

# How to grow multifunctionality in food system planning

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How can spatial planning turn self-organisation into a policymaking asset? This study explores three illustrative cases of urban gardening in which strategic spatial planning, together with enabling governance instruments and statutory planning, creates conditions for self-organisation in local food production. The cases are related to brownfield regeneration, a city centre strategy and an established urban neighbourhood. The findings highlight the multifunctionality of urban gardening, its dependence on self-organisation and its value in creating local food systems. Finally, we discuss the challenges and opportunities of utilising these findings in spatial planning.

## Introduction

The current trend of urban agriculture has made food system planning one of the most dynamic new directions of planning in many European and North American cities. Analogies can be found from history. For instance, food system planning in North America was a central theme for early professional planners a century ago, but in the middle of the 20th century, the theme largely disappeared, partly thanks to planners and to the food industry (Vitiello & Brinkley 2014). The *Policy Guide on Community and Regional Food Planning*, published and used by the American Planning Association in 2007, has helped establish the position of food in urban planning in the US (Bohn & Viljoen 2014). Planning cases elsewhere demonstrate a similar trend. In these cases, planners may contribute to the co-creation of a more sustainable city by focusing on more resilient local food systems in contrast to the globalised agri-business model (Viljoen & Wiskerke 2012).

Despite this development, the role of local food production usually continues to remain ambiguous and debated in urban planning.

The purpose of this study is to examine the ways by which strategic spatial planning can give rise to urban gardening and thereby encourage local food system planning in urban regions. The popularity of urban gardening may have positive effects on transitions towards more local food systems because urban transitions always take time and require keeping momentum at several fronts at the same time (Alberti 2016; Albrechts & Balducci 2013). We see that the diverging forms of urban gardening may have a much bigger role in promoting the transitions than could be judged by the minor share of urban gardening in measurable food production (Martin et al. 2016). This is because urban gardening is a nexus issue that combines several strands of urban life and sustainability. Increasing numbers of urban actors participate in urban gardening, including residents, civic communities, and public and private organisations. Simultaneously, new forms of gardening proliferate in cities, along with the traditional ways of urban gardening (Lovell 2010; Viljoen & Wiskerke 2012; Bohn & Viljoen 2014; Drilling et al. 2016; Keshavarz & Bell 2016; Martin et al. 2016). As urban gardening combines a multitude of urban activities and networks, it may provide the potentiality to solve various social, ecological and economic problems in cities. Hence, multifunctionality is a central asset of urban gardening and does not only focus on the sites where plants are grown.

A multifunctional landscape provides a variety of functions—ecological, social, economic and others—and enables limited space to be used more efficiently (Ahern 2011). Green areas in cities can be modified to increase their multifunctionality and compensate for their declining quantity (Hansen et al. 2017). Multifunctionality also refers to multiple ecosystem services provided by green areas, although ‘function’, in this case, requires a different conceptualisation from that in the landscape perspective (Hansen & Pauleit 2014). These statements make multifunctionality a normative concept tied with land units. We consider this strategy valuable for strengthening local food production in urban areas (Lovell 2010). However, in this study, we primarily use multifunctionality as an analytic concept to explore how urban gardening reveals its potentiality during urban development. Such a multifunctionality is an emergent property. It grows from ‘a set of conditions difficult for planners to define or orchestrate’ (Selman 2009, 48). Understanding both sides of multifunctionality helps planners create conditions for gardening that promote not only local food production but also the quality of social and ecological environments, vitality of urban life, economic benefits and local resilience.

We take a single Finnish city, Tampere, as the object of a case study. This third largest city (228 000 inhabitants) is one of the growth centres in the country.

The city has received various initiations of urban gardening and agriculture during the last century, and now has an opportunity to choose whether this diversity in urban food production should be considered when developing its city-regional food system. New forms of urban gardening and the principles of strategic spatial planning (City of Tampere 2015a; 2015b; 2015c) have been established in the city at the same time, in the beginning of the 2010s, but the city lacks the agenda of local food production (Asikainen et al. 2017, 21–23). This combination makes the city a relevant object for this research. We focus on two new and one old case of urban gardening in the city.

We analyse how strategic spatial planning creates a space and momentum for the diverging forms of urban gardening and related collaborative networks in the city. Particularly, we focus on the multifunctionality of urban gardening, not as a predefined goal but an evolving quality arising from self-organisation. We examine how rules of gardening and other governance instruments enable or disrupt the conditions for self-organisation in these planning processes. We include statutory planning as one of these contextual instruments because of its complementary role to strategic planning (Mäntysalo et al. 2015). Hence, we have the following research questions:

- (1) How can strategic spatial planning make urban gardening emerge and uncover its multifunctional potentiality?
- (2) What is the role of self-organisation in this process, affected by enabling or disrupting governance instruments?

We next develop the theoretical basis of our research. After analysing the cases, we conclude the study by discussing multifunctionality in urban food growing and how the conditions for its development in spatial planning can be created.

### Self-organisation in strategic spatial planning

The relationship of planning and self-organisation has been explored in several studies (e.g. Boonstra & Boelens 2011; Leino 2012; Rauws 2016; Rauws & De Roo 2016; Zhang & De Roo 2016). In cities, self-organisation means the spontaneous ‘rise of new structures, patterns and organisations within an urban system, as a result of interaction between actors and without external coordination’ (Rauws & De Roo 2016, 1057). The interaction that triggers self-organisation may arise, for instance, from mutual adjustments between actors in changing conditions. Self-organisation is non-intentional, not centrally organised and results in a qualitative change in an urban system. For these reasons, self-organisation is not synonymous to self-governance or self-regulation, which stands for purposeful and intentional action (Rauws 2016; Zhang & De Roo 2016, 255, 271). Self-organisation can transform the structure and func-

tions of an urban system, but the emergence of change on a system level is very difficult, if not impossible, to predict (Rauws 2016, 342–343).

Strong claims have been made that planning should use its regulatory power to better secure the sites for urban gardening in cities (Drilling et al. 2016). These claims are justified because urban densification and the pressure of investors widely threaten the gardening sites across European cities and elsewhere. In Finland, where the planning system is regulatory by nature (Mäntysalo et al. 2015), some of the most active cities have used specific plan symbols and made area reservations for old and new allotment areas in land-use plans. However, the problem is that statutory land-use planning can only partly safeguard the positive effects of urban gardening (Viljoen & Wiskerke 2012; Drilling et al. 2016). Statutory planning is designed to maintain stability and certainty, and it aims to predefine outcomes and the optimal urban design (Albrechts & Balducci 2013; Asikainen & Jokinen 2009). Planning for a resilient city should not emphasise stability and certainty, but diversity and variety, and it should increase the adaptation capacity and maintain self-organisation (Alberti 2016, 218). Our interest is to study whether strategic spatial planning can respond to these demands in creating opportunities for local food system planning. We focus on two crucial sides of strategic planning: its capacity to make challenging images and visions for the future of the city and its ability to maintain momentum towards urban transformation (Healey 2004; Albrechts & Balducci 2013). Strategic planning usually operates on the scale of city-region, city or neighbourhood; we focus on the neighbourhood scale.

Strategic spatial planning is an action-oriented form of planning, which is based on visions and seeks to work with uncertainty and ‘to enable the actors to open up to the spectrum of possibilities’ (Albrechts & Balducci 2013, 21). Its focus is on the governing processes of urban transformation and building new ideas for these processes. Hence, it has assets in solving contemporary urban problems and dealing with emerging opportunities and uncertainties (Rauws & De Roo 2016). Strategic planning usually operates within urban networks and is embedded in governance systems (Mäntysalo et al. 2015). It mobilises active stakeholder groups and leaves considerable autonomy for them.

Albrechts and Balducci (2013, 21) state that the crucial novelty of strategic spatial planning is ‘a shift from an ontology of being, which privileges outcome and end state, towards an ontology of becoming, in which actions, movement, relationships, process, and emergence are emphasised’. We take the perspective of ‘becoming’ in our analysis to examine how strategic spatial planning enables urban gardening to emerge and uncover its multifunctionality. We understand the increase of multifunctionality as a self-organising process, in

which urban gardening obtains additional properties and capacities through networks and interdependent actors.

Conditions are important for self-organisation. Following Boonstra and Boelens (2011), Zhang and De Roo (2016, 254) emphasise that 'planning should stimulate and cultivate conditions under which local initiatives can emerge by allowing self-organisation processes to occur'. We distinguish disruptive and enabling conditions from each other. According to Rauws and De Roo (2016, 1057–1058), disruptive conditions include, for instance, situations in which planners suppress actors' efforts to participate in urban projects by predefining the scope and timeframe too tightly. Enabling conditions support actors, for instance, by considering them as co-creators of the city or by supporting small-scale projects in which they can participate on the basis of their own motivations and interests. A trigger and, as emphasised by Nederhand and others (2016), the presence of trustworthy relationships among actors, are often required to generate interaction so that self-organisation is supported. If an interplay of ideas, information, experiences and the focus needed to exchange them exists, actors can easily and mutually adjust their existing practices. These factors promote self-organisation, if the actors have sufficient autonomy and flexibility to adjust their behaviours.

In our methodology, we study enabling governance instruments that potentially trigger self-organisation in spaces created by spatial planning. We focus on the positive outcomes of these emerging processes (in principle, there is no guarantee that self-organisation leads to positive outcomes, see Zhang & De Roo 2016). To examine self-organisation and multifunctionality, we follow the actors, interactions and socio-ecological networks in the studied cases. As intentional interventions and unintended change are not mutually exclusive, surprises may take place. In principle, various phases of a self-organisation process can be found in each case, and how spatial planning can influence these phases by constraining or enabling them is unclear in advance (Zhang & De Roo 2016, 264). We primarily use a system-based approach by focusing on neighbourhoods. They are open, complex and adaptive subsystems of the city. Our case selection enables us to study how strategic and statutory planning create conditions for self-organisation in relation to each other in various cases. This choice reflects our understanding that strategic and statutory planning should be seen as complementary in food system planning.

### Tampere as a case city

Tampere, located in southwest Finland, is a growing city which follows urban densification in its planning and policy making. The city utilises the entire

spectrum of planning tools included in the municipal monopoly in the Finnish planning system (Mäntysalo et al. 2015). Recently, the city has placed more emphasis on strategic planning, both in its master and detailed planning and also in city renewal projects.

Urban gardening has been exercised by residents throughout the history of Tampere. Two historical lines of gardening are visible in the city. The first Germany-originated allotment garden in Finland was established in Tampere in 1916 (Keshavarz & Bell, 2016). Today, four allotment gardens with cottages and 14 city-owned gardening fields around the city are actively utilised by the residents. In addition to these top-down cases, new forms of collective urban gardening, such as community gardening, started to emerge around 2010, following the development in many European and North American cities one or two decades earlier. The gardeners among these bottom-up oriented projects are usually middle-class people reclaiming urban space, such as brownfields, for gardening. Aside from these two lines, some forms of commercial gardening exist in the city. The latest phenomenon is restaurants starting their own gardening in the city centre.

Our case selection enabled a cross-sectional analysis of a single city. We used the following three criteria in selection: variance in location, period of food growing initiatives, and ideas of spatial planning which also reflect

**TABLE 1** Three cases of urban food production in Tampere.

	<b>Hiedanranta</b>	<b>City Centre</b>	<b>Pispala</b>
<b>Urban development</b>	Strategic planning in brownfield regeneration	Strategic plan for the city centre	Statutory plan for an old residential area, later covered by the city-wide strategic masterplan
<b>Food production</b>	Bottom-up gardening to attract sustainability ideas and, subsequently, more food production projects	Emergent local food production in business	Traditional public gardening in the face of urban changes
<b>Conditions and actors for self-organisation</b>	Civic groups operating in the area in a partly facilitated interaction	Restaurants seeking for opportunities under city renewal	Individual gardeners and civic groups in random interaction
<b>References</b>	Willman 2016; Lehtovuori et al. 2016	Asikainen & Viskari 2016; Asikainen et al. 2017	Willman 2013; Jokinen et al. 2011; 2016; Jokinen 2016

the temporal shift from government to governance. The cases are as follows (Table 1): (1) a bottom-up-oriented gardening initiative as a part of an urban regeneration project (Hiedanranta), (2) restaurants as gardeners (city centre) and (3) a traditional gardening field in a century-old wooden-house-dominated neighbourhood (Pispala).

We used several research methods to determine the characteristics of each case: participatory observation focusing on experiments, visioning sessions and other meetings, complemented by interviews with gardeners, the project leader and the coordinator of the urban regeneration project (Hiedanranta); interviews with restaurants, multi-stakeholder workshops and participatory working for shared knowledge generation and co-creation of conditions for gardening (city centre); and interviews with gardeners, observation of gardening practices, survey of gardeners and neighbourhood residents related to detailed planning, and urban ecological surveys focusing on the vascular plant species of the area and the surrounding urban landscape (Pispala). In all cases, we examined planning documents and their background information produced by the city.

### Neighbourhood as a platform for open innovation

Hiedanranta in Tampere is a former factory area at the waterfront that was bought by the city to build a new neighbourhood for 20,000–25,000 inhabitants. Before statutory planning, the city adopted strategic principles to develop the area. It asked the cooperation of local universities in creating a development vision for the area. The vision was based on an urban system that follows the principles of a circular economy, including various forms of food production within the area and the surroundings (Lehtovuori et al. 2016). Moreover, the city arranged an open international idea competition for the area in 2016. To make the strategy more inclusive, the city created the area as an innovation platform (Anttiroiko 2016) by opening it up for temporary uses devised by citizens, organisations and small companies.

One of the first civic initiatives was the floating garden, an experiment in urban food production. It was established in spring 2016, including 40 gardening boxes on pontoon docks at the waterfront (Willman 2016). The floating garden was a co-creational process in which Hiedanranta development officers consulted with gardening activists in developing the garden and gathering citizens for the project. The officers also provided material resources for gardening, such as pontoon docks, gardening boxes, soil and a shed for tools. Hence, the floating garden proceeded as an informal open-for-all gardening action by nearby residents (approx. 10 people), but in close cooperation with the city. The floating

garden developed as an attention-drawing public space in the area. It worked as a creative experimentation of urban food production and simultaneously as an attractor and metaphor for the comprehensive development vision of the area.

Following the idea of innovation platform, development officers created conditions for self-organisation by bringing actor groups together and letting them interact and develop their actions freely. The officers invited the gardeners to participate in several events, vision groups and planning workshops arranged in the area. The gardening group started to network through thematic meetings with two other gardening initiatives starting in Hiedanranta in 2018: an open-access edible park and a greenhouse gardening project aiming to connect refugees and local residents. Hence, real signs of a larger gardening cluster developing in the area exist. Moreover, the urban gardeners have access to other culture and circular economy-related actors in the area, such as skateboarders, artisans, artists, a small vertical gardening enterprise and a dry-toilet association experimenting with human-based nutrients for use as fertiliser in the area. Our evidence of contacts and encounters suggests that spontaneous interaction and networking between actor groups are taking place in the area.

The inclusion of different actors and encouraging them to engage in action and multi-actor networks in the area has been a successful project in Hiedanranta. It is still growing and continuing to reinforce the creative spirit in the area. This kind of strategic planning has been possible because the development officers were free from the strict regulatory rules that usually dominate land use planning. How the conditions of the actor groups and networks will change later on during statutory planning and its implementation remains to be seen.

### Emergence of food-growing restaurants in the city centre

The city centre of Tampere is not planned for gardening. Parks are small, and courtyards are mostly reserved for parking. In recent years, interest towards greening the city centre has been expressed both in statutory planning documents (e.g. City of Tampere 2014) and in strategic land use planning documents (City of Tampere 2015b).

The City Centre Strategy (City of Tampere 2015a) aims to achieve a dense, green and low-carbon city centre, and it emphasises a flexible, enabling urban structure. The main focus of the Plan for Green Network Development (City of Tampere 2014) is in the spatial network of public green areas and the services it produces. Nevertheless, it sets providing spaces for urban gardening in parks and courtyards in the city centre (p. 20) as a target and presents principles for planning more green spaces in the courtyards (p. 79).



The project 'Urban agriculture as a part of resource efficient business' explored the possibilities for business-oriented urban gardening in the spatial circumstances defined by past statutory planning, as well as the possibilities opened by new strategic thinking. Four restaurants in downtown Tampere experimented with producing foodstuffs in the vicinity of the restaurants and using them in the food served in the restaurant. The experiments were designed in collaboration with chefs, real-estate owners and researchers from the Tampere University of Applied Sciences (Asikainen & Viskari 2016; Asikainen et al. 2017).

The participating restaurants form a loose network in which they learn from one another and from the researchers and agriculture specialists. The restaurants are primarily interested in fresh green produce. They spend time acquiring the best ingredients, and each has developed an own unique network of trusted farmers, gardeners and other suppliers in the surrounding rural area. Growing their own produce is a logical continuum of these practices, but the lack of agricultural knowhow has hindered these restaurants from getting started. The project has provided technical and professional assistance (Asikainen & Viskari 2016).

Gardening took place mostly in courtyards and roofs, partly also indoors. The terms and conditions defining the possibilities for gardening were largely set by health and food security legislation. Additionally, the spatial setting, the interests of the housing company and the business model (e.g. flexibility in the menu) of each restaurant affected the design of the urban gardens (Asikainen et al. 2017).

The possibilities for urban gardening emerged in a self-organising manner as a combination of the creativity and leadership of chefs, the interest of housing companies in making courtyards more comfortable, innovations in housing and cultivation technology, and the gardening expertise of the Tampere University of Applied Sciences.

The self-organisation did not happen in a vacuum, though. The strategic policy settings of the City of Tampere and funders, in this case, the European Regional Development Fund, both emphasising carbon neutrality, provided the momentum for the project. Another form of soft governance was the interpretations of legislation made by health authorities, occupational safety authorities and construction authorities concerning urban agriculture in specific spaces (Asikainen et al. 2017).

First, the project shows that strategic spatial planning can widen the space for urban gardening in the city centre. Business-oriented gardening may arise spontaneously and fulfil many targets of the plan, whether the targets are exactly specified for urban gardening or not. Supporting actions are required by experts. Second, self-organisational networks are crucial vehicles for change. Managing the risks of urban gardening demands the cooperation of restaurants

and gardeners, and expanding the gardening areas is possible only if win–win situations for real-estate owners and entrepreneurs are found (Asikainen et al. 2017). Here, statutory planning and block renovation play an important part in turning the strategy into master and detailed plans. This is particularly demanding in infill planning projects in the Tampere City centre where individual housing block projects emerge from complex multi-actor situations (Mäntysalo et al. 2016, 41–64).

### Traditional urban gardening in strategic city-making

The Pispala allotment garden (three hectares) has been actively used for decades. It is composed of nearly 300 open field plots of 50–100 m<sup>2</sup> leased out by the city to its inhabitants (Jokinen 2016). The area was allocated for construction in a detailed plan in 1978, but the buildings were never implemented. The intention of construction was repeated in a masterplan in 1998, sparking a conflict which has continued until now between the gardeners and the city (Willman 2013). The city withdrew from construction in a new masterplan accepted by the City Council in 2017. Strong strategic principles were accepted for the masterplan but without specific goals for urban agriculture or local food production (City of Tampere 2015c). Some of the strategic principles promote these goals in principle, such as the wide-ranging development of green areas in the city and managing them as functional and participatory urban spaces (p. 22). Pispala's new strategic location is in 'the residential zone of the qualitative development of the environment'. In this spatial zone, the uniqueness and identity of neighbourhoods are emphasised, and the residents are wished to participate in developing their own living environment (p. 15).

The historical development of the Pispala allotment garden is crucial for understanding how it faces these new strategic principles. Three kinds of self-organisation can be identified on the basis of the ambiguous goals between construction and gardening and the unintended consequences of previous statutory planning and the regulation of gardening practices (Jokinen et al. 2011).

First, the conflict has mobilised gardeners, several civic associations and residents from surrounding areas to defend the place against construction. Second, the social interaction between individual gardeners has resulted in shared activities and social networks, such as the sharing of seeds, seedlings and crops between gardeners, neighbours and relatives or between allotment and private gardens, and making informal agreements on who the plot holder is in each year or who gardens the same plot together (Willman 2013). The social significance of the allotment has spread into the surrounding neighbourhood through these mutual activities and social networks. Third, the gardening practices maintain a significant part of the surrounding floristic diversity of

spontaneous urban species (that is, wild species that were not intentionally introduced into the site by gardeners), including some historically valuable and rare plant species that exist in the city only in this neighbourhood. A systematic floristic survey revealed this self-organising process. The process merges gardening and the surrounding urban landscape and is dependent on individual choices, uncontrolled social interaction among gardeners and the spontaneous movement of plants (Jokinen et al. 2016). Hence, the gardeners in Pispala are managers of wild urban biodiversity and are not only producers of crop and other usually counted ecosystem services provided by urban gardening.

The last two types of self-organisation demonstrate transformation that, regardless of statutory planning and the rules of gardening, has produced results that have significant value for multifunctionality and neighbourhood-level socio-ecological sustainability. Such values of traditional urban gardening are not yet recognised in planning. The coordination of gardening by the city has been permissive enough to allow self-organisation. The city has allowed gardening to continue despite the conflict, and it has also funded some of the civic associations participating in the conflict, even awarding one of them for its social work in supporting gardening and other citizen activities in the area. Hence, the city has aimed to reach governability by operating between propulsion and endorsement.

### Conditions for multifunctionality can be created

In the three studied cases, the capacity of strategic spatial planning (Albrecht & Balducci 2013) varied case by case in getting urban gardening to emerge and uncover its multifunctional potentiality. The Hiedanranta project was the most efficient. Its strategy was based on an innovation platform (Anttiroiko 2016) that not only attracted many forms of urban gardening but also created interaction among actor groups and put gardening onto a growing trajectory. In the second case, the emerging food-growing restaurants supported the city centre strategy that was in the making and promoted a low-carbon green city. This simultaneity can encourage further expansion of urban gardening in the city centre. In line with the strategic spatial plan, suitable spaces for gardening are already in development in detailed planning and block renovation projects. In the Pispala case, a scale mismatch existed because the strategic masterplan was city-wide, but the masterplan and its zoning principles allowed the development of the allotment garden and gave indirect support to its significance in the neighbourhood.

Hence, strategic planning enabled urban gardening to develop in the studied cases, but the intensity of active support differed between the cases. Active

support is a central issue both in food system planning (Bohn & Viljoen 2014; Martin et al. 2016), in strategic planning (Albrecht & Balducci 2013) and in creating conditions for self-organisation (Nederhand et al. 2016; Rauws & De Roo 2016). The relationships between enabling governance instruments, self-organisation and multifunctionality give more light to the differences between cases.

In Hiedanranta, facilitation and coordination were needed to start gardening and other projects and, later, to get them to interact. Enabling governance instruments allowed the gardeners and other actor groups to increase their spontaneous interaction and networking. This helped them become aware and experienced of one another's actions and to receive inspiration for adjusting their own actions accordingly (Zhang and De Roo 2016). We conclude that the multifunctional features of urban gardening started to increase during this self-organising process.

The collaborative restaurant projects required strict coordination, but the principle of co-creation supported enabling conditions for self-organisation (Nederhand et al. 2016). We found that the diverse networks of restaurants provided potential for self-organisation within and between actor groups and thus helped the restaurants develop new practices. Networks may be an asset in further development when business-oriented models increase the diversity of urban food growing in the city centre. The increasing diversity creates an image of the food-growing city centre that can be widely shared. This vitalising effect is in line with the goals of the city centre strategy.

In Pispala, the gardeners' high number, diversity and interaction have gradually led to a self-organising urban transformation in the neighbourhood scale regardless of statutory planning and the rules of gardening. As a result, the allotment garden has merged with the neighbourhood's life and history; the gardeners have become managers of wild urban biodiversity and maintained plant species with their gardening practices that are locally specific and rare in the city scale. Hence, the upper-level effect of self-organisation (e.g. Rauws 2016) has produced multifunctionality that makes urban gardening important to the neighbourhood and its social and ecological sustainability.

## Conclusions

The features of self-organisation increase the multifunctionality of urban gardening. Although opposite cases can be obviously found, this is a significant finding, as multifunctionality seems to be the most valuable quality of urban gardening, and it makes urban gardening highly relevant for inclusion in local food system planning (Martin et al. 2016). In our research, multifunctionality is a dynamic property of urban gardening that can be fostered by planning.

This resonates with the needs to increase resilience in cities (Alberti 2016) and put focus on 'becoming' as the central idea of strategic planning (Albrechts & Balducci 2013).

In our cases, multifunctionality could be seen not only as a site-centric potentiality, such as food production, biodiversity, nutrient cycling and visual quality, but also as a network potentiality in the form of social networks, community activities, ecological continuities, collaboration across administrative sectors and small entrepreneurship, to name a few.

Multifunctionality as an analytic perspective helped us identify the features of self-organising processes, although self-organisation and self-governance were not always easy to separate from each other. For instance, coordination by self-governance can prevent self-organisation, but at some stage, it can lead to the self-organising process when the circumstances change. New options for planning can arise in these situations, but the statutory planning system does not favour the identification of these opportunities. The three studied neighbourhoods were suitable for examining multifunctionality, as they were at different stages of their life span and at different locations within the urban system. Using the perspective of multifunctionality, we could identify the evolutive stage of each gardening project and, further, the potential upper-level effects of self-organisation. The Pispala case was clearest in this respect; the two other cases were more in the making.

To increase the multifunctionality of urban gardening, planners should create favourable conditions for self-organisation. Our findings show that some general principles can be followed. However, we conclude that the most efficient way to grow multifunctionality can be found case by case. Although self-organisation makes predicting the change on a system level impossible (Rauws 2016), experimenting, learning and identifying the differences of the enabling conditions between cases are possible. The comparison between Hiedanranta and Pispala demonstrated that an effective self-organising process can take place regardless of whether this development is planned or not. Experimental planning and design would be useful for planners to determine whether spatial planning can influence the various phases of the process by constraining or enabling it (Zhang & De Roo 2016).

In line with Albrechts and Balducci (2013), strategic planning in our cases was most powerful in new urban development: the renovation of the city centre and, particularly, the innovation platform of brownfield regeneration in Hiedanranta. The Pispala case indicated that a neighbourhood can reorganise itself through local food production and produce significant life-supporting patterns in self-organising ways. This happened irrespective of planning and could be found only by using quantitative socio-ecological analysis. Hence, to

develop urban gardening and its multifunctionality, specific attention should be paid to differences between neighbourhoods.

Strategic spatial planning, together with statutory planning and specific policy agenda, is a complementary way to promote the transition towards local food systems in city-regions. Our findings suggest that strategic spatial planning can promote the transition towards a city-regional food system, but how it can govern the change depends on the scale and vision set for the planning process. In an ideal scenario, strategic planning can make urban gardening reach its multifunctionality in various scales, but not without political support for local food production.

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