

Advancing circularity in urban food systems: Exploring alternative food practices in Karşıyaka, İzmir

Zeynep Özçam

Department of City and Regional Planning, İzmir Institute of Technology, Türkiye
zeynepozcam@iyte.edu.tr

The conventional food system generates significant social and environmental challenges, particularly in urban contexts where food access inequalities and ecological pressures are intensified. Addressing these challenges requires a holistic approach beyond production, incorporating regenerative practices and responsible consumption. The circular approach offers a promising framework for building more sustainable, resource-efficient, and equitable food systems. The adoption of innovative and alternative food practices is increasingly seen as essential for promoting circularity. This study examines how existing urban food initiatives contribute to the development of circular food systems, with a particular focus on Karşıyaka in İzmir province of Türkiye; a highly urbanised context in which municipality-led food policies and emerging food initiatives are seeking to reconnect fragmented relationships between food production and consumption. Using qualitative methods, the study investigates the circularity potential of these alternative practices through key circularity dimensions: regenerative production, waste prevention and material revalorisation, and responsible consumption. The findings show that while local initiatives support localisation and alternative food provisioning, their contribution to circularity remains fragmented, with weak integration between production, consumption, and material cycles. The study highlights both the potential for, and the limitations of, existing urban food practices to support more integrated circular food systems. Ultimately, the research offers a critical reading of how existing food practices partially contribute to circularity in urban contexts.

Keywords: circular food systems, urban food systems, alternative food practices, urban food planning, Karşıyaka, İzmir

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Introduction

Industrial agri-food systems present some of the most pressing challenges for contemporary society. A growing body of literature has highlighted that unsustainable production and consumption patterns embedded in the conventional agri-food system push environmental and social limits (Springmann et al., 2018; Vermeulen et al., 2012), while their ecological and socio-economic impacts have become increasingly visible in recent years; particularly with the COVID-19 pandemic and the subsequent food crises (Giudice et al., 2020). The dominant industrial model, characterized by resource-intensive food production, long supply chains, and commercialized retail, places considerable pressures on ecological systems while simultaneously contributing to social inequalities; particularly in terms of unequal access to food (Fassio & Tecco, 2019; Springmann et al., 2018; McGreevy et al., 2022). Structured around the production-distribution-consumption-waste axis, the linear configuration intensifies resource exploitation and pollution, and jeopardizes clean and safe food provision, while offering limited solutions for managing waste and residues from extended supply chains (Fassio & Tecco, 2019). Moreover, this configuration of food systems reinforces a consumption-oriented structure in which consumers are positioned as passive actors who are disconnected from food production and its governance (Atasoy, 2013).

In response to these challenges, food system studies increasingly emphasize the need to move beyond a narrow focus on food availability and production efficiency towards addressing broader issues related to food accessibility, food governance, and sustainability (Morgan & Sonnino, 2010; Vermeulen et al., 2012; Vieira et al., 2018). From this perspective, several scholars have argued that the dominant industrial agri-food system, largely designed for mass-production, efficiency, and affordability, requires fundamental transformation through regenerative configurations that seek to enhance healthy ecosystems and support decentralised, local food systems with shorter food supply chains that enable equitable access to clean food (Diekmann et al., 2020; Prost et al., 2018; Vieira et al., 2018; McGreevy et al., 2022). Such transformations are widely discussed as requiring holistic approaches that integrate regenerative production practices, equitable food access, and responsible consumption, rather than focusing solely on production. In this context, strengthening local and regional production-consumption linkages is commonly identified as a key pathway for reconfiguring food systems (Olsson, 2018; Vieira et al., 2018; Liaros, 2021).

Within this broader debate, the circular approach is increasingly presented as a promising pathway through which to build more sustainable, resource-efficient, and equitable economic systems (Geissdoerfer et al. 2017; Kirchherr et al., 2023). Rooted in the concept of the Circular Economy (CE), circular food systems propose a systemic framework for redesigning food production and consumption in sustainable and regenerative ways (EMF, 2019; Jurgilevich et al., 2016). Drawing on “systems thinking”, the circular approach integrates interrelated applications across the entire food system through innovative methods which span from production to consumption and seek to revalorize waste. Importantly, value creation within circular food systems extends beyond economic outcomes and address social, ecological, and cultural dimensions; enable system-wide strategies for waste reduction, revalorisation, and resource recovery; and also promise transformative change across food production, supply, retail, and consumption practices (Fassio & Tecco, 2019; Jurgilevich et al., 2016; Liaros, 2021).

The adoption of innovative and alternative food practices is increasingly recognized as essential for advancing circularity in food systems (Jurgilevich et al., 2016). In this study, alternative food practices, including Alternative Food Networks (AFNs) and Alternative Food Initiatives (AFIs), are understood as locally embedded production, provisioning, and

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consumption practices that challenge conventional agri-food systems by prioritizing regenerative production methods, shorter supply chains, and more direct producer-consumer relations (Sato et al., 2023). These alternatives can be driven by consumers, producers, or both, and may range from business-oriented to socially focused practices (Gori & Castellini, 2023; Quirk et al., 2024). While existing research has highlighted the transformative potential of such practices (Gori & Castellini, 2023), empirical evidence on their contributions to circular food systems, particularly in dense urban contexts, remains limited.

Addressing this gap, this study explores how existing alternative urban food practices relate and contribute to circular food systems. It does so by using a case study from the dynamic urban district of Karşıyaka, located in the İzmir province of Türkiye. Karşıyaka is characterized by its dense population, diverse socio-economic structure, and emerging urban food initiatives. Drawing on qualitative and exploratory research, the study investigates urban farming practices and alternative food provisioning models in Karşıyaka to assess their potential for circularity. Importantly, the food practices examined were not designed as part of a comprehensive circular food system, and they do not explicitly aim to implement circularity as a systemic model. Instead, they represent existing, place-based initiatives that have emerged in response to local needs and policy visions related to sustainability, locality, and food access.

Against this background, this study does not propose a predefined circular food system model. Rather, it investigates the extent to which, and in what ways, existing alternative urban food practices contribute to the circular food system in practice. By doing so, the study generates insights into how such practices can inform future pathways towards more circular urban food systems. Ultimately, the research identifies actionable strategies to promote circularity in urban food systems while contributing to the broader discourse on circular urban food systems and urban food planning.

Towards circular food systems

Circular approaches for urban food systems

Circular Food Systems (CFS) have gained increasing attention as a systemic and holistic framework for addressing the pressing challenges of the conventional agri-food system by fostering more integrated relationships between production, processing, distribution, and consumption (EMF, 2019; Jurgilevich et al., 2016; Liaros, 2021). CFS is situated within the broader concept of the CE, and seeks to replace linear “take-make-dispose” models with regenerative practices, efficient resource use, and waste minimization throughout the system (Geissdoerfer et al., 2017; Murray et al., 2017). When applied to food systems, the circular model aims to reconnect the fragmented components of the food system through regenerative practices, strengthened local networks, and alternative forms of consumption; thereby reducing environmental pressures and supporting more equitable food access (Liaros, 2021; Petit-Boix & Leipold, 2018).

However, critical scholarship cautions against the assumption that circularity automatically delivers environmental and social benefits. Instead, the outcomes of circular food systems depend on how production, consumption, and distribution are organized and governed within specific contexts (Korhonen et al., 2018; Corvellec et al., 2022). In urban settings, circular food initiatives are increasingly understood as context-dependent arrangements that are shaped by local governance structures, institutional capacities, and diverse actor constellations, rather than being predefined closed-loop solutions (Fassio & Tecco, 2019; Marin & De Meulder, 2018). This perspective also reflects a broader distinction between circular economic systems and circular urban systems; the latter operate primarily at a local level and are oriented toward providing societal benefits through services, infrastructure, and everyday practices (Marjanovic et al., 2022).

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Given this, circular food systems should not be understood as generic applicable models that can be implemented all at once. Instead, their development in urban contexts depends on the presence of innovative mechanisms that enable circular practices and their governance. It follows, that the examination of existing components and alternative food initiatives becomes particularly important for analysing how regenerative production, resource use, waste management, and food provisioning practices are currently organized. In addition, focusing on alternative initiatives facilitates the identification of concrete mechanisms through which circular principles can be implemented in practice, and may therefore contribute to the development of more resource-efficient, equitable, and context-sensitive urban food systems.

Circular food system with its components

To operationalise circularity in urban food systems, this paper adopts a set of key CE principles as an analytical lens rather than using either a comprehensive or normative definition of circularity. Building on widely used CE-based frameworks (e.g. EMF, 2019) and circular food system literature (Jurgilevich et al., 2016; Murray et al., 2017), three principles have been selected because they capture key intervention points across the food system:

1. local and regenerative food production,
2. waste prevention,
3. revalorisation of materials.

These principles offer valuable insights for rethinking and redesigning food production and waste processes in a restorative and regenerative manner.

While the principles cover various dimensions of the food system, expanding them further to explicitly address consumption relationships is essential. Existing circular food system frameworks tend to prioritise production processes and material flows, while leaving consumption practices, access, and food provisioning comparatively under-studied. To address this gap, this paper introduces a fourth principle: *promoting new modes of responsible consumption*. This principle explicitly focuses on how alternative food initiatives and supply channels connect production to urban consumption of clean, safe, and locally sourced food. Rather than assuming that localised or alternative practices are inherently circular, the inclusion of this additional principle allows the analysis to examine how and under which conditions such initiatives contribute to circularity in food systems. In line with urban systems perspectives (Williams, 2019), this approach also considers food provisioning as a form of locally governed service delivery that is shaped by institutional arrangements, spatial organisation, and policy frameworks.

At the same time, this study acknowledges significant limitations in applying a component-based framework to urban food systems. When circular principles and their associated components are implemented in a fragmented or isolated manner, they are unlikely to generate meaningful systemic change. Circularity becomes significant only when production, distribution, and consumption relations are reconfigured in integrated ways because it, allows urban food systems to function as coherent and context-sensitive socio-technical systems rather than as a collection of disconnected initiatives.

The following section examines these principles and related components in detail to analyse how circularity can be operationalised in urban contexts.

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Local and regenerative food production

A central concern of the circular food system is reversing the ecological degradation associated with the intensive farming methods used in conventional food production. Extensive evidence shows that chemically intensive and monocultural farming systems impair soil and water quality, contribute to biodiversity loss, and reduce the availability of fertile agricultural land; thereby undermining the long-term capacity of food systems to produce safe and nutritious food (Springmann et al., 2018; Vermeulen et al., 2012; Morgan, 2009). From this perspective, the first principle of circular food systems focuses on regenerative food production, ie. improving the ecosystem services on which food production relies. This basically involves repairing damaged ecosystems and ensuring the production of sustainable and healthy food. Regenerative production is closely associated with agroecological practices that improve soil health, biodiversity, and ecosystem resilience while reducing reliance on external inputs (Francis et al., 2003; Gliessman, 2014).

Within circular food systems, regenerative production is operationalised through sustainable resource use, soil regeneration, and nutrient cycling; cumulatively they form the ecological basis of circularity (Jurgilevich et al., 2016). Practices such as composting and the recovery of organic materials from food waste streams help close nutrient loops and improve soil fertility, while responsible water use and renewable energy integration reduce environmental pressures as well as the GHG emissions associated with food production (Fassio & Tecco, 2019; Liaros, 2021). Rather than relying on large-scale monocultural systems, localisation further strengthens regenerative production by enabling decentralised and diversified farming systems that reduce energy losses, shorten supply chains, and facilitate the local reuse of organic residues (Liaros, 2021). In this sense, regenerative and local food production are foundational components of circular food systems, linking ecological restoration to place-based resource cycles.

Waste prevention and revalorisation of materials

At its core, circularity seeks to transform waste into resources, a principle that lies at the core of circular economy thinking. However, circularity extends beyond simple waste management and involves broader transformations with regard to how resources are produced, distributed, and reused across systems. In the context of food systems, this perspective emphasises both the prevention of food loss and waste along supply chains as well as the revalorisation of unavoidable residues through their reintegration into material and resource cycles.

Within circular food systems, waste prevention constitutes a primary strategy and is closely linked to the organisation of food supply chains. Techniques such as closing, narrowing, or slowing food cycles (De Angelis et al., 2018), together with repurposing waste, are seen as key to this reorganisation. Shortening supply chains through localized food systems can reduce food miles, improve demand–supply coordination, and limit food losses that occur across multiple intermediaries (Fassio & Tecco, 2019; Liaros, 2021). Alternative and locally embedded food provisioning models also contribute to designing waste out of the system by enabling more direct producer–consumer relations and better aligning production volumes with consumption needs. In this sense, waste prevention emerges not only as a technical issue but also as a spatial and organisational challenge embedded in the structure of urban food systems.

Despite prevention efforts, a certain amount of food surplus and bio-waste remains unavoidable. The revalorisation of materials addresses how these waste streams are reintegrated into value cycles rather than discarded. In this regard, circular food system literature distinguishes between inner and cascaded use strategies (De Angelis et al., 2018).

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Inner uses involve closing material loops within the agri-food system itself through techniques such as composting, bio-fertiliser production, animal feed, or biogas generation; thereby supporting soil regeneration and resource efficiency in food production (Fassio & Tecco, 2019). In urban contexts, edible food surpluses may be revalorised through innovative platforms such as food banks and food outlets that collect and redistribute surplus food while also addressing issues of access and affordability. Cascaded uses extend beyond the food system, with bio-based residues utilised in other sectors including biomaterials, biopackaging, construction, energy, and nature-based solutions for urban infrastructure (Fassio & Tecco, 2019; Stefanakis et al., 2021). In addition, food waste streams can also feed other industries by upcycling. Examples include: the textile industry (e.g., textile fibre from industrial bio-waste), the paper industry (e.g., apple peel and cores become paper), and the packaging industry (e.g., bio-packaging) (Fassio & Tecco, 2019); all contribute to broader bioeconomy cycles. Together, waste prevention and revalorisation of materials support circular food systems by linking food-related resource cycles and reducing pressures associated with linear waste streams.

Promoting new modes of responsible consumption

Food systems are increasingly highlighted as key sites for implementing circularity principles. While earlier CE approaches often prioritised production systems and material flows (Jurgilevich et al., 2016; Mylan et al., 2016), recent studies have increasingly emphasised the importance of everyday practices, food provisioning, and responsible consumption in circular transformation processes (Hobson, 2020; Quirk et al., 2024; Greene & Hobson, 2025). These studies highlight that circularity is shaped not only through technical resource recovery, but also through the social and organisational relations which connect production, provisioning, consumption, and waste circulation. In this context, responsible consumption refers not only to individual choices but also to practices and mechanisms that foster closer connections between production and consumption, and also support regenerative, resource-efficient food systems.

Responsible consumption plays a critical role in food system transformation by shaping everyday food practices and supporting more sustainable and circular forms of food provisioning; these have potential impacts on waste reduction and resource efficiency (Borrello et al., 2017; Canto et al., 2021; Hamam et al., 2021). However, while individual consumption choices matter, shifts in consumption patterns cannot be understood solely through individual behaviour, as they are embedded within organised forms of food supply, retail, and provisioning, as well as the infrastructures and governance arrangements through which food practices are organised (Mylan et al., 2016; Oosterveer & Spaargaren, 2012). From this perspective, responsible consumption is closely linked not only to how food is made accessible and distributed, but also to the intermediary infrastructures and governance arrangements through which urban practices are organised.

In this context, alternative food provisioning models such as food communities, consumer cooperatives, municipality-led retail, and community food spaces have emerged as critical organisational forms which support responsible consumption. Beyond facilitating access to locally sourced and ecologically produced food, these initiatives may function as intermediary spaces that could strengthen relationships between producers and consumers through everyday interaction, collective organisation, and alternative provisioning practices. Particularly, consumer cooperatives encourage more collective forms of consumption, and may enable consumers to become more actively involved in food production and distribution. In this sense, consumers may take on the role of “prosumers”, and participate in organised systems that extend beyond passive end-use and contribute to broader food system reconfiguration (Schulz et al., 2019).

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Through such alternative supply channels, the integration of consumption into circular food systems becomes more tangible. These mechanisms can support local and short food supply chains, reduce food waste, strengthen connections between urban consumption and regenerative production, and improve access to locally produced food (Liaros, 2021; Canto et al., 2021). However, the contribution of responsible consumption to circularity is not automatic; it depends on how these practices are organised, scaled, and integrated within both local governance and supply infrastructures.

Table 1 summarises the analytical framework used in this study, which links circular food system principles to their ecological, social, and economic dimensions. In line with the theoretical discussion, food loss and waste prevention and material revalorisation are treated as a single principle; reflecting their close interdependence in practice. While analytically distinct, prevention strategies and revalorisation mechanisms operate along the same circular logic, and range from supply chain reconfiguration to inner and cascaded material loops. The table further highlights how alternative food initiatives and responsible consumption practices function as cross-cutting mechanisms that connect production, distribution, and consumption within urban food systems.

Table 1. Circular food system principles and related circularity elements.
Adapted from Özçam (2024)

Principles	Dimensions		
	Ecological continuity	Social equity	Economic viability
1st principle: Local and regenerative food production			
Resource sensitive production (water/soil)	•		•
Agroecological production techniques (organic farming, eco-production, etc.)	•	•	•
Recovery of organic materials and nutrients (compost / bio-fertilisers)	•		•
Water-food-energy nexus Utilization of water /energy in cycles	•		•
Local & decentralized food production	•	•	•
2nd & 3rd principles: Waste prevention together with revalorisation of materials			
Short supply chain mechanisms (producer-consumer connection)	•	•	•
Collection and sorting mechanisms (material banks)	•	•	•
Redistribution platforms (food surplus use)		•	•
Inner circle revalorisation (composting, bio-fertiliser, and so on)	•	•	•
Cascaded use revalorisation (bio-economy linkages)		•	•
4th principle: Accelerating responsible consumption			
Alternative retail / food access mechanisms		•	•
Organized consumer associations (consumer groups/cooperatives)		•	•
Reuse and sharing platforms (food banks, food outlets, etc.)	•	•	•

Research context and applied research methods

Study area: Karşıyaka, İzmir

This study is situated in Karşıyaka, a dense urban sub-centre of İzmir, Türkiye (see Figure 1), that is characterised by rapid urbanisation, a diverse socio-economic structure, limited local food infrastructure, and strong dependence on metropolitan services. Since the 1980s, urban expansion has transformed much of the district into a predominantly residential and commercial dense urban fabric (Erdoğan, 2013); largely at the expense of productive rural landscapes and local agricultural activity. As a result, local food production is limited, and self-reliance in food provision is low; leading the district to depend predominantly on regional and global food supply chains (Özcan, 2024). At the same time, access to locally produced, ecological, and affordable food remains constrained despite the availability of diverse food-provisioning services.

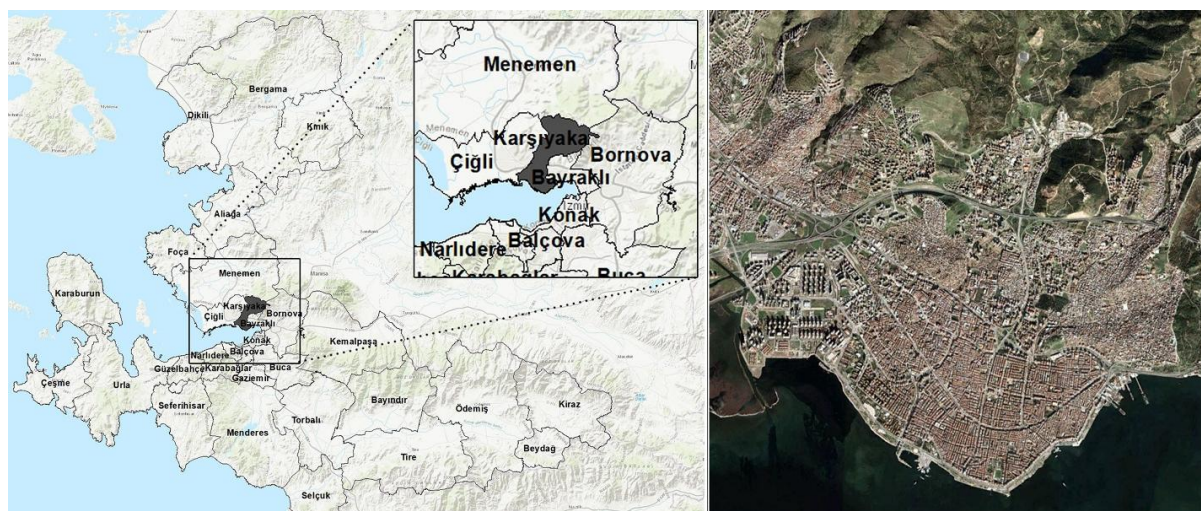


Figure 1. The location of Karşıyaka in İzmir (left) and its urban fabric (right).
Adapted from Özcam (2024)

In response to these challenges, Karşıyaka Municipality has increasingly positioned food systems within broader sustainability and urban resilience agendas through initiatives such as urban agriculture, alternative retail mechanisms, awareness-raising programmes, and the Karşıyaka Food Strategy (Karşıyaka Municipality, 2023). These municipality-led initiatives make Karşıyaka a relevant case for examining how locality, sustainability, and circularity are interpreted and operationalised within an already urbanised urban context.

Research design and data collection

Rather than approaching circular food systems as a predefined or universal model, this study adopts a critical and practice-oriented perspective. Circularity can be understood not as a set of technical solutions applied in isolation, but as a relational, governance-driven process that is shaped by the reconfiguration and interconnection of production, consumption, and distribution within specific urban contexts. From this perspective, individual circular practices only gain transformative meaning when they are embedded within broader, integrated arrangements that strengthen relationships across the food system. This is why the study pays particular attention to both production- and consumption-oriented practices, as well as to how alternative initiatives may (or may not) foster stronger linkages between them. While these domains are examined separately, the distinction reflects the current organisation of food initiatives in Karsıyaka; practices are largely coordinated through municipality-led programmes

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and remain weakly interconnected. Given this, the analysis adopts this separation as a mechanism by which to critically examine the fragmented and weakly interconnected nature of existing practices. Given that Circular Food Systems (CFS) is a relatively recent concept with ambiguous parameters and unclear urban projection, uncovering urban food practices through on-site and qualitative investigation is essential for understanding how circular principles are interpreted, adapted, and governed in practice. As food practices and their circularity potential are highly context-dependent and shaped by local institutional settings, actor relations, and governance arrangements, an exploratory qualitative research design was adopted to capture the organisational structures and relational circularity dimensions of food practices in Karşıyaka.

In line with this perspective, this study focuses on existing, locally developed food practices that address both production and consumption. It also examines how these practices relate to the key components of circular food systems discussed in the theoretical framework. The analysis critically investigates whether and how such practices contribute to circularity by strengthening relationships across the food system, reducing resource losses, and enabling more integrated forms of provisioning and consumption.

To this end, the research adopts an exploratory case study design using qualitative methods for data collection and analysis (Walcott, 1994). The analysis consisted of three main steps:

1. Analysis of local food policies and programmes that promote or shape food-related practices in Karşıyaka.
2. Exploration of key alternative food practices which address both production and consumption.
3. Assessment of circularity potential by examining how these practices relate to circular principles and how relationships across the food system are governed.

The first step involved a descriptive analysis of five local strategy and policy documents – primarily produced by Karşıyaka Municipality (see Table 2) – to identify how sustainability, locality, and circularity are framed at the district level. The second and third steps focused on an in-depth qualitative investigation of local food practices through participant observation and semi-structured interviews. Interviews were conducted with a diverse range of food-related actors, including municipal units, local NGOs, cooperatives, associations, retail actors, and consumers. These interviews explored (i) the types of food practices being implemented, (ii) the organisational and governance structures behind them, (iii) the relationships that exist between production, provisioning, and consumption, and (iv) their perceived alignment with circular principles. Participant observation complemented the interviews by documenting ongoing activities and included meetings, workshops, seminars, and awareness-raising events related to food and sustainability. This combination of methods enabled a critical assessment of how circularity is interpreted and operationalised in practice, as well as the extent to which existing alternative initiatives contribute to more integrated, relational, and context-sensitive circular food systems in Karşıyaka.

Table 2. Data collection and analysis methods

Phase	Data collection method	Number	Content
<i>First phase</i>	Document review and scanning	5 documents	• Karşıyaka sustainable energy and climate action plan (Karşıyaka Municipality, 2021) • Karşıyaka SECAP progression report (Karşıyaka Municipality, 2022a) • Karşıyaka sustainability situation analysis report (Karşıyaka Municipality, 2022b) • Karşıyaka urban food strategy (Karşıyaka Municipality, 2023)
<i>Second & third phase</i>	Participant observation	12 observations	• 1 - Food Centre workshop • 3 - Food strategy document workshops • 1 - Sustainability report launch • 4 - Neighbourhood bazaars • 2 - Neighbourhood fruit gardens • 1 - Farmers' market
<i>First & second & third phases</i>	In-depth interviews	38 interviews	• 8 with local municipality, including subsidiary units • 2 with experts from the advisory board of Karşıyaka Municipality • 8 with local NGOs, consumer units, cooperatives • 4 with food communities actively operating at the local level • 6 with producers or stallholders in bazaars and farmers' market • 10 with consumers at local retail units, bazaars, and farmers' market

Exploring alternative food practices in Karşıyaka

Local food policies and food programs of the district

Karşıyaka Municipality plays a central role in shaping the local food system through a series of policy documents which promote sustainable urban development and food-related transformation (Karşıyaka Municipality, 2021; 2022a; 2023). Key policy outputs include the Karşıyaka City Vision (Karşıyaka Municipality, 2024) and the SECAP – Sustainable Energy and Climate Action Plan (Karşıyaka Municipality, 2021), which outline strategic areas and steps toward sustainable urban transformation. Complementing these, the Karşıyaka Food Strategy Document has been produced and focuses on food-specific strategies and actions that frame food systems within broader sustainability agendas (Karşıyaka Municipality, 2023).

The City Vision (Karşıyaka Municipality, 2024) defines Karşıyaka as an inclusive, healthy, ecological, and circular city, that positions food-related practices with ecological lifestyles, sustainable consumption, and circular resource use. Food-related issues intersect with all aspects of this vision, particularly the circular and ecological themes. In addition, Karşıyaka Municipality has been proactive in addressing climate change. It was the first local government in Turkey to sign the Covenant of Mayors in 2011 and prepare SECAPs. Over time, these plans have evolved, and ambitious greenhouse gas reduction targets have been set: 35% by 2020 and 40% by 2030 in the latest SECAP (Karşıyaka Municipality, 2022a). The most recent SECAP (Karşıyaka Municipality, 2021) defines strategic areas, including waste-to-energy, and also addresses food system challenges including food security, public health, and organic waste reuse.

Alongside these policy frameworks, Karşıyaka has hosted a range of projects on energy efficiency, organic waste management, sustainable agriculture, and social awareness

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campaigns (Karşıyaka Municipality, 2022b). This process reflected broader institutional restructuring within the municipality through which food policies and sustainability agendas have become increasingly integrated (see Figure 2).

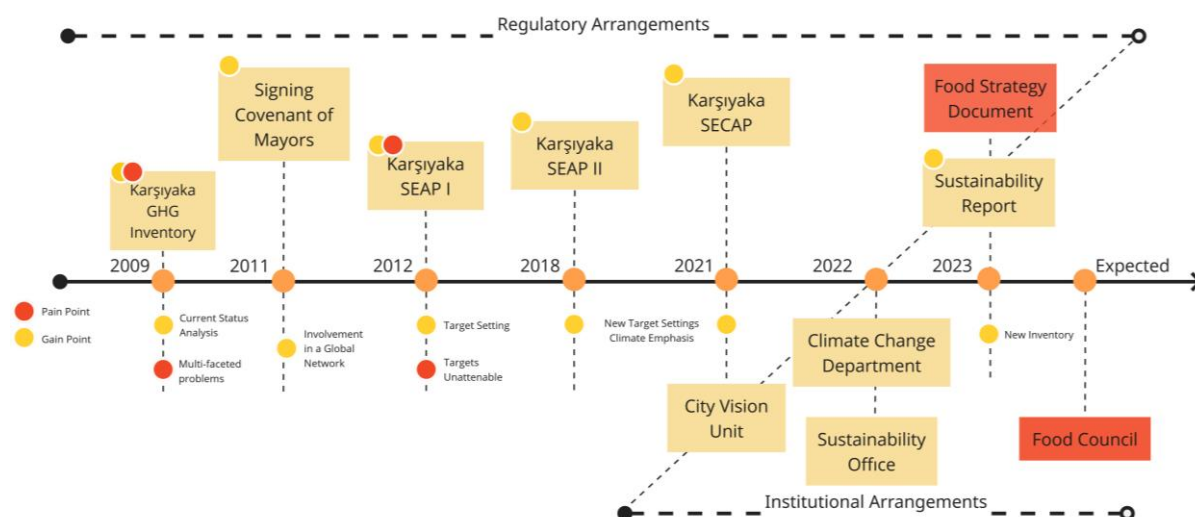


Figure 2. Regulatory and institutional arrangements within the Karşıyaka Municipality. Adapted from Özçam (2024)

Building on this, the production of the Karşıyaka Food Strategy Document (Karşıyaka Municipality, 2023) marked a significant step in shaping the local food system. Developed through participatory processes involving local actors and food planning experts, the document outlines a strategic framework with spatial assessments, guiding principles, and actionable steps. Grounded in four core principles –Ecological, Participatory, Localised, and Fair– the strategy promotes agroecological production, shorter supply chains, alternative retail mechanisms, waste reduction, participatory governance, and equitable food access (Karşıyaka Municipality, 2023). The core directions involve creating a cooperative ecosystem, supporting urban agriculture, strengthening mechanisms for local production, empowering food communities, promoting alternative retail models, implementing certification and training programmes, and developing community kitchens, food banks and composting systems (Karşıyaka Municipality, 2023).

Rather than presenting a fully operationalised circular food system model, the document functions as a strategic framework which seeks to coordinate fragmented food-related initiatives under a shared vision, and to guide future actions toward a more integrated and sustainable local food system. While partial applications by different municipal units are already underway at various scales, many of the proposed actions –such as supporting urban agriculture, strengthening producer– consumer linkages, and promoting food communities remain at an early or fragmented stage of implementation. Although these initiatives reflect growing policy ambition, their contribution to circularity depends on how effectively they are coordinated, governed, and integrated across production, provisioning, and consumption practices. In this sense, Karşıyaka does not represent a finished circular food system, but rather a dynamic urban context in which policy visions, alternative initiatives, and governance arrangements interact in uneven and evolving ways.

Key food practices

Local food practices in Karşıyaka can be broadly grouped into two interconnected domains: production-oriented and consumption-oriented initiatives. These practices are primarily initiated and coordinated by the municipality and its affiliated units, and reflect an effort to localise food production, strengthen producer–consumer linkages, and promote more sustainable food provisioning within a highly urbanised context that possesses limited local food infrastructure. However, intermediary civic and community-led initiatives that could more strongly connect production and consumption practices remain relatively limited. Rather than forming a fully integrated circular food system, these municipality-led initiatives operate as fragmented but also evolving practices that selectively address aspects of regenerative production, access to local food, and alternative consumption cultures.

Figure 3 illustrates the spatial distribution of the key food-related initiatives discussed in the study, including those production- and consumption-oriented practices that are coordinated across different neighbourhoods of Karşıyaka. The following sections critically examine how these practices are organised, the kinds of relationships that they have established across the food system, and the extent to which they align with key circularity principles such as regenerative production, resource sensitivity, waste reduction, and responsible consumption.

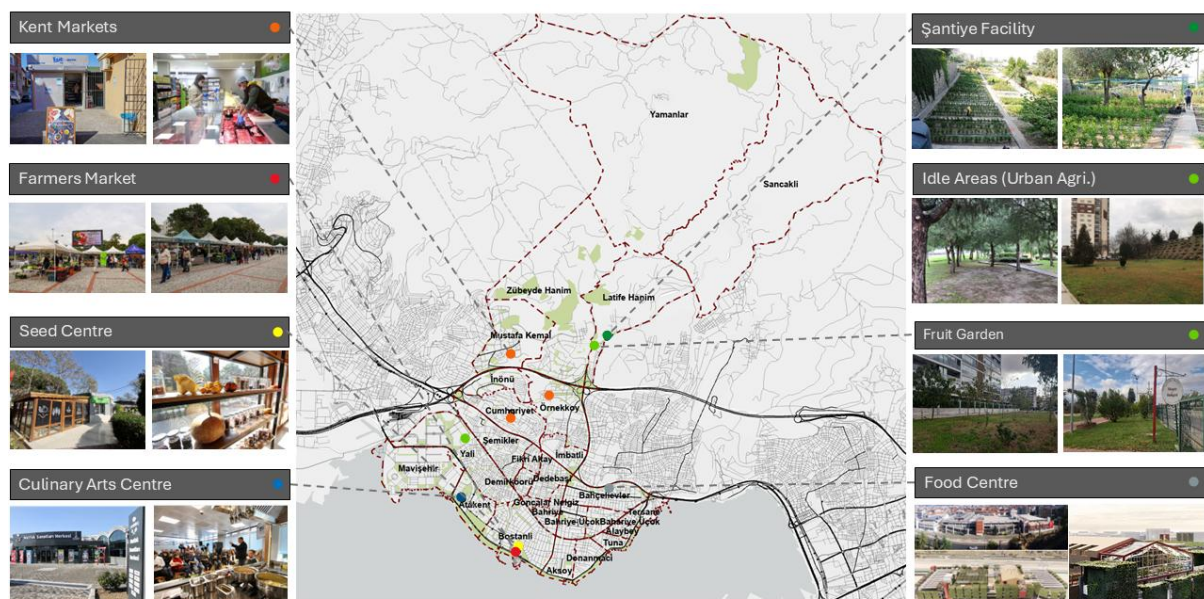


Figure 3. Map of key food practices and initiatives in Karşıyaka.
Adapted from Özçam (2024)

Production-oriented practices

Production-oriented practices in Karşıyaka primarily seek to challenge conventional food production models by promoting local and cleaner forms of production. These initiatives have been largely implemented by the municipality and its affiliated units, and include urban agriculture on idle urban lands, the expansion of small-scale neighbourhood orchards, the dissemination of local seeds through the Seed Centre, and the promotion of composting practices.

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Urban agriculture practices

Urban agriculture has become a key strategy for supporting local food production in Karşıyaka, and is particularly important in the area y given limited agricultural activity in the district's urban periphery. Municipal initiatives include agricultural production at the Şantiye Facility, the establishment of edible landscapes and fruit gardens in neighbourhoods, the use of idle land for cultivation, and the integration of school gardens into educational programmes.

In addition to these aspects, two neighbourhood orchards have been established; both provide accessible fruit gardens for residents. The Şantiye Facility, operational since June 2023, is Karşıyaka's first urban garden to use ecological production methods. Local seeds are used for vegetable cultivation, and some are distributed to local producers. Harvested products are used in municipal events, while composting is practiced at the facility to support ecological production.

The municipality also developed an Idle Areas Inventory Strategy (2022), which identified over 300 municipally owned vacant spaces, of which five were selected as suitable for urban agriculture based on physical and social criteria, (including soil quality, water access, accessibility, and community potential). It is envisaged that these areas will host community gardens, with the aim of involving residents as active users. Similar initiatives are planned for school gardens; strengthening links between food production, education, and awareness.

Composting practices

Composting constitutes a complementary production-oriented practice in Karşıyaka, and is primarily linked to urban agriculture initiatives at the Şantiye Facility. Composting is practiced using bio-waste collected from neighbourhood bazaars and pruning residues from parks and green spaces, with the resulting compost being applied to on-site agricultural activities at the Şantiye Facility. In this sense, composting contributes to material revalorisation and supports regenerative production by recycling organic waste into soil inputs. The municipality also plans to expand composting practices to future urban farming sites identified through the Idle Areas Inventory Strategy; potentially strengthening local nutrient cycling if these projects are implemented.

Beyond municipal facilities, composting is promoted through awareness-raising activities such as household composting and balcony gardening training organised by the Agricultural Services Directorate. These initiatives seek to encourage domestic organic waste reduction and citizen engagement with sustainable food practices. However, composting remains limited to a small number of sites and educational programmes and lacks both the institutional coordination and scale required to function as an integrated, district-wide nutrient cycling system.

Local seed promotion

The Karşıyaka Seed Centre, established in October 2022 in Bostanlı neighbourhood, plays an important role in promoting local seed diversity and small-scale ecological production. The centre cultivates, multiplies, and distributes approximately 1,500 varieties of local seeds - primarily vegetables specific to the Aegean region. Within the first six months of its operation, around 200,000 seed packets were distributed free of charge to residents, producers, and institutions.

The centre also provides consultancy on planting and harvesting, encourages seed return and multiplication, and involves volunteers in packaging activities.

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While this model supports local biodiversity and community engagement, it remains focused on seed circulation rather than broader regenerative farming systems. Its contribution to circularity lies mainly in knowledge sharing and localisation, rather than in systemic resource cycling or large-scale production transformation.

Overall, these practices focus on increasing local food production and raising awareness about ecological farming and seed diversity. While they contribute to localisation and community engagement, their regenerative and resource-sensitive dimensions remain limited. Agroecological practices, nutrient cycling, and integrated resource management are not yet systematically embedded, and material recovery efforts such as composting appear fragmented rather than structurally coordinated. As such, current production-oriented practices support elements of circularity, but do not yet constitute a fully integrated regenerative production system.

Consumption-oriented practices

Consumption-oriented practices in Karşıyaka seek to strengthen access to local, clean, and affordable food while fostering new food cultures and consumption habits. These initiatives primarily seek to improve the availability of locally sourced food and to strengthen relationships between producers and consumers. They also promote new culinary cultures and awareness around sustainable food consumption. These practices are largely driven by the municipality and focus on alternative retail models, community-oriented food services, and educational and awareness-raising activities.

Food Centre

The Karşıyaka Food Centre is a proposed food hub that has been designed to support alternative consumption practices and strengthen connections between producers, consumers, and local organisations. Although not yet implemented due to budget constraints, the project envisions transforming the Bahçelievler Neighbourhood Bazaar into a multi-functional centre with rooftop gardens, ecological food sales units, and spaces for education and community activities.

The Food Centre wishes to function as a social and institutional hub for food-related initiatives, promoting access to healthy, locally sourced food and supporting collaborative governance. However, as the project remains at the planning stage, its practical contribution to circularity cannot yet be assessed.

Culinary Arts Centre

Launched in 2023 through a partnership between Karşıyaka Municipality and Yaşar University, the Culinary Arts Centre promotes sustainable, locally rooted culinary cultures. Training programmes emphasise Aegean food heritage, waste-free cooking, and the use of local products.

The centre contributes to responsible consumption by raising awareness of sustainable food practices and integrating local products into gastronomy. However, its impact remains primarily cultural and educational, with limited direct links to local production systems or resource recovery processes.

Alternative retail mechanisms

These include municipal markets (Kent Market), farmers' markets, and ecological bazaars. These events and venues are designed to enable direct connections

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between consumers and local producers without intermediaries. Two key initiatives stand out: Kent Market and the Farmers' Market.

Kent Market, operated by the municipal subsidiary Kent A.Ş., provides affordable and locally sourced food, particularly in low-income neighbourhoods. Products are supplied mainly by cooperatives from İzmir and the Aegean region. A virtual market also enables online shopping. In addition, the Kent Market Card supports vulnerable households by allowing free access to food within a monthly limit. This initiative enhances food accessibility and shortens supply chains while also promoting local production and social welfare. However, it still relies largely on regional rather than strictly local production.

The Farmers' Market (Local Producer Market) in Bostanlı represents another important initiative implemented by Karşıyaka Municipality to promote the localisation of food practices within the district. Organised and managed by the Agricultural Services Directorate, the market offers local producers a platform to sell directly to consumers without intermediaries. Municipal support, such as the provision of infrastructure and transportation, enables producer participation. The market promotes alternative consumption practices and encourages a culture of alternative consumption by increasing access to local, ecological, and clean products. However, it operates only once a month, and its overall dissemination remains limited as it is organised only in a relatively high-income neighbourhood; restricting its broader accessibility amongst residents across the district.

Overall, consumption-oriented practices emphasise localisation and social access to food, while also seeking to encourage more sustainable consumption behaviours. However, they remain weakly connected to production systems and material recovery processes, which limits their contribution to integrated circular food systems. While localisation and producer–consumer connections are prioritised, practices related to reuse, sharing, and waste reduction at the consumption stage remain limited. Moreover, consumption initiatives have not yet been systematically integrated into production processes or material recovery systems, resulting in a fragmented approach to circularity rather than a coordinated reconfiguration of food-system relations.

Exploring the circularity potential of the key local food practices

In Karşıyaka, food-related initiatives are framed through a local food strategy that promotes sustainability and localisation. While this strategy seeks to consolidate diverse food-related practices under a common framework, existing initiatives remain fragmented and address only specific aspects of production and consumption. Rather than constituting a coherent circular food system, these practices primarily focus on promoting localisation and regenerative actions. Although these applications are not completely circular, they incorporate elements that promote circularity. It follows, that analysing these practices through selected circularity parameters enables identification not only of their potential strengths but also of their limitations as well as areas for improvement; providing insights into how a more circular and sustainable food system could be fostered.

Starting with production-oriented practices (See Figure 4), urban agriculture emerges as a prominent initiative in Karşıyaka, and demonstrates partial alignment with circularity principles. Together with local seed promotion and composting practices, these efforts primarily contribute to the localisation of food production and to limited forms of regenerative production. Collectively, they support shorter supply chains by increasing localised production, promoting ecological awareness, and introducing alternative and local inputs. Urban agriculture increases local food production and encourages basic ecological methods; seed initiatives

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promote the use of local seeds as an alternative to industrial inputs; and composting initiatives enable partial material revalorisation through the reuse of bio-waste. In this sense, these practices contribute mainly to two key circularity dimensions—regenerative production and waste prevention through material recovery; indicating an initial shift towards more resource-sensitive practices

Production-Oriented Practices

Practitioner		Target group		Circularity Assessment		Potentials
Municipality		Citizens & Producers				
Explanation						
Urban Farming Practices Local Seed Production Composting All actualized by the Municipality						
In operation: Only within Şantiye Facility						
Projected: Urban agriculture within idle areas across Karşıyaka						
Tools: • Ecological prod. techniques • Composting • Local seedling and seed production • Distribution to citizens and producers • Using harvested crops in municipal services						

Figure 4. An overview of the production-oriented practices.
Adapted from Özçam (2024)

However, the regenerative dimension of these practices remains limited. Urban agriculture is confined to a small number of sites, such as the Şantiye Facility, a few neighbourhood orchards, and selected school gardens. Agroecological principles, long-term soil management, biodiversity protection, and systematic water and energy efficiency strategies have not yet been embedded into these partial production practices. Their implementation has been incremental and fragmented, and there is a lack of coordinated planning framework and organisational support that would enable their wider adoption across the district. Moreover, innovative approaches to water and energy use are notably absent; highlighting the need for more comprehensive resource-sensitive production models beyond pilot-scale applications.

Composting is another important initiative that contributes to material recovery and waste reduction by supporting internal material circulation and indirectly reducing emissions. However, its contribution to circularity remains partial. Although an organic waste stream is being established, organic waste flows are limited and weakly integrated, and their utilisation for composting is neither systematic nor scaled across Karşıyaka. Expanding these efforts would require a more comprehensive framework for the collection, sorting, and redistribution of organic waste, as well as the establishment of material banks to support continuous nutrient cycling. At present, material circulation and recovery are largely confined to isolated composting practices rather than functioning within an integrated circular system.

To address these challenges, urban agriculture and related initiatives need to be scaled up and embedded within a holistic, city-wide system. A more organised and systematic approach

Consumption-Oriented Practices

Practitioner		Target group		Circularity Assessment		Potentials
Municipality		Conscious Consumers				
Explanation		1st Pr.		Regenerativeness * Partial efforts to connect ecological production to consumption * Local sourcing: Local food products * No systematic model on organic waste flow from consumption	Localisation * Supports for direct connection (via cooperatives & alternatives) * Short supply chains, no intermediaries * Local sourcing: Local food products * Low systemic connection with citizens	Short Supply Chain Localized production Alternative but limited consumption mechanisms Inner circle use: Re-circulation of surplus edible food
Alternative Retail and Consumption Mechanisms		2nd & 3rd Pr.		Material Recovery & Material Flow * Efforts to increase local food flows * No collection mechanisms such as material banks and food banks	Waste Generation * Redistribution surplus edible food in between facilities and services * Efforts to decrease food miles and GHGs * No systematic waste reduction	Medium compliance High Potential
All actualized by Municipality		4th Pr.		Diversified Consumption * Efforts to increase connection between local producers and consumers * Partial efforts to connect ecological production to consumption * No other alternative mechanisms such as sharing platforms or food banks	Food Accesibility * Efforts to increase access to clean and local food produced within urban periphery * Partial efforts to increase affordability * No other alternative mechanisms such as sharing platforms or food banks	Limitations Small level of Public Procurement Unorganized collection Unorganized re-use and sharing platforms Piecemeal Unsystematized Unorganised Top-down
In operation: Culinary Arts Centre Kent Market & Facilities (Services) Farmers Market						
Projected: Food Centre						
Tools: • Local sourcing • Short supply chains (No intermediaries) • Alternative Initiatives • Low pricing • New consumption culture						

Alternative retail mechanisms, in particular, reduce reliance on long supply chains and facilitate direct producer–consumer relations. This supports localisation and generates indirect benefits for resource efficiency by reducing transportation distances and associated emissions. Similarly, the Food Centre was initiated as a multi-actor platform that brings together local producers, producer groups, relevant NGOs, cooperatives, and consumers within a shared space for food provisioning, exchange, and awareness-raising. The Culinary Arts Centre further contributes to responsible consumption by promoting waste-free cooking practices, and raising awareness of local food cultures and sustainable gastronomy. However, these initiatives remain weakly connected to local production and material recovery processes. Their impacts are largely cultural and educational, rather than structural in terms of reorganising resource flows, strengthening production–consumption linkages, or closing material loops within the urban food system.

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Although consumption-oriented practices have the potential to promote more efficient resource use, improved material circulation, and food waste reduction, these potentials have not yet been realised in practice. Measures such as the reuse of packaging, the composting of unsold produce, and the systematic redistribution of surplus food remain limited or absent. Currently, the primary foci of consumption-oriented initiatives remain shortening supply chains and ensuring access to locally sourced food, rather than integrating consumption with waste prevention and material revalorisation strategies.

Overall, the existing initiatives that promote cooperative-led supply chains and retail systems that drive local sourcing contribute selectively to circularity. Indirect benefits include improved resource efficiency, reduced food miles, and more equitable access to nutritious food, while direct contributions are most evident with regard to issues of localisation and responsible consumption. Local sourcing not only strengthens the regional food ecosystem but also plays a pivotal role in shortening supply chains, encouraging resource-efficient and sustainable production methods, and minimizing food miles. However, these contributions remain fragmented and uneven. Collaborative initiatives by municipal departments to redistribute surplus edible food illustrate this pattern. Despite their potential to address food waste and food access simultaneously, they lack a structured, district-wide implementation system.

Promoting localisation remains a central strategy that is aligned with broader circular transition goals in Karşıyaka. Facilitating access to local, nutritious, and affordable food through shorter supply chains without intermediaries directly supports circularity principles. However, these efforts remain largely top-down and fragmented, with limited collaboration with civil society actors such as consumer cooperatives, food communities, or solidarity-based networks. Moreover, key mechanisms that could strengthen responsible consumption, such as food banks, sharing platforms, or reuse-oriented initiatives, are notably absent. Strengthening civic engagement and integrating civil society into food governance, appears essential for moving beyond partial localisation towards a more relational, inclusive, and system-wide circular food transition.

Overall, the food practices observed in Karşıyaka exhibit several isolated elements of circularity, and particularly so with regard to localisation, alternative provisioning, and limited material recovery. However, these elements remain weakly connected across production, consumption, and waste management domains. Circularity is thus not realised as a systemic transformation, but rather as a set of discrete, loosely coordinated practices. This fragmentation reflects both institutional constraints and governance challenges. While municipal initiatives provide important entry points for circular transitions, their impact depends on stronger coordination across sectors, deeper engagement with civil society actors, and more integrated linking of production, provisioning, and material cycles. To clarify how specific practices align with selected circularity dimensions, Table 3 maps key empirical examples to the core circularity elements used in this study, indicating both their contributions and limitations.

Table 3. A synthesis of fragmented circularity in practice

Principles	Production-oriented practices		Consumption-oriented practices	
	Potentials	Limitations	Potentials	Limitations
1st principle: Local and regenerative food production				
Resource sensitive production (water/soil)	Limited ecological practices in urban agriculture	No systematic water/soil management	Awareness-raising through educational activities	No influence on production-side resource use
Agroecological production techniques	Use of local seeds; small-scale ecological gardening	Agroecology not systematically applied	Promotion of local/ ecological food narratives	Consumption practices not linked to production methods
Recovery of organic materials and nutrients	Partial – composting at Şantiye Facility	Composting remains small-scale and unsystematized	Awareness of waste-free practices e.g. Culinary Arts	No operational link to composting systems
Water-food-energy nexus	None observed	No integration of water or energy cycles	None observed	Not addressed in consumption practices
Local and decentralized food production	Urban agriculture, neighbourhood orchards	Production volumes insufficient to support local demand	Local sourcing through markets	Reliance on regional rather than district-scale production
2nd & 3rd principles: Waste prevention together with revalorisation of materials				
Short supply chain mechanisms	Partial – urban agriculture contributes to direct connection	Limited scale; weak link to every retail system	Farmers' markets, municipal retail	Mostly regional sourcing; limited district-level
Collection and sorting mechanisms	Limited collection of organic waste	No district-wide system; no material or food banks	None observed	Waste management not embedded in retail
Redistribution platforms (food surplus use)	Ad hoc surplus use in municipal events	No systematic redistribution structure	Potential through Culinary Arts centre	No district-wide system; no sharing or food banks
Inner circle revalorisation (composting, bio-fertiliser, etc.)	Partial – Composting at Şantiye Facility	Composting remains small-scale and unsystematized	Awareness of waste-free practices	No operational link to composting systems
Cascaded use revalorisation (bio-economy linkages)	None observed	No bio-economy linkages	None observed	No operational link to bio-economy
4th principle: Accelerating responsible consumption				
Alternative retail / food access mechanisms	Potential alternatives; e.g. farmers' market	Insufficient mechanisms to connect production to provision	Potential alternatives; e.g. Kent Market	Uneven spatial distribution, limited in number
Organized consumer associations	Presence of local consumer organisations (e.g. GETO and Imbat)	Lack of producer–consumer co-organisations	Unorganized, informal consumer engagement	Limited formal cooperatives or food communities
Reuse and sharing platforms (food banks, food outlets, etc.)	None observed	Not integrated	Potential of Kent Market as food outlets	Not systematically operational alternatives absent

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Conclusion

Focusing on regenerative production, waste prevention and material revalorisation, and responsible consumption, this study has examined how existing alternative food practices in Karşıyaka relate to key circular food system principles. By focusing on a highly urbanised district in which local food infrastructures remain fragmented and food-related initiatives are predominantly municipality-led, the study contributes to ongoing discussions on how circular food system principles are interpreted and operationalised within already urbanised urban contexts. Rather than treating circularity as a predefined or fully implemented model, the analysis approaches it as a context-dependent and relational process shaped by local governance arrangements, institutional capacities, and the degree of integration among production, consumption, and material cycles.

The findings indicate that Karşıyaka hosts several promising initiatives that align with specific dimensions of circularity, particularly in terms of localisation, alternative provisioning, and limited material recovery through composting. Urban agriculture, seed distribution, and composting practices contribute to localised and partially regenerative production, while alternative retail mechanisms and food-related cultural initiatives support responsible consumption and producer–consumer connections. However, these practices remain fragmented and weakly connected to each another. Circularity is not realised as an integrated system but rather as a set of loosely coordinated interventions that address isolated aspects of the food system.

A key limitation identified in this research is the absence of a holistic governance framework that links production, consumption, and waste management into a coherent circular system. Most initiatives are implemented in a top-down manner, with limited involvement of civil society actors such as consumer cooperatives, food communities, or grassroots organisations. As a result, opportunities to strengthen social participation, expand access for lower-income groups, and develop shared ownership of food system transformation remain underdeveloped. Moreover, material recovery practices are largely confined to small-scale composting, with no district-wide system for organic waste collection, redistribution, or nutrient cycling.

Methodologically, the study is based on a qualitative case study of a limited number of practices within a single urban district, which constrains the generalisability of its findings and limits the study's ability to assess long-term circular transformation processes. Future research could explore how different governance arrangements, intermediary actors, and community-based initiatives shape the relational integration of circular food systems across urban contexts. Comparative and longitudinal studies would be particularly valuable for understanding whether fragmented local practices can gradually evolve into more integrated circular systems over time.

Overall, the case of Karşıyaka illustrates that while local food initiatives can create important entry points for circular transitions, circularity cannot be achieved through isolated technical measures alone. The Karşıyaka case demonstrates that circularity in urban food systems is shaped not only by the presence of alternative practices but also by the relational and institutional capacity to connect them across the wider food system. It requires coordinated governance, stronger relational integration across the food system, and sustained engagement with diverse urban actors. Without these elements, circularity risks remaining a partial and symbolic ambition rather than a transformative strategy for urban food systems.

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