urban food fragments

An exploration of the Viennese food landscape in relation to its historical spatial development

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TECHNISCHE UNIVERSITÄT WIEN

DIPLOMARBEIT

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Urban Food Fragments

Eine Untersuchung der Wiener Lebensmittellandschaft
in Relation zu historischen räumlichen Entwicklungen

ausgeführt zum Zwecke der Erlangung des
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kurzfassung

Die Stadt ernähren, oder ernährt die Stadt uns?
Lebensmittel und ihre räumlichen Auswirkungen werden selten als architektonisches oder städtebauliches Instrument betrachtet. Dennoch ist Nahrung für das menschliche Überleben ebenso notwendig wie physiologische Bedürfnisse wie Wasser, Luft oder Unterkunft. Die Auseinandersetzung mit dem Lebensmittelsystem im städtischen Umfeld zeigt die sozialen, räumlichen und sensorischen Vorteile von Lebensmitteltypologien in der Architektur sowie die möglichen räumlichen Auswirkungen der Lebensmittelproduktion in der Stadt. Diese Masterarbeit erörtert Relevanz, Herausforderungen und Trends der urbanen Ernährungsstrategie, um einen ganzheitlichen Einblick zu geben. Sie untersucht Fragmente der urbanen Lebensmittellandschaft am Puls der Zeit im Kontext von Wien. Die historische Entwicklung der Stadt vom Beginn des 19. Jahrhunderts bis heute wird mit Fokus auf den räumlichen Einflüssen der Lebensmittellandschaft, analysiert. Die Industrialisierung, technologische Entwicklungen, sowie historische Ereignisse waren ausschlaggebend für die Wandlung des städtischen Raums, der sozialen Verhältnisse und der Lebensmittelversorgung. Die Frage, welche urbanen nachhaltigen Lebensmitteltypologien heute existieren wird erörtert. Internationale und nationale architektonische und städtebauliche Projekte verdeutlichen verschiedene positive Aspekte urbaner Lebensmitteltypologien für die Zukunft. Abschließend werden die Herausforderungen und Potenziale urbaner Lebensmittellandschaften aufgezeigt, um eine Diskussion über die weitere Entwicklung von Lebensmitteltypologien in den Städten der Zukunft zu initiieren. Lebensmittel (und ihre räumlichen Implikationen) sind in unseren Städten überlebenswichtig, haben aber auch eine politische, räumliche und nicht zuletzt eine wichtige Identitätskomponente.

abstract

Feeding the city, or does the city feed you?
Food, and its spatial influences, are rarely considered to be an architectural or urban planning tool, although it is as necessary for human survival as other physiological needs. An examination of the food system in the urban environment reveals the social, spatial, and sensory benefits of food typologies in architecture and the potential spatial impacts of food production in the city. This master thesis discusses urban food strategy‘s relevance, challenges, and trends to provide a holistic overview and investigates fragments of the urban foodscape on the pulse of time in the context of Vienna. The city‘s historical developments from the beginning of the 19th century until today are analyzed, focusing on the spatial influences of the foodscape. Industrialization, technological developments, and historical events were decisive in transforming urban space, social conditions, and food supply. Further, the thesis discusses the question of what kind of urban sustainable food typologies exist today and elaborates on various international and national architectural and urban design projects with the goal of demonstrating positive aspects of urban food typologies for the future. In conclusion, the challenges and potentials of urban food landscapes are highlighted to initiate a discussion about further developments of food typologies in the cities of the future. It can be said that food (and its spatial implications) in our cities is essential for survival but also has a political, spatial, and not least an important identity component.

Fig. 01 Food Traces in Vienna, 2021
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ON THE MENU...

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0 // INTRO

FOOD AND THE CITY

foodscape/, noun

urban /, adjective

of, consisting of, or in a city or town

food /, noun

something that people and animals eat,
or plants absorb, to keep them alive

fragment /, noun

a small piece or a part, especially when broken
from something whole

landscape /, noun

a large area of land, especially in relation to its appearance

townscape /, noun

a view or the appearance of a town or city

based on dictionary cambridge

0.1 Introduction

Similar to water, air, sleep, or shelter, food is a necessary human physiological need and necessary for everyone's survival. Nevertheless, it is rarely considered as being a tool for urban design. Moreover, it is nowadays considered almost a matter of course, which is also shown by the increased food supply in urban areas and how people take the variety of today's food for granted. Hardly anyone thinks about where food comes from or how many miles these goods traveled if one can buy everything needed at the next corner's supermarket. Globalization made it as easy as that. In our latitudes, this enormous security has never existed to this extent. In contrast, during ancient times, people did not take their food for granted (Steel, 2009:14). Further, the global pandemic outbreak demonstrated how used we are to global food-supply chains and how much we rely on them but also how fragile the global system is.

As the gap between rural and urban areas has diverged over the last few decades, productive and consumption space has also lost their relation. Local food typologies will become significant in facing climate change, wars, or other crises. The food cycle system from resources to processing and production, distribution, consumption, and waste reveals the relationship between food production and consumption typologies in the urban environment. It helps to map them into the spatial functions of the city. By asking questions about the social, spatial, and sensory benefits of food typologies in architecture, the taste of our city becomes visible.

Architecture is holistic, among many others understanding relations between built environment and communities, investigating historical city traces, and creating an atmosphere. By gaining experiences through traveling and studying abroad, the relation between food and space, and food and culture becomes recognizable and an essential question to me. Also, to hear the first time about the godmother of urban food, Carolyn Steel, in a lecture by art-based researcher Anna Maria Orru, was an inspiring event for the topic of this thesis. Therefore, her research was an immense inspiration and foundation for this thesis. A design studio in Kenya highlighted the relevance of educating about the food circle, even as an architect. Furthermore, the potential of integrating urban food at the household level generated an added value.

The thesis is structured in three main chapters - the spatial aspects of food typologies exemplified by the context of the city of Vienna are first placed in the historical context and status quo and concluded by an outlook based on design projects. At the beginning of this thesis, fundamental knowledge of challenges, terminology of food and space, as well as a digression with three spatial examples are introduced. The relevance and trends of urban food strategies are discussed to provide a holistic overview. The first chapter analyzes Vienna's historical development since the beginning of the 19th century, mainly focusing on the influence of the food supply on the city's urban developments. Industrialization and technical change were decisive in transforming urban space, social conditions, and food supply. A literature review and historical maps were the basis for this research.
Afterward, spatial supply typologies that developed in the 20th century until today are examined.As a result, the discussed main question is how resilient food production is today and which typologies are state of the art. The correlation and influences of innovative food spaces are investigated by case studies within the borders of Vienna.
The third chapter highlights international and national architectural and urban design projects and concludes with various positive aspects of urban food typologies for the future. To conclude, the challenges and chances of urban food production and consumption are described to initiate a discussion on the further development of these typologies and the city in the future. The following research questions guided this master thesis:

To what extent do food typologies shape the cityscape and the city's development in the pulse of time?

What potential does the urban food landscape have as a design tool for architecture and urban space?

Why is food an essential topic in urban planning and architecture?

»The battle over food is not just about what we eat; it is about society itself. Public life is the social glue of cities; public space its physical expression. Without them, urban society - civilisation itself - is fatally weakened. The role of food in forging both is immense.«

Carolyn Steel, 2009: 152

Fig. 02 Use of fishwaste in Kisumu, Kenya, 2020 ©S. Gold

0.2 Common Ground

The following chapter outlines current and future food supply challenges and global agreements that reflect these developments to set the stage.

Challenges

The world population is expected to grow by 1 billion to 9 billion by 2040, and more than two-thirds will be populated in cities. This population growth and urbanization will further increase the relevance of surrounding areas that supply cities with food enormously. This development will not only be a problem in the Global South, where it is already visible nowadays but will also affect more developed countries. Eurostat forecasts Europe's population to inhabit 441.2 million by 2050 (Eurostat, 2020). Vienna, Austria, currently has 1.9 million inhabitants, with a tendency to increase to 2.16 million (cf. Statistics Austria, 2020). Considering these growth forecasts, a central question will be how urban areas react to this increase and how the relationship between productive (food) spaces and productive hinterland will adapt to many hungry people.

Due to the global economic trend and climate change's impact, food supply is already becoming an issue on a national level for many countries. CJ Lim describes in Food City the problems of the current food system and global challenges with the need to produce double the amount of today's food by 2030. It is not just about quantity but how we manage the relationship between our food and resources. He concludes that producing food in a traditional environment like crop fields will not be enough for the increasing number of the future world's population. In this context, it will be essential to reconnect people and urban dwellers to the food they consume and manage resource scarcity carefully. Communities, especially children, need to see how their food is grown and where it originates. As architects and urban designers, we can contribute to excite, inspire, and engage them to face our global challenges (Lim, 2014: 80, 110).

This thesis is written during the Covid 19 pandemic. Our daily behavior and connection to where we eat and consume and how we use, interact and deal with public space in our cities have been altered. These circumstances drastically affected how we live together, especially in dense urban places and are also a further catalyst to question the logistics, value chains, and where our food is coming from. Furthermore, we all will remember seeing almost empty supermarket shelves for the first time - a fact that also inspired me when choosing the topic of this thesis.

Global agreements

The world is expected to face the same global challenges in the upcoming years. This year's IPCC report mentions the importance of resilient cities and how frail our food system is. Due to the following projected challenges, such as climate changes, including rising temperature, rising sea levels, and climate change-triggered migration, food security will be an increasing problem for the world's population and all descendants (IPCC, 2019).

Ten years ago, the food system was responsible for 30% of all global greenhouse emissions and 70% of the world's freshwater supplies (cf. Lim, 2014: 103). Today global emissions from our food system are still around 21% to one-third if we include all agricultural products (IPCC, 2019). Every single component of the food system can contribute to decreasing GHG and be adapted to climate change conditions. The land used for food and how we distribute, consume, and dispose of it can affect a more sustainable city development (Cabannes/Marocchino, 2018:13).

In September 2015, the United Nations established the agenda for Sustainable Development until 2030. The universal plan consists of 17 sustainable development goals, which aim to continue the work of the Millennium Development Goals and direct the

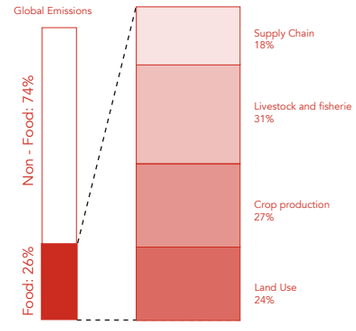


Fig. 03 Global greenhouse gas emissions from food production; based on Poore & Nemecek (2018)
©S. Gold

world towards a resilient and sustainable path. The goal is to improve the conditions for living beings and the planet and to achieve prosperity and peace worldwide. As sustainable development increases the quality of life for everyone, architecture and urban planning must consider it. The spatial aspects of the food system in urban areas can target the following UN-SDG:

Fig. 04 UN SDG's 2, 11, 12
©UN Global Goals

2. Zero Hunger

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, and other disasters, and that progressively improve land and soil quality.

11. Sustainable Cities and Communities

11.7 By 2030, provide universal access to safe, inclusive, and accessible green and public spaces, particularly for women and children, older persons, and persons with disabilities.

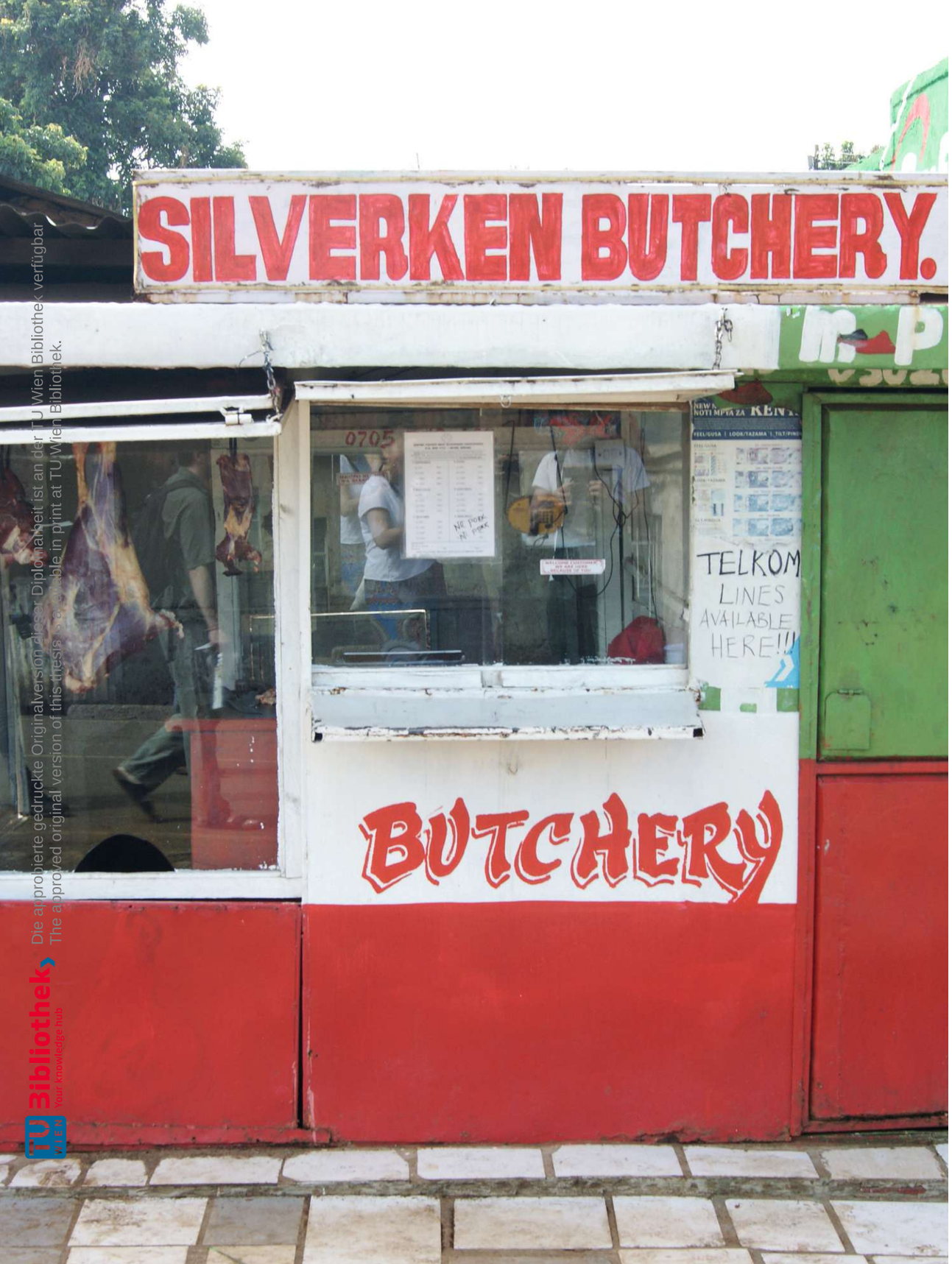
12. Responsible Production and Consumption

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production (United Nations, 2022).

The issue of how we deal with our ending resources, water, soil, and energy, is a social and moral problem. At the end of 2015, the European Commission signed a new package of measures on the circular economy. "A crucial goal is the implementation of the UN 2030 Agenda for Sustainable Development: The aspect "Ensuring Sustainable Consumption and Production Patterns" envisages a 50 percent reduction in (avoidable) food waste in consumption and trade by 2030 and a reduction of this waste in the other areas of the supply chain as well." (WKO, 2022).

Another binding global agreement targeting the food system is the Milan Urban Food Policy Pact. The mayor of Milan decided to launch an international protocol tackling nutrition problems at the urban level, followed globally. More than 100 cities signed the Milan Pact for Urban Food Policy in October 2015. The agreement consists of a guideline for actions with six categories: Governance, Sustainable Diets & Nutrition, Social and Economic Equity, Food Production, Food Supply & Distribution, and Food Waste. Each recommendation offers information on implementing food policies in their cities (Milan Urban Food Policy Pact, 2020). It is one of the most important legacies of Milan EXPO 2015.



»Food is an intrinsic and defining aspect of a city's identity. Its smells, textures and tastes manifest a city's cultural heritage, define its social habits and bring vitality and joviality to its streets. […] The composition of the urban food cultures is of paramount importance not just to the future prosperity of the cities in themselves but to the condition of the global food system as a whole.«

CJ Lim, 2014: 63

Fig. 05 A butchery street shop, food traces in Kisumu, Kenya, 2020 ©S. Gold

Food and Space Terminology

Before closer looking at food in Vienna's spatial and time context, it is important to build a fundamental knowledge of the challenges and terminology of food and space, which will be elaborated on in the following pages.

Food System

The modern food system must be investigated to understand the correlation between food and cities. The „Food Counselor"[1] (translated by S. Gold: „Ernährungsrat") is partly using the definition of Philipp Stierand, which he uses in his dissertation „City and Food - The relevance of urban food system for city development." Accordingly, the food system includes all individuals, businesses, and organizations involved in food production, processing, consumption, and disposal. In addition, the natural environment, social and cultural norms, legal requirements, economic conditions, and political processes are essential components of the food system (cf. Ernährungsrat, 2021). Furthermore, it explains the different layers and stakeholders in the food system. The food system can be influenced more sustainably by acting on all six layers (fig. 08); to less waste and a more closed loop.

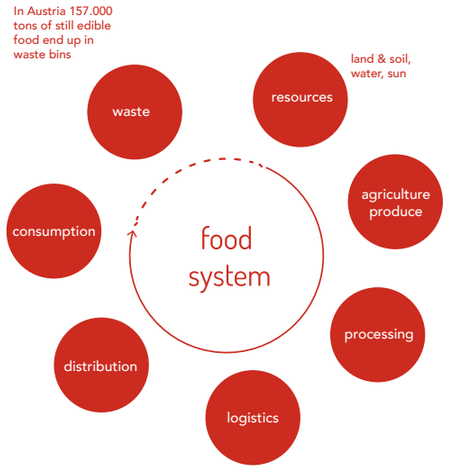


Fig. 06 Food System
© S. Gold

1 The Vienna Food Council is a civil society association and platform for shaping a sustainable food system for Vienna. It enables a wide range of stakeholders to come together from the beginning to the end of the food value chain. The focus is on the food system in Vienna, but global connections and urban-rural relationships are always considered.

For example, food waste is a problem along the entire logistics of the food system - from production to consumption and by the actors in the system, to name a few in private households, the catering industry, or the famous Viennese coffee houses. Moreover, the majority is in food retailing, such as supermarkets. In 2013, 35.600 tons of unsold bread and rolls were returned to sellers and wasted (WKO, 2022). 157.000 tons of still edible food end up in waste bins in Austria (1.3 billion tons worldwide). One Viennese throws approximately 40kg of still edible food in residual waste (organic waste bin not included) per year. In Vienna, the amount of wasted bread daily is the same as the consumed bread supply of Graz, the second biggest city in Austria (Stadt Wien, Umweltschutz).
Implementing and investigating all steps of the food systems are relevant aspects of city planning strategies and a way to categorize built structures.

Fig. 08 Stakeholders in the food system based on Food Council
© S. Gold

Urban Metabolism

Just as humans need a balance of inputs and outputs to function, cities are giant organisms with veins and flows. Urban metabolism is a lot related to human metabolism. In the book Urban Agriculture Europe, urban metabolism is described as: „Urban metabolism is a concept that relates to the movement, circulation, and dislocation of material resources in the city, and to the social, political, and economic process that governs these flows." (Toranghi/Sage/Dehaene, 2016: 166). The analogy of how much, how fast, and what we consume affects our health. Changing our consumption

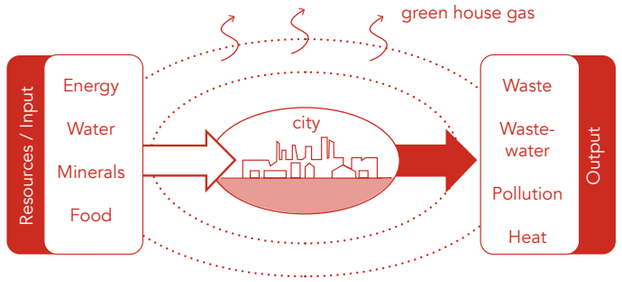


Fig. 07 Schematic urban metabolism based on Clift et al. 2015
© S. Gold

behavior can cause discomfort or more severe diseases. Tornaghi et al. say the same effect applies to urban metabolism: „Similarly, urban metabolism can be related to overconsumption and depletion of natural resources, pollution, natural disasters, and the creation of toxic and obesogenic environments. It describes the relation of inputs and resources to the natural household and the balance of the outcomes." (Toranghi et al., 2016: 166 f).

Food Urbanism

The landscape architect and urban designer Verzone and architect Woods started with an online database of typologies, strategies, and case studies of food-related projects in urban environments and how they influence our cities. This catalog shows the qualities of taking food as a planning tool into consideration in fictive and real concepts. Food Urbanism describes the interrelated relationship between food and the urban environment and can be a solution for new areas with new approaches to productive landscapes. „Food urbanism identifies potential opportunities for transferring rural agricultural skills to the city in a mutually beneficial manner," says Viljoen and Bohn. With Food Urbanism, not only the food system might be influenced, but the quality of urban life can benefit from growing and food-related spaces (cf. Verzone/Woods, 2021: 38).

Urban Agriculture

„The term urban agriculture is thus used in its most general interpretation: the production of food within and in close relationship of the urban context. It is not limited to a closed circle of professionals in the primary sector. The term urban farm also refers to the more general and spatial notion of an unit which produces food within the urban context and is not confined to the economic entity of a professionally and fiscally established commercial enterprise." (Food Urbanism, 2011).

Viljoen and Bohn define urban agriculture in their essay From Continuous Productive Urban Landscapes on the scale of market gardening, municipal parks, or domestic gardening, which is one of the most significant differences between rural farming. Due to the small scale, it has become a very interdisciplinary topic. Farmers, urban planners, and architects must cooperate and share their knowledge to integrate it into urban environments (cf. Verzone/Woods, 2021: 38).

Kevin Morgan describes in an article why urban farming is essential for an urban population: What distinguishes urban agriculture is its visceral materiality, the fact that it is palpable, tangible, and above all visible – in contrast to the industrial food system, where food of doubtful provenance flows into cities from placeless foodscapes (cf. Morgan et al., 2006).

Edible Cities

Over 100 years ago, it was common to provide food to citizens in public spaces. To raise awareness of the connection between the food system and the city's development into a more sustainable environment, the concept of edible cities can be an approach that city governments pursue. The difference with urban gardening, which focuses on the private individual, is that edible cities emphasize public space and consider the participation and inclusion of all citizens. The difference between urban farming is financial because the goal is to sell the yield. In edible cities, residents can farm for free and on a small scale in public space. The problem with edible cities is often the issues with fruit trees and vegetables next to roads and parking lots. Other priorities like infrastructure and cars are critical to our cities' appearance. However, in the face of the climate crisis, more green and a „back to nature" approach integrating green and even edible green can be a solution for a climate-resilient urban space (cf. Utopia, 2019).

»By physically reintegrating agricultural production into the fabric of our cities and suburb, the vision could bridge the gap between farming and everyday consumption that has formed over the last century with the advent of modern agriculture.«

CJ Lim, 2014: 119

Fig. 09 A glasshouse in Vienna, 2022 ©S. Gold

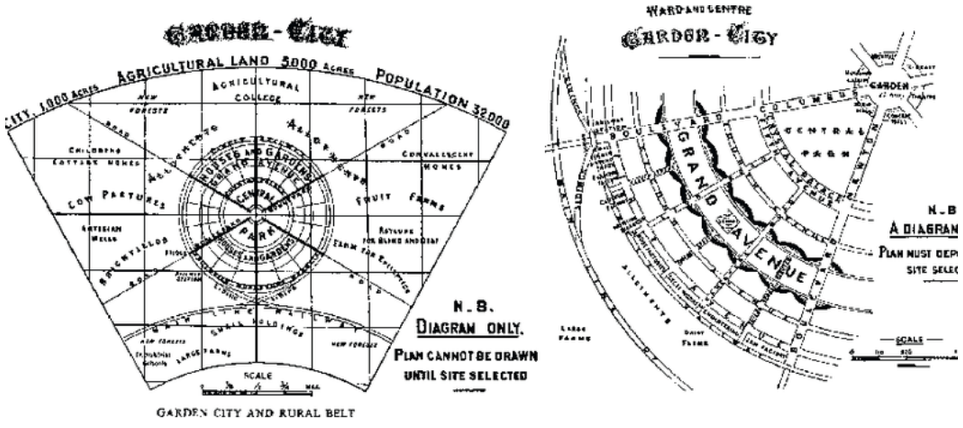
Digression: Tendencies and attempts for urban foodscape

Three examples differing in time and locations give a first overview of tendencies, attempts, and relevance of an actively used urban food landscape.

Due to significant changes in city shapes and daily life during the 19th and 20th centuries caused by technical evolutions, architects‘ and city planners‘ tendencies to integrate agriculture and aspects of rural life emerged. With the concept of Garden City, Ebenezer Howard compares the advantages and disadvantages of rural and urban areas. „Town - Country“ is the diptych of the industrialized cities of the 19th century. The principle of the Garden City is an area of around 2400ha and not more than 32 000 inhabitants.[2] Another aspect is the division of functions: Howard‘s design‘s heart is a garden square, radial, and concentric public buildings and institutions. The middle part is the residential area, and the outer circles continue with production, storage halls, and markets. The surrounding area is a productive landscape with agriculture which supplies the city with food and makes it completely independent. The concept of the Garden City is a dense and high-populated scenario, quite the opposite of a garden or rural idyll (cf. Lupfer/Paul/Sigel, 2011: 668f).

2 As a comparison: according to Statistics Austria, the municipality of Bregenz has an area of approximately 3.000 ha and around 30.000 inhabitants in 2021 (cf. Statistik Austria, 2022).

Fig. 10 Garden City Concept Ebenzer Howard



Howard‘s model included a social, demographic, and functional concept, with conditions aimed at a shared property and a collective city organization of industry, agriculture, and retail. Private initiatives were possible but without speculation possibilities. Even if Howard‘s idea of the Garden City was not realized one to one, the scenario influenced urban planning and tendencies in the 20th century. The built Garden Cities, at least the earliest ones, addressed vital elements of the food system, including production, distribution, consumption, and waste recycling, as an integral part of the city (Cabannes/Marocchino,2018:19). The first Garden City in Germany was realized in 1909 in Hellerau (near Dresden). However, in Vienna, this model was never established.

—> integrating elements of the food system in the city; agriculture as green belt or areas in the city.

The idea of autonomous, green city development has had its ups and downs over the last centuries. Detroit is an example of a more recent approach to urban farming and uses it as a tool to address social issues and spatial vacancy. Due to the local auto industry‘s decrease, Detroit‘s population has declined by a quarter in the last decade and by another 60% since 1950 (Huffpost, 2011). The city got increasingly abandoned due to this economic crisis and de-industrialization. As a result, many people left the town - and migration, empty plots, and crime rates increased. The concept of urban farming started not from a planning craft or the government but the community. Groups use urban agriculture to claim public, unused, or even vacant parts of the city. Urban farming makes access to fresh products easier, supports a more substantial community network, and fosters a sense of responsibility. Hence, the practice is also mobilizing the community to work together. The challenges urban farmers face differ from the ones of rural

Fig. 11 Detroit: Michigan Urban Farming Initiative & Brush Street farm; Alex S. MacLean © The New York Times

farmers: the access to land and the needed scale to be profitable. Even if urban agriculture's social and environmental benefits are visible, policymakers do not see the economic benefits. Nonetheless, Detroit is an example of using wasteland as a resource for bringing agricultural systems on a human scale back to the urban landscape (cf. Lim 2014: 41).

—> waste(land) as a resource and positive social impact of urban agriculture.

Adapting to extreme climate conditions, the Inuvik Community Greenhouse was established in 1998. This Community Garden is located around 200km north of the Arctic circle. Due to the rough climate, people had to deal with issues of no fresh food and crops. Their exposed location, economically high transportation costs, and long distances for their food result in highly high imported food prices. Therefore, out of need, the Community Garden Society started to use an old, abandoned hockey arena that should have been demolished as a greenhouse (cf. Lim, 2014:60).

One advantage of this northern climate is that Inuvik has an average of 56 days of 24-hour sunlight during the summer (June-August). During this time, plants and vegetables grow naturally; kale, roots, potatoes, and all the vegetables one would expect to grow in the North. Surprisingly, they are also able to grow amongst other watermelons.

The community adapted again to the Covid 19 pandemic. The urban gardener's group was only a limited number of people and only allowed to farm under solid restrictions. Nevertheless, at least five families of the 3.200 inhabitants of the town could sign up for a veggie box for a reduced price, funded by the Community Food Centers Canada (Community Garden Society of Inuvik, 2020).

This unique Arctic Urban Garden offers the residents of Inuvik the possibility of techniques such as raised beds to grow high-quality food in extreme conditions. Through workshops, composting projects, and agricultural education, it tackles the local food system and strengthens community development (cf. Lim, 2014: 61).

—> adapting to extreme environments with bottom-up projects; finding solutions for seasonal and regional food production; positive social impact; and using waste space as a resource.

Fig. 12 Inuvik Community Greenhouse ©Invuikgreenhouse

01 // FOOD – LOST IN TIME AND SPACE

HISTORICAL VIENNA SHAPED BY FOOD

Food and space: Vienna since 1850

Aspects and data reproduced in this thesis represent an excerpt from the entire food history and development of the city - and as such, they are intended for a deeper and more detailed analysis that would go beyond the scope of this thesis.

The strong correlation between human behavior, food production, and the urban landscape is evident in historical urban development. 3,500BC urban agriculture was not something new, as the Mesopotamians already used to have farming plots within their cities (cf. Lim, 2014: 133). Settlements developed after humans were able to start to cultivate the land and did not have to live as hunters and gather anymore. It can be said, without the first agricultural cultivation, there was no such thing as a city (cf. Lim, 2014, 291).

In Europe, settlements often developed in beneficial geographic locations. For example, being close to riversides as waterways have always been an easy way to supply cities. This transportation benefit is not only for food but also for feed, wood, and goods from more distant destinations than the city's hinterlands (cf. Gierlinger/Haidvogl/Gingrich/Krausmann, 2013). Toranghi highlights another important aspect of the development of the cities: Not only the geographic location, but historically urban areas became a high concentration of functions, art and crafts, merchants, and citizens, disenfranchised from direct, intensive, self-cultivation of food (cf. Toranghi et al. 2016: 175).

The urban-rural dichotomy changed drastically with the end of the 19th century. The correlation between rural and urban and the daily life of urban dwellers changed due to the industrial revolution. New technologies and the development of steam and water engines influenced transportation and production, and were the start of technical development and new possibilities. New possibilities about where food is coming from, how far away it was produced, and how much is produced. It started a new way of living in urban environments and resulted in detaching the rural land and urban areas (cf. Steel, 2008). At this moment, the food supply chain was directly affected. Many factories opened at the borders of the cities and had a significant impact on how cities developed. Social classes changed as new job opportunities were enabled. The whole logistic chain got new opportunities; some components of the food supply of the 19th century are still visible and characterizing today's city fabric, not only spatially but also atmospherically (cf. Lim, 2014: 291).

Analyzing the urban development of Vienna through the lens of food (supply) is the first foundation of this thesis. Some traces are still visible in today's city, especially by raising the question of how food and the food supply chain shaped the city from the 19th century onwards. It continues with an exploration of food typologies in this period. In chapter 02//food-now and here, the historical events from the early 20th century until today are investigated and followed by today's food typologies.

City development of Vienna
An overview

Vienna, a historical city in the middle of Europe and situated next to the Danube River, has a long history in craftsmanship, art, and architecture, as well as in food and its famous cuisine. The Viennese Kitchen („Wiener Küche") is one of the only cuisines worldwide named after a city. So how can food not be mentioned considering how the town got shaped over the centuries?

In the 19th century, Vienna developed from a pre-industrial residential city into a modern metropolis[3] with more than 2 million inhabitants. This change was a swift and complex transformation. In 1850 Vienna counted 550.000 inhabitants, twenty years later already one million, and after the turn of the century, it reached the

3 Vienna was on its way to joining the world metropolises like London and Paris. After the other two municipalities, the city was the first to host the universal exhibition in 1873, which was a starting impulse for many modernization projects for more prestige and recognition.

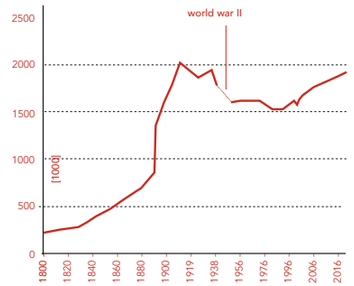


Fig. 13 Population development Vienna 1800-2016 based on Krausman © S. Gold

two million mark - almost as many people as today. Notably, this demographic change was the fastest urbanization process in the history of Europe (cf. Kos/Gleis, 2014: 9, translated by S. Gold). Therefore, the city had to deal with this drastic and rapid growth and the problems entailed, such as housing shortage and a high inhabitant density (4,5 inhabitants per flat). Vienna made the change to an industrial city already in the middle of the 19th century. By 1870, almost 50 percent of the labor force was working in the production sector (cf. Hauer/Weigl, 2014: 37, 134; translated by S. Gold). The shape and appearance of the city changed during that time: The Ringstrasse, with its famous architectural jewels, was built as part of the emperor‘s urban development plans, which started in 1858. Today, on the foundations of the old city wall, the Ringstrasse still forms an essential arterial road and the border to the old town and Vienna’s first district.

With the announcement of the competition of the Ringstrasse, the plans of demolishing the city wall and erasing Viennas‘ Linienwall was the start of another important arterial road, the Gürtel (-street), which is still an important street in Vienna nowadays. The city grew not only demographically but had to expand in spatial size according to the migration. In 1850, alongside the Ringstrasse construction, the incorporation of the suburbs started spatial as well. The inner city and 34 suburban villages became the inner districts, almost as we know them today. A horse-drawn tramway was introduced in 1865 to reach the outer communities. This infrastructure gave the streets of that time a distinctive atmosphere: the ringing of the tram‘s bell, the bells of the horses, and the sound of the wheels were significant for urban space (cf. Wiener Zeitung 2014).

All migrants who moved to the city hoping for a better life needed a place to stay. Around 1870 the development of the outer boroughs with residential perimeter development started. By 1890 the incorporation of Vienna’s districts 11 to 19 followed. The time gap accrued through governmental and financial reasons (cf. City of Vienna, 2021).

Talking about modernization and improvements in living standards, the population who did not benefit directly from these innovations has to be mentioned as well. The downside of the upper class‘s splendor and magnificence was the poor‘s social misery (cf. Kos/Gleis, 2014:10, translated by S. Gold). In particular affected were women and children, as well as traditional industrial occupations, who suffered losses, with long working hours and lower wage. The socioeconomic disparity with a miserable standard of living from 1820 to 1870 contrasts sharply with the economic boom of that time (cf. Hauer/Weigl, 2014: 131, translated by S. Gold).

Fig. 14 Vienna, Josephinischen Landaufnahme around 1790; the Danube Canal, Wien River, and the mainstream of the Danube are highlighted. The Danube Canal is one of the many branches preserved as a transportation shortcut & supply line from the harbors at the Danube to the city after the river‘s regulation.

Urban metabolism in historical Vienna

The supply of cities stands in solid relation with the transport and storage possibilities. Before the industrial revolution, the city had to rely entirely on production in the city and its surrounding hinterland. The technical development in conservation and cooling of food was another reason for the economic boom (cf. Hauer/ Gierlinger, 2014: 60). As there was no railway yet, goods for daily needs were transported and delivered by land or waterway. The first railway driven by a steam engine started in the Austrian Monarchy in 1830 and changed the city's appearance, especially the neighborhood of the junctions.

For the next thirty years, freight and passenger transport increased, especially to the south. In 1873 all six of the main head railway stations were finished. A central railway station in Vienna was discussed, but it has never been developed. All the junctions were not close to the city center, which gave their rich architecture a special appearance in their neighborhood (cf. Kos/Gleis, 2014:340).

Until then, an essential infrastructure line was the Danube. Transport on the Danube was restricted to seasons, as the water level changed by summer and winter. The Danube was and still is a mountain river and its water levels depend on amount of snowmelt. Before the Great Danube regulation in 1870, the river was surrounded by wetlands. The Danube Canal was the most crucial connection and transport route for food and wood to the city, but it was only possible to access with small rowing boats, as the riverbed was not very deep and mostly sandy. The landing places and harbors for steamships at the Danube were at Nussdorf and Kaisermühlen. Many markets developed close to the pier of the Danube Canal. The most important one was Schanzelmarkt[4] which later became the fisher's market.

As transportation became easier, conservation became state of the art, the population increased, and the food and feed deliveries grew almost three times by 1910. Waterways and rivers were crucial to keep the city „clean" or at least a way to remove waste from the streets. The hygiene standards, no access to clean water, and dirty streets caused many diseases and epidemics. Epidemics like cholera, typhus, and pox spread quickly due to the not renewed and not yet adjusted supply and disposal systems (Weigl, 2014: 134). The growing population density in cities supported the spreading of infectious diseases.

The danger of flooding, dung deposit, and the place of harmful vapors: are such negative aspects that have characterized the image of the city rivers as the Danube Canal and the Wien River for a long time. In that respect, the Danube Canal contributed to the cities' atmosphere. All the sewage ended in the channel and all its smells with it. The banks farther from the center were considered less metropolitan. In the suburbs of Roßau and Spittelau, water-related trades such as rafters, binders, and timber merchants had settled along the canal.

Until today the Danube Canal is a river rich in fish and is essential to urban anglers. Further downstream was the suburb of "Unter den Weißgerbern", where tanners, leatherworkers, butchers, and slaughterhouses continued to characterize the riverbank, and towards Erdberg and Simmering, extensive agricultural areas dominated (cf. Payer, 2011). Without spending any thought on the garbage-filled and smelly river - scenarios, today's public life in Vienna benefits from the regulated rivers in the city center until today.

Consumption Tax

The state introduced the consumption tax (Verzehrungssteuer, translated by S. Gold) in 1830, mainly levied on importing goods for daily use. This tax allows to glimpse at what had been imported to Vienna in the late 1800s. As Hauer explains, it is not an exact number, as there are no records of the black market. Further it is not clear how much got consumed by the poor, but it gives an overview of the preferred goods of the Viennese population. Agricultural products with their origin within the city tax district are

4 detailed information to Schanzelmarkt p.71

not included in the tax numbers. Until the late 1860s, one-sixth of the assessment area was wild nature, like the alluvial forest at Prater (cf. Hauer, 2014:11, 59).
The Linienwall - line included the city tax district, the city area, and the suburbs. The old line departments became the 13 tax offices (cf. Hauer, 2014: 23). The Linienwall was a spatial and social-economic border. Daily life outside this boundary was less expensive than in the inner districts because of the taxes on food and products for daily needs and the low plot prices and rents. This development affected the establishment of factories and industries close to the working-class districts. One event underlined this social gap in March 1848. Riots of the lower social classes charged the tax department. The department was closed after the riot for several days; hence 8.000 oxen could enter the city untaxed (cf. Hauer, 2014:25).

Hygiene regulations

With the growth of the cities, the atmosphere on the streets changed. No access to fresh water, no access to nutritious food, and waste and disposal on the streets were welcome scenarios for the spread of pandemics. A side effect of denser development was the more rapid spread of disease and sickness.[5]

After 1831, another enormous cholera epidemic hit the city, with many victims, resulting in the construction of an intercepting sewer for the inner districts. Only 40 years later, in 1873, the „mountain spring water pipeline“ (Hochquellwasserleitung, translated by S. Gold) was established. The pipeline delivers daily fresh water from 80km distanced alpine regions to Vienna. By 1897 more than 70% of Viennese households were already connected to this pipeline, which caused an immense increase in water consumption. Weigl explains in his essay a decrease in diseases and mortality rates after establishing the first mountain water pipeline. Another indication could also be an improvement in nutrition. Almost at the same time, systematic flushing of sewers with water from the mountain water pipeline began - but it was still discharged into the Danube Canal (Weigl, 2014). It was not until 1980 that the first comprehensive sewage treatment plant was opened on the Danube Canal (cf. Gierlinger et al., 2013).

Grüngürtel - The Green Belt of Vienna

The 1870s were an impressive time of development and new beginnings. The first environmental campaign in Austria was launched to save the Viennese Woods. One part of Vienna‘s green lung got retained after being privatized and lumbered (cf. Kos/Gleis, 2014:9).
At the turn of the century, the almost first worldwide green belt was established in Vienna. The wood and meadows zone around the city served as a recreation area and for the city‘s ventilation, especially as the town density increased. The green belt includes not only meadows and forests but also agriculture. However, the supplying effect of this area was never the focus. Agriculture became almost like a park and attraction for recreation. Integrating urban agriculture on exurban fringes can be city development‘s first positive and ethical side effect (cf. Lohrberg, 2001:10).
Agriculture in the vicinity of cities is mentioned only indirectly in almost all urban planning concepts from 1870 to 1920. Not the use but the morphology of the landscape is in the foreground. The planning approach and its secondary functions are recreations, urban hygiene, and the structuring of the city. The supply function does not play a significant role (cf. Lohrberg, 2001:15).
During the last century, the green belt closed, and a vast green lung was created, where recreation and cultivating landscape go hand in hand. This aspect of urban planning and how Vienna got shaped in the 19th and 20th century creates a very high living standard, with an almost rural landscape before the city‘s doorstep.

5 This problem affected not only Vienna but many European metropolises. In 1854 Jon Snow, a British physician, studied a cholera outbreak in Soho, London. He was the first to identify the importance of contaminated water as its cause (cf. Lim,2014: 121), which was a breakthrough in coping with the cholera pandemic and data visualization (cf. The Guardian, 2013).

Vienna city development and food typologies from 1830 - 1950

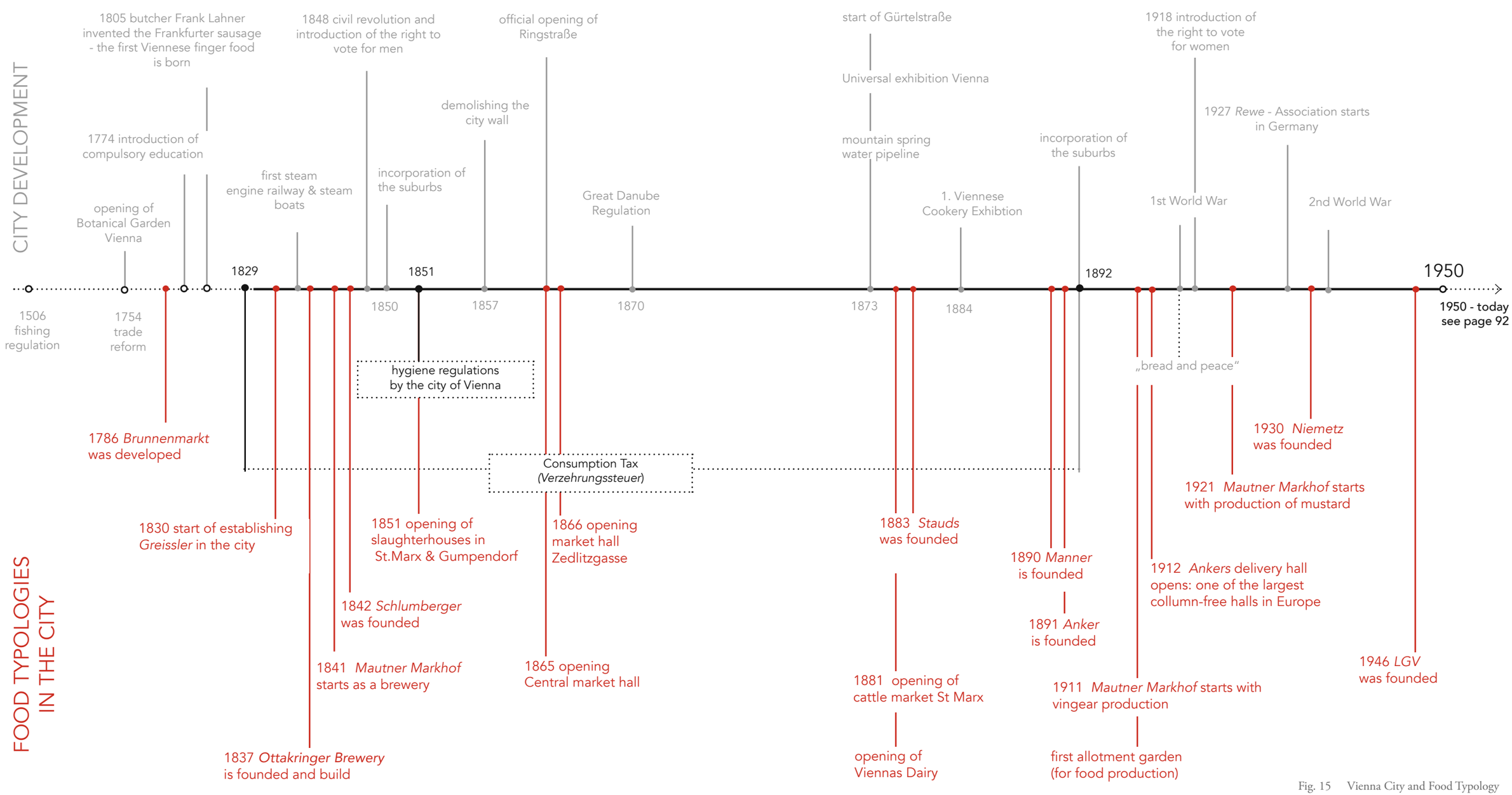
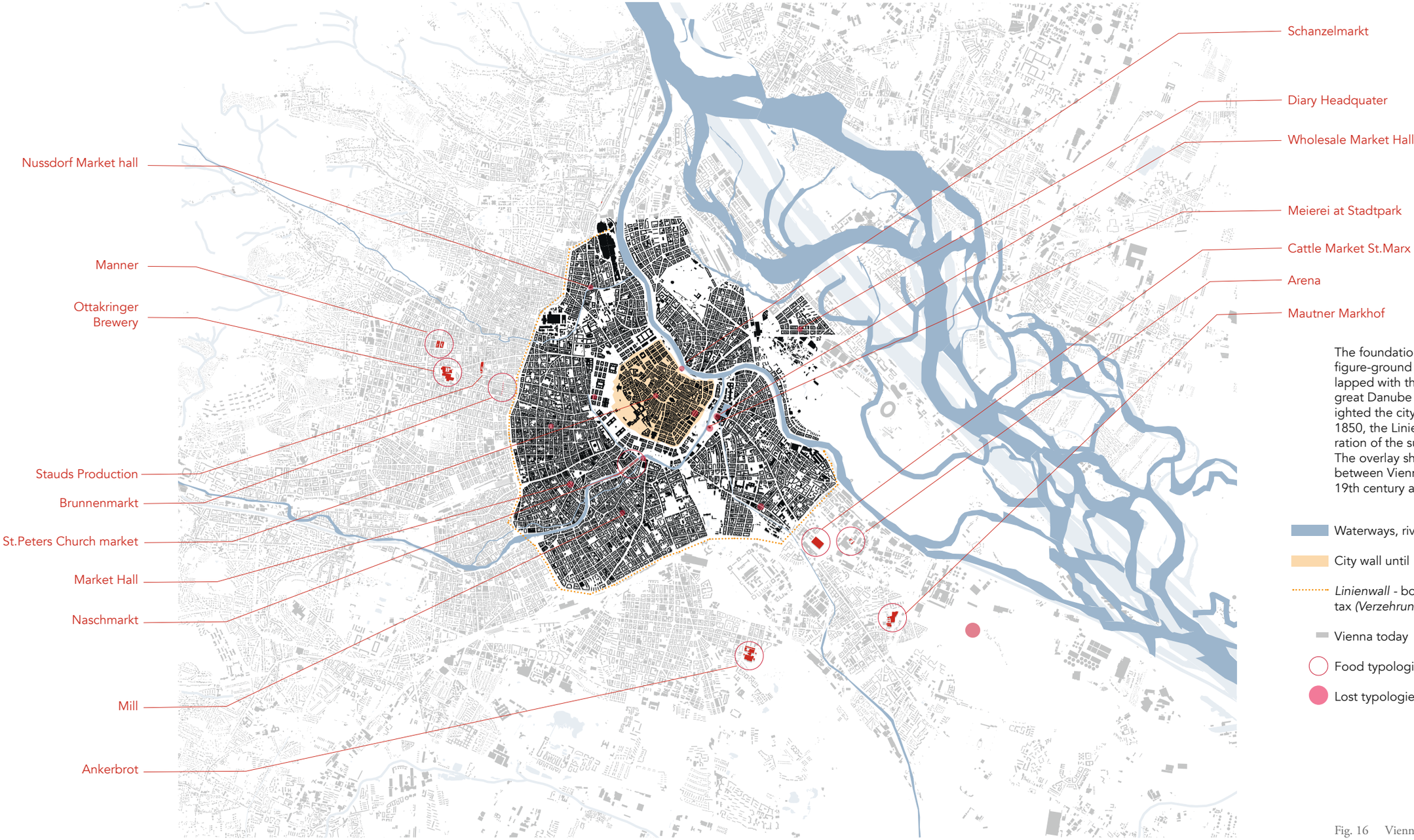


Fig. 15 Vienna City and Food Typology Development - Fragments Timeline 1830 - 1950 © S. Gold

Vienna and food typologies since 1830 underlayed with today's city fabric



The foundation for this map is Vienna's figure-ground plan of today; it overlapped with the waterways before the great Danube regulation and highlighted the city center, city wall until 1850, the Linienwall, and the incorporation of the suburbs in 1892.
The overlay shows the correlation between Vienna's transformation in the 19th century and today's city.

Fig. 16 Vienna Food Map from 1830 underlayed with todays city boundary; based on Franziszeichischer Kataster by Wiener Stadt- und Landesarchiv, Josephinische Landesaufnahme and Schwarzplan Wien ©S. Gold

Food Typologies - Overview

Fig. 17 Selected food typologies in the spatial fabric of Vienna; overview with siteplan, orthophoto, facts and axonometries in the same scale; based on the GIS data by wien.gv
©S. Gold, B. Genc

Ottakringer Brewery

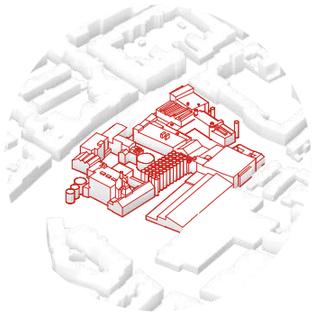
Location
16th district

Year of Establishing
Since 1839

Function
brewery

Function today
still production

→ p.51



Manner Factory

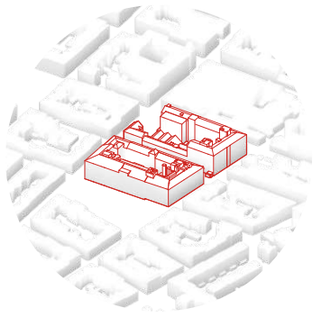
Location
17th district

Year of Establishing
since 1890
at todays location since 1904

Function
waffle factory

Function today
still production

→ p.53



Ankerbrot Factory

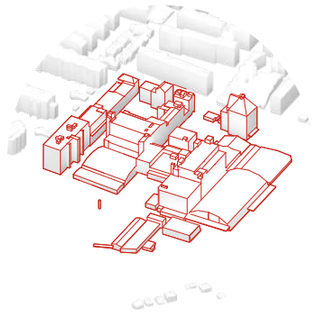
Location
10th district

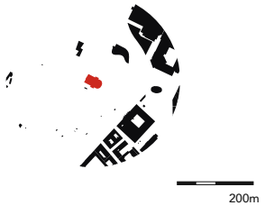
Year of Establishing
1891

Function
bread and bread roll factory

Function today
culture hub with lofts, gale-
ries, event location partially
under monument protection

→ p.55





St.Marx Cattle Market

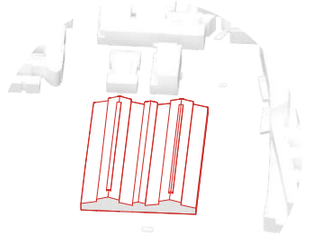
Location
3rd district

Year of Establishing
1883

Function
central cattle
market hall

Function today
reactivated as an event hall
under monument protection

→ p.58



Nussdorf Market Hall

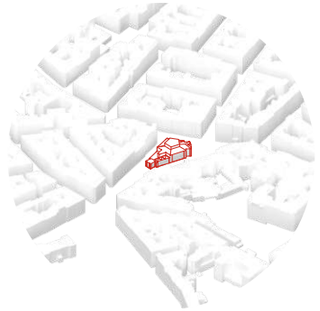
Location
9th district

Year of Establishing
1897

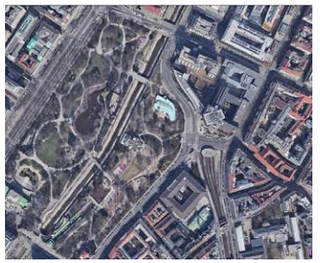
Function
market hall

Function today
supermarket
under monument protection

→ p.75



Meierei Stadtpark



Location
3rd district

Year of Establishing
1903, damages and
massive changes 1947 (WW2)

Function
milk drinking hall

Function today
restaurant
under monument protection

→ p.73

Food and Space in the 19th century

This chapter describes the architecture and atmospheres generated by new food typologies and how they influenced the shape of Vienna in the 19th century. Food was much more visible on the city streets and had a more significant impact and a more relevant role in urban life. Since the dichotomy of urban and rural life had not yet been segregated, production, consumption of food, and spaces needed for these functions were also much more intertwined. Hence, the chapter will be divided into three parts, even if they overlap: typologies of food production, food consumption, and lost typologies. The last subchapter, Lost Typologies, summarizes how typologies and structures are still integrated or only traced in today's city fabric.

1.2 Typologies of urban food production in the 19th century

Industrialization - Factories

Ottakringer Brewery

In the 19th century, beer consumption increased, so the number of breweries also had to rise. Viennese and Austrian beer was famous both among the local population and abroad. Many of the breweries were located outside the Linienwall. Beverages were sold there cheaper since the tax ceased to apply. One of the most significant and essential breweries was the antecedent of Schwechater Brauerei. At that time this company was labeled with "das größte Bieretablissment der Erde", as Waissenberger says (cf. Waissenberger, 1977: 92).

One of the essential breweries until today was established in 1839 in Hernals, later known as Ottakringer Brauerei. First, it should supply only its direct neighborhood and district, but with many measurements and adaptations, the whole factory grew to its today's appearance over the years. By the middle of the 19th century, the brewery already had new technologies as the first steam engine. The brewery uses, until today, only the water from their

Fig. 18 historical view of Ottakringer Brauerei ©Ottakringer Brauerei

Fig. 19 Ottakringer Brauerei courtyard with horse carriages for beer transport ©Ottakringer Brauerei

water well. It was not only a social meeting point with a small ballroom and point of selling drinks but a social place to work with a lucrative canteen. By the end of the century, the complex grew again, and working-class houses were established. In 1913 the whole area had a size of 40.000 square meters. By the turn of the century, the Ottakringer brewery company was the first brewery that got a wage agreement with the monarchy, which improved the working conditions for all Viennese brewing employees.

By 1978 the Ottakringer Brewery was the only self-employed big brewery in Vienna and its surroundings. The beer output was 12,572 hectoliters in 1848 and reached 408,163 hectoliters in 1987. Many trademark changes, the concession for nonalcoholic drinks, and advertising strategies to expand the regional market were beneficial for this Viennese brand (cf. Czeike, 2004: 471 f.).

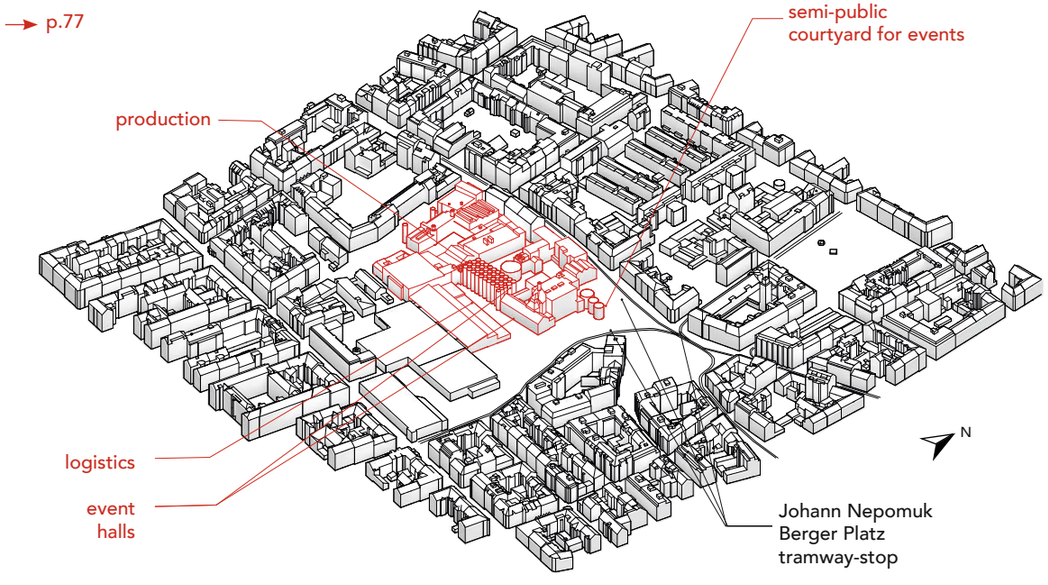


Fig. 20 Axonometry of Ottakringer Brauerei in today's city fabric ©S.Gold

Manner

Another factory whose products were and still are favored by the Viennese is Manner. The company relocated after growing too big to Hernals, today's 17th district, back then still a suburb. The Manner Company started in 1890 with a small shop in the city center. Josef Manner, the owner, was not satisfied with the quality of the imported chocolate, so he decided to start to produce by himself. Social sustainability was, from the beginning, a meaningful mission statement. Josef Manner said: "Jedes Kind, das einen Kreuzer für meine Sachen ausgibt, soll dafür nicht bloß eine Nascherei, sondern auch ein wertvolles Nahrungsmittel haben." (Manner, 2022).

After the factory relocation, it proliferated yearly, giving the whole neighborhood its specific and delicious smell of melted chocolate. The creation of „Manner Neapolitan wafers," initially on a price list in 1898, boosted the company's rise. The Manner company started in 1897 with 100 employees and multiplied to 3000 employees in less than 20 years. The factory enriched its neighborhood not only by its smell but also by its forward-looking social working structure: there was a company doctor, a canteen, workers' houses were set up, and their employees were given paid leave, and even pensioners were supported.

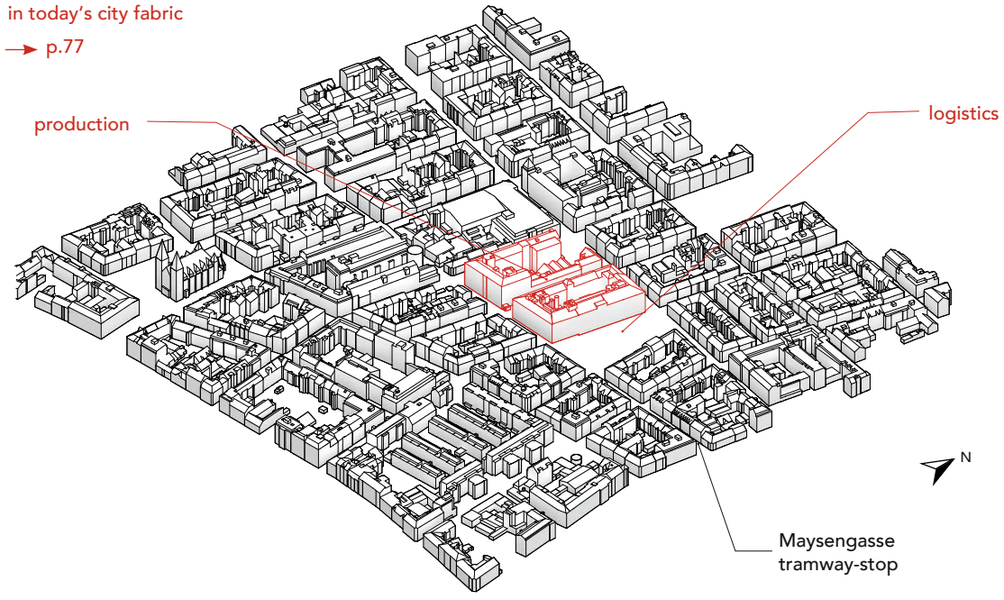
Fig. 21 Manner factory outer view
Fig. 22 Manner factory entrance
©S. Gold, 2022

Fig. 23 Manner advertisment ©Manner

After both world wars, it took a while to return to high economic numbers. One breakthrough was the package design of today's Manner wafers - developed and designed in 1964. The sweets were now airtight packed and could be sent abroad and overseas. In 2011 the company took a future-forward decision and renewed the whole factory and production process. The aim was to reduce energy consumption and get almost self-sufficient. Since then, the world's giant waffle oven has been producing 450 waffles per minute and supplies 600 households in Hernals and Ottakring with heat loss which is transformed into heating and hot water (cf. Czeike, 2004d: 144; Manner, 2022).

Fig. 24 Axonometry of Manner factory in today's city fabric ©S.Gold

Manner factory
in today's city fabric
→ p.77



Anker

In 1891 the brothers Heinrich and Fritz Mendl bought a Viennese bakery which became bankrupt. The Mendl brothers started to renew the production process and logistics. The issue of that time was to industrialize the process of creating dough and baking. Fifteen years later, the Ankerbrotfabrik was Europe's most excellent bread factory.

At that time, the factory was located at the border of the city, today's 10th district, close to a new 1865-built working-class residential area. The location was attractive to expand the factory, which was soon necessary to achieve the bread demand and the spatial proximity to the railway. The factory had to adapt constantly, and some of the most appreciated industry architects[6], civil engineers, and steel concrete companies were involved. The architecture followed the principles of the state of art and local structure: brick walls[7] and a yard structure. The organization of the ground floor plan was adapted to the production process.

6 Friedrich Schön was the architect in charge. He studied first in Budapest, then at the Vienna Polytechnic, and completed his studies at the Academy of Fine Arts under Theophil Hansen.

7 Almost next door, the Wienerberg brick factory was founded in the 19th century, which was the first brick factory in Vienna. The cheap and available construction work was another advantage of the location in Favoriten.

Fig. 25 3D section of „Weissbäckerei" Ankerbrotfabrik, 1954 ©Anker

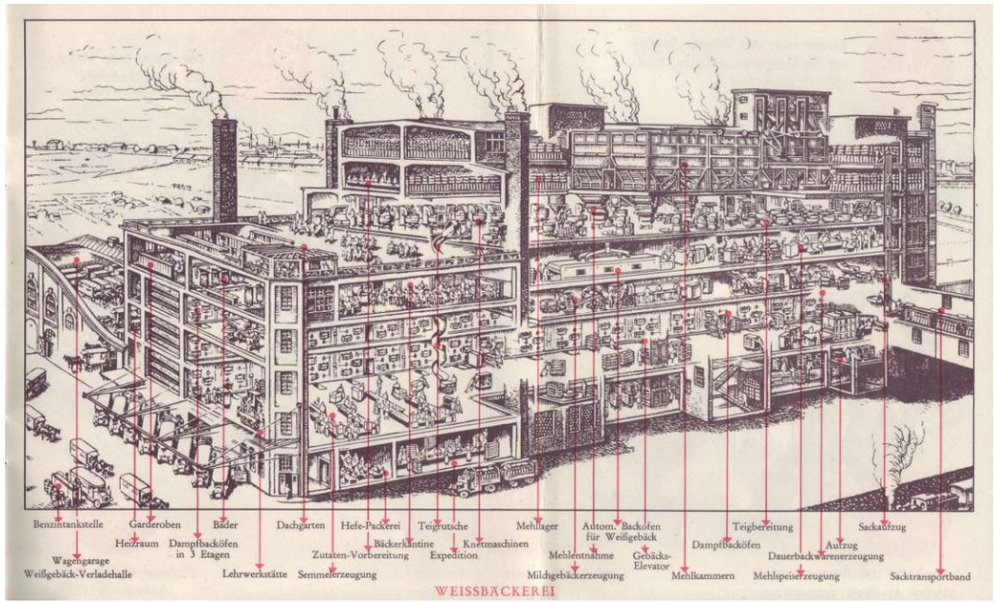


Fig. 26 Small loading hall today; Ankerbrot factory after renovation ©A. Urban

The „small" loading hall with 2.200sqm was built even before the first world war. At that time, it was the largest spatial room without columns in Europe. The construction was built by the son of the famous Ignaz Gridl, one of the most important iron constructors and most eminent civil engineer for the Ringstrasse buildings in the monarchy. Ten years later, an even bigger hall for loading was built with more than 4.000sqm. Moreover, again the construction and size aroused interest all over Europe.

By 1912 the white bread bakery became four stories high with 21 ovens to produce 500.000 loaves daily, while the dark rye bread bakery had a capacity of 200 ovens to produce around 160.000kg of bread daily. With the increasing production, the logistics had to adapt too. Ankerbrot had their horse-driven carriages for bread delivery. It was not the fastest option, but still the most lucrative one: the speed of the horse and the cashier were an ideal team and system. The bread delivery with horse carriages defined the street life of Vienna for the upcoming centuries. The final bread delivery like that was in the 1960s. As the transportation and bread supply was efficient, Ankerbrot opened 100 branches throughout the city and had 4.000 points of resale until 1900. By the century's turn, Ankerbrot became the purveyor of court but was also known as the bakery of the working class. Not only bread was sold, but flour, rice, and lentils as well.

In 1900 the company already had more than 2.000 employees. Quite similar to Manner, Anker pursued a socially sustainable company. They were known for their social support of the employees, sanitary areas at the factory supplied with the Viennese mountain water pipeline (which was also used for the bread production), and even a retreat located in the countryside, provided by the Mendl Brothers themselves. For that time, that was way beyond the working environment standards. Nevertheless, a riot by the workers caused by a conflict of working hour conditions at the end of the century was the first time workers could show and use their powers as consumers and influence the market.

At the beginning of the 20th century, the factory became quite powerful for the city's food supply and owned 50 percent of the market. During the time of the first world war, Ankerbrot was still a stable supplier of food until the regulations and limitations for production by the government started.

In the 1930s, Ankerbrot started with marketing and advertising campaigns. The slogan „Worauf freut sich der Wiener, wenn er vom Urlaub kommt? Auf Hochquellwasser und Ankerbrot" was quite famous in Vienna. The company slowly recovered from the economic crisis during and after the second world war. After some structural and conceptual changes, the old Viennese company flourished again in the 1980s (Kristan/Rapp, 2011: 22-69, 136-165 and Czeike, 2004: 109).

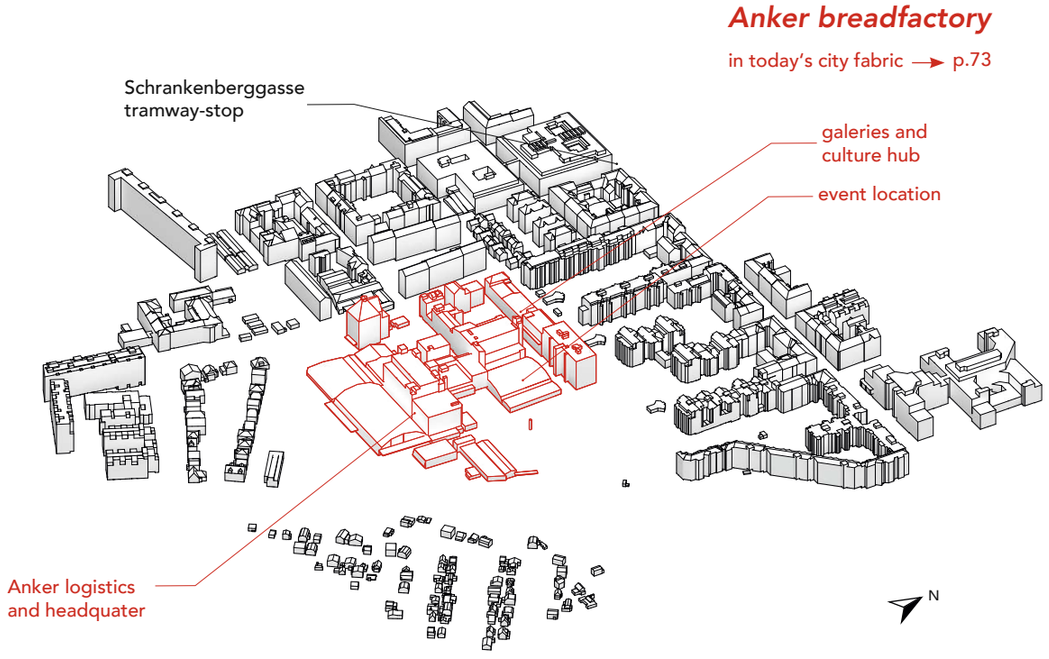


Fig. 27 Axonometry of Anker breadfactory in today's city fabric ©S.Gold

Butchers, Central Cattle Market, slaughterhouses

The Viennese kitchen has a great tradition of meals with beef, which was significant for the urban image for a specific period. In the middle of the 15th century, the city's first spatial regulations for butchers were established. During the middle age, slaughtering was only allowed on (slaughter-) bridges, as the water below washed the blood and other waste away. This aspect highlights the relationship between waterways and food supply again. During the 16th century, slaughtering at bridges was forbidden by the monarchs, and slaughter blocks were installed near today's Schwedenplatz (Czeike, 2004e:91). Afterward, butchers were located at Fleischmarkt[8] and Graben, which became fancy addresses during the city development of the next hundred years. Markets of oxen, mainly imported from Hungary, were located close to Stubentor, the border of the first and today's third districts. The long herd of animals south over Simmeringer Hauptstraße and Landstraße to the city center was significant for urban life.[9] There was even one time per week when all house doors had to be closed, and all street stalls disappeared, as the ox were herd to the market. At the end of the 18th century, the Wiener Neustädter Canal was regulated, and the ox market moved to St. Marx (Czeike, 2004b: 325; 2004d:439).

Fig. 28 St. Marx Cattle Market around 1900 ©Bildarchiv Austria

8 Translated by S. Gold: Fleischmarkt; is still an address in the first district of present-day Vienna, see: Lost Typologies, p. 73

9 In an article by a Viennese newspaper, the readers were asked for memories and their knowledge about historical food production in their neighborhood; one called today's 3rd district the „factory of prime rib and tenderloin." In this area, many butchers used to have their sites and stalls. Another anecdote is the „more unbearable smell" that used to be almost a trademark of this neighborhood (cf. Wiener Zeitung, 02.04.2021).

The meat supply and all its components were connected to daily urban life. The noise, the smell, and the traffic obstruction caused by the numerous cattle drive represented a significant burden for the inner city of Vienna. Death and decay in the form of blood and slaughterhouse waste were daily companions of the city's population. In the 19th century, the understanding and acceptance of slaughtering in urban areas changed, and efforts were made to hide all the blood and inconvenience that slaughtering brought - it was to be hidden behind high walls. Therefore, slaughterhouses and the act of slaughtering should no longer be part of public life (cf. Martsch, 2019: 111, transl. by S. Gold).

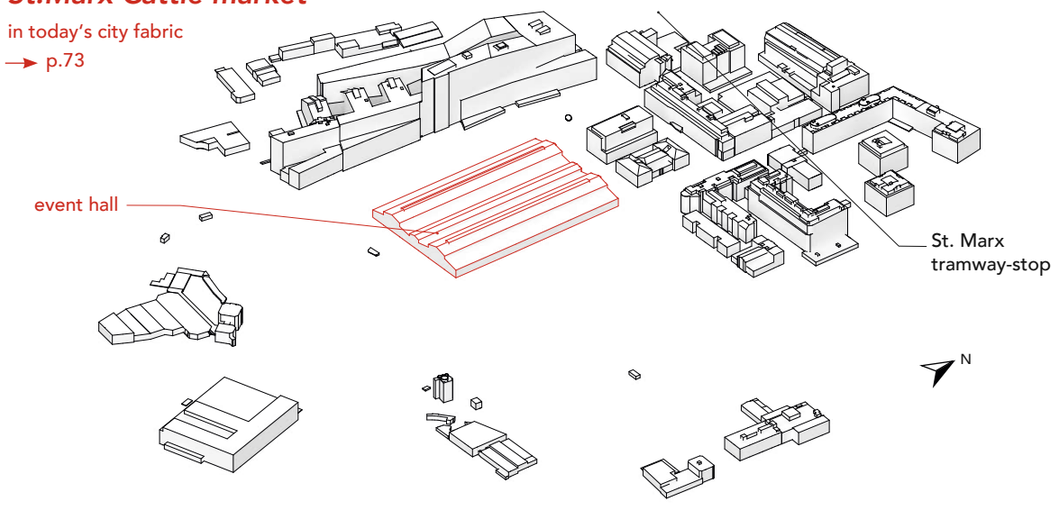
In the second half of the 19th century and after the revolution, the municipal government of Vienna decided to reform the food supply system. One discussion was privatizing the food supply and easing the way to get a trade license. It meant a differentiation of several businesses, especially in meat production like slaughtering and processing. Opening the trade license was to achieve a greater area of supply. The food supply system's regulation was caused by hygiene, transportation and storage, and economic benefits. Another aspect was to regulate the trade and slaughter of cattle and livestock. In 1830 almost 50% of the total imported meat was beef. Around 40% of the cattle in the late 19th century originated from Hungary. As Vienna pursued to become a metropolis, the bloody business was not something to happen on the streets and be part of daily urban life anymore. In the 1850s, several slaughterhouses opened, for example, the Gumpendorfer Slaughterhouse next to the newly regulated riverbed of the Wien River. This slaughterhouse was already connected to the Viennese mountain water pipeline and had a sewage system that entered the Wien River. It was the beginning of new hygiene standards in the meat production system. As the city increased, three slaughterhouses outside the city boundary opened in the 1880s in Meidling, Hernals, and Nußdorf (cf. Martsch, 2019: 102-111; Czeike, 2004b: 325, 637).

In 1883 the central cattle market in St.Marx (today's 3rd district) was founded and built. At that time, it was the only allowed point of sale within a radius of 10km for livestock animals for slaughtering (among other calves, sheep, and pigs). By 1898, this central cattle market sold 14.370 tons of beef and 3.800 tons of pork meat. Another 60 tons of beef and 24 tons of pork were sold at the meat market hall in the 9th district. Seventy-three percent of the beef and 52% of the pork were from subcontractors from Vienna and the suburbs (cf. Martsch, 2019: 105 and Waissenberger, 1977: 113).

The main building of St.Marx was the cattle market hall, the first iron construction in Vienna. The hall consisted of one central nave with three alleys and two side naves connected to the canopy over the street. The architecture of the market hall was a significant step forward in lightweight construction as glass and iron were used for the entire walls. This newly developed construction was significant for 19th-century architecture and was beneficial for natural light inside the building. The buildings of the central cattle market, including other livestock halls, slaughterhouses, and market halls, were constructed in brick and iron (Wiener Stadtentwicklungsgesellschaft, 2006; Waissenberger, 1977: 113).

St.Marx Cattle market

in today's city fabric
→ p.73



Furthermore, cattles were part of the urban life: most livestock was transported to Vienna to the junction of Floridsdorf (beyond the Danube in the northeast of the city). The Central Market Hall did not have a connection to the railway system yet, so thousands of animals had to walk through the city to the market hall in the south, influencing public space. In 1873, the year of the universal exhibition in Vienna, the St.Marxer cattle market was connected to the railway system (cf. Martsch, 2019: 113).

Dairies

In the past, meat and milk were produced in the city. One reason for locating dairies in the city was the short transport distance, as the shelf life was relatively short, especially on hot summer days. In the 1870s, the Ministry of Trade recognized Vienna's undersupply of milk. Not only the lack of milk but also the quality and the adulterations were the reason for the complaints. At that time, one-third of the milk sold in Vienna was already transported by rail (cf. Weigl, 2014:144). Most of the milk was delivered from Schladming (south of Austria). However, after the incorporation, many of the hinterland's dairy farms and „Meierein"[10] belonged to the city of Vienna then. The WIMO - Wiener Molkerei (Viennese Dairy, translated by S. Gold) was the biggest dairy in Vienna. Some smaller diaries of the suburb were still in use after the incorporation, for example, in Gersthof or Wieden (cf. Gerges, 2018).

In 1880 the WIMO - Wiener Molkerei was established as a cooperative and had its headquarters in today's Radetzkystraße in the 3rd district. The supply grew by deliveries from Lower Austria and transportation by train. The building used to be a production area, working-class houses, and a logistic point with a big yard for distribution. Ten years later, a new building was erected in the second district, Molkereistrasse, as the milk production capacity had to expand. The new headquarter of the dairy was near Prater and „safe from the haze and dust of the big city." It had a spacious area of almost 10.000 sqm. Not only was the outer appearance

10 Meierein used to be dairies with their own cows or milk drinking halls.

11 NÖM (Niederösterreichische Molkerei) founded 1898 bought many of the small dairies in Vienna and the WIMO in 1992.

impressive, but the interior was also equipped with expensive materials and the spatial organization of the production procedure. The daily delivery of milk amounted to about 31,000 to 45,000 liters. The colossal farm had 76 carriages (181 horses) and eight small trucks ready for delivery. Since the products of the Viennese dairy also gained tremendous popularity in the Austrian monarchy, it supplied not only branches in Vienna but also in Klosterneuburg, Bad Ischl, and Mödling.[11]

Just as the factories strived for social sustainability, the Viennese Dairy aimed for the same. The new complex not only set new standards architecturally but also in terms of hygiene measures within the company. The building complex served production and logistics but also housed the administrative office, apartments for the workers, bathrooms, showers for the employees, and a fair-price canteen. Since diseases can easily be transmitted through milk production, all employees had to undergo regular medical examinations. Even if an employee was found to be ill, he continued to receive his wages, which was not expected at the time.

In a newspaper article of the year 1903, it was said that Vienna might have the most extensive milk bottle distribution worldwide: they fill 34.000 bottles every night. The spatial organization of production was optimized in the new building, and the procedure of cleaning the bottles and the butter production. Other products of the Viennese Dairy were fine cheese, inspired by French camembert, sour milk, a preference especially in the summer, or milk for babies and children. Furthermore, whipped cream was and still is quite popular to enjoy coffee in Austria. The architecture of the new building complex was appreciated not only by its high, light rooms but also by its used materials (as tiles, marble, and mahogany) (cf. Wiener Molkerei, 1927; Wiener Zeitung, 1903, trans. by S. Gold). According to a study by the University of Natural Resources and Applied Life Sciences in Vienna, 223 dairies with around 3.500 dairy cows were still supplying Vienna at the time of the Second World War. The problems caused by the war were working men who had to go to the army and the destroyed infrastructure of railroads and ruined buildings. After the war, mechanization, and thus the possibility of longer shelf life and even more industrialized production, the importance of dairies decreased. And with it, their spatial presence in the cities. To date, dairy production in Vienna has completely disappeared except for a few traces, highlighted in more detail in chapter 1.4 Lost Typologies (cf. Gerges, 2018).

Fig. 29 Viennese dairy: courtyard with horse-drawn carriages, 1900 ©technisches museum wien

Fig. 30 New Diary headquater in todays‘ Molkereistraße, ca. 1910 ©technisches museum wien

Fig. 31 Prater - Meierei Krieau, picture postcard, before 1905, Vienna ©wien museum

Urban Agriculture

For thousands of years, agriculture was practiced in cities. Remains of the settlements of the Neolithic period, from 6000 BC, show that people cultivated cereals and legumes on the terraces and kept domestic animals. Before the city's transformation into a modern metropolis, not only meat and milk were produced in the city, but the population depended on agriculture in urban and suburban areas. Reasons such as the expensive cost of transportation or the impossibility of storing goods led to the need to produce in the city or its immediate surroundings (Peterson, 2005: 207f., translated by S. Gold).

Gierlinger estimates urban food production (excluding livestock) for the early 19th century based on the Franziszeischen Kataster[12] and the areas used for production. The relation between the consumption tax in the city of Vienna and the net yield of the cadastre is a foundation for the estimated figures, taking into account the inclusion of the suburbs and the changing city boundary. The producing areas are fields, meadows, horticulture, gardens, wetlands, and unusable land. Not all of the lands were for food production. According to the agriculture statistics by Sandgruber, it can be assumed that potatoes (32%), cabbage (32%), turnips (18%), and other vegetables, like green peas, cauliflower, or asparagus (18%) were consumed and partly grown in the vegetable gardens of Vienna by 1830.

12 first cadastre of the Austrian monarchy for land taxes (system for land taxes adopted in 1817) with figures on population, topography and estimates of the net income of the area.

horticulture

Fig. 32 Zoom at today's 3-5th district of Josephinische Landesaufnahme

The suburbs of Leopoldstadt, Wieden, Landstraße, and Erdberg owned almost half of the garden areas and 74 percent of the total arable land of the Viennese suburbs. Within the city limits, arable land of more than 60 hectares was located in Matzleinsdorf and Hundsthurm, today's dense fifth district. Cultivated gardens existed everywhere in the city, pasture land mainly in the southern suburbs and northwest, at the Linienwall. Nevertheless, even back then, agriculture was firmly pushed to the city limits and into the surrounding countryside. Commercial vegetables have been growing in the city and the immediate vicinity since the 15th century. Since the 19th century, the growing and developing city needed more areas for residential and industrial buildings, which pushed the cultivation more and more to the outskirts. The citizens used small fields or meadows in the surrounding city area or small kitchen gardens in the city (cf. Stierand, 2008:31 f. and BMLRT, 2009). The number of private gardens and production of individual small agriculture is wholly left out.

Gierlinger raises the question of what significance inner-city livestock farming and agricultural production had in the first place. Furthermore, above all, to what proportion of total consumption it contributed. If we take a closer look at the excise figures, only a tiny part was likely produced in the city. An estimated amount

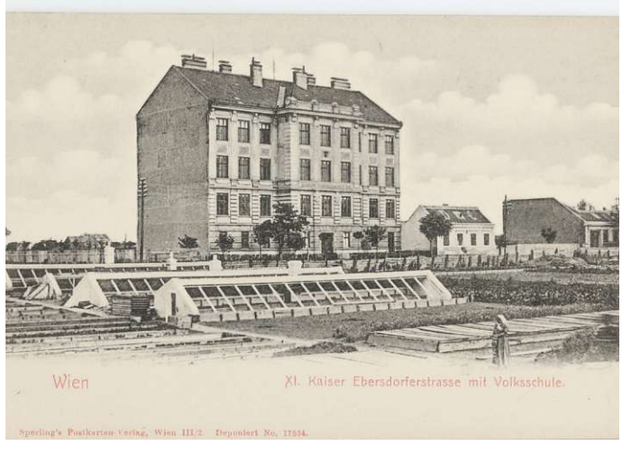


Fig. 33 Elementary school and glass houses of a nursery in Simmering, picture postcard, 1900-1905 ©wienmuseum

of 571 tons of fresh fruit and 1.826 tons of fresh vegetables per year was calculated. This number was not even 10 percent of the imported fruits and vegetables in 1830. Gierlinger estimates that the total food production in the urban context, including dairy, fruit, and vegetable production, and more, may have totaled 20 percent. The question of the importance of livestock farming is still unclear, but the Franziszeische Kataster indicated its importance in the city. Changes in the city's development, such as the Danube regulation and the incorporation of the suburbs, greatly influenced the division and use of a large area. Not only did the change in the cityscape influence the extent of urban agriculture, but also the productivity and the industrialization process (cf. Gierlinger, 2014: 111-123).

Urban Fishermen

Strict dietary regulations, especially during the Christian fasting period since the Middle Ages, forbade slaughtering and eating meat at certain times, making fish and crayfish staple foods highly relevant (Peterson, 2005: 213, translated by S. Gold). Not only beef but also crayfish and „carp, pike, tench, and huchen" played a significant role in the old Viennese cuisine. In an article in a Viennese newspaper, Thiel mentioned the importance of the Danube and the city's proximity to the riverbank as beneficial for infrastructure and a vital food reservoir (cf. Wiener Zeitung, 09.05.2021).

At the beginning of the 19th century, the number of fishmongers increased with the variety of fish sold. The fish sold came from the surrounding towns such as Nussdorf, Stadlau, Schwechat, Schwadorf or later from Lower Austria, from regions such as Thaya and Traisen, but also „lake fish" for example, from Lake Neusiedl (Burgenland) (cf. Wien Museum 2020; Peterson, 2005: 213, translated by S. Gold).

Fishermen of the Danube were allowed to sell their catch in the city center, close to St. Stephen's Cathedral. Around that area were 20 herring huts, where the conserved fishes were sold. Even in the suburbs of Vienna, fishes were sold. One theory of the source of sold fishes is mentioned in an article by Haidvogel: Fishes and crabs are initially from small streams around or even in the city, such as the Wiener Wald stream or Ottakringer Bach, where even a Crab-Island or a Crab-Garden used to be. Danube fish decreased from 230 tons yearly at the beginning of the 1880s to 60tons in 1914 (cf. Wien Museum/Magazin 2020).

1.3 Typologies of urban food consumption in the 19th century

The thesis follows the steps of the food system circle. Hence, the typology of food consumption includes only places where food is sold to be prepared and cooked at home. Restaurants and eateries are excluded as the topic of food, and the city would go beyond the scope of research. Although the distinction between the typologies of production and consumption was not as evident in the mid-19th century as we see it today, the typologies are examined in two separate chapters.

Markets

Markets used to be one of the most important sources of daily food supply. Markets were not only a public place of consumption but also a place of social interaction. During the city's development in the last centuries, there were a variety of markets all over the city. As the city changed, markets were relocated, and some slowly disappeared to a fraction of their former number. Again, the problem of storing fresh produce led to daily or weekend shopping (Peterson, 2005: 207, translated by S. Gold).

One of the oldest and most important markets until today is the Naschmarkt in Vienna. This part of the research is based on the paper „Der Naschmarkt: Seine Geschichte in Kapitel" (The Naschmarkt: its history in chapters, translated by S. Gold) by Dimitz. Dimitz is a social scientist and head of the museum of the 6th district. His paper about Naschmarkt also asks for citizen knowledge to complete his research.

Naschmarkt was relocated from Freyung to today's Resselpark in 1780. The name of the market might not originate from the German word „naschen" (to snack something) but the ash disposal next to the market's new location. Another theory for the name's background is the ancient word „Asch" for milk pails, as the market initially was a farmers' market for milk and dairy products. Over the years, the market grew quite rapidly, and other products like fruits, roots, and cabbage delivered by carriages were sold there. The Naschmarkt was well known for its heatedly argued conflicts between the administration to get taxes and the haggling marketers.

Initially, the central part of the Naschmarkt was a farmers' market, where foreign farmers also sold. In the 19th century, the „Fratschlerinnen"[13] were banned from the city streets and had to move to the Naschmarkt area. The female street vendors prevailed. The women were of great importance to urban life at the market, as they presented their products visually and with their loud voices. In 1817, the market was enlarged by redesigning a Promenade Square and relocating another fruit market. The regulation of the Mühlbach in 1856 expanded the market area one more time. In 1908 more than half of the market stalls sold fruits and vegetables.

13 The Fratschlerinnen or „Naschmarktweiber" (Weiber is an old german word for women, and by now an insult) used to be the name of the female marketer or street vendors. „Fratscheln" is an old Austrian word for asking nosy questions or gossiping. However, it is also an old word for street vendors - they were known for their glibly jokes and rudeness. (Czeike, 2004b: 377)

Fig. 34 Carl Moll, Naschmarkt, 1894 ©Belvedere

The other goods were meat products, a small amount of fish and crabs vendors, bread, eggs, flowers, sauerkraut, flour, legumes, and single craftsmanship.
Otto Wagner had general regulation plans for the city and some ideas for the Naschmarkt. In his opinion, all markets should be removed from the street and urban life and put into market halls. At that time, the typology of market halls was a completely new building type for Vienna and not appreciated by the citizens, either by the marketers or the commoners (Dimitz 2015).

Instead of Wagner's idea, three naves of market pavilions starting from the Secession were built at the beginning of the 20th century. The market grew and grew with the years and the regulation of the Wien River. The erection of a market hall was still discussed but with excellent resistance from the marketers. Instead, a half-open hall with two street-like alleys was erected. This market was demolished in the 1970s and moved to Inzersdorf, where today's central wholesale market is located. Instead of the old market building, a parking lot, first thought temporary, was established. Today it is the location for the Naschmarkt flea market. The new Naschmarkt lacked modernizations such as cooling and storage rooms, no cellar, and no direct connection to the railway (Wien Museum 2021). Today its function has become increasingly gastronomic but is still famous for locals and tourists.

Fig. 35 Alois Friedrich Schönn (artist) fruit market at the Schanzel, 1895, © Wien Museum

Schanzelmarkt and fish market

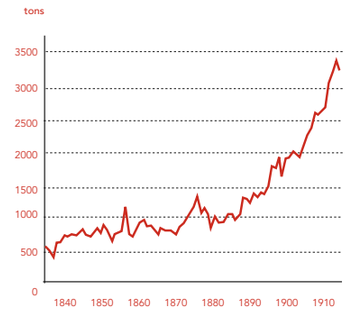
The second important market of the 19th century, Schanzelmarket, was located at the bank of the Danube Canal near today's Schwedenplatz. The „Schanzel" was the name of the canal's part (in front of today's Rotenturmstraße), which served as a port for goods, food, and people who were delivered in small boats across the Danube (Dimitz 2015: 2-3). This market was, besides the Naschmarkt, where all goods delivered by the land way had to be sold, one of the most relevant markets of Vienna.
In 1793 all products and goods delivered by ships from places like Wachau, Hungary, Romania, or Bulgaria on the Danube had to be sold at Schanzelmarkt. It was especially known for the great variety and quality of fruits, which Dimitz describes with a figurative quote of Rudolf Till: "(...) von den ersten Kirschen angefangen bis zu den letzten Trauben und Äpfeln, die noch in der verglühenden Oktobersonne gereift waren" (Dimitz 2015: 2-3).

Fig. 36 Advertising poster of the Com pany A. Hofbauer's Nephew, the river and sea fish at the fish market © Österreichs Donau

As is often the case, a municipal ordinance from 1839 divided Schanzelmarket into three parts: one part for the moorings and sales points for the fruit boats, one part for boats with potatoes, cabbage, and roots - and another special place for shipped goods of small and large size (Payer 2011: 152 f). The entire canal was bustling with life, as it was the only route from the Danube to the city center. From Nussdorf, the beginning of the canal, to Kettenbrücke, small wooden boats were on their way, delivering

Fig. 37 down: Imported fish and shellfish to Vienna from 1840 - 1910 based on Hauer © S. Gold

Fig. 38 down left: Fischmarkthalle Donaukanal
© Foto: Birgit & Peter Kainz, Wien Museum



goods and food to Vienna. Behind the Franzensbrücke, boats with wheat and calves docked, and the ships from Hungary or Turkey anchored (Payer 2011: 153).

A huge problem was the low tide of the Danube Canal, especially on hot summer days, and the sandy riverbed reinforced this issue. Because of regulating the riverside of the Danube Canal and building the city railway (which would later become today's U4), the market had to move upstream. The Schanzelmarkt disappeared entirely at the turn of the century and was replaced by a modern central fish market. The market contained two main halls with 12 booths each and cooling storage underneath the delivery ramp. Along the riverside, fish tanks were placed in the water for livestock. Payer describes an often macabre scenario of melting bloody ice at the riverside and the slowly moving ice on the river during the winter. In 1830 around 600 tons of fish and shellfish were transported and delivered to Vienna. In the next 50 years, the numbers doubled. In the middle of the 19th century, the amount of delivered fish was around 7,32 million kilograms (cf. Czeike, 2004e: 697).

Fig. 39 Joseph d. Ä. Lanzedelly, „Die Obstweiber", 1818–1820 ©wien museum

Fig. 40 Ferdinand Cosandier, „Kreebs'n kaft's Kreebs'n!" around 1820 ©wien museum

Street Vendors

Besides markets, street vendors were a significant visible typology of consumption in public space in 19th-century Vienna. The street vendors without booths were influential in the street atmosphere of those days. They presented their goods and services loudly and had the advantage of not having to pay taxes for a stall or a store. The traders' products on the streets varied from lavender, snails, chestnut grillers, or milk, to mention a few. Some sold squirrels, and hedgehogs, not for eating but as an effective weapon against vermin or bizarre animals such as frogs or salamanders as they were used for weather forecasts (Hengl 2022). The traders and their profession were so significant for that time for Viennese public space they made their way into literature history by the name "Cris de Vienne" (Viennese gestalt). There are many recorded images in the collection of the Wien Museum, see fig. 37 (cf. Wiener Zeitung 2014).

1.4 Lost typologies

In the context of Vienna, some of the previously described typologies of urban food production and consumption are still in use. Others are just outer shells and skin but are still important to a neighborhood with their specific outer appearance and architecture. Furthermore, some are only visible through street names that still give an idea of what used to be there, and some are completely lost and forgotten. This chapter highlights significant but lost food typologies.

The Ankerbrotfabrik was saved from demolition in 2011. After the war, it had several owners. The total factory area was 68.000 square meters. With the conversion to modern technologies in 2003, the same amount of bread can be produced in a third's area. In 2011, the oldest part (17.000 square meters), which is partially protected as a historical monument, was saved from demolition. The spatial appearance is still visible, but the function has changed to lofts, exhibition spaces, gastronomy, and an art and cultural center. The small loading hall was structurally and materially adapted over time, which positively affected its acoustics. The new functions are theater, opera, and music events. With the expansion of public transportation and the new residents and users of the Ankerbrot complex, a lively cultural quarter was created that is integrated into the development of the cultural axis of Vienna (Kristan/Rapp, 2011: 138 f).

Thinking of the herd of cattle running through the streets of Vienna, the only reminder are two statues of oxen that still mark the entrance to the site of the old cattle market. Many of St.Marx's

Fig. 41 Occupation of foreign slaughter house in 1976, which becomes later Arena ©Peter und Burgi Hirsch (Wien Museum)

central cattle market buildings were destroyed during the Second World War. The foreign slaughterhouse became known in the 1970s through the Viennese alternative art scene, which insisted on the right to the city. Immediately before the planned demolition of the abandoned building, a group of young musicians and artists occupied the building and prevented it from vanishing altogether. It was not just about saving an old building but about demanding a participatory design process of public space and a public arena - hence its current name. Today, Arena is an alternative venue for concerts and festivals and has a beautiful outdoor area for open-air cinemas and concerts. The surrounding area of the Arena is not exactly inviting, as there is industry and the city highway in the immediate vicinity.

Nevertheless, the entire area of St. Marx is part of an urban development plan for the coming years and is integrated into the STEP25 urban strategy. This plan includes the central cattle market hall. It was partially revitalized with small events and is now used for designer markets and more significant art events. Both buildings are excluded from the city's infrastructure. However, as the neighborhoods develop with residential and mixed-use buildings, they will soon be amidst a bustling environment.

Fig. 42 Great Market Hall, 1928. View of the market halls, in the foreg round the Ungar Bridge with a view of the tracks of the connecting railroad and the city railroad. ©MA8 Wiener Stadt- und Landesarchiv

Until today, milk production has wholly disappeared from the city of Vienna. Perhaps the only reminder of it is the street name Molkereistrasse in the second district, the location of the magnificent new building of the Vienna Dairy (cf. Gerges, 2018). Other remnants include Meierei Stadtpark and Meierei Prater, formerly milk drinking halls. In the late 1950s, this building type had another flourishing moment. Milk was such a rare product during the war years that it became almost a luxury drink afterward. It was only a brief boom in prosperity, but by 1955 there were twenty -two milk drinking parlors and milk bars in Vienna. Ten years later, there were only seven. In the 1960s, milk consumption declined drastically (Bandhauer-Schöffmann, 2013: 564). At Stadtpark's Meierei, a small reminder of the old days remains with a milk bottle sculpture in front of the entrance. After the renovation and adaptation of the building, it is now a high-class restaurant. The Meierei in Prater Hauptallee is also used today as a restaurant and café.

One typology that, with few exceptions, never gained favor with the Viennese population were the market halls. From the small fishermen's market hall on the banks of the Danube Canal, only the name „Fischerstiege" remains, which reminds us of the Viennese fishermen. The construction of market halls was a new typology in the 19th century. The reasons for building market halls were hygiene, economics, and ventilation. The central market hall, newly built in 1865, was located in Vordere Zollamtstraße. It lost its function in the 1970s after several additions and alterations. Due to the redevelopment of the entire area on Landstraße / Wien Mitte, the market hall disappeared entirely from the cityscape, as did the smaller market halls throughout the city. The only still existing one ist in the 9th district, privately owned and is still used today as a supermarket (cf. Kos/Gleis, 2014:292; Waissenberger, 1977: 111).

Fig. 43 Carl (Karl) Ledermann jun. (Hersteller), 3., Stadtpark - Milch trinkhalle, Ansichtskarte, 1903, ©Wien Museum

Fig. 44 First Viennese market hall in Zedlitzgasse 6, inner view around 1875 ©Hermann Heid

Fig. 45 Innerview of Nussdorfer market hall, the only still existing market hall in Vienna; Allgemeine Bau zeitung 1885 ©Österreichische National Bibliothek

Bread and bread rolls have always been popular with the Viennese urban population. Today, only some street names are traces of this food typology. Many Viennese mills were located near riverbanks. For example, close to Mühlbach, which passed through what is now the fourth district and was later regulated. Another characteristic of Vienna was the ship mills on the Danube, which were also quite numerous. In the middle of the century, almost all smaller mills were commercialized and replaced by larger, steam-powered mills. Few mills were active until the Second World War but disappeared almost entirely in the twentieth century (cf. Waissenberger, 1977: 89 f).

Some other evident food traces in Viennese streets would be, among others, Getreidemarkt, Schlachthausgasse, Mühlgasse, or Fischerstiege, which still give a hint today of functions that used to be there.

1.5 Spatial influences of historic food typologies in today's city

While walking through modern cities, the question arises of how much history or remnants of 19th-century urban structures are still visible - especially food typologies. The 19th and beginning of the 20th century were decisively shaped by industrialization, transformations in working conditions, and technological development. Furthermore, this process brought changes in hygiene and production processes and, thereby new spatial typologies. Local food production generally started to disappear in European cities during that time. Visible traces left are some typologies still in use, revitalized and repurposed structures, and street names, where only imagination can bring back the smell of fresh bread or the sound of thousands of animals herding through the city.

Even food typologies like the Naschmarkt are under intense pressure from the community and public opinion. The discussion about another market hall for this location has been booming again in recent years. There have been discussions of eliminating the flea market area and building a market hall with a sizeable gastronomic function. The residents of the surrounding neighborhoods had and have a firm opinion against this plan. It is a battle between politics and citizenship.

The Manner and Ottakringer factories mentioned in chapter 1.1 still characterize the atmosphere of the 17th district. Food production is not only visible through the knowledge of these two original Viennese brands, but also their production smells. The Ottakringer brewery took the next step to integrate the building complex into the urban fabric and public space by making its old production hall a popular venue for concerts and festivals. Manner is trying to take the circular economy to the next level by recycling its waste heat into the heating circuit of the 17th district.

During the pandemic, the high quality of a consumption-free public space like the Danube Canal in the city's heart became apparent. The riverbank is still a vibrant public space, not with market stalls and the smell of fresh fruits, but with big groups of young people enjoying the good life in Vienna, especially at weekends. Nevertheless, only a few know the origin of a place like this.

0 2 // FOOD – NOW AND HERE

VIENNA TODAY – FOOD TRACES

Fig. 46 Food Traces in Vienna, 2022
©S. Gold

Food supply of Vienna since 1900

The thesis's second chapter continues with Vienna's development investigated through the lens of food. In the pulse of time, influential events and impacts of the 20th century are highlighted. Industrialization was a decisive turning point for the social, spatial, and economic development of society and cities in the 19th century. The same can be said about the First and Second World Wars in the 20th century, but with a negative connotation. This chapter briefly describes the influences of these occurrences on urban development and, again the relationship between food (supply) and spatial development of the city of Vienna.

The development of new food-related typologies, such as supermarkets, and thereby the changing consumer behavior, is investigated. Furthermore, based on the Vienna Food Atlas, selected food typologies of the 21st century are described and researched. Like Chapter 1, it is a fragment of the urban foodscape and does not cover a complete listing of all historical events and relevant typologies, as this would go beyond of this thesis scope.

2.1 Food history and supply from 1900 - today

The city's supplies were already inadequate at the beginning of World War I. There was a shortage of flour, meat, potatoes, fodder, coal, and all other goods for daily use. Before the war, 50 percent of the supplies came from Hungary. However, during the war, imports were reduced to one-sixth, which resulted in a shortage of goods for daily use.

The First World War was a turning point for Vienna's growth and a caesura on its way to becoming a metropolis. It ended in a state of emergency. By 1915 food supplies were regulated by ration cards to control the consumption of low quantities of bread, potatoes, and food. To cope with the drastic situation, the city administration set up various municipal departments, such as war kitchens and a food department, to ensure the fair distribution of food in the districts. The situation escalated rapidly during the war, and hunger was pervasive. One example: At the war's beginning, women rioted at Brunnenmarkt at Yppenplatz because food prices were rising dramatically. Later, thousands of people had to queue every day to get at least a slice of bread, meat, which became an exception, or eggs. Long lines of people in front of stores symbolized those years and a sad indication of food in urban life. Conditions were terrible, and

Fig. 47 Line of waiting people in front of Kriegsküche No. XXI (Vienna 3, Sophienbrückengasse 32), around 1918. ©wien museum

Fig. 48 Allotment garden in Meidling, Vienna 1916 ©Zentralverband der Kleingärten

famine was already visible in every corner of the city. The situation was exaggerated; riots and looting of stores and bakeries went hand in hand with mass strikes and revolutionary slogans such as "Bread and Peace." The government tried to support the population with social policy measures such as tenant support, war kitchens, and even war gardens. The war gardens were an initiative towards a self-organized food supply. After the war, agricultural production in Austria had fallen by 50 percent, and at the war's end in 1918, the city's food supply situation (and general supply) was catastrophic. Some neighboring states stopped supporting the Austrian monarchy and supplying food. The first food deliveries from neutral Switzerland began at the end of the year. Rationing of food supplies finally stopped again in 1922 (cf. City of Vienna, 2022).
During the period of the two world wars, the government had different urban planning ideas and goals. After the First World War, the number of citizens in Vienna dropped to 1.84 million. The government attempted to take sustained action against poverty and hardship. Red Vienna[14] was characterized by social structures, hygiene, health and welfare regulations, and communal housing. Instead of following the garden city principle, the idea of superblocks, building complexes with 1.500 apartments, and densification in urban areas was pursued and has shaped Vienna to this day. The building program was aimed at apartments with bright rooms, water and toilets, and surrounding green spaces (cf. City of Vienna, 2022b). At that time, in the architectural scene, was a discussion between supporters of superblocks and row houses with kitchen gardens with various still famous supporters.

14 social democratic period of the gouverment in Vienna inbetween the wars from 1919 - 1934.

World War Two and its aftermath

The Anschluss in 1938, was another drastic event for city development and city (food) supply in the 20th century. This part of the thesis does not focus on tragic and terrifying events but on how the Viennese citizens fought to survive and supply for themselves. Bandhauer-Schöffmann investigates the food supply during World War 2 in Vienna in her essay "Ernährungsverhalten und Kochkultur in Wien" ("dietary habit and cooking culture" trans. by S.Gold) in the collection "Vienna since 1945 - A metamorphosis of a city". Her paper is the foundation for the following subchapter.

Fig. 49 Employed public in front of a branch of the Ankerbrotfabrik, war postcard, 1915 ©wien museum

The crisis of the war implicated a reintroduction of food regulation cards. In the middle of the 20th century, a study by the Viennese Workingclass Chambers said only a third of the consumed food was purchased within the official supplying system. The other parts were raised with the self-sufficiency of the population. This self-sufficiency was either trading with farmers of the surrounding hinterland or the black market of food from foreign countries. The biggest black market in Vienna was at Resselpark and its neighboring side alleys. The black market in the city was exceptionally costly compared to prices in the countryside. Therefore, if citizens wanted to trade cheaply, they had to leave the city, for example, to one popular trading point, Neusiedl am See. There are some bizarre stories of smuggling, such as a Viennese undertaker who tried to smuggle 700kg of food in 87 wooden coffins - but still got caught by the police (Bandhauer - Schöffmann, 2013: 535 f).

The necessity of self-sufficiency during the war years was supported by the reintroduction and extension of allotment gardens. The municipality decided to seize underused land with nutritious soil, which the citizens could cultivate within the city borders. The so-called "Gardens of Crisis," or the more optimistic name Victory-Gardens, as they were called in the UK, were born. The city government distributed those plots to around 60.000 families as a foundation for food supply. By 1946 a total area of 4,33 million square meters of public city plots and 7 million square meters of private plots were used for agriculture in the city. However, one problem was the missing know-how of the urban population, as the citizens had no experience gardening and its allotments. The

gardens, and the help of the municipality, who supplied instructions for gardening and even provided young vegetable plants, helped to increase the consumption level of vegetables and small animal breeding, almost to the numbers before the war. The crisis gardens were the foundations of today's allotment gardens in Vienna, still spreading throughout the city, even in some dense parts. Another big part of the self-supply of the Viennese population was the collection of mushrooms in the Wienerwald- in 1954, 832.000kg of mushrooms were surveyed for their edibility (Bandhauer - Schöffmann, 2013: 538-539).

For many, the only food source during the war was the few public war kitchens that tried to serve at least one meal a day (Bandhauer - Schöffmann, 2013: 534, 540). The food departments of all districts were re-established by the end of the war. In some districts, the amount of available food was so low that citizens who looted stores and bakeries were ordered to return the goods for fair distribution. Plundering reached new levels: factories, for example, the Ankerbrot Factory, were looted - scavengers ran through knee-high flour, freight trains and abandoned homes were robbed. There were even conflicts between districts: Some were better off than others regarding food supplies. For example, in April 1945, the milk supply in the 8th district completely collapsed, and other districts had to help and guarantee supply.

The hunger crisis after the war slowly eased in the middle of the 20th century. 1950 was the first year of free consumption, and goods such as meat, milk, and butter were available again on a free market. Two years later, sugar, fats, and oils joined, and by 1953 the food regulations cards were finally abolished again (Bandhauer-Schöffmann, 2013: 546).

Until 1954, Vienna continued to rely on foreign food supplies, as Austrian agriculture did not reach the same output numbers as before the war. With tight food supplies, the government decided to ban meat consumption for two days a week for private households, restaurants, and butchers. A year later, the restrictions were relaxed again, but traders still found loopholes in the price regulations. These trading regulations led to another protest and revolt by Viennese homemakers in 1951: The Vienna Market Hall was occupied by hundreds of women who refused to leave until the price of meat was affordable again. The women even threw meat from the butcher's shop at the merchants. In the 1960s, the diet of the Viennese changed once again, as the meat was now part of daily meals and no longer only on feast days (Bandhauer - Schöffmann, 2013: 545 f, 564).

Supermarkets supersede Greissl
Food consumption in the 20th century

Since the beginning of the 19th century, local food consumption was ensured by Greisslers, the Austrian term for small food retailers. The establishment of self-service stores was responsible for a significant change in consumer behavior. The rapid expansion

Fig. 50 Greissler in 16th district of Vienna around 1904; August Stauda ©wien museum

of supermarkets was the beginning of their supremacy in the mid-20th century. Another aspect that influenced consumer behavior was the possibility of owning refrigerators at the level of individual households. This innovation favored the rapid growth and densification of supermarkets. According to Bandhauer-Schöffmann, in the late 1960s, only 19.5 percent of Viennese working-class families owned a refrigerator. Since the end of the century, everyone can keep their food refrigerated at home (Bandhauer-Schöffmann, 2013: 559).

In the 1970s, the number of supermarkets proliferated, and by 1999 the food industry was the most common branch of retailing in Austria. Supermarkets were a synonym for time-saving, variety, and freedom of choice. Especially after the economic crisis due to the wars and compared to Greissler, which has been the standard supply. Greisslers were small stores established as early as the first quarter of the 19th century. Typical of these shops were the serving salesman who took goods such as meat, milk, eggs, flour, or bread from the storage. This type of consumption was also an act of social interaction. By the end of the 20th century, 26 percent of all grocery stores in Austria were already supermarkets (1.881 stores). Most of the small stores slowly disappeared as large companies displaced Greisslers and took over supremacy in food retailing. The drastic decrease was discussed in Austrian public media in the 1970s and was accompanied by a loss of lifestyle and culture of Viennese traditions. An article in a local newspaper 30 years later highlights the almost complete disappearance of the small grocery shops (Österreich Journal, 2001). The loss of 120 stores, with a size of less than 250 square meters, in just one year at the end of the 20th century and a declining trend was shocking. Simultaneously, the economic growth of supermarkets and even larger markets increased dramatically (Bandhauer-Schöffmann, 2013: 557f.).

Fig. 51 1950, first supermarket in Austria: Wiener Straße 2, Linz
©Archiv Stadt Linz

The Greissler vanishing and food consumption behavior change can be connected to industrialization and the possibility of storing goods in the cold and another technological advantage, namely the private use of cars. The use of cars increased decisively in Europe in the later 20th century, as Lim explains in Food City. In the 70s, supermarkets adjusted to the consumption behavior of the society, which became more driven by individual mobility and comfort. The big shops started to establish not only in urban areas but even on green meadows. The new sign of wealth and prestige in society was to drive by car from home to the shop and do food shopping only once per week. The development also marked the start of the

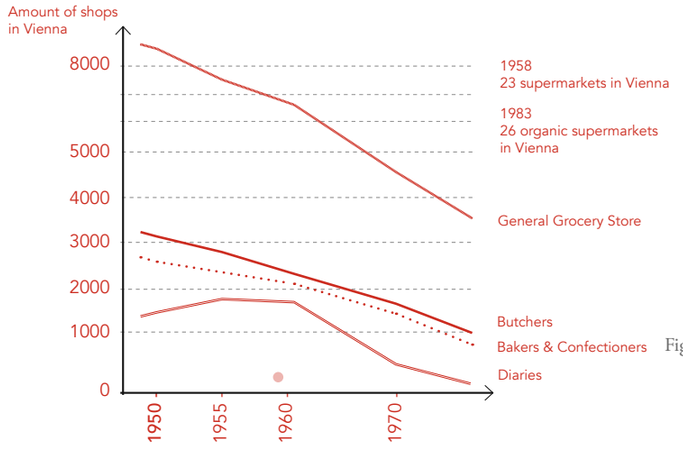


Fig. 52 Greissler, Butchers, Bakers & Confectioners, Diaries in Vienna from 1950 -1970; based on Bandhauer -Schöffmann
©S. Gold

end of grocery stores as social meeting points. Most supermarkets and their increasing density put pressure on traditional markets, shops and local farmers, neighborhood butchers, bakers, and local milkmen (Lim, 2014:162; Planet Wissen, 2020).

The proportion of household income spent on food also changed significantly during the 20th century. At the end of the 19th century, working-class employees had to spend around 70% of their income on food. In comparison, a wealthy family only had to spend 45% of their income. In the 1950s, almost half of the salary was spent for food. Today only 10-12% of monthly household expenses are spent on food and nonalcoholic drinks (excluding eating in restaurants). Therefore, food only ranks fourth place among expenses nowadays, after paying for rent and energy, mobility, and leisure activities (Weigl, 2014: 61; Österreich isst informiert, 2022).

Vienna city development and food typologies since 1950

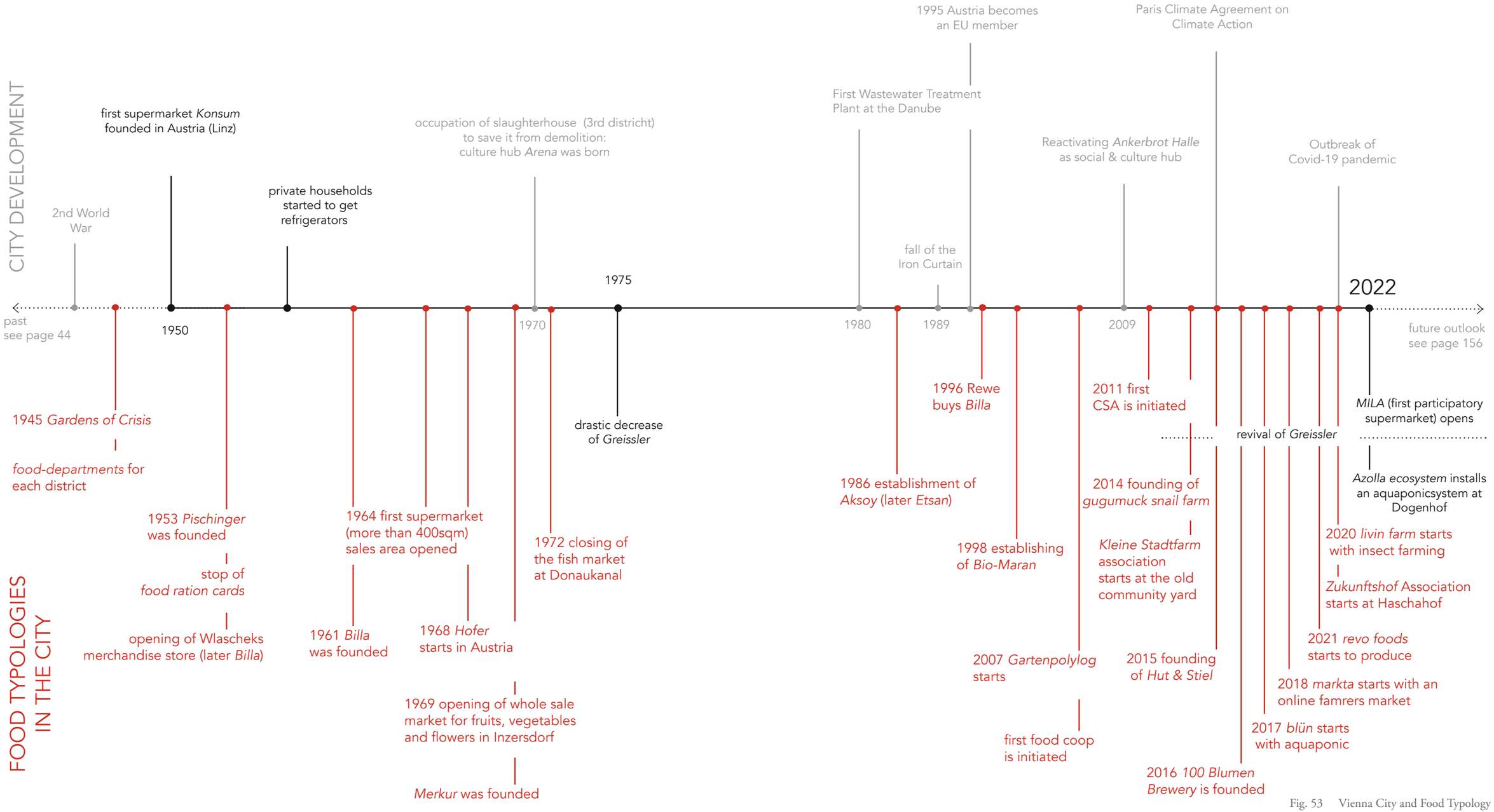
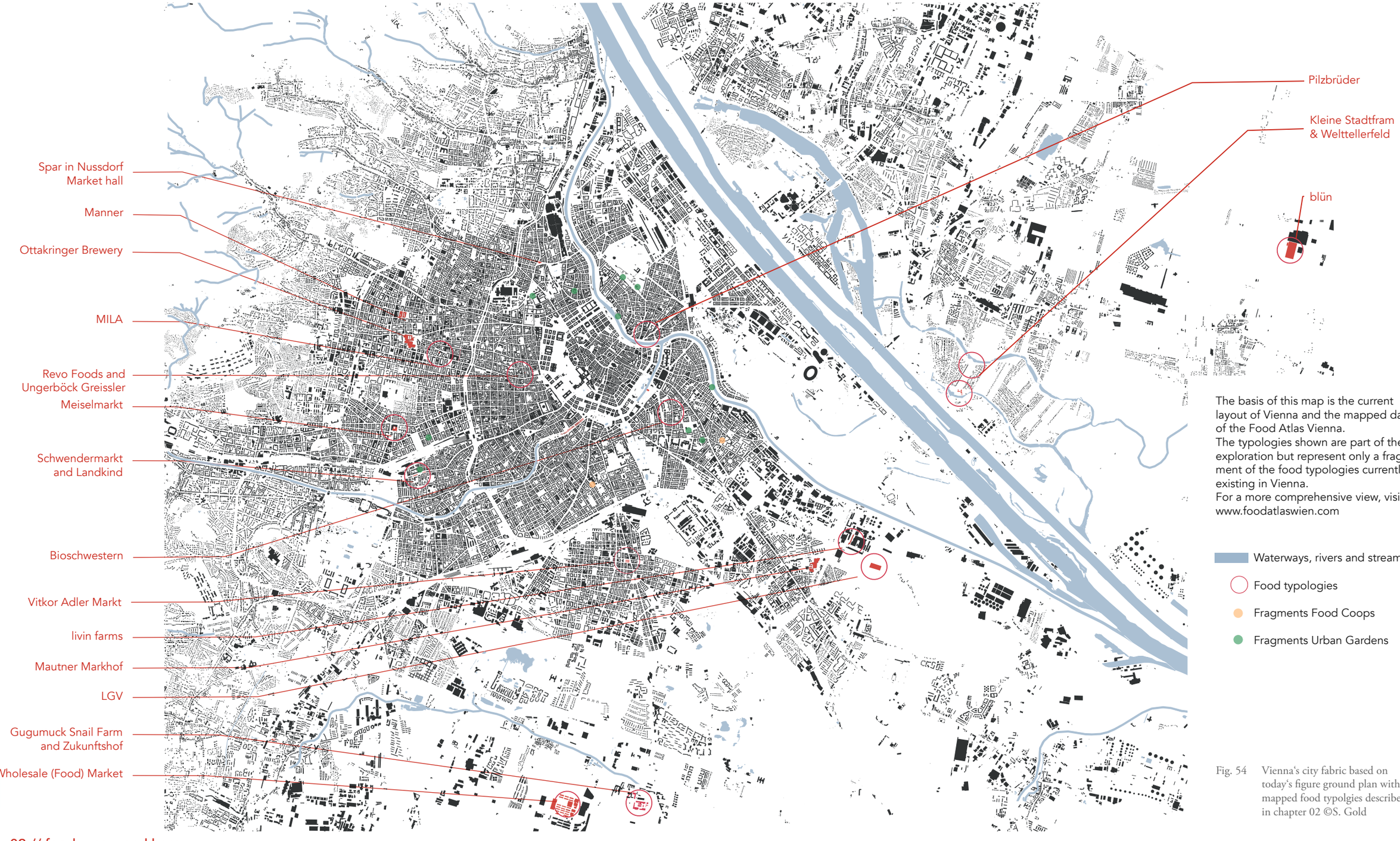


Fig. 53 Vienna City and Food Typology Development - Fragments Timeline 1950-2022 ©S. Gold

Vienna and food typologies
frsgments today's foodscape



The basis of this map is the current layout of Vienna and the mapped data of the Food Atlas Vienna.
The typologies shown are part of the exploration but represent only a fragment of the food typologies currently existing in Vienna.
For a more comprehensive view, visit: www.foodatlaswien.com

- Waterways, rivers and streams
- Food typologies
- Fragments Food Coops
- Fragments Urban Gardens

Fig. 54 Vienna's city fabric based on today's figure ground plan with mapped food typolgies described in chapter 02 ©S. Gold

Selected Food Typologies Today

Fig. 55 Selected food typologies in the spatial structure of Vienna; overview with site plan, orthophoto, facts and axonometries in the same scale, unless otherwise noted; based on GIS data of wien.gv ©S. Gold, B. Genc

200m

Kleine Stadtfarm

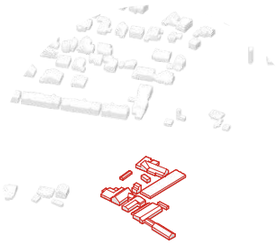
Location
22nd district

Year of Establishing
1970s organic farm, since 2014
Kleine Stadtfarm association

Function
community agriculture

Future function
create awareness of the food system, expand

→ p.103 & 112



blün

Location
22nd district

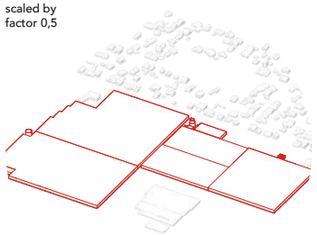
Year of Establishing
since 2017 aquaponics

Function
agriculture and commercial aquaponic

Future function
change the food system, expand

→ p.105

scaled by factor 0,5



Revo Foods

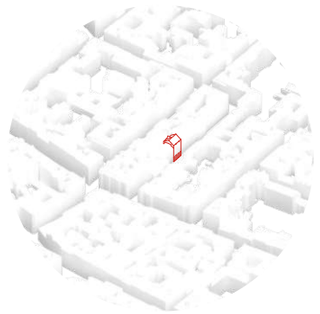
Location
8th district

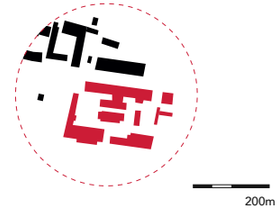
Year of Establishing
2021

Function
3D-printed plant based salmon production

Future function
change the food system

→ p.109





200m

Wholesale Market

Location
23rd district

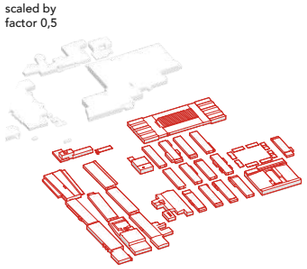
Year of Establishing
1969

Function
wholesale food market

Future function
wholesale food market

→ p.120

scaled by factor 0,5



Mila

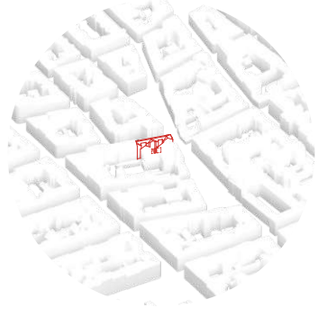
Location
16th district

Year of Establishing
2022

Function
participatory supermarket

Future function
expanding the participatory supermarket

→ p.124



Zukunftshof

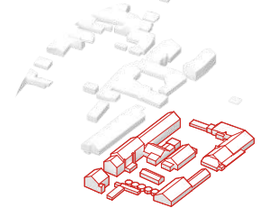
Location
10th district

Year of Establishing
1920 Haschahof
2021 Zukunftshof association

Function
pilot project for integrating urban farming in urban development areas

Future function
living the utopia

→ p.144



Food landscape today

This chapter describes the architecture, atmospheres, and created awareness of the food system generated by food typologies and how they influence Vienna and its citizens today. The food typologies are divided into urban production and consumption categories. Urban production differs from conventional agriculture and innovative urban farms to urban gardening and social initiatives, the subchapter urban consumption highlights the retail giants‘ supermarkets, markets, Greissler, and food coops.

The project Food Atlas Vienna is one of the bases for the chapter of this thesis. As part of the Vienna Biennale for change 2021 (MAK exhibition: EAT LOVE), Vanessa Braun and Daniel Löschenbrand initiated the Food Atlas Vienna to contribute to studio mobile. The goal was to visualize the food landscape of Vienna, primarily with the participatory instrument of citizen science. The process consisted of pedestrians passing by, conversing with them about their knowledge, ideas, and memories of the food system in Vienna, and finally mapping the city‘s food landscape together. The data got collected on a large PVC map with each appointment and digitally on the Food Atlas website. The sites differed in density, frequency of passersby, and social and spatial structure, which made the input and conversations more enjoyable. Braun‘s master‘s thesis, „Urban Food Mapping,“ explains the participatory mapping process and Vienna‘s food landscape in detail.

Fig. 56 Food Atlas Wien with Studio mobil at Viennese Biennale 2021 infront of MAK Wien ©Papanicolaou

Every step of the urban food cycle, from production to consumption to recycling, can impact its surroundings. Food in our cities is no longer as visible as it once was and needs to be brought back onto our streets, into our minds, and into our conscious mouths.

2.2 Typologies of urban food production

Conventional Agriculture

In Austria, almost 16% of the land consists of agriculture, grassland, fruit gardens or vineyards, and alpine pastures, with an overall annual tendency to decrease (cf. Statistik Austria 2022).

The area used for agriculture in Vienna is around 5.700ha, which is 14% of the city‘s total area. The central part is field crops and field vegetables. Another big part represents vineyards[15], unique for a big city like Vienna. The numbers of the total area used for agriculture in Vienna compared over the last decade, a reduction can be observed (in 2003, it still was 6.500ha). The majority of used land for agriculture in Vienna (and its hinterland) is for arable farming (Landwirtschaftsbereicht Wien 2017: 8f, translated by S. Gold). For some districts in Vienna, such as Simmering, greenhouses and huge fields are significant for their appearance.

In total, Vienna has 645 urban agriculture farmers. The mainstays of Vienna‘s unique urban conventional agriculture are 211 vegetable farms, 87 flower and ornamental plant farms, and 179 vineyards. In the districts of Simmering and Donaustadt, around 72.000 tons of fresh vegetables are produced each year. Another relevant district for farming is Floridsdorf (cf. Stadtlandwirtschaft, 2022a). One initiative by the Federal Environment Agency was the SUM - FOOD Report 2017. This study highlights Vienna‘s food paths and hinterlands (SUM = Stadt und Umland) and is part of the city development plan for 2014 (AgStep 2014). One of the most interesting facts of the report based on vegetable harvest

15 The Viennese vine, especially the Gemischter Satz and the Heurigen at the northern borders of Vienna, are also trademarks of the capital of Austria.

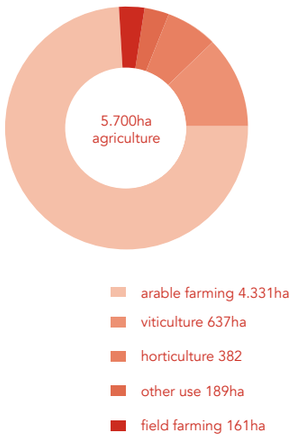


Fig. 57 Agriculture land use in Vienna, 2016; based on Agriculture Report Vienna 2017 ©S. Gold

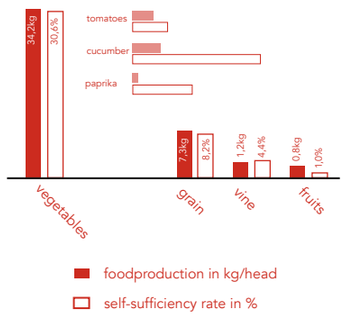


Fig. 58 Food production and self-suffi ciency rate in Vienna 2016 Based on Statistics Austria figures and calculations of the Agriculture Report are based on a population of 1.8 million for Vienna and without considering food losses, imports/exports) ©S. Gold

quantity and consumption per inhabitant shows that Vienna, including its supplying hinterland, could be self-sufficient. Notably, at least one-third of the consumed vegetables are produced within the city borders. There is a surplus of 80.000 tons of vegetable yield annually, considering the actual consumed numbers. Since - according to dietary and consumption surveys, only about one-third of the vegetable recommended for adults is actually consumed. Therefore, if Vienna and its hinterland would produce enough, considering the vegetable dietary recommendations and not the actual consumed numbers, it would be a deficiency of almost 20.000 tons per year. The most popular vegetables produced in Vienna are cucumbers, salads, bell pepper, and tomatoes. More than 60% of the Austrian cucumber supply is growing in the Viennese urban area, which is why Vienna sometimes ironically is called the cucumber capital of Austria (Schwarzl/Weiß, 2017: 21f).

Some vegetables grown and produced in Vienna are getting exported as the domestic demand is too low (BMLRT, 2009). Other vegetables like mushrooms, tomatoes, and cauliflower, only to name a few, are not produced in abundance for the Viennese population and therefore need to be imported (Schwarzl/Weiß, 2017: 22f).

Many of the Viennese farmers have their roots back at the beginning of the 20th century when the production of vegetables was essential for survival. The cooperative of garden vegetables is one significant contributor to vegetables produced in and around Vienna and counts 150 farmer families. The focus is to produce regional vegetables, which are available for disposal only a few hours after harvesting (LGV, 2022).

The primary way to produce vegetables is to grow them in a glass house or protected area. This production system is responsible for 97-99% of cucumbers, pepper, chili peppers, and tomatoes. The plants are secured from terrible weather conditions, and farmers have a more stable harvest. Another huge benefit is to extend the season of fresh vegetables and be able to produce almost all year. For example, if pepper were produced from the open ground in Austria, it would only be possible from the middle of July till the end of September. To look at specific numbers in comparison: in 2015, 25.100 tons of cucumbers were produced in glasshouses and zero on the open field in Vienna. The biggest issue of the protected production system is the high CO2 emissions needed for heating (Schwarzl/Weiß, 2017: 22f; land schafft leben, 2021).

Another initiative to support urban agriculture in Vienna is the website and app „Stadtlandwirtschaft“ (“urban farming”, trans. by S. Gold). Many farmers, markets, and gastronomy with regional products, yard-sells, and bars with regional vines are presented and advertised online. It is a way to remind the Viennese population of the producing surroundings and even the inner-city food producers to create a new sense of how Vienna tastes (Landwirtschaftsbereicht Wien, 2017: 31).

As the spatial connection to the food we eat is lost, a sense of seasonality is lost too. The oversupply and variety we are confronted with in the supermarkets give us little sense of when and where vegetables grow. An association to achieve the opposite is the Vienna City Farm. It was initiated to make the incredible variety of vegetable plants, the joy of gardening, and the fascinating processes of food creation accessible to as many people as possible in the city through their own experience. It started with the idea by Wolfgang Palme, a teacher at the Federal College and Research Institute for Horticulture in Vienna-Schönbrunn, to highlight seasonal vegetable growing. „The smallest garden is a pot“ is one of his mantras - which is possible even on a small scale in the city. The city farm educates children and grown-ups about how food is grown. The first location, at Schönbrunn, had to move to Augarten, where the area was used for agriculture for centuries. One aim is to close the gap between producers and consumers and create an understanding of seasonality and local products. The city farm is a productive environment in the heart of Vienna (cf. cityfarm, 2022).

Another initiative to educate, especially children, and give them a sense of where our food is coming from and how it grows is the Welttellerfeld („world-plate-field“ translated by S. Gold) in the 22nd district of Vienna. It symbolizes on 3500m2 how much space is needed for the average diet for one person in Austria. The fields‘ division visualizes how much food is coming from abroad and how much space for animal feed is needed. The project is one way to create awareness about the food system and how it influences and affects our lives, our health, and on a bigger scale, our cities and our climate too (cf. Welttellerfeld, 2020).

Innovative Urban farms

Conventional agriculture and horticulture are well established in Vienna. Innovative farms with entrepreneurs trying to change the food system at its roots have grown more in numbers over the last years. As most of them are small-scale farms in dense, urban environments, they might not influence the total yield per year with a significant impact yet. Generating awareness of local food production in the city helps to contribute to the question of where the food on our plates or in supermarkets originates. In the following subchapter, a few chosen projects in the context of Vienna are presented as case studies.

Mushroom Farms

Hut und Stiel is a combination of coffee and mushroom culture. The company started as a small student seminar group work at the university. Both founders did not know how this project would turn out and how their mushroom culture would develop over the next few years. The idea of using coffee grounds, which is one of the most extensive waste products (as the coffee we drink is only 1% of the full product), for growing oyster mushrooms, was and still is quite fitting for the capital of coffee culture, Vienna. In 2015 Hut & Stiel started farming oyster mushrooms in the middle of the city - to be exact, in an old Viennese cellar. Since the beginning, Hut und Stiel has focused on short transport ways, regional urban production, and a circular economy.

They decided to relocate their mushroom farm to Kleine Stadtfarm, which used to be one of the very first organic farms, Biohof Polzer, in Austria in the 1970s. One reason for the relocation was the more straightforward production process on the ground floor instead of the cellar. The new spatial conditions mean more building techniques but fewer extra hygiene measurements compared to the moisture and old cellar walls. Another reason was their expanding production, which partly moved outside Vienna to Klosterneuburg. They have now reduced their coffee ground suppliers to a few big ones: the Erste Bank Institute and Viennese Elderly Homes. This step was necessary as Hut and Stiel decided to exclusively use organic certification coffee (ground), in order to make the process and the logistics easier.

Hut und Stiel started by tackling a circular economy and using waste products to make them valuable. With the climate crisis and tendencies of how much area will be needed to feed the world‘s population, the company‘s mentality is targeting Viennese inhabitants‘ vegetarian diets too. The founder and owner Manuel Bornbaum explained on a guided tour at Kleine Stadtfarm that every kilogram of consumed mushroom instead of meat saves 16kg of feed and 15.000 liters of water and additionally reduces transport costs. Even with an at-home mushroom bucket for every household, it is possible to integrate the mushroom farm on the most miniature scale: a flat. However, it is more an advertisement gadget than a real mushroom farm for households. This idea underlines the drive of community and the company‘s interdisciplinary and non competing mentality. Hut und Stiel tackles resilient urban food production for a sustainable future and awareness of a regional food system (cf. Forbes, 2020).

Another mushroom farm opened in 2018 in a dense urban context of the second district in Vienna: Pilzbrüder. Like Hut und Stiel, they use the natural climate of the cellar to produce mushrooms, from shiitake to herb mushrooms, all over the year. In 2020 they harvested and delivered organic edible mushrooms for approximately 50.000 individual servings. Pilzbrüder distributes its mushrooms and mushroom products by yard sales, where only preordering is possible. This process contributes to a regional food supply and a social interaction directly between farmer and consumer in the middle of an urban context and closes the gap between urban production and consumption on a small-scale (cf. Pilzbrüder, 2021).

Snail Farm

Andreas Gugumuck founded the Viennese Snail Farm in 2014. He took over the family farm, quit his IT - job, and focused on the food of the future with a long tradition. Escargots were typical dishes for the Viennese Kitchen until the late 20th century. The farm is focusing on combining tradition and innovation to pursue resource-efficient agriculture and find new ways of urban agriculture. The current location of Gugumucks farm is at the edge of Vienna's south at Rothneusiedl. The space there is idyllic, an old brick farm next to fields still used for agriculture.[16]

Snails need 85% less feed than cattle to produce one kilogram of flesh with more proteins. Benefiting from the short distance between farm and manufacturing shows the quality and sustainability of the company. Another side project by Gugumuck was the Viennese Snail Garden, which follows the concept of urban gardens. There were two snail gardens, one at Hotel Daniel in the third district and one at Karlsgarten at Karlsplatz. However, both projects did not continue as there were several problems. At Karlsgarten, the main issue for the urban garden was the problem of rats, which is quite a common problem in an urban context. At Hotel Daniel, the garden did not continue as the supporting force of the main chef stopped. As the snail farm does not need much space, the smallest size could be 2x2m to host 300-400 snails. It would be a perfect concept of high protein food production for a dense urban environment. Still, at least one person who feels responsible and in charge is necessary. Nevertheless, these aspects also count for urban gardening. A significant benefit of just being a niche of the urban food supply is fewer regulations and norms, as they are not yet established for snail farms (cf. Gugumuck, 2022).

16 The pressure on plots like this is high, and the development area around and „behind" the snail farm will be finished with thousands of new flats and apartments soon. Next to the snail farm is the old Haschahof. The old farm building, which became the Zukunftshof, is integrated into the new district. The association of the Zukunftshof, a team who wants to develop sustainable, resource-saving urban future food in an interdisciplinary setting, of which Gugumuck is also part, is described on p.144

Aquaponics

Another possibility for urban food production is the aquaponic system. The research about aquaponics systems to produce food in extreme environments started in the 1980s in the US. „Aquaponics is the integration of recirculating aquaculture and hydroponics in one production system. In an aquaponic unit, water from the fish tank cycles through filters, plant grow beds, and then back to the fish" this is a short definition of the FAO. Aquaculture is the production of fish and other aquatic animals, and hydroponics is a soil-less culture that works based on substrates and water. An aquaponic system is a complete ecosystem and closed organism. It takes the advantages of both systems, approaches the disadvantages, and turns waste into something valuable. Major weaknesses of aquaponic food production are costs and professional knowledge of fish, bacteria, and plant production needed to become a respective farmer. Technical and biochemistry knowledge is needed as mistakes can easily collapse the whole system. Aquaponics can be a solution if the land is expensive, water is scarce, and the soil is poor (Somerville et al. 2014: 6). This is mainly relevant, as many humans have to live with these conditions already nowadays. Due to ongoing climate changes, adopting these conditions will become more relevant in urban areas.

Over the last years, aquaponic systems have also been established in Vienna. Blün is an agriculture company that established the first commercial aquaponic system in Vienna in 2016. The company was founded by a team of five individuals with interdisciplinary backgrounds, from cultivators to limnologists and business economists. They aim to change the food system to a more local, transparent, and eco-effective way. In the 22nd district, Blün creates a closed loop indoor aquaponic system next to their existing glasshouse structures. They produce Viennese fish and vegetables almost without wasting water. Both fish and vegetables are grown in a sheltered and controlled environment to guarantee a safe and clean product.

To put the aquaponic system process in relation: One kilogram of blün fish has an ecological footprint of about 3 kg CO2 until it is finally consumed. Furthermore, for example, for beef, 15.000l of water is needed to produce 1 kg, and one kilogram of blün fish meat needs only 120l – which goes even further to water the plants. Using the ending resource water twice for fish and watering the plants is one of the significant benefits and positive aspects of aquaponics and encourages more sustainable agriculture. Another advantage is the fish's "waste products" as a fertilizer. Although they reduce their CO2 footprint through their production process, the minor transport ways and their seasonality are sustainable. Still, the company does not have an organic certificate to EU regulations, as they do not grow their vegetables in soil. This shows the drastic gap between conventional agriculture and innovative farms. It highlights the need for a shift in thinking, especially in law and policy, to address and change the food system.
They see a circular economy as an answer for future agriculture. Agriculture as a family business for Blün is a solution for how their children and grandchildren can live and work on the planet - primarily related to food (cf. GEO magazine, 2015; Okto, 2020).

Insect farms

Eating insects is not common in our region yet, but it may be at some point. One old recipe from the 19th century was printed in a Viennese newspaper back then for cockchafer soup. The soup was a cheap meal because of several cockchafer plagues. Another preparation was candied cockchafers; both seemed well known and favored. Eating insects has undergone another revolution in Europe over the last few years, as they are a sustainable alternative to a conventional meat diet. The main problem is that only one has to start to eat insects to make them more common in Austria.
Zirp is a company that produces insect foods and mealworms in Vienna. As their start-up proliferated, they even made it to sell their products in supermarkets. One benefit of production in dense urban environments is that it shortens transport routes and saves valuable resources (cf. Zirp, 2020).
Facing climate change, insects are high in nutrition and proteins and are suitable for digestion. Insects are a perfect alternative for vegetarians; they are gluten-free, easy to digest, and have high nutritional value. The production tackles not only the consuming aspect of the food cycle, but food waste as a resource and food for insects as well. Therefore, it aims for a circular economy.
Another insect farm company, livin farms, was founded in 2015 by Katharina Unger. The young product designer researched and explored the possibilities of sustainable insect farms and how they could be integrated on a household level, firstly in Asia. The company returned four years later to Austria with a plan to educate about the food system in schools and aim for a bigger scale. After receiving funding from the European Innovation Council as part of the European Green Deal, the company expanded and now focuses on insect breeding on an industrial scale, producing only feed and fertilizer rather than food. Their concept is to provide insect farms to other companies with large amounts of organic waste that can eventually be turned into money. Again, the focus is on using waste as a resource, this time organic waste, and turning it into valuable end products. The company is sustainably addressing the

circular economy. They use a process that already occurs in nature but brings it into a technically artificial environment. Their location is in an old factory hall in Simmering. One employee agrees that the spatial condition is irrelevant, as the production needs to be in a highly controlled space (room-in-room concept). However, the farm can be installed almost everywhere, but experts‘ knowledge or a completely automatized process on this production scale is necessary. The company‘s mission is to empower the food, feed, and recycling industry to turn their industrial low-value organic waste into high-value insect protein products (cf. Livin Farms, 2022).

Microgreens

The possibility of small-scale urban farming in dense environments is growing microgreens on an individual level or on a more extensive scale for consumption. Microgreens are baby vegetables produced in small indoor spaces. A benefit is the high nutritional value of those plants, which can be 40 times more than outgrown vegetables. The aspect of difficulties for innovative start-ups is visible at Vienna MicroGreens. It was a small business that started recently to grow this future food in the 12th district of Vienna. The variety of plants ranged from arugula, broccoli, mustard, and peas to red amaranth or radishes. The young team wanted to change the food system with urban, vertical, thoughtful, and inspiring farming. Vienna MicroGreens sold their plants within their soil at Meidlinger Markt, so they stayed longer fresh. Their consumers range from gastronomy to resellers or individual customers. As the food production sector is not lucrative, they have already shut down their business, but new pioneers will follow (MicroGreens, 2022).

Food-Tech

Among historic factories that have existed for nearly two centuries and still influence their neighborhoods with their production smells, new food start-ups with a solid technological approach are sprouting up. 3D-printed plant based salmon, for example. Strasser, the owner of a farmers market shop and restaurant, says, as an outlook on food supply in the next 25 years, we should also consider technologies we do not yet know about for future cities (cf. Okto, 2020).

Revo Foods is a young Food-Tech start-up in the 8th district in Vienna established in 2021. The young company aims for a sustainable, plant-based salmon filet, which is new on the market and is 3D-printed. The spatial requirements for the production are more of a laboratory than a conventional fish farm. In the ground floor zone and basement of an old historic building, an interdisciplinary team of more than 20 people is working on the perfect texture for the salmon filet.

After only one year, they sell their products in supermarket chains in 16 countries. However, what does it mean for our future cities if food production is behind closed laboratory doors? The process of 3D printing food can be done everywhere - which has its advantages and drawbacks. On the one hand, it can tackle how we supply ourselves with nutrients, even in extreme environments. On the other hand, food loses spatial connection and relation more if we try to imagine how the process will further develop for the next 50 or 100 years (cf. Revo, 2021; brutkasten, 2021).

Beekeeping

Vienna is not only one of the most liveable city for humans but bees too, as the city offers a high biodiversity. The municipality renounces completely fertilizer which is another benefit for the bee colonies as the chemicals can often lead to mass deaths of the insects. Bees are essential for our agriculture and thus for the entire

planet Earth. After all, around 85% of agricultural yields depend on bees‘ pollination. If the insects did not exist, there would be crop losses and famine. Vienna now has around 5.000 bee hives, and more than 200 million bees contribute to the city‘s nature and wildlife during the summer months. As bee hives need only small spaces, they can be integrated on roofs of existing buildings such as, for example, the state opera house or the city hall. Every district has its honey with a unique taste - the variety of plants and flowers varies from neighborhood to neighborhood. The food for the bees is growing on the streets, and car emissions do not have harmful side effects on the honey; the emissions can’t go into the nectar as the time of the actual pollution is too short (ORF, 2019; Wiener Staatsoper, 2022).

Urban Gardening

For almost more than 20 years, urban gardening has been booming in Vienna and all over Austria. The urge for urban dwellers to enjoy time outside while taking care of vegetables and plants has not only the aspect of refreshing the food supply but a social one too. One will meet new neighbors and strangers with an interdisciplinary or multicultural background, can exchange expertise, and will earn new gardening knowledge. The network Gartenpolylog has been a mentor and communicator between the city and gardeners since 2007. The first established urban garden in cooperation with the municipality was eye-opening for the city: they had to give up control over a small land plot, but citizens had the chance to take responsibility and create something they wanted. Since then, more than 90 urban garden projects have been established all over the city of Vienna. Urban gardening can be seen as a down-to-earth approach to recognizing seasonality and where food originates. Seeing the whole city as a garden can be an added value for social and climate aspects of public space as non-commercial meeting places are created where a social exchange can occur without even speaking the same language. Often gardens are not only a place to learn about farming but how to deal with conflicts in a bigger group or even with more significant issues regarding space and other outside influences (cf. Gartenpolylog, 2022). CJ Lim describes the benefits of community gardens as providing fresh produce and plants, satisfying labor, neighborhood improvement, a sense of community, and connection to the environment. They are publicly functioning in terms of ownership, access, and management. Public space can sprout on vacant lots (Lim,2014:60).
Urban gardening can be a temporary solution, a reactivation of an abandoned plot, or integration into a development area. The gardens contribute to getting nature back into our cities, which is beneficial for microclimates. They can also be the first step to creating awareness of how our vegetables are growing and be a visualization of the citizen‘s rights in the city.

Fig. 60 Urban Gardening in Vienna, 2022
©S.Gold

Social initiatives - grassroots tendencies

If citizens aim to change something big, like the food system, it is easier to do it with persons sharing a similar vision to discuss and exchange ideas and concepts. Bottom-up projects benefit from social engagement and a sense of responsibility. The biggest issue is often the missing financial support and long-term motivation, which can often go hand in hand. Most of the time, it starts with volunteering for a better future, not an economic goal.

Knowing the global tendencies and the innovative food start-up scene in Vienna, two urban farming initiatives need to be named. One project is Kleine Stadtfarm in the 22nd district, bedded in an idyllic landscape and single-house neighborhood. This project is already mentioned at Hut & Stiel, as they moved their production there. However, today Kleine Stadt Farm is an association with around 20 members who try to close the gap between urban city dwellers and the food system and create awareness of the correlation between humans, nature, and the environment. The members have intercultural and interdisciplinary backgrounds. Processes of democratic decision-making, gardening, and farming give new experiences to the collective. It is a learning-by-doing experience, similar to experiences in urban gardening. A food coop and a small yard store, where consumers can directly buy products from the Kleine Stadtfarm, are also part of the association. The small store also has a social aspect, as it is part of a program to reintegrate long-term unemployed and migrants into farming and sales. The association sees itself as a prototype for an alternative to conventional monoculture agriculture and considers how and where it could multiply again in the future (cf. Kleine Stadtfarm, 2022, Okto, 2020).

Another project that has already been mentioned and aims to change the urban food system is the Zukunftshof in Rothneusiedl. The Zukunftshof is part of an urban development area at Vienna's city limits and is an association of innovative companies such as Hut & Stiel, Gugumuck, blün, and many more. Currently, the association is between the interim use of parts of an old rural brick building and the creation of its concept for further use at the very beginning. More details about the project are in chapter 03 - food and tomorrow?

»The shared meal is mankind's most complex social phenomenon for a reason. It is the context in which, more than anywhere else, we define ourselves as social beeings and recognise our deeper bond with land, sea and sky. We have to discover what a strong, local, post-industrial food culture could be like, but there has never been a better time to find out.«

Carolyn Steel, Hungy City 2009: 246

Fig. 61 Food traces in Naples, 2021 ©S. Gold

2.3 Typologies of Urban Food Consumption

In an issue on food and the city of Architectural Design magazine Castle says, if access to clean drinking water and public sanitation were the main obstacles to social progress in the 19th-century city, a healthy diet and access to fresh food for all promised to be the hottest question for the 21st century (Franck, 2005: 4).
Toranghi et al. describe the urban landscape of food consumption on point: „More than ever before, moving to the city subjects people to an urban diet - a supermarket diet - and makes people, as far as their access to food is concerned, dependent on a limited set of options. When controlling resources and ways of accessing food, the city seems to reduce options rather than multiply them radically. On the one hand, urban environments offer an unprecedented variety of foods from different cuisines, from far away places, and throughout the seasons. On the other hand, this seeming variety is offered through a limited number of channels, controlled by an ever-decreasing number of players.“ (cf. Toranghi et al. 2016: 175).

Supermarkets

The primary research resource for this subchapter was the issue „Superpower Supermarket - The world of Retail Giants“ by the Austrian magazine Dossier. Supermarkets are the primary source of modern urban dwellers for food supply. Today all Austrian households spend more than 22 billion euros on foodstuff - most of which we buy in supermarkets. On every second corner in Vienna is one shop of the big brands; even the numbers confirm this phenomenon: Austria is the country with the highest supermarket density in Europe. It is not only the highest density of supermarkets, but a side effect of many shops are the high food prices. Austria has the third highest prices for food in the EU. Comparing Vienna with Hamburg, Vienna has 440 supermarkets per one million inhabitants; Hamburg has less than a third, but the same amount of population and, in terms of size, two times as much as Vienna (cf. Sim/Kaufmann, 2020: 18-21).

The concept of self-service markets started in the 1915s in America. In the beginning, consumption associations were the operators. This concept originated in the 19th century as the associations started to ensure an affordable food supply for members back then. The first food self-service store in Austria, „Konsum,“ opened around 70 years ago in Linz (cf. Eckelsberger/Sankholkar, 2020: 8). Today the market is dominated by three food retail giants in Austria: Spar, Rewe (Billa, Merkur, Penny), and Hofer. By now, they own almost 90% market share, which means much power not only to small shops but also to farmers, dairies, and even politicians. It was visible during the beginning of the Covid - crisis: without those three, the system might have collapsed (cf. Eckelsberger/Sankholkar, 2020: 7).

The beginnings of Spar originated in the 1950s in West Austria. The idea of independent merchants and wholesalers paying license fees and benefiting from joint logistics, advertising, and common brand identity, including the firm logo, originated in the Netherlands. Spar started, especially in the countryside, with an international concept of selling flour and sugar in cans owned by

Fig. 62 Supermarket density in a one square kilometer fragment of Vienna of the 4th & 5th district ©S. Gold

Fig. 63 small Spar shop in Hütteldorf Vienna, 1960 ©dossier

consumers. Initially, fruits and vegetables were not sold at Spar shops as they were distributed at local markets or yard sales.

The greatest opponent is Billa, bought by the German Rewe group in 1996. In 1953 Billa was first established as perfumery and later extended as a merchandise trade. The Rewe concern entered the production sector with their brand, as the branded products were not always available. The Billa brand was born out of necessity.

Hofer, the third of the big players, originated in Germany and started in 1913 as a small mom-and-pop store. Since the late 1960s, the discount supermarket, where affordable prices are in the foreground, has been available in the Austrian food market.

The problem of the unequal distribution of the retail food market is not only the extermination of small grocery shops but a desolation of urban space and inner cities, sealing of meadows and agricultural land too. A study by the Austrian trade association in 2018 describes the spatial requirements of an ideal supermarket. Sales area of at least 1000sqm, at least 80 generous customer parking spaces at ground level, rectangular sales area, free of columns, warehouse at ground level, a delivery possibility for semi-trailer trucks, and direct accessibility from the main traffic route. Nevertheless, do supermarkets have to be a hidden problem for the food supply chain and contribute negatively to urban space development? Gernot Stöglehner, Professor of Spatial Planning at BOKU Vienna, says: „In the right location, a supermarket is an essential element of local supply; in the wrong location, it massively damages the spatial structure."

Another issue on the other end of the food supply chain is food waste. The big chains try to keep this dark side well hidden - all the garbage rooms of supermarkets are secured with cameras and special key locks. Towards the public, they donate unsold products to social markets and charitable institutions. However, none of the big chains want to say how much food waste they produce. However, food waste is factored into the price. Ultimately, the consumer pays 10-15% of the price for waste and thriftiness. [17]

17 The Rewe group tried to target the problem, but only for a short time: Minor signs on the supermarket shelves informed the consumers that some products would not be available after 5pm. A first step to reducing food waste - but as our affluent society is not used to empty shelves, consumers started complaining, and the concept stopped immediately.

Constant availability, short shelf life, and a whole assortment play a significant role in food waste. The more stores, the less frequency at the individual locations, and the more food is disposed of - especially in the case of agricultural products. For discounters, the problem is minor, but then the waste problem is shifted to the customer's trash can, as it is with discount promotions. In France, the disposal of edible food from the retail food trade is anchored in law, with penalties for non-compliance with the donation obligation of up to almost 4.000€ (Atefie/Skrabal, 2020: 98f).

A counter-movement of new organic and natural food stores in the early 1980s was an attempt to build an alternative food supply in Vienna (Bandhauer-Schöffmann, 2013: 558). According to a study by Bio-Austria, Austrians spent 1.9 billion euros on organic food in 2018. The pioneer of Austrian organic markets was Bio-Maran, which opened in 1998 and was acquired in 2010 by the Denns chain. The supermarkets still have a minimum size of 400 square meters but focus on organic and fairtrade foods. The downside could be poor working conditions, low wages, and high workload (cf. Sankholkar, 2020: 43).

Apart from the big chains are some alternative supermarkets. An Austrian Federal Economic Chamber study says there are over 400 Ethno-markets. The biggest chain is Etsan, which started in 1986 as a Greissler under a different name.

Fig. 64 Billa in Vienna, 2022 ©S. Gold

Markets

Markets used to be the leading resource for food supply over the last centuries. With the dominance of supermarkets, food markets have lost importance over the years. Today the number of consumers is slowly increasing because shopping at a market is, besides the food supply, still an experience with a particular atmosphere, varying from market to market. Viennas markets are a mixture of old, almost historic booths and a modern vibe caused by gastronomy (cf. ORF, 2021). There are 17 food retail markets and five

temporary markets in Vienna. Most of them, such as the Brunnenmarkt, Floridsdorfer Markt, Viktor-Adler Markt, or Naschmarkt, originated in the 18th century.
Often the Viennese markets, especially the Naschmarkt, are magnets for tourists. The Naschmarkt counts every week around 66.000 visitors, almost the same amount of visits as the Brunnenmarkt. There is only one market under a roof, the Meiselmarkt, in the 15th district. It was built in 1905 as a temporary structure, demolished in 1995, and built into a former water reservoir of the Wiener Hochquellenwasserleitung as the new Meiselmarkt (cf. Meiselmarkt, 2022). When supermarkets started to develop, markets used to be a less expensive alternative, especially for fruits and vegetables. Over the years, the prices of supermarkets decreased, even for exotic goods.

Farmers‘ markets can be a sustainable way to get seasonal and regional foods and goods, also benefiting from reduced packages of market goods. The same problem as with supermarkets appears,

Fig. 65 Brunnenmarkt, 2022
©S. Gold

by thinking of the origin of the goods of the famous markets. The main logistic point for almost all food distributed in the city is the wholesale market in the south of Vienna. Almost three-quarters of the distributed food at the Viennese markets are bought here. Sometimes the packed vegetables from the shelf in a supermarket are the same as those distributed in a market booth. The wholesale market is a whole world by itself. It is the largest market in Austria, with about 33ha and 400.000 tons of food per year. 23% of the goods come from Austria, the other part such as dried fruits, nuts or non-seasonal fruits and vegetables are imported. Almost 5000 transporters and cars bring the food daily from the city limits to the stores and, ultimately, to the customers. This market is incomparable with wholesale markets in the global south. There is no bargaining or degust, only giant staples of boxes loaded with goods. The biggest issue is the relation between price and waste, which is often the case in the food system. The principle is that time is money, and every purchase goes fast. Another difference between urban markets is the time the space is in use. A day at the wholesale market starts at around midnight when the first trucks deliver; for customers, the market opens at 4:30am, and in the late morning, the spectacle is over (cf. Die Presse, 2018).

What does it mean for public space if (farmer) markets move from the streets to digital and online platforms? During the Covid - crisis, supermarkets and their customers had to deal with empty shelves for the first time in a decade. Farmers without commercial or private consumers needed to adapt to the situation, and online platforms boomed. Markta is an online shop or a digital farmers‘ market for organic food directly from the producers. The company aims for a regional and seasonal food market. This concept narrows the gap between producers (farmers) and consumers and is an alternative to supermarkets. The bigger picture is to create a fair and sustainable market with reduced CO2 emissions and exceptional attention to local products (cf. Markta, 2022).

What will happen to our public spaces if we shift all our trades and consumption from ordering dinner or buying food to the online market? The atmosphere, the smells, and the sounds at a market are an experience that an online platform can not match, but it is a new way of convenience. When traveling around the world, one way to get to know a culture is to walk through local markets to guess the dishes, haggle with the locals, and smell the different countries - we need places with atmospheres like markets in our future cities to not lose the local culture.

Revival of Greissler

Another alternative of the food retail next to the giants and markets is Greisslers, which used to be many more in numbers. Over the last years, Viennese aimed for a more sustainable lifestyle and requested another possibility for food consumption besides supermarkets. With that wave, a revival of Greissler focusing on reduced packages, regional products, and goods where the origin can trace back hit the city. However, do they have a chance, next to the trade giants?

Most of the small food shops try to survive in the density of supermarkets by providing small gastronomy too, which can help to gain attention. For example, in 2017, the LGV Gardeners shop opened in the 4th district. It benefited from the old Viennese character of a Greissler and the close location to the Naschmarkt. Even if the Gardeners shop had the right location to reach interested consumers, who could pay for fresh and regional goods, an attractive shop design, and the cooperation of local producers, it had to close this year. BWM architects were responsible for the interior, where presented goods and social exchange of consumers and sellers were in focus (LGV, 2022).
Many of the smaller food stores cannot gain enough profit to survive, and the Covid-19 pandemic was another burden for them. Another example was the „fish and greissler“ store by Zechner. His statement about the food consumption landscape is that it is tough to survive next to supermarkets; as consumers are used to various goods, high quality, and low prices. The only Greissler who would have the possibility to survive might be high-end shops with delicacies or small shops initiated by one person. However, they would run only by self-exploitation; another unsuccessful food shop owner agrees (cf. Kurier, 2018).

A small niche is the Bioschwestern store in the third district. It is only open two days a week and is almost exclusively for picking up online orders. Their web store aims to bridge the gap between producer and consumer, as all products come directly from farmers in and around Vienna. Only the products ordered are delivered, reducing food waste. This close relationship with local farmers brings seasonality back to consumers and introduces forgotten varieties. Even if the small store is only open for a short time, the owner knows the consumers‘ names after a few weeks; it is almost the same experience as being at a market stall (cf. Bioschwestern, 2022).

Landkind, a farmers‘ shop and market cafe in the 15th district, stands for passion for sustainable production, respect for craftsmanship and small-scale, regional agriculture, and the belief that our consumption choices make a difference. Nina Strasser, the owner of Landkind, says that a rethinking by customers must happen to appreciate seasonality. Consumers lost their connection as everything is available all over the year in supermarkets, but tomatoes taste very different after winter than when they are always available. The damages of conventional agriculture, which affects us all in the same way, should be reflected in the price of the goods. This would also increase the chance of organic and sustainable agriculture to. Strasser also sees potential in urban food production, as it will be more local again. How it will develop in the next 50 years

is not yet imaginable because technologies are just emerging; urban farming will develop significantly and create new job opportunities (cf. Okto, 2020). All of the small food shops are a benefit for their neighborhoods and create a recognition value for urban space. The Greisslers are a social meeting point and bring a little countryside to the city‘s streets.

Fig. 66 Outer view of Mila, 2022
©P. Knott

Another unique store is Mila. Mila stands for Mitmach Laden and is the first participatory supermarket in Vienna. The concept has many international examples, from Paris to New York. One concept is La Louve in Prais, where more than 7.000 members of a cooperative created a counterweight to commercial retail groups in 2016. In New York, thousands of Americans joined forces in the 1970s to live the dream of food sovereignty with their Park Slope Food Coop. The goal is to reduce the anonymity between producer and consumer. Organic and regional products should not be a question of money. All price calculations, as the best-kept trade secrets, are disclosed, and decisions about location and assortment are on a grassroots democratic basis (cf. Mila, 2022).

The association Mila is working for an ecologically sustainable and socially equitable food system and was founded in 2020. Mila works as a cooperative; they decide democratically which food and goods will be sold and for which price. One way to lower prices is for all members to work a certain number of monthly hours in the supermarket. This concept supports the idea of the social economy activity and revives the importance of the markets as a social meeting place.

At the moment, Mila operates in a slimmed-down version as a mini market in an old Greissler shop in Ottakring. The shop has only a tenth of the later planned 600 sqm for the participatory supermarket. Still, membership is necessary if one wants to do grocery shopping there. The association currently has 500 members. To set up an economically cooperative supermarket 1.500 members more would be required. The members of Mila have already started to have agreements with local producers, but not all products are with organic standards. The prototype of this initiative helps the operators and members in a learning-by-doing process on a small scale, especially in terms of assortment, storage possibility, and opening hours (cf. Augustin, 2022).

The participatory supermarket could be one answer to changing the food system into a more social and environmentally friendly way. The concept creates awareness of the logistics of our food and social circumstances for employees too. As a social meeting point, it contributes to an active ground floor zone and can be seen as a revival of Greissler - in the end, on an even bigger scale.

Food Coops and CSA

Another alternative to supermarkets are Food Coops. In 2007, a group of almost only students initiated the first Food Coop in Vienna. They wanted to close the gap between producer and consumer and bring organic food into the urban context. By now, more than 80 Food Coops exist in Austria. Like Mila, the concept is based on an association, a member‘s decision on the range, and the distribution. The producers and farmers sometimes invite members of food coops. Helping at the farm gives the whole experience of where their food is produced. It is also a chance to see where their money ends - directly at the producers.

The food coops concept is based on trust between consumers and producers, between the members, and on social interactions on both levels. It can lead to small steps to change food consumption habits as it supports small-scale regional (urban) agriculture, and members take their food information and experiences back home (cf. foodcoops, 2022).

A direct democratic food supply and one approach to food sovereignty are CSA - community-supported agriculture. The first CSA was initiated in 2011 in Austria and has since then received more attention. The main focus lies in the name: the community

supports farmers, both sides are responsible for dealing with risks, costs, and harvest, and, in the end, ensure the survival of our supplying producers. Same as with the concept of food coops, intermediary trade, which regulates and cuts the price, is left out of the distribution process (cf. Umweltberatung, 2022).
Food coops and CSAs often work together in a network, significantly reducing the logistics and making distribution easier.

2.4 Today's foodscape and its spatial influences

The transformations of the 20th century had impacts on food typologies, modern cities' appearance, and today's citizens. Bandhauer-Schöffmann raises the question of how food production and consumption have changed the eating behavior of Viennese since the inception of the second republic in 1945. She divides her answer into three topics: Firstly, the rationing of food and helping deliveries after the wars. It was the point of introduction of some entirely new goods for the Viennese population. Furthermore, foreign goods from far away were available for almost everyone for the first-time. Secondly, the confrontation of new cuisines as the possibility to travel abroad became more common. Moreover, the influences of the cuisines of immigrants came along with their eating cultures and new flavors (Bandhauer-Schöffmann, 2013: 578). Understanding consumer behavior changes and their relation to the spatial conditions of the last decades makes the situation we have today more comprehensible.
What does the development of food consumption and its presence mean for urban and public life today? Most notably, the change of consumption behavior meant and still means a loss of visibility of food origins on the streets and in urban life. In the Viennese ground floor zone, small shops, for example, old butchers and bakeries, are only visible with empty and sometimes even barricaded shop windows. The only still visible traces of Greissler are old letters and fonts above shop windows. What we see now as empty streets used to be vivid zones, full of presented goods, food, and life. Lim describes the disappearance of food habits and presence in urban environments as a loss of civilization and culture of cities: „Intellectual greed or sensual nourishment, the relationship between life and art, and media share much common ground in food. Bizarre, unethical or sustainable, food ultimately promotes dilution of cultural boundaries and restores the primal link between urban inhabitants and their sustenance“ (Lim, 2014: 75).

Analyzing the foodscape of today's city, the gap between production and consumption that has developed over the last centuries becomes visible and some historical food traces become very clear. However, a tendency of innovative start-ups to tackle the food system by creating awareness and bringing production back to urban environments can be observed as an alternative to supermarkets' dominant appearance. Nevertheless, it is essential to say that conventional urban agriculture can not be directly compared to the new technological structures of the past few years, and some tendencies of future food will be more successful than others. For example, Schönlechner, among others professor for food technology at BOKU Vienna, puts it: looking at countries where greenhouses with LED lamps are already used as a demanding need for food production can be a sustainable, realistic future outlook. She also says, if something tastes good, is affordable, and can be easily integrated into the current diet, it catches on (cf. Österreich isst informiert, 2022). More technologies and their spatial impacts will come as the climate crisis will affect the food system more. However, it still is essential not to forget the social, cultural, and spatial effects food typologies can contribute.

»Our current production system is designed as if we had inexhaustible resources, as if the earth were one big storeroom. For centuries, we have assigned ourselves a central position as superior beings, able to control our habitat by means of language, reason and consciousness.«

Krogh, 2020: 13 ff

Fig. 67 Temporary market stall at Brunnenmarkt, 2022 ©S. Gold

0 3 // FOOD – AND TOMORROW?

URBAN OASES

Future Food Outlook

What will our cities look like in the next 10, 50, or 100 years? Food supply has already influenced the appearance of cities in the last decades, which could also be the case in the future. This chapter reviews international and national best practice projects that consider food as a design tool for a sustainable approach to architecture and urban design. The conclusion summarizes the drawbacks and potentials that urban foodscapes face today and might face in the future.

3.1 International best practice food typologies

The international case studies highlight the potential of integrating urban food and their potentials for creating awareness for the food system.

Pasona Urban Farm

In 2010 the new headquarter of Pasona Group was finished in Tokyo. The design for the renovation project of an existing 50 year old office building is by Kono Designs. The task was to keep the existing structure and extend it with a second green-skin facade to inhabit balconies for farming. The office function was extended by an auditorium, cafeterias, a rooftop garden, and, most notably, urban farming facilities in the interior.

„The change in the way local people think and what they talk about was always one of the project's long-term goals," says Kono in an interview. Pasona Urban Farm is the most significant farm-to-table office concept in Japan. It is designed in a way to stimulate and encourage urban communities to engage with farming and plants visually and through hands-on activities. The employees have to look after the plants in the building by contract. All the food harvested is served on-site in the cafeteria. Another benefit of maintaining the crops by the employees is the social interaction and teamwork empowerment. A sense of responsibility and encouragement is promoted as well.

Almost 4.000 square meters are dedicated to green space in the project, which houses a variety of over 200 species of plants, fruits, vegetables, and rice. The plants are used for spatial functions as partition walls in meeting spaces, salads upgrade the micro-climate in seminar rooms, and tomato vines suspend over conference tables. The building system consists of a climate control system that monitors humidity, temperature, and airflow to create a comfortable environment for the employees and the farm (cf. Kono Designs).
The project tackles the immense food miles Japan needs to deal with. The country produces less than one-third of its grain regionally, leading to over 50 million tons of food imported annually. The average amount of imported food is transported over 14.000km, which makes Japan the country with the highest food miles worldwide. By creating an urban farm within the Parsona headquarters, they aimed for a zero food miles concept and to empower traditional and urban farming by educating the next generation (cf. Dezeen, 2013).

Fig. 68 Pasona Urban Farm, Tokyo employees work at the urban farm
Fig. 69 Pasona Urban Farm, Tokyo office ©dezeen

Creating a building with a living green wall as a facade also creates a dynamic identity for public space. It changes how employees and mindful bypassers think about farming and urban food production. In addition the beneficial aspects of the microclimate in and around the building add value to the surrounding neighborhood.

—> creating awareness of the food system, empowering farmer's work & integrating urban food production into the community.

Abattoir Foodmet

The Abattoir Foodmet is a mixed-used market building designed by the office ORG Permanent Modernity in Anderlecht, a Brussels neighborhood, finished in 2015. The area is very close to the city center and accommodates many migrants and newcomers to the city. The different origins and roots can often lead to a cultural clash. The food market aimed from the beginning to contain urban food production on the roof but had no clear concept of how it is implemented. By now, it contains the most extensive European aquaponic system (4.000m²) and offers related retail programs, like a farm-to-fork restaurant. After installing the fish tanks in 2017, and launching the production of tomatoes, herbs, and fish one year later, today, around 70.000 fish are in the system (cf. Abattoir, 2019). The aquaponics system gets maintained by the company BIGH, which aims to create sustainable farms within the synergy of existing building systems. Steven Beckers studied architecture and is the founder and administrator of BIGH. He got the idea and inspiration to implement aquaponic systems in urban environments in the European context while being abroad in China. People in chinese cities have to struggle with polluted soil and no possibility to distribute fresh food within the city center, except for closed and monitored systems (cf. Cities of Making, 2019; BIGH, 2022).

ORG Permanent Modernity designed elements and platonic panels, which give the building a significant appearance and usage flexibility. The concept with the panels gives a clear urban form and enough freedom for no predefined content. With those overdimensioned porticos, the design creates a strong recognition character and can be arrayed in different variations.

The project profited from a participatory process, which was initiated for creating the masterplan, and implementing the interests of different stakeholders, from private developers to citizens. The building is only the first step in an urban development area that will convert the last artisanal slaughterhouse in the center of an European capital into a mixed-use district. All these food activities have earned the Abattoir site the nickname „the belly of Brussels."

The tendencies of the new development are to maintain the neighborhood's character, to densify the area and connect it to the urban development of Brussels.

The Anderlecht abattoir shows some similarities to the site of St.Marx in Vienna[18], built at the end of the 19th century as a steel

18 St.Marx Cattle market in Vienna, see p.58

Fig. 70 Abattoir Foodmet, Brussel insight market hall © F. Dujardin

construction, moved due to regulations a hundred years later, and now loaded with much pressure as a redevelopment area of the city. Currently, the old market hall in Anderlecht, a classified monument, is temporarily used by Cultureghem, a non-profit organization that cultivates urban space. The masterplan still includes food activities such as butcheries, distribution, and markets but combines them with education, residential and other functions such as a semi-housed swimming pool (cf. ORG Permanent Modernity, 2022 / 2011).

—> combination of production and consumption in one building, extending the food characteristics and integration in development areas.

Administrative building with an integrated rooftop greenhouse

Fig. 71 Amtsgebäude Oberhausen by Kuehn Malvezzi ©kuehnmalvezzi

Oberhausen, Germany, is a city with a lot of vacancies and not a lot of attractive public space. The architecture office Kuehn Malvezzi and landscape office atelier le balto combine typologies of an administration building and a rooftop garden in an urban context in their architecture competition-winning contribution. With their approach, they attempt to bring nature partly back to public space. The glasshouse on top grows neat from the facade but with a visual separation by changing materials. This view can give pedestrians food for thought and create awareness of the food cycle and urban food production. The connecting part of the market square and public rooftop is a vertical garden, which guides the visitor over several stairs and scaffoldings to the top of the building and can function as the connection between two typologies (cf. Oskar von Miller Forum, 2021).

In a lecture at Oskar Miller Forum, Kuehn says that nature can be seen as a function in the city and technique as a resource, especially for buildings with a circular building technique system. Since the completion of the structure in 2019, the Frauenhofer Institute for Environmental, Safety, and Energy Technology has developed and implemented building-integrated plant production concepts at the rooftop glasshouse (cf. nextroom, 2019).

The project benefits from an interdisciplinary planning and design team and can be seen as the start of a behavior change in daily routines. If urban dwellers see a glasshouse daily, they might first consider it odd and later regular. Architecture can change human behaviors and lifestyles by raising questions, designing new solutions, and creating awareness.

—> integrating food production in the urban environment visually to consider it as common.

Supermarket of the Future

One of the biggest supermarket concerns in Austria and Germany also focuses on changing the food system‘s sustainability. The project „market of the future,“ designed by the architecture studio Acme, is a prototype combining production (only basil plants for a start) and consumption. The focus is on regional and fresh produce, as one member of the Rewe group says. The location of the project is on the city outskirts of Wiesbaden. It is a typical industry and consumption area with many square meters of sealed soil.

The combination of a conventional supermarket with an aquaponic system and a glasshouse on top is something new for Germany. The Berlin-based company ECF Farm Systems maintains the aquaponics system (cf. Acme, 2022). On top of the sales area, ten tons of basses and 800.000 pots of basil are produced on 1.600sqm. It could be a design task the future asks for more often.

The project is a starting point for the future development of the stores. The food distribution concern is convinced by the iconic

Fig. 72 Innerview of the supermarket of the future by acme studio; glass house with an aquqponicsystem on top of the supermarket ©acme

timber structure, which is a backbone and modular element for the architectural identity of the new store. How Rewe advertises the concept (arranging the parking lots around the building, creating biodiversity, reducing packages, and focusing on regionally produced food) can be criticized as "greenwashing". However, the starting point of creating awareness of the food system for the general public needs to be somewhere (cf. Rewe, 2021).

—> integrating production into a commercial consumption typology, like a supermarket, to create awareness of the food system for the general public.

Connectedness: the Danish Pavilion at Venice Architecture Biennale

Fig. 73 Connectedness at Biennale 2021 Venice © H. Berndtson

The exhibition contribution of the Danish Pavilion at the Architecture Biennale was designed by Lundgaard & Tranberg Architects. The topic of the 2021 Biennale was „How will we live together," and the answer by the Danish architecture office and the curator Marianne Krogh was an installation based on a circular (rain) water system. By rearranging the way through the pavilion, the visitors are guided by different states of water and will end up in a vast relaxing area; floating on a pool. The exhibition works as a closed organism by itself and is not shutting down when the Biennale closes its doors.

The heart of the exhibition is the water reservoir which connects the rainwater from the roof, water purifying plants, and all the other stations, like veins in our body. The focus lies on circular systems and learning from respecting nature by generating this closed loop of rainwater, condensation, filtering water, and using it for plants and tea ceremonies. Visitors are not only visually guided by water streams or water pipes but can hear water dripping or rushing and smell the plants and herbs farmed inside the pavilion. Architectural characteristics such as scales, condensations, extensions, transitions, materiality sensations, and tectonics are underlined by the different conditions of the water. In the final relaxing room, which regularly overflows depending on the weather and visitors' activity, one can feel the connectedness of the circulatory system, highlighted through the visible combination of architecture, technology, and science.

By answering the question of how we will live together with a circular water system, the worst weather conditions Venice has to face according to climate change are highlighted. Besides, water is not a resource everyone in the world has access to - even if water is life. To complete this atmospheric, soft awareness experience of climate change, the publication of the exhibition, an encyclopedia, (re)describes the world in a time as the Anthropocene and varies in the authors' professional backgrounds (Krogh, 2020: 13 ff).

—> understanding the connectedness to our (ending) resources and emphasizing them spatial within a circular system.

Fig. 74 Connectedness at Biennale 2021 Venice ©dezeen

3.2 *National best practice food typologies*

Chapter 02 focuses on food production and consumption examples in Vienna today. The best practice public intervention and architecture projects mentioned here show how architecture can contribute to creating awareness of the food system and social sustainability. The case studies vary in scale, from art to revitalization projects, but all with the aim to make food production visible in public urban space.

Kreis(verkehr)kartoffel Vienna

Christoph Schwarz, known as a film producer and for self-experimentation art projects, reached medial presence with his latest project Kreis(verkehr)kartoffel, in the 3rd district in Vienna. It was part of his year of a strike without money when rescuing food from waste and urban farming became necessary for his daily life. A roundabout is a dead public space - the perfect area to implement urban farming.

The project's central element is a water tank for watering the potato plants, which are growing in the middle of the roundabout in an area of a concrete desert of parking lots and a construction site for three new high-rise buildings. When neighbors and bypassers were invited to join the event during a performance, the vegetables were planted and harvested weeks later. The yield was democratically divided depending on the workload of the participants (cf. Kreiskartoffel, 2021).

The surrounding community was either engaged or curious to join the farming in the middle of the roundabout. Alternatively, were angry car drivers who went by yelling or horning as someone blocked the driveway to read the information of the public intervention. Hence, it was only a tiny public intervention in urban farming; the neighborhood profited from it.

Another project by Christoph Schwarz reclaiming public space against a car centrism urban development is the installation „Cabriobeet." The intervention questions the reasonableness of a more bureaucratic effort to create a raised bed on the pavement than getting a parking lot. So, a car filled with soil and herbs ended up on the streets of the 9th district to be able to implement a small garden on the street. Another way to create awareness of the possibilities for urban dwellers to become self-sufficient.

The artist said in an interview about his year-long strike without money: „Radical is not picking chicken filets out of the garbage can and cooking them - radical is our form of factory farming that deliberately accepts overproduction. Radical is not our call for car-free cities, but the way we have built our cities around our cars." (cf. Bleninger, 2021).

—> creating public interventions to create awareness of urban farming, priorities in public space & engage with the community.

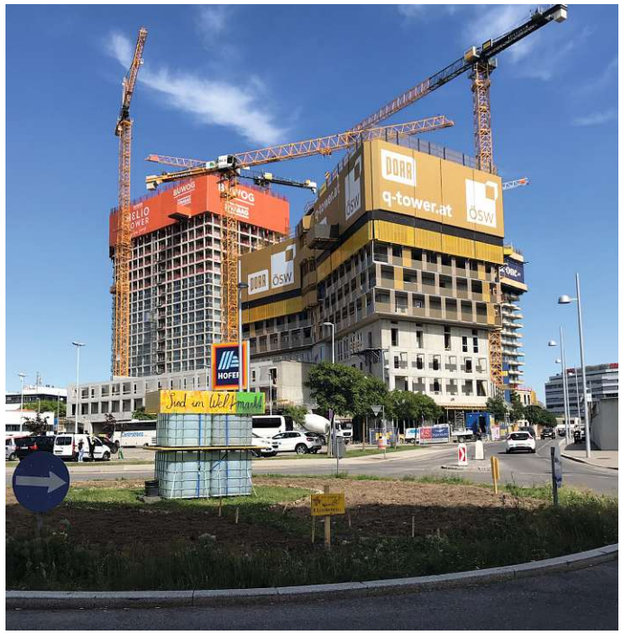


Fig. 75 Kreiskartoffel ©S. Gold

Oasis 8 and Urban Oasis Wien

Waste can be seen as a resource, not only a waste of space or food waste but also thermal waste in the form of heat. Architect and artist Markus Jeschaunig created a visualization of heat waste in public space with his urban oasis projects and prototypes. In 2015 he installed Oasis nr.8 on a vacant site in the city of Graz. The intervention uses the waste heat of cold storage rooms of a restaurant and a bakery for urban farming tropical fruits such as bananas and pineapple. The ETFE bubble stands in strong contrast to the surrounding old buildings and acts not only visually as a parasite.
Bananas are one of the most popular fruits in Europe, and we find them the whole year in the supermarket - but for which price? Usually for a low amount of money, but a high CO2 footprint, many food miles, and sometimes harvested under no sustainable conditions. The temperature in Oasis nr.8 does not decrease below 15 degrees, even during the cold seasons—a perfect microclimate for growing tropical fruits in our longitudes, without heating.
The surrounding community was invited to maintain the plants inside and started to call the project the nickname banana hood. This public intervention creates awareness of aspects we will face forced by climate change and raises the question of how circular our food system is.

Fig. 76 OasisNo8 by MarkusJeschaunig ©S. Oberhofer
Fig. 77 Oasis No8 by Markus Jeschaunig insight view © S. Reiser

It can be seen as synergetic urbanism, which Jeschaunig defines: „synergetic urbanism activates local resource- and material flows to create zero-emission products, cities, and life. Synergetic space strategies utilize locally harvested energy rather than supplied high-quality energy.“ (cf. agency in biosphere, 2022).
At the Vienna Biennale, 2017, and the theme city factory, another urban oasis prototype was realized as public intervention. This time the oasis functions as an answer for new sustainable work in the sense of a circular economy and innovative utilization of urban resources (description of the Biennale Call).

Urban Oasis Wien acts again as a parasite installation and docks onto the technical infrastructure of restaurants‘ cooling and heating systems in the underground station of Karlsplatz. The self-sufficient small urban farm could be used all year round for shared use by the residents. A small solar panel that powers a battery provides the plants extra light during the evenings. The concept uses the warm air flow as protecting insulation and works with wood, polycarbonate, and plexiglass materials. Urban Oasis Wien was realized with the cooperation of the vertical farm institute. The project was created to raise questions and create awareness, not to build the perfect prototype. It engaged the community as the plants (from salad to kohlrabi) needed to be watered daily. As it is always with public interventions, there were criticizing opinions, too: some citizens were not ready yet to enjoy food that grew in heat loss (cf. derStandard, 2017).

—> visualizing waste as a resource to create awareness of circular economy and start to implement urban farming on a (small) scale.

Zukunftshof Vienna

At the south border of Vienna, in Rothneusiedl, one huge city development area with around 10.000 flats waits to be realized in the next ten years. Currently, the area does not feel like being in the city anymore as the surroundings are fields and buildings, almost like village structures. On one of the last streets before leaving the city of Vienna is the Snail Farm of Gugumuck, and next to it is the old Haschahof (City of Vienna, 2021b: 45f).

Haschahof has a history of hundred years of urban farming, from dairies to horticulture, and was one of the first certificated urban farms in Vienna. A citizen initiative preserved the old brick farm building from demolition a few years ago. In 2020 the Zukunftshof association was established and started to use the Haschahof as a temporary home. The Zukunftshof has a clear mission to change the food system and is a lighthouse project for urban farming in the context of urban development. Some stakeholders describe the area as a flagship of an „edible city-village of the third millennium," (cf. Stadtlandwirtschaft, 2022b) hence a prototype for climate-efficient city planning. The aim is to connect the old identity of the existing village atmosphere with new urban farming technologies, not only on the ground but also on facades, roofs, terraces, and indoor productions.

Fig. 78 Zukunftshof
©n. degiorgis

The reactivation of the old brick building started with the temporary usage by the association of the Zukunftshof, which will be the initiators of this lived utopia. The concept is like a laboratory of various future food companies, including Hut & Stiel, Zirp Insects, blün, a beekeeper, and many more. The idea is to cooperate within a circular economy for the whole Zukunftshof and, later on, maybe for the entire neighborhood. In a first step, the aim is again to create awareness and common knowledge of urban farming. Mainly by thinking not only of the building system in a cycle but the local food system too: the food produced at Zukunftshof is either sold at the market, processed directly on the farm, or offered in the future farm-to-fork restaurant on site.

Living this utopia starts today and will be a long path with a lot of passion and volunteering work by the cooperative Zukunftshof. Nevertheless, it can be seen as a bottom-up wake-up call for an economic and ecological strategy for resilient city planning facing climate change. The engaged community of the Zukunftshof works under the motto that they are not afraid of the future; they want to shape it. By supporting local agriculture and creating related social and cultural events, the collective opens new possibilities for educating and involving citizens (cf. Stadtlandwirtschaft, 2022b; Zukunftshof, 2019).

—> reactivating and reusing old (food) typologies, using them for urban food and integrating them into urban development areas.

»While the importance of local food growing is fast gaining ground, the ability to conceive of urban food production actually happening within the bewildering array of structures and surfaces of the city is a difficult concept. Can urban agriculture be the antidote for the many spaces that exist between utility and productivity in our cities?«

Lim, 2014: 96

Fig. 79 Swegreens instore farm at Fotografiska, Stockholm ©S. Gold

3.3 Conclusion and Tales of Urban Oases: Viennese Foodscape of Tomorrow

Food as an urban design tool was not only relevant in the past but will also have a crucial role for architects and urban planners in the future. The historical development of a metropolis highlights the relevance of integrating food production into urban space. Next to developing cities with specific identities and improving the urban living quality, it is also essential to create resilient spaces by not losing a city's identity. A city's characteristics can be enjoyed by, among others visiting a restaurant, sharing a meal with (local) people, or strolling through markets. Sharing a meal in a foreign country is a way to get to know a culture by seeing, hearing, and tasting it. Without communal eating, no human group can hold together.

This thesis discussed the interconnection of food, urban planning, and architecture. Based on the example of Vienna, the importance of food in the visual identity over various historical epochs has been illustrated. By taking current geopolitical and environmental challenges such as the Covid-19 pandemic, global growth of population, or global warming into account, the awareness of where our food originates from will be crucial in the future. A couple of case studies illustrated that food will also be a material factor in the appearance of urban areas such as the city of Vienna in the future. By looking at the urban foodscape over the last century, it can be concluded that food (and space) is essential for the urban environment but also has a political, spatial, and, last but not least, an important identity component.

Conclusion 1: Current social and environmental problems, obstacles to integrate modern urban food projects, and interests of the relevant stakeholder

Implementing smaller urban farming and consumption projects in today's cities, several challenges on different levels, from politics, economy, or consumers' perspectives, need to be faced. As cities are dense areas, and real estate prices in urban areas are high, the focus on available land or vacant sites is exceptionally high.

Next to the scarcity of land, not (yet) adopted regulations and norms also face a problem for modern urban farming: It is not straightforward to asses in which categories of the zoning plan urban food production is allowed. Is processing and distributing part of urban farming, or does it mainly, on a small scale, fulfill a self-supporting purpose? Integrating new urban concepts in which production and consumption might belong together can be a direct competition for supermarket chains that use their scaling power to keep their market share. Food retail is competitive, especially for smaller (local) alternatives. Consequently, smaller shops focusing on the distribution of local products will only be able to persist if customers are willing to pay a premium over imported goods that can be bought cheaper at supermarkets or if they get some subsidies.

These are global problems and are not limited to the city of Vienna. CJ Lim describes in Food City the difficulties of urban agriculture through the example of SOLEfood, a farmers-collective in Vancouver. Often the value of land is extremely high, and inner city locations require tax classification agreements with landowners or even the city council regarding the classifications. 'City councils claim that they lose a lot of tax money and that more attention needs to be given to how they make up the lost revenue.' Furthermore, 'The fact that deprived urban neighborhoods benefit economically and socially from the farms supports the need for a rethink of how land property values are assessed.' (Lim, 2014: 97).

Elevating the practice of cultivation, selling, and composting to

political dimensions on a municipality level in designing urban areas unites the ability to view and practice food production in a new sustainable way. Urban agriculture as a community-building tool has many positive social and environmental impacts (Lim, 2014: 47). Suppose the first step of integrating urban agriculture are small-scale interventions in public space, almost acting more as art than architecture. In that case, initiator or bottom-up projects benefit from a gray zone in regulations and limits.

Food is political.

Conclusion 2: Spatial aspects of urban food typologies

The relevance of food typologies can be highlighted by recognizing the influences of food supply in cities and its development since the 19th century. In the act of need and supply, cities and their society were formed, among others, by food. As demonstrated by the case studies in chapter 3, today's focus might shift from the supplying factor to offering alternatives and their integration as new standards. Food is spatial and gives urban space a specific identity and atmosphere. Using plants and farming on different scales contributes to a better microclimate and general environmental and social conditions.

As mentioned by ecologist Säumel, urban dwellers nowadays desire to reconnect with nature, the countryside, and agriculture, especially after recent food scandals and the Covid-19 crisis. Urban agriculture can close the gap through information, education, and bringing the urban population in direct contact with food production. Urban farming will help make children aware of where and when vegetables are growing and originating. Further, new typologies of food and architecture can contribute to hotspots of biodiversity in urban regions, cooling points facing climate change, and creating circular economies within cities (cf. DerStandard, 2022). Architecture can act as the link between humans and food. Integrating food supply, production, and consumption into urban planning creates new public space. Urban farming and production support not only the food chain but help to define a city's identity and add value to public spaces. The farmland within the city borders is not only enrichment by its products but also contributes to the city's green lungs. These developments and awareness of the urban population will help establish new typologies as foodscape will play a crucial role in future cities. A few examples of the spatial aspects of food in Vienna could be schools with gardens to educate and inform, floating aquaponic systems and gardens at the Danube Canal or food towers in abandoned structures like the Flakturm.

Food is spatial.

Conclusion 3: Social, cultural, and economic impacts of urban food typologies

Considering the amount and speed of technological development over the last decade, it can also be expected that the way we live as urban dwellers may change entirely over the next fifty years. The agricultural industry has also undergone numerous changes. Some of these have changed many people's circumstances employed in that sector, leading to mass migration or poverty. Agriculture remains highly dependent on the wasteful use of non-renewable resources, especially oil and fresh water. As these resources may run out over the next 50 years, further agricultural changes will likely lead to further migration, poverty, and social exploitation (Lim, 2014: 88).

Conventional farming and future technologies that will allow new urban farming systems cannot be compared directly. As Steel describes in Hungry City, urban farming creates awareness

of where our food originates from: By relocating farming in our neighborhoods and streets, we are able to see the roots of our food on a daily basis and are forced to question where it originates from — vegetables can be connected to a farmer harvest them, and meat can be connected to a living animal, not only a foiled package. Food as a design tool helps close the gap between urban and rural landscapes, visualize the food-growing landscape, and to taste something regional that can be associated with the weather and seasons (Steel, 2009:320).

Furthermore, the profession of farmers will be put into a new spotlight. Developing urban farming generates new job opportunities in cities. However, government support is required to achieve growth in that sector. Säumel explains the importance of public participation, which can be a problem in top-down concepts. On the one hand, urban food production and consumption concepts are an economic push. On the other hand, which first will be in the foreground, farming and gardening have a social impact. If the community feels responsible and engaged, it can be an educative and more sustainable approach. The municipality then only needs to act supportive and not as a leader (cf. derStandard, 2022).

Complete self-sufficiency in food supply might be utopic for cities, but shifting the food system to a more regional one, will help the urban environment to be more independent and resilient. Primarily, when pandemics show the system's fragility and wars drastically affect the supply, a more regional approach in cities will be key. Producing more local food, creating jobs, delivering fresh fruit and vegetables, and reconnecting consumers with their food can be achieved. Urban food systems might not be necessary for cities to survive, but by recognizing the social, environmental, and economic benefits, urban dwellers will benefit in the future (cf. Lim, 2014: 43).

Especially in countries where food is a fundamental part of the culture and way of life, such as in France or Italy, it may be more obvious worth fighting for. Fighting for local food supply when it is threatened and consciously integrating food typologies in urban environments as a means of shaping everyday life (Steel, 2009: 239).

Food is identity.

Conclusion 4: Creating awareness of the food system and scarce resources - establish urban foodscape as common

Recent global warming demonstrates that humans must alter how they treat their habitat and scarce resources if they want to stay longer on planet earth. Through implementing urban food projects, awareness of all steps of the food cycle is created for the urban population. For example, closed circularity, as at the Danish pavilion[19]creates a new understanding and a more cautious dealing with natural resources. Waste is considered a resource too. Wasteland, abandoned buildings, and waste products might still have a significant usage, as Hut und Stiel[20] demonstrates with their mushroom production.

A vivid interdisciplinary exchange is necessary to foster awareness of the food system. Especially in innovative food production companies, a mixture of professional backgrounds and international teams opens new views and ideas. This leads to new trends and results in adapting to new living conditions and changing our human species' diet: Beef or food with many food miles has a very high CO2 footprint which can be reduced by developing regional alternatives. For example, snails were always part of the Viennese Kitchen and slowly getting their way back on the plate as they are an excellent alternative to beef.

In Food City, Professor Tara Garnett, head of the Food Policy Research Network at the Oxford University, says that the

19 Connectedness: the Danish Pavilion at Venice Architecture Biennale 2021 p.138

20 Hut and Stiel produces mushrooms in coffee ground in Vienna p.102

technological production of more food can not be the solution to the world's food problems. Instead, the population needs a more responsible understanding of the food supply chain, local access, and affordability of the food produced (Lim, 2014: 73). To conclude, creating awareness of the foodscape to support environmental aspects of the food supply chain must start in all age groups, especially among the youngest community members.

Foodscape is essential for the urban environment.

Tales of urban oases in Vienna: A day in a scenario of a food city

Houses of food - scenarios and mind games of different scales and time

Asking questions about how our food system functions in an urban environment and how it might develop in the future in the context of climate change and other crises. As designers, it does not matter which scale and professional background; it is important to start to irritate with innovation and start discussions with scenarios and mind games, some lighthearted, some dystopian. Firstly, approaches are not meant to be practical ideas that can be implemented right away - but scenarios of a day in the future in a food city of Vienna that provoke thoughts for future development. They can serve as an impetus for discussion and seize the opportunity to see food as a tool in architecture and urban design.

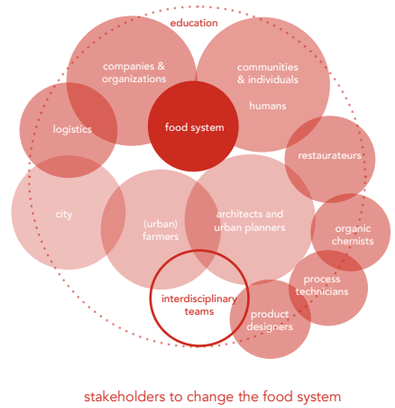


Fig. 80 Urban Oases network stakeholders ©S. Gold

Different scales and professions influence all scenarios. The first one is a minor scale and shows an individual space, a flat. A person is harvesting the kitchen window garden provided by the government to ensure food independence on a small level. Then, on to way to work, the Urban Floating Market Farm at Danube Canal is highlighted. It is developed as a typology combining production and consumption, works almost self-sufficient, and has a closed circular economy. Citizens are on weekends invited to help at the farm, enjoy the products at a farm-to-fork bistro or use it as a public, social meeting point as a farmers market will take place in honor and as a revival of Schanzelmarkt. Further, the following scenario shows the Tower of Food, which uses waste (space) as a resource. This vertical farm, an aquaponic system, indoor farming, and a food bank are installed in and next to the Flakturm and works as a local supply for the neighborhood. In the evening, a group of friends gather in the Sensory Food Garden to enjoy their local products over the rooftops in Vienna and exchange their thoughts about food culture with other attendees during dinner. This garden has become a social meeting point.

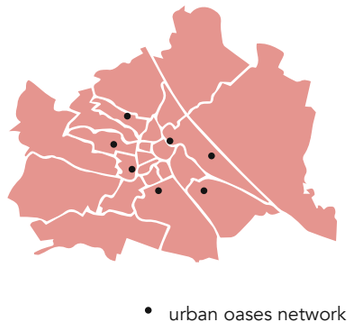
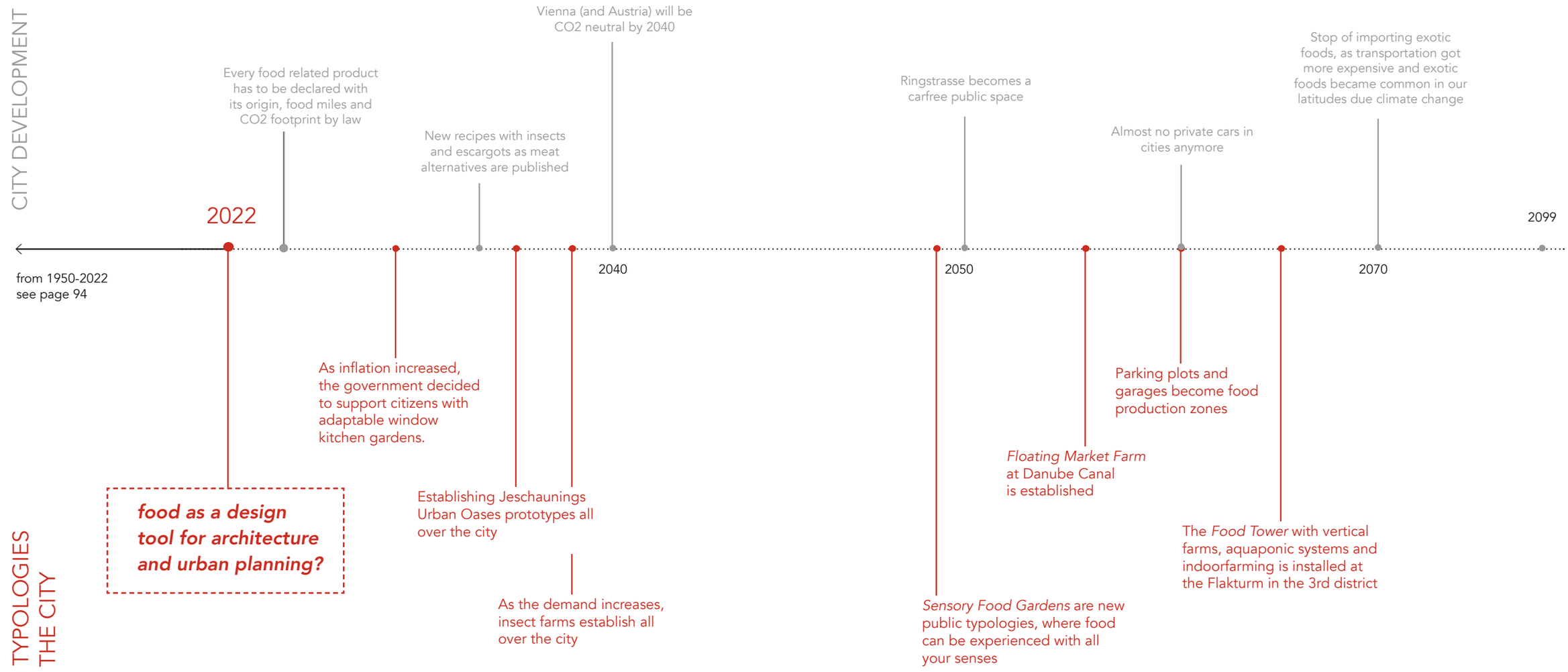


Fig. 81 Urban Oases network Vienna ©S. Gold

Vienna city development and food typologies - future scenarios

This timeline is based on possible scenarios for the city of Vienna for the next 77 years. The food typologies and city development are mind-games and can be seen as irritation to start a discussion.

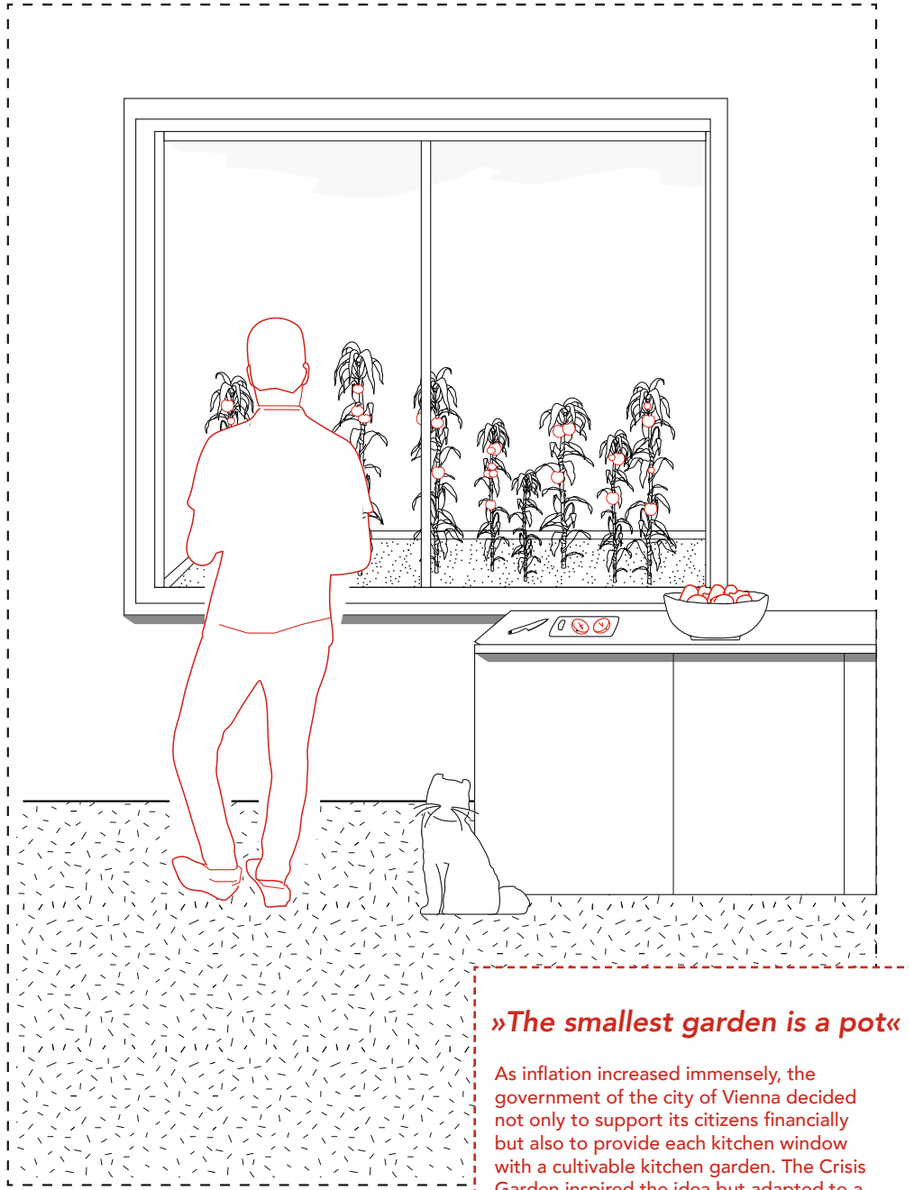
The government of the City of Vienna has had a climate neutrality pact since 1999. In 2022, it was updated and contains important topics on how to reduce the carbon footprint by 2040. The goal is to become climate neutral in the next 18 years (cf. City of Vienna, 2019).



The here described interventions start from small scale as public interventions to projects impacting only neighborhoods until the entire city. All of them have different initiators and stakeholders, from individuals, artists, and the government.

Fig. 82 Vienna City and Food Typology Development - Fragments Timeline of the future ©S. Gold

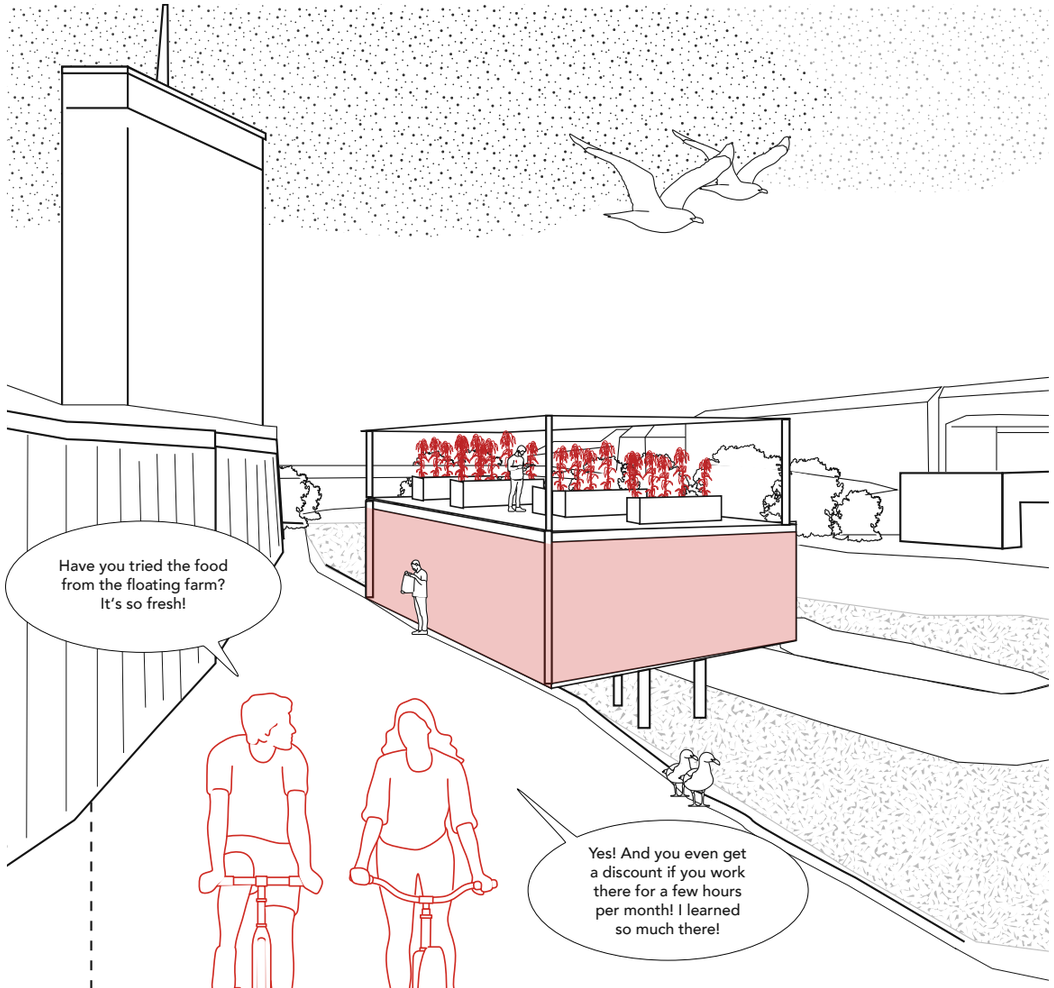
In the morning at home...



»The smallest garden is a pot«

As inflation increased immensely, the government of the city of Vienna decided not only to support its citizens financially but also to provide each kitchen window with a cultivable kitchen garden. The Crisis Garden inspired the idea but adapted to a smaller scale. Seed letters with instructions are sent to each residence in the spring. The window gardens are statically tested and contribute to the education and self-sufficiency of the Viennese population.

Fig. 83 »The smallest garden is a pot«
©S. Gold

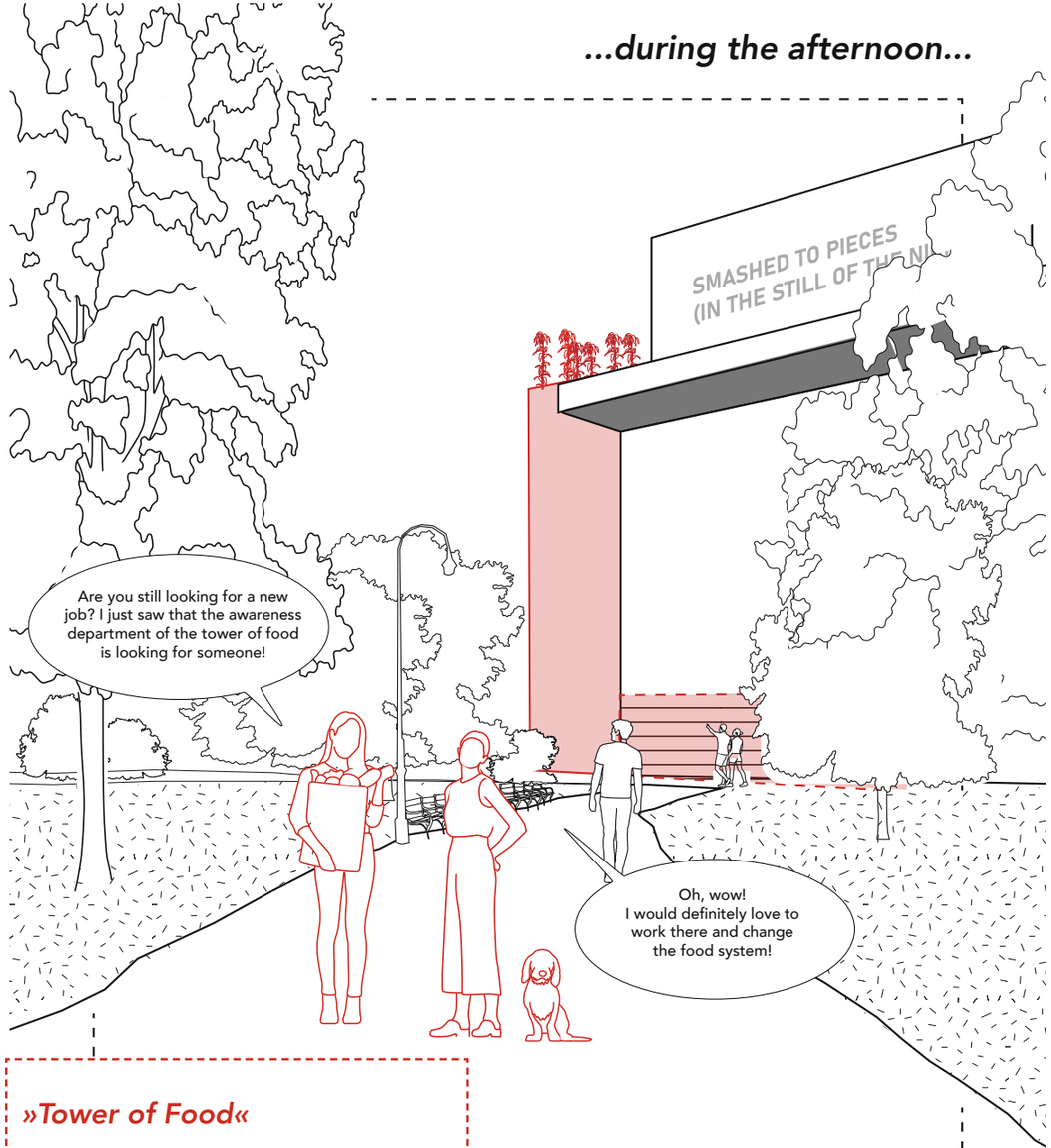


...on the way to work...

»Floating Market Farm«

This farm floats on the Danube Canal and is almost self-sufiecent with water flow and solar panels. It's a revivial of Schanzelmarkt in a modern way. Fresh products from the aquaponic system and gardens are distributed in the shop or on weekends at the market there. There is a possibility to support the farm and work there to reduce price. The Floating Market Farm contributes to create awareness of the food system and supplies the city with fresh products.

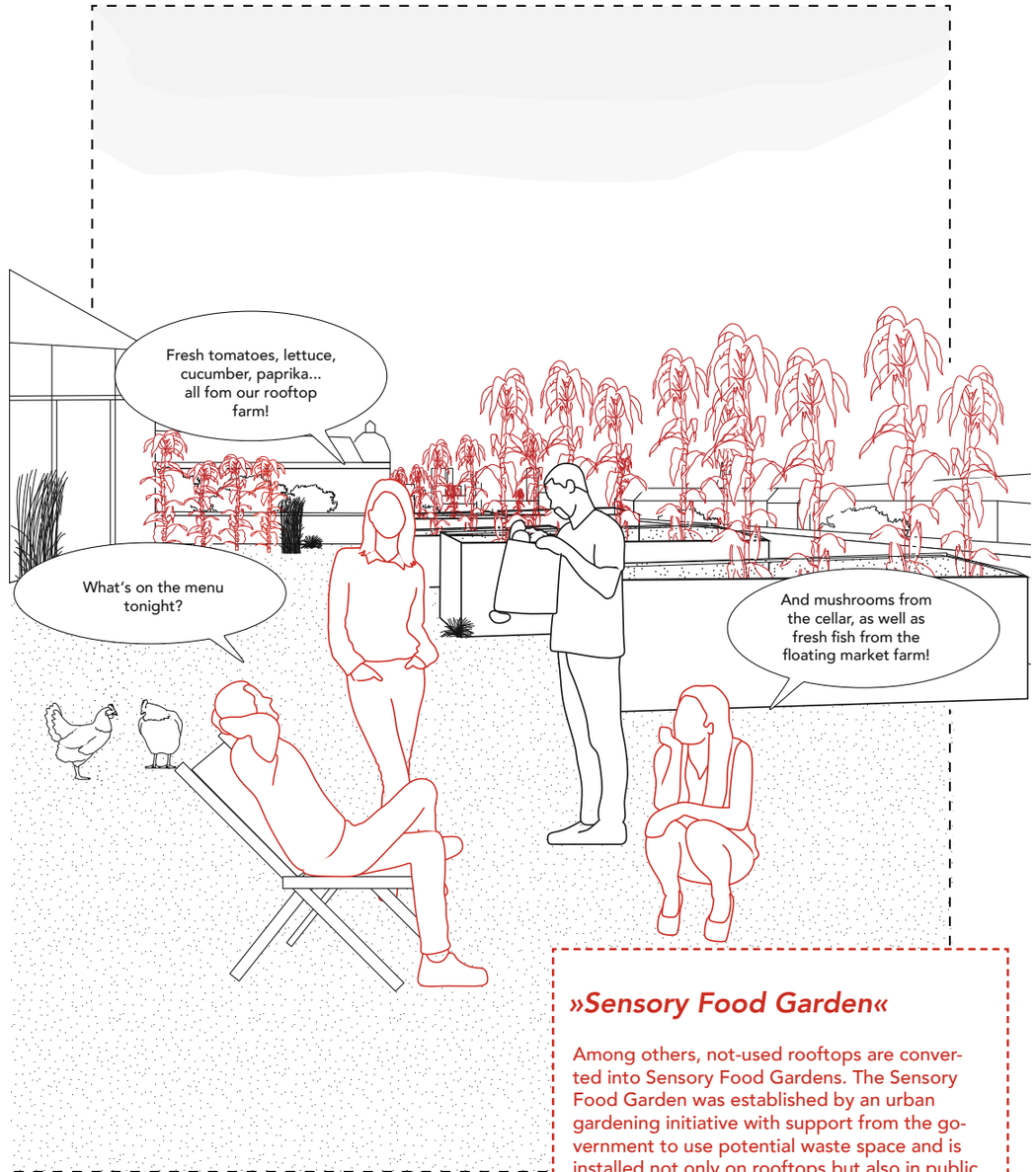
Fig. 84 »Floating Market Farm«
©S. Gold



»Tower of Food«

Using waste (space) as a resource, the city decided to revitalize the Flakturm as a Tower of Food. The outer appearance is except one side entirely untouched for preserving the monument in today's city fabric. A vertical farm, an aquaponic system, indoor farming, and a food bank are installed in the building. Furthermore, a farmers market supplies the neighborhood. On the weekends, the Arnbergpark is a social meeting point as a market take place in front of the Tower of Food.

Fig. 85 »Tower of Food«
©S. Gold



...in the evening.

»Sensory Food Garden«

Among others, not-used rooftops are converted into Sensory Food Gardens. The Sensory Food Garden was established by an urban gardening initiative with support from the government to use potential waste space and is installed not only on rooftops but also in public spaces such as small interventions at public transport stops and public buildings. The experience goes from seeding, gardening, farming, and harvesting - and at the end, cooking a meal together. All senses are satisfied.

Fig. 86 »Sensory Food Garden«
©S. Gold

Fig. 87 Where does the food come from?
©S. Gold

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APPENDIX

LIST OF FIGURES, BIBLIOGRAPHY

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