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Community gardens as a response to the contradictions of sustainable urban policy: Insights from the Swiss cities of Zurich and Lausanne

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In this paper we explore how policy discourses on urban sustainability impact the governing of urban food gardening in favoring community gardens. Our main hypothesis is that community gardens better accommodate the tensions created by the discourses of the compact and green city compared to other types of food gardening, especially allotment gardens. In the context of the Swiss cities of Lausanne and Zurich, analysis of policy documents confirms this hypothesis by identifying four frames that orient policies toward favoring community gardening: (i) *Adapting* green space planning to densification favors community gardening with their modest, flexible and multifunctional design, (ii) *Revaluating* the role of urban food gardening in urban sustainability represents community gardening as a new multifunctional benchmark, (iii) *Reorganizing* urban food gardening fosters diversity in gardening opportunities which in turn supports a variety of forms of community gardening, (iv) *Justifying* urban food gardening through public values and needs supports community gardening with their cost-efficient green space management, lower land management and more active citizen participation. In this vein, urban policymakers continually turn to community gardens as a strategic urban planning tool that gives urban green space greater legitimacy in the wake of the densifying city. Overall, urban food gardens continue to be negotiated between space-related marginalization and socio-political significance serving different needs to urban citizens. This results in the need of a more sophisticated planning approach considering different types of urban gardens related to their location in the built city, associated functions, and user groups.

KEYWORDS

urban sustainability, urban gardening, urban agriculture, compact city, green city, public policy, frame analysis, Switzerland

Introduction

Urban and peri-urban agriculture has become an important lever for sustainable transformation, it links different areas such as ecological, political, social, health, and economic systems in the pursuit of urban sustainability (Hebinck et al., 2021). Yet, urban sustainability is not a homogenous concept or coherent approach. Policy actors take on

an understanding of sustainability based on place-specific problems, histories, and identities of the city (Frantzeskaki et al., 2017). The way sustainability goals are operationalized in cities often leads to governance frameworks and policy objectives that may contain potential contradictions and conflicts. In some cases, it can jeopardize the realization of sustainability goals. The "compact city" and the "green city" are two such concepts, repeatedly mentioned in discourses on sustainable urban development that carry potential conflicting visions of sustainability (Madureira and Monteiro, 2021). Both concepts inform contemporary urban governance frameworks and as such have consequences on the way urban food production spaces are framed, planned, and managed (Hautamäki, 2019).

The compact city with its dense and proximate physical development, comprehensive public transport system, and good accessibility to local services and jobs is one of the leading paradigms of sustainable urbanism (OECD, 2012; Bibri et al., 2020). Yet, scholars have identified trade-offs in the striving for compactness, especially in social and environmental aspects of sustainability (Bramley et al., 2009; Westerink et al., 2013), including a potentially low proportion of urban green space (Haaland and van den Bosch, 2015). At the same time urban green is continually used by urban planners as a tool for urban sustainability planning, e.g., as an adaptation strategy to climate change in the city (Madureira and Monteiro, 2021). It is furthermore considered to notably contribute to the quality of life and ecosystem services in cities (Jim, 2013), while resulting in more sustainable, more liveable, and more equitable cities (Jim, 2004, 2013; Pincetl and Gearin, 2005).

In the context of the compact city, urban green space—including spaces for food production—often is contested. In several Europeans cites, these spaces are regarded as open resources for city development, competing with housing or business areas (Valette et al., 2012; Tappert et al., 2018; Gibas and Boumová, 2020; Zwierzchowska et al., 2021). There are competing views on how to organize and manage these spaces. The establishment of community gardens has blurred the traditional land-use boundaries between allotment gardening and farming, which has subsequently increased competition for urban land (Jahrl and Schmid, 2017). These developments pose challenges for urban policy, as to simultaneously satisfy different user interests for land use against the background of densification and the pursuit of urban sustainability (Frauenfelder et al., 2014; Haaland and van den Bosch, 2015).

In analyzing political negotiation processes on urban food gardening of Swiss cities, Tappert et al. (2018) conclude that the compact city discourse favors the promotion of community gardening as they encompass several positive functions feeding into the overall sustainability agenda. We take this observation as the starting point for this paper. We take a closer look at urban greening policies and planning by analyzing the underlying frames resulting in favoring community gardening. This overall objective leads to one research question: How do urban public policies end up favoring community gardening over other types of food gardening? We hypothesize that community gardens better accommodate the tensions created by the discourses of the compact and the green city compared to other types of food production. We identify emerging frames in policy documents in dealing with different land-use types and user interests, based on the example of the Swiss cities Lausanne and Zurich. The study focuses on two types of land use for urban food production, the long-standing tradition of allotment gardening and relatively new community gardening. We analyse the data and structure the results following an approach adapted from Snow and Benford (1988) analysis of framing processes.

Conceptual perspectives

In this section we situate the compact and green city in the overall sustainability debate and relate urban food gardens to urban sustainability. By placing both aspects in the Swiss context, we lay the basis for our analysis.

Compact city: Densification and urban sustainability

Sustainability has developed into a central political guiding principle since the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Since then, sustainability has been the most widely and intensively discussed urban concept (De Jong et al., 2015; Rink, 2018). In the context of the debate, cities are addressed as central arenas or actors in the transformation toward sustainability (Frantzeskaki et al., 2017; Rink, 2018). Sustainability is above all a normative and guiding principle that does not originate from urban planning or urban research. It became a key concept for urban planning through the declination of the Rio convention in Local Agenda 21. Attempts to concretise sustainability are usually oriented toward the widespread three-pillar models, which include ecological, economic, and social planning parameters. In most cases, the primacy of ecology is assumed and the understanding of sustainable urban development is often that of resource-conserving and environmentally compatible urban development, where densification, mixed land use, and a polycentric planning approach are considered sustainable per se (Rink, 2018).

These aspects are taken up in the concept of the compact city. The compact city has gained much attention in the political discourse of urban planning in recent years (Westerink et al., 2013; Tappert et al., 2018; Bibri et al., 2020). It is widely acknowledged by policy and science as a leading planning concept to be fostered to limit urban sprawl (Artmann et al., 2019), which also holds true for Switzerland. Sustainable development is laid down in the

Swiss federal constitution as a matter of environment and spatial planning (Swiss Confederation, 2021). It is therefore not surprising that in the context of sustainability and urban development, the compact city, defined as "inward development" or "infill urban development", is of central importance (Schweizerischer Bundesrat, 2001). Urban sprawl with its low-density, single land use, and car-dependent characteristics results in substantial environmental, social, and economic consequences, e.g., higher infrastructure cost and an increase in transport expenditure, lower social interaction, and environmental degradation (Mehriar et al., 2020). Protecting agricultural land constitutes another line of argument to prevent urban sprawl in Swiss and European contexts (EU, 2002; Ruegg et al., 2014). Swiss public policy has tried to counteract the loss of agricultural land since the 1960s, e.g., by defining agricultural zones. Yet, peri-urban agricultural land has continually been the subject to development projects in Switzerland (Mann, 2009), but these lands are overall better protected than inner-city gardens.

As a leading paradigm, the compact city aims at limiting urban growth, encouraging efficient land use and social mixing and focuses on the importance of public transportation as well as the quality of urban design. This potentially results in various positive environmental, ecological and social effects, e.g., lowering per capita rates of energy use, limiting the consumption of building and infrastructure materials, reducing pollution due to the proximity to amenities of daily life, limiting the loss of green and natural areas, creating a better quality of life through more social interaction. However, the compact city is also associated with conflicts and contentions. The increasing density might result in negative effects such as e.g., higher land and property prices, decreasing neighborhood satisfaction, and social exclusion (Bramley and Power, 2009; Bibri et al., 2020). In the compact city, green space is subject to more constraints and pressures and are more vulnerable to degradation and loss (Jim, 2004).

Green city: Green space and urban sustainability

In Switzerland, urban gardens and city farmland are considered as part of urban green space. Overall, urban green space (or "urban green") is land in an urban environment that has any amount of vegetation, such as parks, urban forests, residential gardens, street trees, roof-top gardens, or urban agriculture (Breuste et al., 2013). In this concern, Breuste (2020) defines the green city as a synonym for preserving existing nature and enhancing every kind of urban nature while making it useable for urban residents. In this way, the green city is an idea or concept of urban development that focuses on the relationship between people and nature (Haase, 2018).

The concept is not new, but its meaning and functions have changed over time. Green space in cities used to be designated as space for recreation or gardening. Today it is a tool of sustainable urban planning that addresses multiple social, ecological, and economic challenges in providing various ecosystem services (Pincetl and Gearin, 2005; Haase, 2018). Tappert et al. (2018) highlight green space's contribution to the urban ecosystem (through air purification, water and climate regulation, carbon storage, biodiversity, habitat for wildlife), benefiting urban residents (recreation, social interaction, community building, health benefits, subjective wellbeing, aesthetics) and producing economic value by increasing the quality of landscapes (its location, scenic setting, liveability, recreational value, image, level of identification, and cultural heritage). The various ecosystem services that green space provides through multifunctional "green" interventions have received increasing attention from the scientific and policy communities. As "nature-based solutions" they are often discussed as services to address societal challenges, e.g., urban gardens addressing issues of climate change, food security, biodiversity or urban degeneration (Artmann and Sartison, 2018; Frantzeskaki, 2019). Out of concern for urban densification leading to increased pollution and degradation of nature, the Swiss Federal Office for Spatial Planning advocates integrating natural green space into urban planning and to promote a functional and social mixing to foster the wellbeing of residents (Schweizerischer Bundesrat, 2012).

Gardening in the city is undergoing a process of change. While traditional allotment gardens on mainly public land shaped the gardening cityscape for many decades, new forms of gardening have established in recent years. Originating from the United States, these new forms of gardening spread in cities around the world through civil society bottom-up processes (Biedermann and Ripperger, 2017), taking on different shapes between gardening and farming. Ernwein and Salomon-Cavin (2014), based on research in the Swiss city Geneva, refer to such processes as "the agrarianization of the city". This term indicates that the city is becoming a privileged terrain for experimenting with different kinds of agriculture and participatory models of agriculture. These experiments take on different forms (from the urban farm to community garden), are located in different places (buildings, abandoned spaces, etc.) and using different techniques (from organic to hydroponics). Compared to traditional farming, located in agricultural areas, the agrarianization of the city participates in the construction of cultivation practices that address other actors, follow other logics and objectives, or which mix them. With these urban forms of agriculture, it can be difficult to define contours, which can pose a problem for the development of policies (Ernwein and Salomon-Cavin, 2014). While initially, community gardens in public green space were initiated as civil society projects by the population (Buijs et al., 2016), today they are actively promoted

by urban policy as part of the urban sustainability discourse (Rosol, 2010; Jahrl et al., 2021).

In this chapter we have presented the unique features of the compact and the green city discourses. The study answers how these dual important city discourses affect urban gardening and what they imply for the promotion of community gardening.

Materials and methods

Research approach

This research follows a case study approach applying a "descriptive case study" (Yin, 2009). A prerequisite for the selection of the cities Lausanne and Zurich was the city ownership of garden as well as farmland in the urban area. The cities were selected according to a "most similar" case selection strategy, which are marked by similarities or differences in the measured independent variables $(X_1 + X_2)$ but differences in the dependent variable (Y) (Seawright and Gerring, 2008). Prior investigations concluded, national policies set the frame for urban densification (X_2), however, the cities are affected to varying degrees of urban development resulting in the decline of urban food gardens (Y). Both cities vary in the degree of institutionalized support for gardening, especially for community gardening (X_1) (Jahrl et al., 2021). Limiting the study to two case cities allows for an in-depth analysis of the city's interrelations on compact and green city in relation to urban food gardening. In choosing Swiss cities, the analysis enriches the literature of policy strategies toward gardening in the compact city as urban planning paradigm in highly industrialized countries and countries facing high urbanism due to scarcity of land. Due to Switzerland's mountainous character, most of the country's population, infrastructure and agriculture are concentrated in one third of the country's total area. At the same time, it is the city governments that are the main decision-making entities for local urban development (Rudolf et al., 2018).

We conducted a qualitative content analysis of documents from politics/administration (administrative strategies, plans, reports, press releases and other grey literature). These documents concerning sustainable development and gardening in the city were gathered through city council online databases. The most important urban policy documents in the analysis, which form the basis for the explanations in Section Results, are listed in the Supplementary material. Furthermore, information gathered through websites and documents from media, science and civil society organizations informed the analysis. Documents were obtained in online searches in French and German starting with a list of terms corresponding to: "allotment gardening," "community gardening," "farming," "densification," "green space," "open space," "compact city," "green city," "urban sprawl," "sustainability," "urban development," "participation," "biodiversity." Four exploratory interviews with policy administrators from the two case cities were carried out to obtain additional documents and data not available online. The final sample consists of 160 documents mainly from 2000 to 2018 and updated in 2021. Using a qualitative text analysis programme (MAXQDA), data was analyzed by applying a deductive and inductive coding strategy (Mayring, 2002). The adapted theoretical framework of frame analysis (see Section Frame analysis) set the overall coding strategy on "challenges," "strategies," and "acting." These codes were supplemented by codes derived from the data.

As highlighted in Jahrl et al. (2021) also the analysis of this paper distinguishes between two types of gardening: allotment gardening and community gardening. The term "allotment garden" refers to traditional gardening on equipped plots (∼200 m^2) used by an individual and/or a family for non-commercial horticultural and recreational purposes. A membership fee and/or rent is payable and common rules must be observed. Allotments are managed by local authorities, private or public bodies or by an association (Bell et al., 2016). Allotment gardeners in the case cities are mainly organized in allotment garden associations. In the city of Zurich some allotment gardens are leased directly to gardeners.

The term "community gardening" is not clearly defined in literature, it is used in manifold ways. In this paper, we use the definition of community gardening from Veen et al. (2016, p. 1273): "a plot of land in an urban area, cultivated either communally or individually by a group of people from the direct neighborhood or the wider city, or in which urbanites are involved in other ways than gardening, and to which there is a collective element". A collective element could be a shared responsibility for gardening or collective ownership (Knapp et al., 2016). Community gardeners in the case cities are sometimes part of a gardening initiative or a loose network of gardeners. In the city of Lausanne community gardens are called "plantages".

The analysis furthermore touches upon city farming in both cities. City farming in this vein is defined as agricultural land and properties owned by the city and which are located within the city border. While these farms were initially run similarly to conventional farms, they tend to diversify (and sometimes abandon) their traditional farming activities to offer community services or spaces for community gardening. As a result, city farming is increasingly considered alongside community gardening in both cities and is also caught between the compact and green city discourses.

Frame analysis

In examining urban policy governing food gardening in the tension between compact and green city we apply frame analysis as an analytical tool. The term "frame" refers to basic

schemes of meaning and action that circulate in discourses and make it possible to understand what a phenomenon is about. Discourses link different frames to specific patterns of interpretation (Keller, 2011). Various disciplines, such as communication studies and sociology, use frame analysis as an analytical tool, it has an established history in public policy (Mah et al., 2014; Van Hulst and Yanow, 2014). According to Hajer and Laws (2006), frame is a conceptual tool for capturing how political actors deal with ambiguity and assign a particular meaning to certain social or physical events. It is also a tool for explaining how political decision-makers structure reality to deal with practical problems. The aspect of problem structuring as the basis for political action has a special role to play. The application of frame analysis ideally offers insights into the mechanisms of policy making and concrete problem solving (Hajer and Laws, 2006). Rein and Schön (1994) in Mah et al. (2014) examine how issues are problematized through conflict and negotiation, which can be analyzed in the rhetoric or persuasive language of a political debate. Frame analysis, to varying degrees, looks at language, or more specifically language use, as the organizing frame for understanding society (Hajer and Laws, 2006). In the case of this analysis, we focus on frames expressed mainly in policy documents. For the reconstruction of the meaning embedded in the frames, policy documents provide an appropriate source (Mah et al., 2014).

For analyzing policy documents we draw on categories of frames developed by Snow and Benford (1988) in analyzing collective action or social movements. Their framework rests on three core framings: (i) identification of a problem and the attribution of blame or causality (diagnostic frame), (ii) proposed solution to the diagnosed problem, which entails strategies, tactics and targets, (prognostic frame), (iii) promoting collective action and emphasizing responsibility to resolve the problems identified (motivational frame). In addition to the study of social movements, scholars have used and adapted these frame-categories for a variety of topics, most recently in urban research on, e.g., how the sharing city project is understood and strategically communicated by the municipality of Barcelona (Sánchez Vergara et al., 2021), the way Canadian municipalities frame the challenge of reducing carbon emissions (Reynard et al., 2021) as well as examining urban greening policies in the Democratic People's Republic of Korea (Park et al., 2021).

In our analysis, the three type frames were adapted to the aim of the research. They were used as lenses to explore the data, to identify the meaning, values and beliefs expressed in the analyzed policies (Goodwin, 2011) and to structure the results. In analyzing urban food gardening within the compact and green city discourses, we identify the diagnostic frame as the "challenges of densification and urban food gardening in the city". Here, we explore the context of densification and green space and more specifically, the challenges of urban food gardening in a densifying city. The prognostic frame deals with the "strategies of densification and urban food gardening in the city" while the motivational frame focuses on "acting to address densification and urban food gardening in the city".

TABLE 1 Characteristics on gardening and farming in Lausanne and Zurich.

	Lausanne	Zurich
Population (2020)	140,202	421,878
Population density (habitant/km^2) (2020)	3,388	4,798
Allotment gardening	550 plots on 11 ha; let to allotment garden associations on 10 sites; mainly in city outskirts	5,400 plots on 130 ha; let to 13 allotment garden associations; additionally, about 300 allotment gardens on about 13.4 ha let to individuals or groups
Community gardening	17 community gardens ("plantages") on 1.6 ha let to 500 citizens near their homes; additional forms of gardens (e.g., "potagers") managed by community centers, churches, schools, collective groups, etc.	35 community gardens (garden plots and mobile containers) on 5 ha; additional forms of gardens (migrant gardens, school gardens, mixed-use gardens with animal husbandry, vegetable cultivation)
City farming	7 city owned farms (total 430 ha) let to farmers: two on city outskirts incl. the cooperative Rovéréaz; five beyond city borders	8 city owned farms let to farmers and one professional farm under city management within city boarder (total 810 ha); two former farms run by citizens (neighborhood farms), one Community Supported Agriculture (CSA)

Source: Population and population density https://www.pxweb.bfs.admin.ch/; https://de.statista.com/statistik/daten/studie/216783/umfrage/groesste-staedte-in-der-schweiz/.

The case cities

Zurich and Lausanne are among the biggest cities in Switzerland (respectively 1st and 4th). As Zurich is in the German speaking part of the country and Lausanne in the French speaking part, these two cases enable to gain insights of urban food gardening across Switzerland. Table 1 highlights the characteristics on gardening and farming in the case cities.

Results

The adapted frames of Snow and Benford (1988) formed the basis for data collection, analysis and helped us to structure the results.

Diagnostic: Challenges of densification and urban food gardening in the city

In accordance with national guidelines, the city of Zurich and Lausanne pursue the paradigm of urban densification. In Zurich, city strategies define: the future development of the city of Zurich will mainly take place within the existing building areas. The city of Lausanne has defined centers of development to concentrate population and job growth in city areas with the best public transport links and services, while aiming to limit development outside these centers. At the same time, both cities are defining themselves as a green city aiming to preserve and to strengthen green space. Green space is associated with a high quality of life for urban citizens. In its policy documents, the city of Lausanne refers to a large variety of parks, gardens, "plantages", etc. as an asset for the attractiveness of the city. In documents on Zurich, a high quality of life for urban citizens is often associated with attractive landscapes surrounding the city and attractive, high-quality inner-city green space.

Almost all documents in both cities on spatial planning and green space address the issue of densification. In some cases, the compact city approach is both advocated and criticized within the same strategic document. Overall, the compact city approach is legitimized in both cities by the growth of the city. In 2020, the city of Zurich comprised ∼420,000 inhabitants. For 2040, an increase of 100,000 inhabitants and an additional 12,000 jobs are expected. Also, Lausanne is facing a rapid population growth after a decline at the end of the 1990s. In 2018, more than 7,000 housing units are planned or under construction on land owned by the city, both inside and outside the municipal territory. The municipal master plan on spatial planning of 2021 anticipates a growth of 30,000 inhabitants until 2030. It is interesting to see, that the same strategic document also mentions densification as a risk of impairment to the population's quality of life. Urban policy in Lausanne faces the challenge of preserving and developing green space but also the need to reflect on its respective qualities and the social demand, as well as its preponderant role in the fight against global warming. The same ambivalent approach toward densification can be found in Zurich. The densification of the city and the associated challenges are central themes in all of Zurich's strategies in relation to spatial planning and green space and especially in the concept for species and habitat promotion. Urban policy identifies a range of disadvantages associated to urban densification, e.g., increasing traffic emissions, increasing property prices, increasing neighborhood conflicts—among them is the increased pressure on existing open and green space.

Through increased urbanization, both cities are equally concerned with the quality of green space in terms of biodiversity and ecological connectivity. The city of Lausanne adopted a "Nature in the City" policy in 2005, which questions the compact city planning paradigm. Already in this policy, the following issues were identified that are still relevant today: improvement of the ecological network, planting of indigenous species and creating new community gardens in the neighborhoods. An update of this concept in 2018 emphasizes the role of nature as a counterpart to the densification of the city and central social challenges as, e.g., global warming and heat island, loss of biodiversity or social tensions. The same development can be seen in the city of Zurich. While in earlier strategies green space was often associated with attractive landscapes and an associated high quality of life. In more recent strategies a very strong connection is made between the need to preserve green space as a means of combating climate change, increasing ecological connectivity, and promoting biodiversity, thus contributing to the quality of life of all citizens. Zurich strategies for green and open space planning relate densification and the increased multifunctional use of green and open space for recreation to pressure on green space, not only on the amount of green space, but also on its quality. The main problem discussed is to ensure a critical size for ecological connectivity which contributes to biodiversity. The conservation and promotion of biodiversity is a central guiding principle of Zurich urban policy defined in various strategies. In the concept on the promotion of species and habitats, a justification for this central objective is seen in the increasing densification: it inevitably leads to a reduction in near-natural habitats which results in a biotic homogenisation of the remaining habitats. This favors the spread of invasive species and results in reduced quality of life for the urban population.

Aiming at densification to counteract urban sprawl and to protect agricultural areas is present in spatial planning strategies in both cities, but especially in Lausanne, were urban policy attaches great importance to the protection of agriculture in and around the city. In its strategy on "urban agriculture", the city advocates the promotion of innovative projects for sustainable agriculture and food supply while facing a lack of land for such projects as agricultural land is also affected by urban development projects on the outskirts of the city. Zurich policy, connects agriculture with providing an attractive landscape for citizens. Spatial strategies highlight recreation and leisure activities of a growing population and the corresponding need for infrastructure and facilities that can come into conflict with demands for an attractive landscape and biodiversity measures, often focussed on agriculture.

The threat to gardens through continuing densification varies in both cities. Gardens in the city of Zurich have been and continue to be the subject of planning considerations for

new building projects or the creation of multifunctional open space for citizens. Since 2004, 12.1 ha of garden area have been lost, a decrease of 6.9%. Most of the loss was due to the abolition and reutilisation of traditional allotment garden sites as housing, infrastructure facilities or public parks. Until 2030 a continued loss of garden areas, primarily affecting allotment gardens (around 19 ha) is expected. In addition to the loss of allotment gardens, there is also a shift of allotment gardens to the outskirts of the city, as stated in the spatial development strategy. Contrary to Zurich, allotment gardens in Lausanne have historically been installed on the outskirts of the city. The 2011 master plan for allotment gardens refers to the tradition of allotment gardens in the periphery of the city and at the same time notes that it is precisely these outer locations that are increasingly popular centers of urban development. Though, until 2018, only a small allotment garden area vanished due to urbanization and no relocation of existing allotment garden areas is expected before 2025, as highlighted in the "urban agricultural policy".

Densification impacts on the provision of gardens in both cities, but to different extents. For the reason of densification and the low proportion of garden areas on public land, the city of Lausanne has already installed community gardens, called "plantages", as early as 1996 in highly populated areas of the city. The gardens are in the immediate vicinity of the tenants' homes, who agree to abide by some rules and pay a modest contribution. These gardens are made up of small plots, simple equipment, the layout is modest and functional. City administration maintains a long waiting list for such gardens. While Lausanne currently faces the difficulty in finding suitable areas for additional "plantages", Zurich faces the difficulty of not being able to maintain the current number of existing gardens. Considering the land to be lost until 2030 and the land for gardening to be gained through shifts in use, the resulting overall loss will amount to about 6 ha of gardening land. This contrasts with a very high demand for gardening land from the side of the citizens, expressed in enquiries and waiting lists for garden plots.

Prognostic: Strategies of densification and urban food gardening in the city

Gardening and farming in the cities of Lausanne and Zurich are embedded to a different extent in overarching public policy strategies. In Lausanne, gardening enjoys broad acceptance and is part of sustainability strategies. While in Zurich the department of green space management (GSZ) is primarily concerned with preserving and enhancing green space, in Lausanne this goal is anchored in overarching strategies. In both cities, specific city departments are dedicated to the planning and maintenance of urban green space. With their strategies and measures they are keen on protecting green space from conversion to other uses (Jahrl et al., 2021).

Both cities have launched strategies in recent years on the further development of urban food gardening. In 2019, Zurich's department for green space management (GSZ) presented a strategy on gardening which for the first time considers the different types of gardens in the city. Community gardens are included as a part of public strategic planning. The strategy underlines the need to counteract densification and to limit building density to the necessary minimum as well as to minimize soil sealing. Similarly, in 2018, Lausanne's department of housing, environment and architecture presented its "urban agricultural policy: from balconies to fields". This strategy not only includes gardening but it presents the first Swiss-wide policy on gardening and farming in a city and expresses Lausanne's desire to take on a leading role on "urban agriculture" in a national and international context (Jahrl et al., 2021). In terms of gardens, the new strategy is an extension of the master plan for allotment and community gardens of 2011, which focused on identifying garden sites to be affected by development or conversion in the long to medium term and identified alternative slots or residual fields for future gardening in the city.

In both city strategies, the municipal authorities emphasize the need to diversify its gardening offers. As declared in the new strategy on gardening in Zurich, the city is keen on creating more opportunities for gardening which cover the various current and future user needs as community gardens, "urban farming" or self-harvesting gardens. Also in Lausanne, the new strategy identifies further diversification opportunities for food production in the city, from hobby gardening to professional farming and mixed forms as part of the overall "urban agriculture" concept. With the need to diversify, the strategies of both cities show differentiation in the importance of different types of urban food gardening.

Over time, allotment gardens have lost importance as a strategic planning tool in both cities. In prior garden strategies of the city of Lausanne, allotment gardens were considered as fulfilling fundamental functions in the same way as sports facilities or public green space. Public support and the commitment on the retention of the existing areas was justified as the gardens fulfill social, ecological and urban planning functions. Nowadays, overarching urban policies (e.g., municipal master plan 2021, "urban agriculture" policy) actively support community gardens. They are considered to allow sustainable development to be implemented in a concrete and daily manner which fits into the overall "urban agriculture" concept. In Lausanne, "urban agriculture" is considered as an expression of a cultural heritage and an approach to carry out concrete actions in terms of food sovereignty, food autonomy, citizen awareness building related to food and agriculture as well as strengthening the quality of life of the inhabitants and the attractiveness of the city of Lausanne. There is great pride in the early promotion of community

gardens in the city, a development that has taken place in other Swiss cities only in recent years. Already in the garden strategy of 2011, community gardens were described as the solutions of the future. The same development in terms of allotment gardens can be seen in Zurich. The spatial development strategy of the Zurich city council from 2010 defines the goal of preserving allotment garden areas as valuable green and open space and highlights the need for additional areas. This goal has somewhat changed with the upcoming of community gardens in Zurich which originate in civil society engagement (Jahrl and Schmid, 2017) and which are considered by urban policy as a popular way of land management. In the new strategy of 2021, urban policy constitutes community gardens a more diverse role in their sustainability performance and in better achieving urban policy goals. The low sealing of soil by a few communally used infrastructures, such as garden sheds, is an important argument for city administration to support community gardens. Although high importance is attached to the promotion of community gardens, the city itself acknowledges the lack of development goals for community gardens and a missing coordinated strategy for their promotion.

Supporting community gardening in both cities is also underpinned by the need to widen the beneficiaries' group through this type of land management. The aim of the community gardens is to appeal to wider parts of society and specially to meet the needs for families and other user groups, such as marginalized groups, by offering less investment-intensive garden forms. This is in slight contrast to allotment gardens whose gardeners are perceived to mostly belong to a similar sociocultural group, namely a male dominated working class culture (Appel et al., 2011; Keshavarz and Bell, 2016). In the city of Zurich, green space for gardening is in strong competition with other uses relevant to the public. GSZ is therefore keen to emphasize that gardens are not only of benefit for the gardeners but provide public value in preserving and promoting public goods (soil, biodiversity, landscape). Above all, it is argued in both cities, that the participation of the population in the maintenance of green areas can help to reduce the costs of maintenance by the city.

The way most of the gardens are organized at the moment enables both cities flexibility with the land in the long-term, as expressed in city strategies. In Lausanne, strategies emphasize that community gardens have the capacity to settle in the interstices of the city and, if necessary, to disappear in the event of new construction. In Zurich, community gardens are located in certain public zones that are initially well protected from conversion, but urban policy is considering rezoning them as building zones if necessary.

Motivational: Acting to address densification and urban food gardening in the city

To increase the availability of garden plots, existing garden areas are being restructured in both cities. In Zurich, since 2004, the amount of community gardens has increased to almost 5 ha, mainly through conversion of individually leased allotment gardens (3 ha). This practice is expected to continue as the use of individually leased allotment gardens with their spacious layout can thus be intensified. Furthermore, it is the aim to provide community gardens in allotment garden areas leased to allotment garden associations. Overall, plots for gardening shall be reduced in size and gardens to be leased to associations or larger groups which is already partly the case. So far, the common use of allotment gardens is often not allowed by the statutes of the garden associations, but the practice has so far often been tolerated. Community gardens are expected to increase by around 13 ha until 2030. The reduction of plots in order to increase the number of available gardens is also aimed for by the city of Lausanne. To cope with the high demand for "plantages", the size of plots in newly developed areas was reduced, overall, all areas face a redeveloped in the coming years. For new allotment gardens, a restructuring toward community gardens is planned, to limit the size of new plots, give preference to collective shelters, reserve collective spaces to encourage conviviality between gardeners and visitors (e.g., play areas for children, recreational areas). The city of Zurich has formulated a similar goal in its new strategy on gardening, as to create recreational areas within the garden areas accessible for all citizens and more usability for the wider population, e.g., through public pathways. However, these goals are not new, they have already been formulated in the masterplan for allotment gardens from 2004 which already identified the problem of an increasing demand for space from other uses and the need to give citizens access to garden areas.

The city of Lausanne has taken several measures to increase the availability of garden plots and achieving greater participation of urban citizens. In 2020, the initiative "pocket gardens" was launched, which aims to encourage citizens to identify small areas in their vicinity that are suitable for gardening and to encourage private property owners and developers to provide areas for gardening. These gardens can also be of temporary nature. Associations, groups, companies and residents can obtain a "greening permit" and cultivate small areas in their neighborhood such as at the foot of trees, in small green areas or in containers placed on pavements or squares. A second measure is the specification that garden areas must be included in new development projects. Furthermore, "urban agriculture" is to be considered in new urban districts, as defined in the municipal masterplan of 2021. This can be

seen by the example of the new so-called "eco-neighborhood" Plain du Loup. The area aims to accommodate around 11,000 inhabitants and jobs on 30 ha by 2034. In this district, agricultural land is partly made available for the construction of a new urban district. The plans foresee the creation of separate areas for participatory "urban agriculture" projects. Beyond the implementation of community gardens in urban development sites, owners and housing cooperatives are called upon to dedicate further areas for community gardens.

The implemented and planned modifications to urban food gardening in both cities follow the overarching goal of multifunctional land use. Zurich defined in the "masterplan environment", urban green and open spaces are to be designed in a multifunctional way considering biodiversity targets. An example is the newly created garden area Dunkelhölzli. Conceptually, the entire Dunkelhölzli area is considered a landscape park with areas for gardening and open green space for leisure and recreation. This former predominantly agriculturally used land on the outskirts of the city was re-designated as a so-called recreation zone, which makes gardening with accompanying infrastructure possible. The area provides allotment as well as community gardens. A similar development can be seen in Lausanne. While farming and gardening are part of the densification strategy in the built environment in urban development centers, agglomeration parks address multifunctional land use as farming and/or gardening and forestry with leisure, recreation, participation and ecological networking. The city is directly involved in three agglomeration parks for which "urban agriculture" is one of the components (Rovéréaz, Sauvabelin, and Blécherette).

These examples point to the overlap of gardening and farming on public city land which is happening in both cities. In Zurich, the increase in community gardens will also result from the partial conversion of city-owned horticultural and agricultural land, as defined in the new garden strategy. In recent years, several initiatives have emerged in the grey area between agriculture and community gardening as community supported agriculture initiatives which partly cultivate agricultural or former horticultural land provided by the city. Additionally, traditional family farms have been transformed into neighborhood farms. Neighborhood farms are small hobby farms run jointly by local residents which multifunctional use is located in between gardening, agriculture including animal husbandry, (semi-)public park, nature preservation and playground. Residents are responsible for the cultivation and care of the land. There are currently two neighborhood farms in the city of Zurich and two more are planned by the city administration until 2030. Similarly in Lausanne, the former city owned dairy farming estate, Rovéréaz, was transformed into the city's flagship of "urban agriculture" projects in 2017. It combines community gardening with professional market gardening of vegetables and fruits while functioning as a knowledge hub toward sustainable cultivation practices and a recreational area of high ecological importance (Jarrige et al., 2020).

Discussion

This paper aimed to explore how policy discourses on urban sustainability impact the governing of urban food gardening in favoring community gardens in the Swiss cities Zurich and Lausanne. The analysis revealed that governing urban food gardening in between the compact and green city discourse are marked by four main frames: (i) adapting green space planning to densification, (ii) revaluating the role of urban food gardening in urban sustainability, (iii) reorganizing urban food gardening to foster diversity in gardening opportunities, (iv) justifying urban food gardening through public values and needs. These four frames, in turn, help to elaborate the rationale for the increased support of community gardens in the context of densification and urban sustainability over other types of food gardening.

Adapting green space planning to densification

Analyzing policy documents on spatial planning and greening policies reveals the compact city discourse as a dominating discourse impacting the governing of urban food gardening. The compact city, advocated in both cities out of concern about urban sprawl and the loss of agricultural land, sets the main framework within which greening policies can operate and implement strategies on urban food gardening. This holds true for both cities, though the cities react differently as expressed in the rhetoric of their strategies. Densification fluctuates between "chance" and "threat". "Chance", as it fosters innovative greening strategies as seen in the city of Lausanne (e.g., tradition of "plantages", compulsory garden areas in development projects), and "threat" as it results in the loss of garden areas and a biotic homogenization of the remaining green space, which is especially the case in the city of Zurich.

The urban context provides a possible explanation for these dual perspectives. While Zurich faces about three times as many inhabitants on about twice the size of the city of Lausanne, Zurich citizens have 10 times the area of allotment gardens throughout the city at their disposal. While in Zurich allotment garden areas tend to be pushed to the outskirts of the city due to inner-city densification, in Lausanne allotment garden areas are traditionally located on the outskirts which fostered the development of "plantages" in inner-city areas. In this concern, densification has favored the establishment of community gardens in inner-city areas. Community gardens as a strategic planning tool benefit from their simple and, compared to allotment gardens, more space-efficient design, which easily

fit into interstices of the city. It is however the interstices that might be affected by urban development in the long term. This flexible and somewhat non-committal planning approach which is also practiced in other cities is often criticized in literature (Nikolaidou, 2014; Koopmans et al., 2017; Tappert et al., 2018). At the same time this type of policy planning is granted legitimacy as it enables the population to make active use of public space in a variety of ways (Nikolaidou, 2014) and thereby advocates urban gardening as part of strategic urban planning (Caputo, 2018).

Revaluating the role of urban food gardening in urban sustainability

As highlighted by Jahrl et al. (2021), the more diverse the functions that urban policy ascribes to gardening, the less interchangeable this form of land use is compared to other land uses, and the more likely it is that gardening is considered in urban planning. In former times, urban gardens primarily served the needs of individual citizens through the aspects of self-sufficiency and recreation. In times of global change, their functions are embedded in an overall urban context (Pincetl and Gearin, 2005; Haase, 2018). Our analysis reveals, the compact city discourse promotes this approach. The loss of green space results in a critical questioning of the existing land use and the functions it fulfills. Urban policies in both cities are eager to promote types of gardening that address multifunctional goals within an urban sustainability context, which clearly favors community gardening, as seen in both cities. These findings are supported by Derkzen et al. (2017) stating that community gardens can trigger a shift to novel multifunctional urban green spaces providing a wide range of ecosystem services, as, e.g., food producing, climate regulating, local identity strengthening or educational functions. Our analysis takes this a step further in highlighting, community gardens as the new multifunctional benchmark, other land uses as allotment gardening or city farming are evaluated against. This shall be underpinned by the example of the community gardening and farming context in the city of Zurich. Through the establishment of community gardens on farmland, the role of food production and farming takes on new meaning. Areas previously used for one crop per season by family farms are replaced by the cultivation of diverse crops (e.g., vegetables) and collective farming. In this context, agriculture organized as community gardens has a new, more multifaceted and participative role than primarily being the bearer of an attractive landscape with a valuable recreational function for urban citizens.

However, the role and functions of urban food gardens in the city are not solely dependent on the type of garden, but also on their location in the city. Gardens are defined by their contrasting function to the built environment and thus within the compact city discourse. Whether gardens are located in the city center or the outskirts is subordinate; rather, the proximity of the gardens to the built surface plays a central role. Gardens in landscape parks are considered as an instrument for achieving multifunctional goals with aspects of food sovereignty and/or recreation. When integrating garden areas in new building projects, the social component plays a major role in terms of neighborhood promotion and integration.

Reorganizing urban food gardening to foster diversity in gardening opportunities

While cities are keen to keep urban food gardens as part of the emphasized green city context, urban food gardening is undergoing a reorganization process to better serve urban policy goals which is especially the case with community gardening over favoring allotment gardens as well as city farming.

The nexus of gardening and farming is particularly relevant in the context of the compact city, as it is the prevention of urban sprawl and the protection of agricultural land that has favored the compact city as the overarching guiding principle of sustainable urban planning (Ruegg et al., 2014). Considering the pressure on gardens in the city through densification, it allows the argument that the protection of agriculture outside the city is at the expense of gardens in the city. While this certainly holds true, our analysis highlights also a different picture. Community gardens in varying degrees of professionalization are built on city-owned farmland or are planned, and farms are given to voluntary neighborhood collectives. This leads to a shift in use and an overlap of previously separate types of land use and a promotion of community gardens at the expense of farmland. Unless rezoned, agricultural land is earmarked and its use is precisely defined (e.g., regulations on building on agricultural land) (Ernwein and Salomon-Cavin, 2014). This legal framework fosters community gardening characterized by modest features contrary to allotment gardens with their very high degree of built-up areas.

In a densifying city in which land is becoming a scarce commodity, allotment gardens are subject to criticism. While a few years ago allotment gardens were still perceived as a desirable use of land for a variety of functions this image has slowly changed. In the political discourse of Swiss cities, allotment gardens are often described as unsustainable land management with too high land consumption, limited accessibility and benefits to only a few citizens (Tappert et al., 2018). This analysis reveals that such limiting attributions toward allotment gardening accompany the promotion of community gardening in allotment garden areas and on newly defined garden areas. Both cities clearly aim to foster the possibilities for gardening in the city.

In the context of densification, the garden offer is becoming continual differentiated ranging from flexible and improvised gardens to established long-term gardens such as in agglomeration or landscape parks or in zones defined for this purpose. It seems, community gardening is the trigger for the differentiation and promotion of various forms of gardens of different characteristics. Such reorganization and diversification in gardening opportunities are however also influenced by a changing society with different demands on green space and the interest for more active participation in the governance of urban green space (Ghose, 2005; Rosol, 2010; Buijs et al., 2016). Densification and the increasing scarcity of space are stimulating collective action and an increased responsibility on the part of citizens in green space management, which can be seen in Lausanne's initiative of "pocket gardens", where citizens are invited to actively green the city, or private property owners and developers who are encouraged to provide areas for gardening. Overall, fostering community gardening marked by more citizen participation serves in both cities also as justification and legitimization for urban food gardening in a densifying city.

Justifying urban food gardening through public values and needs

In times when the compact city has become the prevailing city planning approach and urban sustainability is the overarching concept to steer city development, green space is an important asset for the "quality of life" of citizens. At the same time, it is undergoing a critical examination in its design and function. The analysis reveals that greening strategies of the cities Lausanne and Zurich are equally concerned to present the benefits of urban food gardens. These benefits are seen above all in serving public needs in terms of cost-efficient green space management, flexibility in urban planning and the public use of gardens. With the promotion of community gardens, all three aspects are equally linked. Community gardens benefit from the current garden planning negotiations between the different land use types. Community gardens are marked by their simple equipment, more flexible planning practice, lower land consumption, cost-efficient green space management and more active citizen participation. These characteristics are actively supported by urban policy and increasingly being transferred on to other forms of food production spaces, predominantly allotment gardens and in part on farmland.

In answering the hypothesis, we conclude that community gardens with their modest, flexible and multifunctional design are more likely to accommodate the compact and the green city discourse, while better serving urban sustainability goals than allotment gardens or city farming. Furthermore, community gardening gives green space greater legitimacy over other uses of urban space. Opening up gardens to more active participation and to the public in general contributes to a legitimization for maintaining and promoting gardens over other uses and especially over other uses of green space. While some scholars argue for the shift of gardens to more public space and consider it as a "cure for social fragmentation, and an effective way of acting with and for a specific public" (Ernwein, 2014, p. 79), others question the social benefits of flexible gardens in particular as they "provide short-term benefits for a few people instead of long-term outcomes for society" (Nikolaïdou et al., 2016, p. 16). The later argument also holds true for community gardening in both cities, which are also facing some downsides as well as contradictions.

Community gardens with their small and simple layout are often installed on inner-city areas that are more likely to be affected by urban development. While community gardens are a flexible instrument aimed to counteract densification, it also legitimizes construction activities. Areas are built on, but at the same time, community gardens are built in the direct vicinity of the built-up area. While community gardens aim to ensure a biological enhancement of urban space, a reduction of plot size in gardens allows access for more citizens but entails a more intensive use of garden space with a potentially negative impact on biodiversity.

This study has implications for urban policy and research. While cities are trying to anchor urban food gardening in addressing multifunctional land use, food production as such mainly plays a subordinate role. In times of growing awareness of urban food gardening as important lever of a socio-ecological transformation of the food system, and city efforts to further legitimize urban food gardens, urban policy should increasingly consider embedding urban food gardening in an overall context of urban food strategies. Furthermore, the analysis shows that community gardens have greatly diversified the range of gardens and will continue to do so. In both cities, there is great interest in the use of green space for gardening. The cities are urged to gear their planning approaches to user interests, which Haaland and van den Bosch (2015) define as needs-based approach of green space planning.

The reorganization of gardens leads to the marginalization of certain user groups, while on the other hand new groups are to be addressed. Future research needs to pay more attention to these dual developments in order to provide urban policy with a good planning basis for a balanced garden offer considering different governance models [e.g., mosaic governance (Buijs et al., 2019)] and potentially addressing a wide range of user groups in order to increase the social relevance of urban gardens. This paper highlights the need for a more sophisticated planning approach addressing different garden types in relation to their location in the built-up city, associated functions, governance models and user groups in addressing challenges of urban sustainability and sustainable urban food systems.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

IJ, OE, and JS contributed to conception of the study. IJ designed the study, organized and analyzed the database, and wrote the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsufs.2022.902684/full#supplementary-material

References

Appel, I., Grebe, C., and Spitthöver, M. (2011). *Aktuelle Garteninitiativen: Kleingärten und neue Gärten in deutschen Großstädten.* Kassel: Kassel University Press GmbH.

Artmann, M., Kohler, M., Meinel, G., Gan, J., and Ioja, I.-C. (2019). How smart growth and green infrastructure can mutually support each other — A conceptual framework for compact and green cities. *Ecol. Indic.* 96, 10–22. doi: 10.1016/j.ecolind.2017.07.001

Artmann, M., and Sartison, K. (2018). The role of urban agriculture as a nature-based solution: a review for developing a systemic assessment framework. *Sustainability* 10, 1937. doi: 10.3390/su10061937

Bell, S., Fox-Kämper, R., Keshavarz, N., Benson, M., Caputo, S., Noori, S., et al. (2016). *Urban Allotment Gardens in Europe.* New York: Routledge.

Bibri, S. E., Krogstie, J., and Kärrholm, M. (2020). Compact city planning and development: emerging practices and strategies for achieving the goals of sustainability. *Dev. Built Environ.* 4, 100021. doi: 10.1016/j.dibe.2020.100021

Biedermann, A., and Ripperger, A.-L. (2017). *Urban Gardening und Stadtentwicklung: neue Orte für konflikthafte Aushandlungsprozesse um städtischen Raum.* Wiesbaden: Springer-Verlag.

Bramley, G., Dempsey, N., Power, S., Brown, C., and Watkins, D. (2009). Social sustainability and urban form: evidence from five British cities. *Environ. Plan. A Econ. Space* 41, 2125–2142. doi: 10.1068/a4184

Bramley, G., and Power, S. (2009). Urban form and social sustainability: the role of density and housing type. *Environ. Plan. B Plan. Des.* 36, 30–48. doi: 10.1068/b33129

Breuste, J. (2020). "The green city: general concept," in *Making Green Cities: Concepts, Challenges and Practice*, eds J. Breuste, M. Artmann, C. Ioja, and S. Qureshi (Cham: Springer Nature), 1–15.

Breuste, J., Haase, D., and Elmqvist, T. (2013). "Urban landscapes and ecosystem services," in *Ecosystem Services in Agricultural and Urban Landscapes*, eds S. D. Wratten, H. S. Sandhu, R. Cullen, and R. Constanza (Oxford: Wiley & Blackwell), 83–104.

Buijs, A., Hansen, R., Van Der Jagt, S., Ambrose-Oji, B., Elands, B., Lorance Rall, E., et al. (2019). Mosaic governance for urban green infrastructure: upscaling active citizenship from a local government perspective. *Urban Forestry Urban Greening* 40, 53–62. doi: 10.1016/j.ufug.2018.06.011

Buijs, A. E., Mattijssen, T. J. M., Van Der Jagt, A. P. N., Ambrose-Oji, B., Andersson, E., Elands, B. H. M., et al. (2016). Active citizenship for urban green infrastructure: fostering the diversity and dynamics of citizen contributions through mosaic governance. *Curr. Opin. Environ. Sustain.* 22, 1–6. doi: 10.1016/j.cosust.2017.01.002

Caputo, S. (2018). "Urban futures and food production," in *Re-imagining Sustainable Food Planning, Building Resourcefulness: Food Movements, Insurgent Planning and Heterodox Economics. Proceedings of the 8th Annual Conference AESOP Sustainable Food Planning group, November 14-15, 2017*, ed C. Tornaghi (Coventry University).

De Jong, M., Joss, S., Schraven, D., Zhan, C., and Weijnen, M. (2015). Sustainable–smart–resilient–low carbon–eco–knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *J. Clean. Prod.* 109, 25–38. doi: 10.1016/j.jclepro.2015.02.004

Derkzen, M. L., Van Teeffelen, A. J. A., Nagendra, H., and Verburg, P. H. (2017). Shifting roles of urban green space in the context of urban development and global change. *Curr. Opin. Environ. Sustain.* 29, 32–39. doi: 10.1016/j.cosust.2017.10.001

Ernwein, M. (2014). Framing urban gardening and agriculture: on space, scale and the public. *Geoforum* 56, 77–86. doi: 10.1016/j.geoforum.2014.06.016

Ernwein, M., and Salomon-Cavin, J. (2014). Au-delà de l'agrarisation de la ville: l'agriculture peut-elle être un outil d'aménagement urbain? *Discussion à partir de l'exemple genevois. Géocarrefour* 89, 31–40. doi: 10.3917/geoc.891.0031

EU (2002). *Sixth Community Environment Action Programme. Decision No 1600/2002/EC of the European Parlament and of the Council.* Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002D1600&from=EN (accessed January 10, 2022).

Frantzeskaki, N. (2019). Seven lessons for planning nature-based solutions in cities. *Environ. Sci. Policy* 93, 101–111. doi: 10.1016/j.envsci.2018.12.033

Frantzeskaki, N., Broto, V. C., Coenen, L., and Loorbach, D. (2017). *Urban Sustainability Transitions.* Abingdon: Taylor & Francis.

Frauenfelder, A., Delay, C., and Scalambrin, L. (2014). Potagers urbains vs jardins familiaux? Réforme urbaine et controverses autour du beau jardin et son usage légitime. *Espaces et sociétés* 158, 67–81. doi: 10.3917/esp.158.0067

Ghose, R. (2005). The complexities of citizen participation through collaborative governance. *Space Polity* 9, 61–75. doi: 10.1080/13562570500078733

Gibas, P., and Boumová, I. (2020). The urbanization of nature in a (post)socialist metropolis: an urban political ecology of allotment gardening. *Int. J. Urban Reg. Res.* 44, 18–37. doi: 10.1111/1468-2427.12800

Goodwin, S. (2011). "Analysing policy as discourse: methodological advances in policy analysis," in *Methodological Choice and Design*, eds L. Markauskaite, P. Freebody, and J. Irwin (Dordrecht: Springer), 167–180. doi: 10.1007/978-90-481-8933-5_15

Haaland, C., and van den Bosch, C. K. (2015). Challenges and strategies for urban green-space planning in cities undergoing densification: a review. *Urban Forestry Urban Greening* 14, 760–771. doi: 10.1016/j.ufug.2015.07.009

Haase, D. (2018). "Grüne stadt," in *Handbuch Stadtkonzepte: Analysen, Diagnosen, Kritiken und Visionen*, eds D. Rink and A. Haase (Opladen, Toronto: Verlag Barbara Budrich), 151–168.

Hajer, M., and Laws, D. (2006). "Ordering through discourse," in *The Oxford Handbook of Public Policy*, eds M. Moran, M. Rein, and R. E. Goodin (Oxford: Oxford University Press), 251–268.

Hautamäki, R. (2019). Contested and constructed greenery in the compact city: a case study of Helsinki City Plan 2016. *J. Landscape Architecture* 14, 20–29. doi: 10.1080/18626033.2019.1623543

Hebinck, A., Selomane, O., Veen, E., De Vrieze, A., Hasnain, S., Sellberg, M., et al. (2021). Exploring the transformative potential of urban food. *NPJ Urban Sustain.* 1, 38. doi: 10.1038/s42949-021-00041-x

Jahrl, I., Moschitz, H., and Salomon Cavin, J. (2021). The role of food gardening in addressing urban sustainability – A new framework for analysing policy approaches. *Land Use Policy* 108, 105564. doi: 10.1016/j.landusepol.2021.105564

Jahrl, I., and Schmid, O. (2017). "The governance of urban agriculture and multifunctional land use in the city of Zurich," in *Toward Sustainable Relations Between Agriculture and the City*, eds C. Soulard, C. Perrin, and E. Valette (Cham: Springer), 219–235. doi: 10.1007/978-3-319-71037-2_13

Jarrige, F., Mumenthaler, C., and Salomon-Cavin, J. (2020). "Une ferme urbaine multifonctionnelle: maîtrise foncière publique pour un projet d'agriculture innovant à Rovéréaz, Lausanne," in *Le foncier agricole dans une société urbaine : innovations et enjeux de justice*, eds C. Perrin and B. Nougarèdes (Avignon: Cardère).

Jim, C. Y. (2004). Green-space preservation and allocation for sustainable greening of compact cities. *Cities* 21, 311–320. doi: 10.1016/j.cities.2004.04.004

Jim, C. Y. (2013). Sustainable urban greening strategies for compact cities in developing and developed economies. *Urban Ecosyst.* 16, 741–761. doi: 10.1007/s11252-012-0268-x

Keller, R. (2011). The sociology of knowledge approach to discourse (SKAD). *Hum. Stud.* 34, 43–65. doi: 10.1007/s10746-011-9175-z

Keshavarz, N., and Bell, S. (2016). "A history of urban gardens in Europe," in *Urban Allotment Gardens in Europe*, eds S. Bell, R. Fox-Kämper, N. Keshavarz, M. Benson, S. Caputo, S. Noori, and A. Voigt (London; New York: Routledge), 30–54.

Knapp, L., Veen, E., Renting, H., Wiskerke, J. S. C., and Groot, J. C. J. (2016). Vulnerability analysis of urban agriculture projects: a case study of community and entrepreneurial gardens in the Netherlands and Switzerland. *Urban Agricult. Regional Food Syst.* 1, 1–3. doi: 10.2134/urbanag2015.01.1410

Koopmans, M. E., Keech, D., Sovova, L., and Reed, M. (2017). Urban agriculture and place-making: narratives about place and space in Ghent, Brno and Bristol. *Moravian Geogr. Rep.* 25, 154–165. doi: 10.1515/mgr-2017-0014

Madureira, H., and Monteiro, A. (2021). Going green and going dense: a systematic review of compatibilities and conflicts in urban research. *Sustainability* 13, 10643. doi: 10.3390/su131910643

Mah, C. L., Hamill, C., Rondeau, K., and Mcintyre, L. (2014). A frame-critical policy analysis of Canada's response to the World Food Summit 1998–2008. *Arch. Public Health* 72, 41. doi: 10.1186/2049-3258-72-41

Mann, S. (2009). Institutional causes of urban and rural sprawl in Switzerland. *Land Use Policy* 26, 919–924. doi: 10.1016/j.landusepol.2008.11.004

Mayring, P. (2002). *Einführung in die qualitative Sozialforschung*. Weinheim und Basel: Beltz Verlag.

Mehriar, M., Masoumi, H., and Nosal-Hoy, K. (2020). Correlations of urban sprawl with transport patterns and socioeconomics of university students in cracow, Poland. *Sci. J. Silesian Univ. Technol. Series Transport* 108, 159–181. doi: 10.20858/sjsutst.2020.108.14

Nikolaidou, S. (2014). *Emerging forms of Urban Gardening in Geneva*. COST ACTION Urban Allotment Gardens in European Cities; Short Term Scientific Mission Report. Basel: University of Applied Sciences Northwestern Switzerland.

Nikolaïdou, S., Klöti, T., Tappert, S., and Drilling, M. (2016). Urban gardening and green space governance: towards new collaborative planning practices. *Urban Planning* 1, 5–19. doi: 10.17645/up.v1i1.520

OECD (2012). *Compact City Policies: A Comparative Assessment*. Paris: OECD Publishing.

Park, M. S., Shin, S., and Lee, H. (2021). Media frames on urban greening in the Democratic People's Republic of Korea. *Forest Policy Econ.* 124, 102394. doi: 10.1016/j.forpol.2020.102394

Pincetl, S., and Gearin, E. (2005). The reinvention of public green space. *Urban Geogr.* 26, 365–384. doi: 10.2747/0272-3638.26.5.365

Rein, M., and Schön, D. (1994). *Frame Reflection Toward the Resolution of Intractable Policy Controversies*. New York: Basic Books.

Reynard, D., Collins, D., and Shirgaokar, M. (2021). Growth over resilience: how Canadian municipalities frame the challenge of reducing carbon emissions. *Local Environ.* 26, 448–460. doi: 10.1080/13549839.2021.1892046

Rink, D. (2018). "Nachhaltige stadt," in *Handbuch Stadtkonzepte: Analysen, Diagnosen, Kritiken und Visionen*, eds D. Rink and A. Haase (Opladen, Toronto: Verlag Barbara Budrich), 237–258.

Rosol, M. (2010). Public participation in post-fordist urban green space governance: the case of community gardens in Berlin. *Int. J. Urban Reg. Res.* 34, 548–563. doi: 10.1111/j.1468-2427.2010.00968.x

Rudolf, S. C., Kienast, F., and Hersperger, A. M. (2018). Planning for compact urban forms: local growth-management approaches and their evolution over time. *J. Environ. Plan. Manage.* 61, 474–492. doi: 10.1080/09640568.2017.1318749

Ruegg, J., Salomon Cavin, J., and Quincerot, R. (2014). L'émiettement urbain? Ville compacte et ville diffuse sont dans le même bateau. *Cahiers de géographie du Québec* 58, 353–366. doi: 10.7202/1033009ar

Sánchez Vergara, J. I., Papaoikonomou, E., and Ginieis, M. (2021). Exploring the strategic communication of the sharing city project through frame analysis: the case of Barcelona sharing city. *Cities* 110, 103082. doi: 10.1016/j.cities.2020.103082

Schweizerischer Bundesrat (2001). *Agglomerationspolitik des Bundes*. Bern. Available online at: https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-10624.html (accessed March 3, 2022).

Schweizerischer Bundesrat (2012). *Raumkonzept Schweiz*. Available online at: https://www.are.admin.ch/are/de/home/raumentwicklung-und-raumplanung/strategie-und-planung/raumkonzept-schweiz.html (accessed February 8, 2022).

Seawright, J., and Gerring, J. (2008). Case selection techniques in case study research a menu of qualitative and quantitative options. *Polit. Res. Q.* 61, 294–308. doi: 10.1177/1065912907313077

Snow, D. A., and Benford, R. D. (1988). Ideology, frame resonance, and participant mobilization. *Int. Soc. Mov. Res.* 1, 197–217.

Swiss Confederation (2021). *Federal Constitution of the Swiss Confederation*. Available online at: https://www.fedlex.admin.ch/eli/cc/1999/404/en (accessed November 8, 2021).

Tappert, S., Klöti, T., and Drilling, M. (2018). Contested urban green spaces in the compact city: the (re-)negotiation of urban gardening in Swiss cities. *Landsc. Urban Plan.* 170, 69–78. doi: 10.1016/j.landurbplan.2017.08.016

Valette, E., Perrin, C., and Soulard, C. (2012). "Sustainable cities vs sustainable agricultures. A scientific project on agro-urban systems, North and South of the Mediterranean," in *International Conference on Multifunctional Agriculture and Urban-Rural Relations "Agriculture in an urbanizing society", Wageningen University, The Netherlands*, 1–4.

Van Hulst, M., and Yanow, D. (2014). From policy "frames" to "framing": theorizing a more dynamic, political approach. *Am. Rev. Public Adm.* 46, 92–112. doi: 10.1177/0275074014533142

Veen, E. J., Bock, B. B., Van Den Berg, W., Visser, A. J., and Wiskerke, J. S. C. (2016). Community gardening and social cohesion: different designs, different motivations. *Local Environ.* 21, 1271–1287. doi: 10.1080/13549839.2015.1101433

Westerink, J., Haase, D., Bauer, A., Ravetz, J., Jarrige, F., and Aalbers, C. B. E. M. (2013). Dealing with sustainability trade-offs of the compact city in peri-urban planning across european city regions. *Eur. Plan. Stud.* 21, 473–497. doi: 10.1080/09654313.2012.722927

Yin, R. K. (2009). *Case Study Research: Design and Methods*. 4th Edn. Thousand Oaks, CA: SAGE Publications.

Zwierzchowska, I., Haase, D., and Dushkova, D. (2021). Discovering the environmental potential of multi-family residential areas for nature-based solutions. A Central European cities perspective. *Landscape Urban Plan.* 206, 103975. doi: 10.1016/j.landurbplan.2020.103975