



Urban Food Tech: adapting food to climate change

Technology
Report

Vienna,
July 2022

Dear readers,

Vienna is one of the world's top places for sustainable innovation. Around 9,200 companies in Vienna are working in urban and environmental technology. More than 90,000 people generate annual sales of around 40 billion euros, equivalent to 16 per cent of the total sales of all companies in Vienna.

According to various studies, Vienna's strong points are its innovative strength, comprehensive start-up support and its strong sustainability focus. Vienna is also at the top of several Smart City rankings. The key objective of Smart City Wien is to provide the best quality of life with the greatest possible conservation of resources by 2050. This goal is implemented in many innovative individual projects. Other factors in Vienna's favour are its research and technology-friendly climate, its geographical and cultural proximity to growth markets to the east, its high-quality infrastructure and professional development and, last but not least, the highest quality of life in the world.

To maximise Vienna's potential, the Vienna Business Agency acts as an information and cooperation platform for Vienna's technology developers. It creates relationships between companies and development partners from business, science and the city administration and supports Vienna's companies with pinpointed funding and a wide range of consulting and support services.

Food production affects the climate in many ways. More than 25 percent of global greenhouse gas emissions are caused by food production and only around a third of the food produced is actually consumed. Technological and organisational innovations in the production, packaging and distribution of food are therefore an important means of mitigating climate change and achieving the Paris agreement climate goals.

This report describes the innovative solutions Vienna's pioneers are working on.

Discover This report provides an overview of current trends and find out about outstanding lighthouse projects in Vienna.

Happy reading!
The Vienna Business Agency



REACT-EU ALS TEIL DER
REAKTION DER UNION AUF DIE
COVID-19-PANDEMIE FINANZIERT.



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process.² However, this is not without its downsides: production is extremely energy-intensive and a significant proportion of nutrients are lost in the process. These surpluses subsequently disrupt the balance climate and ecosystems.³

Food production affects the environment and climate in many ways: Agriculture accounts for 50 percent of ice-free land globally.⁴ Growing food uses fossil fuels, fertilisers and pesticides. Farming, particularly intensive farming, means soil is eroded and cannot be used for other purposes. In many countries around the world, agriculture means water shortages and deforestation. However, the production, processing, storage, logistics and disposal of food also consume resources, producing additional greenhouse gases.

Global warming caused by human activity is now very well documented. Figure 1 shows the change in global surface temperature since pre-industrial times. It is clear that human activity already has caused about 1.0°C of global warming compared to pre-industrial levels. The global 1.5°C mark is likely to be reached between 2030 and 2052.¹ Even after anthropogenic greenhouse gas emissions come to an end, the greenhouse gases already emitted will cause long-term changes in the earth's systems in the coming centuries.

Austria and Europe are committed to the Paris Climate Agreement to bring about the decarbonisation of society. In 2019, the European Parliament adopted a resolution by a large majority declaring a climate emergency in Europe. This underscores the urgency of climate change and the need for effective countermeasures. Against this background, discussions about sustainability, environmental protection and climate effectiveness in policy, economy and lifestyles are more important than ever. And nutrition is also an important factor here. Major social upheavals, such as digitisation and technological progress are important elements of these discussions.

The interaction of technologies, nutrition and climate is characterised by contradictions: The food production system we know today originates from the end of the last Ice Age. The stabilisation of the climate meant people could rely on relatively predictable seasons. This made agriculture possible. In becoming sedentary, humans needed new technologies, for example agricultural implements such as the plough or food processing methods such as baking bread.

Many thousands of years later, the dawn of industrial agriculture saw a transformation of human life. The Haber-Bosch process developed in 1913, which fixes ammonia, makes it possible to produce synthetic nitrogen fertiliser on an industrial scale. Today, about half of the population is fed by food fertilised with synthetic nitrogen from the Haber-Bosch

1
IPCC Report 2019

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Czaja 2016

3
Manthiram and Gribkoff 2022

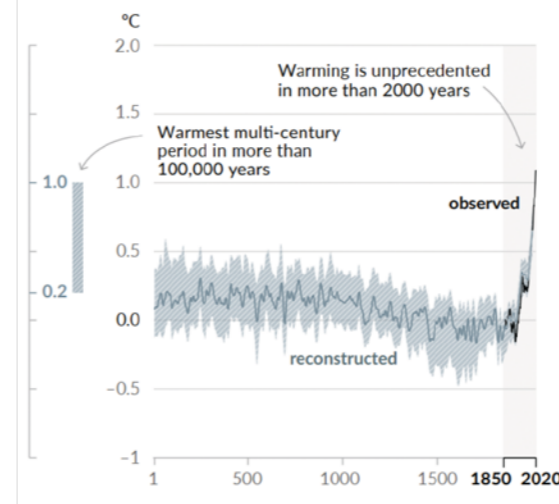
4
IPCC 2019

Global surface temperature changes compared to 1850–1900

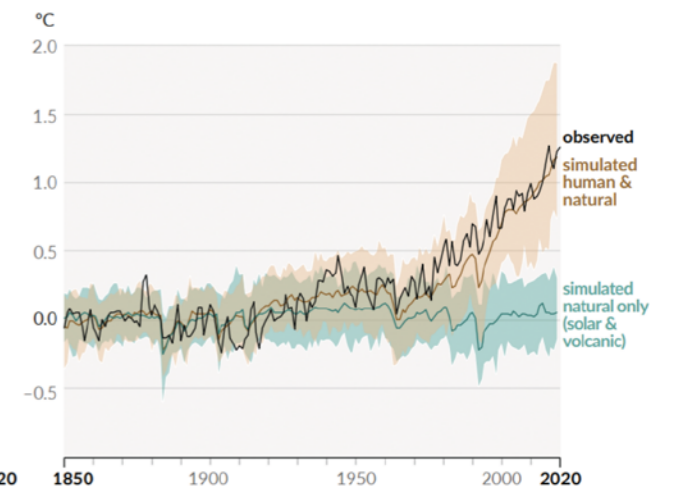
Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

Changes in global surface temperature relative to 1850–1900

(a) Change in global surface temperature (decadal average) as reconstructed (1–2000) and **observed** (1850–2020)



(b) Change in global surface temperature (annual average) as **observed** and simulated using **human & natural** and **only natural** factors (both 1850–2020)



Source: IPCC 2021

As Figure 2 shows, more than a quarter of global greenhouse gas emissions can be traced back to food production.⁵ The IPCC (International Governmental on Climate Change), on the other hand, estimates a proportion of global greenhouse gas emissions of between 21 per cent and 37 per cent.⁶ The largest share of emissions is caused by livestock and fisheries, followed by the production of crops for human and animal consumption. The agricultural use of soil also leads to greenhouse gas emissions, as do the transport, processing and storage of food. Over half of the emissions from food production are linked to animal products.⁷ Therefore, consuming animal proteins comes with high ecological costs.

A significant problem in this context is food waste, which occurs at all stages of the value chain. Avoidable food waste (i.e. bread, fruit and vegetables, meat off the bone, unshelled eggs, etc.) results in greenhouse gas emissions which provide no benefit whatsoever. Globally, around a third of the food produced every year, around 1.3 billion tons, is wasted. The carbon footprint of food produced but not consumed is estimated at around 4.4 gigatonnes. Food waste thus causes 8-10 percent of the greenhouse gases emitted by human nutrition.⁸

Food production not only contributes to climate change. Climate change also creates challenges for food production. Heavy rainfall, heat waves and natural disasters are increasing in frequency and severity. The general rise in temperature is not only changing the conditions for plant production, but also for the associated ecosystems. New pests find new homes, while some plants run out of favourable growing areas. Technologies should help to optimise crop cultivation. In addition, technology can be used to develop environmentally friendly protein sources, to create packaging technologies that make food last longer and to make logistics in the food industry more environmentally friendly. This can improve the resilience of food systems and increase food security. In light of this situation, this report examines the conflict between food, technology and climate change in the city of Vienna.

The global COVID-19 pandemic and measures to contain it have transformed the world's food supply. Hoarding, empty supermarket shelves, closed restaurants and a lack of harvest workers also pose considerable challenges to the entire value chain in Austria. On top of this comes the prices of staple foods, which have risen significantly due to the war in Ukraine, among other things, which, of course, have meant that wasting food has become more expensive.

Austria is currently one of the European countries with the best data on food waste. According to the latest estimates, around one million tons of edible food in Austria is wasted every year^{9,10,11,12,13} (please refer Figure 3). Almost 50 per cent of this food is from private households. Bread and baked goods in particular, as well as fruit and vegetables, end up in our rubbish bins instead of in our stomach.¹⁴

Now is the time to examine and tackle costly food waste. Austria is committed to the UN Agenda 2030 sustainable development goal of reducing avoidable food waste per capita at retail and consumer level by 50 per cent by 2030 and to reduce food losses along the production and supply chain, including post-harvest losses.

In the Vienna Climate roadmap to 2040 – the Vienna Climate Guide – the city of Vienna has set itself the goal of

reducing food waste by half by 2030. One of the city's measures in this area is passing on food to markets and preventing food waste in the city's direct sphere of influence, i.e. in Vienna's hospitals and educational institutions.¹⁵

5 Our World in Data 2022

6 IPCC 2019

7 Our World in Data 2022

8 J. Gustavsson et al. 2011

9 Hrad et al., (2016) – University of Natural Resources and Life Sciences, Institute of Waste Management

10 Hietler P. and Pladerer C. (2017) – Austrian Institute of Ecology

11 BMNT (2018) and Hietler P. and Pladerer C. (2019) – Austrian Ecology Institute

12 Hrad et al. (2016) – University of Natural Resources and Life Sciences, Institute of Waste Management

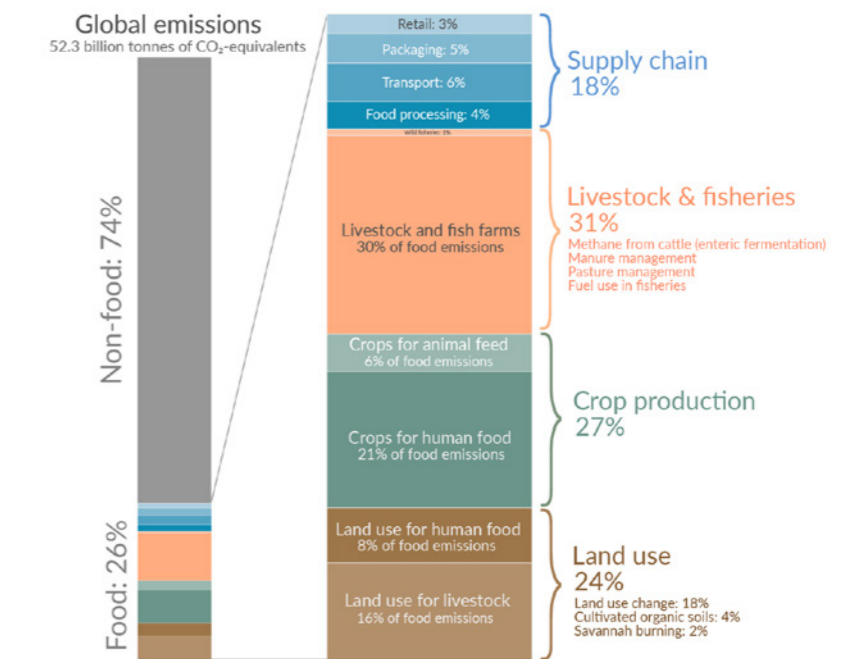
13 Schneider et al. (2012) and Obersteiner G. and Luck S. (2020) – University of Natural Resources and Life Sciences, Institute for Waste Management

14 Obersteiner and Luck 2020

15 Vienna Climate Roadmap to 2040 2022

Food production accounts for over a quarter of global greenhouse gas emissions

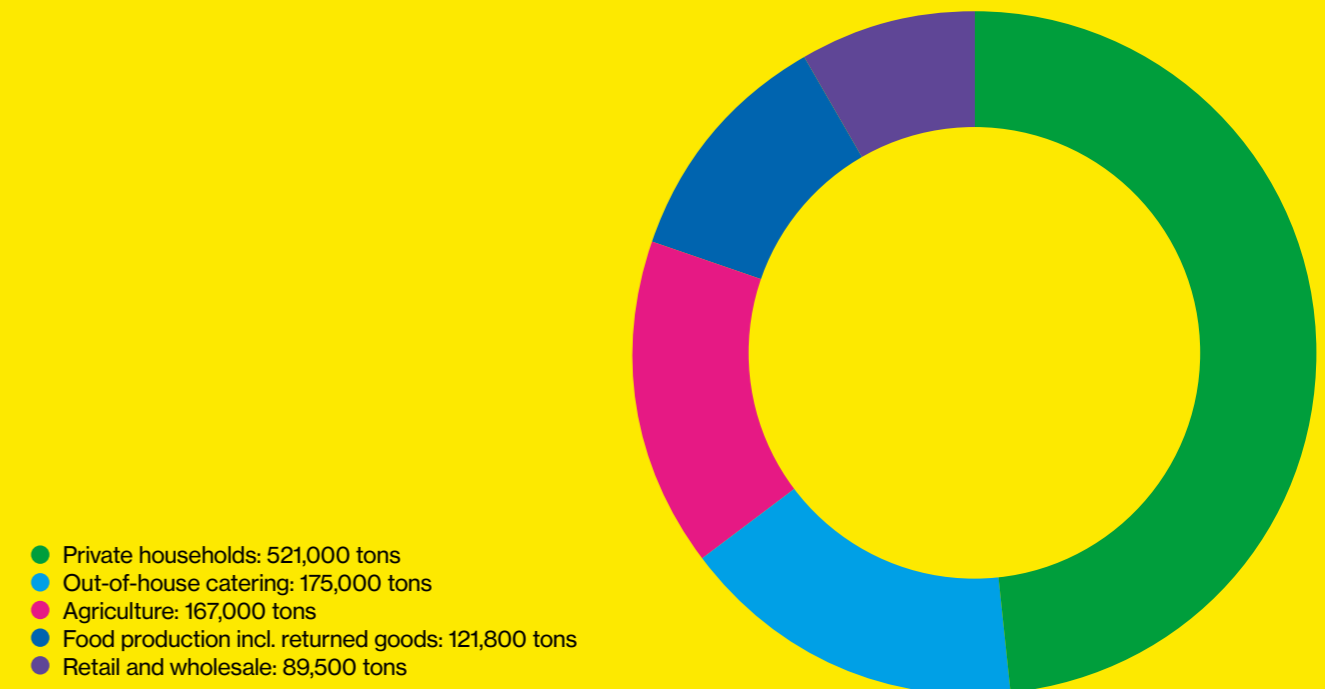
Global greenhouse gas emissions from food production Our World in Data



Data source: Joseph Poore & Thomas Nemecek (2018), Reducing food's environmental impacts through producers and consumers, Published in Science. Licensed under CC-BY by the author Hannah Ritchie (Nov 2022).

Our World in Data 2022

Avoidable food waste along the value chain in Austria



VBA diagram

Vienna's food system is influenced by a range of factors. These are discussed in this chapter.

2.1 Nutrition and product trends

Vienna is growing: according to a population forecast from 2018, the City of Vienna will break the two million mark in 2027.¹⁶ Younger age groups are growing slightly in Vienna, partly due to the arrival of young people. The Landwirtschaftskammer Wien (Vienna Chamber of Agriculture) (2022) identifies relatively individualistic consumer habits with high purchasing power within this group. This is accompanied by an increased interest, especially among young people, in the origin, sustainability and nutritional value of food.¹⁷

These topics are also booming in Vienna. One key trend is regionality, which should ideally be present along the entire value chain. Vienna's food sector is becoming increasingly interlinked¹⁸ Food is increasingly perceived not only as a source of energy, but as a sensory experience, something to socialise over and a gateway to learning about crafts and agriculture. Markets, farm-gate sales, organic fruit and vegetable boxes, specialised shops and the trend towards home cooking, accelerated by the Covid 19 pandemic offer opportunities.¹⁹ The Vienna Chamber of Agriculture Strategy 2025 has embraced this trend and intends to use it to encourage positive attitudes among the public.²⁰ Other trends such as "slow food" also align with this concept. In addition, the increasing digitisation of regionality is increasingly being used to network and supply local produce. This represents a very different approach to globalisation, which also concerns nutrition. A market for

international cuisine has established itself in Vienna.²¹ The "local exotics" trend resolves this apparent contradiction. This term describes the cultivation of food which has its origins far afield. One example is Austrian rice cultivation.²²

Sustainability is closely linked to regionality. However, there are different views on how sustainability should be understood in practice. An example is the question of packaging: Vienna now has a large number of shops that offer zero-packaging food, serving the cause of "zero waste". While supporters of the zero-waste movement often abstain from buying products with non-recyclable or even reusable food packaging, others point to the fact that packaging improves shelf life and thus reduces food waste.²³ One thing is for certain: agriculture must reduce its greenhouse gas emissions and, where necessary, adapt to changing climate conditions. When it comes to the question of greenhouse gas emissions, protein supply frequently comes up. It's fair to say the traditional Austrian diet is relatively meat heavy. The high protein content of meat and other animal foods makes them particularly attractive from a nutritional point of view. However, their high carbon footprint, plus ethical questions, are significant motivating factors for switching to alternative protein sources. The trend towards more sustainability in nutrition has produced a large number of such alternatives. Although some of these, such as cell and tissue cultures, are not yet market-ready, other meat and fish substitutes are already widely available. One Vienna company producing fish substitutes is Revo Foods.²⁴ The salmon

16
Stadt Wien 2021

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Rützler 2021; MA 22 and ERW 2022

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Vienna Chamber of Agriculture 2022

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Rützler 2022a

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Vienna Chamber of Agriculture 2022

21
Rützler 2021

22
Die Presse 2021

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Berghofer et al. 2015

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www.revo-foods.com

substitute is based on pea protein and is 3D-printed. When developing the product, the company strived to achieve similar nutritional values to real salmon. Rebel Meat, meanwhile, takes another approach.²⁵ This company produces meat substitutes that are half organic meat, half plant-based. All these products aim to help people significantly reduce their meat consumption without noticeably changing their diet.

Protein sources common in other cultures, such as insects, are also on the rise. These are firmly anchored in the food culture in many Asian, African and Latin American countries. In recent years, they have also received attention as food and animal feed in countries where they are not a part of the traditional diet. Insects are considered a particularly environmentally friendly source of animal protein because they use feed very efficiently. This means they typically require very little food to gain weight. On average, their feed conversion efficiency is four times that of cattle. In addition, they produce very few greenhouse gases compared to other farm animals and require little water. They are easy to feed as they also eat biological waste and do not have to occupy agricultural soil²⁶ which is in extremely scarce supply in urban areas.

Apart from their ecological advantages and their high protein content, they are considered to be particularly nutritious (high in unsaturated fatty acids, fibre and micronutrients density (e.g. iron, magnesium and zinc)). In addition, they are unlikely to transmit diseases to humans (so-called zoonotic diseases).²⁷ In fact, over 60 percent of novel infectious diseases are transmitted from animals to humans.²⁸ This is particularly interesting in light of the discussion about SARS-CoV-2, since it is probable that this virus was also transmitted from animals to humans.²⁹

Insects are sold, among other things, as high-protein snacks. Because insect foods currently elicit cultural disgust among many Europeans³⁰, more highly processed insect products, as protein bars or burger patties, are likely to find the widest acceptance in the short term. An example of a Vienna company that is already on-board is ZIRP Insects.³¹ But insects are also used as feed for livestock and pets. One Vienna company using insects as feed is Livin Farms³², which offers a modular and fully automated system for the production of insect larvae on an industrial scale. The larvae are fed with biological waste and by-products at the point of origin, i.e. at the customers. Typical animal feed comes from grain, fruit and vegetable processing, from industrial bakeries or food retailers. The larvae can also be processed into various end products, such as protein powder, fat or fertiliser. Such technologies feed into the circular economy and help reduce the food sector's GHG emissions. However, legal obstacles and other hurdles will have to be overcome for insects to spread further as a source of protein.

Another source of protein that has been rediscovered in recent years is the Roman snail, which has a long history as a foodstuff in Vienna. Long-forgotten as a Vienna delicacy, the Roman snail is described by the "Ark of Taste", an initiative of Slow Food International, as a regionally significant and endangered species. The Gugumuck family produces snails in Vienna.³³

Although these foods are still more or less niche due to their current price or exceptionality, they dovetail with the Real Omnivores trend. The food trend expert Hanni Rützler sees real

omnivores as people who want a sustainable and balanced diet and are open to a wide variety of foods. In contrast to classic omnivores, they emphasise diversity. They still want to eat traditional Western foods, but also unusual and novel ones (offal, snails, insects, algae, etc.) and food-tech foods (animal food substitutes made from plant-based raw materials, fungi or insects, meat and fish from cell cultures, in-vitro meat, etc.). This trend, along with increased awareness of the issues facing food systems due to the Covid 19 pandemic, is giving food tech companies a boost.³⁴ Digitisation in retail is also key in order to make these highly individualised goods known and available to customers. Overall, online groceries, delivery services and takeaways are becoming increasingly popular.³⁵ The boom in convenience products and small meals is also having an impact here.³⁶ One example is the Vienna company Alpha Republic³⁷, which produces low-carbohydrate, high-fibre confectionery.

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www.rebelmeat.com

26/27
FAO

28
Jones et al. 2008

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Andersen et al. 2020

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Berghofer et al. 2015

31
www.zirpinsects.com

32
www.livinfarms.com

33
www.gugumuck.com

34
Rützler 2022b

35
Vienna Chamber of Agriculture 2022; Rützler 2022a

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Snacks (Rützler 2022a)

37
Neoh

2.2 Production, processing and distribution trends

In the pre-consumer phase, technologies can be used to mitigate climate change and conserve natural resources in a number of ways: Yields, production processes and workflows and product quality should be maximised while any risks are minimised.

Some trends in production, processing and sales are described below, with a special focus on Vienna. A number of these trends are already established in the market, while others are just getting started.

Aquaponics: fish at close quarters

Aquaponic systems use the excretions of farmed fish as plant fertiliser. Water and nutrients are circulated in the process. The principle of an aquaponic system is simple and similar to that of a biological sewage treatment plant. Farmed fish are raised in fish tanks. First, a mechanical filter is used to remove larger solids from the contaminated pool water. Then, a biological filter containing so-called nitrifying bacteria converts ammonia into nitrite and then into nitrate (nitrification). Nitrate is the form of nitrogen that plants can consume best. In addition to nitrate, wastewater also contains other nutrients, especially phosphorus and iron. This makes wastewater a good fertiliser. Wastewater is fed into a so-called grow bed. Grow beds are available in different designs that suit different plants. Once the nutrients have been removed from the water, the water is cleaned and can be returned to the fish tanks.³⁸ This closed circuit prevents the leaching of nutrients during plant cultivation. This principle is also used by the Vienna company blün.³⁹

Aquaponics is based on the concept of hydroponics. This term describes systems that supply plants with nutrients through water instead of through the soil. This principle is also often used in indoor agricultural production⁴⁰, which are described in the next section.

Soilless farming: agriculture in and on buildings

A special and relatively young form of urban farming is farming within buildings and on rooftops. These concepts help partly decouple agricultural production from the soil, which is in scarce supply in urban areas. This gives buildings an additional function and helps city dwellers make a contribution to the fight against climate change, regionality and biodiversity. There are also several additional benefits. Farming in and on buildings not only creates new, local systems for agricultural products, but also serves recreation and education. They offer a pathway to new synergies between buildings and agricultural production, advance technological developments and strengthen communication within local networks. Farms like this will meet only a fraction of the city's food needs in the short term. It should be noted that the prices for products from commercial production facilities in and on buildings have usually been high and the products are not yet generally accessible to consumers.⁴¹

○ Vertical farming

Vertical agricultural production is still in its infancy. The idea is to enable year-round crop production in multi-storey greenhouses, producing crops under controlled conditions and with minimal soil consumption.⁴² A big issue with vertical farming, however, is the energy requirement per plant, which, depending on the design, can be enormous.⁴³ At present, vertical farming is primarily used for herbs and so-called microgreens, such as for sprouts.⁴⁴ In Vienna, there are already several companies supplying both the catering trade and individual customers.⁴⁵

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Lankaponics 2022

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blün 2022

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Thomaier et al. 2015

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Thomaier et al. 2015; Der Standard 2021

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Der Standard 2021

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www.herbeusgreens.com



© PATS Indoor Drone Solutions

○ Building-integrated agriculture

This refers to greenhouses integrated into buildings, which exploit synergies with the building to achieve greater resource efficiency. Synergies lie in, for example, the use of waste heat from the building, solar cells on the building, and irrigation or cooling with rainwater. Since such systems have usually been added subsequently, potential synergies are usually not fully exploited.⁴⁶

○ Urban rooftop farming

Roofs can be used for the production of plants, either in an open form or in a greenhouse. Open systems also have a temperature-regulating effect, i.e. they cool the building in summer and insulate it in winter. Green façades have the same effect.⁴⁷ Urban rooftop farming is already fairly widespread in Vienna and is often performed by residents, so that consumers become users.⁴⁸ Residents can compost their leftover food and use it as fertiliser for their rooftop farm. One example of rooftop urban farming in Vienna is the ERnteLAA project,⁴⁹ which was planned by the property developer. There are also numerous buildings in Vienna with rooftop beehives.

Insect breeding, as performed by Livin Farms, is also well-suited for buildings. Theoretically, building façades can also be used for plant production.⁵⁰

○ Preservation and rescue of products

Preservation is key to being able to enjoy food for as long as possible and thus avoid waste. The greatest amount of nutrients must be retained. On the one hand, innovative technological processes, for example through heating processes such as the impulse process, will extend shelf lives in the future (a higher degree of mechanisation in production will also reduce human contact and thus the risk of germs). On the other hand, traditional preservation techniques are popular, such as fermentation (sauerkraut, kimchi, etc.) and pasteurisation. For example, Wiener Miso specialises in the production of fine fermented spice pastes. Mainly old grain and legume varieties from Austria such as forest perennial rye, as well as vegetables and seeds such as the Waldviertel white poppy PDO (protected designation of origin) are used in production.

Unverschwendet⁵¹ (Unwasted), is a startup that makes jams, syrups, chutneys, sauces and spreads from surplus fruit and vegetables. The surplus goods used are fresh, but are not sold in food retail due to their size, appearance, poor planning, and the like. These processed products have a significantly longer shelf life than fresh produce.

Distribution and consumers

In sales, the internet is increasingly being used to network regional producers and customers in Vienna. Examples are Bio-Kistl, digital marketplaces with a regional focus and local small producers. Here, the Internet is supporting the trends towards regionality, organic and highly individualised products.

Another important role that technologies can play in distribution is in logistics and transportation. Here the food sector's carbon footprint can be reduced through alternative transport. Public transport should also be used in Vienna's nutrition strategy.⁵²

Cooperation in the food sector has also been gaining in importance for some time. Examples of cooperation are social farms, community gardens and other "forms of farming where consumers themselves are the members or producers"⁵³, such as food co-ops. A food co-op⁵⁴, or food cooperative, is an association of people who organise themselves to buy organic products directly from local producers. There are over 20 food co-ops in Vienna. There are also 20 self-harvest ("U-Pick") areas in Vienna (MA 22 und ERW 2022). The "Future Farm" in Vienna's 10th district is an example of the community producing agricultural products sustainably.⁵⁵

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Thomaier et al. 2015

47 / 48

Thomaier et al. 2015

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Caritas 2022

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Thomaier et al. 2015

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www.unverschwendet.at

52

MA 22 and ERW 2022

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MA 22 and ERW 2022, p. 14

54

www.foodcoops.at, retrieved on 06/07/2022

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www.zukunftshof.at

2.3 Packaging trends

Goods are exposed to numerous stresses that packaging must be able to withstand. Otherwise, if the packaging is damaged, the packaged goods can also be damaged. This is why goods protection has the highest priority. Packaged goods are exposed to various mechanical stresses (shocks and falls, horizontal acceleration, shocks, vibrations, stacking loads, transverse pressure forces, abrasion and chafing effects) during transport, loading and interim storage.

Disposable food packaging, in particular, creates large amounts of waste and is the most common cause of litter in Austria. At the same time, packaging is now facing increasingly complex technical and hygienic challenges. Consumers themselves are very happy to buy cleanly packaged products. However, society is facing major changes due to climate change, images of polluted seas and rivers, and of course comprehensive sustainability and circular economy efforts. If the packaging industry can and wants to move with the times, it needs new technologies and service innovations as well as ways of reducing packaging.

Vienna is host to a number of packaging reduction projects in the takeaway industry that use a reusable solution. skoonu⁵⁶ provides reusable crockery to gastronomy partners for a rental fee and takes care of the logistics and cleaning of the crockery. The reusable crockery is cleaned in a dishwasher, packed in reusable boxes and delivered to the partner companies on electric cargo bikes. vital⁵⁷ is another reusable system for take-away, delivery and convenience food. Users can register via an app and see the participating companies that offer the reusable tableware. These reusable bowls can be borrowed (without a deposit) from participating companies and returned. Another company committed to reducing packaging waste is Lunzers Mass-Greisslerei⁵⁸ grocery shop, where customers can buy groceries without packaging. All its food comes from organic farming and special emphasis is placed on regionality and seasonality. Furthermore, all groceries are offered unpackaged and according to measure.

Committed companies along the packaging value chain, from raw material processors to recyclers, from packaging to consumer goods manufacturers, founded the "Packaging With A Future Platform".⁵⁹ This is a forum in which every participating company or industry can offer partial solutions to increase packaging efficiency. Everyone involved in production, use and recycling of packaging must come together to get things going on this front.

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www.skoonu.com, retrieved on 06/07/2022

57

www.vital.org, retrieved on 06/07/2022

58

www.mass-greisslerei.at, retrieved on 06/07/2022

59

www.packagingmitfuture.at, retrieved on 25/08/2022

Vienna's businesses the opportunity to offer guests an environmentally friendly paper alternative for packing leftover food for home or office and thus saving food. The City of Vienna regularly provides contingents of GenussBoxes free of charge.

- OekoBusiness Vienna:⁶⁸ The circular economy concept is also essential for companies producing in Vienna. OekoBusiness Vienna supports companies in becoming part of the circular economy. There is a seal of approval for gastronomy "natürlich gut essen" ("Eat well, naturally"), which is linked to co-funding offers from the city.
- Vienna strategy for pesticide minimisation⁶⁹
- The "Wien isst G.U.T." Food Action Plan ("Vienna Eating Well")⁷⁰
- Milan Urban Food Policy Pact – sustainable nutrition for Vienna⁷¹

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Milan Urban Food Policy Pact 2021

61/62
www.wien.gv.at/umweltschutz/nachhaltigkeit/wien-isst-gut.html#initiativen

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www.wien.gv.at/wienergusto.at

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[www.wien.gv.at/umweltschutz/gutes-gewissen.html#:~:text="Gutes%20Gewissen%20-%20Guter%20Geschmack"%20-%20Initiative%20f%20mehrer%20Tier,Umwelt%2C%20Tier%20und%20Mensch%20aufzuzeigen](http://www.wien.gv.at/umweltschutz/gutes-gewissen.html#:~:text=)

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www.wien.gv.at/umweltschutz/oekokauf

66
www.oekoevent.at

67
www.genussbox.at

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www.wien.gv.at/umweltschutz/oekobusiness

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www.wien.gv.at/umweltschutz/naturschutz/pestizidminimierung.html

70
www.wien.gv.at/umweltschutz/nachhaltigkeit/wien-isst-gut.html

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www.wien.gv.at/umweltschutz/nachhaltigkeit/lebensmittel-nachhaltig.html#policycompact

Since 2015, the City of Vienna has been committed to the development of sustainable food systems as part of its commitment to the Milan Urban Food Policy Pacts.⁶⁰ The City of Vienna is supporting the transition to a more sustainable food system with a wide range of measures and initiatives. The Wien isst G.U.T. (Vienna Eating Well, Healthy and Enjoyable – environment and climate friendly – Tierfair)⁶¹ Food Action Plan acts as a common umbrella and information hub for the many sustainable food initiatives in Vienna.⁶²

Other initiatives include:

- Wiener GUSTO⁶³ is an initiative of the city's own farm, which sells organic products it produces itself.
- The SUM Food dialogue platform serves to promote cooperation between the city and the surrounding area with regard to food supply.
- It promotes organic farming through the city's own agriculture in Vienna.
- "Good conscience – good taste":⁶⁴ The aim of this initiative is to improve animal and environmental protection in food production.
- Canteen kitchens and canteen food: Criteria in the framework of ÖkoKauf,⁶⁵ the sustainable procurement programme of the City of Vienna, ensure that the food procured is sustainable and healthy, and that climate-friendly nutrition plans are drawn up in hospitals, care homes for the elderly, and educational institutions. At the same time, this has a role model effect.
- ÖkoEvent⁶⁶ has been the City of Vienna's seal for environmentally friendly event organisers since 2010. Events only receive the ÖkoEvent label if they serve organically produced, seasonal and regional food.
- GenussBox:⁶⁷ The GenussBox (Indulgence Box) gives

- Smart KITCHEN⁷² is a workshop-style event focusing on avoiding food waste. Restauranters, kitchen staff, cooks, chefs and apprentices from a wide variety of catering establishments take part in the events to cook together and discuss the topic of food waste.
- Küchenprofi(t)⁷³ and Moneytor⁷⁴ are programmes focusing on preventing food waste.
- Initiative Mehrweggeschirr⁷⁵ (reusable dishes initiative) represents a cost contribution when using Vienna's reusable tableware. As a result, event can avoid waste, the climate can be protected and a valuable contribution can be made to Vienna's festival culture.

3.1 Vienna's nutrition strategy: a vision of the future

The new nutrition strategy of the City of Vienna will serve as a vision and roadmap for the future of the Viennese food system. It has been developed in cooperation with the Environmental Protection Department of the City of Vienna and the Vienna Nutrition Council and pursues aims such as implementing the Sustainable Development Goals of the United Nations (SDGs). In the area of ecological sustainability, the City of Vienna focused, as in the past, on increasing the proportion of organic, plant-based, regional and seasonal food. This in turn adds regional value, increases security in a crisis and promotes the health of Vienna's population. Greater regional added value will also contribute to the transparency of Vienna's food system. Four principles were defined to achieve these goals – sustainability, resilience, solidarity and cooperation.

3.2 Vienna Climate Roadmap to 2040: the climate agenda

The Vienna Climate Guide, a roadmap to 2040, which is the climate agenda of the City of Vienna, emphasises the positive effect of eating as organic, regional, seasonal and plant-based produce as possible on the city's carbon footprint. According to the roadmap, environmentally friendlier consumer habits must go hand in hand with a reduction in avoidable food waste. After all, the average Vienna resident throws away around 40 kg of food per year,⁷⁶ a total of several tens of thousands of tons! The climate roadmap states that food waste should be reduced by 50 per cent by 2030 and gradually reduced to a minimum by 2050.⁷⁷

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www.smart-kitchen.at

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www.united-against-waste.at/kuechenprofit

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www.united-against-waste.at/sich-informieren/abfallmonitoring

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www.wenigermist.at/mehrweg

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www.digital.wienbibliothek.at/wbrup/download/pdf/3951390

77
Vienna Climate Roadmap to 2040 2022, p. 70

4. The “players”: the actors in Vienna’s food system

20

At around 17 per cent, Vienna has a relatively higher proportion of organic farms compared to the Austrian average of around 16 per cent. This proportion is set to increase in the future. The City of Vienna owns around 2,000 hectares of arable land and vineyards, making it one of the largest organic farms in Austria. A new brand for the products manufactured by the City of Vienna titled “Wiener Gusto” was developed in 2022 for marketing. The product line includes organic wheat flour type 700 smooth and organic mountain lentils. The range will be expanded to include other organic products over the coming two years.⁸³

The intention is for organic farming not only to contribute to climate protection and sustainability, but also to strengthen the reputation of urban agriculture within society and secure Vienna’s standing as an agricultural location. This is particularly relevant in urban areas where undeveloped land is scarce and can come under intense pressure.⁸⁴ In order to make it easier for companies to accomplish this, 250,000 euros per year will be made available as part of the Vienna Organic Action Program 2022+.⁸⁵

On the one hand, many farms have been forced to move from urban areas to neighbouring rural areas due to the pressure on agricultural land, while on the other hand, some farms have to specialise in order to survive. In its nutrition strategy, the city has set itself the goal of preserving good-quality agricultural soil. The conflict with the increasing need for living space is a good example of the interactions of the food system with other social systems and requires appropriate measures on the part of urban planning and politics.⁸⁶

Food systems within a city are extremely complex: The interaction of local conditions (climate, politics, city structure, culture, traditions and innovations, etc.) and larger social trends (nutrition, research and development, economic situation, crises, etc.) means that Vienna has a food system with some special features.

Food systems are embedded in the social and ecological systems with which they interact. Furthermore, an urban food system does not stop at a city’s limits.

There are also countless connections within the urban food system. Food is produced in an extremely raw material-intensive manner, transported over long distances, cooled and processed. The value chain in the food industry includes agriculture, food production, trade, gastronomy and households. Therefore, a large number of actors are directly connected to the nutrition system in a city. These actors in the City of Vienna are presented below.

4.1 Agriculture

For a large city, Vienna has considerable agricultural production: According to a survey by Statistik Austria, as of 2020, around 600 farms with agricultural land including permanent grassland totalling 7,300 hectares were located within the urban area.⁷⁸ However, the agricultural sector is in decline.

Vegetable production is particularly important in Vienna (see Figure 2) with 211 companies, especially in the 11th, 21st and 22nd districts, and viticulture (see Figure 3) with 179 farms on around 6,000 hectares,⁷⁹ especially in the 19th, 21st and 23rd districts.⁸⁰ There is also considerable production of ornamental plants and flowers.⁸¹ Livestock farming in Vienna is insignificant, with a total of just over 1,000 animals, the overwhelming majority being poultry.⁸²

78/79
Statistik Austria 2022

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MA 22 and ERW 2022

81
Stadtlandwirtschaft Wien 2022

82
Statistik Austria 2022

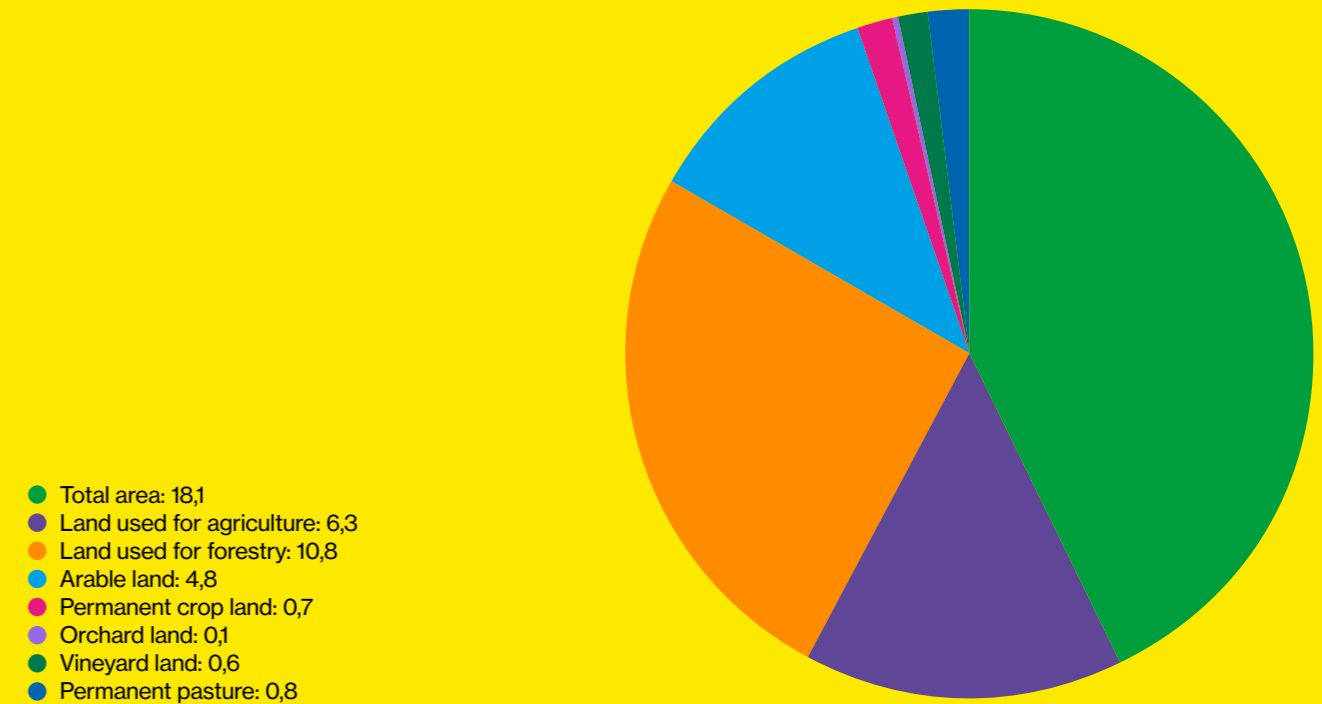
83
Stadt Wien 2022b

84
Vienna Chamber of Agriculture 2022

85
Stadt Wien 2022a

86
MA 22 and ERW 2022

Agricultural areas in the city of Vienna, as of 2020. All figures in 1,000 ha



Statistik Austria 2022



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4.2 Food production

Austrian food production generates sales of 13.5 to 20 billion euros per year. It consists of around 3,500 companies and employs around 70,000 people. Manufactured products include baked goods, delicatessen products, spices, fats and oils, meat, processed fruit and vegetables, non-alcoholic and alcoholic beverages, milk and dairy products, as well as sugar and confectionery. Around 250 of these companies employ more than 50 people and have a turnover of over 250 million euros per year. Around 35 large companies are active in the food industry in Vienna.

You can find out more about Vienna's food industry in "Food – Study Vienna".⁸⁷

In Austria, around 10 million tons of goods are used in food production, and around 1.5 million tons are lost in the course of the manufacturing process, of which around 121,800 tons are considered avoidable food waste. This corresponds to around 14 per cent of the goods input used, 8.12 per cent of which could be avoided.⁸⁸

houses and coffee restaurants as well as 217 delivery kitchens and catering companies in Vienna. The new Vienna nutrition strategy identifies a need for support in private community catering, so that the actors involved can process higher-quality food and thus supply a large number of people with high-quality food. Labels from committed companies are also seen as an opportunity for improvement and should be promoted, for example organic seals, animal welfare seals, the "Eat well, naturally" programme, OekoBusiness and the Austrian ecolabel. Note the variety of forms of community catering (MA 22 und ERW 2022).

Vienna's public catering is of considerable importance in the food system. Vienna's communal catering provides 100,000 warm meals every day.⁸⁹ The city's sustainable procurement programme is called ÖkoKauf Wien and has been in existence for over 20 years.⁹⁰ It currently requires that recipients provide

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www.wien.gv.at/wirtschaft/standort/food-studie.html

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Waste avoidance in Austrian food production: financed by the Collection and Recycling System Waste Prevention Fund, with the support of Reclay Österreich GmbH, 2017

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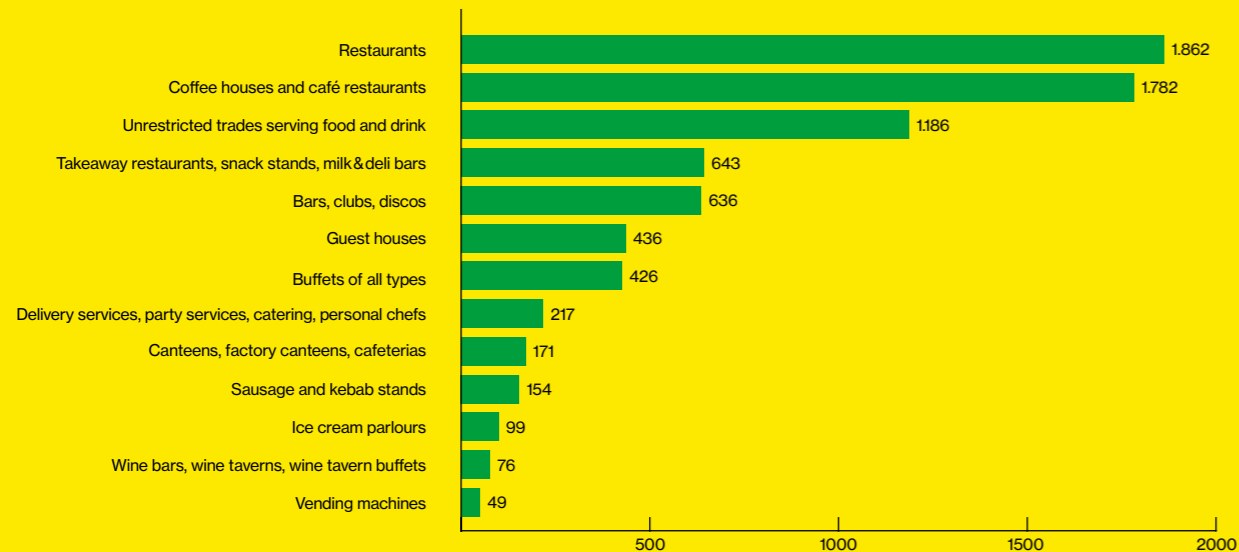
MA 22 und ERW 2022

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www.digital.wienbibliothek.at/wbrup/download/pdf/3951390

4.3 Community catering

Community catering plays a major role in cities. This includes gastronomy, i.e. facilities for catering with complete meals or drinks for immediate consumption. Providers may be restaurants that sell takeaway or eat-in food and beverages, mobile and stationary establishments, and restaurants with and without seating. Delivery kitchens can also be included here. As of February 2021, there are 1,862 restaurants, 1,782 coffee



© WKO

an organic food share of 50 per cent, which has already been implemented in children's day care centres and schools. This share will be gradually increased in the future. Children's day care centres and schools are seen as the ideal places to teach the principles of healthy nutrition and sustainable agriculture from the ground up in the future, prevent civilisational diseases and arouse the curiosity of young people about this topic. Other aims include giving vulnerable groups special consideration and passing on both theoretical and practical knowledge in order to integrate the connection between nutrition and climate. One initiative in this area is the SchoolFood4Change project.⁹¹

A special case in Vienna's food industry is the catering at various institutions in the city.

The City of Vienna – Schools (56 employees) is the school maintainer responsible for Vienna's general and vocational compulsory schools (primary schools, middle schools and the associated all-day schools as well as vocational and technical schools). Vienna has around 380 public compulsory schools for 112,000 pupils and around 12,400 teachers. There are two options for catering for pupils in compulsory schools: at an all-day school, where catering takes place in the schools, or by going to an after-school care centre. Around 30,000 pupils have lunch every day in Vienna's compulsory all-day schools.

The City of Vienna – Children's Day Care Centres (10 employees) runs the early-years educational facilities, i.e. the crèches and Children's Day Care Centres, as well as after-school care centres for compulsory schools. In 2019, around 8,000 people were employed in Vienna's children's day care centres. The City of Vienna operates around 350 municipal children's day care centres. The City of Vienna – Children's Day Care Centres offer around 7,000 places for children up to 3 years of age, around 22,000 places for children

between 3 and 6 years of age and around 6,500 after-school care places. In total, around 27,000 children in these day care centres are provided with lunch by the city of Vienna every day.

This helps feed around 57,000 children and pupils in Vienna's children's day care centres and schools every day.

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MA 22 and ERW 2022

4.4 Trade

In 2020, the Austrian food retail sector generated sales of around 23.7 billion euros. This represents an increase of 10.1 per cent on the previous year.⁹²

There are more than 5,000 retail branches in Austria.⁹³ With 441 supermarkets per million people, Austria has an unusually high density of supermarkets compared with the rest of the EU.⁹⁴ Market (power) in food retailing is also very concentrated in Austria. The four largest food retailers share around 90 per cent of the market.⁹⁵ In addition to retail, there is also grocery wholesale. The Austrian wholesale grocery trade consists of around 2,400 companies with a total turnover of around 19 billion euros per year. These companies employ around 31,000 people.⁹⁶ There is also a trend towards digital marketplaces in the food sector (e.g. Gurkerl⁹⁷), both from conventional food retail and from alternative trading platforms (e.g. Markta⁹⁸).

Vienna wholesale market⁹⁹

Vienna's wholesale market handles around 400,000 tons of goods every year. The market covers an area of 30 hectares. The main products at the market are fruit, vegetables and flowers as well as meat, fish and egg products. The core business is trading in fruit and vegetables, with around 70 per cent of all fruit and vegetables traded in Vienna going through the Vienna wholesale market.

4.5 Game changers: Vienna companies and initiatives helping protect the climate

This chapter opens by introducing innovative Vienna companies whose products are distinguished by their climate friendliness. The Mein Hof – Mein Weg¹⁰⁰ platform was created by the Austrian Rural Education Institute for innovative agribusinesses. As of June 2022, it lists ten companies from Vienna, all of which are characterised by special features such as organic farming, direct marketing, special products, highly environmentally friendly management, biodiversity and animal welfare. Well-known examples are Wiener Schneckenmanufaktur e.U. (Gugumuck), Hut & Stiel, blün, and the organic fig farm.

Another example of an innovative farm is the Zukunftshof project¹⁰¹ in the 10th district. In recent years, the historic square courtyard has been converted into a lighthouse project that aims to make urban agriculture accessible to the public. It is managed by an association according to the principle of the circular economy.

An example of an innovative company in agricultural production material is Green Legacy.¹⁰² The company produces a cellulose-based hydrogel that can absorb 300 times

its own weight in water and the nutrients dissolved in it, and is used in agriculture to regulate the water balance, for example in viticulture, horticulture and fruit production. The hydrogel can compensate for dry periods and is therefore a climate change adaptation measure to reduce drought stress on plants. However, the product is not yet approved for organic farms.

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www.de.statista.com/themen/4494/lebensmittelhandel-in-oesterreich/#dossierKeyfigures

93
Reusable displays at the point of sale – a zero-waste eye-catcher – development and implementation of a reusable solution for sales displays. Hietler P. and Pladerer C., in cooperation with Logistikverbund Mehrweg, Polymer Logistics, Packservice, Ottakringer Brauerei and Spar, financed by the Collection and Recycling System Waste Prevention Fund, Vienna, 2018

94
MA 22 and ERW 2022

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www.gs1.at/sites/default/files/2021-06/Poster-KEYaccount-Handelstabelle-Lebensmittel-und-Drogeriefachhandel-2021.pdf

96
Waste avoidance in the Austrian food wholesale trade: DI Philipp Hietler and DI Christian Pladerer, Project Management WWF Austria Environment & Economy / Sustainable Nutrition, DI Julia Haslinger, Helene Glatter-Götz, MSc., Olivia Herzog, MSc., in cooperation with the KASTNER Group: Mag. Herwig Gruber and Vanessa Flicker, financed by the Collection and Recycling System Waste Prevention Fund, 2019

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www.gurkerl.at

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www.markta.at

99
www.grossmarkt-wien.at

100
www.meinhof-meinweg.at/at/index.php

101
www.zukunftshof.at

102
www.greenlegacy.et

Circular Analytics TK GmbH¹⁰³ offers a software solution that assesses packaging system life cycles and technical recyclability. The calculations can take account of differences in infrastructure in each country, which means international companies can use the software.

An example of environmentally friendly containers in the catering industry is the solution from the company Skoonu.¹⁰⁴ In cooperation with the designer Oliver Irschitz and the Austrian Ecology Institute, Skoonu has developed reusable tableware that is provided free of charge for consumers. An app is used to manage logistics between customers and companies. Skoonu now has partner companies not only in Vienna, but also in Graz, Traun and Vöcklabruck.

Another example in waste prevention is Unverschwendet¹⁰⁵ (Unwasted), a company that produces products such as jams, syrups, chutneys, etc. from unsaleable or surplus fruits, vegetables and herbs.

The Veganer Gesellschaft (Vegan Society)¹⁰⁶ is a highly active and successful environmental organisation that focuses on nutrition. It inspires people to make climate-friendly food choices which taste great, encourage people to enjoy their food, and benefit human health and animal welfare.

4.6 Vienna as a research location

As part of its nutrition strategy, Vienna plans to provide financial support for research that will contribute to the sustainable further development of Vienna's agriculture. Innovative food projects will be examined, with particular regard to their social and ecological aspects. With the help of valuable knowledge, networks and material support, the city aims to support initiatives and start-ups that embrace the sustainability focus of the nutrition strategy.¹⁰⁷

University of Natural Resources and Life Sciences Vienna (BOKU)

The University of Natural Resources and Life Sciences Vienna (BOKU) sees itself as a university of sustainability. Ensuring nutrition and health is one of the core competencies of research and teaching at BOKU. A number of departments pursue this topic, for example the Department of Food Science and Food Technology, the Department of Sustainable Agricultural Systems, the Department of Crop Science and the Department of Agricultural Biotechnology. BOKU is an important partner at the COMET K1 Centre at FFoQSI (see below).

University of Veterinary Medicine Vienna (Vetmeduni Vienna)

The University of Veterinary Medicine Vienna is the only academic veterinary medical education and research facility in Austria and the oldest in the German-speaking region (founded in 1765 by Empress Maria Theresia). Its key areas of work are animal health, preventive veterinary medicine, public health and food safety. The Department for Livestock and Public Health in Veterinary Medicine and its university clinic deserves special mention here. It houses the Institute for Food Safety, the Institute for Animal Nutrition and Functional Plant Substances, and the Institute for Animal Welfare Science and Animal Husbandry. The university is also linked to the COMET K1 centre at FFoQSI.

FFoQSI – Austrian Competence Centre for Feed and Food Quality, Safety & Innovation:

The COMET Centre for Feed and Food Quality, Safety and Innovation researches key topics along animal and human nutrition value chains, for example preventing crop failures and maintaining the health of livestock; the safety, tolerability and shelf life of food; sustainable food processing and packaging; food safety and sustainability in food production. The centre brings together the expertise of renowned Austrian research institutions and more than 30 innovative and research-oriented companies from several countries.

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www.circularanalytics.com

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www.skoonu.com

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www.unverschwendet.at

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www.vegan.at

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MA 22 and ERW 2022

University of Applied Sciences Campus Vienna (FH Campus Wien)

The bachelor's degree course of study in Packaging Technology¹⁰⁸ was developed with well-known companies in the packaging industry, brand products, and in cooperation with the Vienna University of Technology. Industrial plants of the business partners are also involved, within the framework of R&D projects.

FiBL – Research Institute of Organic Agriculture¹⁰⁹

FiBL includes non-governmental foundations and associations as well as non-profit companies. It carries out research and knowledge transfer to consulting and public relations services in the field of organic farming. FiBL has a European umbrella organisation and a national branch in Vienna as well as other European countries.

Knowledge transfer is also part of research. An example of this is an initiative WeltTellerFeld¹¹⁰, which makes the global dimensions of nutrition easier to understand (MA 22 und ERW 2022).

The private research company "Vertical Farm Institute,"¹¹¹ based in Vienna, consists of a multidisciplinary team of experts from the fields of architecture, engineering, plant physiology and art. The Vertical Farm Institute aims to develop and implement new building technologies for vertical farms and sees its mission as the reduction of land, water and energy consumption.¹¹²

4.7 Institutions and organisations in Vienna

Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH (AGES)

Austrian Agency for Health and Nutritional Safety, founded in 2002, is a state-run Austrian company. AGES uses its scientific expertise to support federal ministries in matter of public health, animal health, food safety, drug safety, food security and consumer protections along the food chain. Its tasks focus on food safety, animal health, public health and food security.¹¹³

MA 59 – Marktservice & Lebensmittelsicherheit (Food Inspection and Market Authority – Municipal Department 59)

The Food Inspection and Market Authority department manages municipal markets, monitors compliance with food laws and regulations, and carries out tens of thousands of consumer protection checks every year. There is also a food hotline and a free "Vienn Markets App", and a Market Office Museum. The services area provides information about the steps to be taken when erecting or operating a market stall or founding or opening a food business.

Höhere Bundeslehr- und Forschungsanstalt für Gartenbau Schönbrunn (Higher Federal Teaching and Research Institute for Horticulture Schönbrunn – HBLFA Schönbrunn)

The HBLFA Schönbrunn and Austrian Federal Gardens are under the Federal Ministry of Agriculture, Regions and Tourism (BMLRT), while the Federal Ministry of Education, Science and Research (BMBWF) is responsible for pedagogical matters. The HBLFA manages the teaching institutes for garden and landscape design and horticulture. One of the most important tasks of productive horticulture is supplying the population with fresh vegetables. The Greater Vienna area offers the businesses and facilities that guarantee the city's local supply with high-quality food from horticultural production. This involves close cooperation with BOKU.¹¹⁴

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www.fh-campuswien.ac.at/studium-weiterbildung/studien-und-lehrgangangebot/verpackungstechnologie.html

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www.fibl.org/en/

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www.welttellerfeld.at

111/112

www.verticalfarminstitute.com

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www.ages.at

114

www.gartenbau.at

4.8 Interviews with Viennese companies

Vienna wholesale market

The Vienna wholesale market in the 23rd district offers infrastructure and space for trading in fruit and vegetables for buyers in the city and the surrounding area. The approximately 220 standholders at the wholesale market account for 70 per cent of the total trade in fruit and vegetables in Austria. Since its takeover by Wien Holding in 2019, the market has had its own sustainability management team that, at the time of interview, was tasked with evaluating the market's sustainability. This process is expected to be completed in 2022.

For the company GMW Grossmarkt Wien Betriebs GmbH, climate change is a key issue for a number of reasons. Mobility and logistics deserve first mention. E-mobility will gain importance in logistics. At present, international goods are mainly delivered with articulated lorries and distributed with small trucks. In the conversion of logistics to e-mobility, refrigeration is a challenge that consumes large amounts of electricity. Urban transport policy should follow suit here. A railway connection through the area has been shut down because rail freight has fallen out of favour due to the lengthy transport times. Achieving the fastest possible transport times is still important in the food sector.

Cooling is also an issue at the Vienna wholesale market, for example because standholders are building more cold stores due to climate change. Photovoltaic systems are to be installed in order to cover the high energy demand for cooling, particularly during the sunny season. The technical implementation for this is already in planning.

In addition, the wholesale market aims to unseal the surface areas where possible. Only 3 per cent of the wholesale market area is currently unsealed. More unsealed areas should create more infiltration opportunities and reduce heat build-up on the site. Roof areas could also be better used with more greenery.

Food waste is a major issue at the 30-acre market. The systems are closely interlinked here, which results in both positive and negative side effects. The market cooperates with Wiener Tafel, which collects donations of goods from the tenants every day, sorts them and recycles them. The market also has its own rubbish dump (via the MA 48). One problem is that certain goods that are not accepted by food retailers are sold cheaply at the wholesale market, thereby driving down prices. In addition, market drivers have to dispose of their waste as cheaply as possible. A frequent loophole is the passing on of goods that are no longer edible to the Wiener Tafel, which has to dispose of a large proportion of them and bear the cost of doing so.

The wholesale market in Vienna is constantly exploring whether retailers might be interested in certain climate measures. Aquaponics is one example, but there are also many technologies in the fruit and vegetable sector which improve shelf life. Pooling standholders to manage investments can make sense.

In terms of customers, some want good food for a bargain and want to invest more time in processing the food themselves, while others prioritise quality but don't want to spend time processing. Overall, there is a growing demand for processed products that save kitchen time, for example sliced and peeled potatoes, so-called convenience products. Pre-processing can often improve durability.

In the hotel and catering industry, some establishments value organic, but these are in the minority. At the wholesale market, organic food is also a small area with a small turnover. There is a need for a bit of public relations here.

There are also sustainability challenges for the sector when it comes to preventing animal suffering or promoting animal welfare, with eggs being one example. The production and sale of cage eggs is prohibited in Austrian retail, but they can be sold in in Austrian wholesale. The wholesale trade has made a voluntary commitment to reduction here, but some cage-farmed eggs are still being sold because the demand is there. Here, the wholesale market is in dialogue with the organisation Vier Pfoten (four paws), as it is with regard to fish. However, no solution has yet been found for fish.

To promote the circular economy, one place to start is packaging. Separate collection and disposal take place. A niche is currently served by two companies that recycle pallets and crates, which is particularly interesting for smaller companies. Large companies mainly use reusable systems with plastic boxes.

Climate change does not directly affect the wholesale market in Vienna, but it does affect the standholders on site. The changing climate opens up opportunities for Austrian food producers to grow new crops that previously could only be grown in warmer climates.

blün

blün¹¹⁵ is active in agricultural production and product processing. The company produces fish and vegetables locally using the ecologically efficient aquaponic process. The wastewater from the fish is used to fertilise and irrigate the vegetables in the greenhouse. Having a production method that is as resource and climate friendly as possible is an integral part of the company's vision. The company uses the AMA (Agrarmarkt Austria) seal of quality "Gutes vom Bauernhof", and the labels "AMA GENUSSREGION" (AMA delicacy region) and "Stadternte" (city harvest).

Because production takes place in a closed system in the hall and greenhouse, climate change has no effect on it. All in all, this production method is very resource-friendly and uses little water and land. There is still room for improvement in greenhouse energy consumption. In Vienna, sustainable energy is seen as a challenge for the entire food industry. There is no geothermal heat or geothermal energy at the current location. For the new location, the company is looking for a way to use 100 per cent renewable energy to further reduce its carbon footprint. In addition, work is progressing on replacing fish meal with insect meal. Other climate protection and

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www.bluen.at

food waste prevention measures in the company include processing surpluses, for example tomatoes into ketchup and sugo or fish waste into animal feed.

Observers detect industry trends towards local distribution channels to keep transport distances as short as possible, and towards the circular economy. Vienna's food scene is described as very colourful and lively, and reference is made to the large agricultural areas within the city area. When it comes to food and climate change, much research and development is still required. CRISP/CAS9, resource-saving irrigation, and the circular economy are identified as possible research areas.

Circular Analytics

Circular Analytics¹¹⁶ offers consulting in the field of sustainable packaging, from the assessment of the sustainability of packaging to optimisation.

Naturally, climate change is of great importance to the company, since the greenhouse gas potential plays an important role in the ecological compatibility of the product. This is where the company sees its greatest impact on climate change. In addition, the company strives to help raise awareness among employees.

In the future, Circular Analytics intends to reduce its carbon footprint by reducing business trips. The company also sees huge potential in research projects and the development of climate measures in the food industry. The research institutions in Vienna in the food sector are rated as very good, and consulting in this area is also booming. However, the production facilities in Vienna are becoming less and less important. Other trends in the food industry include a decrease in the proportion of animal foods in our diet and the optimisation of packaging to reduce food waste and litter.

There would be synergies in joint research projects focusing on out-of-home catering with the responsible municipal departments. The food industry faces challenges from the need for raising awareness, for example in schools and children's day care centres. In addition, people are reluctant to pay higher prices for regional and organic food.

LIVIN Farms

LIVIN Farms¹¹⁷ as developed a technology for fattening black soldier fly larvae. The fattening systems are designed and built by Livin Farms and then operated by customers. The customers are companies in the food industry that produce at least 1,000 tons of leftover food. These leftovers serve as food for the larvae. Fattening lasts a week, after which the larvae can be processed further, mainly for the production of animal feed and fertiliser for in agriculture. In the future, the technology could also be used for insect production for direct human consumption, but the legal framework is not in place and demand simply is not there. Nevertheless, the food scene in Vienna is perceived as increasingly international and society is opening up to new concepts, textures and ingredients in nutrition.

Climate change is of great importance to the company. The technology creates more local cycles and the proteins produced have a 92 percent lower carbon footprint than protein-rich soybeans. Insect protein can also replace fishmeal,

which is very inefficient to produce: About five tons of ocean fish are needed as feed to produce just one ton of commercial fish. Finally, insects are less dependent on regional raw material flows because they can live on residues and in the dark. A possible synergy for the future is the joint use of a plant by several companies that cannot produce the necessary mass of residues on their own.

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www.circularanalytics.com

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www.livin farms.com

Greenpeace has listed the trustworthiness of various quality marks in a guide.¹²⁰ In the organic sector, the following are considered very trustworthy:

- The AMA Bio Gütezeichen (AMA seal of quality)
- The Bio Austria Organic seal
- Demeter
- The Prüf Nach! (Check it out!) mark
- The Wiesenmilch (meadow milk) logo

Various food retail chains also offer organic seals, some of which are very trustworthy. The EU organic seal is also regarded as trustworthy.



Individual seals of quality prove a regional origin (in the broadest sense), which also contributes to reducing greenhouse gas emissions. Ivanova et al. (2020) quantify the reduction at 0.4 tons of CO_{2-eq} per capita per year, which is linked to the shorter transport distances. Danube Soya is an example classified by Greenpeace as trustworthy.



The Fairtrade seal, which is regarded as trustworthy, has certain ecological advantages relating to the use of certain hazardous substances and in terms of protecting rainforests. The same applies to the Fairtrade Cocoa Programme, which is classified as trustworthy.



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Reganold and Wachter 2016; Ivanova et al. 2020

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Reganold and Wachter 2016

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https://greenpeace.at/assets/uploads/pdf/ratgeber/2021_GutezeichenGuide_v2.pdf

Animal products have a scientifically undisputed influence on our carbon footprint. According to a meta study by Ivanova et al. (2020) a vegan diet can save 0.4 to 2.1 tons of CO per capita_{2-eq} per year (median 0.9 t CO_{2-eq}) and a vegetarian diet can save 0.01 to 1.5 tons of CO_{2-eq} (median 0.5 t CO_{2-eq}) per year. The V-labels vegan and vegetarian are considered trustworthy.



Quality seals can also serve as a guide for food packaging. For paper packaging, there is Greenpeace's FSC recycled logo, classified as trustworthy, unlike the FSC label, which is not very trustworthy, and the absolutely untrustworthy FSC Mix and PEFC labels.



Apart from the preceding discussion, it has been scientifically proven that reusable packaging is significantly more climate-friendly than disposable packaging and containers. This is also true of single-use bio-based and recyclable packaging. There are eco-labels for packaging, such as the Austrian eco-label for reusable containers and reusable cup systems, and since 1 January 2022, it has been a legal requirement to clearly label beverages (beer, water, juice, non-alcoholic soft drinks and milk) in reusable containers in sales outlets over 400 m². This labelling is additional to that of producer on the product itself and can typically be found on the price tag. The labelling requirement also applies to orders by post.¹²¹



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www.wko.at/branchen/handel/lebensmittelhandel/novelle-abfallwirtschafts-gesetz.html#heading_kennzeichnung

In Vienna there is a special takeaway sticker on reusable dishes. These stickers help catering establishments inform their customers that the takeaway meal crockery can be returned and reused. The stickers also show that customers can bring their own reusable crockery or whether reusable crockery is provided.



Last but not least, there are labels indicating CO₂ offsetting for product emissions, for example the ClimatePartner label. It is important to remember that labelling does not include emissions that are not directly related to the product.



mentation of the Green Deal. This corresponds to a budget of approx. 0.6 trillion euros.¹²³

Agriculture is a core part of the Green Deal. The Farm-to-Fork Strategy, a central element of this new EU sustainability policy, was published in May 2020. The strategy's aim is to enable a transition to sustainable food systems that produce affordable and healthy food under fair working conditions. A number of problems in current food production should be solved in this way:¹²⁴

- the high ecological footprint of food systems. On the one hand, this includes the enormous amounts of greenhouse gases caused by food production. Data suggests that between a quarter and a third of global greenhouse gas emissions are generated in this way. Another problem is the loss of biodiversity caused by agriculture. The food systems improved by the farm-to-fork strategy are intended to be climate-neutral or even climate-positive. Climate change must be stopped and adaptation measures must be implemented where necessary. Another aim is to reverse the trend of biodiversity loss.
- Large quantities of natural resources are used in food production. Many of these resources cannot regenerate as quickly as they are consumed. Other resources, such as phosphorus reserves, virtually fail to regenerate at all.
- In the EU, over half of adults are overweight. Sustainable food systems should contribute to reducing poor nutrition. Therefore, everyone should have access to sufficient, nutritious, safe and sustainable food.
- Low and unfair wages are commonplace in the food sector. This is especially true for producers. The Farm-to-Fork strategy aims to improve wages while keeping prices affordable for consumers. The hope is that these measures go far beyond the EU's borders. Fair trade is one particular area that should grow.

But how are the goals of the Farm-to-Fork strategy to be achieved? The Common Agricultural Policy (CAP) and the Common Fisheries Policy (CFP) form the basis here.¹²⁵ Compatibility with the Green Deal is a fundamental prerequisite for reforming them.¹²⁶ These include, for example, the so-called eco-schemes (eco-regulations) as a new political instrument. These are premium payments linked to agricultural practices. They are designed individually by the nation states, but must serve to implement the Green Deal. Participation should be voluntary for farmers. Many of these possible eco-schemes contribute to climate protection, for example CO₂ capture in plants and soil or reducing the use of pesticides and fertilisers (Figure 1).

A new initiative under the Farm-to-Fork strategy is the proposal for a legal framework for sustainable food systems (FSFS), which will be adopted by the European Commission in 2023. The FSFS aims to ensure that sustainability is anchored in all food-related policies. As a result, consumer food information about nutritional values, origin, shelf life, climate and environmental impacts and social standards must be improved. For this purpose, an EU sustainability label will be introduced in one form or another.¹²⁷ In addition, the EU

Reshuffle the pack – that's the aim of the European Green Deal. This EU programme was presented at the end of 2019 to great media fanfare. With the measures and instruments of the Green Deal, the EU aims to achieve net zero gases by 2050 and thus become the first climate-neutral continent. In line with the classic pillars of sustainability, the Green Deal also has a social component: no region or vulnerable population group should be disadvantaged by this policy. Economic sustainability is to be achieved by decoupling economic growth from GHG emissions.¹²²

The launch of the Green Deal coincided with the start of the Covid-19 pandemic. The aims of the investments made under the Green Deal include helping to overcome the crisis and to shape it in a future-oriented manner. One third of the EU Covid recovery fund is therefore earmarked for the imple-

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Possible agricultural practices for eco-schemes

Organic farming	Preserving old and converting new land
Integrated crop protection	Field edge strips, mechanical weed control, etc.
Agro-ecology	Crop rotation, multiple crops, flower strips, etc.
Animal husbandry and animal breeding	Feeding, housing and exercise, animal health, etc.
Agro-forests	Restoration and maintenance, etc.
High nature value farming	Fallow, semi-natural areas, grazing in open areas, etc.
Carbon farming	Gentle tillage, permanent green spaces, etc.
Precision farming and improved nutrient management	Nutrient management plan, controlled and optimised nutrient release, more effective irrigation... Nitrate-related measures, prevention of leaching
Water demand	Less water-demanding plants, irrigation planning, etc.
Soil protection	Erosion protection strips, terracing, etc.
Other climate protection measures	Improved manure removal, feed additives to reduce emissions from enteric fermentation

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Corporate Sustainability Due Diligence Directive, known as the EU Supply Chain Act, is being prepared at EU level. Its goal is to help create more socially and ecologically compatible supply chains. The Vienna parliament is committed to implementing a supply chain law with the same purpose at national level.¹²⁸

The EU sees sustainable food systems as a prerequisite for a resilient supply.¹²⁹ Against the background of the war in Ukraine and inflation, this topic has become even more pertinent. However, in many places, shifting towards greater sustainability means a 180-degree turnaround that is difficult to achieve without help. The EU utilises different forms of support: advisory services, financial instruments, and research and development are the most important tools for making change socially and economically compatible.

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In 2021, the Vienna Business Agency hosted the EFIB Forum – European Forum for Industrial Biotechnology & the Bioeconomy. The EFIB Forum is a Europe-wide conference on the relevance of industrial biotechnology and bioeconomy. The majority of participants come from industry.

7.1 Funding

A so-called food bonus when evaluating funding applications in the following ongoing funding programmes will apply until the end of 2022:

- Innovation funding programme for the development of innovative services and products, including from the food sector
- Research funding programme to support R&D projects on product, service and process innovations
- Nahversorgung Focus funding programme for innovative ideas in local supply or gastronomy
- Material goods_innovative investments funding programme for investment projects
- Shared facilities funding programme for the acquisition of equipment infrastructure for joint use by different companies in the food sector
- Location initiative funding programme for business locations or relocations in the food sector
- Creative project funding programme for the development of creative economy products, services or processes related to food
- It is about the big issues of food production, distribution and communication.

The Vienna Business Agency offers a “360° service” for companies in Vienna. This includes funding and consulting services, workshops and further coaching for start-ups, business or office space search assistance, contacts with possible partners in technology or the creative industries. The Vienna Business Agency also positions the capital of Austria in the international business environment, supports international companies locating to Vienna and is the first point of contact for expats when they arrive in Vienna. The Vienna Business Agency offers funding opportunities for food sector projects in various funding programmes. In the research programme, research and development projects (R&D projects) are funded as part of special calls. The innovation program supports companies developing new or significantly improved products, services and processes or implementing organisational innovations. The R&D cooperation initiation programme is ideal for preparing large projects with several (international) partners. Internationalisation promotes companies that open up new markets.

A city worth living in requires long-term alternatives to conventional food production. Let's rethink food production, distribution, logistics and hospitality! The Covid pandemic and other developments have proven this. As a result, innovative food projects in production, packaging, logistics, recycling and innovative gastronomy will also be the focus in 2022.

Together with the Vienna Design Week, the Creative Industries department of the Vienna Business Agency has been advertising annual challenges related to “Urban Food & Design” since 2018. These challenges involve the development of design solutions for food industry challenges. With the “Urban Food” funding priority, a total of 7 million euros in funding was available for food sector projects in 2020/2021. In addition, the topic was and is being discussed in numerous events and collaborations, for example at the Vienna Biennale for Change 2021.





The following table displays an overview of just some of the innovative companies in Vienna that are active in the food sector.

Companies in the field of Urban Food Tech

COMPANY	DESCRIPTION	WEBSITE
ACM-AUTOMATISIERUNG, COMPUTERTECHNIK, MESS- UND REGELTECHNIK GMBH	Measuring systems and technologies for premium beverages	www.acm.co.at/de
AGRANA BETEILIGUNGS-AG	AGRANA is an internationally oriented Austrian industrial company that refines agricultural raw materials into high-quality food, animal feed and natural fertilisers and into technical products and preliminary products for industrial use. It employs 10,000 people in 58 locations worldwide in the sugar, starch and fruit industries, and is the world market leader in fruit juice concentrates and preparations.	www.agrana.com
ALPHA REPUBLIC GMBH	NEOH wants to revolutionise the global confectionery market as an innovative food tech. Not only is sugar removed in the products, but everything similar to sugar, with no compromise on taste. Their sugar substitute is the most innovative in the world.	www.neoh.com
ARKEON GMBH	Arkeon develops protein ingredients for health and lifestyle. The products are carbon-negative, vegan, natural and not tested on animals.	www.arkeon.bio
AUGORA EU	Augora sells locally produced, fermented food. It is organic and unpasteurised.	www.augora.at
BÄCKEREI ÖFFERL GMBH	Production of bread and pastries	www.oeffler.bio
BERGFALKE GMBH	Alpengummi: the little natural tooth cleaner for people on the go. The chewing base is made from local pine resin and beeswax.	www.alpengummi.at
BIOFISCH GMBH	Biofisch are pioneers of organic fish farming and have always thought and worked regionally, sustainably and ecologically, in the cycle of nature. From the Waldviertel fishpond to the factory in Hetzendorf to the weekly market in Vienna: honest craftsmanship for the highest quality and freshness on your plate	www.biofisch.at

COMPANY	DESCRIPTION	WEBSITE
BLUEWATERS GMBH	BLUEWATERS pursues transparent and comprehensive solutions for complex environmental problems, particularly in the area of drinking water.	www.bluewaters.at
CIRCULAR ANALYTICS TK GMBH	Circular Analytics analyses and develops sustainable solutions for packaging and everyday items	www.circularanalytics.com
DIE MENÜ-MANUFAKTUR GMBH	Die Menü-Manufaktur GmbH, based in Vienna, cooks mainly with regional produce and always guarantees freshness and quality with meticulous incoming inspections. All dishes are prepared according to original Austrian recipes using traditional methods and are delicately seasoned and finely seasoned by master chefs.	www.menuemanufakturen.at
DIE ZUCKERLWERK-STATT E.U.	The candy workshop produces handmade sweets from the best ingredients and according to centuries-old recipes. The quality begins with the origin of the ingredients and packaging. Most of the raw materials are sourced from selected suppliers in Austria. This is how small, handmade moments of happiness are created.	www.zuckerwerkstatt.at
DIRECTSENS GMBH	DirectSens is a company specialising in the development of third-generation biosensors. and is very successfully established on the market, especially in the food sector.	www.directsens.com
FERMIFY GMBH	Fermify provides food companies with a full-service and automated B2B platform for casein production to amplify their alternative cheese and functional ingredient product quality, sustainability and speed-to-scale.	www.fermify.org
FREUDEWERK GMBH	ADD TO WATER – the pure joy of drinking water. Our flavours revitalise your drinking water with a natural taste, without sugar, calories or colouring.	www.addtowater.com
FRISCH & FROST NAHRUNGSMITTEL GMBH	Frisch & Frost is a leading frozen food specialist for typical Austrian pastries and potato dishes. Founded in 1966, the rural brand produces French fries, potato specialties, soup accompaniments, side dishes and ready-made vegetable dishes. The Toni Kaiser is all about warm pastries, such as yeast dumplings, original Viennese apple and curd cheese strudel, Kaiserschmarren and sweet dumplings as well as strudel dough. The strudels are made using a unique, patented process in the strudel manufactory in Vienna.	www.frisch-frost.at

COMPANY	DESCRIPTION	WEBSITE
GEEN LEGACY GMBH	Polyter GR – Hydrogel – The all-rounder for sustainable plant growth is a super-absorbent, cellulose-based hydrogel. With its unique formula, it is a soil activator, nutrient and water reservoir at the same time. It revitalises soil and promotes sustainable plant growth from the root.	www.polyter.at
GMS GOURMET GMBH	This traditional Austrian company with 1,500 employees is the market leader in communal catering. As a specialist in target group-specific catering, it cooks for guests of all ages; in children's day care centres, schools, workplaces, care homes, hospitals, private residences, restaurants and special events.	www.gourmet.at
HERBEUS GREENS GMBH	Austria's first vertical indoor farm employs 13 people with vast experience in food production and technology. The farm produces top quality fresh vegetables of the best quality (microgreens and baby leaves) all year round under constant conditions specially tailored to the products.	www.herbeusgreens.com
HERD AON GMBH	From its experiences with its own start-ups, as well as through its network in the catering, food trucks and restaurants sector, Herd knows the challenges and ups and downs of food companies. Herd's services provide all the building blocks and the network to make launching and sustaining businesses in the food sector easier. The company is also helping shape the sustainable food systems of the future.	www.herd.wien
HINK GMBH	One of Vienna's truly traditional companies, Hink has produced the finest patés since 1937. Classic creations such as fine foie gras with Perigord truffles or venison and goose liver patés helped build the "Hink" brand's reputation. The Spak family has been managing the company since 2007 and is currently expanding the product range.	www.hink.wien
JOSEF MANNER & COMP AG	Founded in 1890 by Josef Manner, the peach-pink branding colour and the St. Stephen's Cathedral logo are unmistakable features of the brand to this day. In 2018, the company had around 700 employees, a turnover of around €200 million and an export quota of 55%.	www.manner.com
KRUSTE&KRUME GMBH	Austria's first flour grocer's shop. It offers the best bakery flour from Austrian mills in various grades, such as durum wheat flour and semolina, excellent Italian flour, baking ingredients such as malt, bread seasonings, spring salt and baking accessories, including fermentation baskets, rolling pins, French baking linen, baking linen from Austria's Mühlviertel region, dough cutters, tubs for long proofing and much more.	https://krusteundkrume.at

COMPANY	DESCRIPTION	WEBSITE
LALLEMAND GMBH	Lallemand is a Canadian company specialising in the production of yeast and bacteria since 1915. It uses eleven business units for baking, fermented beverages, human and animal nutrition, and fuel, agriculture and pharmaceuticals. More than 4,000 people work in 45 countries on all continents worldwide.	www.lallemand.com
LGV-FRISCH-GEMÜSE WIEN REG. GEN.M.B.H.	The cooperative was formed in 1946 by the merger of initially more than 1,000 horticultural businesses. Today, around 100 vegetable nurseries in Vienna and Lower Austria form the basis for the largest supplier of fresh vegetables in Austria. The cooperative has its own shop on the Naschmarkt, the "LGV-Gärtnerschäftl" offering customers the opportunity to buy, taste and enjoy.	www.lgv.at www.lgv-gärtnerschäftl.at
LUNZERS MASS-GREISLEREI – OLD-STYLE GROCER'S SHOP	Packaging-free grocery shopping by weight	www.mass-greisslerei.at
MARKTA GMBH	Shopping like at the farmer's market	www.markta.at
NENI AM TISCH GMBH	This family business makes products such as spreads, hummus and other oriental-inspired specialties, and has restaurants in Vienna, Berlin, Hamburg, Cologne, Munich, Zurich, Paris, Amsterdam and Mallorca. The name originates from the first names of the company's founders.	www.neni.at
ORGANIC TOOLS GMBH	Tools for those with small plots – such as the innovative Obst-raupe fruit harvester	www.organic-tools.com
OTTAKRINGER BREWERY	Founded in 1837, Ottakringer is Vienna's last remaining major brewery. The brewery makes more than 15 different types of beer with water from a depth of 118 metres from its own well. The medium-sized family business currently employs around 180 people, brews 570,000 hectolitres of beer every year and achieved sales of 80 million euros in 2016 with a market share of around 6% in Austria. An event location on the brewery site which hosts more than 5,000 events per year has become an integral part of Vienna life.	www.ottakringerbrauerei.at
PLANT REPUBLIC GMBH	Vegan products for your own brand. Eat meat-free with our vegan milk and meat alternatives such as tofu, vegan spreads, plant drinks, vegan yoghurt and creams as well as vegan meat substitutes such as vegan sausages and burgers. As a private label specialist, we offer you a 360° solution: products and packaging that are tailor-made for you and delivered on time.	www.plant-republic.eu

COMPANY	DESCRIPTION	WEBSITE
PYSCIS GMBH	PYSCIS produces the finest gourmet preserves by vintage, exclusively in limited editions.	www.pyscis.com/?lang=de
RAMSA-WOLF GESELLSCHAFT M.B.H.	Founded in 1926, the company is located in Vienna's 14th district, producing mustard in all variations – from classic mustard to cranberry and orange varieties. The company also makes onion ragout and various special products in cooperation with customers.	www.ramsa-wolf.at
REVO FOODS GMBH	With the help of special 3D food printers, plant-based "fish products" such as salmon or tuna fillets are produced that taste and look just like the real thing.	www.revo-foods.com
STAMAG STADLAUER MALZFABRIK GESMBH	The company produces brewing malt as well as baking ingredients and special flours. STAMAG's factory in Stadlau has been founded in 1884. Around 160,000 tons of grain are processed into approx. 350 different products every year. Since 1973, the company has been part of the IREKS group of companies, a family business from Germany that employs around 2,900 people worldwide.	www.stamag.at
SKOONU GMBH	Skoonu is an innovative crockery rental system. When ordering from one of our gastro partners, the food you want is filled in reusable stainless-steel containers. You can simply hand in the dishes at a participating restaurant.	www.skoonu.com
STAUD'S WIEN	STAUD'S WIEN has always had firm foundations in Vienna. The raw materials are handpicked, with most coming from Austria. The rest is sourced from where the selected fruits and vegetables grow best. STAUD'S processes them using tried and tested craftsmanship and state-of-the-art technology in its small manufactory in the middle of Vienna's Ottakring district.	www.stauds.com
SZIHN GMBH	Production of bread and pastries	www.szihn.at
TEMPRIFY GMBH	The dry ice-free overall system for optimised last-mile delivery.	www.temprify.com
UNVERSCHWENDET GMBH	Throw away good fruit & veg? Not with Unverschwendet. We transform surplus fruit, vegetables and herbs into delicious products such as jams, syrups, chutneys, pickles, sweet and sour, sauces and much more.	www.unverschwendet.at

COMPANY	DESCRIPTION	WEBSITE
VERTICAL FARM INSTITUTE	The vertical farm institute conducts future nutrition research and planning in cooperation with regional and international partners. The practical research produces feasibility studies and concepts for vertical farms in different climate zones. The work takes socio-economic considerations into account and eco-social business models are developed for integration into the local environment.	www.verticalfarminstitute.org
VITANA SALAT- UND FRISCHE SERVICE GMBH	Founded in 1986, the company was part of the Verkehrsbüro group of companies until 2007. Since 2008 it has been a 100% subsidiary of the EFKO Group, Austria's market leader in vegetable processing. In the south of Vienna, 100 employees process 20 tons of products every day, producing around 500 different products such as dressings, salads, apple sauce, cut vegetable and salad mixtures, etc.	www.vitana.at
WIENER SCHNECKEN-MANUFAKTUR E.U.	This Vienna business is the first company in Austria to receive permission to process snails according to EU guidelines. The snail farm is reviving Vienna's old tradition of eating snails and creating a real future food.	www.gugumuck.com
WIESBAUER – ÖSTERREICHISCHE WURST-SPEZIALITÄTEN GMBH	The Wiesbauer family business sees itself as a pioneer in the meat-processing industry when it comes to innovations, hygiene, product safety, environmental standards and brand policy, and ensures complete transparency in all aspects of its business policy. Founded in 1931, the holding company bundles various companies in Austria and Hungary with over 800 employees.	www.wiesbauer.at
WOJNAR'S WIENER LECKERBISSEN DELIKATESSEN-ERZEUGUNG GMBH	This family business has existed since 1930 and produces various delicatessen products in Vienna's 23rd District. The range spans from spreads and salads to catering and convenience products. Around 400 employees produce around 44 tons of products every day, using around 1,000 different recipes every week.	www.wojnar.at
XOCOLAT MANUFAKTUR KG	Xocolat offers more than 400 selected chocolate bars and numerous other fine chocolate delicacies. The parent company and nine Xocolat branches offer a wide range of selected chocolate specialties. In the Xocolat manufactory, an extensive range of delights is produced mainly by hand, with no artificial flavourings or preservatives.	www.xocolat.at





Andersen, Kristian G.; Rambaut, Andrew; Lipkin, W. Ian; Holmes, Edward C.; Garry, Robert F. (2020): The proximal origin of SARS-CoV-2. In: Nat Med 26 (4), p. 450–452.
DOI: 10.1038/s41591-020-0820-9.

Berghofer, Emmerich; Schönlechner, Regine; Schmidt, Julia (2015): Neue Verfahren und Techniken bei der Lebensmittelherstellung und Lebensmittelversorgung. Bedeutung für Konsumentinnen und Konsumenten. Published by Austrian Ministry of Health. Available at www.broschuerenservice.sozialministerium.at/Home/Download?publicationId=541.

blün (2022): aquaponik – fischzucht und gemüseanbau im kreislauf. Available at www.bluen.at/pages/aquaponik, last updated 19/05/2022, last accessed 19/05/2022.

Caritas (2022): ERnteLAA. Urban Gardening. Available at www.caritas-stadtteilarbeit.at/projekte/alle-projekte/erntelaa-urban-gardening, last updated 20/05/2022, last accessed 20/05/2022.

Czaja, Sandra (2016): Chemische Synthese. Nahrung für die halbe Welt. Available at www.spektrum.de/news/nahrung-fuer-die-halbe-welt/969784, last updated 08/06/2016, last accessed 10/05/2022.

Der Standard (2021): Vertical Farming. Wachstumszweig oder Pflanzerei? In: DER STANDARD, 15/07/2021. Available at www.derstandard.de/story/2000128156429/vertical-farmingwachstumszweig-oder-pflanzerei, last accessed 20/05/2022.

Die Presse (2021): Food-Trends 2022 von Local Exotics bis Real Omnivore. In: Die Presse, 24/06/2021. Available at www.diepresse.com/5998811/food-trends-2022-von-local-exotics-bis-real-omnivore, last accessed 04/05/2022.

European Commission (2019): A European Green Deal. Available at www.ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en, last updated 10/05/2022, last accessed 13/05/2022.

European Commission (2022a): Agriculture and the Green Deal. Available at www.ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/agriculture-and-green-deal_en, last updated 17/03/2022, last accessed 13/05/2022.

European Commission (2022b): Farm to Fork Strategy. Available at www.ec.europa.eu/food/horizontal-topics/farm-fork-strategy_de, last updated 16/05/2022, last accessed 16/05/2022.

European Commission (2022c): Food information to consumers – legislation. Available at www.ec.europa.eu/food/safety/labelling-and-nutrition/food-information-consumers-legislation_en, last updated 16/05/2022, last accessed 16/05/2022.

FAO: Der Beitrag von Insekten zur Nahrungssicherung, Lebensunterhalt und Umwelt.
Available at www.fao.org/3/i3264g/i3264g.pdf.

IPCC (2019): Climate Change and Land.
An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Summary for Policymakers.
Available at www.weltagrabericht.de/fileadmin/files/weltagrabericht/Weltagrabericht/15Klima_Energie/2019IPCC_SPM.pdf.

Ivanova, Diana; Barrett, John; Wiedenhofer, Dominik; Macura, Biljana; Callaghan, Max; Creutzig, Felix (2020): Quantifying the potential for climate change mitigation of consumption options. In: Environ. Res. Lett. 15 (9), p. 93001.
DOI: 10.1088/1748-9326/ab8589.

J. Gustavsson; C. Cederberg; U. Sonesson; R. Van Otterdijk; A. Meybeck (2011): Global Food Losses and Food Waste- Extent, Causes and Prevention.
Available at www.researchgate.net/publication/285683189_Global_Food_Losses_and_Food_Waste-Extent_Causes_and_Prevention.

Jones, Kate E.; Patel, Nikkita G.; Levy, Marc A.; Storeygard, Adam; Balk, Deborah; Gittleman, John L.; Daszak, Peter (2008): Global trends in emerging infectious diseases. In: Nature 451 (7181), p. 990–993.
DOI: 10.1038/nature06536.

Landwirtschaftskammer Wien (2022): Strategie Zukunft Stadtlandwirtschaft Wien 2025.
Available at www.wien.lko.at/zukunft-stadtlandwirtschaft-2025+2400++3547038,
last updated 04/05/2022, last accessed 04/05/2022.

Lankaponics (2022): Wie funktioniert Aquaponics? Published by Engineers without Borders. Karlsruhe Institute of Technology.
Available at www.ewb-karlsruhe.de/lankaponics/technische-details/wie-funktioniert-aquaponics,
last updated 19/05/2022, last accessed 19/05/2022.

MA 22 and ERW (2022): Ernährungsstrategie Wien. Edition 2.0.

Manthiram, Karthish; Gribkoff, Elizabeth (2022): Fertilizer and Climate Change.
Published by MIT Climate Portal. Available at www.climate.mit.edu/explainers/fertilizer-and-climate-change,
last updated 10/05/2022, last accessed 10/05/2022.

Milan Urban Food Policy Pact (2021): Milan Urban Food Policy Pact.
Available at www.milanurbanfoodpolicypact.org,
last updated 19/07/2021, last accessed 27/06/2022.

Obersteiner, Gudrun; Luck, Sandra: Lebensmittelabfälle in Österreichischen Haushalten. Status Quo.
On behalf of WWF Austria. University of Natural Resources and Life Sciences Vienna.
Available at www.wwf.at/wp-content/cms_documents/studie_lebensmittelabfaelle-in-oesterreichischen-haushalten---status-quo.pdf.

OTS.at (2022): Lieferketten – Czernohorsky/ Gara: “Unternehmen müssen auf Menschenrechte und Klimaschutz achten!”.
Available at www.ots.at/presseaussendung/OTS_20210325_OTS0075/lieferketten-czernohorsky-gara-unternehmen-muessen-auf-menschenrechte-und-klimaschutz-achten,
last updated 21/06/2022, last accessed 21/06/2022.

Our World in Data (2022): Food production is responsible for one-quarter of the world’s greenhouse gas emissions.
Available at www.ourworldindata.org/food-ghg-emissions,
last updated 06/05/2022, last accessed 06/05/2022.

Reganold, John P.; Wachter, Jonathan M. (2016): Organic agriculture in the twenty-first century. In: Nature Plants 2 (2), p. 15221.
DOI: 10.1038/nplants.2015.221.

Rützler, Hanni (2021): “Fleisch war etwas Rares, Edles und Teures.” In: Neue Züricher Zeitung, 17.01.2021.
Available at www.futurefoodstudio.at/fleisch-war-etwas-rares-edles-und-teures,
last accessed 28/04/2022.

Rützler, Hanni (2022a): Food-Trends: Was bleibt und was sich ändern wird.
Available at www.zukunftsinstitut.de/artikel/food/food-trends-was-bleibt-und-was-sich-aendern-wird,
last updated 04/05/2022, last accessed 04/05/2022.

Rützler, Hanni (2022b): Real Omnivores. Die nachhaltigen Esser der Zukunft.
Available at www.futurefoodstudio.at/real-omnivores,
last updated 16/02/2022, last accessed 28/04/2022.

Stadt Wien (2019): Landwirtschaft Statistiken.
Available at www.wien.gv.at/statistik/wirtschaft/landwirtschaft/#daten,
last updated 18/05/2022, last accessed 18/05/2022.

Stadt Wien (2021): Wien wächst moderat weiter. Bevölkerungsentwicklung 2020.
Available at www.wien1x1.at/bevoelkerungsentwicklung-2020,
last updated 06/09/2021, last accessed 16/05/2022.

Stadt Wien (2022a): Wiener Bio-Aktionsprogramm 2022+.
Available at www.wien.gv.at/umwelt/wasserrecht/agrarwesen/bio-aktionsprogramm-2022-plus.html,
last updated 23.06.2022, last accessed 23/06/2022.

Stadt Wien (2022b): “Wiener Gusto” – Bio-Produkte der Stadt Wien ab 1. Juni 2022 online bestellen.
Available at www.wien.gv.at/arbeit-wirtschaft/bio-produkte-wiener-gusto.html,
last updated 23/06/2022, last accessed 23/06/2022.

Stadtlandwirtschaft Wien (2022): Wir leben Stadtlandwirtschaft.
Available at www.stadtlandwirtschaft.wien/about,
last updated 18/05/2022, last accessed 18/05/2022.

Statistik Austria (2022): Agrarstrukturerhebung 2020.
Available at www.statistik.at/web_de/statistiken/wirtschaft/land_und_forstwirtschaft/agrarstruktur_flaechen_ertraege/betriebsstruktur/index.html,
last updated 18/05/2022, last accessed 18/05/2022.

Thomaier, Susanne; Specht, Kathrin; Henckel, Dietrich; Dierich, Axel; Siebert, Rosemarie; Freisinger, Ulf B.; Sawicka, Magdalena (2015): Farming in and on urban buildings. Present practice and specific novelties of Zero-Acreage Farming (ZFarming). In: *Renew. Agric. Food Syst.* 30 (1), p. 43–54.
DOI: 10.1017/s1742170514000143.

Wiener Klimafahrplan bis 2040 (2022).
Available at www.wien.gv.at/umwelt/klimaschutz/klimafahrplan/index.html,
last updated 15/06/2022, last accessed 15/06/2022.



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Mariahilfer Strasse 20
1070 Vienna
www.viennabusinesagency.at

Contact

Dipl. Ing. Rupert Bittmann
Technology Services
T +43 1 25200-542
bittmann@wirtschaftsagentur.at

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