance of continuous monitoring of and support for, FSIs, especially given the precarity of their existence, exemplified by the almost complete transformation of FSI landscapes in both cities following COVID-19.

By making FSIs visible and accessible, the mapping process generates empirical data that can be used by those seeking distributional, procedural, and recognition justice in UPU food systems. However, for these maps to be influential, the data they contain needs to be integrated into UPU governance processes and must be up-to-date and trusted by decision-makers. Integration into governance systems will require the active engagement of municipal officers with the maps, along with political will to engage non-commercial food actors and to admit the contributions made by FSIs into policy planning and implementation. Ensuring relevant and accurate data requires regular re-runs of the mapping process. As the manual mapping process was resource-intensive, automated searching systems are being examined as a means to monitor the evolution of FSIs more rapidly (Wu et al., 2024).

While the mapping methodology described in this paper already generates a comprehensive understanding of the distribution and composition of online FSIs, there is room for improvement. Analysis could be further enhanced if small area statistics on matters of food security were available, and experiments in automated mapping may lead to more agile systems, leading to real-time data tracking and monitoring. Additionally, there are opportunities to make the process more radically critical over time in terms of expanding those involved in augmenting and disseminating the maps. Certainly, following Kitchen and Dawkins (2024), what is presented in this paper is more than a static representation of spatial information; it embodies a process which has wider potential for mediating spatial practices and facilitating communication and dialogue, thereby contributing to just and sustainable urban food system transitions. Overall, the approach documented in this paper contributes directly to global calls for transitions to more just and sustainable UPU food systems.

CRedit authorship contribution statement

Anna R. Davies: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Hyunji Cho:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation. **Marco Vedo:** Writing – review & editing, Formal analysis, Data curation. **Robert Martinez Varder:** Writing – review & editing, Formal analysis, Data curation. **Ana Maria Gatejel:** Writing – review & editing, Formal analysis, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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⁴ See: <https://cultivate-project.eu/>.

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