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Beyond emerging. Just, multi-species, convivial and food-related urban ecosystem services in two food forests in Sicily and California

Oltre l'emergente. Servizi urbani ecosistemici giusti, multispecie, conviviali, and correlati al cibo in due foreste alimentari in Sicilia e California

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ABSTRACT AND KEYWORDS

Beyond emerging

Cities are simultaneously contributors to climate change and hotspots for its effects, which unevenly impact urban populations. At the same time, cities are leading the way in developing experimental solutions, with urban planning and design playing a pivotal role in fostering equitable and biodiverse urban environments. The discourse on urban ecosystem services, particularly those provided by nature-based solutions and green and blue infrastructures, exemplifies this effort. This paper advocates for the inclusion of food and multispecies justice and conviviality within the academic discussion, sectoral regulations and professional practices regarding urban ecosystem services. We posit that food forests, which emulate natural forest ecosystems to provide food for humans while benefiting other species and the ecosystem as a whole, are exemplary models offering more equitable, multispecies, and food-related urban ecosystem services. Our argument is supported through an analysis of two case studies – one in Sicily and one in California. These case studies reveal both significant commonalities and crucial differences, highlighting an ongoing challenge: transitioning from experimental and emerging practices to more mainstream and institutionalized ones.

Keywords: food forest, urban ecosystem services, food justice, multispecies justice, ecological design

Oltre l'emergente

Le città sono al contempo responsabili del cambiamento climatico e luoghi particolarmente colpiti dai suoi effetti, che impattano in modo diseguale le popolazioni urbane. Allo stesso tempo, le città sono all'avanguardia nello sviluppo di soluzioni sperimentali, e la pianificazione e la progettazione urbana svolgono un ruolo cruciale nel favorire ambienti urbani equi e biodiversi. Il dibattito sui servizi ecosistemici urbani, in particolare quelli forniti dalle soluzioni basate sulla natura e dalle infrastrutture verdi e blu, esemplifica questo sforzo. Questo articolo sostiene l'inclusione della giustizia alimentare e multispecie e della convivialità nella discussione accademica, nella regolamentazione settoriale e nelle pratiche professionali riguardanti i servizi ecosistemici urbani. Proponiamo che le foreste alimentari, che emulano gli ecosistemi forestali naturali per fornire cibo agli esseri umani mentre ne beneficiano altre specie e l'ecosistema nel suo complesso, siano modelli esemplari in grado di offrire servizi ecosistemici urbani più equi, multispecie e legati al cibo. La nostra argomentazione è supportata dall'analisi di due casi studio, uno in Sicilia e uno in California, che mette in luce significative somiglianze, differenze cruciali e la sfida aperta di passare da pratiche sperimentali e emergenti a quelle più diffuse e istituzionalizzate.

Parole chiave: foresta alimentare, servizi ecosistemici urbani, giustizia alimentare, giustizia multispecie, progettazione ecologica

1. Introduction: incorporating conviviality and food and multispecies equity into Urban Ecosystem Services

Cities are both key contributors to climate change – driving CO2 emissions, habitat loss, and biodiversity loss – and hotspots of its impacts. They increasingly face heat waves, flooding, and pandemics, which disrupt urban environments and their dwellers. Over the last few decades, a rich political, public, and academic debate has sought out solutions focusing on emergent, middle and long-term solutions. A technocratic take on the problem identifying high-tech solutions as the way forward (e.g., smart cities) has been particularly popular, especially within the spatial disciplines. At the same time, many notable studies have investigated how reconciling with nature[1] can contribute. Gómez-Baggethun et al. (2013) identified two different main modalities in which this renewed attention toward nature is manifested: "the ecology in cities", which often focuses on single scales and designing energy-efficient buildings, sustainable logistics, and providing inhabitants with functioning green urban environments; "the ecology of cities", which is characterized by interdisciplinary and multiscale studies with a social-ecological systems approach. This latter framework, both echoes scholarly and applied studies affiliated with the concept of the "ecology of design"[2] (Pizziolo, 2000; Pizziolo and Micarelli, 2003), and relates to studies that acknowledge the total dependence of cities on their surrounding landscape and the links between urban and rural, viewing the city as an ecosystem itself (Grimm et al., 2008).

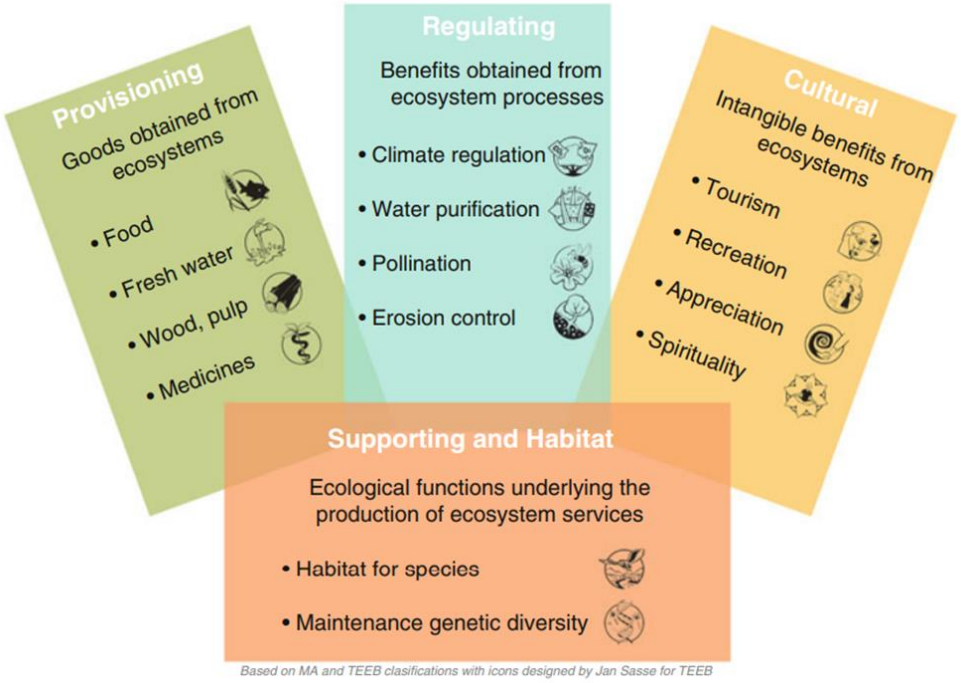
The increasing insertion of green and blue infrastructure, as well as nature-based solutions (NBSs), into both the theories, practices, and regulations of urban planning precisely addresses this theme of ecology in and of cities. Green infrastructure involves the network of natural and semi-natural spaces in urban areas (e.g., parks and green spaces, such as city parks, community gardens, and urban forests, green roofs and walls, street trees and green corridors, greenways, and nature trails). Blue infrastructure refers to the network of water-related elements in urban areas (e.g., water bodies such as lakes, rivers, ponds, and streams, as well as stormwater management systems such as detention ponds, rain gardens, and wetlands). Such infrastructures can be incorporated into NBSs that use ecosystem functionality to tackle various challenges, including climate change, disaster risk reduction, water management, and human well-being. Remme et al. (2024)'s effort to align NBSs with urban ecosystem services (UESs) clarifies that the former enhances ecosystem services by using natural processes to deliver multiple benefits and improve the provision and regulation of ecosystem services. These benefits humans receive from nature are critical for maintaining environmental health, improving quality of life, and supporting human well-being in cities.

They include (Figure 1):

- Supporting Services: Biophysical structures or processes such as soil formation, nutrient cycling, and habitat provision;
- Provisioning Services: Such as providing food, water, raw materials, and energy;
- Regulating Services: Such as climate regulation, air purification, and flood control;
- Cultural Services: All of the intangible outputs of ecosystems that affect the physical and mental states of people, including recreational, aesthetic, and spiritual benefits.

Gómez-Baggethun et al. (2013) stress that by leveraging both green and blue infrastructures incorporated into NBSs, cities can enhance their ability to provide essential ecosystem services and improve the overall quality of urban life, providing ecological benefits while also addressing societal needs.

Figure 1. Classification of ecosystem services based on the Millennium Ecosystem Assessment (MA 2005) and the Economics of Ecosystems and Biodiversity initiative (TEEB 2012)



Source: Produced by Gómez-Baggethun 2013 with icons designed by Jan Sasse for TEEB. Icons reproduced from Jan Sasse for TEEB

Nevertheless, as already discussed elsewhere (Cykman & Privitera, 2023), NBSs have been criticized for not giving enough attention to justice and equity-related matters (see Tozer et al., 2020; Cousins, 2021; Anguelovski & Corbera, 2023). This neglect of socio-economic inequality is connected to human-aggrandizing discourse on climate change and the Anthropocene[3], which ignores how climate change-related impacts significantly affect urban residents, especially those who are already struggling with other issues, such as housing and access to quality food (Gaspar, Blohm & Ruth, 2011). COVID-19 shed light on the resilient and resistant capabilities of cities on one side[4] (Suleimany et al., 2022; Ningrum et al., 2022), and difficulties in dealing with mental issues, social fragmentation, and loneliness on the other side (Hernández et al. 2023; Ottoni et al., 2022; O'Sullivan et al., 2021).

In the literature, this lack of inclusion of unheard and marginal voices regards not only humans but also other species. In fact, the question of how NBSs could be extended to include other species "co-sharing" the urban environment with humans remains largely unexplored. Privitera and Cykman (forthcoming) investigate how scholars from various disciplines and subfields – including Anthropology, Geography, Animal rights, Ecofeminism, Science and Technology studies, Indigenous studies, New materialism, etc. – have driven the "more-than-human turn" since the 2010s, challenging the dualist view that separates humans (and cities) from nature (Sheikh et al., 2022). This emerging strand of scholarship sustains that cities, in the pursuit to satisfy humans' needs and desires, have developed into hostile places for plants and animals, which must endure pollution, habitat unavailability, and reduced access to nutrients[5]. In this regard, Rupprecht (2020: 79) argues that re-conceptualizing nature as infrastructure "reduces more-than-human life to the status of a resource or tool for human exploitation, failing to account for interdependency in ecological systems, and is thus inherently unsustainable". This is why he

provocatively asks Rupprecht (2020: 82) “if animals and plants are at the center of these ecological systems, why are they conceptualized as resources instead of collaborators in the process of commoning?”.

From this perspective, interspecies injustice within the urban environment is caused by the same type of urban planning and design that underpins the human spatial inequalities mentioned above. In other words, for socio-ecological services to be just, adequate and inclusive, they must provide benefits to other species as well as to the weakest urban human dwellers.

Not only is the environmental justice theme lacking in the discourse and practice surrounding urban ecosystem services generated by NBSs, but food insecurity and justice-related issues are also not adequately addressed. These are increasingly central in both political and real-world contexts.

As described by Parham and Abelman (2018), food spaces such as small grocery shops and markets, which once acted as critical townscape elements that knit together the spatial fabric of the city, no longer find a coherent place in that fabric. Instead, functionalist urban design has advocated for the segregation of land uses, the privatisation of public space, and the rise of interiorised, private circulation and meeting spaces, thereby draining food-related activity and vitality from the street. The legacy of such an approach can still be found today when food spaces are mainly relegated to food courts and other built and privatized spaces in mainstream urban planning and design (among the other publications, Bourlessas et al., 2021; Anguelovski, 2015). A fascinating and emerging debate in the literature revolves around food-centered and conscious urban design (Parham & Abelman, 2018), which explores the potential synergies between a food-centred framework and sustainable urban design for the future. Such an approach advocates for designing public spaces focused on food and conviviality: an intervention that, in specific regions and periods, can significantly contribute to food security, particularly during times of economic and political instability. However, as noted by Gómez-Baggethun et al. (2013), cities typically only produce a minor portion of their consumed food and predominantly rely on external sources to satisfy their needs.

In a food-centered urban design framework, specific food proposals are central to shaping and retrofitting settlement spaces – from agricultural edges to private and public vegetable gardens and orchards in urban green space. These are integrated with spaces for food processing and distribution, along with corresponding built forms, extending into the townscape of markets, food shops, restaurants, and cafés. From this perspective, designing abandoned spaces, undeveloped areas, and green and blue infrastructures can all be an integral part of a broader edible urban landscape design. Incorporating convivial green spaces into broader gastronomic strategies for cities (Parham, 1993; Parham, 2015) involves designing and planting orchards, tree rows, or structured food forest plantings. Blue spaces may also be sites for food gardens and urban food forestry initiatives as well as other agroforestry rehabilitation actions that work towards improving human and more-than-human wellbeing and ecosystem functioning (Delgado-Lemus & Moreno-Calles, 2022).

These elements act as individual stitches that form a productive green and blue fabric when combined on a larger scale. According to Rupprecht (2020: 79) conviviality is exactly what’s missing in the re-conceptualization of nature as infrastructure. Based on this critique, Rupprecht argues for rethinking infrastructure as landscape that can be cared for through stewardship by its inhabitants. Edible landscapes (Fetouh, 2018; Çelik, 2017) constitute a type of landscape design that integrates crops, such as fruits, vegetables, herbs, nut-bearing trees, edible flowers, and other ornamental plants into traditional landscape and garden design.

In this context, green and blue infrastructure could be framed as fundamental landscape interventions aimed at generating food-related UESs.

It is worth pointing out that several scholars worry about the risk that food-conscious urban design turns into a niche or elitist trend that caters to segments of the urban bourgeoisie and place gentrifiers (Bridge and Dowling, 2001; Zukin, 2008; Gonzalez & Waley, 2013). We concur with other scholars (Parham & Abelman, 2018) who feel that this is a significant risk to consider. Nevertheless, it can be reduced if food-centered design targets food poverty and food desert-apartheid areas[6] (for example, see Gordon et al., 2011; Smith, 2012) and employs community-based approaches aimed at collaborating with marginalized groups, leveraging the strong sense of identity of immigrant and minority ethnic communities. Moreover, in previous works (Cykman & Privitera, 2023; Privitera & Cykman, forthcoming) and in this paper, we argue that a *really* inclusive approach must consider other species' right to food and conviviality, in addition to anthropic socio-economic issues.

So far, the literature regarding NBSs hasn't acknowledged this rich debate. Not only have food justice and insecurity been mostly underrepresented in NBS discourse and practice (see Dunlop et al., 2024) – with a few exceptions[7] – but, paradoxically, NBSs have been accused of causing dispossession and spreading monoculture behind their "green façade" (see Kill et al., 2022). Up until now, blue spaces have mostly entered into the scholarly discussion as alternative types of urban green spaces or have been the focus of studies regarding pollution control, flood control, drainage and urban development (Delgado-Lemus & Moreno-Calles, 2022). However, their specific contributions to the social and ecosystemic regeneration of urban environments through NBSs and the implications of these for environmental and food equity also deserve attention. Engaging with environmental equity and justice in both green and blue spaces is a timely and necessary step in transforming NBSs into a more consistent and inclusive set of actions that can provide multi-purpose services, including those related to food and supporting other species.

In our view, urban agroecology – and especially urban food forests – embodies the concept of the multispecies commons (Privitera & Cykman, forthcoming) as described by Rupprecht (2020: 79), i.e. "containing elements of stewardship that can easily be re-conceptualized as a collaborative, more-than-human practice: co-stewardship of urban multispecies commons." As Rupprecht affirms (2020: 84), edible landscapes, rather than edible infrastructure, are "spaces attentive to the ways human lives and well-being are entangled and interdependent with more-than-human lives and well-being through food production and consumption." For these reasons, it is important to explore food forests as a way to delve into their potential to deliver urban ecosystem services providing food and multispecies justice (see Riolo, 2019).

In light of the above, this paper aims to address the growing interest in urban ecosystem services (UES) and nature-based solutions (NBS) as tools to improve urban sustainability and address complex socio-ecological challenges. Specifically, it seeks to explore under-examined themes in UES, including food and multispecies justice, relationality, conviviality, and educational services, using urban food forests (UFFs) as a focal point.

In order to do so, the paper is organized as follows: the first section (above) presents the theoretical frameworks of NBSs, UESs, and UFFs and reviews their literature, emphasizing the need to incorporate food and multispecies justice and equity issues; the second section explains how urban food forests can serve as "vanguard" experimentation to innovate urban planning discourse, practices, and laws and presents our research objectives; the third section describes the applied methodology; the fourth section presents an analysis of the two case studies; the final

two sections discuss the findings and present the conclusion.

2. Urban food forests as "vanguard" experimentation

Urban agroecology provides the overarching framework for applying ecological principles to urban agriculture, focusing on sustainability and integration with urban systems. It has been defined as a science, a movement, and a practice (see Wezel et al., 2009; Francis et al., 2003) with deep roots in Indigenous, popular, and ancestral "peoples" knowledges and wisdoms, and recently converging with academic knowledges framed by Western science, as well as with what's known as "critical thought" from the global and Latin American revolutionary tradition (see Rosset et al., 2021; Rosset et al., 2022; Altieri & Nicholls, 2017).

Urban agroforestry applies these principles by incorporating trees and plants into urban landscapes for productive and ecological benefits. It combines elements of traditional agroforestry (a land management system where trees and shrubs are grown around crops and livestock) with urban planning and design principles.

Urban food forests (UFFs) are a specific type of urban agro-ecological forestry that intentionally and strategically uses "woody perennial food producing species in urban edible landscapes to improve the sustainability and resilience of urban communities" (Clark & Nicholas, 2013: 1652). They are characterized by their mimicry of the structure and function of a natural forest, and usually involve seven different layers of plants, including: the overstory; the understory; the shrub layer; the herbaceous layer; the root layer; the ground cover layer; and the climbing layer. Some also recognize the mycelial layer as an eighth one. This planting system combines different species in a variety of layers to maximize the synergies among them and optimize the use of soil and light resources, so as to create a self-sustaining ecosystem focused on food production. As mentioned by Salbitano et al. (2019), another innovative element of the food forest is "permanence". Inspired by permaculture principles, UFFs are designed to be permanent, rather than be an annual or temporary way of farming. Instead, they focus on designing and achieving sustainable and resilient socio-ecological land use systems (Krebs & Bach, 2018).

Centered on non-human needs and time-frames, this perspective entails a shift from an anthropocentric paradigm to an ecological one, with humans reconceptualizing their perceived role from that of master to that of part of a web of mutual awareness and care across species in which they seek to facilitate the functionality of the whole system. From an urban design perspective, UFFs can be seen as "green spaces" which embed ecocentric benefits for other species, unlike conventional urban parks that prioritize human enjoyment and benefit through recreation and aesthetics.

Framing UFFs as avant-garde providers of UESs facilitates this paper's reconceptualization of them as inclusive UESs, and promising emerging solutions for addressing social and environmental issues within our cities. The findings in existing literature indicate that the majority of food forests perform well when evaluated by social-cultural and environmental criteria by building capacity, providing food, enhancing biodiversity, and regenerating soil, among others (see Albrecht & Wiek, 2021; Leni-Konig, 2020). As part of agricultural, green and sometimes blue infrastructure, they provide various ecosystem services, such as the purification of air and water, the mitigation of floods and droughts, the regeneration of soil fertility, the moderation of extreme temperature, the enhancement of landscape quality, and the provision of food and habitat for both humans and other species. We find public UFFs particularly compelling, i.e. those that are accessible to anyone.

UFFs are spreading more and more across the world, mostly coming from bottom-up and grassroots organizations. While examples vary by latitude, location, settlement size (see Coffey et al., 2021), type of actors involved, relationship with institutions, size, and so on, all of them share the aim to challenge, if not turn upside-down, the socio-ecological status quo in terms of power relations.

All of these experimentations constitute a heterogeneous constellation of ideas and visions for a different future. Like all vanguard movements, they embody a "utopia in action"[8] through their own experiences. They seek to demonstrate that other ways of relating to the world are possible, or better, already exist. Currently, they are still emerging and most examples are marginal and not institutionalized.

In previous studies, we demonstrated that public urban agroecology projects can be framed as multispecies commons whose (co)designing and (co)management by institutions and other actors challenges mainstream human-centric urban governance and calls for multispecies urban reflexivity (Privitera & Cykman, forthcoming). Building on this previous research, in this article we will first look closer at the multiple services and benefits provided by public (or semi-public) UFFs to both human and other urban dwelling species. By doing so, our analysis will scrutinize the potential of UFFs to contribute to the current debate on UES toward questions of conviviality and equity in our cities. We aim to reflect upon the need to innovate practices and regulations regarding NBS solutions, green and blue infrastructure, and UESs. In this regard, this paper will investigate whether UFFs can represent a practice of change and, especially, how they can be scaled up, made mainstream, or even be institutionalized. By doing so, we seek to provocatively inspire reflections on the reasons behind the emerging character of such experiences.

The paper will examine two examples of UFF, one in Palermo (Sicily, Italy) and one in Isla Vista (California, United States). They are two cases in point of UESs showcasing potential inclusivity toward both human and non-human communities. We will look at their stories, involved actors and resources.

We believe that the chosen UFFs are exemplary cases for examining the potential and challenges of providing multispecies and food justice-related UESs.

3. Methodology

This investigation employs a case study approach, which involves "an empirical inquiry that investigates a contemporary case in depth and within its real-world context" (Yin 2014: 16). Our examination of two cases is based on a comparison between them.

Data was collected using a mix of methodologies, including participatory observation, interviews, desk consultation, and the analysis of both qualitative and quantitative scientific and grey data and literature. The methods of data collection and the degree of firsthand involvement by the authors vary for each case. The first author of this paper was directly involved in the care and maintenance of the UFF in California from July 2021 to March 2022. Being, by then, a graduate student and scholar[9], her direct involvement has been tied to her research interest from the very beginning. Her positionality towards other members of the collective promoting the food forest was primarily as an activist and local resident; only later did her scientific focus emerge. For example, together with two other activists, she co-produced a video presentation for an academic conference (Barbero et al., 2022). Additionally, a conference proceeding paper (Cykman & Privitera, 2023) and a book chapter (Privitera & Cykman, forthcoming) were developed by expanding the Master's thesis of activist Noa Cykman (Cykman, 2022) to include urban design and planning-

related questions. The general data about the UFF in California was collected from 2021 to 2024 through collaboration with other members of the collective and during informal conversations in order to contribute to the previously mentioned scientific works. To specifically delve into the aspects related to UES, conviviality, and the emerging characteristics of UFFs, a written survey was distributed to one member of the UFF in California in the fall of 2024[10].

During the last few years, the first author has examined similar food forest initiatives in Mediterranean climates (Privitera & Cykman, forthcoming), particularly in Southern Italy, where she has been a resident, researcher and activist for several decades. This led her to discover the ongoing project in Palermo. Through snowball effect and email exchanges, she secured an opportunity to conduct an online interview with the first designer and promoter of the UFF in Palermo[11], who facilitated contact with the organization managing the project. She visited the food forest for an entire day and, on that occasion, met the second author of this article. The second author has been collaborating with the Sicilian UFF for approximately 15 months, from 2023 to 2024, in the role of a landscape residency and then consultant with a focus on supporting, enhancing, and implementing the project. During the one-day visit, the two authors spoke with several members of the managing organization and interviewed one of the founders[12], who also originally promoted the UFF.

The choice of these two case studies was made intentionally to include different features related to food forest-generated UESs. Both Sicily and California share a similar Mediterranean climate and experience comparable climate change effects, such as heatwaves, droughts, flooding, and fires. Both regions are significant food producers, “breadbaskets of the country”, with Sicily and California being major suppliers of fresh fruits and vegetables exported worldwide. However, in California, production is highly industrialized and controlled by a few agribusiness corporations. Whereas in Sicily, production is more fragmented among numerous small and medium-sized farms and is less technologically advanced. The socio-economic disparities in California are extreme, with many marginalized communities, including Latinos, Black individuals, and the homeless, facing food insecurity linked to systemic and structural forms of intersectional injustice. Consequently, while urban green spaces have historically been viewed primarily in recreational or aesthetic and always elitist terms, emerging urban farming and agroforestry projects aim to address food injustice and insecurity for marginalized communities. In southern Italy, food insecurity and justice issues are less severe but have worsened during the COVID-19 pandemic and are closely related to rising poverty rates (see Privitera & Lo Re, 2021; Privitera et al., 2023). A major challenge in Southern Italy is the lack of public urban green spaces, especially in areas affected by low-quality, often illegal urban development. The remaining non-urbanized areas are limited in size, highly fragmented, frequently neglected in local planning, and inhospitable to both people and wildlife. Despite pressures from surrounding urbanization, we believe these areas have the potential to provide valuable UESs. Blue spaces also face major challenges in terms of accessibility, habitat and biodiversity degradation, and pollution control.

Finally, California has a rich history of community organizing, with NGOs advocating for change and pressing institutions. In contrast, Sicily’s social activism history is less well known and the island has a reputation for “weak institutions” compromised by corruption and criminality. However, grassroots activism and social organizations have been an important part of the island’s culture and development and remain one of the more interesting and dynamic drivers of its

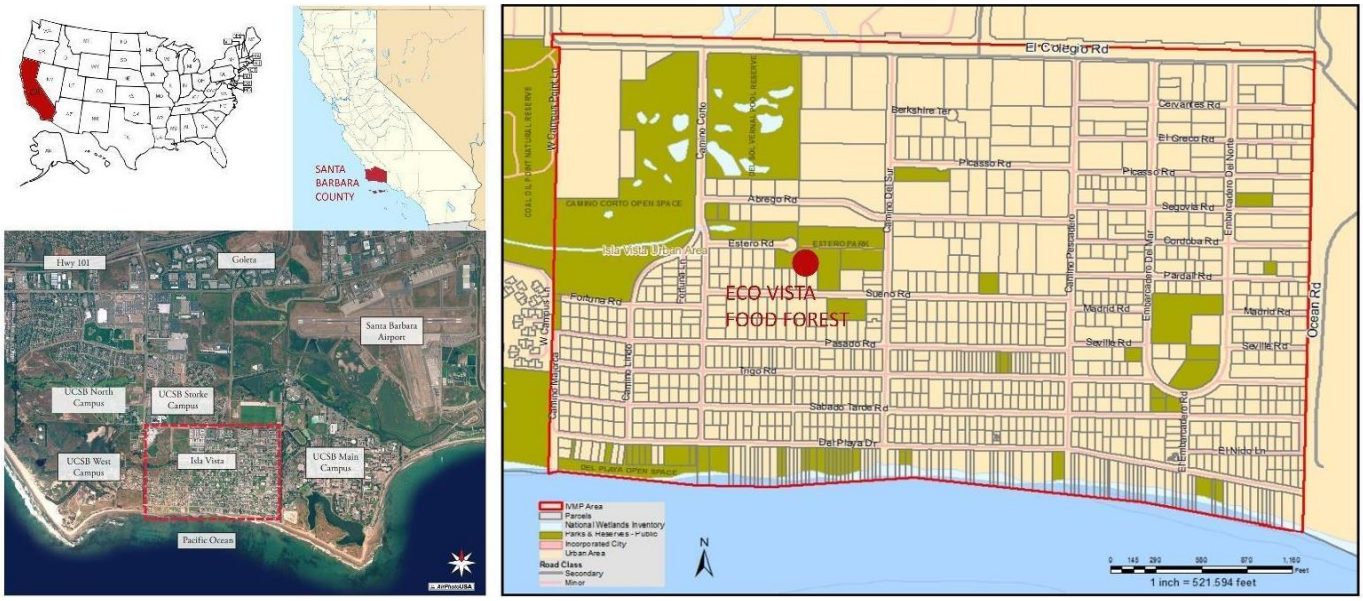
formal and informal resource management. Sicily's intermediate development status makes it an example of the South within the Global North, while California's socio-economic distress reflects various "Souths" within one of the highest GDP regions in the world, emblematic of the Global North. This background information serves as the starting point for establishing the comparison between the two case studies.

4. Two urban food forest stories

4.1 Isla Vista Food Forest

Isla Vista (Figure 2) is a small college town on California's Central Coast. Situated on the ancestral and unceded land of the Chumash people, it was known in precolonial times as the Chumash village "Anisq'oyo," meaning "place of manzanita." After the Second World War, the area was designated to accommodate the University of California, Santa Barbara, which triggered rapid and extensive urban development across the surroundings. This sudden urbanization resulted in the destruction of native ecosystems, a problem further exacerbated by the climate crisis, including rising temperatures and frequent flooding. Not only was there a significant reduction in green spaces and biodiversity, but the few that remained were primarily parks made up of lawns with limited functionality and ecological diversity.

Figure 2. Location of Isla Vista Food Forest in Isla Vista, in the county of Santa Barbara, California, U.S.



Source: drawings by the authors

Over time, Isla Vista has transformed into a densely populated college town, recognized as one of the areas with the highest rate of people per square mile in the United States. The combination of a small number of landlords and high housing demand has resulted in persistently exorbitant housing prices that make daily life expenses, including food, unaffordable. As a matter of fact, despite being situated in one of the most agriculturally productive regions in the United States[13], nearly half of UCSB students have experienced food insecurity over the past decade (UC Global Food Initiative, 2017; Yuan et al., 2024).

Local public agencies and civil society movements have long worked to address these challenges. The Isla Vista Recreation and Parks District (IVRPD), established

in 1972, emerged from community efforts to preserve green spaces in an area undergoing rapid urbanization. The agency manages 25 parks and approximately 55 acres of open space, advocating for local governance and resisting real-estate development pressures. While tensions and power dynamics inevitably exist, the IVRPD promotes community engagement through public meetings.

In response to a request by the Eco Vista collective[14], the IVRPD convened an open meeting to discuss converting an unused section of a park into a food forest. Eco Vista is a student-and community-led collective founded in 2017 and with a focus on climate and socio-environmental justice through local action. The collective has played a crucial role in championing several projects, including an Eco Vista Green New Deal and the publication of an online journal on art and climate change called *Radicle Zine*[15]. The collective's main activities are connected to food, gardening, and multispecies agency. Following a series of discussions, delayed in part by the COVID-19 pandemic, the IVRPD granted the public land for the project, which officially began in January 2021.

Eco Vista activists collaborated with IVRPD to implement an ecosystem-based planning and design approach, incorporating the needs of prospective multispecies inhabitants from the outset. The collective aimed to provide a range of social and ecosystem services, such as offering nutritional support for humans—particularly to address poverty and food insecurity — as well as for other species, especially pollinators; mitigating urban heat island effects and flood risks; recreating wildlife habitats; and facilitating bioremediation. From its inception, the UFF was envisioned as a third space where people could gather, build community bonds, and engage in educational activities.

The site of the food forest was once a road, later filled in with soil after its removal. Given the flat terrain, the design process focused on assessing the soil type and its impact on precipitation absorption, as well as analyzing wind velocity. The soil consisted of hardpan clay, which caused water to pool on the surface during rainstorms instead of being absorbed. Existing vegetation was sparse, consisting mainly of invasive crabgrass spreading through rhizomes.

To address these challenges, the first step was to remove the turf and till the soil. This was deemed appropriate since the existing soil had minimal fertility, mitigating the typical downsides of tilling. Amendments, including high amounts of compost and gypsum, were added to improve water absorption and increase soil organic matter. Mounded earthworks were also incorporated to enhance drainage. Finally, sheet mulching was implemented to suppress weed regrowth.

Initially, the planted trees were supplied by the IVRPD and included a limited selection of common fruit trees such as plums, citrus, and avocado. However, due to their high mortality rate, these were later replaced with more drought-tolerant species, including pineapple guava, strawberry guava, white sapote, and loquat. White sapote was selected not only for its drought tolerance but also for its exceptional yields. Native plants — both edible and non-edible — have considerable ecological benefits. For instance, native grassland plants, such as purple needle grass, were incorporated to establish an ecotone[16]. In areas prone to standing water due to the clay soil, juncus was frequently planted. The understory was designed to maximize biodiversity by including as many native pollinator-friendly and nitrogen-fixing plants as possible, such as multiple species of ceanothus, monkeyflower, and yarrow. The prioritization of native wetland plants in the understory also aimed to reduce the formation of water-logged soils, which is a serious risk to plants. The adjacent ocean serves as extensive blue infrastructure, which considerably impacts the surrounding area, including the Isla Vista UFF. For instance, the marine climate

reduces the fire risk at Isla Vista while generating subtropical microclimate which allows subtropical plants to thrive in an otherwise dry climate.

From an urban perspective, the Isla Vista UFF offers a public, free, accessible, and walkable space where community members—including low-income individuals, students, unhoused people, and migrants—can access free food. This food is not only organic but is also grown using regenerative soil-building techniques, providing significantly higher nutritional value compared to supermarket produce. Additionally, the UFF creates a habitat for native flora and fauna, which are increasingly scarce in developed, urban, and agricultural areas. With its more than 60 species of plants, the Isla Vista UFF provides a convivial green space where humans and other species (birds, fungi, butterflies, etc.) can meet, gather and cultivate multispecies bonds.

The success of the UFF relies on weekly maintenance carried out by the core group of the collective in collaboration with IVRPD. Over the years, monthly communal harvest festivals and volunteer days have fostered a sense of belonging among participants, leading to the formation of many friendships and relationships. Collective care initiatives create opportunities for individuals with shared values to come together, collaborate, and contribute to the public good. This active community engagement has especially involved UCSB students (Figure 3), who participate not only in planting and maintaining the space but also in harvesting, visiting, and enjoying it as a shared communal area.

Figure 3. Volunteers ploughing the soil of the Isla Vista food forest during a collective care day, Isla Vista, California, 2022

Source: Eco Vista archive

The Isla Vista UFF exemplifies both the opportunities and challenges inherent in partnerships between civic organizations and local authorities. Challenges include limitations related to land ownership and management resources—as these remain under IVRPD's formal jurisdiction. Nevertheless, the organization has been largely supportive, sharing Eco Vista's goals of community engagement and advancing the food forest initiative.

Looking ahead, a key challenge will be involving other community members and scaling this experience to other underutilized spaces in Isla Vista, converting more neglected areas into thriving food forests. Paraphrasing one of the members and founders of the Isla Vista UFF[17], similar initiatives can "go beyond the emerging",

spread out more and being institutionalized by positioning food forests as a sort of "preventive medicine" with the potential to avoid municipal government spending by providing nutrition relief, urban heat island mitigation, flood control, and ecotourism. In this sense, UFFs emerge as a valuable medium-term investment. Expanding UFFs relies on integrated networks involving local nurseries, universities, schools, professionals, farms, and activist groups. Government roles vary by context but can include cost-effective contributions like providing manure and municipal compost.

4.2 The "Mare Memoria Viva" Urban Ecomuseum Food Forest

Located in Palermo, the capital city of Sicily in Italy, this UFF is intrinsically connected to the story of its promoter, the cultural association Mare Memoria Viva (MMV). Established by a group of young activists and researchers, this association started to operate in 2012 as the result of a multiannual action-research project aiming to retrace the untold history of the transformation and degradation of Palermo's waterfront. Once a vibrant area of the city characterized by fishing districts and local beaches, this extensive waterfront area was upended in the second half of the twentieth century by what's known as the "sack of Palermo". Uncontrolled development brutally covered huge sectors of the city with concrete and low-quality buildings while rubble from the many construction sites was illegally dumped along the city's southern coast. Because of this, these areas became increasingly perceived as neglected, and objectively polluted. This painful and lacerated relationship with the sea was exactly the core of the action research conducted by the MMV group, whose goal was to flip the narrative, embracing a community-based account of the landscape made of memories and "small" stories.

The municipality of Palermo gave MMV permission to use a publicly owned historic structure that had recently been renovated but that had not yet been assigned a specific purpose. The building is an evocative Liberty style train depot, with a surrounding garden spreading over half a hectare. The property is located at the mouth of the Oreto river on the waterfront, in the Saint Erasmus neighborhood. This seaside neighbourhood which was once a centre of vitality and community, is now one of the most vulnerable and underserved areas of Palermo.

In 2014, the association won a grant that supported the building's development into an Eco-museum, i.e. a community driven museum that focuses on people's relationship to place[18]. However, legally the structure was still directly managed by the Municipality. This changed in 2019, when MMV established an innovative "co-management pact" with the municipality, allowing them to sell admission tickets and invest in further developing the property.

Since their establishment, they have functioned as a cultural and creative innovator (Moulaert et al., 2005), a role extensively examined in European literature for its contribution to social and cultural services within the social but still private third sector. While third sector innovation often contributes fresh ideas, it may not have sufficient resources and skills to take on all of the responsibilities increasingly being delegated to it by public institutions. MMV has had to fund its activities by securing numerous relevant grants, enabling it to promote additional events and initiatives. While initially focused on oral history research, the organization has expanded to explore new themes, such as engaging with the surrounding landscape and neighbourhood.

As mentioned during an interview with one of the founding members, while the neighbourhood itself was not at the core of their initial activities, it inevitably "slammed in the Eco-Museum's face"[19] because they were surrounded by it. The

neighbourhood exhibits several critical issues, including significant pollution along the river, extensive soil sealing with concrete surfaces, and low-quality buildings. It also suffers from a lack of green and recreational spaces, high rates of poverty and crime, and is predominantly composed of working class and low-income communities.

In this context, the MMV started to propose ideas and projects focused on regenerating its outdoor area into richer community spaces, which was previously managed by the municipality as ornamental beds with unwatered mowed meadow and low maintenance trees and shrubs. In 2019, they held two co-designing workshops to build two garden structures made out of sustainable materials (bamboo and earth) to create opportunities for community involvement and education and make the spaces more welcoming for people. In 2020-2021 the Museum won a grant funding a project aimed specifically at rethinking its gardens. It was on that occasion that an expert in food forests was invited to promote a 4-day co-designing workshop to design and plant the food forests. Students and architects took part in the workshop (Figures 3 and 4), resulting in the creation of a food forest mainly meant to convert the existing "monotonous lawn gardens"[20] into a welcoming habitat for birds and pollinators (Figure 5). About 220 specimens were planted, but many didn't survive the scorching Sicilian summer. Plants were chosen with dry cultivation in mind, but that was not enough to protect them from record-breaking heat waves. Furthermore, in Sicily even drought tolerant species need irrigation to survive until they develop a strong root system. That is why, from a horticultural point of view, these kinds of activities should be carried out during the cold rainy season. However, from a public participation point of view, Spring and Summer are ideal. Whatever the season is, participatory events require a lot of staff time dedicated to recruiting participants and preparing for their unskilled work. The MMV is a polyfunctional organization with many responsibilities (from running a museum to carrying out community support activities to holding special events), only a handful of staff members, and limited funds usually connected to annual grants. The funding for the UFF was for the event itself, but not for the upkeep necessary to establish and maintain the newly planted garden.

Figures 3 and 4. Participatory workshop to design the Palermo food forest, Palermo, 2022

Source: MMV facebook page

Figure 5. Lunch time for a new pollinator and urban dweller in Palermo's food forest

Source: Authors, 2024

At first, MMV staff tried to care for the developing garden themselves, but soon realized that it would take more time than they could spare from the activities that directly funded their work. Later, they decided that either well-organized caring activities and/or the installation of automated drip irrigation needed to be planned to protect the most important plants. Caring activities have been limited to lighter, enjoyable tasks to emphasize the social value of gardening. Community members have demonstrated that they especially enjoy planting annual flowers from seed or plantlets, repotting plants, harvesting herbs and deadheading flowers. The older children in the afterschool program also enjoy an annual woodworking workshop where they contribute outdoor furniture to the garden. These lighter tasks can be carried out by everybody comfortably, including older participants with back problems and younger participants with limited skills and strength. Heavier work (installing the drip irrigation lines, moving large amounts of earth and mulch, digging pits to plant large trees and shrubs, building dry stone borders, pruning thick branches, and removing invasive plants) has since been carried out by the second author during her residency (described below), interns and MMV staff along with paid gardeners, who also perform all of the maintenance tasks. More plants have been planted during a few similar community engagement events and through the landscape residency. Occasional educational activities have continued to be proposed by MMV mostly involving the women and children of the neighborhood in caring activities as well as educational activities encouraging nature literacy and biophilia.

At the same time MMV began developing its green space, it also increased its engagement with the blue spaces just outside its walls, conducting school visits to the Oreto river outlet and adjacent beach and hosting artistic events to create occasions for the local community to engage with and appreciate these contaminated but vital landscapes.

The next significant moment in the development of the MMV UFF was during the 2023-24 year, when one of the authors conducted the above-mentioned residency dedicated to the garden and its beneficiaries. She studied the space's history and development to identify a running theme that could connect the various one-time activities that had shaped the place and MMV's relationship with it. She used this as a guide to develop the garden's current layout and enrich the garden's florula with

another 800 or so plants. She collaborated with the gardeners to improve and expand the automated drip irrigation system, aiming to reduce or eliminate irrigation once the plants are established. Her contributions also included developing a new museum exhibit on the Oreto River and organizing school and public engagement activities focused on the river and coastal dune ecosystems. For example, she led several expeditions with MMV members, school groups, and university students during which participants collected seeds and cuttings of native plants, then propagated in a small nursery on site with the intent of developing a botanical garden that could become part of the educational walks to the river and seashore conducted by MMV staff.

Today, MMV's outdoor area is organized in three main sections that are characterized by interventions made by the city when the site was originally restored, by the UFF workshop and other events during the pandemic years and by the landscape residency recently concluded by one of the authors.

The first area is the "urban garden", situated between the parking lot and the future site of MMV's educational center and restaurant, containing decade-old citrus trees, oleanders, laurels, cycads, a ficus, and other ornamental plants. Most of the larger specimens in this area were planted by the municipality around 2012. Although not native to Sicily, these plants thrive under the harsh conditions typical of urban environments – such as the urban heat island effect, poor soil quality, and heavy foot traffic – while resonating with the family memories and cultural identity of the Sicilian community. During the UFF laboratory and subsequent interventions described above, this area was integrated with native shrubs that belong to the native Mediterranean macchia and are also drought, heat and pest resistant. During the residency, some exotic plants that are not important to residents or cannot support typical urban conditions were removed and other ornamental plants with strong identity values that are traditional in Palermo's urban gardens were added (e.g. Italian jasmine, sweet mock orange, meadowsweet, plumeria, and philodendron). While automated drip lines were installed to support newly planted specimens, the soil was not amended in this area so that it could continue to represent a typical urban environment in future educational activities. The tall oleanders, and ficus tree were pruned for security and to make the area more accessible and all thorny or spiny plants were removed so that the area would be safe for small children.

The second area, called "Irene's garden" in honor of a friend of MMV that passed away, is where the earth structure called the "nest" was built during a workshop and where much of the UFF laboratory intervened. This area contains plants that represent the Sicilian countryside, known as the *Conca d'Oro*, including heirloom fruit trees, native shrubs, herbs, vegetables and edible and ornamental flowers. During the residency, raised plant beds were built with recycled masonry and filled with compost that had been maturing since the UFF workshop. These beds were developed around the pre-existing fruit trees and filled with about 500 annual plants donated by a nursery specialized in heirloom herbs and flowers. Drip irrigation was added and other heirloom fruit trees were planted. Spiny, thorny, and poisonous plants were avoided since this garden is also adjacent to the future educational center and restaurant and sought to be safe for small children. The raised plant beds were built to facilitate community gardening activities where annual plants could be renewed each season, allowing participants with problems bending over or working heavy soil to participate comfortably.

The last part of the garden, called "the garden of the shores", is located between the main museum building and the walk to the Oreto river that is often the focus of school visits. During the UFF workshop, this area was heavily planted with native

shrubs and fruit trees. However, the area's poor soil, extreme exposure to sun and wind, and heavier use during events lead to most of the plants dying. During the residency, remaining plants were protected with tutors and borders, invasive plants were removed and the soil was heavily amended to reflect pedological conditions along the Oreto river.

5. Discussion

In this section we will discuss the main commonalities, differences and challenges of the case studies described in Table 1.

Table 1. Table summarizing the main characteristics of the two case-studies

	Isla Vista UFF (California)	Palermo UFF (Italy)
Inauguration date	2021	2021-2022: design and workshop to realize and inaugurate the food forest. 2023-2024: an intensive residency regarding the garden was completed.
Promoters	Isla Vista Food Forest Collective (grassroot organization), Isla Vista Recreation and Park District (IVRPD-community-based public institution).	The Ecomuseo Mare Memoria Viva, and guest food forest and landscape experts.
Urban location	Isla Vista, characterized by housing and food unaffordability, whose residents are mainly students, migrants, and the homeless.	Low-income historic neighborhood of Saint Erasmus, characterized by a lack of green spaces and a high level of neglect, especially around the Oreto river mouth.
Dwelling species	More than 60 species of plants, including one adult fig tree, five young fruit trees, dozens of herbaceous plants, dozens of native shrubs and grasses.	More than 150 species, organized in three thematic spaces: an urban garden full of Palermo's most loved ornamental plants and citrus trees, Irene's garden full of heirloom and tropical fruit trees, aromatics, flowering annuals and native perennials, and the shore garden, dedicated to the Oreto river floodplain, from the riparian forest landscape at its springs to the coastal dune habitat at its outlet.
Blue infrastructure	Proximity to the Pacific Ocean.	Proximity to the mouth of the Oreto river on the waterfront.
Food foresters' equity goals	To address food insecurity and neighborhood accessibilities; to convert a derelict public space into a public green space; to experiment with multispecies justice; to explore how combining indigenous and western knowledge can inform soil regeneration.	Increasing urban biodiversity by creating a hub wherein several species, especially animals, can find a safe home. For this reason, plants were chosen that provide nests for birds and nutrients for pollinators.
Practices of care and conviviality	Volunteer days (monthly); classes and tours for students and non-profit	The promoters (along with interns and paid gardeners) are responsible for daily/monthly care activities (e.g., weeding, maintaining the irrigation

	organizations; citizen science activities; community harvest events. Ecological care: watering, adding compost and mulch, weeding, pruning, and harvesting.	system and pruning) and choosing which plants are planted when. Community members have been involved through projects paid for with external funds, especially in light planting activities (annuals) and didactic activities.
Governance	The multispecies interests are advocated by the collective and became part of the co-decision process with IVRPD.	The food forest is totally managed by MMV; the municipality is advised and can set requirements but doesn't directly contribute to upkeep.
Accessibility	Land owned by the IVRPD, 24h open access	Land owned by the municipality of Palermo, accessibility according to MMV's opening hours.

Source: Authors

Both UFFs share common characteristics: they are located in cities with a Mediterranean climate; they serve as innovative pilot projects that have introduced hundreds of plant species; they occupy public land and involve several stakeholders; they have been promoted by grassroots organizations that mobilized collective caring actions with the aim of creating public spaces that foster bonds between diverse human-beings and also with other species; finally they are situated in priority neighborhoods. The Palermo case study is located in a low-income neighborhood that doesn't have a harmonious relationship with the adjacent natural river or coastal ecosystem. The Isla Vista case study is nestled in a college town characterized by unaffordable housing, high levels of food insecurity, and a few parks mainly composed of green grass lawns. Thus, both UFFs represent "welcoming and safe havens" for humans and more than humans.

These two cases also have several differences. The Palermo UFF has been designed with the specific goal of increasing urban biodiversity by creating a hub wherein several species, especially animals, can find a safe home. For this reason, its over 800 plants have been chosen to accommodate nests for birds and nutrients for pollinators. While food production for humans is secondary (also because of worries about soil contamination), food and nutrition for other species have been at the centre of the initial design and still play an important role. In other words, starting from recognizing the conditions of subalternity, injustice, and distress experienced by animals in this area of Palermo, the design and implementation of the food forest specifically aimed to address these interspecies inequities. As the garden developed, it increasingly focused on the cultural UES benefiting the community rather than the provisioning UES. However, food bearing plants have very strong emotional resonance for MMV's community. The more nature adverse participants were able to connect to the outdoor environment through the plants that they knew and recognized first. For instance, one boy in the afterschool program who regularly made a point of snobbing gardening activities in front of his peers still regularly asked to harvest lemons and herbs to take home to his mother. As MMV's UFF became a more welcoming habitat, staff noticed a marked increase in the presence of birds, pollinators and reptiles. This allowed for some of the garden-correlated educational activities to focus on plant-pollinator relationships, for insect-phobic participants in the womens' and childrens' group to overcome some of their fears and appreciate garden fauna and for a part of the indoor river exhibit to be added with illustrations of landscape's wildlife mounted both indoors and outdoors.

In addition to increasing biodiversity, the Isla Vista UFF was envisioned with the fundamental purpose of experimenting with ecological and community-based

initiatives to tackle food insecurity, given that the majority of the local community struggles to access affordable fresh food. In other words, both UFFs address the issue of inclusivity and food and environmental justice through distinct approaches, focusing on both human and non-human communities. Furthermore, in Isla Vista, there is a core group of University students who reside in the same neighborhood and organize monthly caring activities to clean the UFF and organize shifts to irrigate it. They also carry out additional activities with professors who dedicate a part of their teaching courses to some scientific and caring aspects of the food forest, involving different students who usually live in the college town and close by the UFF. At the MMV UFF, one of the authors was able to engage a class of national and international university students from a course where she served as a teaching assistant in various garden and community outreach activities during her residency. The university students were highly motivated to participate, viewing the activities as valuable hands-on experience that would enhance their future careers as landscape designers and spatial planners. The involvement of the students was positively received by the community, particularly the women's group, who felt a renewed sense of importance and pride in themselves and their garden by acting as hosts. MMV could learn from the Isla Vista UFF's example and seek more involvement from University students to lighten the load on MMV staff and stimulate residents to be more interested and participatory. Foreign students were especially appreciated, perhaps because they don't represent a superior-inferior power dynamic in the same way a local researcher or activist would.

This brings up another difference regarding the process behind the construction and development of the UFFs. The Palermo UFF is the result of an initiative promoted by a third-sector association, the Ecomuseum Mare Memoria Viva, which has been active for several years in the neighborhood. However, the participatory workshop to design the UFF mainly involved young architects and activists who were not from the area. After the workshop, educational activities primarily targeted entirely different groups: the children attending MMV's after school program and women from the neighborhood. While involving all potential users and caretakers from the outset is important, it has proven quite difficult. Target groups have different priorities from UFF promoters (for example, most of the middle school boys at the MMV site preferred playing soccer rather than planting seeds), but leads to greater stability and cohesion if these groups can be engaged. Garden upkeep has been partially outsourced because the plans and priorities of MMV have adapted to those of the community. It is entirely valid for residents of vulnerable communities to lack interest in manual gardening work, especially since many of these residents may farm elsewhere or come from families who have recently escaped rural poverty. Most of the women participating in MMV's support programs are housewives or grandmothers, who dedicate most of their day to unpaid manual labor (cleaning and childcare activities). They are also justifiably far more concerned that their children do their homework afterschool rather than "play at being farmers". In contrast, the UFF in Isla Vista was proposed by Eco Vista, a student-community-based initiative focused on climate and local action, to IVRPD which oversees the maintenance, conservation, and fruition of Isla Vista's parks system. The co-design and co-management of the UFF did not always happen smoothly, but conflicts have been generative and represent a model of shared care that stands as another key lesson to learn. In order for the MMV UFF to be more successful in engaging the community, they need to perceive the garden as more than a return to their roots but also as a resource for their children's future. In future projects involving artists, activists and academics, the women's and children's group should also be protagonists invested

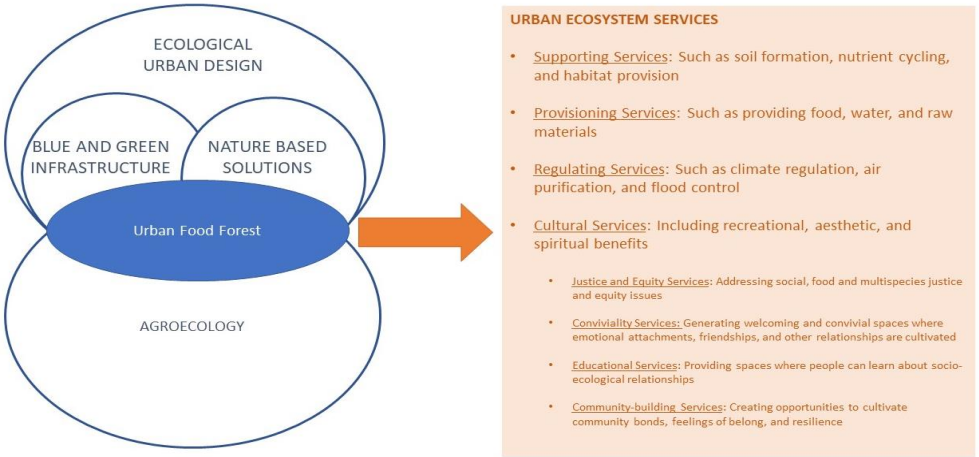
with the role of hosts to short-term participants in workshops. These one-time events will probably continue to be the moments when MMV is most able to invest in development due to the nature of their economic resources.

The two cases have also revealed the different roles of public institutions and urban policies. In the Palermo case, the municipality has only granted the land and is not involved in management and mostly not involved in decision-making. In contrast, the Isla Vista case demonstrates collaboration from the outset between the collective and the IVRPD, a unique, community-oriented public institution. Over the years, the collective has advocated for multispecies agency and conviviality through lively yet constructive conflicts that have generated occasions for mutual learning between the collective and IVRPD and co-governance.

Another difference regards ecological water management. The Palermo UFF was designed by following very strict dryland farming rules which it then had to compromise on. However, it has found a practical middle ground through the installation of a water-saving automated drip irrigation system that can be adjusted by staff so as to only supply the minimum necessary. The Isla Vista UFF design has been less attentive to virtuous water management and mainly depends on the weekly water supply provided by the park district. In both cases, several plants could not stand the increasing summer heat, consequently, more drought-tolerant species, which are often autochthonous, were planted. The challenges connected with plant irrigation teach that embracing a long-term and deeply ecological vision implies incentivizing low maintenance and fostering UFFs' independence from human help and conservation of natural resources. However, climate change will increasingly challenge the resilience of these systems, and emergency help may always be necessary.

Both provide a biodiverse ecosystem in areas that have been severely environmentally degraded, and contribute to several important UESs (Figure 6). In particular, the analysed UFFs support important provisioning services, especially of food for humans and other species. These services, as we already mentioned above, also promote justice and equity by addressing food insecurity, food, environmental and multispecies justice issues.

Figure 6. Chart including how food forests relate to the current academic date on NBSs and the corresponding UES



Source: Authors

Both cases contribute to supporting services, particularly in soil formation and restoration, enhancement of nutrient cycling, and habitat creation. From the outset,

the Palermo UFF prioritized increasing biodiversity and wildlife, especially considering its proximity to the river and shore. Initially focusing on birds, it later expanded to include other animal and plant species. The Isla Vista case was designed with a particular emphasis on soil restoration and flood mitigation.

The UFFs also provide cultural UESs through the organization of caring and harvesting events (Isla Vista case) and community-engagement events (both cases), that contrast loneliness and nurture community cohesion and social bonds between neighbours. In the Isla Vista UFF, the involvement of university students generated educational services, allowing students to receive hands-on learning experiences by carrying out scientific and caring tasks. In the Palermo UFF, the educational workshops and activities with residents stimulate the sometimes nature-adverse community towards a more interested and aware relationship with their local environment by appealing to the senses, while offering opportunities for people to gather and learn about plants. The growing popularity of outdoor nature walks with visiting schools and some successes in involving University students in UFF activities indicate that MMV could benefit from expanding on these activities. In other words, the UFFs also serve as "peer and multispecies educational gardens". Both cases, in different ways, turned into community reference places for receiving socio-ecological services, gathering, learning, and enjoying the place and each other. In that sense, both UFFs have sought to regenerate a sense of conviviality between all human and non-human community members.

6. Conclusion

Interest in using and deploying UES through the implementation of NBS to address a wide range of urban issues and improve the sustainability of urban systems is growing worldwide (Remme et al., 2024). New planning strategies to protect and enhance the provision of such services within our cities are at the core of an ongoing discussion on how to better incorporate socio-economic issues, equity and more-than-human thinking into NBS deployment and UES management (Kabish et al, 2017; Toxopeus & Polzin 2021; Maller, 2021). The two cases examined here confirm that we need more ecologically oriented social science mixed with more socially-oriented ecological solutions while thinking about urban design. This same bridge needs to be crossed in mainstream theories and practices in the general UES and NBS debates.

Growing efforts are being made at the international level to develop broad policies focusing on UES and NBS. Global initiatives like the UN Sustainable Development Goal 11, the Convention on Biological Diversity, the New Urban Agenda, and IPBES highlight the importance of urban ecosystem services and advocate for integrating NBS into urban planning. The 2022 UN Environment Assembly's definition of NBS (UNEP/EA.5/Res.5) and the COP27 Sharm el Sheikh Implementation Plan have advanced the institutionalization of NBS at the global level. In Europe, NBS research and implementation are central to the European Green Deal, the EU Biodiversity Strategy for 2030, and the EU Adaptation Strategy, with the EU investing €665 million in NBS projects as of 2023 (European Commission, 2023).

Despite these important milestones, the effective mainstreaming of UES and NBS into urban policies, spatial planning, and actual deployment on the ground is still limited (Kabish et al., 2017; Toxopeus & Polzin, 2021). This can be attributed to the novelty of these concepts, the previous lack of a precise definition of NBS and UES, a limited knowledge among policymakers and practitioners, a lack of binding

policies at local scales (i.e. the urban scale), and a lack of recognition of their economic values.

This paper primarily seeks to tackle some open and still unexplored themes within the debate on UES, namely, food and multispecies justice as well as relationality, conviviality, and educational services.

We presented food forests as a prime example of NBS that offer a more comprehensive approach to these unexplored themes. Rooted in a deeply ecological worldview, food forests reject the prioritization of humans over other species, instead emphasizing the relational interdependence and mutual benefits that arise from the wellbeing of all. The basic idea behind the concept of food forests is that using components that mimic natural processes in the built environment (i.e. biophilic design) can generate a broad number of benefits in cities, and produce an equal, safe, and liveable urban environment. The analysis of the two case studies in Sicily and California has confirmed that a series of services are provided by both of them, with some services particularly evident in each case. We expanded the list of cultural ecosystem services to also include justice and equity-driven services, community building and relational services, and educational services. All of these services move in the direction and merge toward a more resilient and just urban socio-ecosystem.

By comparing these two UFF cases, the paper aims to provide some insights in order to orient theories and practices of ecological urban design toward green cities that are first of all based on principles of multispecies and food justice. They are characterized by conviviality, which is often absent in discussions of NBS, UES, and blue and green infrastructure (with notable exceptions, such as Rupprecht's work). UFFs have become spaces of multispecies conviviality, including and welcoming those often excluded from urban life (e.g., low-income communities, non-human species), allowing them to thrive. Through food cultivation, activists incrementally engage more individuals in fostering justice, interspecies relationships, and a sense of community belonging and empowerment. UFFs hold the power to inspire and mobilize people because they symbolize the socio-ecological change they wish to see, incorporating interconnected and extensive ecosystem services that are not always present in NBS or blue and green infrastructures alone. These UFFs act as "socio-ecological utopias in action"[21], that inspire people and offer alternative ways to envision the world, while expanding the understanding of green spaces in terms of deep ecology, conviviality, and food justice.

However, the broader impact of such practices is by no means assured. These initiatives are experimental, innovative, and often groundbreaking, yet they remain isolated islands amidst a "concrete and lawn jungle." Without integration into mainstream urban planning policies and design practices, they struggle to scale up. To enhance their influence and practical application, and move beyond their current emergent state, a shift in values and mindsets across institutional and practical levels is essential.

New institutionalist approaches to planning emphasize that transitioning from isolated micro-interventions to a framework of institutionalized practices requires significant public resources. In 2019, MMV became the first co-management pact between the municipality and a civil society group in Palermo. Previously, community groups could only adopt public property, which limited their opportunities and increased their burdens. However, such agreements are becoming more common in Palermo and across Italy, as government organizations work to ensure that community participation enhances public property value rather than diminishes it, while avoiding increased public risk. In the Californian case, the long-

term collaboration between the collective and the IVRPD throughout the various phases of the Isla Vista UFF, from design to daily maintenance, exemplifies an experimental form of multispecies reflective urban governance (Edelenbos & Boonstra, forthcoming; Privitera & Cykman, forthcoming). While the collective influenced the IVRPD's agenda and understanding of the Isla Vista UFF, the IVRPD sought to accommodate, albeit not without challenges, innovative approaches to urban policies concerning NBS, UES, and UFFs.

In line with new institutionalist developments in planning scholarship (e.g., Savini & Bertolini, 2019), we advocate that institutions can further support civic organizing without undermining their primacy in planning. Institutional investment in just, multispecies, convivial, and food-related urban ecosystem services – such as those provided by UFFs – represents a significant potential frontier for advancing the ecologically just city[22].

Notes

1. This is not the place to analyze the complex meaning of the word "nature," nor to examine the problematic way in which it is used, which reinforces a dualistic view between nature and culture (see, among the others, Swyngedouw, 2011). For the purposes of this text, let us define nature as that which is not purposely built by human beings, but which has the power to spontaneously generate through ecologic processes; not *techne*, but *physis*. This definition of "nature" seeks to restore agency to the living systems we refer to with this term and to neither marginalize nor other them. For further reading, see Sundberg et al. (2020).
2. Micarelli and Pizziolo introduced the term "ecologia del progetto" (which could be translated with "ecology of design" or "ecology of planning") to describe an innovative and creative approach to environmental planning and design grounded in an evolutionary perspective on the relationship between humans, nature, and society. According to this approach, design is seen as the art of fostering ecological relationships within this triad. Planners are deeply embedded in a relational field, engaging in reciprocal interactions and mutual transformations with other living beings and the environments they inhabit.
3. Like many other scholars, we agree that the discourse on the Anthropocene needs to include its terminological and substantial variants (see, among the others, Chthulucene, Capitalocene, Wasteocene) that, in our view, uncover existing as well as new forms of socio ecological-spatial injustices.
4. One of the authors has analyzed the capability of community organizations to respond to the effects of COVID-19 in the following publications: Privitera et al. (2023); Privitera & Lo Re (2021). The other author has examined how the COVID-19 pandemic has affected recreational ecosystem services in the urban environment: Funsten at al., 2022.
5. We are aware that cities can also be less hostile for some organisms (for example pollinators) compared to surrounding agricultural land due to a rich variety of microclimates, greater diversity of flowering plants and fewer pesticides. The environmental damage caused by city's is much more related to their externalization of their resources and waste flows.
6. Many activists argue that food apartheid better reflects the structural injustices and disparities in food access faced by low-income communities and communities of color. By applying this term to inequitable food access, it draws attention to the intentional actions and policies that have created and continue to perpetuate inequities. It also emphasizes that food insecurity is not just a result of geographic location but instead, it is deeply entrenched in historical, political, social, and economic systems.
7. See for instance: FAO. Nature-Based Solutions in Agriculture: Pathways to a more resilient and sustainable food system. Available at: https://www.fao.org/north-america/news/detail/en/c/1392985/. Accessed on 1 September 2024.
8. Elisa Privitera and Noa Cykman dedicated a panel to "Utopian Practices in Action for Urban Socio-Ecological Justice," which is accessible online at the following link: https://ejcj.orfaleacenter.ucsb.edu/2021/09/rcjgc-panel-10/
9. Elisa Privitera was awarded a prestigious Fulbright–Falcone Foundation–NIAF

Fellowship by the US-Italy Fulbright Commission, which supported her visiting period at the University of California, Santa Barbara, during the 2021–2022 academic year. This scientific exchange allowed her to deepen her research into critical environmental justice studies and food justice-related initiatives.

10. Tony Barbero, December 12, 2024.
11. Salvatore Bondì, February 24, 2024.
12. Giuliano Fontana, April 15, 2024.
13. Although Santa Barbara's agricultural land ranks among the most productive in the country, most of its harvest is destined for export.
14. https://ecovistacommunity.wordpress.com/
15. https://ecovistacommunity.wordpress.com/radicle-zine/
16. Ecotones are transitional zones between two distinct ecosystems or biological communities, where characteristics of both ecosystems blend and interact. They provide fundamental ecosystem services because they often support a higher level of biodiversity and represent gradual changes in environmental conditions.
17. Ibidem note 11.
18. Recent work on ecomuseums and possible alliances between them and urban planning can be found in Pappalardo (2023).
19. Here we are paraphrasing the interview with Giuliano Fontana (footnote 12).
20. It is worth noting that the garden has developed through several interventions since 2012, when the citrus and laurel trees were planted by the municipality.
21. Ibidem note 8.
22. We align with Li Gresti and Saija's (2024) conceptualization of the planning processes as an instituting process, a process through which the correspondence between the plan's content/public regulations and people's will to pursue it is constantly verified through organizational tools, holding the role of allowing civic instances and conflicts to productively relate to such a realm.

Author Contributions

This article is the result of a collaborative endeavor between the two authors. More in detail, Elisa Privitera envisioned the paper and its structure, wrote the first draft, and reviewed the entire article; Cassandra Funsten has widely intervened in the section regarding the MMV case, contributed to the introduction, theoretical framework and conclusion sections, and revised and proofread the entire article.

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Conflicts of Interest

The authors declare no conflict of interest.

Originality

The authors declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere, in English or any other language. The manuscript has been read and approved by all named authors and there are no other persons who satisfied the criteria for authorship but are not listed. The authors also declare to have obtained the permission to reproduce in this manuscript any text, illustrations, charts, tables, photographs, or other material from previously published sources (journals, books, websites, etc).

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References

Albrecht, S., & Wiek, A. (2021). Food forests: Their services and sustainability. *Journal of Agriculture, Food Systems, and Community Development, 10*(3), 91–105. https://doi.org/10.5304/jafscd.2021.103.014

Anguelovski, I., & Corbera, E. (2023). Integrating justice in nature-based solutions to avoid nature-enabled dispossession. *Ambio, 52*(1), 45–53. https://doi.org/10.1007/s13280-022-01771-7

Anguelovski, I. (2015) Alternative food provision conflicts in cities: contesting food privilege, injustice, and whiteness in Jamaica Plain, Boston. *Geoforum* 58, 184–94.

Barbero, T., Cykman, N., & Privitera, E. (2022). Creating a commons in the 21st century: The experience of an urban food forest in California. Presentation at Reimagining our Worlds from Below: Transnational Conversations on Resistance, Movements, and Transformations, SSSP Online conference, hosted by the Orfalea Center, UCSB. https://www.youtube.com/watch?v=qcguqqUynWg. Retrieved November 24, 2024.

Bourlessas, P., Cenere, S., & Vanolo, A. (2021). The work of foodification: an analysis of food gentrification in Turin, Italy. *Urban Geography*, 43(9), 1328–1349. https://doi.org/10.1080/02723638.2021.1927547

Çelik, F. (2017). The importance of edible landscape in the cities. *Turkish Journal of Agriculture - Food Science and Technology*, 5(2), 118–124. https://doi.org/10.24925/turjaf.v5i2.118-124.111

Clark, K. H., & Nicholas, K. A. (2013). Introducing urban food forestry: A multifunctional approach to increase food security and provide ecosystem services. *Landscape Ecology*, 28, 1649–1669. https://doi.org/10.1007/s10980-013-9903-z

Coffey, S. E., Munsell, J. F., Hübner, R., & Friedel, C. R. (2021). Public food forest opportunities and challenges in small municipalities. *Urban Agriculture & Regional Food Systems*, 6, e20011. https://doi.org/10.1002/uar2.20011

Cousins, J. J. (2021). Justice in nature-based solutions: Research and pathways. *Ecological Economics*, 180. https://doi.org/10.1016/j.ecolecon.2020.106874

Cykman, N. (2022). *Cracks in the concrete: Urban multispecies justice at the Isla Vista Food Forest* (Master's thesis, University of California, Santa Barbara).

Cykman, N., & Privitera, E. (2023). The urban value of food forests: Reflections from a project of urban socio-ecological justice in California. In E. Marchigiani, C. Perrone, P. Savoldi, & M. C. Tosi (Eds.), *Proceedings of the National Conference of Italian Urban Planning*, (pp. 72-79). Planum Publisher.

Delgado-Lemus, T.S. & Moreno-Calles, A.I. (2022). Agroforestry Contributions to Urban River Rehabilitation. *Sustainability*, 14, 7657. https://doi.org/10.3390/su14137657

Dunlop, T., Khojasteh, D., Cohen-Shacham, E., et al. (2024). The evolution and future of research on nature-based solutions to address societal challenges. *Communications Earth & Environment, 5*, 132. https://doi.org/10.1038/s43247-024-01308-8

Edelenbos, J., & Boonstra, B. (Eds.). (forthcoming). Reflexive urban governance. Cheltenham: Edward Elgar.

European Commission: European Research Executive Agency (2023). *Nature-based solutions – EU-funded nbs research projects tackle the climate and biodiversity crisis*. Publications Office of the European Union, https://data.europa.eu/doi/10.2848/879543

Fetouh, M. (2018). Edible landscaping in urban horticulture. In Urban horticulture (pp. 95–110). Springer. https://doi.org/10.1007/978-3-319-67017-1_7

Funsten, C., Di Franco, C., Borsellino, V., Surano, N., Asciuto, A., & Schimmenti, E. (2022). The recreational value of botanic garden events: A case study of the Zagara plant fair in Palermo, Italy. *Journal of Outdoor Recreation and Tourism*, 39, 100565. https://doi.org/10.1016/j.jort.2022.100565

Gasper, R., Blohm, A., & Ruth, M. (2011). Social and economic impacts of climate change on the urban environment. *Current Opinion in Environmental Sustainability*, 3(3), 150–157. https://doi.org/10.1016/j.cosust.2010.12.009

Gómez-Baggethun, E., Gren, Å., Barton, D. N., Langemeyer, J., McPhearson, T., O'Farrell, P., Andersson, E., Hamstead, Z., & Kremer, P. (2013). Urban ecosystem services. In T. Elmqvist, et al. (Eds.), *Urbanization, biodiversity and ecosystem services: Challenges and opportunities* (pp. 175–252). Springer. https://doi.org/10.1007/978-94-007-7088-1_11

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., et al. (2008). Global change and the ecology of cities. *Science*, 319(5864), 756–760. https://doi.org/10.1126/science.1150195

Hernández, J.R.E., et al. (2023). Cities in the times of COVID-19: Trends, impacts, and challenges for urban sustainability and resilience. *Journal of Cleaner Production*, 139735. https://doi.org/10.1016/j.jclepro.2023.139735

Kabisch, N., et al. (2016). Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecology and Society* 21(2):39. http://dx.doi.org/10.5751/ES-08373-210239

Krebs, J., & Bach, S. (2018). Permaculture—Scientific evidence of principles for the agroecological design of farming systems. *Sustainability*, 10(9), 3218. https://doi.org/10.3390/su10093218

Leni-Konig, K. (2020). *Beyond school gardens: Permaculture food forests enhance ecosystem services while achieving education for sustainable development goals* (Master's thesis). Harvard Extension School.

Li Destri Nicosia, G., & Saija, L. (2023). Planning as an instituting process: Overcoming Agamben's despair using Esposito's political ontology. *Planning Theory*. Advance online publication. https://doi.org/10.1177/14730952231209755

Lourdes, K. T., Hamel, P., Gibbins, C. N., Sanusi, R., Azhar, B., & Lechner, A. M. (2022). Planning for green infrastructure using multiple urban ecosystem service models and multicriteria analysis. *Landscape and Urban Planning, 226*, 104500. https://doi.org/10.1016/j.landurbplan.2022.104500

Maller, C. (2021) Re-orienting nature-based solutions with more-than-human thinking. *Cities*, 113, 103155. https://doi.org/10.1016/j.cities.2021.103155

Ningrum, V., Chotib, & Subroto, A. (2022). Urban Community Resilience Amidst the Spreading of Coronavirus Disease (COVID-19): A Rapid Scoping Review. *Sustainability*, 14(17), 10927. https://doi.org/10.3390/su141710927

Ottoni, C. A., Winters, M., & Sims-Gould, J. (2022). "We see each other from a distance": Neighbourhood social relationships during the COVID-19 pandemic matter for older adults' social connectedness. *Health & place*, 76, 102844. https://doi.org/10.1016/j.healthplace.2022.102844

O'Sullivan, R., Burns, A., Leavey, G., Leroi, I., Burholt, V., Lubben, J., Holt-Lunstad, J., Victor, C., Lawlor, B., Vilar-Compte, M., Perissinotto, C. M., Tully, M. A., Sullivan, M. P., Rosato, M., Power, J. M., Tiilikainen, E., & Prohaska, T. R. (2021). Impact of the COVID-19 Pandemic on Loneliness and Social Isolation: A Multi-Country Study. *International journal of environmental research and public health*, 18(19), 9982. https://doi.org/10.3390/ijerph18199982

Pappalardo, G. (2023). Open challenges and possible alliances for two fields of knowledge and practice: Museology and urban planning in the 21st century. *Les Cahiers de muséologie*, 3, 116–133. https://doi.org/10.25518/2406-7202.1505

Parham, S., & Abelman, J. (2018). Food, landscape, and urban design. In Routledge Handbook of Landscape and Food (1st ed., pp. 409–432). Routledge. https://doi.org/10.4324/9781315647692-28

Parham, S. (2015). *Food and urbanism: The convivial city and a sustainable future*. Bloomsbury.

Parham, S. (1993). Convivial green space. In *Proceedings of the Seventh Australian Symposium of Gastronomy* (pp. 1-10). Canberra.

Pizziolo, G. (2000). Toward an ecology of planning. *Plurimondi*, 2(4), 51–60.

Pizziolo, G., Micarelli, R. (2010). *L'arte delle relazioni*. Alinea.

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge handbook of ecosystem services* (pp. 25–44). Routledge.

Privitera, E., & Lo Re, L. (2021). Il potenziale trasformativo del dono, della cura e delle reti territoriali: Spazi di prossimità e pratiche di solidarietà durante la pandemia a Catania. *Contesti. Città. Territori. Progetti*, 2, 97-118.

Privitera, E., Aiello, L., & Barbanti, C. (2023). Co-planning tools and community welfare to react to the crisis in Southern Italy: Reflections from a Sicilian social cooperative. *inFOLIO*, 41, 134-143.

Privitera, E., & Cykman, N. (forthcoming). Whose city? Reflections on urban agroecology as multispecies commons. In J. Edelenbos & B. Boonstra (Eds.), *Reflexive urban governance*. Cheltenham: Edward Elgar.

Remme, R. P., Meacham, M., Pellowe, K. E., et al. (2024). Aligning nature-based solutions with ecosystem services in the urban century. *Ecosystem Services, 66*, 101610. https://doi.org/10.1016/j.ecoser.2024.101610

Riolo, F. (2019). The social and environmental value of public urban food forests: The case study of the Picasso food forest in Parma, Italy. *Urban Forestry & Urban Greening, 45*, 126225. https://doi.org/10.1016/j.ufug.2018.10.002

Rupprecht, C. D. D. (2020). Edible green infrastructure or edible landscapes? A case for co-stewardship in multispecies commons. *Proceedings of the Asia Pacific Society for Agricultural and Food Ethics*.

Russo, A., Escobedo, F. J., Cirella, G. T., & Zerbe, S. (2017). Edible green infrastructure: An approach and review of provisioning ecosystem services and disservices in urban environments. *Agricultural Ecosystems & Environment, 242*, 53–66. https://doi.org/10.1016/j.agee.2017.02.006

Salbitano, F., Fini, A., Borelli, S., & Konijnendijk, C. C. (2019). Editorial—Urban food forestry: Current state and future perspectives. *Urban Forestry & Urban Greening, 45*, 126482–126484. https://doi.org/10.1016/j.ufug.2019.126482

Savini, F., & Bertolini, L. (2019). Urban experimentation as a politics of niches. *Environment and Planning A: Economy and Space, 51*(4), 831–848. https://doi.org/10.1177/0308518X19826085

Sheikh, H., Mitchell, P. & Foth, M. (2023). More-than-human smart urban governance: A research agenda. Digital Geography and Society, 4, 100045. https://doi.org/10.1016/j.diggeo.2022.100045

Suleimany, M., Mokhtarzadeh, S., & Sharifi, A. (2022). Community resilience to pandemics: An assessment framework developed based on the review of COVID-19 literature. *International journal of disaster risk reduction: IJDRR*, 80, 103248. https://doi.org/10.1016/j.ijdrr.2022.103248

Sundberg, J., Dempsey, J., & Marchini, F. R. (2020). Nature–culture. In International Encyclopedia of Human Geography (2nd ed., pp. 315–324). https://doi.org/10.1016/B978-0-08-102295-5.10889-3

Swyngedouw, E. (2011). Nature does not exist! sustainability as symptom of a depoliticized planning. *Urban*, (1), 41-66

Tozer, L., Hörschelmann, K., Anguelovski, I., Bulkeley, H., & Lazova, Y. (2020). Whose city? Whose nature? Towards inclusive nature-based solution governance. *Cities, 107*, 102892. https://doi.org/10.1016/j.cities.2020.102892

Toxopeus, H. & Polzin, F. (2021). Reviewing financing barriers and strategies for urban nature-based solutions. *Journal of Environmental Management*, 289, 112371. https://doi.org/10.1016/j.jenvman.2021.112371

University of California Global Food Initiative. (2017). Food and housing security at the University of California. Retrieved from https://www.ucop.edu/global-food-initiative/_files/food-housing-security.pdf

Wezel, A., Bellon, S., Doré, T., et al. (2009). Agroecology as a science, a movement, and a practice: A review. *Agronomy for Sustainable Development, 29*(4), 503–515. https://doi.org/10.1051/agro/2009004

Yuan, K., Davis, O., & Yang, J. (2024, February 23). *Food insecurity amongst UCSB students*. Daily Nexus. University of California, Santa Barbara. Retrieved from https://dailynexus.com/2024-02-23/food-insecurity-amongst-ucsb-students/

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). SAGE.