Smart and Edible: How Edible Cities Create Smart Public Spaces

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Abstract

Edible cities enable the public to harvest produce on public land, supported by public governance arrangements between city administrations and civil society. The main goal of such initiatives is to transform food systems. The project investigated edible cities by comparing cases in Austria, Germany and France. Impacts of edible city initiatives were assessed by expert interviews. The project aimed to generate policy knowledge on the process, outcomes, and good practices of edible city initiatives, which are potentially relevant for the Vienna Smart City strategy and its possible further development towards smart food and public spaces. Edible city initiatives that are jointly driven by the municipality and civil society actors are most promising with regard to citizen engagement, collective empowerment, and the transformation of urban food systems. To this end, all actors involved have to develop a shared vision of edible city, and implement it cautiously, though consistently and in a committed, participatory, and transparent way. This report outlines concrete policy recommendations for successfully transforming Vienna into an edible city.

CONTENTS

DEUTSCHSPRACHIGE ZUSAMMENFASSUNG UND HANDLUNGSEMPFEHLUNGEN[1]

In Essbaren Städten können alle Menschen auf öffentlichen Flächen Lebensmittel ernten. Dies ermöglichen Governance-Arrangements zwischen Stadtverwaltungen und Zivilgesellschaft. Das Hauptziel von Initiativen für eine Essbare Stadt besteht darin, Lebensmittelsysteme zu transformieren. Das vorliegende Projekt hat Essbare Städte in Österreich, Deutschland und Frankreich miteinander verglichen. Die Effekte von Initiativen für eine Essbare Stadt wurden durch Expert:innen-Interviews erhoben. Das Projekt zielte darauf, den Prozess, die Ergebnisse und guten Praktiken von Initiativen für eine Essbare Stadt zu verstehen. Dieses Wissen ist potenziell für die Vienna Smart City-Strategie von Bedeutung sowie für ihre mögliche Weiterentwicklung in Hinblick auf smarte Lebensmittel und einen smarten öffentlichen Raum. Initiativen für eine Essbare Stadt, die gemeinsam von Stadtverwaltungen und zivilgesellschaftlichen Akteuren betrieben werden, haben das größte Potenzial, zivilgesellschaftliches Engagement, kollektive Ermächtigung und die Transformation urbaner Lebensmittelsysteme zu fördern. Dabei ist wichtig, dass alle Akteur:innen eine gemeinsame Vision einer Essbaren Stadt entwickeln und diese mit Umsicht, kontinuierlich und engagiert sowie auf eine partizipative und transparente Weise umsetzen. Dieser Bericht formuliert Empfehlungen um Wien erfolgreich in eine Essbare Stadt zu transformieren.

Basierend auf der im Bericht dargestellten Evidenz, empfehlen wir die Entwicklung einer Essbare Stadt-Strategie in Wien, indem die existierenden Initiativen für eine Essbare Stadt stärker unterstützt werden, sodass sie ihre Perspektive Schritt für Schritt umsetzen können. Wir sehen das größte Potenzial dafür in einer kollaborativen Herangehensweise, wobei Stadtverwaltung und Zivilgesellschaft auf Augenhöhe zusammenarbeiten. Dabei sollte die Stadtverwaltung eine klare und

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engagierte Rolle einnehmen, indem sie einerseits zivilgesellschaftliche Selbstorganisation unterstützt, andererseits aber aktiver wird und bestimmte Aufgaben übernimmt, wenn das Engagement der Bürger:innen im kleineren Rahmen bleibt. Dieser Ansatz entspricht dem Governance-Arrangement „Gemeinde als Infrastruktur-Dienstleisterin". Die Stadtverwaltung hat dabei die wichtige Funktion, eine ganzheitliche und systematische Vision von Wien als Essbarer Stadt zu entwickeln, indem sie Ideen aus der Zivilgesellschaft und deren Erfahrungen auf eine partizipative und demokratische Weise integriert. Die häufig geäußerte Befürchtung, dass die Pflanzung von Fruchtbäumen und -sträuchern, oder von Gemüse für den öffentlichen Konsum dazu führen wird, dass zuviel geerntet wird, dass es zu Konflikten zwischen Bürger:innen kommt, oder sie Gegenstand von Raub und Zerstörung werden, ist angesichts der in diesem Bericht dokumentierten Evidenz unbegründet. Allerdings wird in Interviews mit Essbare Stadt-Initiativen häufig empfohlen, dass Fruchtbäume nicht neben Straßen und Parkplätzen gepflanzt werden sollen. Wiederholt wird darauf hingewiesen, dass entweder Bürger:innen oder die Stadtverwaltung sich um Fallobst kümmern müssen. Essbare Stadt-Initiativen können eine Reihe positiver Effekte auf Bürger:innen und die Stadtverwaltung haben. Obgleich wir nicht über quantitative Evidenz dafür verfügen, scheinen Essbare Stadt-Aktivitäten die Beziehung zwischen Stadtverwaltungen und Bürger:innen zu verbessern, das Potenzial aufzuweisen zu einer Transformation des Lebensmittelsystems beizutragen, und die Ästhetik des urbanen Raums zu verbessern. Diese positiven Effekte gehen mit einer Reduktion der Ausgaben für den Erhalt von öffentlichem Grünraum einher. Allerdings erfordern Aktivitäten für eine Essbare Stadt eine adäquate Finanzierung.

Schlüssel-Empfehlungen für die Entwicklung einer Essbaren Stadt:

- **Die gleichrangige Beteiligung von zivilgesellschaftlichen Akteur:innen und Stadtverwaltungen** sowie politischer Rückhalt sind für Essbare Stadt-Initiativen vorteilhaft.

- In dieser Hinsicht ist es besonders wichtig, eine **gemeinsame Vision** von Zweck, Umfang und Skalenebene einer Essbaren Stadt auszuhandeln.

- Die aktive Beteiligung von Bürger:innen ist in hohem Maße wünschenswert, und sollte durchgehend von Stadtverwaltungen und zivilgesellschaftlichen Organisationen ermutigt werden. Dennoch **sollte die Stadtverwaltung die Letztverantwortung für eine Essbare Stadt-Initiative übernehmen**.

- Essbare Stadt-Initiativen sollten **mit kleinen Schritten in Richtung auf eine großräumige Vision** der Transformation des urbanen Lebensmittelsystems beginnen.

- Die Essbare Stadt sollte als eine **ganzheitliche Vision** verstanden und kommuniziert werden.

- Um eine wirkliche Transformation zu bewirken, sollte die Entwicklung einer Essbaren Stadt zu einem zentralen Anliegen in der **Stadtentwicklung** werden.

- Dies inkludiert, für Essbare Stadt-Aktivitäten **dauerhaft nutzbare Flächen** zu schaffen und zu sichern, und eine **große Bandbreite an verschiedenen Aktivitäten** zu organisieren.

- Es braucht **Expert:innen-Wissen** zum Gärtnern und zu partizipativen Gruppenprozessen; wenn dieses Wissen noch nicht existiert, hat vor allem die Stadtverwaltung die Aufgabe, Expertise bereitzustellen.

- Die Entwicklung einer Essbaren Stadt erfordert eine **angemessene Finanzierung, politische Unterstützung, das aktive Engagement der Stadtverwaltung sowie Strategien zur Konfliktlösung**

- Die Stadtverwaltung hat die potenziell wichtige Funktion, selbstorganisierte Aktivitäten von Bürger:innen zu erleichtern und die **Regeln zu klären**, die für die Nutzung und den Erhalt von Orten einer Essbaren Stadt gelten.

- Eine **große Bandbreite an Akteur:innen** wie etwa Kindergärten, Schulen, Altenheime, sozial orientierte Vereine und Unternehmen sollten in Aktivitäten für eine Essbare Stadt inkludiert werden.

INTRODUCTION: BACKGROUND OF THE REPORT

Why Edible City

There is a worldwide trend towards vegetable and fruit production in urban space with initiatives that take on various forms, ranging from guerilla and community gardening to activities promoting the planting of fruit trees and shrubs, or strengthening commercial urban agriculture. In Vienna, the city government and administration have been supporting urban community gardening for many years and have situated this approach within the smart city strategy (Magistrat der Stadt Wien 2019, 64). In Vienna as elsewhere, these initiatives are often framed as contributing to social cohesion, ecological awareness, and sense of place (Exner/Schützenberger 2015, 2017, 2018).

Although this type of gardening has become prominent in the media, meets widespread interest among residents, and has attracted hopes for renewing public space and increasing public attention for urban food policy concerns, it has remained limited in scope. To date, urban community gardening in Vienna is often practiced in public space, but is usually closed to those who are not members of a particular gardening group. Moreover, urban community gardening is usually not linked to issues of food system transformation, although some gardeners or gardening groups in Vienna interpret their practices in these terms. In fact, in many cities, urban community gardening is organized in a semi-private way, and is often *not* interpreted in a broader food policy sense.

Edible city initiatives attempt to go beyond single sites of urban vegetable and fruit production in both dimensions: They redefine food as public produce in view of transformative food policy. Having emerged first in the small town of Todmorden in UK, edible city initiatives have started to interpret community gardening in a more political sense, often highlighting public access to vegetable and fruits, and on the urban scale. Through this, they aim to contribute towards more sustainable urban food systems, to revalue local food, and to reinterpret public space as a source for food open to all.

Since then, a range of understandings and practices corresponding with the edible city idea has emerged, and it has spread internationally, including followers in (urban as rural) Austria.

Despite the popularity of the movement, little is known about local understandings of edible city, about how such initiatives are created and developed, by which actors, and with which effects. In view of further developing the support for urban community gardening in Vienna, and in the perspective of a more systematic approach to such activities that connects them with urban food politics[2], this study attempts to distill recommendations on how to do that. These recommendations are based on investigations in a number of edible cities in Austria, France, and Germany. In the following, we first outline the concept of edible city and the history of the corresponding movement, briefly review the state of the art in the scientific literature, and explain our research questions.

What is Edible City

The edible city concept first emerged in Todmorden, UK, where gardeners started to produce food for the community in public space in 2007 (Paull 2011), in connection with the Transition Town movement which had begun to create collective alternatives to the dependence on fossil fuels[3]. From then on, the edible city idea spread first across the UK through the Incredible Edible network that was formed in 2012[4] and is now counting over 148 local groups in the country[5]. Incredible Edible has since then spread internationally with a particular resonance in France[6]. In parallel, the edible city idea was also taken up in other countries, and beyond the Incredible Edible network. For instance, in Germany, an estimated number of approximately 150 edible city initiatives is reported[7].

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[2] https://www.milanurbanfoodpolicypact.org/, access 3.10.2021
[3] https://www.transitiontowntotnes.org/incredible-edible/, access 3.10.2021
[4] https://www.incredibleedible.org.uk/, access 3.10.2021
[5] https://www.incredibleedible.org.uk/organisation-information/, access 3.10.2021
[6] https://lesincroyablescomestibles.fr/, access 3.10.2021
[7] https://utopia.de/ratgeber/essbare-staedte-so-funktioniert-das-konzept/, access 6.10.2021

Despite the frequent use of edible city as a label, it appears that edible city is understood in various ways. Recent efforts to connect and standardize different approaches and experiences within the EU Edible Cities Network resulted in a definition that lays emphasis on the structural character of the envisaged transformations, underlining that "[t]he systemic use of urban landscapes for food production is a major step towards more sustainable, livable and healthier cities"[8]. In line with the original understanding of edible city in Todmorden and many other cities of the Incredible Edible network, this report starts out with a definition of edible city as (1) a city- or district-wide initiative and (2) official, formal or informal policy that (3) supports projects that aim to establish the cultivation of fruit trees and shrubs, and/or of vegetables in public space for (4) public harvesting. We therefore regard public access to plant produce as key for the edible city idea in this report.

This does not preclude that edible city initiatives also pursue other activities, as is expressed in the broader definition that the Edible Cities Network proposes, defining so called edible city solutions as: "Activities, measures, products and services that support and facilitate sustainable urban food production, distribution and consumption. Examples include urban farming, building-integrated agriculture, agroforestry, indoor and vertical farming, urban beekeeping, food surplus redistribution programmes, community kitchens, closed loop systems for sustainable resource management and urban food-related educational services. They empower local communities, contribute to climate protection, create new green businesses and jobs while generating local economic growth and fostering social cohesion."[9] Correspondingly, the project Seestadt Aspern in Vienna, for instance, understands edible city as consisting of a number of different components that are not restricted to public produce[10]. However, this report specifically focuses on the public character of vegetable and fruit production, and in relation with general concerns of urban food policy transformation. The *urban* is understood in a broad way here, because in many cases, edible city initiatives are located in towns

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[8] https://www.edicitnet.com/what-is-edicitnet/, access 1.10.2021
[9] https://www.edicitnet.com/wp-content/uploads/EdiCitNet-Glossary.pdf, access 1.10.2021
[10] https://essbareseestadt.at/bausteine/, access 8.10.2021

and villages or target urban villages in the sense of city districts or parts of it. In fact, Todmorden in the UK where the very idea of edible city emerged is a town with approximately 15.000 inhabitants. Regarding the urbanized character of societies in the Global North in general, and implied structural disconnect between food production and consumption, we believe that urban space in the more traditional sense of big agglomerations is not a particularly useful criterion for delimiting edible city initiatives to learn from their experiences.

Potential Benefits and Challenges of Edible City for Vienna

Both, the systematic character of food producing activities in urban space as highlighted by the Edible Cities Network's definition as well as the character of public produce accessible to all that was one of the core ideas in the original edible city understanding in the UK, point towards a level of organizational complexity and political ambition that go beyond single gardening initiatives such as urban community gardens, to take one prominent example. This level of complexity and ambition may suggest a stronger impact on food systems, public space, and citizen engagement in urban space than single initiatives could have that are not part of an edible city perspective.

Almost all community gardens in Vienna currently produce for private consumption, often on public land leased to private associations. In contrast, many edible cities enable the public to harvest produce on public land, supported by public governance arrangements between city administrations and civil society. In doing so, edible city initiatives may show the following benefits in comparison with single initiatives of urban gardening and similar activities:

They may

- engage and activate more comprehensively the public;
- have a stronger potential impact on urban imaginaries, also those related to smart city visions;
- realize more fully potential benefits;
- be more inclusive than private community gardens;

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- circumvent the criticism being levelled against (semi-)private gardening on public land by practicing public gardening for public consumption.

Initiatives that orient themselves towards edible city strategies, however, do come with potential problems, as pre-research in Vienna regarding views of various stakeholders on urban plant produce in general, and edible city initiatives in particular have shown[11]. First, contaminations cannot be ruled out, depending on the origin of the soil and the location of the site. This issue can only be disregarded as long as fruit and vegetable planting is not allowed (as in the municipal program "Garteln um's Eck"[12]) or raised beds are used (as in some of the urban community gardens). Second, possible conflicts between potential users are a major concern of the administration, for instance with regard to fruit trees and berry shrubs that may be harvested by the public. Such conflicts may be challenging if not properly cared for in specific public governance arrangements involving citizens and by raising public awareness. Third, a lack of care and enduring commitment for the maintenance of fruit trees, berry shrubs or open vegetable plots by citizens may be regarded as a potential pitfall of edible city projects. Fourth, possible damage to or defilement of cars parked in the vicinity of or under fruit trees may be feared, as well as the defilement of the pavement and potential cleaning costs. Fifth, the harassment by insects such as wasps feeding on non-harvested fruits or berries may be a problem. Sixth, conflicts may arise between the city administration and citizens, if edible city elements are introduced into an urban landscape where such elements are to date quite foreign.

Besides these specific concerns, the question of how to conceive of a more comprehensive edible city strategy in terms of smart food and smart public spaces is open. Such a conception and its subsequent implementation have to deal with a higher degree of complexity as is usual in establishing single urban community gardens or a more limited district specific edible city vision. Particular public

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[11] especially within the project „Green Urban Commons",
https://greenurbancommons.wordpress.com/, access 6.10.2021
[12] https://www.garteln-in-wien.at/garteln-ums-eck/, access 6.10.2021

governance arrangements such as outlined by the Milan Urban Food Policy Pact of 2015[13] are certainly called for in this regard, including to "[f]acilitate collaboration across city agencies and departments and seek alignment of policies and programmes that impact the food system across multiple sectors and administrative levels, adopting and mainstreaming a rights-based approach", "[e]nhance stakeholder participation at the city level through political dialogue, and if appropriate, appointment of a food policy advisor and/or development of a multi-stakeholder platform or food council, as well as through education and awareness raising", "[i]dentify, map and evaluate local initiatives and civil society food movements in order to transform best practices into relevant programmes and policies, with the support of local research or academic institutions", and "[d]evelop or revise urban food policies and plans and ensure allocation of appropriate resources within city administration regarding food-related policies and programmes"[14].

Scholarly State of the Art in Edible City Research

Individual components of edible city approaches in the Global North[15] have been studied to varying degrees. For urban community gardens, a wealth of studies is available, while there is little literature on other practices such as wild plant, fruit and mushroom collecting in cities (for fruits, see Colinas et al. 2019). In Vienna, urban community gardens have been studied mainly in the grey literature so far, and very few peer reviewed publications exist on the subject (e.g., Exner/Schützenberger 2015, 2017, 2018; Mayrhofer 2018, 2019). Exner and Schützenberger (2014) discussed Viennese community gardens in a food sovereignty perspective (see in a wider context, e.g., Weinzierl 2016).

In comparison with research on single urban gardening initiatives, research on edible city initiatives is still scarce. However, publications focusing on the concept of edible city as involving a particular

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[13] https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2020/12/Milan-Urban-Food-Policy-Pact-EN.pdf, access 6.10.2021
[14] https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2020/12/Milan-Urban-Food-Policy-Pact-EN.pdf, access 6.10.2021
[15] see for a list, https://essbareseestadt.at/bausteine/, access 8.10.2021

and in part rather complex public governance arrangement has grown in recent years in German speaking countries. For instance, Säumel et al. (2019) present a conceptual framework of edible city solutions including a SWOT analysis by comparing projects in various cities in Germany, The Netherlands and Cuba, in order to explore the capacity of such solutions. Scharf et al. (2019) studied edible city components and initiatives in Berlin under a commons lens. Hajzeri et al. (2019, 43) analyzed the "challenges of effective integration of edible plant into urban open spaces by means of planning and policy support" in the Essbare Bezirk Friedrichshain-Kreuzberg. Based on investigations in the German forerunner edible city Andernach, and two additional empirical cases, Sartison and Artmann (2020) discussed such initiatives in terms of nature-based solutions with regard to urban sustainability transformations. Artmann et al. (2020, 1) developed a conceptual model for "testing multi-dimensional impacts of urban naturebased solutions supporting social-spatial, social-ecological and individual sustainable transformation" and applied it to edible cities.

Despite increasing scholarly attention to edible city initiatives, a number of questions have still hardly been addressed. This involves the motivations of actors, the concrete processes of the development of related governance arrangements, and their outcomes. This report attempts to contribute to closing this research gap for Austria, taking into consideration empirical evidence from other EU countries, in particular Germany and France, which host well developed edible city activities in many places. In doing so, we aim at informing decision makers in Vienna about the pros and cons of edible city initiatives with regard to a possible enrichment of smart city policies in Vienna towards smart food and smart public space. We understand *smart* in this context as multifunctional food procurement in public space. Multifunctionality can be considered *smart* (in the sense of intelligent) because it is efficient and overcomes problematic fragmentations in addressing urban challenges. In the following, we first describe our research design, before presenting the results of the analysis of our empirical data. Finally, we identify good practices and distill policy recommendations that may serve as a guideline for urban development discussions with a particular consideration of the situation in Vienna.

PROJECT AIMS AND RESEARCH DESIGN

With a particular focus on Austria and additional information from edible city cases in Germany and France, this report answers the following research questions: (1) Who initiates edible cities for which reasons and by which means? (2) by which actors and mechanisms is the development of an edible city shaped? (3) what are impacts on citizens, city imaginaries, and the relation between administration and citizens? In this way, we identify typical actors, processes and impacts of edible city initiatives with a particular focus on Austria.

Following our definition of edible city presented above, we include city- or district-wide initiatives corresponding with official, formal or informal policies that support projects that aim to establish the cultivation of fruit trees and shrubs, and/or of vegetables in public space for public harvesting. Corresponding to this definition, eleven edible city initiatives in Austria plus three cities in France and three in Germany were investigated. In addition, one interview was conducted on two cities in the Austrian province of Carinthia, and one key event of an edible city project in Vienna was documented by participant observation. Table 1 gives key information on these cases.

We analyzed these examples following the governance arrangement approach described by Buizer et al. (2015). In this approach, governance constellations are dissected along the dimensions of actors and their coalitions, their power relations based on specific resources, the rules of the game of policymaking and of governance, and the discourse of the relevant actors interacting within the arrangement. Governance arrangements can be typified according to the role of the state, ranging from hierarchical to closed or open co-governance to self-governance. When market actors are decisive, market governance may be distinguished as a separate type of governance arrangement.

For the Austrian cases, we conducted semi-structured expert interviews face-to-face or online, and collected policy documents and selected media texts. For the cases in Germany and France, we

administered questionnaires with open items. The questionnaire was translated into French. Several Austrian cases were visited in order to get a visual impression of edible city activities.

With actors from nine Austrian cases, semi-structured interviews were conducted face-to-face or online. For two Austrian cities (Korneuburg, Klosterneuburg), the questionnaire administered to the German and French cases was used. The guiding questions for the semi-structured interview and the questionnaire addressed components of the governance arrangement, together with key data on respective initiatives, and information on their development. When possible, we triangulated information from interviewees and took differences in opinion into special consideration, checking for possible indication of different framings of edible city initiatives and conflicts. We were interested in both success stories and failures or examples with implementation problems.

In Austria, the following cities were investigated in regard to edible city initiatives up to 2020 in a number of provinces (see also table 1). *Styria*: Leoben, Übelbach; *Lower Austria*: Kirchberg am Wagram, Klosterneuburg, Korneuburg, Wiener Neustadt; *Carinthia*: Friesach, Villach; with additional interview information on Klagenfurt and Krumpendorf. In *Vienna*, the initiatives Zukunftshof, Obststadt Wien and the edible city activities of the neighborhood renewal office in Florisdorf (Gebietsbetreuung Floridsdorf) were investigated; moreover, the kick off workshop of the project Essbare Seestadt was subject to participant observation, with follow-ups per email and in personal conversations. In addition, initiatives in France and Germany were screened. In France, representatives of edible city initiatives in Metz (North-Eastern France, region Grand Est, department *Moselle*), Riedisheim (region Grand Est, department *Haut-Rhin*) and Sens (department *Yvonne*, close to Paris) were interviewed with a semi-structured questionnaire, which was administered by email. In Germany, the questionnaire was answered by representatives of relevant initiatives in Andernach (province *Rhineland-Palatinate*), Fürth (*Bavaria*) and Gerolzhofen (*Bavaria*).

The data was analyzed through a combined inductive-deductive coding approach. Deductive categories were structured as to capture important dimensions of the governance arrangement, as well

as further success conditions, and problems, and were partly inspired by the questions that were used to investigate projects in green space management by Buizer et al. (2015). In particular, we coded for motives of initiators, their understanding of edible city, factors of success and failure of respective initiatives, conflicts relating to them, and recommendations that interviewees would give other projects. Deductive codes were refined inductively and further differentiated according to specific aspects. Impacts of edible city initiatives on citizens were assessed by expert interviews, as was done with respect to city imaginaries, and the relation between administration and citizens. In the context of this study, it was not possible to verify expected or suggested outcomes of edible city initiatives that were indicated by the interviewees. Positive outcomes fall into a number of general categories. For each of these, aspects identified by interviewees will be briefly explained in the following, going through each category. We further assessed the impact of edible city on city imaginaries and the relation between administration and citizens independently of the interviews by checking policy documents, city websites, and media reports, if available. After coding, we grouped cases into types with similar governance arrangements and dynamics in order to draw lessons on possible organizational structures and processes that can inform related policies in Vienna. We investigated whether governance arrangements differ in terms of their particular factors of success and problems, and analyzed these data in view of the conditions for a successful implementation of edible city activities. In the following we present the results of the analysis.

RESULTS

We will first describe outcomes in a generic way and then go on to explain the variety of governance arrangements that produce them. We will link outcomes of these arrangements to the way edible city initiatives are successfully started and developed, and which problems they encounter.

Outcomes of Edible City Initiatives

Integrating agriculture into the city: This outcome is expected to remodel identities connected with agriculture and to change the relation of urban space and agriculture, e.g., by redefining urban space as a space for food production. This is said to especially benefit kids and the youth. Integrating agriculture into the city may also force building contractors to include farming into planning. This, it has been explained in an interview, does not only refer to classical agriculture but also to future and currently still marginal forms of farming (such as vertical or indoor farming).

Amplifying a beneficial societal trend: Many remarks in the interviews point towards a societal trend that edible city takes up and amplifies. For instance, edible city is linked with urban gardening and the notion of connecting people through gardening. But edible city in itself is also sometimes regarded as a societal trend. Although it has been critically remarked in one interview, that this trend has already "worn out", it was also underlined (in the same interview) that edible city is still much needed in view of rethinking the current food system, considering contemporary crises.

Strengthening eological awareness: Repeatedly, interviewees expect edible city to raise ecological awareness and to serve the goal of ecological education. They moreover link edible city with the aim to promote regional and seasonal food and support climate protection. Such ecological benefits may also have the potential to create synergies and foster cooperations, pointing towards circular management models with regard to the food supply of districts (especially if newly built).

Providing social benefits: Often, edible city is claimed to have social benefits, e.g., by creating social meeting places that combine anonymity with freedom, by strengthening social inclusion, and by enabling collective action against individualization and marginalization. Sometimes, edible city activities are brought in relation with public health. The development of commons in an edible city context (e.g., public fruit trees and shrubs made accessible through online digital fruitmaps, but also public vegetable produce) is also seen as a social benefit. Food production in urban space is moreover

said to constitute a social benefit through raising awareness for the environmental and civil protection dimension of local food supply, i.e., to increase resilience.

Providing political benefits: In the interviews, edible city is sometimes put in relation with right to the city movements, and specifically with the potential to include a broad range of citizens in edible city activities insofar as they develop successfully. In a related way, edible city is claimed to create a new category of open space in the city, which is demanded by citizens, and it is said to empower citizens to design and shape urban space themselves. It may also allow citizens to be included in urban planning measures. Moreover, edible city is seen to support citizens who are willing to become active in their city. This, it has been indicated, would serve to create a stronger civil society, or even a social movement. Others emphasize that edible city activities may demonstrate to citizens that they cannot take urban green space management by the municipality for granted (meaning that they may become aware of the effort required for green space maintenance, which increases recognition and legitimacy of the municipal administration). In another perspective, edible city projects are said to strengthen the ownership of urban space by the public, at least implicitly. In one interview, edible city is said to have the potential to promote a city (i.e., Vienna) as an international forerunner (as has been the case with social housing in Vienna). In another interview, edible city is connected with the possibility to create a lived utopia in view of regional food supply.

Realizing food sovereignty: A specific type of political benefit is expected by some interview partners that connect edible city activities with the aim for food sovereignty, i.e., a democratization of food systems, insofar as such activities contribute to food consumption.

Providing benefits for the municipality: Another specific type of political benefit relates to the administration and government of a municipality. In this regard, interviewees repeatedly point towards financial savings through edible city activities that leverage citizens self-organization and voluntary labor. But benefits such as social integration and a reduction of crime rates are mentioned

within this framing as well. In general, interviewees indicate, the municipality benefits from edible city projects insofar as it learns to know better citizen needs.

Offering economic benefits: These are mentioned only in one interview, where edible city components are connected with the development of a local cooperative.

Governance Arrangements

Through the description of the governance arrangements found in our material, this section answers the questions who initiates edible cities for which reasons and by which means, and by which actors and mechanisms the development of an edible city is shaped. Table 2 summarizes key information on the size of the respective cities, and on scope, scale and dynamics of edible city initiatives.

The most important actors of edible city projects in Austria as well as in the cases investigated in Germany and France are (1) civil society actors ranging from single activists to collective organizations such as informal movements and networks, NGOs and "movement-like" political parties, or transdisciplinary research projects, (2) individuals or collective actors within municipal administration and government, (3) single residents that become engaged in edible city activities, (4) public institutions, most often schools, kindergardens and homes for the elderly. A certain edible city initiative may be started, developed and maintained primarily by either civil society or municipal actors. Residents are of course also key insofar as they are those that are being addressed by edible city initiatives regardless of who is starting, developing and maintaining them. In some cases, they are also an important element of maintenance of edible city components (such as single fruit trees), and in this sense they also are one of the actors of the overall governance arrangement. Beyond this potential role of residents, they are more or less consumers in terms of aesthetic pleasure and produce. Public institutions such as schools may be relevant primarily as places for gardening activities, and for organizing them, but they do not appear to be part of the governance arrangement in the proper sense, similar to the limited role of residents in this respect.

The interplay of civil society and the municipality can be classified according to characteristic coalitions, power relations based on specific resources, the rules of the game of policymaking and of governance, and the discourse regarding edible city, i.e., how the concept is interpreted. In the following, we will describe the major types of edible city governance arrangements in order to draw lessons for further policy initiatives with a particular focus on Vienna. All governance arrangements that can be observed in our empirical cases can be ordered according to the degree of influence of either civil society actors or municipal administration and government. In view of potential recommendations for edible city initiatives in Vienna and elsewhere, two aspects will be considered especially: respective outcomes of different governance arrangements for citizens, city imaginaries, and the interaction between civil society and administration; and regarding the success, stagnation or failure of edible city approaches depending on the type of arrangement. Starting from the extreme end of a dominant role of civil society, we proceed with intermediate types towards the opposite case of a dominant role of the municipality. Each type can be differentiated into subtypes, reflecting nuances within each governance arrangement type (see also figure 1).

Governance Arrangement Type No 1: Benign Neglect by Municipality

This type of edible city governance arrangement is characterized by the decisive role of civil society actors, whereas the municipality is not involved in any substantial manner in edible city activities. In all the cases of this type that we analyzed in our material, the municipality is not resisting edible city in an active way, at least not in an obvious manner. Within our material, we can discern two subtypes according to the sustainability of activities, reaching from the maintenance to the failure of civil society activities: (a) ongoing care by single persons and civil society initiatives: Floridsdorf/Vienna, Obststadt/Vienna, Zukunftshof/Vienna (also the research project Essbare Seestadt could be included in this subtype); (b) burn out of civil society activities: Wiener Neustadt/Lower Austria. These subtypes may also involve a certain resistance on part of the municipality in certain stages of development, or attempts to co-opt civil society initiatives.

These initiatives have limited scope and scale. Since the municipality does not provide any significant resources, activities rely on civil society input, which often lacks paid labor resources, professional management and care of material infrastructure, and the means to expand gardening beyond rather limited surface areas within urban space. Although some of these initiatives appear to be sustainable on this rather small scale and with limited scope, some are negatively affected because of burn out, loss of vision, and frustration. In some cases, initial enthusiasm took into account a prospective involvement of the municipality. If this involvement does not materialize after a certain period of time, overinvestment of civil society resources in terms of emotional energy, labor time, and sometimes financial resources becomes evident, and may result in frustration.

Governance Arrangement Type No 2: Municipality as Infrastructure Provider

In this case of a governance arrangement, the municipality offers basic infrastructure for the self-organization of civil society actors in view of edible city activities. Therefore, the respective arrangement quite closely interrelates municipality and civil society. This relation can be either fraught by tensions or be characterized by smooth cooperation. Conflictual and cooperative dynamics can also alternate, e.g., that after a conflictual period, the arrangement becomes more cooperative. Within this type, three subtypes according to the intensity of conflict and engagement of the municipality can be distinguished: (a) smooth cooperation (Leoben/Styria, Übelbach/Styria; Sens/France) or smooth cooperation after initial tensions (Friesach); (b) cooperation with tensions (Kirchberg am Wagram/Lower Austria); (c) minimum authorizations by the municipality (Metz/France, Riedisheim/France, Fürth/Germany). The latter subtype can hardly be described as a cooperative arrangement since the municipality only provides basic legal and political support. However, because of the clear commitment of the municipality to edible city, this subtype is distinct from the governance arrangement type No. 1, which entails no such municipal commitment.

Governance Arrangement Type No 3: Competing Edible City Frames

In one empirical case that we have studied, edible city is framed differently by different actors that enter into political competition or even conflict. This case is represented by Villach in Carinthia, where the vice mayor has started with edible city related activities some years before another political group, which has the character of a movement party (with a strong bottom up dynamics and civil society participation), framed these activities as edible city, and also took on a somewhat broader perspective on these activities. While this type of dynamics does not affect the positive outcomes of edible city in this case, but may even have contributed to the expansionary dynamics of it, this example nevertheless points towards edible city as an object of potential conflict. In fact, the vice mayor does not primarily frame gardening activities that the municipality supports or manages as edible city, but rather as part of a sustainable city, although edible city has also entered the wording of the activities that the vice mayor has organized and further pursues. The dynamics in this case resemble in part a conflict between top down (municipal) and bottom up (civil society) actors, although the latter type of actor is in fact a political party represented in the town council. But this party operates in a rather participatory way and has characteristics of a local social movement. This situation leads to mutual criticism, because for the movement party, the municipal activities do not appear to be sufficient, while from the perspective of the municipality, the movement party's criticism is unfounded or grounded in tactical considerations.

This type is similar to the governance arrangement "Municipality as infrastructure provider", but it differs from it by the clear distinction between competing frames of edible city activities, which are each backed up by separate material initiatives. For instance, not only the municipal department governend by the vice mayor, but also the movement party installs and manages raised beds and community gardens[16].

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[16] At the last elections in Villach in 2021, the movement party has increased its political clout and now is also part of the city government, being responsible for traffic planning and environmental protection; see https://villach.at/stadt-regierung/stadtsenat/stadtrat-gerald-dobernig, access 10.10.2021

Governance Arrangement Type No 4: Municipality in Charge

This final type of governance arrangement is dominated by the municipality, with a very limited or non-existent role of civil society. In some cases, residents are involved, mostly in attending beds. Three subtypes can be distinguished according to the effectiveness and sustainability of municipality driven activities:

(a) municipal edible city strategy: Klosterneuburg (Lower Austria), Korneuburg (Lower Austria), Andernach (Germany), Gerolzhofen (Germany),

(b) demise of municipality activities: Klagenfurt (Carinthia);

(c) disinterested civil society: Krumpendorf (Carinthia).

Two cases in Germany that we investigated are shaped primarily by the municipality. This type of governance arrangement includes the prominent town of Andernach, which has become an important example for edible city initiatives in German speaking countries. This has been used strategically in Austria. For instance, in one case, a local political actor has reported a multi-party excursion of politicians to Andernach for a first hand experience of edible city, which was organized in order to increase political support for this idea. The German examples of municipality-driven arrangements appear to be successful in terms of positive outcomes and sustainability of the strategy, but a primary or sole responsibility of the municipality can also result in failure, either because of a lack of a minimum appeal and support by residents and local civil society or because the municipality itself does not further pursue edible city or loses interest in the overall perspective.

Success Factors and Problems of Governance Arrangements

While governance arrangements differ regarding their effectivity and the general patterns of how edible city initiatives start, develop, and are managed, they involve a common set of success factors, according to the information in our interviews and questionnaires across all the examples that we investigated in Austria, Germany, and France. Also the problems that interviewees mentioned do not

seem to be specifically tied to a certain governance arrangement, although some problems may occur more frequently in specific arrangements, or are more important in these. We list all success factors that were indicated and describe variations in case of conflicting opinions. Each initiatives' interviewee or interviewees suggested only a part of these factors. When there were no contradicting statements regarding an initiative or across initiatives, we interpret the factors that were mentioned as being valid for the success of any edible city initiative.

When Do Edible City Initiatives Succeed?

Success factors fall into five groups, regarding (1) material aspects, (2) meaning, know-how and understanding, (3) social aspects, (4) the perspective of the initiative, (5) aspects related to the municipality and (6) general preconditions. In the following, we will describe these factors in a summary fashion by restructuring the information provided by the interviewees in terms of an ideal typical process of creating an edible city. Table 3 displays more detailed information.

An edible city initiative requires a variety of material and social conditions for a smooth, stable and effective process of development. It should start with rather small steps, but should however be oriented towards a large-scale and systematic change of the outlook of urban space. For starting an edible initiative, a core group of dedicated volunteers with a variety of skills and well-established social contacts are necessary, or alternatively a paid employee of the municipality. First of all, suitable places which are accessible through landowners have to be identified, essential infrastructure (in particular regarding water provision) has to be planned, and legal issues regarding different forms of liabilities have to be clarified. Second, the necessary financial means have to be organized. The overall development of an edible city initiative requires careful and systematic planning, since this type of initiative targets food system transformation. In this view, it is important to realistically assess the resources of the core group in terms of time, money and expertise. Starting an edible city initiative should not be planned too much in detail, but all necessary conditions should be known. The core group should combine a range of skills including gardening know-how. Experience shows that it is

often beneficial to proceed incrementally with the development of the initiative: starting in smaller places minimizes risk and allows to walk the pace of participants. These initial places should, however, not be too small in order to make some impression on the public. They should then be expanded and/or multiplied carefully, but as swiftly as possible. Leadership becomes very important in the second phase after the initial start, because the first enthusiasm usually wanes. Leadership should be exerted not by an individual, but by a group. Decisions should be taken collectively. A mission that is able to guide a well-connected core group is helpful. Besides the preparation of essential material conditions as described above, and the set-up of the core group and development process, the question of how to include further actors becomes crucial. In cases where edible city starts from civil society actors, involving the municipality is the key issue.

Institutional actors should be involved right from the start in order to increase and diversify ownership. Institutions such as schools, kindergardens, universities, neighborhood offices, retirement homes or therapy gardens help to solidify an edible city initiative. They also help to bring in expert knowledge (e.g. on gardening), help to raise media attention and to make places for edible city activities available, and to organize additional activities (e.g., joint harvest and cooking), or broaden the purview of edible city with regard to circular economies. It is especially important to integrate existing gardening initiatives in the care for specific edible city places. Local gardening associations have been seen to be helpful in this regard. But other care-oriented initiatives such as associations that support refugees can also support care for places. Besides, property developers and construction firms can be relevant actors that may facilitate gaining access to space. Firms have also been reported as helping edible city initiatives to gain legitimacy, e.g., when they are using produce grown in edible city gardens. In the case of civil society-driven edible cities, civil society has a crucial function to raise pressure on the municipality for supporting edible city, and is safeguarding the autonomy of initiatives, e.g., through providing voluntary labor. But even in municipality-driven edible cities, civil society has a crucial role to play, namely to provide feedback and communicate ideas to municipal

initiatives so that edible city indeed responds to public interests. Citizens may also play important roles as caretakers in municipality-driven edible cities.

Whether or not edible cities are driven by civil society actors, the municipality is of decisive importance for success. First of all, municipalities must provide political backup and authorize edible city initiatives and corresponding activities. The most beneficial way to create these conditions is a joint decision of a municipality to support edible city, reflecting a shared and ultimate responsibility of the municipality for the development of this vision. In general, municipalities should focus on enabling edible city activities, and not or not primarily on regulating them, since they should be open for the engagement of civil society actors. It is very helpful when a municipality declares its commitment to public food, e.g., through actively acknowledging the public character of fruit trees in public space, encouraging public harvest. In some cases, the initiative of the municipality is even decisive, which may be a viable way to develop an edible city (see governance arrangement "municipality in charge" for further information). But even if the municipality is not driving edible city, it still should take over core management tasks of edible city places through municipal employees, although without covering the daily management of each place. Experience has shown that it is both helpful and feasible to easily (unbureaucratically) refund expenses of citizens for edible city activities. In addition, it is advisable to reserve budget and definite personal resources from green space departments for edible city activities. This may include establishing a fruit/food street worker and similar positions. Financing edible city activities is also a major topic for civil society-driven initiatives, and this may not only include money transfer, but also in-kind contributions or assistance with regard to loan applications. Further vital support beyond financial means and contributions to the maintenance of beds by the municipality includes machinery, seedlings, access to land, expert knowledge (e.g., expert tree cutting) and infrastructure (e.g., water provision). Most importantly, the municipality should take over (a larger share of) tasks in case that edible city spaces are not sufficiently managed by citizens, e.g., regarding fruit windfall. The municipality should cooperate with various actors in finding solutions to problems that may emerge, and be careful to create good

relationships with civil society actors from the start on. This also means that the municipality should be open for civil society demands such as for land and further support. Specific municipal departments may be crucial to assist edible city activities through tasks such as digging or watering. Municipal departments can be involved through panel discussions in order to raise attention and interest for edible city as a vision. Municipalities may gain knowledge and further support through exchange with other municipalities, e.g., regarding potential conflicts and how to resolve them as well as other possible problems.

As soon as institutional actors and further organizations are integrated in edible city activities, mediating actors may become important. At times, specific strategies for connecting conflicting departmental agencies (e.g., through third parties or round tables) are required. In cases of grave conflict, the spatial separation of involved actors (who care for specific places) may be a solution. It has been pointed out that the mayor may be in a privileged position to mediate between conflicting parties. In parallel, it is in some cases necessary to deal with critics. A viable strategy consists in including articulate critics and integrate their concerns. However, it is also important to not giving too much attention to obstructionist critiques that question edible city in principle. Successful edible city initiatives require promoters that have an open mind watching out for unexpected shared interests between different actors in view of edible city activities. The exchange with social movements may be of particular importance in order to gain inspiration and legitimacy, especially by connecting with edible city pioneers that demonstrate that edible city is feasible. Starting and developing edible cities benefits from a specific attitude that is marked by self-confidence of edible city promoters that do not easily limit themselves to compromises. In fact, a civil society representative of one particularly successful initiative told us that he would recommend never to ask for "permission" in regard of edible city activities, but to always ask for "cooperation". In this way, edible city activities safeguard their positive momentum and are able to transcend obstacles. Moreover, it has recurringly been pointed out that edible city promoters need patience, should be committed, and have to be perseverant despite frustrations, which often cannot be avoided.

Material conditions are equally important. First of all, suitable species for edible city places should be selected, and the pros and cons of different options should be carefully considered. For instance, fruit trees and shrubs are less labor-intensive than vegetables, but may be more sensitive to drought. It has been pointed out that species diversity should be maximized and traditional seeds should be used where possible. Respondents emphasized the value of aesthetically attractive vegetables. In one case, the municipality aims to produce its own seedlings in the longer run. Regarding the location of edible city fruit trees, respondents repeatedly advised not to plant them near streets or parking lots due to fruit windfall. In general, plantings should be distributed across the city in order to visibly shape the outlook of the city through the initiative. Further important factors for location decisions are availability of water, openness to the public, and possible synergies with already existing gardening activities, e.g., adjacent community gardens. The design should be attractive, which requires a proper outlook. The more compact edible city places are, the more easily is maintenance. Regarding the vision of edible city, it is key to not to allow individual plots or to limit them. Fences may be possible or useful in order to create a sense of respect, but access for the public must be safeguarded. It has been pointed out that edible city activities should not be limited to raised beds, but should also cover on the ground plantings. Fruit trees may be kept small in order to facilitate harvest. Compost beds for waste recycling should be an integral part. Financing ongoing management can be organized through membership fees, institutional donations, the sponsoring of individual trees or raised beds, and through tax-financed public spending. Since edible city plantings have often been described as being a low cost alternative to usual ornamental plants, many municipalities seem to see a budget advantage in edible city projects.

After edible city has been started as an initiative, it is of key importance to explain the idea of public produce to the broader public, including the ethical values of sharing and respect that go along with it. This also involves including gardening experts and scientific knowledge in order to transmit the potential and objectives of transformation towards an edible city. In addition, the responsibility of citizens has to be clarified and publicly communicated. It may also be helpful to set definite aims.

This does not necessarily have to be done in quantitative terms. Regarding information, transparency is paramount. Regular events in connection with edible city facilitates the flow of information. Meetings should take place in a friendly atmosphere. Information should also be transmitted through traditional information channels such as blackboards. Rules must be clarified through public communication, e.g., that edible city places should not expand informally, that beds may be leased out for public harvest, or that participants and/or users have first to sign a declaration. In general, it is very important to clarify the different tasks and duties of the municipality and of citizens or further actors. In view of rolling out edible city activities and transforming local food systems, initiatives should make specific efforts to ensure good (local) media coverage. Various activities can anchor the initiative in public debate, e.g., to organize public film viewing in edible city places or in connection with the topic, the open announcement of care-taking days for edible city places in the media, or engaging celebrities to raise media attention. Social media should be used, the atmosphere of public events should be welcoming. Synergies between different actors should be sought, e.g., with entrepreneurs that may use edible city produce.

Information on success factors and recommendations provided by interviewees was mostly unanimous, but some divergence of opinions became visible regarding the scale and scope of edible city initiatives. This divergence is correspondingly also reflected in the problems identified by respondents (see Table 4). We interpret these divergences to indicate a special need for negotiation. On the one hand, respondents advised to "think big" in view of the ultimate goal of edible city to contribute to food system transformation, while on the other hand, initiatives were recommended to act cautiously and rather in view of possible limitations in order to make small but guaranteed steps. Edible city initiatives should focus in the municipal and regional levels, and may use support through EU projects (as has been the case in one town that we investigated). Regarding scope, a similar bandwidth of opinions emerged as with reference to scale. Some advised a large surface of edible city places to really make public impact, while others pointed towards the need to recognize limits and that municipalities are not in the position to transform all public spaces into edible spaces. In any

case, goals regarding scale and scope should be defined realistically. A range of different edible city components should be offered, which allows for different levels of involvement.

In the longer run, edible city initiatives should engage in diffusing the idea, e.g., through applying edible city to new types of places, e.g., dog zones or private gardens. Initiatives should also promote the diffusion of edible city ideas among district officials. They may also focus on educating specific publics, e.g., children. Most importantly, edible city must be included in local development plans, corresponding to the municipality's commitment to the vision. In addition, edible city activities may become part of calls for housing projects, and should be included in adaptations of zoning plans.

Edible city has the potential to reconnect urban and rural areas and may use innovative approaches such as vertical farming in this regard. Some think that the conditions for establishing edible city initiatives are better in rural areas than in big cities because of surviving connections with gardening and food production. Previous experiences of core groups and promoters in terms of food and gardening activisms have been indicated as being helpful. Edible city activities should be grounded in what exists already in view of this vision in a specific area. One may accumulate experiences in a succession of smaller steps towards this vision. Urban gardening has been regarded as a societal trend that edible city initiatives may make use of to increase public interest in the vision.

Which Problems Do Edible Cities Face?

Partly overlapping with the general categories of success factors (see table 3), table 4 displays detailed information on problems that edible city initiatives are facing. These fall into the following groups: (1) political support, (2) material preconditions, (3) public response, (4) perspective and (5) context conditions. We will outline in the following how these problems play out. Political support does not only concern the municipality, but is equally about civil society politics.

The two most common problems refer to factors of political support. Interestingly, these concern both the role of the municipality and of residents, regardless of the governance arrangement to which the

respondents' initiative belongs. This points towards the fact that it is hardly any other factor that may inhibit or question edible city initiatives as much as lack of political support. It is therefore primarily a matter of political will, skills, and opportunities, and especially of a productive interplay between municipality and civil society, whether edible cities encounter enduring problems or successfully overcome them. Even in municipality-driven initiatives, civil society is important in terms of the citizenry which is supposed to contribute labor, or is expected to at least use edible city plantings, and not to destroy these. As it appears in our interviews, the role of the municipality is nevertheless somewhat more important than the role of civil society regarding the stability of edible city. Civil society may take over a substantial part of the management of edible city places, but without municipal support, even civil society-driven edible city initiatives do not last long or are severely limited and encounter enduring problems. Problems, thus, arise primarily when the municipality fails to provide various sorts of support, ranging from a clear commitment to edible city, over material and financial support, to help with the public relations of edible city activities. Municipalities may also be unresponsive to citizens' needs, which may also endanger edible city development. On the side of civil society, the most common problem is lack of active and enduring engagement of citizens and civil society groups. Often, it is reported, civil society actors start with a high level of motivation – even enthusiasm – which then usually dwindles. In case that there is only one leader in civil society activities, this situation may lead to serious burn out dynamics and create substantial frustration.

Further problems related to the role of the municipality concern the influence of party politics, which may lead to tactical behavior in view of strengthening certain political parties at the expense of fostering an idea for its own merits. For instance, if an opponent supports edible city, a political party may reject the idea solely because the opponent is promoting it. Moreover, inter-departmental conflicts may hamper edible city initiatives. Besides lack of sustainable engagement of citizens, active citizen involvement is also fraught when citizens prefer individual plots. Labeling existing gardening activities as "edible city" has not proven helpful, because these activities usually do not relate to the term and also do not gain ownership of it if a top-down approach prevails.

Regarding conflicts, they most importantly concern issues of edible city visions and scope. These conflicts seem to be particularly relevant in the interaction between municipalities and civil society actors, either individuals or organizations. It appears that civil society actors repeatedly favor more profound, transformative and large-scale edible city activities, while municipalities are acting more cautiously and are in part criticized for taking up edible city only in a superficial way. Conflicts may also concern detailed questions of species selection (related to notions of "regionality", e.g., in regard to foreign or non-traditional fruit tree, shrub or vegetable species), or of the thematic focus of edible city, e.g., whether it is mainly about education, or aesthetic improvement, or the politicization of certain food system problems. In contrast, problems of overharvest, destruction or theft do not seem to be of particular relevance. Even larger scale edible city activities do not suffer from these problems, as our interviewees report.

Problems related to lack of knowledge (e.g., regarding gardening), and oversized bureaucratic requirements are mentioned repeatedly. Land conflicts, partly related to city growth, may be a challenge for edible city initiatives, together with hurdles such as slow administrations.

POLICY RECOMMENDATIONS

In this final section, we synthesize the results on governance arrangements, success factors and recurring problems of edible city initiatives in view of recommendations. When recommendations are specific for certain governance arrangements or actors, this will be indicated. Based on the evidence, we suggest the establishment of an edible city strategy in Vienna by responding more favorably to existing edible city activities, enfolding their larger scale perspective step by step. We see the highest potential in a collaborative approach where civil society and the municipality work together on equal terms, with a decisive and committed role of the municipality in enabling civil society self-organization on the one hand, and by stepping in and taking over certain tasks in case that citizens' engagement remains more limited. This approach corresponds to the governance arrangement "Municipality as infrastructure provider". The municipality has also the important

function to develop a holistic and systematic vision of Vienna as an edible city, integrating civil society ideas and experiences in a participatory and democratic manner. The often-mentioned concern that planting fruit trees and shrubs, or vegetables for public consumption may be subject to overharvest, may instigate conflicts among citizens, or be the object of theft and destruction, is unwarranted considering the evidence gathered through interviews with edible city initiatives. However, it is recurringly advised to not plant fruit trees adjacent to streets and parking lots. It has also been pointed out that either citizens or the municipality have to take care for fruit windfall. Edible city initiatives may provide a series of benefits to citizens and the municipality. Although we cannot present quantitative evidence, edible city activities seem to improve the relation between municipalities and citizens, seem to have potential to contribute to food system transformation, and are able to improve the aesthetics of urban space. These benefits come along with cost reductions in the maintenance of public green space. However, edible city activities need proper financing.

Key recommendations

- **Equal engagement of civil society actors and municipal administrations** with corresponding political support are very promising for organizing effective edible city initiatives

- In this view, special attention should be laid on **negotiating a shared vision** regarding purpose, scope and scale of edible city

- Although the active involvement of citizens is strongly beneficial and should be consistently encouraged both by municipalities and civil society organizations, the **ultimate responsibility for an edible city initiative should be located within the municipality**

- Edible city initiatives should start with **small steps oriented towards a large-scale vision** of transforming urban food systems

- Edible city should be understood and communicated as a **holistic vision**

- Edible city should be a central concern in **urban development** to make it effective

- This includes to create and safeguard **permanently usable areas** for edible city activities and to initiate a **range of different activities**

- **Expert knowledge** on gardening and how to organize participatory group processes is required; if these do not yet exist, it is primarily up to the municipality to create these conditions

- The development as edible city requires **proper financing, political backup, active administrative engagement and will, and conflict resolution strategies**

- The municipality has a potentially important role to facilitate self-organized activities of citizens and to **clarify the rules** of engagement for use and maintenance of edible city places

- It is beneficial for the success of edible city initiatives to include a **broad range of actors** such as kindergartens, schools, homes for the elderly, social associations or businesses.

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Table 1: Investigated cases

	Location	Governance arrangement type	Key actors	Type of actor interviewed	Number of interviews
Investigated cases					
Austria					
	Vienna				
	Floridsdorf	benign neglect by municipality	local initiative of neighborhood renewal office, partly in loose connection with other actors	neigborhood renewal office	1
	Zukunftshof	benign neglect by municipality	local initiative driven by an agricultural entrepreneur in the context of collective activism	initiator	1
	Obststadt	benign neglect by municipality	local initiative driven by single garden activist who is also active in Wiener Neustadt; support from a group	initiator	1
	Styria				
	Leoben	municipality as infrastructure provider	initiated by member of local NGO working with children, funded by EU project; municipality actively supports	municipal officer (green space department), initiator	2
	Übelbach	municipality as infrastructure provider	initiated by two permaculture gardeners, with active support from the mayor	two initiators, mayor	3
	Carinthia				
	Villach	competing edible city frames	initiated by the current vice mayor, then similar and more extensive activities were started within the frame of edible city by a local movement (bottom-up) party	initiator, politician (vice mayor and head of green space department), municipal officer	3
	Friesach	municipality as infrastructure provider	initiated by local transition town initiative, driven by key activites; further on supported by mayor	initiator, mayor, assistant of mayor	3
	Lower Austria				

Kirchberg am Wagram	municipality as infrastructure provider	single person as initiator, supported by mayor	mayor, initiator	2
Wiener Neustadt	benign neglect by municipality	single person as initiator, supported by previous mayor and NGO	municipal officer (green space department), two NGO (incl. initiator)	3
Korneuburg	municipality in charge	environmental department, an environmental counselling firm, residents, local schools and kindergarden	municipal officer (environment department)	1
Klosterneuburg	municipality in charge	vice mayor, town councillor	vice mayor, town councillor	2
Germany				
Andernach	municipality in charge	municipality; implementation through a municipality-owned firm that is working with long-term unemployed people	municipal officer	1
Fürth	municipality as infrastructure provider	intercultural garden Fürth; help from other institutions (e.g., school) and the municipality	activist	1
Gerolzhofen	municipality in charge	municipality, together with school and kindergarden	municipal officer	1
France				
Metz	municipality as infrastructure provider	activists; help from municipality	activist	1
Riedisheim	municipality as infrastructure provider	activists; help from municipality	activist	1
Sens	municipality as infrastructure provider	local youth organization (Jeune Chambre Économique de Sens & sa région); help from municipality	activist	1
Additional information on Austrian cities				

Klagenfurt (Carinthia)	benign neglect by municipality	municipal councillor	town councillor Klagenfurt	1
Krumpendorf (Carinthia)	municipality in charge	municipal councillor	town councillor Klagenfurt	1
Essbare Seestadt (Vienna)	benign neglect by municipality	applied research project with an inter- and transdisciplinary team including social scientists, activists, residents; with support from/communication with stakeholders	kick off meeting of project and further email communication	participant observation

Table 2: Key information on investigated cases

Investigated cases				
		Population size of city/town	**Scope of initiative**	**Dynamics and scale**
Austria				
	Vienna			
	Floridsdorf	1,9 mio	one fruit orchard and a little vegetable garden as original edible city projects; besides, further gardening projects are framed as part of "edible city" by the initiator	rather top down with limited contributions bottom up; achieved some goals but on a limited scale
	Zukunftshof	1,9 mio	participatory transformation of previous agricultural activities by neighbors and further activists; attempts to shape local urban development processes	bottom up driven, with some support from the city administration; still at the beginning, expansive dynamics
	Obststadt	1,9 mio	planting of single fruit trees for public harvest (to date about 30 trees planted)	bottom up initiative, still at the beginning, expansive dynamics
	Styria			
	Leoben	24.000	one schoolgarden, more than 10 raised beds for institutions (retirement home etc.), 2 raised beds in public space; additional beds in public space (citizens care); vegetables and fruit trees	productive interaction between bottom up and top down activities; expansive dynamics
	Übelbach	2.000	one community garden in public space, several beds in public space	productive interaction between bottom up and top down activities; reached a saturation point
	Carinthia			
	Villach	63.000	municipality organizes 2 community gardens and manages several self-service gardens; beds in public space with herbs/vegetables; municipality frames public fruit trees as "edible trees"; local "movement party" manages a community garden, raised beds and pursues further collective garden related activities	partly conflictual cooperation between bottom up and top down actors (within the municipality); achieved sizeable changes with prospect of further expansion

Friesach	4.900	transition town initiative manages 2 community gardens, 1 fruit orchard, and pursues further food related activities	civil society-driven; productive interaction between bottom up and top down activities; expansive dynamics
Lower Austria			
Kirchberg am Wagram	3.700	beds at institutions (kindergarden, school); park with herbs and fruit trees; several beds in public space; vegetables, herbs, and fruit trees	partly conflictual cooperation between bottom up and top down actors; achieved sizeable changes with prospect of further expansion
Wiener Neustadt	46.500	one community garden in a public park; approximately 300 single fruit trees on private initiative as "commons"	conflictual relation between bottom up and top down actors; substantial reduction in activities after limited initial success
Korneuburg	13.300	more than 40 different places with beds (herbs, vegetables) and fruit trees/shrubs in public space	productive interaction between bottom up and top down activities, but primarily shaped by municipality
Klosterneuburg	27.500	more than 10 places (vegetables, herbs) in public space	top down initiative
Germany			
Andernach	30.100	approximately 1 ha in total; fruit trees/shrubs, vegetables; raised and ground beds; in addition a 14 ha permaculture farm	top down initiative with participatory elements, holistic and comprehensive concept; forerunner with international acclaim
Fürth	128.200	6 places with ground and raised beds; trees/shrubs, vegetables	bottom up initiative, with help from the municipality; expanding
Gerolzhofen	6.800	no precise information available	top down initiative with some participatory elements
France			

Metz	2.800	30 gardens; vegetables and medicinal herbs	bottom up initiative in productive interaction with municipality
Riedisheim	12.600	300 m2, one place, but with further plans	bottom up initiative in productive interaction with municipality; expanding
Sens	26.500	2 places; fruits, vegetables, herbs	bottom up initiative in productive interaction with municipality
Additional information on Austrian cities			
Klagenfurt (Carinthia)	101.700	no further activities	top down initiative; joint commitment by municipality, but no action taken
Krumpendorf (Carinthia)	3.500	more than 100 plants	top down initiative; involvement of residents failed
Essbare Seestadt (Vienna)	1,9 mio	research project; active in different places of the Seestadt Aspern	inter- and transdisciplinary research project

Table 3: Summary of success factors

	Main group	Specific factor	Description
Factors of successful edible city development			
Material aspects			
		Species selection	• Share of fruit trees/shrubs should reflect labor intensity and drought sensitivity. Fruit trees/shrubs less care-intensive than vegetables, but more sensitive to drought • Big variety of species, traditional seeds • Optically attractive vegetables • Municipal seed production
		Location	• Not near streets/parking lots • Distribute plantings across the city in order to shape its outlook • Access to water • Open to the public • Synergies with existing adjacent community gardens
		Design	• Proper outlook • Compact for easier care • Permanent (not only temporary use) • No individual plots • Fences to create respect, but must be publicly accessible • Not only raised beds, but also on the ground • Keep fruit trees small for better harvesting • Compost beds for waste recycling
		Financing	• Membership fees • Institutional donations • Sponsoring of individual trees or raised beds • Low cost alternative to ornamental plants
		Land ownership	• Availability of public land • Cooperation with land owners
		Legal issues	• Clarification of liabilities • Authorization through municipality
Meaning, know how, and understanding			
		Knowledge	• Explain the idea (public produce) and its ethical values (sharing) • Value green space • Include gardening experts and scientific knowledge • Clarification of citizens' responsbility for caring for facilities • Define aims (but without quantitative focus)

		Information	- Transparency - Regular events for information flow - Pleasant settings for meetings - Public communication through blackboard
		Rules	- Not allow to expand informally - Clarification what municipality provides and what citizens have to do - Lease out beds for public harvest - Participants sign declaration
		Planning	- Careful and systematic planning, not just "planting something edible" - Check land ownership first - Plan infrastructure (water etc.) first - Assess resources (money, available time...) carefully
		Public relations	- Specific efforts for good (local) media coverage - Public film viewing - Open announcement of care-taking days in the media - Welcoming atmosphere - Engaging celebrities for media attention - Engaging neighbors and political parties - Use of social media - Synergies with, e.g., enterprises using produce
Social aspects			
		Staff	- Dedicated voluntary core group with resources and good contacts or at least one person paid by municipality - Commercial incentives, municipal leadership and management, or authorization of the core group - Diverse skills in a core group, responsibility of one particular person per site
		Social relationships	- Bottom-up movement - Regular festivities and other activities in edible city spaces for ownership and recruitment - Combining community gardens with projects for unemployed - Creating alliances between youth and pensioneers - Create meeting places (connecting ecology with social life)
		Involving institutional actors	- Institutional actors solidify initiative, e.g., schools, kindergardens, universities, neighborhood offices, homes for the elderly, therapy gardens - Integrate institutional actors from the start to increase ownership - Institutional actors help to disseminate gardening knowledge, to bring in expert

			knowledge, to raise media attention, to make places for edible city activities available, and to organize additional activities (e.g., joint harvest and cooking) • Institutional actors may help organizing circular economies
		Involving organizations	• Integration of existing (gardening) initiatives in care of space • Local gardening associations (for expert knowledge) • Including other care-oriented initiatives (e.g., for refugees)
		Involving firms	• Including property developers and construction firms for gaining access to spaces • Firms supporting edible city to gain legitimacy
		Role of civil society	• raises pressure on municipality • provides voluntary labor • safeguards autonomy of initiative • guarantees that municipal actions meet public interest
		Development	• Cautious start, expand if successful • Balanced planning before starting (not too much, not too little) • Neither start too small nor too large • Adapt to the pace of participants • Develop carefully, but as swiftly as possible • Small pilots minimize risk
		Social process	• Leadership important because enthusiasm wanes • Leading group, not single person • Collective decision-making • Mission guiding closely connected core group
		Mediating actors	• Smart strategies for connecting conflicting departmental agencies (e.g., third parties, round tables) • Spatial separation in case of conflicts • Role of mayor to mediate between conflicting parties
		Dealing with critics	• Include strong critics and their concerns • Not giving too much room to obstructionist critiques
		Spontaneous synergies	• Watching out for unexpected shared interests
		Attitude	• Self-confidence, no compromises • Never ask for „permission", always for „cooperation" • Patience and perseverance despite frustrations • Openness, continuous development
		Social movement exchange	• Gain inspiration and legitimacy through edible city pioneers

Perspective			
		Scale	• Thinking big • Focusing on municipal and regional level • Using support through EU projects
		Scope	• Large surface for public impact • Recognizing limits (municipality cannot make everything edible) • Defining goals that can be achieved realistically • Offering range of different edible city components (level of involvement)
		Idea diffusion	• Applying the idea to new areas (dog zones, private gardens...) • Spreading of idea within the municipality among district officials • Educating children
		Institutionalization	• Including edible city in local development plans • Including edible city spaces in calls for housing projects • Adapting zoning plan
Municipality			
		Role of municipality	• Political backup and authorization of initiatives (joint decision "pro edible city" by municipality) • Enabling, not regulating • Commitment to public food (e.g., actively acknowledging public character of fruit trees in public space) • Ultimate responsibility • Openness for civil society actors • Initiative (which is often decisive) • Core care-taking function (municipal employees), but not taking over daily management • Easy refunding of costs spent by citizens for edible city activities • Budget and personnel for greenspace departments caring for edible city spaces, including establishing fruit/food street worker • Support in terms of financing the project (not only direct funding but also assistance with loan application) • Support through machinery, seedlings, access to land, expert knowledge (e.g., expert tree cutting), infrastructure, bed maintenance • Care for edible city spaces in case citizens do not (e.g., regarding fruit windfall)
		Municipality-society-interface	• Cooperation in finding solutions • Good contacts right from the start • Openness of municipality for demands (for land, support...)

| | | Involving municipal departments | • Support regarding specific tasks, e.g., watering, digging
• Through various means, e.g., panel discussion with relevant departments, civil society, developers, construction companies
• Alleviate anxieties and address concerns |
		Inter-municipal exchange	• on issues such as potential conflicts and problems/solutions
General preconditions			
		Urban-rural-contexts	• Self-sufficient agriculture within cities (with innovative approaches such as vertical farming) • Edible city conditions better in rural areas than in big cities
		Previous experiences	• Food and gardening activism of founders predating edible city • Grounding edible city in what already exists • Accumulating experience in more limited initiatives
		Societal trend	• Urban gardening increases openness for edible city

Table 4: Summary of problems

	Main group	Specific factor	Description
Problems of edible city initiatives			
Political support			
		Political will	• No support from municipality at all • Only formal support, but not in practice • Substantial effort to get the approval of the municipality • Insufficient care for green space in general • Lack of support by local district government due to different thematical focus • Lack of support from green space department which rejects public gardening • Lack of municipal support results in dwindling attention for the project in public discourse • Diverse actors and interests • No interest by other mayors (KLIEN region) • Politics often acting under pressure • Lack of responding to citizens preferences (wish for more greenspace in participation process on urban development – was not taken up by municipality) • Pseudoarguments referring to issues such as theft, destruction, liability that could be solved • Only superficial uptake of urban gardening trend • Superficial cooptation by environmental department – lack of real cooperation with initiator • Lack of public support in case of conflicts (e.g., regarding management of edible city places) • Lack of trust and support in the beginnings
		Municipal coordination	• Inter-departmental conflicts • Tendering procedures are very intransparent • Administration is very slow
		Party politics	• District government identifies project with opposing political party and thus rejects support

			• Populism in the sense of just "being against" • Tensions between different parties promoting edible city • Problems due to additional political engagements of edible city civil society groups (e.g., when also caring for refugees)
		Municipality-society-interface	• Lack of care for privately planted fruit trees or garden activities due to lack of coordination with municipality • Lack of communication opportunities with mayor • Attack by mayor (cut down on water, cutting planted trees) • Lack of care for or active disruption of civil society initiatives by municipality • Substantial lobbying efforts at city council and departments • Lack of recognition of voluntary work
		Active citizen involvement	• Lack of care and overall engagement by citizens – problem grows when plants grow • Lack of will to take responsibility (but manipulation is no solution; intrinsic motivation necessary) • People are egoistic: harvest but do not contribute to community • Support does not come automatically (but has to be actively sought, e.g., together with departments, fire service etc.) • Citizens are not interested in municipal actions towards edible city • Preference in individual plots • Initial enthusiasm dwindles, difficulties to keep people involved; people get enthusiastic easily but also break away rapidly • Collective empowerment did not take place • Greed: „first comes first serve" in terms of harvest; harvest before ripening; while fruit windfalls occur on other sites • People are in favor of regional food, but do not get active • Harvesting conflicts (due to envy) may arise in the future • Initial skepticism of citizens • Citizens do not harvest

		Vision	• Conflict between private initiator who does not support „regionality" and the mayor, who only wants to plant local fruit tree species/varieties • Conflict between private initiator who focuses on permaculture and uses non-native/non-traditional species, and the mayor who claims to focus on children (contradicted by private initiator) • Conflicting visions between municipality, developer, and civil society
		Top-down labeling	• Labeling existing initiatives as „edible city" does not work out (only partial identification with the label)
		Civil society networking	• Lack of civil society networking: single persons are decisive, which is risky • Lack of cooperation competences of certain private initiators • Keeping civil society up to date and motivated is crucial but difficult • Conflict with local fruit tree association
Material preconditions			
		Finance (partly connected with political will)	• Lack of financial resources for relevant municipal departments to support edible city • Spending cuts affecting green space management • Lack of assistance with application for funding from municipality • Lack of financial income • Additional infrastructure costs • Substantial effort to organize funding
		Administrative will	• Lack of participation in discussions by municipal departments • Lack of administrative initiative and will
		Staff	• Substantial effort to establish group
		Material logistics	• Dogs are a problem when beds not raised • Substantial effort to organize materials
		Legal issues	• Municipal regulations too restrictive (e.g., regarding tree height) • Too many regulations to consider
		Location	• Community gardens need more privacy • Diffculty in finding places
		Knowledge	• Lack of people with expertise in development of the initiative and in conflict resolution • Lack of gardening know how • Lack of political understanding of the idea of public harvest

		Species selection	• Questioning of „foreign fruit tree species" • Drought is an increasing problem • Some fruit trees endagner children because of wasps
		Burn out	• Exhaustion due to work overload and frustration • Only one person in charge
		Time resources	• Time is scarce • Time constraints may be especially tight for mayors
Public reseponse			
		Windfall	• Fruit windfalls
		Social pressure	• Shame for harvesting, threats by citizens
		Attitude	• Initial opposition due to envy • Different complaints (e.g., tourists, insects, reduction of parking lots) • Private trend to gardening, but not in public space, because everybody has access • Lack of sense of community and identification with edible city projects
		Theft and destruction	• Sometimes theft (but no destruction) • Sometimes vandalism • Partly harvest too early
		Design	• Initial criticisms due to aesthetics
Perspective			
		Scope	• Conflict between private initiator who wants „more", and the mayor who is opting for „less is more" • „Thinking too big" by civil society initiators
		Development	• Lack of attention on how to make edible city spaces more attractive
		Strategic value	• Calming one's consciousness
Context conditions			
		Environmental policies	• Slow progress in environmental policies • Mainstream model centered on car is the problem for edible city • Lack of exchange with KLIEN region
		Commercialization	• Commercial approach
		Land conflicts	• Conflicts over land due to city growth • Gentrification of green space • Developers create conflicts • Dogs urinating on the berry bushes

Figure 1: Governance arrangement types
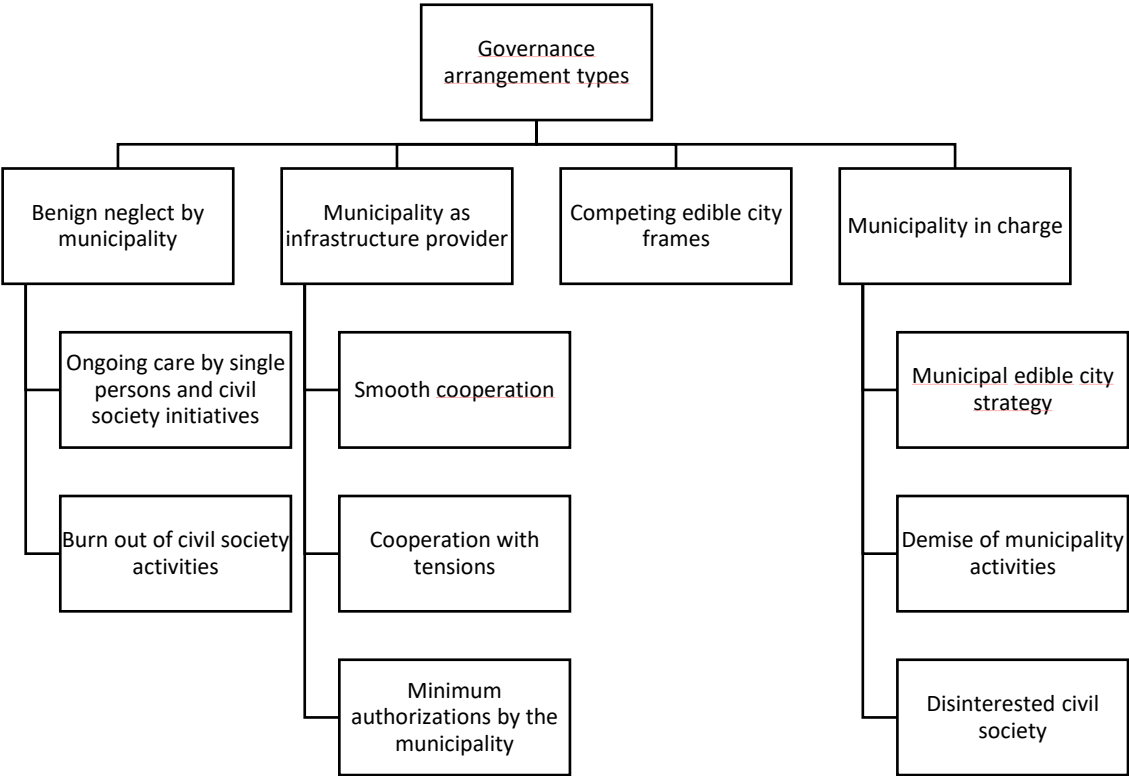
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