



Governance models and the socio-ecological role of community gardens in post-socialist Krakow

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ABSTRACT

Community gardens are increasingly recognized as critical nodes for socio-ecological learning and innovation, particularly in post-socialist cities navigating historical legacies and contemporary urban challenges. This study investigates how governance models -bottom-up, top-down, and hybrid - influence the inclusivity, ecological adaptability, and long-term sustainability of community gardens in Krakow, Poland. Drawing on qualitative research conducted across three distinct sites - a grassroots initiative (Salwator), a municipally-led project (Pychogród), and a hybrid model (Jagiellonian University Campus) - this paper explores the interplay between governance arrangements and socio-ecological outcomes. Ethnographic observations, semi-structured interviews, co-design workshops, and action research were employed to capture governance dynamics and the evolving role of gardens as transformative infrastructures. Findings reveal that grassroots initiatives foster strong community ownership and flexible ecological practices, yet face challenges related to resource instability and volunteer fatigue. Conversely, top-down models provide structural security and institutional support but risk alienating participants by limiting local agency. Hybrid approaches, exemplified by the Jagiellonian University Campus garden, blend institutional legitimacy with participatory processes, fostering inclusive decision-making and ecological experimentation, although they grapple with sustaining engagement amidst transient populations. The results underscore the necessity of adaptive governance frameworks that balance institutional support with community agency, particularly in post-socialist urban contexts characterized by fragmented social trust and uneven civic engagement. By conceptualizing community gardens as socio-ecological infrastructures, this study contributes to understanding how urban food systems can integrate sustainability goals with local cultural and environmental specificities. The findings offer actionable insights for policymakers, urban planners, and practitioners aiming to harness the transformative potential of community gardens to address broader sustainability challenges.

Introduction

Cities, as pivotal nodes within local and global food systems, are uniquely positioned to drive transitions toward sustainability. They concentrate resources, infrastructure, and diverse communities, providing fertile ground for innovative food initiatives. In recent years, urban agriculture has garnered attention for its capacity to influence dietary patterns, improve ecological resilience, and foster social cohesion (Morgan and Sonnino, 2010; WinklerPrins, 2017). Among its various forms, community gardens stand out as integrated spaces where food production, environmental stewardship, and civic participation converge (Guitart et al., 2012). This study builds on the special issue's concern with urban food challenges by exploring how community gardens, as embedded urban practices, contribute to sustainability

transitions in a post-socialist context.

Krakow, a historically significant and rapidly evolving city in southern Poland, offers a compelling site for exploring this inquiry. More than three decades after the collapse of state socialism, the city's urban fabric remains shaped by centralized planning legacies, shifting demographic profiles, and evolving imaginaries of public space (Hirt, 2012; Ferenčuhová, 2016). Within this transitional environment, community gardening has evolved beyond subsistence-oriented allotments. Today, such gardens are increasingly understood as socio-ecological infrastructures, settings where citizens, institutions, and policies converge to negotiate inclusion, ecological adaptability, and long-term sustainability (Barthel, Parker and Ernstson, 2015; Mokras-Grabowska, 2021).

While community gardens are well established as sites of food

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production, ecological resilience, and social learning, their potential to advance sustainability depends significantly on how they are governed. In post-socialist cities like Krakow, governance takes multiple forms: from grassroots mobilisation to municipal initiatives and collaborative arrangements. These configurations emerge in response to persistent institutional legacies and evolving civic practices (Colding and Barthel, 2013). Yet, little is known about how these governance models influence inclusivity, ecological adaptation, and the capacity to anchor long-term transformations. To address this gap, this paper asks: *How do governance models (bottom-up, top-down, and hybrid) shape the inclusivity, ecological adaptability, and sustainability of community gardens in Krakow, as they evolve into transformative socio-ecological infrastructures responding to the cultural, political, and environmental challenges of post-socialist urban change?*

The study employs a comparative, qualitative research design encompassing three community gardens in Krakow, each representing a distinct governance model: a grassroots bottom-up initiative, a municipally supported top-down structure, and a hybrid arrangement blending institutional support with community participation. Using ethnographic observation, semi-structured and go-along interviews, co-design workshops, and action research, the study triangulates data to examine governance negotiations, everyday practices and socio-ecological interactions (Kusenbach, 2003; Sanders and Stappers, 2008; Dymek et al., 2021).

This paper is structured as follows: the next section presents the literature on urban sustainability, governance, and post-socialist urban change. Section three outlines the methodological framework and criteria for case selection, data collection, and analysis. The fourth section presents the research findings around three interconnected themes: (a) the influence of governance on inclusivity; (b) ecological adaptability and ecological practices; and (c) conditions for long-term sustainability. The fifth section discusses broader implications for post-socialist cities and global urban food system governance, while the conclusion reflects on the potential of community gardens to act as transformative socio-ecological infrastructures.

By examining the interaction of governance models with socio-cultural transformations, and environmental conditions, this study contributes to understanding how cities navigating post-socialist transitions can harness community gardens to advance urban sustainability. It highlights that while community gardens hold significant promise as arenas of socio-ecological learning and innovation, realizing the transformative potential of this space depends on governance frameworks that are adaptive, participatory and context-sensitive. The findings are relevant to policymakers, urban planners, researchers, and practitioners seeking to integrate community gardens into boarder sustainability agendas, particularly in cities shaped by post-socialist trajectories.

Literature review

Historical development of community gardens

Community gardens, broadly understood as collectively managed urban green spaces where residents cultivate plants for various social, ecological, and cultural purposes, have a long and multifaceted history. Their conceptual roots are often traced to nineteenth-century Europe and North America, where industrialization, urbanization, and socio-economic inequalities prompted the creation of allotment gardens, victory gardens, and school gardens as pragmatic responses to urban poverty, public health concerns, and wartime food shortages (Lawson, 2005; Bell et al., 2016). Notably, such practices were not confined to the West; collective urban gardening traditions have long existed in parts of Africa, Asia, and Latin America, often linked to colonial policies or subsistence needs (WinklerPrins, 2017). Recent research highlights how community gardens in the Global South, such as in Cape Town, function not only as sources of food and green space but also as vehicles for environmental justice, fostering ecological stewardship, knowledge

exchange, and the revitalization of neglected urban areas (Jorgensen, 1989). By the late twentieth century, cities across the Global South were witnessing a proliferation of community gardens as grassroots responses to urban food insecurity and the paucity of green space. For instance, during Cuba's economic crisis in the 1990s, Havana's residents famously converted vacant lots into urban organic gardens (es. *organopónicos*) to bolster local food supply, a case that illustrates the global reach of community gardening ideals (WinklerPrins, 2017). Over time, these initiatives took on more diverse functions, evolving into places for community-building, social learning, environmental stewardship, and civic engagement (Smith & Kurtz, 2003; Barthel, Parker and Ernstson, 2015).

In Western Europe and North America, community gardens benefited from a variety of influences: grassroots activism, urban social movements emphasizing social justice and environmental quality, and policy frameworks supporting public participation in urban planning. In many cases, they emerged as bottom-up responses to market-driven development, environmental degradation, and spatial inequalities (Smith & Kurtz, 2003; Guitart, Pickering and Byrne, 2012). As a result, the concept of community gardens took on a flexible character, accommodating a wide range of objectives, from improving neighborhood cohesion to experimenting with sustainable food systems.

These notions gradually spread to Central and Eastern Europe (CEE), including Poland, where the post-1989 political and economic transformations opened the urban fabric to new forms of civic participation (Hirt, 2012; Czepczyński, 2008). However, the region's gardening traditions predate the global community garden discourse by over a century, taking shape through allotment gardens (pol. *ogródki działkowe*) deeply ingrained in the urban landscape as semi-private, household-level plots focused on subsistence and recreation (Szczepańska et al., 2021; Dymek et al., 2021; Djokić et al., 2018; Bański, Czapiewski, 2015; Mokras-Grabowska, 2021). Under state socialism, allotment gardens provided families with supplemental food and green refuges amid highly regulated urban environments (Mincyte, 2009; Dymek et al., 2021; Hlavaček et al., 2016). The post-socialist transition brought both challenges and opportunities. Economic liberalization and urban market pressures led to spatial reorganization and redevelopment, which, in turn, threatened traditional allotments (Dymek et al., 2021; Becker, 2018; Szczepańska et al., 2021). As highlighted in studies of Poznań and Warsaw, allotment gardens were increasingly viewed as remnants of an outdated past, often threatened by investment pressures and spatial reorganization (Dymek et al., 2021; Hlavaček et al., 2016). However, this period also opened spaces for civic engagement and introduced new models of collective urban gardening influenced by global discourses of sustainability, participatory planning, and localism (Bell et al., 2016; Prové et al., 2016) (Fig. 1).

In cities like Krakow, one can thus encounter a hybrid legacy. On one hand, there is the long-standing tradition of allotment gardening, historically individualized and shaped by a period of top-down state management. On the other hand, emerging initiatives reflect newer, community-driven experiments that emphasize collective governance, environmental education, and cultural exchange (Łabędź, 2017; Krzysztoń, 2014; Dudzic-Gyurkovich, 2021; Becker, 2018). This reflects a broader trend of urban reorganization seen in CEE cities like Prague and Budapest, where community gardens are increasingly recognized for their social, ecological, and cultural functions (Djokić et al., 2018; Szczepańska et al., 2021).

This convergence of historical and contemporary influences makes it essential to clarify how to define "community gardens" in this study. While acknowledging the layered cultural significance of traditional allotments, we adopt a definition that highlights collective governance and shared decision-making processes aimed at producing socio-ecological benefits. Specifically, we define community gardens as urban green spaces cultivated and managed by a collective of local stakeholders who engage in deliberative processes, share responsibilities and resources, and align their gardening activities with broader

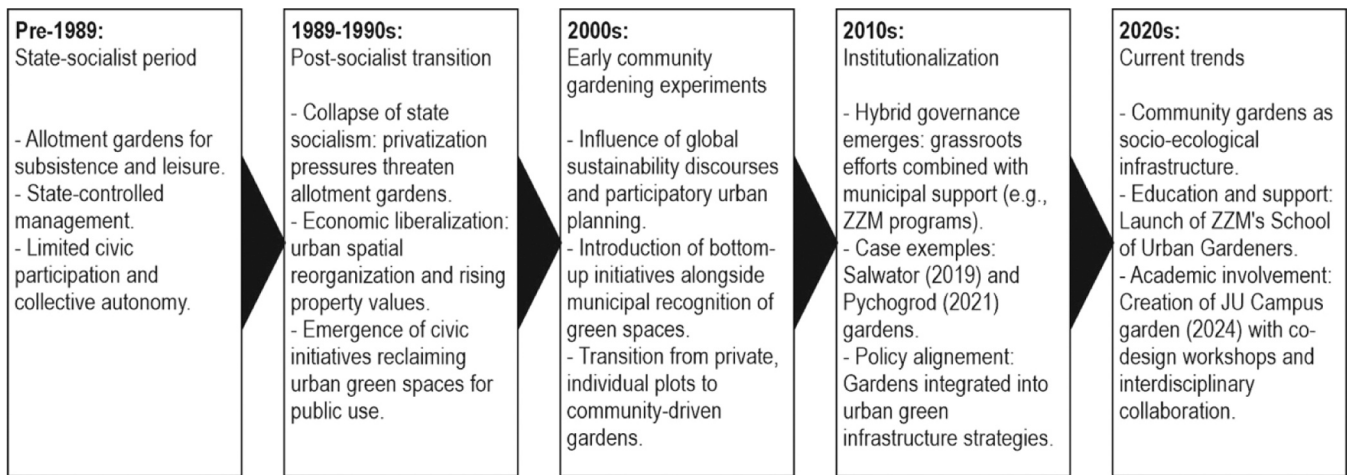


Fig. 1. Timeline of Krakow's community gardens (Source: author).

environmental, social, and cultural objectives (Beilin & Hunter, 2011).

Governance models in urban green spaces

Urban governance literature highlights the significance of decision-making structures, ranging from bottom-up and top-down models to various hybrids, in shaping the inclusivity, durability, and ecological performance of community gardens (Ansell and Gash, 2007; Guitart, Pickering and Byrne, 2012). Bottom-up approaches emphasize community initiative, local knowledge, and participatory processes. They can bolster place-based identities and rapidly adapt to changing conditions but may face limited resources and inconsistent participation if not anchored by supportive institutions (Guitart et al., 2012). This aligns with recent shifts in regional science, which increasingly acknowledge the role of small-scale, community-based initiatives in shaping urban quality of life and resilience (Chen and Schintler, 2023). One might also note that community gardens' longevity is intertwined with urban land dynamics: amid rapid city growth, unprotected grassroots gardens are vulnerable to redevelopment, reflecting broader spatial inequalities in green space access (Rosol, 2010; Haase et al., 2017). In Poland, grassroots urban movements have begun to play a more prominent role, particularly in cities like Krakow, where residents organize to protect green spaces and engage in bottom-up revitalization projects (Łabędź, 2017), often driven by concerns over privatization and loss of public accessibility (Krzysztońek, 2014).

By contrast, top-down governance, often led by municipal authorities, provides formal land tenure security, administrative support, and policy integration. This stability can ensure that community gardens are recognized within broader urban planning agendas (Beilin & Hunter, 2011; Bell et al., 2016). However, top-down interventions may risk marginalizing local voices and failing to reflect the nuanced interests and cultural practices of garden users. Studies on Warsaw and Poznań highlight how top-down approaches can provide stability (e.g., land tenure security) but risk excluding community perspectives and local priorities (Szczepańska et al., 2021; Dymek et al., 2021). In post-socialist contexts like Krakow, historical legacies of centralized authority often result in uneven trust between citizens and institutions (Czepczyński, 2008). Krzysztońek (2014) highlights how urban elites in Krakow, while acknowledging civic movements, often prioritize market-oriented development agendas, limiting grassroots influence in urban decision-making. Yet, research suggests that cities offering attractive public amenities, such as parks, gardens, and leisure spaces, may experience stronger growth and be more successful in attracting skilled residents (Carlini and Saiz, 2019).

In response, hybrid governance models have emerged as a strategy to balance institutional stability with grassroots innovation. These models

involve partnerships among civic groups, municipal departments, non-governmental organizations, and even private stakeholders (Ansell and Gash, 2007). As observed in Poznań, partnerships between local authorities, NGOs, and garden users can address land security issues while promoting ecological and social sustainability (Dymek et al., 2021; Hlavaček et al., 2016). While promising, these models must address power imbalances, divergent priorities, and uneven capacities to manage shared resources. For example, the governance of urban agriculture in Warsaw reveals the challenges of reconciling community-driven practices with formal policies aimed at land management and food security (Prové et al., 2016). The interplay of bottom-up mobilization and top-down policies in Krakow underscores the potential for hybrid governance to support community gardens. The historical advocacy from civic groups for participatory urban governance reveals opportunities to integrate community-led initiatives into broader sustainability agendas. Hybrid models in Krakow must address barriers such as institutional inertia, land ownership disputes, and fragmented civic networks (Becker, 2018; Hlavaček et al., 2016; Krzysztońek, 2014). Insights from recent studies in the Global South, such as ecotourism projects in rural Uzbekistan, demonstrate how local environmental initiatives, when coupled with inclusive governance, can generate social and economic benefits, strengthening local employment and livelihoods (Abdurakmanova and Ahrorov, 2025).

Community gardens as socio-ecological infrastructures

Conceptualizing community gardens as socio-ecological infrastructures places them at the intersection of ecological processes and human agency. Beyond their provisioning functions, such as food production, they contribute to soil remediation, biodiversity enhancement, and urban microclimate regulation (Harris, 2009; Barthel et al., 2015). For example, studies highlight that well-maintained allotment gardens in Poland can serve as vital components of urban green infrastructure systems, enhancing ecological resilience and environmental quality (Klepacki & Kujawska, 2018). Also, gardens in CEE cities like Belgrade demonstrate how informal gardening practices contribute to urban greenery and ecological restoration, even in unregulated contexts (Djokić et al., 2018).

Equally significant are their social dimensions. Community gardens facilitate collective learning, cultural exchange, and the development of social capital, as participants experiment with horticultural practices, share resources, and forge inclusive local identities (Wakefield et al., 2007). Similar trends have been noted in Warsaw, where younger generations are increasingly engaging in allotment gardening for recreation and environmental education (Szczepańska et al., 2021; Dymek et al., 2021). These infrastructural qualities depend on governance

frameworks that encourage long-term stability with adaptability. By linking local knowledge with formal policy support, well-managed gardens can enhance a city's broader green infrastructure network, bolstering resilience against environmental pressures such as climate change or urban heat islands. However, scholars caution that if such urban greening initiatives are not inclusive, community gardens may inadvertently reinforce social inequalities rather than alleviate them (Haase et al., 2017). For instance, recent scholarship emphasizes the strategic importance of allotment gardens in urban green space systems, demonstrating how careful classification and planning, aligned with governance models, can integrate gardens into citywide sustainable development strategies (Dymek, Wilkaniec, Bednorz and Szczepańska, 2021). Thus, effective governance arrangements are a cornerstone in ensuring that gardens function as enduring socio-ecological nodes rather than transient experiments.

Post-socialist urban transformations

The post-socialist transition in Central and Eastern European cities provides a complex backdrop for examining community garden governance. Decades of centralized control established a pattern of top-down management and limited citizen participation, while simultaneously fostering the ability of citizens to provide themselves and their immediate networks with a degree of self-sufficiency. However, this self-sufficiency was predominantly confined to close family, friends, and neighborhood connections, reflecting the low levels of bridging social capital that characterize post-communist societies (Czapiński, 2010; Lasinska, 2013). In Poland, for instance, the density of social networks and levels of social trust remain relatively low compared to Western European countries, a legacy of the limited existence of independent civic associations under communism and the resulting "middle range social vacuum" (Nowak, 1979; Murzyn-Kupisz and Działek, 2013). This vacuum constrained broader civic engagement and reinforced reliance on personal networks, often explained as an adaptation to the shortages and centralized control of the centrally planned economy (Kolankiewicz, 1996; Rose, 2000). After the political changes of the early 1990s, new opportunities emerged for civic engagement, yet these were accompanied by market pressures, shifting policy frameworks, and uneven legacies of trust in public institutions (Hirt, 2012; Czepczyński, 2008).

In Poland, allotment gardens historically served as semi-private refuges of food production and leisure, and functioning as a de facto local sharing economy particularly during periods of scarcity (Bański, Czapiewski, 2015; Mokras-Grabowska, 2021). Over time, some of these spaces have evolved, at least temporarily, into more publicly accessible community gardens that emphasize collective benefits, environmental stewardship, and cultural integration, reflecting changing urban realities and social aspirations. Community gardens provide an inclusive alternative, particularly for marginalized groups or residents facing spatial exclusion (Becker, 2018; Djokić et al., 2018) (Fig. 1).

The transformation of allotment gardens into community-focused sites resonates with broader transitions in urban governance. Scholars

have pointed out how strategic planning can incorporate these green spaces into citywide sustainability frameworks (Bell et al., 2016; Dymek et al., 2021). Yet, the pace and depth of this integration vary, influenced by historical path-dependencies, socio-economic stratification, and disparities in municipal capacity. In Krakow, for example, the interplay between a culturally rich urban environment,¹ a dynamic academic population,² and shifting environmental attitudes³ offers fertile ground for exploring how governance models shape the trajectories of community gardens.

Challenges and opportunities in community garden governance

A central challenge for community gardens, especially in post-socialist settings, lies in ensuring secure land tenure and stable funding mechanisms. Rapid urbanization, rising property values, and competition for central urban parcels can threaten the continuity of gardens (Beilin & Hunter, 2011; Dymek et al., 2021; Becker, 2018). Specifically in Krakow, securing long-term land tenure and institutional support is challenging amid rising property values and competing development priorities (Krzysztońek, 2014). Overcoming these challenges often requires forging durable partnerships between community groups and public or private entities, as limited institutional support, unclear regulations, and weak coordination between stakeholders undermine the long-term sustainability of gardens (Hlavaček et al., 2016; Becker, 2018). Hybrid governance models, combining local initiative with institutional support, may facilitate negotiations over land use, resource allocation, and long-term maintenance, helping gardens weather the fluctuations of urban policies and market forces.

The evolving nature of these governance models also presents opportunities. When effectively implemented, they can enhance inclusivity by involving multiple stakeholders, diverse cultural groups, different age cohorts, and various socio-economic segments, thereby enriching the social fabric of neighborhoods and strengthening community social capital. As Dymek et al. (2021) illustrate in the case of Poznań, the purposeful classification and planning of allotment gardens based on their ecological and social functions has helped align them with municipal sustainability goals. Applied to Krakow, similar strategies could integrate community gardens more systematically into the city's green infrastructure network, bolstering both ecological resilience and reinforcing local ownership.

Theoretical gaps and research contribution

While the conceptual origins of community gardens and their global diffusion have been explored, more nuanced research is needed on how these concepts are locally adapted and redefined locally, particularly in post-socialist contexts. The layers of historical allotment use, evolving civic cultures, and contemporary environmental imperatives demand careful, context-sensitive inquiry (Hirt, 2012; Czepczyński, 2008). By investigating the governance models of community gardens in Krakow, this study aims to offer insights into how global ideas are localized, how historical legacies interact with emerging frameworks, and how

¹ Krakow is former capital of Poland and European Capital of Culture 2000 as well as a city rich in UNESCO World Heritage Sites.

² With one of the oldest universities in the world, Jagiellonian University established in 1364 as well as over 20 other Higher Education Institutions.

³ The city was a finalist in European Green Capital competition 2023 (EC, 2023), participates in the European knowledge and innovation community working to build a zero-emission Europe (Climate-KIC, 2023) and is a member of the EU's Mission of "100 Climate-Neutral and Smart Cities by 2030" (Krakow.pl 2023a). In 2022 the recommendations of the Krakow Citizens Panel regarding climate change and city's climate neutrality were handed over to the president of the city (Krakow.pl 2023b), and in 2023 the Krakow Climate Education Center was opened (Krakow.pl 2023c).

community gardens can become more resilient and inclusive socio-ecological infrastructures.

This study therefore asks: In what ways do different governance models (bottom-up, top-down, and hybrid) influence the inclusivity, ecological adaptability, and long-term sustainability of community gardens in Kraków, particularly as these spaces take on transformative socio-ecological roles in navigating the cultural, political, and environmental challenges of post-socialist urban transformation?

Methodology

Case study selection and contextualization

This study employed a comparative, qualitative research design to examine how differing governance models influence co-creation processes and socio-ecological outcomes in community gardens in Kraków, Poland. Drawing on an approach common in urban studies, the research integrated multiple qualitative methods and case studies to capture both the complexity of governance arrangements and the situated nature of community gardening practices (Lawson, 2005; Bell et al., 2016). From the 21 community gardens mapped and monitored⁴ in 2024, as part of an earlier participatory typology-building effort, three gardens were selected for deeper exploration. These cases were chosen based on both analytical contrast and the high degree of responsiveness and engagement from participants during the previous research phase. The selection aimed to encompass varying degrees of institutional involvement and community agency (Fig. 2): (1) the Salwator garden, a bottom-up initiative; (2) the Pychogród garden, a more top-down, municipally supported endeavor; and (3) an emergent hybrid model at the JU Campus, where co-design workshops and action research activities informed garden development.

This tripartite typology, bottom-up, top-down, and hybrid, draws on governance theory distinguishing between citizen-led, institutionally-managed, and collaborative forms of collective action. In this study, “bottom-up” refers to gardens initiated and governed autonomously by residents; “top-down” describes gardens organized by municipal or institutional actors; while “hybrid” denotes co-management involving both grassroots stakeholders and formal institutions.

The broader socio-political context in which the research was conducted is also noteworthy. Between 2022 and 2024, Poland experienced heightened political conservatism, growing institutional centralization, and the social impacts of the war in neighbouring Ukraine, including an influx of refugees and increased military visibility. While these developments did not directly impact the selected gardens, they heightened the relevance of autonomous, resilient, and inclusive civic initiatives. Additionally, the aftermath of the COVID-19 pandemic significantly shaped public interaction with urban green spaces. As demand for outdoor space and local food production surged, the price and scarcity of allotment gardens increased in many cities, including Kraków, pushing more residents toward community garden initiatives as accessible, collectively governed alternatives (Lin et al., 2021; Bristowe and Heckert, 2023). This contextual framing, coupled with the three contrasting governance models, enabled an in-depth, theoretically grounded comparison of how governance arrangements affect co-creation dynamics and socio-ecological functions.

This tripartite case selection facilitated an in-depth, context-sensitive comparison. Ethnographic observation, semi-structured and go-along

interviews, participatory co-design workshops, and action research were combined to yield a rich, triangulated dataset. These methods were specifically chosen to capture multi-scalar interactions and co-creation processes in governance. For example, go-along interviews were selected to spatialize narratives of participants, while participatory workshops allowed stakeholders to co-design governance frameworks in situ. The application of these methods aligned with each governance type: co-design was employed in the hybrid JU Campus garden, where governance structures were still forming, while ethnography and interviews were prioritized in the already operational Salwator and Pychogród gardens. By integrating these methods and perspectives, the analysis could illuminate how historically rooted practices, evolving policy frameworks, and emergent civic imaginaries intersect in the governance of urban green spaces (Pink, 2007; Sanders and Stappers, 2008).

The case studies were chosen based on theoretical and empirical considerations. The Salwator garden, initiated by local residents without formal institutional mandates, exemplifies a bottom-up governance model rooted in flexible decision-making, cultural expressions, and adaptive organizational forms. In contrast, the Pychogród garden, founded with municipal support, represents a top-down model characterized by structured oversight, resource stability, and alignment with city-level ecological strategies (Colding and Barthel, 2013). Both gardens reflect Kraków’s post-socialist urban context, shaped by shifting civic landscapes, policy experimentation, and the evolving role of green spaces (Hirt, 2012; Mokras-Grabowska, 2020).

The JU Campus garden introduced a hybrid model, shaped through transdisciplinary workshops and action research involving faculty, students, the Municipal Greenery Authority (ZZM), and neighborhood residents. This integration of academic, civic, and environmental actors embodied a co-creation ethos, blending institutional support with grassroots input (Lang et al., 2012; Polk, 2015). Notably, this initiative was embedded in an academic curriculum, enabling students and researchers to collaborate as part of an applied sustainability learning process.

Data collection methods

- **Ethnographic observation:** Prolonged ethnographic fieldwork was conducted at the Salwator and Pychogród gardens over multiple seasons over one year, with a particular focus on a regular daily meeting over two months in summer 2023. Observations focused on daily routines, spatial configurations, informal decision-making episodes, conflict resolution and maintenance activities (Jorgensen, 1989; Pink, 2013). Detailed field notes documented the interplay of social relations, horticultural practices, and governance structures, generating insights into the embodied and relational dimensions of community gardening (Rosol, 2010). This method enabled a deep understanding of how governance is enacted through everyday practices, and how authority and inclusion are negotiated informally.
- **Semi-structured and go-along interviews:** Interviews were conducted with a purposive sample of approximately 25 participants, including gardeners (11), official from the municipal Greenery Authority (ZZM) (1), NGO representatives (1), and local residents of the surrounded neighborhood (14). Semi-structured interviews allowed participants to articulate their experiences, motivations, and long-term visions, while go-along interviews, conducted in situ, enabled respondents to narrate their engagement with garden spaces as they moved through them (Kvale and Brinkmann, 2009; Kusenbach, 2003; Brinkmann, 2018). These spatially contextual interviews revealed how people interpreted and influenced garden governance in real time. Interviews were held in English, with careful attention to linguistic nuances and cultural references to ensure accurate interpretation (Temple and Young, 2004). When necessary, Polish

⁴ This study builds on a previous phase of research by the author involving the participatory mapping and typology development of 21 community gardens in Kraków. That exploratory survey, conducted in 2024 through e-mapping, interviews, and on-site observations, informed the selection of the three case studies presented here. While the current paper focuses specifically on governance and co-creation dynamics, it forms part of a broader, multi-phase project on community gardens in post-socialist urban contexts (Teoule, 2025).

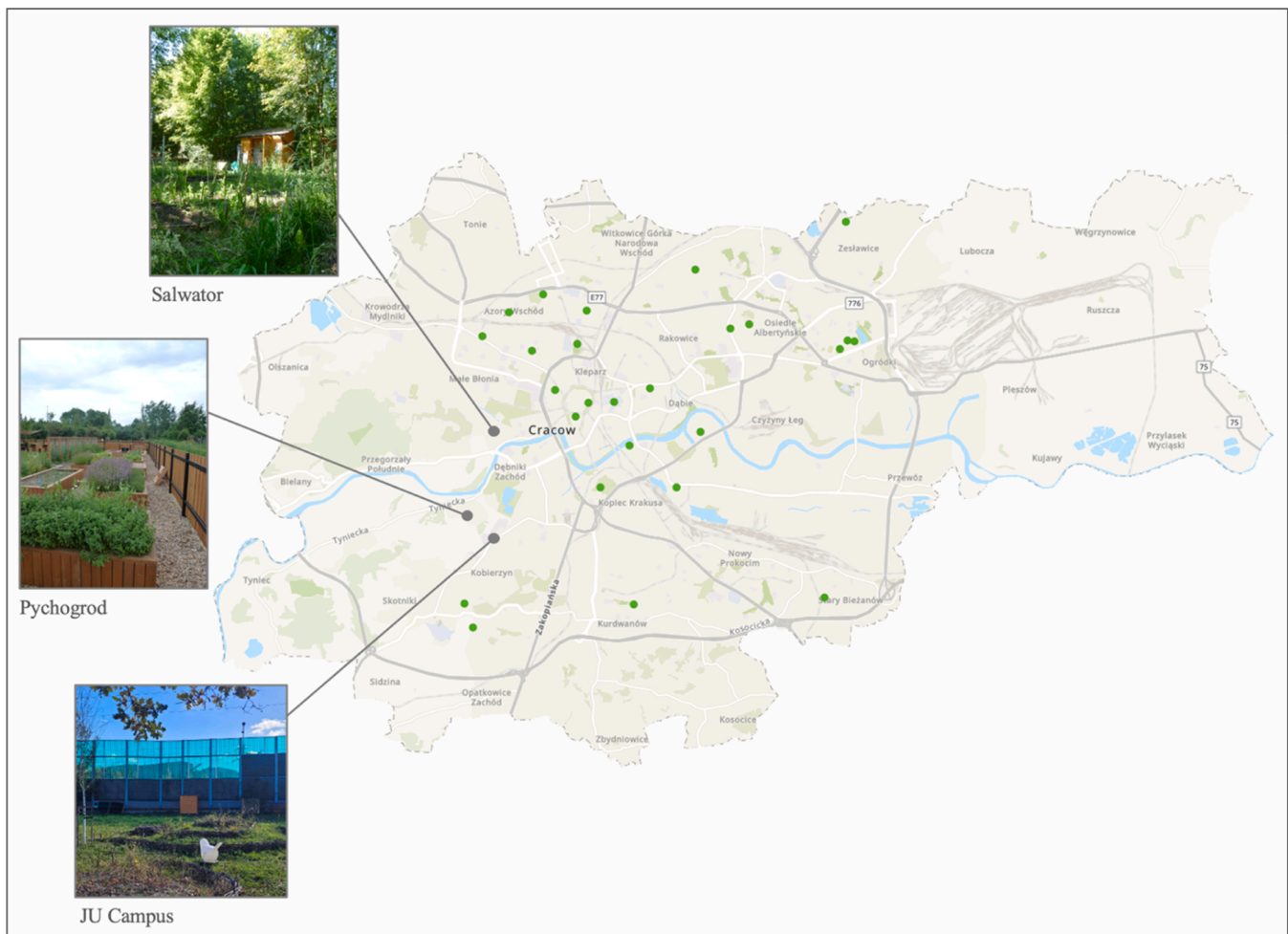


Fig. 2. Distribution of community gardens in Krakow in 2024 and case studies selected.
Source: Own study

terms and translated excerpts were used to ensure clarity and respect for original meanings.

- Workshops and co-design methods at the Jagiellonian University campus garden:
- Co-design methods were here applied exclusively and developed during the research period within an academic setting. This context enabled co-design to serve both as a governance tool and a research method. At the university campus site, participatory workshops facilitated collaborative design processes. Participants worked with maps, sketches, and visualization exercises, proposing spatial layouts and planting schemes (Sanders and Stappers, 2008; Hou, 2013). The workshops, held in English and Polish, brought together stakeholders with differing expertise, urban ecologists, gardeners, community organizers, students, and university staff, to co-create a governance framework aligned with both ecological resilience and social inclusion. Detailed documentation, including audio recordings, photographs, and annotated designs, captured the evolution of participants' ideas and the negotiation of diverse priorities (Brand and Rocchi, 2011). The co-design process also fostered reflexive engagement with the role of knowledge, inclusion, and institutional constraints, making it both a method and an object of study.
- Action research integration: The action research component underpinned the co-creation process at the university garden, linking scholarly inquiry with practical, iterative interventions (Bradbury, 2008; Greenwood, Levin, 2007). The research team organized thematic sessions and public events, such as workshops on soil health, biodiversity, and cultural activities for children and adults, that

simultaneously generated empirical data and contributed to the garden's establishment. This integration aligns with the "living lab" approach to sustainability transitions, in which the research site functions as both an experimental space and a mechanism for community engagement (Wittmayer and Schäpke, 2014; Voytenko et al., 2016; Działek et al., 2025).

Researcher positionality

This research was conducted by a sole author, resident of Kraków, Poland, during the study period. The researcher's outsider status (as a non-Polish citizen) and insider experience (as a local resident) together shaped the perspective brought to the field. Living in Kraków provided the researcher with everyday exposure to the city's culture, public spaces, and community life, helping to build rapport with garden participants and an intuitive understanding of local urban issues. However, the researcher is not fluent in Polish; to navigate this, interviews were primarily conducted in English, and when language barriers arose, ad-hoc translation support was used or bilingual participants stepped in to translate key points. All documents and communications (e.g., city regulations, garden rules, online forum posts) in Polish were translated to English, and care was taken to cross-verify translations for accuracy. The researcher acknowledges the risk of ethnocentrism and bias, given a Western European background studying a post-socialist context; this was mitigated through a reflexive, embedded ethnographic stance, for example, by spending long periods participating in garden activities without imposing external frameworks, listening to local interpretations

of governance before forming conclusions, and engaging in regular self-reflection and peer debriefings about one's own assumptions. By explicitly stating this positionality, we underscore that the findings emerge from an interpretive process influenced by the researcher's identity, and we have taken steps to ensure that local voices and meanings remain central in that process.

Ethical considerations

The study followed established ethical guidelines and received approval from the university ethics committee. All participants were informed of the aims, methods, and voluntary nature of the study and gave informed consent before interviews or workshop participation. Anonymization protocols were strictly followed: all names were replaced with pseudonyms, identifying details were removed, and audio recordings were securely stored. Participants had the opportunity to ask for clarifications; some received short reports on preliminary findings via email, fostering transparency and reciprocity. These steps were especially important given the participatory nature of the research and the personal or political sensitivity of certain discussions.

In line with ethical research standards for community-based and participatory studies, detailed socio-demographic data were not collected from individual participants. Given the small scale and visibility of the gardening communities involved, doing so could have compromised participant anonymity and trust. Instead, contextual information was developed through prolonged field observation, informal conversations, and repeated interactions. This allowed for the identification of general user profiles (e.g., students) and socio-spatial characteristics, providing meaningful site-level understanding while prioritizing ethical integrity and participant safety.

Data analysis

Interviews, workshop transcripts, and field notes were analyzed using thematic coding to systematically interpret the data. A preliminary codebook was developed based on the literature and our research questions, incorporating both theory-informed codes (e.g., “decision-making process”, “conflict resolution”, “stakeholder roles”) and case-specific themes (e.g. “bottom-up initiative” or “top-down policy”). Using this codebook as a guide, the researcher first deductively coded the transcripts to identify segments related to these *a priori* themes. Subsequently, an inductive coding phase was carried out in which emergent patterns were identified and incorporated, allowing new codes to be created for ideas that repeatedly appeared in participants' narratives (for example, an unforeseen emphasis on personal well-being benefits or interactions with city officials might arise and warrant a new code).

Key concepts such as “inclusivity,” “co-creation,” and “environmental stewardship” were operationalized through observable practices and narrative cues. Inclusivity was assessed not through demographic variables, excluded for ethical reasons, but through relational, spatial, and procedural indicators. Relational inclusivity involved the observed or reported integration of newcomers and less-vocal members; spatial inclusivity referred to how accessible and inviting the physical garden layout was to diverse publics; and procedural inclusivity was interpreted through the diversity of actor participation in planning or decision-making (Arnstein, 1969; Rosol, 2010). Furthermore, environmental stewardship was coded through maintenance practices, biodiversity concerns, and expressions of care for non-human life. Finally, co-creation process was evaluated based on instances where governance structures or physical designs were visibly shaped through collective input, negotiation, or iteration across actor groups (Polk, 2015; Lang et al., 2012).

The analysis was primarily done by the sole author, steps were taken to enhance reliability: the researcher iteratively recoded the data after a four weeks' interval to check for consistency, and any ambiguities or

borderline cases were discussed with academic peers to reach interpretative consensus. For instance, segments expressing frustration with design constraints were discussed in relation to both spatial layout and perceived lack of agency and were assigned multiple codes where relevant. This reflexive review process supported consistency and interpretive depth.

Data triangulation was achieved by systematically comparing themes across ethnographic observation, interviews, and workshop materials. Rather than weighting sources *a priori*, each method was analyzed for its unique contributions to the research questions. For instance, field notes often revealed informal dynamics and embodied practices; interviews captured individual experiences and perceptions; and workshops illuminated collective visions and negotiation processes. Divergences across data types were retained and analyzed to expose tensions and plural perspectives within governance configurations.

All coded data were then synthesized by theme, and the relationships between themes were mapped out (using narrative summaries) to build a coherent picture of how governance models correspond with various social and ecological outcomes in the gardens. Themes were further analyzed in relation to the governance typology, allowing for cross-case comparison of co-creation dynamics across bottom-up, top-down, and hybrid configurations.

Results

Municipal-led initiatives and historical legacies

The governance of community gardens in Kraków reflects enduring post-socialist legacies, notably the persistence of centralized management structures despite formal decentralization reforms since the 1990s (Hirt, 2012; Czepczyński, 2008; Mokras-Grabowska, 2021). Although local authorities were empowered during the transition to a market economy, municipal approaches to civic engagement have remained cautious, shaped by inherited top-down planning traditions (Rosol, 2010; Szczepańska et al., 2021). Zarząd Zieleni Miejskiej (ZZM), the municipal green space management authority, plays a central role in orchestrating community garden development through formalized programs. Unlike in many Western European cities where community gardens frequently arise organically from grassroots movements advocating for the “right to the city” (Lefebvre, 1968; Rosol, 2010), Kraków's community gardens are predominantly initiatives spearheaded by municipal agencies (Ferenčuhová, 2016; own study, 2024).

ZZM provides institutional guidance through tools, consultations, and training programs while facilitating essential infrastructure such as tree care, tool rental, and access to land. Importantly, this support is conditional upon the signing of agreements that outline the “rights and duties” of garden leaders and participants, emphasizing a structured partnership model (Fig. 3). Such conditions reflect ZZM's dual aim of promoting environmental management while maintaining oversight, highlighting both the opportunities and constraints within Kraków's municipal-led community garden initiatives.

This municipal dominance is evident in the strategic objectives articulated by ZZM officials, who view community gardens not only as spaces for urban greening but also as instruments for social management and civic engagement. As one municipal representative explained, “*It's also a great way to get the citizens to manage our green spaces, for free,*” highlighting a dual agenda of environmental improvement and cost-efficient maintenance (Mokras-Grabowska, 2021). This perspective aligns with neoliberal governance practices where public participation is encouraged within the confines of state-defined roles, thereby maintaining institutional control while promoting a veneer of community involvement (Ferenčuhová, 2016; Woźniak, 2019).

Moreover, the historical context of post-socialist urban transformation in Kraków reveals a tension between inherited bureaucratic structures and emerging civic initiatives. The transition period saw local authorities grappling with new responsibilities and limited resources,



Fig. 3. ZSM Support strategy for community gardens in Kraków. (Source: Zarząd Zieleni Miejskiej, ZSM, 2022)

leading to an incremental shift towards participatory governance. However, without a robust tradition of grassroots activism or strong civil society networks, municipal-led initiatives often lack the depth of community ownership and long-term sustainability seen in more organically developed community gardens elsewhere (Colding and Barthel, 2013). This is further complicated by the uneven distribution of resources and support, which can reinforce existing socio-economic disparities and limit broader civic engagement (Dudzic-Gyurkovich, 2021).

The institutional frameworks established by ZSM also reflect a pragmatic adaptation to Kraków's unique socio-political landscape. By implementing standardized guidelines, offering workshops, and running leader training programs, ZSM attempts to replicate successful community garden models while ensuring alignment with broader municipal policies on urban sustainability and green infrastructure (Colding and Barthel, 2013). However, this approach can inadvertently stifle local innovation and limit the potential for gardens to serve as true socio-ecological space that empower residents beyond their designated roles (Barthel, Parker and Ernstson, 2015).

Balancing autonomy and institutionalization

While municipalities often set the overarching framework, some community gardens have emerged through grassroots efforts. A notable example is the Salwator garden, founded in 2019 (Fig. 1) as a resident-led initiative. This garden grew from the collective motivation of local residents seeking to bring positive change to their urban environment. After identifying an abandoned plot of land spanning 24–28 acres in the Zwierzyniec district, near the Salwatorski cemetery, the group approached municipal authorities for support. To their surprise, the administration responded favorably. As one gardener explained during an in-depth interview, “I asked the municipality about a free spot, and they responded positively,” highlighting the collaborative attitude of local authorities towards community-led initiatives. The Salwator garden exemplifies how grassroots initiatives can spark urban greening projects even within a governance system traditionally dominated by top-down processes. Initially, the garden operated autonomously, with residents

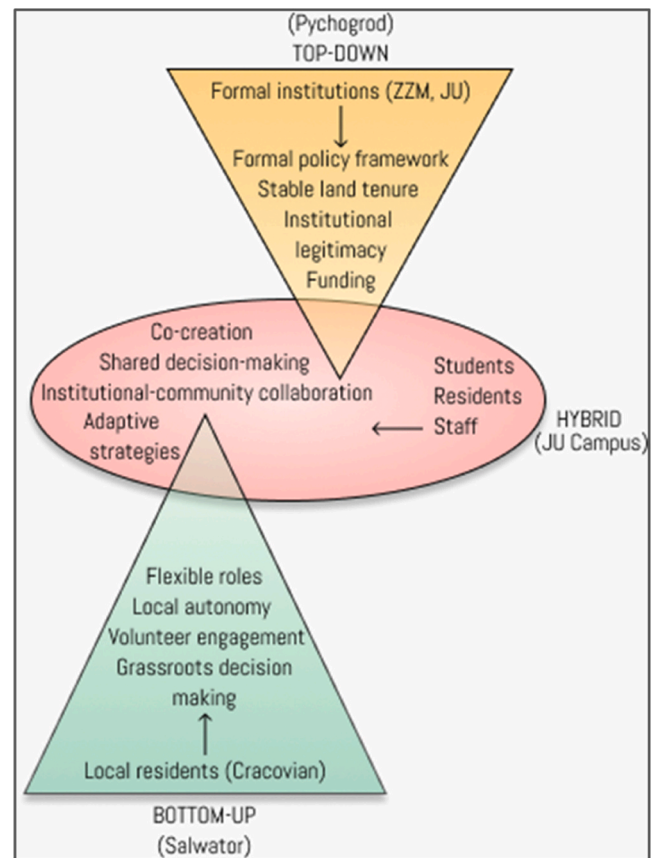


Fig. 4. Governance structure diagram for Krakow's community gardens. (Source: author)

managing and designing their plots without strict oversight. This freedom fostered a strong sense of ownership and community engagement (Barthel, Parker and Ernstson, 2015; Dymek et al., 2021) (Fig. 4). However, the trajectory of Salwator garden also illustrates the complexities inherent in maintaining grassroots autonomy when interfacing with institutional frameworks. As the garden gained visibility and demonstrated successful outcomes, ZSM incorporated it into a broader municipal pilot program⁵ aimed at testing new urban greening strategies. This integration brought both benefits and challenges. On one hand, municipal support provided additional resources, such as funding for infrastructure improvements and access to expert advice on sustainable practices. On the other hand, the formalization of Salwator into a pilot project introduced new layers of oversight and standardization, which sometimes conflicted with the residents' original vision and autonomous management style (Ferenčuhová & Gentile, 2016; Rosol, 2010). The hybrid governance of Salwator garden demonstrates both the potential and challenges of blending grassroots innovation with institutional frameworks. While municipal involvement can offer stability and resources, it can also impose restrictions that hinder community creativity. Such tensions reflect broader patterns in post-socialist urban settings, where civic activism and established institutions often negotiate shared governance models rather than adhering strictly to top-down or bottom-up approaches (Colding and Barthel, 2013).

⁵ Gardeniser is a European initiative that facilitates the exchange of best practices among professionals and volunteers involved in urban community gardening. The project aims to enhance participants' competencies and provide insights into existing methodologies within the context of European urban community gardens. For more information, visit here <https://www.replaynet.eu/en/gardeniserplus>

A contrasting dynamic emerges in the Pychogród garden, which was established in 2021 (Fig. 1) under the direct supervision of ZZM, followed a fully institutionalized process. Covering 200–300 square meters, the garden was part of Pychowice neighborhood renewal project aimed at revitalizing a meadow near a Natura 2000 protected site. From the outset, municipal authorities established clear rules, secure land tenure, and an organized planting schedule. As one participant shared, *“The city organized the first planting days. It felt reassuring to have their support.”* This approach aligns with findings that top-down governance can mitigate risks such as land appropriation and vandalism. (Becker, Kunze, 2014; Dymek et al., 2021) (Fig. 4). However, the formalized structure came with limitations. The municipality’s strong presence restricted opportunities for participants to experiment or take full ownership of the space. One participant remarked during a go-along interview *“I wouldn’t have built the beds like this, we don’t have enough space for planting, we can’t change the structure now”*. As a result, the garden lacked the adaptive, innovative energy observed in more autonomous cases like Salwator. This statement reflects a broader issue in top-down models where formal support does not always translate into deep, sustained community engagement.

The JU Campus garden, created in 2024 (Fig. 1), also in the Dębni district, provides a more balanced hybrid model that integrates institutional legitimacy with participatory processes. The garden’s establishment began through co-design workshops involving university faculty, students, ZZM representative and nearby residents. Although situated on university land, the garden was designed to remain partially accessible to the public and intentionally engaged neighborhood residents, particularly through open events and collaborative gardening sessions. This accessibility ensured that diverse perspectives shaped the space. A participant commented, *“The workshops were great because everyone could contribute, and bring a multiplicity of visions.”* By facilitating deliberative processes, JU community garden avoided the pitfalls of rigid institutional control while retaining the organizational benefits of top-down support (Fig. 4). However, hybrid models are not without challenges, especially in settings where participants may rotate frequently, such as university campuses.

Inclusivity, social trust, and the limitation of engagement

The inclusivity of Kraków’s community gardens is shaped by the interplay between governance models, socio-economic disparities, and the city’s post-socialist legacy of fragmented social trust. Under socialism, collective initiatives in Poland were largely state-driven, creating a lingering ambivalence toward civic participation in public projects (Ferenčuhová, 2016; Dudzic-Gyurkovich, 2021). This historical backdrop influences current levels of trust and engagement, which vary depending on how gardens are governed.

Bottom-up gardens like Salwator have demonstrated a capacity for inclusivity by lowering barriers to entry. Interviews revealed that many participants were drawn to the garden due to its openness and lack of formalized rules. One gardener explained, *“I found out about the garden through friends on Facebook. I just showed up one day, and they welcomed me immediately.”* The absence of rigid structures allowed a diverse set of individuals, including those unable to access formal allotments due to economic or bureaucratic constraints, to engage in gardening, especially in post-pandemic context. However, while grassroots gardens reduce structural barriers, their inclusivity is often limited by informal social norms and volunteer burnout. Ethnographic observations highlighted that younger participants (under 18) and men were less likely to engage at the outset, with a gardener noting, *“My husband only comes when there is heavy stuff to carry.”* This gendered division of labor reflects broader societal patterns and highlights the need for strategies to diversify involvement intentionally.

By contrast, top-down community gardens like Pychogród, while initially providing a stable legal and structural foundation, often struggle to foster deep, sustained community involvement. Municipal

outreach efforts have largely relied on formal channels, such as public meetings or call-for-volunteer programs, which fail to engage residents who are less attuned to institutional communications. One resident from the neighborhood remarked, *“Most people in the neighborhood didn’t even know this garden existed until last month.”* This visibility gap underscores the limitations of top-down approaches when local and cultural engagement strategies are lacking. Moreover, institutional facilitation can sometimes create a passive dynamic, where participants feel like caretakers rather than co-creators of the space, reducing their sense of agency and attachment. Taken together, the Salwator and Pychogród cases illustrate opposite ends of the inclusivity spectrum, one emphasizing open, informal access with limited structural support, and the other offering institutional stability but limited participatory depth. This contrast sets the stage for the third case, the JU Campus garden, which was intentionally developed as a hybrid model designed to bridge these gaps.

By combining elements of top-down and bottom-up governance, the JU garden enables a comparative analysis of how structured participatory tools can actively cultivate inclusivity through shared ownership and dialogue. The use of mind-mapping techniques (Fig. 5) allowed for a structured yet flexible approach to integrating diverse perspectives. By visually organizing ideas and identifying shared priorities, mind-mapping facilitated open dialogue. This method not only democratized the planning process by ensuring that participants could contribute on equal footing regardless of expertise but also revealed synergies between institutional goals and community needs. Such an approach enabled the creation of a shared vision for the garden that balanced ecological priorities with social functions like gathering spaces and educational areas. Early workshops were instrumental in broadening participation by engaging a mix of students, faculty, municipal actors, and local residents. As one participant noted, *“The workshops feel like we really contribute to something bigger.”* Multilingual communication and collaboration with different faculties and disciplines further expanded the garden’s reach, attracting international students, often underrepresented in civic initiatives.

Nevertheless, field observations revealed challenges in sustaining inclusivity over time. The transient nature of student populations created turnover, disrupting the continuity of engagement and leaving gaps in leadership. One participant explained, *“The motivation from students is great, but when they leave, it feels like starting over again.”*

A common limitation across all governance models is the persistence of social and economic inequalities, which influence who engages with community gardens and how. Interviews across sites highlighted that community gardens, despite being publicly accessible, remain largely self-selective spaces. Residents with limited time, financial pressures, or lack of gardening knowledge were often excluded, either because they perceived the garden as requiring expertise or because they felt they had little to contribute. *“I would like to join, but I know nothing about gardening, I don’t want to make mistakes,”* shared one resident near Pychogród garden. These barriers reflect a broader need for governance frameworks that integrate accessible educational programs, mentorship, and tailored outreach strategies to demystify participation and make gardens welcoming to all residents.

Finally, trust, both among participants and between residents and institutions, emerges as a critical factor for inclusivity. Grassroots gardens tend to build trust through informal social connections, while top-down models often need to overcome skepticism toward municipal actors. Hybrid models like the JU community garden show promise in building trust by facilitating inclusive processes from the outset, yet their success hinges on consistent institutional commitment and mechanisms to retain local ownership. Without sustained outreach, transparent communication, and adaptive leadership structures, even participatory spaces risk reverting to exclusionary or temporary initiatives.



Fig. 5. Examples of mind-maps designed for the JU Campus garden. (Source: Workshops outputs Author, 2023)

Ecological dimensions and knowledge exchange

The ecological dimension of community gardens in Kraków reveals both their potential to contribute to urban sustainability and the challenges of ensuring long-term ecological adaptability. These gardens are

not merely spaces for cultivation but dynamic platforms where ecological knowledge is produced, shared, and mobilized in ways that reflect governance structures and the socio-environmental conditions of the city.

Bottom-up models, such as the Salwator garden, showcase a strong



Fig. 6. Ecological features of community gardens. (Source: Ethnographic observations, author, 2023)

inclination toward grassroots experimentation with sustainable practices, including composting, organic cultivation, and adaptive planting strategies. Participants actively tested methods suited to Kraków's local environmental pressures, such as contaminated soils, seasonal variability, and water scarcity (Fig. 6). As one gardener explained during a go-along interview, *"We started composting because we realized it's not only good for the soil but also reduces waste. Everyone can come and use it."* This hands-on experimentation reflects the potential of bottom-up governance to generate localized, flexible solutions that respond directly to ecological realities. Moreover, the transfer of skills and knowledge, both tacit and explicit, within these gardens fosters a progressive, community-led process of urban ecological learning. However, reliance on volunteer labor and personal initiative also exposes these gardens to vulnerabilities. Challenges like vandalism (Fig. 6), uneven participation, and seasonal neglect limit their capacity to consistently maintain ecological functions. This fragility reflects findings from Barthel et al. (2015) and Colding and Barthel (2013), who emphasize the need for supportive structures to sustain community-led environmental stewardship over time.

In contrast, top-down models, exemplified by the Pychogród garden, initially benefit from structured ecological frameworks provided by the municipality, such as organized planting sessions, pre-selected plant varieties, small compost, and basic infrastructure like raised beds or pathways (Fig. 6). These efforts ensure an immediate, visible transformation of neglected urban spaces into functional green areas. The community garden has also been built with a kindergarten area, showcasing the multi-functional intent. However, long-term ecological adaptability is often limited due to the rigid, prescriptive nature of such initiatives (Fig. 6). As one gardener remarked, *"We received clear instructions, but when problems came up, we had to figure it out ourselves."* This observation highlights a recurring issue: municipal frameworks prioritize establishment but neglect ongoing ecological mentoring and adaptive problem-solving, leaving participants unprepared to address emerging challenges independently. Such gaps align with broader patterns observed in post-socialist cities, where institutional actors often focus on visible outcomes but overlook the need for sustained ecological education and capacity building (Mokras-Grabowska, 2021; Haase et al., 2013).

Hybrid models, as seen in the JU Campus garden, attempt to bridge the strengths of top-down guidance and bottom-up creativity. The co-design workshops emphasized sustainability from the outset, incorporating expert knowledge on ecological design, native species selection, and composting systems (Fig. 6). One participant described the process: *"They explained why certain plants are more suitable for Polish weather."* This blend of institutional input and community participation enabled the garden to address local environmental challenges while fostering participants' ecological literacy. The JU garden also benefitted from knowledge exchanges with other community gardens, such as the nearby Macierzanki garden, which provided seeds and advice on organic methods (Fig. 6). These inter-garden networks reflect what Barthel et al. (2015) describe as "knowledge commons", shared repositories of ecological know-how that strengthen resilience through collective learning. Nevertheless, despite its strengths, the JU garden highlights key challenges for hybrid governance. Many participants, particularly first-time gardeners, reported uncertainties about implementing ecological practices in the absence of ongoing mentorship. *"We started composting, but sometimes we weren't sure if we were doing it right,"* admitted one student gardener. This gap underscores the importance of sustained education and iterative learning processes. Programs like ZZM's "School of Urban Gardeners" demonstrate the potential for formalized training initiatives to complement hybrid governance models, equipping participants with the skills and confidence to manage ecological systems effectively (Colding and Barthel, 2013; Dymek et al., 2021).

Discussion and conclusions

This study has explored how governance frameworks (bottom-up, top-down, and hybrid) influence the inclusivity, ecological adaptability, and long-term sustainability of community gardens in a post-socialist city. By drawing on ethnographic observations, semi-structured and go-along interviews, participatory workshops, and action research, this analysis reveals that governance models are not neutral structures but key determinants of the gardens' transformative potential as socio-ecological infrastructures. Community gardens in Kraków function as coupled socio-ecological systems: the way they are governed profoundly shapes both community dynamics and ecological performance (Ostrom, 2009; Barthel, Parker, and Ernstson, 2015). Social benefits (e.g., cohesion, learning, inclusion) and ecological benefits (e.g., biodiversity, resilience, ecosystem services) are codependent, with governance models mediating the strength of this interdependence (Lynch, 1981; Rosol, 2010).

The Salwator garden illustrated how bottom-up governance can foster deep engagement, experimentation, and responsiveness to local ecological challenges. Participants emphasized autonomy and informal decision-making, crafting adaptive practices for waste, planting, and water management. However, the model's fragility was visible in its dependence on volunteers, limited inclusivity, and lack of long-term support structures (Hirt, 2012; Mokras-Grabowska, 2021). These findings resonate with broader post-socialist urban literature on the precarity of grassroots initiatives within historically centralized planning contexts (Dudzić-Gyurkovich, 2021).

In contrast, the Pychogród garden reflected the advantages of top-down governance, particularly in securing land tenure and municipal support (Dymek et al., 2021). City-led coordination by ZZM ensured material infrastructure and regulatory clarity, creating stable conditions for garden development. However, institutional control also created barriers to ownership, with many participants expressing limited agency or a sense of detachment from garden governance (Becker, Kunze, 2014). The initiative struggled to reach marginalized groups and activate broader civic engagement, shortcomings also identified in other top-down models in CEE (Ferenčuhová, 2016).

The hybrid model at the JU Campus garden offered a middle ground. It combined academic and municipal legitimacy with participatory design, enabling diverse stakeholders, including students and inhabitants, to co-create the garden's governance and design. This model exemplifies collaborative governance (Ansell and Gash, 2007) and engaged both grassroots energy and formal resources. While challenges emerged, such as volunteer turnover among transient student populations and the need for stable facilitation, the garden illustrated how institutional frameworks can empower, rather than constrain, collective agency (Sanders and Stappers, 2008; Barthel et al., 2015).

Across all cases, the study affirms that governance models interact dynamically with Kraków's socio-political context, particularly its post-socialist legacies. Years of centralized control have shaped civic distrust and uneven participation, making trust-building and inclusion particularly vital for bottom-up and hybrid models (Czepczyński, 2008; Rosol, 2010). Yet, despite structural constraints, these gardens are becoming important spaces of socio-ecological experimentation and deliberative democracy. They offer avenues for rebuilding local agency, fostering environmental stewardship, and cultivating shared urban imaginaries.

The findings contribute to broader theoretical discussions in urban and environmental governance. Collaborative governance theory (Ansell and Gash, 2007) provides a useful lens to understand the processes of negotiation, trust-building, and shared rule-making seen in hybrid models. Simultaneously, the socio-ecological systems framework helps reveal how governance arrangements mediate feedback loops between human actors and ecological conditions. Gardens function as commons (Barthel et al., 2015), requiring co-management, clear rules, and context-sensitive coordination. The Kraków case also underscores the value of co-creation in sustainability transitions, highlighting how

experimental, transdisciplinary methods can generate both social and ecological resilience.

While the study offers rich insights, several limitations must be acknowledged. First, the small number of case studies (three) and their inherent contextual specificities limit the generalizability of findings. These cases were selected for their contrasting governance configurations and levels of accessibility, but they do not encompass the full diversity of community gardens in Kraków or other post-socialist cities. Second, although the study employed mixed qualitative methods to enhance triangulation and depth, the sampling strategy focused on active participants and did not systematically capture socio-demographic diversity. This approach may have introduced selection bias, and future research should aim to include more comprehensive demographic data where ethically and practically feasible.

These limitations also open avenues for future investigation. Comparative studies across cities and governance models, especially those integrating ecological indicators and long-term institutional trajectories, would enhance understanding of how inclusivity, stewardship, and co-creation unfold across scales. Additionally, longitudinal research could better track how participation and governance structures evolve, particularly in relation to volunteer turnover, seasonal rhythms, and shifting policy frameworks.

To translate these insights into policy and practice, we argue that governance frameworks for urban gardens must be flexible, inclusive, and adaptive. First, outreach strategies should be prioritized to engage underrepresented groups, including elderly residents, migrants, and those unfamiliar with gardening, through multilingual communication, local partnerships, and accessible public events. Second, stable resource allocation is crucial: small grants, infrastructural support, and technical mentoring can significantly enhance long-term viability and ecological performance. Third, feedback mechanisms should be institutionalized through participatory planning tools, such as co-design workshops and rotating leadership structures, to ensure responsiveness and shared accountability. These recommendations are globally relevant. In both post-socialist and non-post-socialist cities, community gardens can serve as laboratories of adaptive governance and sustainability innovation.

Declaration of Competing Interest

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

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