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Fungiculture in the city: mushrooming amid a global food crisis

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ABSTRACT: This study investigates the potential of urban mushroom cultivation (i.e. fungiculture) in addressing ongoing global food crises and the climate crisis. A case study of Copenhagen, Denmark, served as the primary focus of this research, providing insights into the practicalities of urban mushroom farming. Both quantitative and qualitative data was collected through a mixed methods approach. The findings reveal that while urban fungiculture offers numerous advantages, there are significant structural barriers to its widespread adoption. Key challenges identified include: regulatory hurdles, economic constraints, cultural perceptions, and logistical issues related to production and distribution.

Despite these challenges, the findings suggest that urban fungiculture holds considerable promise for contributing to more localised and sustainable food systems. By integrating mushroom farms into the urban fabric, cities can increase local food production, reduce dependence on industrialised agriculture, and foster stronger connections between urban residents and their food sources.

The study concludes that for urban fungiculture to be successfully scaled and integrated into broader urban agriculture initiatives, targeted policy support, greater alignment across multiple levels of governance, and community engagement are essential. Further research in cities beyond the European context is recommended to assess the capacity of urban fungiculture in making strides toward food sovereignty. This research contributes to the growing body of literature advocating for pragmatic improvements to food systems amid the realities of the corporate food regime.

Key terms: fungiculture, urban agriculture, path dependency, corporate food regime, food sovereignty, food systems, capitalism, Copenhagen

ZUSAMMENFASSUNG: Diese Studie untersucht das Potenzial der städtischen Pilzzucht (d.h. Pilzanbau) bei der Bewältigung der aktuellen globalen Nahrungsmittelkrise und der Klimakrise. Eine Fallstudie in Kopenhagen, Dänemark, diente als primärer Fokus dieser Forschung, um Einblicke in die Praxis der städtischen Pilzzucht zu erhalten. Mit Hilfe eines gemischten Methodenansatzes wurden sowohl quantitative als auch qualitative Daten gesammelt. Die Ergebnisse zeigen, dass die urbane Pilzzucht zwar zahlreiche Vorteile bietet, aber auch erhebliche strukturelle Hindernisse für eine breite Anwendung bestehen. Zu den wichtigsten Herausforderungen gehören: regulatorische Hürden, wirtschaftliche Zwänge, kulturelle Wahrnehmungen und logistische Probleme im Zusammenhang mit Produktion und Vertrieb.

Trotz dieser Herausforderungen deuten die Ergebnisse darauf hin, dass die urbane Pilzzucht vielversprechend ist, um zu lokaleren und nachhaltigeren Lebensmittelsystemen beizutragen. Durch die Integration von Pilzfarmen in das städtische Gefüge können Städte die lokale Lebensmittelproduktion steigern, die Abhängigkeit von der industrialisierten Landwirtschaft verringern und eine engere Verbindung zwischen den Stadtbewohnern und ihren Lebensmittelquellen schaffen.

Die Studie kommt zu dem Schluss, dass für eine erfolgreiche Ausweitung der städtischen Pilzzucht und ihre Integration in umfassendere Initiativen zur städtischen Landwirtschaft eine gezielte politische Unterstützung, eine stärkere Abstimmung zwischen den verschiedenen Verwaltungsebenen und die Einbeziehung der Bevölkerung von wesentlicher Bedeutung sind. Weitere Untersuchungen in Städten außerhalb des europäischen Kontexts werden empfohlen, um die Fähigkeit der urbanen Pilzkultur zu bewerten, Fortschritte auf dem Weg zur Ernährungssouveränität zu machen. Diese Forschungsarbeit trägt zu der wachsenden Zahl an Literatur bei, die sich für pragmatische Verbesserungen der Lebensmittelsysteme inmitten der Realitäten des Lebensmittelregimes der Konzerne einsetzt.

Schlüsselbegriffe: Pilzanbau, urbane Landwirtschaft, Pfadabhängigkeit, unternehmerisches Ernährungssystem, Ernährungssouveränität, Ernährungssysteme, Kapitalismus

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PART 1



“We are embedded in a global food system structured around a market economy that is geared to the proliferation of commodities and the destruction of the local. We are faced with transnational agribusinesses whose desire to extend and consolidate their global reach implies the homogenization of our food, our communities, and our landscapes. We live in a world in which we are ever more distant from each other and from the land, and so we are increasingly less responsible to each other and to the land. Where do we go from here? How can we come home again?”

- Kloppenburg et al., *Coming into the Foodshed* (1996)

1. Introduction

Increased distances between farm and table, circuitous supply chains and value-adding processes have come to characterise global food systems. Raw food—that is; plants, fungi, and animals—are processed and packaged into all kinds of ‘products’, divorcing humans from the more-than-human ecologies that sustain their lives. The uncoupling of where and how food is grown, from where and how it is consumed, has undermined the complex cultural and place-based histories of nourishment. Mass urbanisation is not the cause of this problem, but it deeply exacerbates its symptoms. In the city, it is all too easy to forget that food does not come from a grocery store. It does not emerge from the soil portioned, labelled, and wrapped in plastic.

Understanding what food actually is, is the first step in finding our way home. We must cultivate a curiosity about the natural world, its rhythms, and relearn our collective responsibility in stewarding these processes. We should consider how the food we consume reaches our tables, where it is grown, how it is processed, and how many hands it passes through. We must politicise these considerations, questioning who benefits from, and who is disadvantaged by particular modes of doing. Everyone needs to eat, but the burdens of the global food system are not borne equitably. It is necessary to become intimately acquainted with how these systems function at multiple scales, and the realities of their harms. If instead, food cultivation is perceived by urban populations as an abstract, bucolic concept; if it is something alien to city life; if it is done by strangers thousands of miles away; why should people living in cities care? How should they pay closer attention?

Integrating food cultivation in urban environments is a promising way of bridging this gap. Situating sites of production within places of consumption opens new possibilities for learning and exchange. Growing food or raising livestock in the urban fabric may seem strange, but it could forge new pathways for alternative thinking. It makes visible many normative assumptions about what a city is, and what it is not.

Urban food cultivation can take many different forms, and serve several different functions.

Activities can range from community rooftop gardens, to for-profit hydroponic growing systems. Thus, it is critically important to this discourse to be specific. Understanding the distinctions between different articulations of urban agriculture is at the heart of successfully integrating food growing and city making in a thoughtful way. Certain foods cannot, and perhaps should not, ever be grown in the city. Others, however, can thrive in urban conditions.

Mushrooms, for example, are a food that is especially well suited to cultivation in cities. Because they do not photosynthesize, most fungi can be grown inside without sunlight—even underground. They require marginal amounts of water, take up relatively little space (as compared to livestock or common crops), are nutrient-dense, delicious, a viable meat alternative due to their *umami* quality, and if done correctly, urban farms can produce high yields of diverse varieties. In fact, in the European context, commercialised mushroom production originated in cities. The common button mushroom—i.e. the *champignon de Paris*—was first grown in abandoned limestone quarries beneath Paris (Sebaaly et al., 2021). Some accounts suggest, “By 1880, more than 300 mushroom farmers worked in Parisian quarries to produce 1,000 tons of Paris mushrooms each year” (Monaco, 2017, p. 2). However, the dawning of the Paris metro system at the end of the 19th century conferred an even better use of these subterranean tunnels, putting an end to the practice entirely.¹

Welcoming fungiculture into the city offers a practical means of localising food production, and reconnecting urban communities with food cultivation. It has the capacity to address many urgent environmental, cultural, and supply issues concurrently. The advantages of urban mushroom farming are so multiplicitous, and its drawbacks so negligible, that it is in fact difficult to make a case against supporting these initiatives. It is therefore the aim of this research to better understand the conditions that both prevent and facilitate the emergence of fungiculture in the urban fabric. This brings me to my research questions.

Given the urban origins of mushroom cultivation in Europe, its suitability to city conditions, and the widely accepted benefits of local food production, why aren’t there more mushroom farms in European cities? What are the barriers to establishing and operating a commercial urban mushroom farm in 2024?

The following study begins by reviewing relevant bodies of literature, and framing the value of urban fungiculture amid ongoing global food crises in the context of late stage capitalism. I develop a theoretical framework based on these literatures, which operationalizes Food Regime Theory, principles of food sovereignty, and Path Dependence Theory to examine the economic, ethical, and historical dimensions of the barriers facing commercial mushroom farms in European cities. This research mainly focuses on two commercial mushroom farms in Copenhagen, Denmark, but also investigates urban agriculture more broadly

1. It is worth mentioning that other parts of the world boast much longer traditions of growing mushrooms. Evidence of shiitake cultivation in China dates back to the Tang Dynasty (618–907 AD)(Li and Xu, 2022, p. 3951). However, to the best of my knowledge, these practices were not part of urban life.

within this context. The case study selection was informed by several practical, theoretical, and empirical considerations elaborated in the ‘Case Study Justification’ section (p. 28). Quantitative and qualitative data were collected using a mixed methods approach, and the quality and validity of this study was strengthened by multiple rounds of triangulation and analysis. The results illuminate four main types of barriers that inhibit the success of urban mushroom farms in Copenhagen. They are: (1) regulatory and economic barriers, (2) governance barriers, (3) cultural barriers, and (4) production and distribution barriers. I conclude by offering a few practical policy recommendations, and outlining avenues for further study.

But this research is not really about urban mushroom farms. It is not even really about food cultivation, or the evils of the global industrialised food system. This research is about pragmatic optimism. It is about thinking with, and paying attention to alternatives. It is about struggling forward in a way that does not feel completely hopeless amid the realities of injustice.

In the face of compounding systemic global issues, individual action can feel completely ineffectual. Even in finding the words to contend with these feelings, productivism creeps in. The pressure to be more efficient, make progress, and find solutions faster takes hold. I become trapped by the same logics that produce the systems I wish to dismantle. My desire to improve material conditions for those around me, as well as for those living oceans away, does not clarify an aim, nor a path forward.

Systemic issues can never be resolved at an individual level, but this does not justify apathy. I am deeply inspired by the work of anthropologist Anna Lowenhaupt Tsing, who reminds me to keep my head up. She urges the curious to engage in what she calls ‘the arts of noticing’; to find the generative elements that resist through their existence. We must continue to look for what mushrooms amid capitalist ruins.

2. Literature Review

2.1 Global Food Crisis

Ensuring that sufficient food is produced and fairly distributed among the world’s growing population is a multi-scalar, transnational behemoth of a problem. According to the European Commission, “In 2023, record levels of acute food insecurity persist due to protracted food crises and new shocks. In 48 countries, 238 million people are facing high levels of acute food insecurity – 10% more than in 2022” (Molinari, 2023, p. 2). The World Food Program cited even higher numbers that same year claiming, “from 78 of the countries where it works (and where data is available) [...] more than 333 million people are facing acute levels of food insecurity in 2023, and do not know where their next meal is coming from” (World Food Programme, 2024). The FAO published a report in 2022 titled, *The State of Food Security and Nutrition in the World* where they conclude, “This

year's report should dispel any lingering doubts that the world is moving backwards in its efforts to end hunger, food insecurity and malnutrition in all its forms" (FAO et al., 2022, p. 129). It also estimates that "nearly 670 million people will still be undernourished in 2030—8 percent of the world population, which is the same percentage as in 2015 when the 2030 Agenda was launched" (FAO et al., 2022, p. 10). In short, things are not looking good on the global food crisis front.

2.1.1 What is a Food Crisis?

Food crises are not a new phenomenon. "Since the dawn of mankind, hunger has been our omnipotent enemy. From simple food shortages to famines, whether on a national, regional, or global scale, human history is filled with hunger" (Mavroeidis et al., 2022, p. 1). Mitigating these crises and ensuring a sufficient food supply is an underlying tenet of nation-building; permeating politics, technological development, and international trade the world over. But what exactly is a food crisis? What role might cities have to play in addressing these global problems?

According to the field of agricultural economics, a "food crisis occurs when rates of hunger and malnutrition rise sharply at local, national, or global levels" (Timmer, 2010, p. 224). The 2024 Global Report on Food Crises extends this definition to a call to action, defining "a food crisis as a situation where acute food insecurity requires urgent action to protect and save lives [...] and exceeds the local resources and capacities to respond" (FSIN and Global Network Against Food Crises, 2024, p. 1). In short, a food crisis is a sudden shortage of food in a particular geographical area, which cannot be ameliorated by local resources. In these kinds of crises, international imports and immediate aid are typically necessary to avert disastrous consequences.

The 2007-08 global food crisis "involved approximately a doubling of international wheat and maize prices in the space of two years and a tripling of international rice prices in the space of just a few months" (Headey, 2013, p. 1). The material and social impact of these price surges spurred renewed academic interest in food crisis research (Headey, 2013; Weis, 2013; Gress, 2014; Xu, 2019; Mavroeidis et al., 2022; Fontan-Sers and Mughal, 2023). Understanding how, "from 2006 to 2008, world market prices of grains, oilseeds, and cooking oils spiked on a scale not seen since the early 1970s" became a subject of critical inquiry (Weis, 2013, p. 65). Although many explanations were offered, "the origins of the food price spikes are still strongly debated" and there exists little academic consensus around the root causes (Godfray, 2014, p. 2). One study mapped several overlapping factors that contributed to the crisis at different time scales and levels, arguing that there is never a singular cause for these kinds of problems (Gress, 2014). Although this is a valid point, the lack of causal consensus also makes circumventing further crises especially challenging. It should therefore come as no surprise that other food crises have since followed. Recently, the COVID-19 pandemic caused a huge surge in food prices and supply chain instability. However, "unlike in the 2007–08 crisis, the situation in 2020–21 appears to be more a question of access to food than its production" (Fontan-Sers and Mughal, 2023, p. 2). This is why some scholars argue that these crises are critical to food systems

research more broadly. They can be mobilised to hone in on the root causes of structural challenges. Van Der Ploeg claims, “Covid 19 has turned out to be a giant searchlight that ruthlessly exposes the major weaknesses of these [food] chains” (2020, p. 945). Thus, studying crises offers a strong entry point into better understanding global food shortages.

“If we do have a food crisis it will not be caused by the insufficiency of nature’s productive power, but by the extravagance of human desire”

- Masanobu Fukuoka, *The One Straw Revolution* (2009)

2.1.2 What Causes a Food Crisis?

Among humanitarian organisations and NGOs, the claim that the planet does in fact produce enough food to feed everyone, but hunger persists because of inequitable distribution, has been popular for years. For example, the World Food Program USA’s website states, “There is no global food shortage because we produce more than enough food to feed everyone in the world. We produce so much food globally yet one-third of it—1.3 billion tons—is wasted” (“Is There a Global Food Shortage?”, 2023). Similarly, a 2020 article published by The United Nations Environment Programme stated, “There is enough food for everyone [...] the problem we face today is not a lack of food. Rather, it is a problem of efficiency. We can see this throughout the production and consumption process, beginning with how land is used” (*How to Feed 10 Billion People*, 2020). These statements frame the food crisis; not as a food shortage, but a crisis of waste and lack of efficiency. This perspective implies that greater efficiency within global food systems is the key to solving food crises. It suggests that sufficient efficiency could offer a panacea for global hunger. However, this argument is not particularly convincing. Gratefully, the academic literature and scientific research on the subject offer a more nuanced understanding of the problems at hand.

Food systems are complex systems, and food crises have complex causes. Mavroeidis et al. argue, “any food crisis could be perceived as a complicated nexus of socioeconomic and environmental factors. Broadly speaking, any phenomenon that threatens food security (FS) could constitute a driving force behind a food crisis (i.e., armed conflicts, economic busts, and climate change)” (2022, p. 1). The listed ‘driving forces’ can certainly catalyse food scarcity at particular geo-political moments, but we must dig deeper into ‘nexus of socioeconomic and environmental factors’ in order to unpack the systemic causes of recurring disaster.

Zhun Xu researches the relationship between global food crises and economics, pointing out, “technically we have long been able to feed the world population with sufficient nutrition, but so far capitalism has failed to do the job” (Xu, 2019, p. 278). This is a markedly different position than those of the aforementioned NGOs, as it perceives food shortages not as the problem, but as a symptom of an economic system. Xu reframes food crises, not as supply shortages, but as crises of capitalism. In the context of this research, the capitalist food system can be understood as a system of production that is,

Associated with industrialization and relies heavily on fossil fuels, chemical inputs, cheap labour, and technologies that are tied into an export-oriented, productivist model of food production and harvesting. Capitalist relations externalize social and environmental costs of the food system. These include compromising food and farm worker safety and contributing to diet-related diseases, soils and water degradation, air pollution, biodiversity loss, and global climate disruption (Laforce et al., 2021, p. 194).

This helps make sense of how global food crises persist despite transnational efforts and billions spent in aid. Magdoff explains this paradox, arguing, “the contradiction between plentiful global food supplies and widespread malnutrition and hunger arises primarily from food being considered a commodity, just like any other” (2012, p. 15). In capitalism’s endless march toward wealth accumulation, food—that is; the plants, animals, and fungi that support human life—are transmuted into ‘products’, entirely divorced from the sacred ecological, cultural, and place-based histories of nourishment. These problems are accelerated by the fact that “any given agricultural product is grown in an increasingly limited number of areas on a decreasing number of farms, and is processed and retailed by a narrow set of transnational agribusinesses in which economic and political power are being progressively concentrated” (Kloppenburger et al., 1996, p. 4). If the food system is owned by transnational agribusinesses, then it follows that the goal of the system is to produce profit—not to feed people. Within this system, food, which is a fundamental human right, is denigrated to the status of commodity, subjected to the same pressures as any other product sold on the free market. Within this power constellation, food can never be made accessible to all. The global food crisis can never be resolved because the conditions upon which it relies are inherently unsustainable.

2.1.3 (Re)conceptualising Sustainability

Given that the global food system is built upon capitalist principles that rely on unsustainable growth, what might a sustainable alternative look like? What exactly is meant by ‘sustainable’? The High Level Panel of Experts on Food Security and Nutrition has pointed out, “There are many different views as to what constitutes a “sustainable” food system, and what falls within the scope of the term “sustainability” (HLPE, 2014 p. 29). The FAO, (which can be considered *one* voice in the food systems discourse, albeit an amplified one) defines a sustainable food system as that which “delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised” (Nguyen, p. 1, 2018). Immediately following this definition, the report clarifies, “This means that: it [i.e. the food system] is profitable throughout” (Nguyen, p. 1, 2018). The prioritisation of economic profitability is troubling. The global food crisis cannot be resolved using the same economic logics that produced it in the first place. Borrowing from intersectional feminist studies, “The master’s tools will never dismantle the master’s house” (Lorde, 1984, p.2). We must look beyond capitalist logics to find answers. There already exist alternative ways to conceive of food ‘production’, imbuing the practice with principles of sustainability and

reverence. The Seventh Generation value is one example of such principles.

The Seventh Generation value² “has lived through the teachings and lifeways of a multiplicity of Indigenous Nations across Turtle Island, Latin America, and the Caribbean, and is derived from the Gayanashagowa or Great Law of Peace/Great Binding Law, the Constitution of the Haudenosaunee Five Nations Confederacy (later Six Nations) that was passed down by Peacemaker” (Engle et al. 2022). It “takes into consideration those who are not yet born but who will inherit the world [...] Nations are taught to respect the world in which they live as they are borrowing it from future generations” (‘Values’ Haudenosaunee Confederacy)³. In other words, the consequences of every decision must be weighed in careful consideration of the next seven generations. Fostering the health and nourishment of plant communities, animals, fungi, skies, waters and lands, as well as cultural, artistic and spiritual tenets is as vital as human survival (Clarkson et al. 1992, Da Costa et al. 2021). Anthropocentrism is antithetical to this view point because human life does not exist independent of other natural, cultural and spiritual ecologies. Afterall, “Life requires the interplay of many kinds of beings. Humans cannot survive by stomping on all the others” (Tsing, 2017, pg. vii). Hence, ‘sustainability’, which tends to be a slippery, weaponized concept in Eurocentric discourses, is in fact an intrinsic, inalienable dimension of many indigenous worldviews.

Bridges can be built between principles like the Seventh Generation value and food systems more broadly. This may not be possible at a large scale, as global food systems inherently undermine the intimate place-based knowledge fundamental to the Seventh Generation value. But things can improve—especially at a local scale. If a sustainable food system is one where we live in the world as if “borrowing it from future generations”, a lot needs to change. We must move forward with generosity, reverence, and consideration, and stand in defiance of the profit-driven exploitation that epitomises the dominant global industrial food system.

2. The Seventh Generation value is also referred to as the Seventh Generation principle.

3. As a white settler on Turtle Island, I introduce indigenous wisdom into my research with the deepest respect. My intention is to humbly contribute to academic discourses that uphold oral histories, non-Eurocentric worldviews, and modes of knowledge making and sharing that have been marginalised through colonial violence.

“Why do I say that nature does not produce? The original meaning of the word suggests the contrary: to lead out and forward, to bring forth from the depths. And yet, nature does not labour: it is even one of its defining characteristics that it creates. What it creates, namely individual 'beings', simply surges forth, simply appears. Nature knows nothing of these creations - unless one is prepared to postulate the existence within it of a calculating god or providence. A tree, a flower or a fruit is not a 'product' - even if it is in a garden. A rose has no why or wherefore; it blooms because it blooms”

- Lefebvre, *The Production of Space* (1997)

2.1.4 Capitalism and Food Regime Theory (FRT)

In their foundational 1989 paper Friedmann and McMichael's develop the 'food regime' concept and explore, “the role of agriculture in the development of the capitalist world economy, and in the trajectory of the state system” (Friedman and McMichael, 1989, p. 93). Described as a Marxist approach to the study of food systems, Food Regime Theory (FRT) and the function of food regime analysis, is to link “international relations of food production and consumption to forms of accumulation broadly distinguishing periods of capitalist transformation since 1870” (Friedman and McMichael, 1989, p. 95). Significant to this research, the industrialisation and globalisation of agriculture cannot be understood independently from the development of capitalism.

Since 1989, both authors have continued to write about food regimes and elaborate their original ideas. In 2009, McMichael published, *A food regime genealogy*, where he identifies a 'corporate food regime' which “embodies a central contradiction between a 'world agriculture' (food from nowhere) and a place-based form of agro-ecology (food from somewhere)” (McMichael, 2009, p. 147). This distinction is critically important, as it speaks to the spectrum of social and spatial place-based intimacy that can be lost or built through food. The notion of the corporate food regime also calls attention to the dominance of big business in food system governance. He concludes by putting forward,

The food regime concept is a key to unlock not only structured moments and transitions in the history of capitalist food relations, but also the history of capitalism itself. That is, the food regime is an important optic on the multiple determinations embodied in the food commodity, as a genus fundamental to capitalist history (McMichael, 2009, p. 163).

Friedman and McMichael's approach is remarkable because it “established the grounds by which key sets of food relationships might be reconfigured in a dramatically changed form. In short, it broke out of the linear history of food industrialization, and opened the space for alternative visions of our food futures” (Campbell, 2009, p. 309). This is precisely why it offers a useful theoretical lens from which to analyse global food systems and their patterns of crises. Rather than focusing on linear development or causality, the FRT lens

takes a holistic view of the many, often paradoxical relationships between phenomena that shape the material realities of food access under capitalism.

Other scholars have also contributed to the debate. Tilzey recently proposed revisions to the periodisation of Friedmann and McMichael's food regimes, arguing that the world has now entered into the 'Post-Neoliberal food regime', due to "the fragmentation of neoliberal hegemony, if not as yet its supersession, and a return to heightened inter-state competition and antagonism" (Tilzey, 2019, p. 243). Reflecting on Tilzey's work, Porcheddu claims that although food regime analysis importantly situates the commodification of food within the political economic context, it misses that food commodification is "dependant on not recognising food as a natural element essential to the life of human beings, and as a cultural element and fundamental right to each of these beings" (Porcheddu, 2022, p. 204). Porcheddu then invokes the concept of food sovereignty arguing that it "can offer a fundamental contribution since it does not only constitute a challenge and an alternative to the current food regime, but also represents a different way of understanding the relationship between humans and nature as well as the relationship between humans [sic] themselves" (Porcheddu, 2022, p. 205). There is a link here to the aforementioned Seventh Generation value, which also renders an alternative way of understanding the human/more-than-human connection. It is a perspective that draws greater attention to how humans conceive of food, centering ecology rather than economy as a guiding axiom.

"Let's change the way we eat
Let's change the way we live
And let's change the way we treat each other"

- Tupac Shakur, *Changes* (1992)

2.1.5 Environmental Impacts of Food Regimes and the 'Meatification' of Diets

Before delving into a discussion about food sovereignty, it is important to first take a moment to elucidate the environmental ramifications of the commodification of food, and the commodification of nature more broadly. Afterall, global hunger, malnutrition, and food crises are only one branch of the problems precipitated by what McMichael calls the 'corporate food regime'. There is also a convincing body of literature that exposes globalised food systems and intensive agricultural practices as some of the largest drivers of ecological destruction, biodiversity loss, greenhouse gas (GHG) emissions, and water pollution around the world (Farchi et al. 2017). To put it blatantly, "a third of global GHG emissions comes from the food system" (Crippa et al. 2021). The worst of these environmental impacts are associated with industrial livestock production, which is,

The driving force behind rising meat consumption on a world scale, and the process of cycling great volumes of industrial grains and oilseeds through soaring populations of concentrated animals serves to magnify the land and resource budgets, pollution,

and greenhouse gas emissions associated with agriculture (Weis, 2013, p. 65)⁴.

The emissions associated with the livestock industry are caused, “both directly (mainly methane production by ruminant species) and indirectly (largely due to deforestation associated with land-use changes for pasture and the production of feed crops)” (Salter, 2018, p.49). The resulting, “estimates of global greenhouse gas emissions from the livestock industry range from 12 to 18%” (Allen and Hof, 2019, p. 91). Furthermore, land that could be used to produce crops directly for human consumption are instead used to grow feed crops for livestock due to the profitability of the meat industry. For example, in Denmark, a small country with a very powerful food and agriculture lobby, “The dominating field crops are cereals. Most of the cereals, 85%, are used for animal feed” (Danish Agriculture & Food Council, 2023, p. 4). Vast quantities of water are needed to irrigate feed crops, and raising livestock is also water intensive. Moreover, effluent from feedlots can contaminate fresh water supplies, leading to water scarcity and toxification in surrounding communities (González et al. 2020, Crippa et al. 2021, Salter 2018).

Tragically, industrial meat production is almost as harmful as industrial meat consumption. A growing body of evidence suggests that regularly eating red meat is linked to the development of multiple kinds of cancer, (Mukhtar et al. 2023, Cross et al. 2007), obesity, chronic disease (Fogelholm et al. 2015, Fuhrman 2018, Abdisa 2023), and premature death (Farchi et al. 2017). “The International Agency for Research on Cancer (IARC) concluded in 2015 that processed meat is carcinogenic to humans”, which is, “attributed to chemical carcinogens produced during curing or smoking of processed meats or through cooking meat at high temperatures” (Salter, 2018, p. 51). Some studies suggest that “consumption of red meat should be reduced below 50 g/day to avoid an increased risk of prostate cancer, breast cancer, or colorectal cancer” (González et al., 2020, p. 2).

Despite these findings, global demand for meat is on the rise (Katare et al. 2020, Hemler and Hu 2019). Voracious consumption, coupled with “the ‘meatification’ of diets, a term which encapsulates the dramatic shift of animal flesh and derivatives from the periphery of human food consumption patterns, where it was for most of the history of agriculture, to the centre” (Weis, 2013, p. 67), is coming at a high cost to the health of humans and the planet. This is a particularly salient point when considering widespread, ongoing food shortages, amid a growing global population. Some scholars argue that limiting meat consumption is one strategy that “developed nations will need to pursue in order to guarantee enough

4. Importantly, Weis cites industrial livestock production as the driving force behind rising meat consumption—not just greater consumer demand. This distinction matters for two reasons. First, it captures the responsibility of corporations in perpetrating the climate crisis (rather than blaming individual behaviour). Second, the emerging middle class in countries like China and India are often scapegoated for rising GHG emissions, while middle classes in Europe and North America have enjoyed fossil-fuel intensive diets and lifestyles for decades. Rising consumer demand for cheap meat does need to be addressed. However, it is the responsibility of governments to better regulate corporate emissions. And also, blaming racialized people from colonised countries for climate change, when they have been historically and systematically denied access to the luxuries associated with white, middle-class lifestyles is myopic and racist.

food for all—across a more populated and warmer world” (Sakschewski et al., 2014, p. 110). Hemler and Hu claim that without drastic changes, the current “systems will not be able to support future populations, especially as climate change and population growth further threaten our environment and food supply” (2019, p. 276). These studies point to an urgent need to restructure food systems around reduced and more ethical meat production, coupled with more sustainable ways of growing, harvesting and distributing plant-based foods.

2.2 Food Sovereignty

Let us return to the concept of food sovereignty, as it encompasses salient political and ethical dimensions that undergird a radically different way to conceive the production, distribution and consumption of food, as compared to the global industrialised food system. Food sovereignty is a movement, a philosophy, and an empowered approach to organising food systems. At the 2007 World Forum for Food Sovereignty in Mali, food sovereignty was defined as,

The right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers (“DECLARATION OF NYÉLÉNI”, 2007, p. 1).

Critically, the Declaration positions itself in direct opposition to the corporate food regime. Its aim is not simply to offer an ethical alternative. The movement calls out, and wholly rejects the evils that have become insidiously normalised in the corporatization of growing and distributing food. Food sovereignty is about democratising ownership and responsibility over food systems, however, it is not always obvious how this should be achieved. Who should be involved? How should decision-making power be distributed?

Mass migrations of people from rural landscapes to city centres since the dawn of the Industrial Revolution has resulted in a dearth of knowledge about food cultivation within urban populations. And yet, the majority of food grown and harvested beyond metropolitan limits is consumed within cities. This asymmetry in knowledge and expertise makes it difficult to welcome everyone into the conversation. However, it also offers powerful opportunities for cross-pollination.

Acknowledging the importance of the food sovereignty movement, but also its deeply rural origins, some scholars have wondered how food sovereignty should be articulated in the urban realm—a context dominated by consumers, but typically very few producers (García-Sempere et al., 2018, García-Sempere et al., 2019). They suggest, “with the goal of achieving FS, urban social movements are developing and promoting (among other things)

farmers' markets, consumer groups, community-supported agriculture, urban community gardens, and purchase of local products by public institutions" (García-Sempere et al., 2019, p. 1147). This underscores both the importance of urban social movements in raising awareness about the harms of the corporate food regime, but also, the need to (re) connect urban dwellers more directly with production and growers. In every aspect, the tenets of food sovereignty are antithetical to the neoliberal market logics that govern the corporate food regime. La Via Campesina, a global coalition leading the food sovereignty movement, argues,

Neoliberal policies are wrecking Food Sovereignty. Neo-liberal policies prioritize international trade, and not food for the people. They haven't contributed at all to hunger eradication in the world. On the contrary, they have increased the peoples' dependence on agricultural imports, and have strengthened the industrialization of agriculture, thus jeopardizing the genetic, cultural and environmental heritage of our planet, as well as our health ("Food Sovereignty Explained", 2003).

While on the topic of neoliberal policies, it is worth noting that food sovereignty as a concept grew out of opposition to 'food security' discourses in the early 1970s. By the mid-1980s, food security had become a neoliberal policy buzzword within international efforts aimed at eradicating global hunger and malnutrition. Jarosz offers a thorough analysis of the genealogy and context-specificity of both concepts in her 2014 article, *Comparing food security and food sovereignty discourses*. She writes,

Food security is embedded in dominant technocratic, neoliberal development discourses emphasizing increases in production and measurable supply and demand and is aligned with transnational agribusiness and institutions of governance at the national and international scales. In contrast, food sovereignty discourses emerge from civil society and NGOs and align with Marxist political economy/ecology discourses within and outside academia (2014, p. 2-3).

In other words, food security approaches attempt to solve food crises within the confines of the existing global capitalist system, whereas food sovereignty recognises that the ownership structures, power concentrations and wealth accumulation strategies of the capitalist system are the crisis. Jarosz also argues that in the World Bank's 1986 report titled, *Poverty and Hunger: Issues and Options for Food Security in Developing Countries* (which became widely referenced),

Food security is redefined as a lack of individual purchasing power so that adequate personal income, markets, and the workings of the globalized food system ensure food security rather than state-led entitlements or other arenas of exchange or entitlements. Poor people are responsible for alleviating their own hunger by making more money or increasing crop productivity through developmentalist initiatives (2014, p. 4).

A circular logic that blames the poor for their own poverty is surely not the solution to

ongoing global food crises. Food security has proven itself to be a poor strategy. Thus, advocates of food sovereignty argue that policy aims should be reoriented toward facilitating local empowerment and self-governance, so that communities are not reliant on trade oriented imports. But how might this reorientation take shape?

The literature tells us that principles of food sovereignty must be articulated in a way that is contextually, geographically, and culturally specific. There is no copy-paste solution. Implementation will be different in Denmark than in Peru. The common thread between all contexts however, is that food sovereignty is always “a process involving persistent, diverse and interconnected struggles” (Desmarais and Wittman, 2014, p. 1156). Its inherently political nature causes food sovereignty to be bound by other intersecting power axes, and “if we are to engage in a battle for food sovereignty, then we concurrently must engage in numerous other struggles” (Epting, 2018, p. 596).

Like democracy, food sovereignty is never achieved, but only invoked through action. It is in the doing, the building, the fighting, and the struggling that food sovereignty is continually remade. We must arrive again and again. This dynamism is precisely why we “need to pay attention to the multiplicity of sites and the multifaceted nature of resistance to dispossession and inequality” (Desmarais and Wittman, 2014, p. 1157). The points of friction will act as guides. The sites of resistance offer a place to begin.

2.2.1 Food Sovereignty and Scale

Iles and Montenegro de Wit remind us that,

Sovereignty is not an extraneously existing object but is a living process, it foregrounds the conscientious building and maintaining of relationships between people, institutions, technologies, ecosystems, and landscapes across multiple scales. It provokes more attention to the how of systemic change than to the what (2015, p. 482).

The question of multiple scales is important to broach in food sovereignty discourses, because interventions are needed at multiple levels. There is certainly work to be done within the international and national policy arenas, however, independent projects at a local level can be just as meaningful. Epting considers these entanglements, describing a spectrum of food sovereignty (from absolute to none), claiming that sovereignty can be assessed at varying scales (ranging from the global to the individual level). He then goes on to argue,

If you want to fundamentally change food systems in order to restore food sovereignty, the realistic ways that could bring it to fruition are not consistent with contemporary views of what it means to be radical. We must make concessions to practical considerations. It will be an arduous battle with very little instant gratification (Epting, 2018, p. 601).

Two things stand out here. The first is that the path to food sovereignty might not be a radical one. Instead, it might be a case of encouraging achievable, practical improvements. The second is that contemporary conceptions of radicalism, and insistence upon radical reform may be hindering marginal progress—particularly at the urban scale. Tiny, pragmatic interventions may appear futile on the surface, but they may also be more sustainable, and lead to more actionable solutions. Afterall, “while hoping for a just food system might be too ambitious, having one that is always working toward this goal could provide us with an ethical orientation toward food systems” (Epting, 2018, p. 602). A solid ethical orientation, coupled with considered interventions could facilitate the transition in a doable way. Existence is perhaps resistant enough.

“The law of most paths: following a path makes a path easier to follow”

- Sara Ahmed, *What's the Use? On the Uses of Use* (2019)

2.3 Path Dependence and Food Systems

Paths to greater food sovereignty may not be well-trodden, but they already exist. So why are they so hard to follow? Why are even the small, aforementioned interventions difficult to push through?

Industrial, globalised, fossil fuel dependent modes of growing, processing, packing, selling, and distributing foods continue to dominate because *they are already dominating*. They have a history of domination. This phenomenon can be described as path dependency. “A system is path dependent if initial moves in one direction elicit further moves in that same direction; in other words there are self-reinforcing mechanisms or positive feedbacks” (Kay, 2003, p. 406). Path Dependency Theory is often used to explain why adapting to different (if not improved) ways of doing almost anything in an institutional setting is challenging. The notion that ‘history matters’ is a core tenet of this theory (De Munck, 2022).

This does not imply that within systems, change is impossible—that path dependency precludes choice. In fact, it is quite the opposite: “at every step along the way there were choices - political and economic - that provided real alternatives. Path dependence is a way to narrow conceptually the choice set and link decision making through time. It is not a story of inevitability in which the past neatly predicts the future” (North, 1990, p. 98-99). Indeed, multiple choices remain available, but once a path is established, alternatives become more difficult to choose. Following the established path not only makes that path either to follow, it also causes alternatives to become forgotten, overgrown, and entirely abandoned.

Valuable research has been conducted into the relationship between path dependency

and food systems. In 2017, Klimek and Hansen published a study examining Denmark and Norway's agri-food industries and their contrasting "path dependent institutional responses at the neo-liberal turning point in the early 1990s" (p. 115). They conclude (among several other salient findings) that "policies that organise the markets channel structural developments into specific path dependent patterns", thus linking institutional responses and agri-food system development (Klimek and Hansen, 2017, p. 120).

Path dependencies can also underwrite policy discourses. For example, de Krom and Muilwijk postulate that because the Dutch government positions itself as the global leader in sustainable food production and consumption, it follows that their actions in the food policy arena are synonymous with 'sustainability'. The authors "argue that such a discursive closure is unproductive because it reinforces existing dominant perspectives on sustainable food and agriculture, and overlooks the transformative potential of alternative perspectives" (2019, p. 1-2). This point is acutely relevant to my research, as path dependencies make particular choices visible, while obscuring other possibilities from sight. They make identifying alternatives challenging, and seriously considering them absurd. They create authoritative ways of thinking, working, and doing, which paves the way for more of that kind of thinking, working, and doing. Locating alternatives presupposes wanting to find them, and for that, we must train ourselves to look differently.

2.4 Thinking With Alternatives

Rather than fighting to transform the expansive, formidable, and exploitative food regime, it may prove more fruitful to invest energy into taking stock. This may require us to look differently—to find and support the people, beings and initiatives that already embody food sovereignty. Alternatives exist. Thinking with alternatives and paying closer attention to them builds directly on the ideas of anthropologist Anna Lowenhaupt Tsing, who urges the curious to search for the generative elements amid the capitalist system, and let their resilience be the entry point into investigation. Researching the livelihoods of migrant mushroom pickers in the American Pacific Northwest, she notes,

In the shadow of the Anthropocene's "anthropo-," we must reorient our attention. Many preindustrial livelihoods, from foraging to stealing, persist today, and new ones (including commercial mushroom picking) emerge, but we neglect them because they are not a part of progress. These livelihoods make worlds too—and they show us how to look around rather than ahead (2017, p22).

Looking around, rather than ahead, is precisely how learning from alternatives begins. Even when oriented toward a meaningful ideology, the drive for progress can invisibilize what is happening right before our eyes. We must slow down in order to notice.

Additionally, Kloppenburg et al. propose the term 'foodshed' as "a unifying and organising metaphor for conceptual development that starts from a premise of the unity of place and people, of nature and society", which is very much in alignment with food sovereignty principles and thinking with alternatives (Kloppenburger et al., 1996, p. 3). They then point

out, “within the existing food system there already exist alternative and oppositionalist elements that could be the building blocks for developing foodsheds: food policy councils, community supported agriculture, farmers markets, sustainable farmers, alternative consumers” (1996 p. 34). But what characterises these oppositionalist elements as alternatives? How do they relate to transitioning toward greater food sovereignty?

2.5 Alternative Food Systems (AFS)

The definition of ‘alternative food system’, as well as the features that constitute one, varies among researchers. Some indeterminacy is certainly semantic, with scholars preferring the word ‘network’ rather than ‘system’ (Barbera & Dagnes, 2016; Blumberg et al., 2020, Laginová et al. 2023). Other discrepancies are the result of a divergence between the ways that researchers conceive of ‘alternativeness’, vs. the ways that practitioners and laypeople conceive of their own work in food systems (Venn et al., 2006). Meanwhile, other scholars emphasise ‘short food supply chains’ (Kebir and Torre, 2012), or ‘local food systems’ (Enthoven and Van Den Broeck, 2021)—both of which are included in a broad AFS category, but not always explicitly. Laginová et al. provide a helpful overview (see Figure 1) of the main elements that constitute AFSs, alongside the scholars who have expounded upon the identified elements. Still others conceive of AFS through more theoretical, interdisciplinary approaches.

Authors	Element	Description
Marsden et al. (2000)	distance	shorter distances between producers and consumers
Jaros (2008)	size of participating farms	small farm sizes and small production scale
La Trobe and Acott (2000)	holistic production approaches	holistic production processes, contrasting with large-scale production
Werkheiser and Knoll (2014)	traditional, organic, or welfare production methods	commitment to the environmental and social dimensions of sustainable food production
Kloppenburger et al. (2000)	participation of non-certified alternative agriculture farms	organic food producers whose food does not have to be formally certified also participate in AFNs
Jaros (2008)	alternative outlets	e.g., food cooperatives, farmers’ markets, food banks
Thorsøe and Kjeldsen (2016)	demand and intermediaries support the growth of small, organic farms	this support relationship is characterized by willingness to pay significantly more for quality product
La Trobe and Acott (2000)	a common-value niche pervades the entire network	producers, intermediaries and consumers often share the same value framework
Jaros (2008)	parallel use of several sales markets	considering the range of sales markets, they can be considered combinable
Pedersen and Kjaergard (2004)	use of seasonal labor	AFNs are often tied to seasonal production, and therefore entire chains are of seasonal nature
Holloway et al. (2007)	integration of organic and traditional practices with the use of ICT	producers in the “bottom of nature” also ensure sales or promotion in an urbanized area using modern technologies

Figure 1: This table provides an overview of important elements of AFS, alongside descriptions from key authors (Laginová et al. 2023, p.2)

For example, drawing upon David Harvey's work on dialectics, which "is rooted in historical-geographical materialism" Jarosz argues, "AFNs emerge from processes-in-place that constitute and sustain them", emphasising "processes, flows and relations over analyses of things, structures and systems" (Jarosz, 2008, p. 232). This conception is in alignment with Desmarais and Wittman's understanding of food sovereignty **as a process** characterised by interconnected struggles already discussed in section 2.2 (Desmarais and Wittman, 2014). Thus, there exists a meaningful theoretical parallel across AFS and food sovereignty frameworks. Both emphasise material flows, processes, and relationality between actors, nodes, and ideas. They engage numerous struggles concurrently in their resistance to the corporate food regime.

One salient characteristic that distinguishes AFSs from globalised food system hegemony is the articulation of producer-consumer relationship. Expanding on this idea, Venn et al. propose a spectrum of intimacy between producer and consumer, identifying four types of AFS. From most entwined to least, they are: producers as consumers, producer-consumer partnerships, direct sell initiatives, and specialist retailers (Venn et al., 2006). This spectrum underscores the varying degrees to which an AFSs can repair the alienation typically associated with industrialised food production and distribution. Through more intimate producer-consumer relationships, AFSs promote greater communion with food landscapes, stronger social ties, feelings of community, awareness of food waste, environmental impact, and a stronger sense of place. Some common examples of AFSs are: CSAs (Community Supported Agriculture), farmers' markets, cooperatives, community gardens, foraging groups, self-cultivation practices, market gardens and urban agriculture. In all of these cases, there exist more direct connections between growers, consumers, and the earth. Food grown, shared, and sold through these systems is much more resistant to the processes of commodification. This is particularly important in the urban realm, where people are already so removed from the landscapes that feed them. AFSs hold great potential in reconnecting city people with food growers, and offer a practical and meaningful avenue by which to push back against the corporate food regime.

2.5.1 Urban Agriculture (UA)

Urban agriculture (UA) is a decidedly interesting branch of AFSs because of its urbanity. It implies bringing a rural activity into urban areas, thereby connecting sites of production with spaces of consumption. Historically, feeding the city has been considered, "a rural issue and therefore beyond the scope of the urban planning agenda" (Morgan, 2009, p. 341). However, this is beginning to change. "Rapid urbanisation and its attendant sprawl, particularly in the global south⁵, are threatening the sustainability of agriculture even at

5. It is important to acknowledge that in many urban areas—particularly in the global south—agriculture and food cultivation has never disappeared from the city (Morgan, 2009). Of course, urban conditions inherently limit the capacity of traditional agrarian practices, but there are many cities around the world where livestock is kept, and where self provisioning is common. Thus, discussions around urban food cultivation and food policy should always be context specific, and Euro-centric assumptions should be avoided.

the urban periphery”, making food policy an ever more pressing concern. (Azunre et al., 2019, p. 104). Food scarcity and supply chain instability are regularly emerging in political and planning discussions at the municipal level (Abdoellah et al. 2023). Additionally, “more resource-efficient and local food production systems are needed that help to reduce the negative environmental impacts of food production, to shorten food supply chains and to create a resilient supply of high-quality and nutritious food for a growing world population” (Dietze and Feindt, 2023, p. 1-2). Indeed, increasing local food production and urban farming may be a meaningful part of the solution. However, “Urban farming is not one thing. Its varieties range from expansive peri-urban to small scale 'guerilla gardening', for-profit to subsistence, and individual to communal” (Rutt, 2020, p. 614). This diversity can obscure an obvious way forward. What kinds of urban agriculture might have the most meaningful impact in the push for greater food sovereignty? What is most feasible?

2.5.2 Types of Urban Agriculture: For-Profit and Nonprofit

UA “encompasses a wide range of forms, productions, activities, actors, motivations, experiences, and objectives, which are mainly distinguished into two segments: commercial urban agriculture (for profit) and urban gardening (non-profit)” (Alves and De Oliveira, 2022, p. 1). Both kinds are important, but academic attention has mostly been focused on the latter—particularly to the role of community gardens in cities (Classens, 2015; Crossan et al., 2016; Eizenberg, 2012; Ghose and Pettygrove, 2014; Jacob and Rocha, 2021). Dietze and Feindt point out that there exists a rich literature on “low-tech food production systems associated with social values, cooperative forms of organization and co-benefits for urban environments and social cohesion”, whereas “controlled-environmental food production systems (CEFPS), i.e. enclosed systems that protect food production from external environmental influences [... in order to] optimize production efficiency, product quality and yields” has received much less scholarly attention (Dietze and Feindt, 2023, p. 2). The commercial aspect of CEFPS in cities has also been understudied—especially in the European context where agricultural production is highly regulated. Moreover, “What scholars of urban farming and greening could be even more attentive to, are the *indirect inhibiting conditions* related to our food systems” (Rutt, 2020, p. 630). Several research gaps require attention, as too much focus has been paid to non-profit agricultural activities, while commercial activities, and the indirect barriers they face, have not been thoroughly studied. Further research into CEFPS is needed because it has its own set of challenges and opportunities. It is a kind of food production that interacts differently with the urban fabric precisely because of its commercial nature.

2.5.3 Where and How Commercial Urban Agriculture Takes Place

In studying urban agriculture, Azunre et al. use William Alonso's bid-rent theory to argue that because of “the need to allocate city land to uses that produce the largest net income over a given period of time [...] agriculture has been confined to the urban periphery and rural areas where the value of land is within the means of agricultural land users” (Azunre et al., 2019, p. 104). This of course has implications for the possibilities of food growing in cities because “urban gardens and farms – the last remaining land potentially available

for building in cities – are often a source of multiple tensions between property developers and city-dwellers. Urban agriculture spaces are often perceived as pockets of resistance to urban development” (Demailly and Darly, 2017, p. 334). Indeed, this is the stereotypical narrative of UA in the city. It is among the first to fall victim to development precisely because it is a relatively unprofitable activity that takes place on a piece of ‘undeveloped’ land. But what if UA was not either of these things? What if it did not follow this narrative?

Many studies presuppose that UA, in all its forms, requires the same kind of space. It overlooks *which* foods are being grown, and *the methods* used to grow them, both of which shape where and how UA takes place in cities. Indeed, not all foods and not all methods of cultivation are suited to urban environments. In researching the role of local government in promoting sustainable urban agriculture, Halloran and Magid’s study argue,

The choice of what type of crop to grow is also dependent on the cost of production per unit. As a result, some rationalize that only certain food should come from the city. A Copenhagen urban agriculture entrepreneur growing microgreens believes that a specialization should occur within the city in order for urban agriculture to make sense economically: “What people don’t think about is what should not be produced in the urban environment. One cucumber in the city is too expensive to produce” (2013, p. 130).

In other words, the material and economic realities of cities must be considered alongside the specificities of particular foods, if urban food cultivation is to be increased. With the realities of bid-rent theory in mind, food production in under-used urban spaces could prove profitable enough to make a strong case for UA. It might never make sense to grow cucumbers or wheat in a central business district, but perhaps some foods that make perfect sense.

2.5.4 Future Foods

The Center for the Study of Existential Risk (CSER) at the University of Cambridge published a study in 2021 called, *Future Foods for Urban Food Production* exploring the potential of “future foods”, which they define as, “foodstuffs that are appropriate alternatives to conventional PSF [plant source food] and ASF [animal source food] as the bulk of the human diet, made possible through technological development” (Tzachor and Richards, 2020, p. 3). They conclude,

Developing and deploying closed-environment, modular, and distributed future foods production systems in cities is expected to be increasingly important in achieving a sustainable and risk resilient alternative to conventional globalized food supply chains, necessary to ensure food security within the context of a growing human population and expanding urbanization (Tzachor and Richards, 2021, p. 6).

This study demonstrates that certain attributes make certain foods well-suited to urban cultivation. Qualities like: the ability to grow in low-light conditions, or without soil, or

requiring few external resource inputs, or having a high nutrient density, are significant to this line of reasoning. Catering to these attributes could facilitate a tactful approach in implementing local food production in a socially and economically sustainable way. Notably, fungi hold huge potential in the arena of future foods and future cities.

2.6 The Potential of Urban Fungiculture

Mushrooms are a food that is especially well suited to cultivation in urban areas for several reasons. Firstly, “mushrooms are devoid of leaves and of chlorophyll-containing tissues [...and] “are incapable of photosynthetic food production” (Chang and Wasser, 2017, p. 6). Because of this, most fungi can grow inside without sunlight—even underground. Unlike other forms of urban agriculture which take place outside or require sunlight (often coinciding with more expensive rents), mushroom cultivation can take place almost anywhere: parking garages, office buildings, basements, shipping containers etc. Mushroom farms can therefore adapt to diverse locations while still localising food production, and the harms associated with an import-oriented food supply.

Second, “mushroom cultivation requires relatively little space” and mushrooms are “fast-growing organisms (15–30 fructification days) with a high yield” (Pérez-Montes et al., 2021, p. 119). In other words, producing mushrooms is a particularly efficient way to feed a lot of people quickly—especially when compared to livestock production. Moreover, “mushroom cultivation demands relatively modest economic and environmental resources” (De Cianni et al., 2024, p. 2). The “very low input requirements for production” is one of the reasons that “cultivation of edible mushrooms is becoming increasingly successful in many regions” (Higgins et al., 2017, p. 1).

Third, there are practically no health risks or knock-on effects associated with urban mushroom cultivation. Unlike livestock production, which creates vast amounts of waste, effluent, and methane, or agricultural practices that use toxic pesticides and herbicides, mushroom farms do not pose health threats to people in cities. Okuda argues, “since no pesticides or chemical fertilizers are typically used in mushroom cultivation, the burden on the surrounding environment caused by mushroom cultivation is small and such activities can be regarded as a good example of circular agriculture” (2022, p. 2). This circularity is another advantage. Although not unique to urban production, “mushroom farming is a particularly appropriate activity to demonstrate the potential symbioses of circular economy. Many cultivated fungi naturally cycle organic matter and nutrients by decomposing organic waste and yielding edible mushrooms” (Dorr et al., 2021, p. 2). In fact, “it is possible to completely compost agricultural waste through the successive cultivation of mushrooms” (Grimm and Wösten, 2018, p. 7796). Not only can mushroom cultivation act as a recycling system for all kinds of by-products from the food, forestry, and agricultural industries, but also, spent substrate (the medium on which farmed mushrooms grow), can subsequently be recycled for a variety of uses, including: energy production, animal feed, and compost, and mycelium networks can be used to produce packaging as a substitute for non-biodegradable plastics (Grimm and Wösten, 2018).

Fourth, mushrooms are incredibly nutritious. “Edible mushrooms contain various bioactive ingredients such as proteins, polysaccharides, polyunsaturated fatty acids (PUFA), dietary fibers, amino acids, vitamins, and minerals. They have essential health effects, such as antioxidant, antimicrobial, immune-stimulatory, and anticancer, cholesterol-lowering properties” (El-Ramady et al., 2022, p. 12) Some varieties, “such as oyster mushrooms and white buttons, contain as much protein, by weight, as dairy milk” (Van Rosendaal, 2023, p. 2) Numerous studies have expounded the nutritional and medicinal benefits of edible mushrooms, providing strong impetus to incorporate mushrooms into everyday diets (De Cianni et al., 2024; El-Ramady et al., 2022; Kalač, 2013; Kothari et al., 2018; Manzi et al., 2001; Reis et al., 2012).



Figure 2: Yellow oyster mushrooms grown at an indoor farm on a wood-based substrate (Photo by: Isabel Barboza)

Lastly, and perhaps most importantly, mushrooms are delicious and diverse. “More than 2000 species of mushrooms exist in nature but only approximately 22 species are intensively cultivated, for commercial purposes” (Manzi et al., 2001, p. 321). There are so many flavours and textures to explore. Moreover, their *umami* quality can offer an inviting alternative to animal protein. Whereas meat lovers may be reluctant to swap a piece of steak for a piece of tofu, mushrooms seem to have a better reputation. “Because of the mushroom's chewy texture and meaty taste, it can be used as a non meat alternative to develop meat analogs” (Singh et al., 2023, p. 2). Studies have found that even people who are wholly uninterested in adopting plant-based diets are willing to reduce their meat consumption if mixed with mushrooms. For example, a burger patty that is composed of 30% mushroom and 70% ground beef is still greatly enjoyable to meat-lovers, even though it decreases their meat consumption by 30% (Lang, 2020). This is because,

Mushrooms’ compatibility and paired familiarity with meat make them easy for consumers to accept together [...] There is far less conceptual distance between mushrooms and meat for the average person than there might be for meat blended with other plant-based ingredients such as soy, lentils, or artificial vegetable or protein derivatives (Lang, 2020, p. 2).

Thus, urban fungiculture could address many urgent environmental, cultural, health-related, and food supply issues concurrently. Its potential benefits are so multiplicitous

that it is in fact difficult to make a case against mushroom cultivation in cities.

2.7 Literature Review Conclusion

The academic literature suggests that ongoing food and climate crises are perpetuated by a prevailing corporate food regime. Globalisation, industrialisation and the commodification of food are divorcing humans from the more-than-human ecologies that sustain their lives. The result is an expanding conceptual gap between ‘nature’ and ‘food’, when in fact, they are one in the same.

Cities have an important role to play in re-localising food cultivation, supporting sovereignty, and bridging more intimate connections between growers and consumers. Although not all foods can, nor should be cultivated in urban settings, mushrooms are a good example of a food that is especially well suited to cities. They are fast growing, nutrient-dense, produce high yields, take up very little space, provide a viable meat alternative, require few resource inputs, are delicious, diverse, and safe to grow.

Given all these considerations, one would think that urban mushroom cultivation would be happening in high volumes in cities around the world. However, relatively few exist. To the best of my knowledge, no study to date has examined the barriers to establishing and operating urban mushroom farms—especially not in European cities. This leads me to my research questions:

If fungiculture is well suited to urban settings and has the capacity to meaningfully address many of the challenges associated with global industrialised food systems, why aren’t there more mushroom farms in European cities? What are the barriers to establishing and operating an urban mushroom farm in 2024?

3. Research Design

3.1 Researcher paradigm

This research project emerges from a Critical Realist (CR) ontology. Critical Realism “is premised on distinguishing between society and persons, and thereby establishing both as real, legitimate objects of knowledge” (Walsh, 2021, p. 372). It recognises the existence of structures that shape social reality, and seeks to glean a deeper understanding of these structures through observable events and circumstances within the social world. The value of CR in the context of this research, is that it “aims to construct solid causal explanation of phenomena” by admitting “the existence of an objective reality” while also implying “that our knowledge of it can only be partial and subjective” (Masiero, 2018, p. 1-2). In simpler terms, through observation and by talking to people, it is possible to gain a deeper understanding of the barriers inhibiting urban fungiculture initiatives, however, the uncovered ‘truths’ are implicated by the subjectivity of informants and their perception of reality.

3.2 Research nature

This is an applied research project, as it seeks to better understand a practical problem (the obstacles that inhibit the success of fungiculture initiatives), and find pragmatic, actionable solutions (albeit incremental, micro-level solutions) to these obstacles. The aim of this research is to produce knowledge that could help inform policy development and governance mechanisms surrounding urban food production in European cities. However, it also contributes to academic discourses regarding; Food Regime Theory, urban food sovereignty, and Path Dependency Theory by providing a case study that applies and tests these theoretical frameworks. The research nature is both exploratory and explanatory, as this project probes the ‘what’ and the ‘why not’ of urban mushroom farms. It delves into an understudied phenomena, as little is known about the challenges and opportunities associated with urban fungiculture. This case is a case of resistance against the corporate food regime. It is a case of path dependency preventing new forms of food cultivation from mushrooming in the urban fabric.

3.3 Research type and reasoning and theoretical framework

The data collection process is informed by a theoretical framework that draws upon Food Regime Theory, food sovereignty, and Path Dependency Theory. These theories were intentionally selected due to the varying, but complimentary dimensions of food system barriers that they reveal. Food Regime Theory helps to identify the macro economic structures that influence the viability of small-scale food production in cities. Food sovereignty principles provide an ethical orientation for evaluating the impacts of urban fungiculture. Path Dependency Theory calls upon the historical development of food systems to illuminate how and why barriers continually emerge. Thus, these three theories enhance my analysis, as they allow for empirical data to be reconceptualised as material manifestations of structural, systemic, and historical barriers.

With this framework in mind, I employed deductive reasoning in the field, searching for glimmers of proof of theory within the data that emerged. Using inductive reasoning, I also searched for patterns that could lead me to develop my own interpretation of the data. Overall, my approach can be understood as abductive, as there was an interplay between both inductive and deductive reasoning throughout my process. This enabled me to suggest explanations for why urban mushroom farms are not more common in European cities, based on both theoretical insights and empirical observations.

4. Methodology

The primary methodology used in this research project is a case study of two commercial fungiculture farms in Copenhagen, Denmark. The rationale behind this methodological selection was manifold. Firstly, case study is a common methodological approach in food system, food sovereignty, and urban agriculture research. Secondly, the applied and pragmatic nature of this project lent itself well to a case study methodology. Thirdly, I was inspired by arguments put forward in the article, *Five Misunderstandings About Case-Study Research*. Flyvbjerg asserts that attempting to produce theory that is universally applicable beyond the scope of a defined spatio-temporal context is futile. This is because,

There does not and probably cannot exist predictive theory in social science. Social science has not succeeded in producing general, context-independent theory and, thus, has in the final instance nothing else to offer than concrete, context-dependent knowledge. And the case study is especially well suited to produce this knowledge (Flyvbjerg, 2006, p. 223).

Indeed, this methodological approach offers an object of study at a manageable scale. It does not concern itself with grand theory production, thereby making the methodology arguably more accessible and also, easier to understand. A particular event, initiative, or place can act as a useful microcosm for probing into a much larger problem. The context-specific knowledge gleaned about two urban mushroom farms in Copenhagen, Denmark glimpses deeper structural challenges in European food systems at large.

4.1 Data Collection Methods

Within this case study methodology, a mixed methods approach was used to gather both quantitative and qualitative information. In combining multiple forms of data collection I produced multiplicitous, interesting, and sometimes contradictory findings. Together, they also prevented biases, and resulted in a more fulsome understanding of the case at hand. Approaching the fieldwork informed by a robust theoretical framework, and concurrently tapping into a diversity of sources helped ensure rich findings. The quality and validity of this study was strengthened through multiple modes of triangulation. I will now describe in greater detail the types of qualitative and quantitative methods that were used to collect the data necessary to broach my research questions.

Qualitative Collection Methods

4.1.1 Semi-structured interviews

The majority of the qualitative data used in this study was collected through semi-structured interviews. My intention was to speak with a wide variety of stakeholders holding a diversity of perspectives about food systems in the Danish context and urban mushroom growing. I requested interviews from informants across differing axes of expertise, targeting the following demographics:

- Owners and operators of urban mushroom farms in Europe
- Owners and operators of indoor, vertical agriculture farms in Europe
- Conventional mushroom farmers (typically rural and more large-scale)
- Managers of urban farms (ones that grow plants and herbs using principles of agroecology)
- Persons who hold general knowledge about urban food growing (specifically urban fungiculture initiatives, however more general knowledge about UA was welcomed)
- Representatives from multiple levels of governance (municipal, regional, national and supra-national), as well as representatives from national agricultural agencies, and public-private partnerships that work on food systems
- Independent research and innovation companies developing agricultural technology
- Founders of alternative food networks and farmers markets
- Experts on CAP (the EU's Common Agricultural Policy)
- Experts working in the field of organic food production
- Professionals working at environmental think tanks
- Grocery store and supermarket managers
- Statistics agencies

In conducting semi-structured interviews as a primary qualitative data collection method, I aimed to gain a deeper understanding of the subjective experiences and opinions of those involved in urban mushroom cultivation, as well as clarify the positionality of various organisations, institutions and government bodies in reference to this phenomenon. I choose to do semi-structured interviews (as opposed to structured or unstructured) because they complimented my exploratory and explanatory research nature. They enabled me to enter into interviews prepared to speak with experts, while also affording the flexibility to adapt the questions based on the themes that emerged in real time. Having a predetermined structure bolstered my confidence and assured me that the critical topics would be discussed, while still maintaining the liberty to probe deeper, improvise, and suggest new questions. It also allowed the conversations to flow naturally (avoiding too much or too little formality). I wanted to make my interviews a comfortable experience for participants while still applying the academic rigour that this research required. Ultimately, I conducted eight semi-structured interviews over a period of ten months; from October 2023 to July 2024, with the following stakeholders:

Interviewed Stakeholders

Supra-National Governance Stakeholders

1. Representative, **Department of Regional and Urban Policy** (DG REGIO), European Commission *requested to be anonymised*
2. Representative, **EU CAP Network** *requested to be anonymised*

Municipal Governance Stakeholders

3. Paul Maslen, Biologist, **Copenhagen Municipality**, The Technical and Environmental Administration Parks, Cemeteries and Cleaning

Alternative Food Systems Stakeholders

4. Mads Sejersen Vinther, *Fagpolitisk chef*, [Organic Denmark](#)
5. Viola Capriola, Co-Founder & Developer, [Grønt Marked](#) (farmers market in Copenhagen)

Urban Food Growers

6. Kyle Cometta, Founder, [Funga Farm](#) (urban mushroom farm)
7. Nikolaj Vedde, COO, [Bygaard](#) (urban mushroom farm)
8. Nanna Hjortkjær Jespersen, Farm Manager, [ØsterGRO](#) (rooftop urban farm and CSA)

Each of the interviewees was asked to review and agree to a ‘Research Information and Participation Agreement’ form (see Appendix), which outlined the terms of their engagement in this study. They were given the option to have their name and official job title kept anonymous, and could also opt out of having the conversation recorded. This is why some of the interviewees are referenced as representatives from their organisation in the Results and Discussion section.

4.1.2 Participatory observation field work

Supplementary qualitative data was collected through participatory observation methods. My goal was to connect with people volunteering, organising, and working in Copenhagen’s alternative urban food scene, and observe as much as possible. I began volunteering regularly at an urban farm organisation, alternating between two of their locations: ØsterGRO¹ and Øens Have. I ended up doing one volunteer shift a week for 10 weeks, from October to December 2023. I paid close attention to the challenges and opportunities facing urban farms that employ traditional growing methods (outdoors, in soil and sun), in order to compare and contrast these findings with what I learned about urban mushroom farms, which commonly use CEFPS. I learned something new at every shift. The themes and topics that emerged through this immersive experience were numerous. Not only did I engage in practical conversations about cultivating food and agroecology, I also garnered a deeper understanding of the Danish context, its governance structures, food cultures, communities, immigration policies, politics, history, prejudices, tensions and triumphs. By embedding myself within the alternative urban food growing community, I created valuable opportunities for immersive learning, and established relationships with volunteers and staff who held key insights into the history and context of food cultivation in the city. Most of this learning happened while weeding, planting, and broad-forking, or over shared lunches. I took photos, and following each volunteer shift, I wrote detailed field notes and recorded my observations. Participatory observation was particularly effective in uncovering more nuanced barriers that urban food growers face.

1. ØsterGRO is Denmark’s first rooftop farm.

4.1.3 Email Inquiry

The semi-structured interviews provided a plethora of information, however, several of these conversations raised points that required substantiation and further research in order to ensure reliable findings. For example, the COO of Bygaard explained that Pillar 1 CAP subsidies are distributed on a per-hectare basis, so their urban farm is excluded from receiving these supports. Hence, when I interviewed an EU CAP Network representative, I asked, are primary food producers in cities wholly excluded from CAP subsidies? They were not sure, and were therefore unable to give a firm answer, and directed me to contact their colleague in a different division of the EU CAP Network. Rather than requesting a full interview, I began using a more direct method of email inquiry to confirm (or challenge) these initial findings. This second representative was also unable to give a definitive answer, and wrote back to me, “As far as I know, there are very different subsidy options in the member states detailed in their CAP Strategic Plans, but usually the activities which are connected to agricultural areas such as indoor mushroom growing in European cities are not subsidised. Anyway, I think that the CAP Implementation Contact Point [...] is more competent in this question” (personal communication, July 25, 2024). I emailed the CAP Implementation Contact Point to inquire further, but never received a reply despite sending follow up emails.

Email inquiry became a critical triangulation method in verifying information that emerged through semi-structured interviews. It also allowed me to collect additional quantitative data that is difficult to capture in a qualitative interview, because most people—even when they are experts in their field—cannot rattle off precise statistical information from memory. When initially designing my research, I did not anticipate needing to corroborate certain findings, but ultimately, this method strengthened the validity of my final results.

4.1.4 Policy document review

Further data was mined through reading and compiling policy documents produced by multiple levels of government (from both the Danish and EU contexts), as well as reports published by think tanks, research centres, and affiliated agencies. The documents covered topics ranging from municipal food strategies to urban agriculture viability to assessments of supra-national subsidy distributions. I searched for information that might have a bearing on the potential of urban mushroom production. The data collected added texture and nuance to my understanding, thereby preparing me for interviews and enriching my perspective during participatory observation volunteer work. These policy documents also helped fill in the gaps, and act as a proxy for agencies that I was unable to interview. For instance, I was never able to secure an interview with someone from the Danish Agricultural Agency, so instead, I read several of their reports. Lastly, policy document review enabled an additional form of triangulation, by providing a cross-reference for information shared through interviews and observed during my participatory observations.

Quantitative Collection Methods

4.1.5 Content compilation

I draw basic statistical data from Statistics Denmark’s website, peer-reviewed journals, policy

documents, and semi-structured interviews to do hypothetical modelling. I supplemented my qualitative findings with quantitative data, and projected the potential impact of urban fungiculture in Copenhagen if it were to be scaled up. By gathering information and figures about rates and quantities of mushroom consumption and production in Denmark, I was able to compare those figures to other countries, and other scales (European and global consumption/production rates), in order to better understand the quantifiable impact of urban fungiculture in Copenhagen.

4.2 Data Analytic Methods

4.2.1 Interview coding and evaluation

All eight of the semi-structured interviews conducted were audio recorded. They were then transcribed using Adobe Premiere Pro, and condensed and edited for clarity purposes in Google Docs. The transcripts were then sent to the interviewees, and their feedback was welcomed. MAXQDA (a qualitative data analysis software) was used to code the interviews and field notes, applying an in-vivo approach. This technique produced many disparate codes, and was not constructive in helping to find themes or patterns in the data. The second round of coding involved a more structured inductive approach, where I attempted to lift key themes from the texts, however, this also proved unsatisfactory, and did not offer the clarity or specificity needed to meaningfully assess the data. Finally, I tried a deductive approach, wherein I developed a shortlist of codes that directly correlated to addressing my research questions, allowing me to tease out relevant information across multiple texts. I underwent another close reading, ascribing (sometimes multiple) codes to the transcriptions and field notes. This included codes like, 'barrier', 'opportunity', 'small-scale production', 'less meat', and simply 'of interest'. This was most helpful, as it enabled me to analyse themes and patterns across conversations and visualise constellations of relationships, cluster ideas presented by various stakeholders. From there, I used thematic analysis, triangulation, and comparison in order to group findings into barrier types: Regulatory and Financial Barriers, Governance Barriers, Cultural Barriers and Production and Distribution Barriers. Although not perfect, these barrier types created useful containers for grouping ideas, and allowed me to establish a framework for presenting results. They emerged out of connections to the theoretical framework, which will be discussed further in the Results and Discussion section.

4.3 Case Study Justification

I chose Copenhagen, Denmark as a critical site for researching the barriers inhibiting commercial fungiculture initiatives in European cities. The logic informing this case study selection was dictated by several practical, theoretical, and empirical considerations.

I was living in Copenhagen in the fall of 2023 when I began my field work. I knew I was interested in studying urban food systems, and I wanted to conduct my research in a city where English was widely spoken, and where I would have access to participatory

opportunities and a diversity of interviewees. When I moved into my flat on Æbeløgade², I was pleasantly surprised to learn of my neighbours. I was living on the same street, one block away from Denmark's first urban rooftop farm: ØsterGRO (see Figure 3). As already mentioned, I began volunteering regularly at both ØsterGRO and their sister farm, Øens Have. Øens Have is located on the island of Refshaleøen, practically on the same plot of land as Bygaard urban mushroom farm (see Figure 4). During a volunteer shift at Øens Have, I remember popping inside one of Bygaard's shipping containers and witnessing a hive of busy workers harvesting blue oyster mushrooms. It was my first exposure to the world of urban mushroom cultivation, and my intrigue sent me firmly down the path of wanting to learn more.

Alongside these serendipitous experiences, from an outsider's perspective, there appeared to be a thriving local food scene in Copenhagen—both in terms of food cultivation and world-class dining. Not only was the city home to Noma³ and considered to be the heartland of 'New Nordic Cuisine', but also, indoor vertical growing initiatives like Nordic Harvest and Nabo Farm were gaining prominence. There was so much hype around Copenhagen when it came to sustainability, urban planning, and hope for the future. Afterall, "Copenhagen has pursued an urban 'green' agenda especially since the mid-2000s, driven by sharp awareness of the range of benefits this agenda can provide" (Rutt, 2020, p. 618). The city enjoyed a reputation of being one of the most well-designed and eco-friendly places on the planet. At this time I was also in the throes of assembling my first literature review; devouring article after article about food systems and their attendant challenges. Through that process I stumbled across Karl Krähmer's degrowth critique of sustainable urban development in Copenhagen. His provocation made a strong impression on me. He argues,

Copenhagen has been much-praised for its sustainability planning: it was awarded European Green Capital in 2014, it was recognized as a Green Economy Leader by the London School of Economics in 2014 and is the self-proclaimed Capital of Sustainable Development. This makes Copenhagen a critical case: if this city does not manage to be sustainable, which other city possibly could?" (2021, p. 1273).

Copenhagen is a critical case, and Krähmer's logic can be applied to transforming (or at the very least, making small, practical changes within) the corporate food regime. Given all of its wealth, resources, green leadership, and purported interest in local, organic, sustainably-produced food—if Copenhagen cannot overcome the barriers facing urban food cultivation, which other city possibly could?

I then started researching commercial urban fungiculture more broadly, and found that although urban mushroom growing initiatives did exist across Europe, they were few and far between. At most, any given city was home to just one mushroom farm. In Copenhagen however, I quickly came across three commercial fungiculture initiatives: Bygaard, Funga

2. Æbeløgade was the name of my street in Østerbro.

3. Noma was voted "The World's Best Restaurant in 2010, 2011, 2012 and 2014" (Noma | The World's 50 Best Restaurants 2021, n.d.).

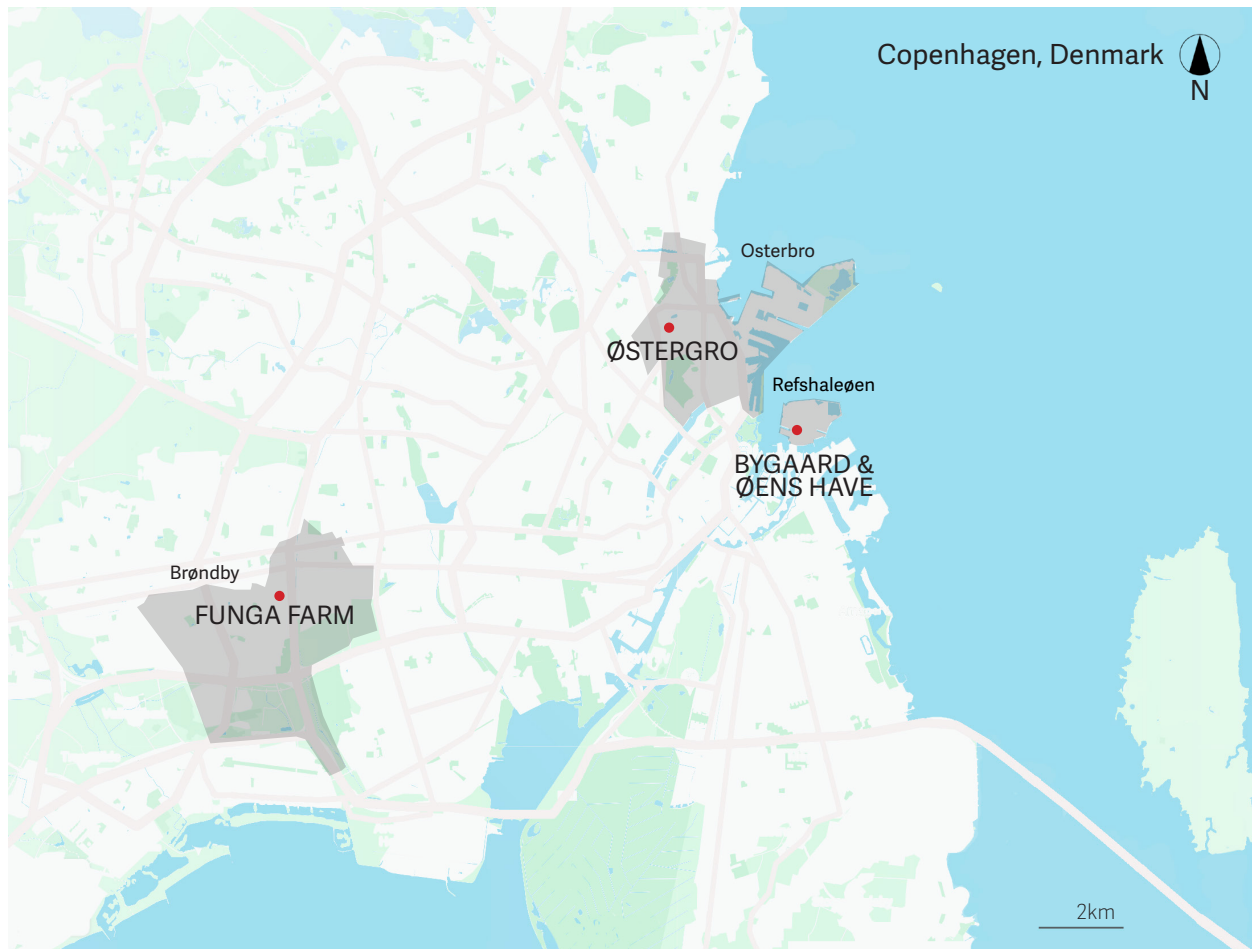


Figure 3: Map of Copenhagen indicating the locations of urban fungiculture and agriculture sites relevant to this study.



Figure 4: Here you can see the proximity of Bygaard (building on the left), to Øens Have's garden site on the right (Photo by: Isabel Barboza).

Farm, and Beyond Coffee. Although each of these organisations had a different business strategy and clientele, they all shared an aim to localise food production, make a positive environmental impact, and increase mushroom consumption in cities—particularly as a meat alternative. They also all operated as for-profit businesses, like conventional farms outside of the city. Omitting community projects and non-profit growing activities from this study was very intentional, as the economic logics and obstacles that nonprofit and for-profit food growing initiatives face are markedly different. This is mostly because the motives driving nonprofit and for-profit UA projects are also different. These considerations provided further impetus to understand the challenges that commercial urban mushroom farms face, and also, why there appeared to be more fungiculture activities happening in Copenhagen than in other cities across Europe.

4.3.1 Urban Food Growing Initiatives Relevant to this Study

Bygaard is an urban mushroom farm located on the island of Refshaleøen. The whole growing operation takes place in a series of climate-controlled portable shipping containers. Their mushrooms are delivered once a week by bike-courier to clients around Copenhagen. The majority of their buyers are restaurants, however, they also sell direct to consumers via an online web shop, and at Grønt Marked (Copenhagen's farmers market). I interviewed Nikolaj Vedde, Chief Operating Officer (COO) of Bygaard in November 2023.



Figure 5: Entrance to Bygaard urban mushroom farm on Refshaleøen. (Photo by: Isabel Barboza)



Figure 6: Interior of Bygaard urban mushroom farm in Copenhagen. (Photo by: Isabel Barboza)

[Funga Farm](#) started in a basement in Nordvest, but is now located in Brøndby, about 10km outside of central Copenhagen. They describe themselves as “an urban farm that grows hyper-local, organic and sustainable craft mushrooms from spore to harvest” (Funga Farm, n.d.). Funga Farm’s mushrooms are not available for purchase directly by consumers, as they are not “a mass-producing farm, rather our mushrooms are made-to-order and production is tailored to meet your weekly needs” (Contact Us, n.d.). I interviewed Kyle Cometta, Founder of Funga Farm in October 2023.



Figure 7: Maitake growing at Funga Farm. (Photo by: Kyle Cometta)

[Beyond Coffee](#), “is an organic, circular mushroom producer in Copenhagen's Nordhavn. Beyond Coffee produces delicious, nutritious and protein-rich mushrooms from waste products, such as coffee grounds and beech chips” (About Us, n.d.). The company is based on the premise of a circular economy, wherein spent coffee grounds are collected from locations around the city, and used as a growing medium for mushroom cultivation. Rather than strictly producing mushrooms, Beyond Coffee also sells home growing kits and leases ‘MiniFarms’ to other companies (i.e. climate-controlled ‘fridges’ where employees can grow their own mushrooms). Despite numerous attempts to contact Beyond Coffee over email and Instagram over a period of seven months (November 2023 - May 2024), I was unable to connect with a representative from the organisation. As of July 2024, the company was listed as ‘permanently closed’ online.

ØsterGRO is located atop a former car auction house in the neighbourhood of Østerbro, the farm offers a small CSA (Community Supported Agriculture) program in cooperation with a family-run farm in Kyndeløse called Stensbølgaard. There is also a little restaurant located in a lush greenhouse on the rooftop called, Gro Spiseri. Although the urban rooftop farm provides a beautiful backdrop to the dining experience, the food grown on the roof is primarily for the CSA (not for the diners who come to eat at Gro Spiseri). At Øens Have on the other hand, all of the food grown on the farm goes directly to the kitchen of the on-site restaurant. There is no CSA at Øens Have, however, both farm locations and their activities can be understood as part of alternative food systems in Copenhagen. I interviewed Nanna Hjortkjær Jespersen, Farm Manager of ØsterGRO on November 6, 2023.



Figure 8, 9 & 10: (Far left) The staircase leading up to ØsterGRO's rooftop CSA site, (center) the volunteer lunch table inside Gro Spiseri's greenhouse, (far right) tomatoes growing in the greenhouse.



Figure 11: (Left) A volunteer preparing a garden bed for garlic at ØsterGRO.

Figure 12: (Right) A view of the rooftop garden site.

4.3.2 Distinctive features of Bygaard and Funga Farm

Bygaard and Funga Farm are critical cases in examining the obstacles facing urban mushroom farms in Copenhagen, Denmark. They share important similarities and also, a few meaningful differences in their interactions with the urban fabric, as well as with other fungiculture initiatives across Europe. The distinctions matter because they shape these businesses' economic viability and the quality of their mushrooms. Two key features are elucidated below.

Firstly, both Bygaard and Funga Farm grow mushrooms that are not commonly available in supermarkets. They cultivate varieties like: Lion's Mane, Nameko, Pink Oyster, Shimeji, and Cinnamon Cap (see Figure 11). Neither farm cultivates the common button mushroom (also known as the champignon de Paris, or simply the 'cultivated mushroom'), meaning they grow rarer varieties when compared to conventional industrial producers who typically produce button mushrooms or portobello.



Figure 13: Cinnamon Cap mushrooms growing at Funga Farm (Photo by: Kyle Cometta)

To add some quantitative context to this point, “of the recognized mushroom species, about 7,000 species (50%) are considered to possess varying degrees of edibility, and more than 3,000 species from 231 genera are regarded as prime edible mushrooms” (Chang and Wasser, 2017, p. 7). Despite this, “only 35 species are commercially cultivated and 10 have attained the status of industrial production in several countries” (Niazi and Ghafoor, 2021, p. 450). Moreover, “presently, six mushrooms viz., *Agaricus bisporus*, *Lentinula edodes*, *Auricularia spp*, *Pleurotus spp*, *Flammulina velutipes* and *Volvariella volvacea*⁴ contribute about 90% of the world mushroom production” (Prasad & Singh, 2023, p. 51). Thus, there exist hundreds more varieties of edible mushrooms to taste and enjoy, but they are simply not cultivated by conventional producers, and thus not available in European supermarkets. This novelty creates a market for producers like Bygaard and Funga Farm, especially in a city with such a thriving restaurant scene, where chefs are always searching for fresh, flavourful, and unique ingredients.

4. The common names for these mushrooms are: Button Mushroom, Shiitake, Wood Ear, Oyster Mushroom, Velvet Foot, and Paddy Straw Mushroom.

Secondly, there are several initiatives across Europe that seek to develop circular urban economies by collecting spent coffee grounds from cafes and offices around the city, to use them as substrates on which to cultivate oyster mushrooms. This appears to be the basic business strategy for initiatives like Beyond Coffee, Hut + Stiel, and Nām Mushrooms (see the list on the right). It is a wonderful concept, and indeed, it is possible to cultivate mushrooms on a variety of spent materials and byproducts. However, neither Bygaard nor Funga Farm cultivate mushrooms in this way. Kyle from Funga Farm explained to me that although growing on spent coffee is a, “really cool circular story, the mushrooms you get from growing off of coffee are nowhere near the quality of mushrooms you get from growing on a substrate that the mushroom has evolved for millions of years to break down and consume” (K. Cometta, personal communication, Oct 18, 2023). The substrate to which he is referring is wood. Because of thriving forestry industries, sawdust and wood chips are just as much a byproduct in need of recycling as spent coffee grounds. Bygaard and Funga Farm cultivate mushrooms on wood-based substrates, and therefore produce high-quality mushrooms with greater consistency, while still engaging in a circular economy. This is significant to this study, because it directly influences the productive capacity of fungiculture initiatives. In order for urban farms to meaningfully address the global challenges created by the corporate food regime, the mushroom growing operations have to reliably produce high-quality fungi.

Both of these distinctions also add to the significance of these two particular farms as cases, because they differ from both conventional large-scale button mushroom producers, but also from urban fungiculture initiatives who focus on recycling spent coffee. In this way, Bygaard and Funga Farm are notable and worthy of closer examination. They are well-established businesses, and although they do face challenges, they are already making an impact in Copenhagen, and inspiring others to do the same.

Other Commercial Urban Mushroom Farms in Europe

This is a list of the main European commercial urban mushroom farms outside of Copenhagen, Denmark. Numbers 7-9 are no longer actively operating, but were included for reference purposes.

1. Tupu, Berlin

- Attempting to build a European network of urban mushroom farms

2. Nām Mushrooms, Lisbon

- Claim to be the first circular economy urban farm in Portugal

3. PermaFungi, Brussels

- They grow on coffee grounds

4. La Caverne, Paris

- They also grow endives, and all the food they grow is delivered by bike courier

5. Rotterzwam, Rotterdam

- They grow on coffee grounds

6. Hut + Stiel, Vienna

- They grow on coffee grounds

7. GroCycle Urban Mushroom Farm, Exeter

- Ran from 2013-2017, project appears complete

8. La Boîte à Champignons, Île-de-France

- Bought by Kroptek in 2016

9. Revolution Farm & Kitchen, Dublin

- In Oct 2023, the farm's focus shifted from commercial production to educational initiatives

4.4 Limitations of this Study

The main limitation that impacted the success of this study was accessing prospective interviewees—especially those from the Copenhagen Municipality and the Danish Agricultural Agency. Official representatives from national government offices, private companies and conventional mushroom farms also denied my requests for interviews, or simply did not respond to my email out reaches. They claimed to be too busy, or believed my research to be too niche. This later point was another critical limitation, as several people who I suspected would have key insights into my topic firmly believed they did not have the necessary information to support my research. I encountered more success when I admitted less about the specifics of my field of study, and began a casual conversation on a theme that the interviewee was comfortable speaking about, and then slowly foraying into urban food cultivation, and finally into urban fungiculture. These assumptions point to a pervasive lack of understanding about the potential of urban mushroom cultivation, which will be unpacked further in the Results and Discussion section.

4.5 Researcher Positionality

My personal politics and professional background colour this project. Prior to beginning this research, and even this master's program, I worked in Canada as a Program Coordinator at a non-profit community kitchen during the COVID-19 pandemic. The mission of that organisation was (and still is) “to lower barriers to healthy food for families and individuals who are living on low income in our community” (Shelbourne Community Kitchen, n.d.). Much of the fresh fruit and vegetables that were distributed through our programs were grown organically by dedicated volunteers at a nearby garden site.

The experience was deeply formative. It introduced me to the wonders of food cultivation, but more relevant to this research, it instilled in me an understanding of the cascading injustices that are intrinsic to corporate food regimes. I saw first hand the commodification, profiteering, wastefulness, and inequity perpetuated by industrialised agriculture and supermarket ascendancy. I also experienced the joy, belonging, and healing fostered through food sovereignty—even if it was felt, more than actualised.

I am deeply concerned about the realities of climate change, neverending urban expansion and the indelible disruption of traditional food systems by colonial expansion and greed. I worry about the disappearance of wild spaces, about biodiversity loss, and the implications of prideful anthropocentrism. Many of these concerns led me to this research vein.

I also happen to love mushrooms.

PART 2



5. Results & Discussion

Barriers to Establishing Urban Mushroom Farms

This case study revealed the many barriers that inhibit the establishment and operation of urban mushroom farms in Copenhagen, Denmark. It also illuminated findings that point to how and why mushroom farms persist, despite the many challenges they face. The causes of these barriers are often entwined, and each individual finding can be categorised in multiple ways. For instance, certain regulatory barriers are also governance barriers. Production barriers can also be financial barriers. Sometimes the barriers engage one another in a compounding way, impacting the potentiality of fungiculture in the urban fabric. Other times, elaborating upon a barrier leads to another barrier entirely. Such is the nature of findings. They are not always tidy.

In the following section, I present the results of this study, which have been sorted into four main categories. They are as follows:

1. **Regulatory and Economic Barriers**
2. **Governance Barriers**
3. **Cultural Barriers**
4. **Production and Distribution Barriers**

These categories derive from my theoretical framework, drawing upon structural dimensions of Food Regime Theory, food sovereignty, and Path Dependency Theory. They provide helpful containers for organising and analysing the data, and provide an interpretive link between the raw data and the relevant literature. They also help to animate context-specific, material barriers, broadening this study's results to a wider significance.

Throughout the following section, I interpret my findings in reference to the theoretical framework. I argue that commercial fungiculture is well suited to urban settings and has the capacity to meaningfully address many of the issues perpetuated by the global industrialised food system. It should therefore be more actively and intentionally supported. Finally, I expound why there are so few mushroom farms in European cities despite their transformative capacity and suitability to urban areas.

5.1 Regulatory and Economic Barriers

5.1.1 Access to CAP subsidies

Even though urban mushroom farms produce a primary agricultural product, they are not eligible to receive CAP (Common Agriculture Policy) funding through either of its two pillars.¹ In an interview, Nikolaj, the COO of Bygaard, pointed out,

1. "Pillar I provides direct income support to farmers and regulates the market through the common market organisation to counterbalance price volatility in agricultural markets in the EU. Pillar II provides funding for rural development, including environmental schemes" (Højte et al., 2024, p. 8).

EU agricultural subsidies are given out on the basis of how many hectares—what space you occupy [...] Which leaves us, and all other vertical farming situations, to fight in the icy winds of market competition without any other support that all other agricultural producers—which are our direct competitors in the supermarkets and to the restaurants—which they get because they take up a lot of space (N. Vedde, personal communication, November 13, 2023).

Lack of access to CAP funding is not exclusive to mushroom farms in cities. Rural farms that use traditional agrarian methods can also be excluded simply due to their size. Viola, Co-Founder of Grønt Marked, Copenhagen's only real farmers' market², pointed out, "small producers, they don't really get access to any subsidies or funds" (V. Capriola, personal communication, May 30, 2024). This is because the "majority of direct payments are granted to farmers in the form of a per-hectare basis" (European Commission, 2023, p. 1). Thus, the less conventional food production becomes, and the less space it takes up, the less recognised it is by EU regulatory structures, and the less access the growers have to income support through the CAP Pillars. I spoke with a representative from the EU CAP Network who corroborated that the bigger the farm, the more money a farmer is able to claim. They said, "the more hectares you have, the more you can claim and you have to have eligible agricultural area to be able to claim those" (personal communication, July 12, 2024). When I inquired whether they were aware of any advocacy groups or initiatives fighting on behalf of urban agriculture initiatives to gain access CAP funding, this representative responded, "No, I don't think so. I don't think there's ever been particularly a push to support. There is support in villages, there is support for towns, but it's predominantly rural and agricultural support" (personal communication, July 12, 2024). I also asked Nikolaj of Bygaard if he was aware of anyone fighting for change, and he replied "That's why I do these interviews. That's why I do the tours. That's why I sit on panels" (N. Vedde, personal communication, November 13, 2023).

The absence of advocacy initiatives offers an obvious site of intervention. A more dedicated approach and a stronger lobby presence would help spotlight the needs of urban producers in the policy arena. It could also popularise fungiculture's potential for impact. Nikolaj's comment underscores the value of academic research into more discrete barriers. Studies like this one can raise awareness about the benefits of urbanising certain kinds of food production, but also, and perhaps more importantly, about the systemic barriers that hinder positive progress toward more ethical and environmentally conscious food systems in Europe.

2. To the best of my knowledge, there is only one farmers market operating in Copenhagen: Grønt Marked, at rotating locations. It is also worth noting that Bygaard sells their mushrooms there. Funga Farm does not. Speaking about Copenhagen, Viola (co-founder of Grønt Marked) pointed out, "There are places here that they call themselves, 'We are farmers markets', and they import everything" (V. Capriola, personal communication, May 30, 2024). As such, there may in fact be other initiatives that brand themselves as 'farmers markets' in Copenhagen, but none as regulated, local, or expansive as Grønt Marked.

5.1.2 Shaping regulatory frameworks: agribusiness, the state, and the EU

Interview data also suggested that multinational agricultural corporations collaborate with the Danish state to develop the regulations that govern best-practices in their sector. Although the input of agri-business giants can be valuable, it has resulted in a regulatory framework that favours their needs, concurrently creating challenges for smaller farmers who cannot fulfil certain production or safety requirements lobbied for by large-scale industrialised producers. Nikolaj of Bygaard told me,

The biggest players are the ones who are in cooperation with the State, and help inform the certification processes and the safety procedures. A lot of these rules are there for good reason. But some of the rules are... for example, raw milk and cheese production, [...] *Arla*³, the biggest milk producer gets to decide with the government what does a safe and healthy production entail. And it just so happens that only a huge producer with a certain scale can fulfil these requirements” (N. Vedde, personal communication, November 13, 2023).

In other words, the needs and concerns of smaller farmers have been neglected. Mads Sejersen Vinther, *Fagpolitisk chef*⁴ at Organic Denmark, offered some historical context on this point. He explained,

The system has been put up for conventional farming for the past 50, 70 years or something. That means that every field, everything has been built on the basis that started in the sixties. It was: growth was good, higher yields were good, a lot of use of chemical fertilisers were good. So everything that is now, is a sort of a framework built on conventional farming (M. Sejersen Vinther, personal communication, April 9, 2024).

This finding is in direct support of Path Dependency Theory. ‘History matters’ is foundational to the path dependence discourse, and the regulatory barriers that urban producers face are a direct result of an entrenched history of doing things in a particular way. The bushwhacking required to forge an alternative path underscores “the role of history in shaping institutions, innovation, and industrial regulation” in Denmark (Goldstein et al., 2023, p. 3). Attempting to establish a small-scale urban food production business is made more difficult, because of a history in support of large-scale, rural, industrialised production.

Although there is a growing awareness at the EU-level that the CAP must be adapted to provide greater support for smaller, organic, and alternative food producers, change is slow. Interviews did reveal that efforts are being made to address this barrier by prioritising greater inclusion and collaboration. A representative from the EU CAP Network explained that welcoming diverse voices, particularly those of smaller farmers is on the agenda, but

3. *Arla Foods Group* is a Danish-Swedish multinational co-operative, and is the fifth largest dairy company in the world.

4. The title, *Fagpolitisk chef*, translates directly as: ‘Head of Trade Union Policy’.

funding must be available to support their participation. They said,

One of the things that we have talked about over the years and have discussed in many forums are the sorts of ways that you facilitate engagement by everybody in the process and, making sure that, for example; can you pay for the participation of small farmers in these types of activities? Can you pay for them to get support for somebody to cover them on the farm while they go? All those sorts of things, there are some funds available for that. But just trying to make that more commonplace, to be sure that it's not just the usual suspects that you're talking to, but that you really try to engage as wide a range of people as possible (personal communication, July 12, 2024).

Developing a more inclusive CAP and lowering regulatory barriers for smaller producers can only happen alongside years of persistent resistance, research, and advocacy, as well as adequate funding to support meaningful participation. Moreover, the needs of small rural farmers are not the same as urban food producers. Specificity is important here. Urban food producers, such as mushroom growers, experience a unique set of challenges. Not only do they deserve a seat at the table, but they may also require special considerations to access their seat, and to feel genuinely welcomed into the conversation. Equitable inclusion is not synonymous with equal inclusion. A flexible framework and tailored adaptations are critical to facilitating true inclusivity.

Additionally, member states have a meaningful say in how the CAP is articulated and implemented within their own borders. This same representative from the EU CAP Network told me, “I suppose the EU framework is a framework that has a lot of, or at least in the CAP, [...] flexibility for member states to apply it in the way that they see fit, but there is quite a lot of path dependency in the support that is provided” (personal communication, July 12, 2024). As such, conflicting priorities can arise between supra-national, national, regional and municipal interests. This finding has been echoed in other studies. Guth et al. reviewed CAP for the years 2014–2020, and acknowledged that the policy “proposed some solutions aimed as a more even distribution of direct payments, [but] in practice they proved ineffective, also because the implementation thereof was voluntary for the member states” (Guth et al., 2020, p. 13). Danish think tank, CONCITO, published a report analysing the 2023-27 CAP Reform and Denmark’s implementation of the revised objectives, claiming, “this report shows, there are significant insufficiencies both in the EU CAP framework, but especially also in the way the Danish CAP Strategic Plan (Danish CSP) has been implemented” (Højte et al., 2024, p. 4). CONCITO is not the only voice raising concerns over the Danish State’s implementation of CAP. Scholar Rasmus Blædel Larsen wrote a scathing assessment of Denmark’s CAP Strategic Plan (CSP) arguing, “The lobby-organisation for the big industrial farmers (L&F) has succeeded in inventing creative arguments and projects in order to channel available funds in pillar 2 back into pillar 1 and the largest farms” (Larsen, 2023, p. 4) He goes on to explain that the Danish authorities justify funnelling subsidies to large Danish agribusinesses (rather than supporting small farmers) by arguing that large farms are the most debt-ridden, and therefore require the most financial aid, and “it would be unfair towards the large farms to fulfil the obligatory

redistribution contained in the new CAP” (Larsen, 2023, p. 5). A fuller investigation of Larsen’s claims were beyond the scope of this research project, however, his article does suggest dubious decision making and questionable motives within the implementation of CAP by the Danish state. Thus, even if CAP—an EU level policy—is revised to better support smaller, urban producers, these intentions may prove ineffectual if not also supported on national and local levels. There must be alignment between all levels of government, and across regulatory and economic frameworks for funding to actually reach urban producers.

Preclusion from CAP funding is further exacerbated by laws that bar urban mushroom farms from accessing other funding streams. Competition rules cause urban mushroom farms to be doubly excluded. Indeed, “there’s so much funding money out there, but we are, due to EU rules, excluded from getting it, because it is illegal for a EU member state to subvert competition for agricultural producers in the market” (N. Vedde, personal communication, November 13, 2023). This creates a significant economic barrier for these businesses operating in cities because the cost of rent is typically much higher than in rural areas. And yet, being located in the city is integral to their *raison d’etre*. “If things are to be produced ethically or sustainably and if people are to be paid properly, if we are to pay our rents that makes it so we can deliver everything by bike, we need to be in the city where rents are more expensive and all the costs need to be folded into the final price” (N. Vedde, personal communication, November 13, 2023). Without access to subsidies, these growers must sell their mushrooms at a higher price to cover the costs associated with upholding high standards of ethics and environmentally-conscious practices in urban areas. This has important implications on the accessibility of these mushrooms. Even if they were more widely available, they might still be too expensive for many consumers. According to Viola of Grønt Marked, these combined factors contribute to why there are not more of these kinds of initiatives in the city. When I spoke with her about alternative food networks and urban food growers in Copenhagen more generally she shared,

I don’t think Copenhagen has many alternatives yet. They’re coming, compared to ten years ago. But they’re struggling. Many of them. Most of them. Because it’s difficult to navigate high costs and high prices. If you don’t have a lot of support from customers and also through the policy level that facilitates what you are doing (V. Capriola, personal communication, May 30, 2024).

One barrier precipitates the next. A lack of access to subsidies forces urban growers to sell their mushrooms at higher prices, higher prices means less accessibility for the general public, and less accessibility means less people eating mushrooms, which limits the impact of these initiatives.

5.1.3 Entrepreneurialism in the Danish Context

Although the Danish state is partly responsible for the economic and regulatory barriers facing urban mushroom producers, paradoxically, the state may also be the reason why these farms exist. My interview with Kyle, Founder of Funga Farm, revealed a salient counterpoint about this context's advantages. He explained,

I would have to say that part of the reason why I was personally able to take this journey was because of Copenhagen and because of the social safety net that I have here [referring to Denmark]. Moving from California, my wife and I, we are not big consumers. We live off of little, I have two kids, but even still I was able to take a risk and do a startup where I didn't have any idea that I was going to be making a good salary for quite some time because I knew: we have healthcare, we have affordable housing, our kids have daycare and schooling and, worst case scenario we'll be alright. Because of that, I was able to kind of take that risk and start the business whereas in a different city, in a different state, I don't know if it would have been so easy to do such a thing (K. Cometta, personal communication, Oct 18, 2023).

Thus, the social safety net available to Kyle and his family in Denmark enabled him to undertake entrepreneurial risk in a way that might not have been possible in another country. Access to stable public services was precisely why he was able to assume the entrepreneurial risk concomitant with starting a niche enterprise. The state is a co-collaborator in creating the economic regulations that stifle these businesses, while also providing a welfare system that empowers entrepreneurial risk. These kinds of contradictions are characteristic of capitalism, and the peculiarity of resisting the corporate food regime while operating within it, is evidenced here.

5.1.4 Zoning for fungiculture

There is no procedural or regulatory precedent for where and how mushroom farms should be accommodated in the urban fabric. Even though the resource inputs for fungiculture are low, and growing spaces can be adapted to a variety of locations, there remains apprehension and uncertainty regarding permitting, zoning and allowances. Nikolaj of Bygaard noted, "It's also about permits, because if you're trying to do something that is unconventional, then sometimes the system, the municipality especially, can be quite inflexible in terms of granting these permissions" (N. Vedde, personal communication, November 13, 2023). The omission of commercial urban food production from current urban zoning and bylaw frameworks subjects these businesses to excessively bureaucratic processes and procedures. Instead of working within a regulatory framework that acknowledges their particular needs, they must navigate systems that actively work against them.

5.1.5 Mushrooms are not plants

The final regulatory barrier identified through interviews is related to misconceptions about the intrinsic nature of mushrooms. Agricultural policies have historically been developed to support high-yielding crop and livestock production, wherein mushrooms are lumped in with crops. EU policy on organic food production clearly affirms, "Mushrooms

are considered as plants for the purpose of the EU organic legislation. The mycelium is comparable to the vegetative parts of annual or perennial plants; while mushrooms are comparable to the reproductive parts of plants, like flowers and fruits” (European Commission, 2023, p. 59). However, mushrooms are not plants, nor animals. They are the fruiting bodies of Fungi, a biological kingdom entirely separate from Animalia or Plantae. As such, their needs are unique from other foods. Although this may not appear to pose problems, the knock-on effects of miscategorising fungi as plants creates complications for growers. For example, when attempting to facilitate the unionisation of their employees, which Bygaard was wholly in support of, they ran into an unexpected problem. According to the union, the category that best captured their company’s activities was, ‘plant nursery’. Bygaard is not a plant nursery, “but that is the category the labour laws would see us as— which is another challenge” (N. Vedde, personal communication, November 13, 2023). This precipitated problems about how to navigate the process of unionisation. Accordingly, a general lack of understanding about fungi, coupled with the novelty of fungiculture projects in Copenhagen, exposes urban producers to regulatory and economic barriers not experienced by conventional rural farmers.

5.2 Governance Barriers

5.2.1 Insufficient political awareness

Semi-structured interviews revealed that there is insufficient awareness at multiple levels of governance to provide greater support for urban food production. The topic does not even appear to be on the radar. A representative from the Department of Regional and Urban Policy (DG REGIO) at the European Commission was doubtful about whether urban farms could contribute meaningfully to more sustainable food systems. When asked about considering urban food production within EU-level policy development, they replied, “I don't have insights on food production in cities. [...] This will be my personal view because food production in urban areas, the outputs, the yields in that kind of production is not very high. We will not be able to replace imports or the food that comes from out of the cities” (EU DG REGIO representative, personal communication, November 13, 2023). This is a cogent point. Cities have historically, and will likely always rely on the surplus agricultural production to feed their populations. Unfortunately, this hegemonic perspective also precludes urban fungiculture from gaining greater legitimacy among policy makers. It thwarts the potential of urban mushroom farms offering a small step forward, simply because its viability within the food policy arena is largely unrecognised.

When discussing the *Ex-ante assessment of the “Food” thematic area under the Urban Agenda for the EU* with this same representative, I inquired about why there is no mention of reducing meat consumption or industrial livestock production in the EU within the document, which, is widely-acknowledged as a major driver of global GHG emissions. The reply: “I think we have a little bit different understanding about sustainable food systems” (EU DG REGIO representative, personal communication, November 13, 2023).

They went on to say, “I cannot say that I am amazed about beekeeping or mushroom farming or any specific food production, but I see a very important social aspect in this

area, if we are speaking about community gardens and these kinds of things” (EU DG REGIO representative, personal communication, November 13, 2023). Thus, the social and community-building benefits of urban gardening activities are appreciated at the EU-level, however, thoughtfully-integrated CEFPS, and the practical benefits of urban fungiculture, are not perceived as useful solutions to the problems created by industrial food production.

I also asked a representative from the EU CAP Network about current discussions within their organisation regarding reducing meat production and consumption in the EU. This interviewee clarified that the EU CAP Network does not take positions, they simply implement the CAP as it is, and help facilitate discussion and networking between member states, the managing authorities and other stakeholders. However, they did identify some of “the topics that are in the policy debate” as: “reducing meat production and increasing alternative proteins for human consumption”, “reducing numbers of livestock more generally as well as other emissions” and, “improving energy efficiency from the agriculture sector and then also improving carbon sequestration through natural vegetation” (personal communication, July 12, 2024). Again, these topics were raised by members of the EU CAP Network, meaning, reducing meat production and consumption and exploring the best practices of achieving these goals is on the minds of food system stakeholders. That said, discussion does not always perpetuate action, and whether these conversations can influence policy development remains to be seen.

5.2.2 Governance barriers specific to Denmark and Copenhagen

Other governance barriers that emerged through interviews were more specific to the history and context of Copenhagen and Denmark. I interviewed a Biologist employed at the Environmental Department, City of Copenhagen, to learn more about the city’s municipally-led environmental strategies. When asked if planting more edible plants in public parks or increasing urban food production was on the agenda, he explained,

It's really not, to be honest. I can see one of your questions asking if we have a role representing our food security. But I think in Denmark it's never going to be relevant. You have to remember that Denmark [...is] the second highest country in the world with regards to percentage of arable land. Over 60% of our land is actually arable farming. [...] Of course, it can be of interest, of a local interest. There's no denying that. But I don't think we'd ever consider it on a larger scale” (P. Maslen, personal communication, May 24, 2024).

This perspective helps shed light on why there is not greater urgency or impetus at the municipal level to improve supports for urban food producers in Copenhagen. They already have a surplus of rural production in a country with plenty of arable land and only 6 million people (*Population Figures*, 2024). As Paul pointed out, from an agricultural needs standpoint, there is no reason for the municipal or national government to ramp up urban food production.

Despite this lack of impetus, the City of Copenhagen advertises many food growing initiatives in the city. Its tourism websites, *Wonderful Copenhagen* ‘the official tourism

organisation of the Capital Region of Denmark' and *Visit Copenhagen* 'the official guide to Copenhagen' feature photos and mentions of ØsterGRO, Øens Have, and Funga Farm, marketing the city as a place for 'urban farming' and 'green living' to the rest of the world. Nikolaj from Bygaard told me, "we are a poster child in many ways of Copenhagen as a 'green city', a green destination" (N. Vedde, personal communication, November 13, 2023). Actants in alternative food systems are instrumentalized for marketing purposes; arguably benefiting both parties. The city can promote itself as innovative, sustainable, and eco-friendly, while these small businesses benefit from free exposure. That is one way of conceiving these relations, however, I argue that municipal support for these initiatives is superficial.

Reframing them through a critical political-economic lens, the commodification of alternative food systems becomes clear. As usual, Harvey puts it best: "what is at stake here is the power of collective symbolic capital, of special marks of distinction that attach to some place, which have a significant drawing power upon the flows of capital more generally" (Harvey, 2002, p. 103). Urban agricultural initiatives are used in building up Copenhagen's collective symbolic capital. This in turn has 'significant drawing power upon the flows of capital', making it an attractive site for tourism and investment.

In the case of ØsterGRO, the power of collective symbolic capital and capitalist contradictions are especially visible. It can be argued that the municipality is genuinely supportive of this rooftop CSA, as evidenced through its green roof policy¹, its promotion of ØsterGRO on its tourism websites, and its provisioning of income opportunities (The city offers ØsterGRO teaching contracts to facilitate educational experiences for kindergarteners). However, this is a surface reading of these power relations.

A more critical examination suggests that Copenhagen is proud to boast its green roof policy, but material access to rooftop space for alternative food producers is rare². When discussing ØsterGRO's growing site, which is located on the roof of a former car auction house in Østerbro, Nanna shared, "we basically borrow it, or use it for free from the owner of this building [...] Now I look after his veggie garden once a week. It's like an agreement, you know?" (N. Jespersen, personal communication, Nov 6, 2023). The social relations (and in this case, the exchange of services between citizens) disguises the land tenure precarity and lack of state support for these kinds of initiatives. ØsterGRO quite literally borrows their space from a friend. Thus, the City of Copenhagen is more committed to the aesthetic of sustainability than providing meaningful support to ensure the longevity of these activities.

1. "Copenhagen has been inspired by the world's leading cities and has since 2008 focused on integrating green roofs as part of urban development. [...] The City of Copenhagen has mandated green roofs in most new local plans since 2010." (Municipality of Copenhagen, the Technical and Environmental Administration, n.d.)

2. It is also important to note that most buildings are not built with sufficient structural reinforcement and safety infrastructure to allow for urban food growing. Thus, new green roofs are typically low maintenance green roofs rather than spaces for intentional food cultivation.

That said, the arrangement between ØsterGRO and the building owner also begs further investigation. Paying attention to this arrangement—one that is grounded in reciprocity and mutual benefit—is a perfect example of what we find when we engage in what Tsing calls, ‘the arts of noticing’. Not only is ØsterGRO’s CSA an alternative food system that emerges out of resistance to the corporate food regime, but also, it takes place in a way that undermines the capitalist logics of surplus value and wealth accumulation. Paradoxically, the city, through glossy marketing, then transmutes this non-capitalist relationship into a commodity fit for consumption. These are the contradictions of resistance under capitalism.

5.2.3 Copenhagen's food policy focus

Points of intervention into bolstering urban food security³ can be diverse, and increasing food cultivation in cities is not the only way forward. Policy document analysis revealed that within Copenhagen’s food policy arena, concerns have been elsewhere for over two decades. For instance, the municipality has made big strides in improving the quality of ingredients and meals offered through public kitchens; addressing a different aspect of food system challenges. Copenhagen’s Food Strategy explains, “For the past 18 years, the City of Copenhagen has prioritised the efforts to strengthen food and meals in the city. We have implemented an ambitious transition with the result that today almost 90 per cent of the food served in public meals in the City of Copenhagen is organic” (The City of Copenhagen, 2019, p. 5). These efforts earned the City a ‘Special Mention’ at the 2017 Milan Pact Awards⁴ as the project addresses three of six key Milan Urban Food Policy Pact (MUFPP) categories: sustainable diets & nutrition, food supply & distribution, and governance. The remaining MUFPP categories: social & economic equity, food waste and food production were not addressed through Copenhagen’s ‘Organic Conversion in Public Kitchens’ initiative. However, it is notable that food production is acknowledged by the Milan Urban Food Policy Pact as a key category for evaluation within its Framework for Action. Focusing on food production in the urban realm can be a relevant strategy in fostering greater food sovereignty, despite the fact that it is not part of Copenhagen’s Food Strategy.

5.2.3 Denmark's food policy focus

Document analysis revealed some encouraging policy development in support of plant-based foods at a national level. In October 2023, the Ministry of Food, Agriculture and Fisheries in Denmark published a report titled, *Danish Action Plan for Plant-based Foods*. It speaks very plainly and openly about the urgent need to transition away from meat-heavy diets in Denmark. The report asserts, “A plant-based diet is good for both our health and climate. We must—in short—turn down meat in favour of legumes such as beans, lentils

3. I am using ‘food security’ rather than ‘food sovereignty’ here, as the former is more closely aligned with neoliberal governance strategies in ensuring a secure food supply for cities.

4. “One of the most important goals of the Milan Urban Food Policy Pact (MUFPP), is to stimulate the exchange of practices and learning between signatory cities. To foster this collaboration since 2016 the City of Milan and the Cariplo Foundation launched the Milan Pact Awards (MPA) with the aim of recognizing the most creative efforts and monitoring which cities were implementing the commitments they had made when they joined the pact” (Milan Pact Awards, n.d.).

and chickpeas.” (Ministry of Food, Agriculture and Fisheries of Denmark, 2023, p. 15). It goes on to identify many ways that national and local governments can aid in this transition, including: providing grants for plant-based start-ups, supporting networks for plant-based food producers, increasing education about preparing plant-rich dishes, and serving more plant-based meals in public kitchens, as well as several other suggestions (Ministry of Food, Agriculture and Fisheries of Denmark, 2023). Importantly, the report begins by defining plant-based foods as, “all foods derived from plants, as well as edible fungi, algae and nutritious microorganisms” (Ministry of Food, Agriculture and Fisheries of Denmark, 2023, p. 7). Thus, the significance of mushrooms in this transition is acknowledged from the very start. The report also draws on studies conducted by the University of Copenhagen, that identify “fifteen protein crops that have optimal growing conditions in Denmark. These are chickpeas, peas, beans, lentils, a variety of nuts, **mushrooms**, quinoa, faba beans, buckwheat, amaranth, hemp, soy, lupine, rapeseed and grass protein” (Ministry of Food, Agriculture and Fisheries of Denmark, 2023, p. 32). Mushrooms are indeed suitable for cultivation in Denmark (especially considering its moderate climate), however, the report is directed toward the development of plant-based food production in rural areas. There is no mention of any kind of urban cultivation as part of this transition, which unfortunately does not support the capacity of cities in food systems transitions.

Reflecting on the current Danish food system alongside the *Danish Action Plan for Plant-based Foods*, important path dependencies are also illuminated. Although a state sponsored transition toward the cultivation and consumption of more plant-based foods is a positive sign, the ways in which this transition is slated to occur demonstrates the enduring effect of path dependence. The proposed expansion of the plant-based foods sector is predicated on a productivist, industrial agricultural model, steeped in virtues of economic growth and international trade expansion. I argue that swapping the industrial production of livestock for the industrial production of protein-rich crops is the path of least resistance in accommodating this change, precisely because of path dependency. Transitioning from one industrial mode to another forestalls the system from undergoing any radical change. The action plan points out, “a dairy farmer can use his experience in the production of plant-based drinks without needing major retraining” (Ministry of Food, Agriculture and Fisheries of Denmark The Department, 2023, p. 17). In other words, the same paths can be followed to ensure similar profitability. Ways of thinking and doing do not need to be renegotiated. The people, institutions, and companies that hold power, can continue to hold power. The status quo can remain intact, and the status quo is food production as big business. This is why food system change is hard, and why, by extension, urban fungiculture initiatives face so many barriers. The history of rural, industrial large-scale agribusiness has paved the way for more rural, industrial large-scale agribusiness. Working the same system, using the same modes of production, but substituting in new ‘products’ does not forge a new path.

5.2.5 VAT in Denmark

The Value Added Tax (VAT) rate in Denmark is 25% on all goods and services including groceries and foodstuffs. This causes the cost of food in Denmark to be relatively higher when compared to countries that have lower rates of VAT, or simply do not charge tax on

basic groceries. If food is to be produced without harmful pesticides and fertilisers, and the added cost of organic production is also factored in, the prices are driven up even higher. Mads from Organic Denmark explained,

It is more expensive to grow an organic product, it doesn't matter what it is, it becomes more expensive when you put VAT on top, the VAT is relatively higher for organic—no, not even relatively—it is just higher for organic products than for the same conventional products because the production costs are higher (M. Sejersen Vinther, personal communication, April 9, 2024).

Discussing organic food more broadly, Mads went on to say, “That we would like to change. We do know that other countries have different rates of VAT for different product categories. We don't have that in Denmark. We only have one VAT for all products” (M. Sejersen Vinther, personal communication, April 9, 2024). Hence, high VAT was identified as a barrier that hinders the uptake and accessibility of organic foods in Denmark. This barrier also points to an obvious policy change that could make certain foods more accessible. Lowering or eliminating VAT on organic, locally produced fruits, vegetables, and mushrooms could entice alternative consumer behaviour. Especially in Denmark where the VAT is 25%—the lower price point might incentivise a shift away from meat as a key component of every meal. Moreover, there is no better place to push for this change. Denmark already boasts some of the highest rates of organic food consumption per capita in the world. Paul, the Biologist at the Municipality of Copenhagen told me, “Danes *love* organic food. We're actually the country with the second highest percentage of organic food consumption in the world” (P. Maslen, personal communication, May 24, 2024).⁵ The organic food movement could continue to gain momentum with greater governance support, which could in turn have a positive impact on urban mushroom farms which exclusively grow organically.

5. A report titled, *Denmark – a Food and Farming Country, Facts & Figures*, published by the Danish Agriculture & Food Council, corroborated this claim: “Organic production is increasing globally. Denmark is a main driver behind this development. Danish consumers consume more organic produce than any other Europeans, and 30% of the Danish milk consumption is organic. Around 12% of Danish farmland is cultivated organically” (2023, p. 5).

5.3 Cultural Barriers

5.3.1 Danish diets

Several cultural barriers were identified as impeding the success of urban fungiculture initiatives in Copenhagen. A meat-centric food culture, supported by the legacy of intensive livestock production in Denmark emerged as a key finding. Reflecting on this, Nikolaj of Bygaard explained,

We see our competitors, not just as the other mushroom producers... but if you can buy a swine sausage for 20 kroner per kilo in the supermarket and our mushrooms are 50 kroner for 200 grams... [...] then we compete with cheap meat in a country where there are five times as many pigs as people. That's a bit of an uphill battle (N. Vedde, personal communication, November 13, 2023).

Readily available Danish pork in supermarkets at subsidised prices is indeed difficult to compete with. This point illustrates how a meat-centric food culture becomes institutionalised through decades of lobbying for government support.

Kyle from Funga Farm also recognised meat-centric diets in Denmark as an obstacle, noting that he was, “fueled by this desire to find alternatives to meat and eat less meat. And mushrooms were the one thing that really made sense. You didn't miss meat when you had the umami of a mushroom in your dish” (K. Cometta, personal communication, Oct 18, 2023). Thus, the success of Bygaard and Funga Farm is limited by the nation's dominant meat-heavy diets, but they are also determined to transform this culture. Path dependence emerges again. Shifting the country's culinary culture is difficult because historically, Danes have eaten a lot of meat. The ‘meatification’ of diets is continually capitalised on by the livestock industry, which is propped up by government subsidies. This sheds light on how particular food cultures continue to be reproduced. Path dependency creates positive feedback loops, and breaking this cycle requires an extraordinary amount of resources and will. Data illuminated through policy document analysis corroborated this path dependency. The Danish Action Plan for Plant-based Foods (discussed in the previous section), notes, “it takes continuing education to change the ingrained culture that centres most of its dishes around animal-based ingredients (such as a piece of meat or fish). And further training is required in technical skills within biotechnology, taste, structure and more advanced fermentation processes” (Ministry of Food, Agriculture and Fisheries of Denmark, 2023, p. 17).

Other interviewees suggested that a culture of being culinarily adventurous, and supporting alternative food networks is not common in Denmark. When asked about urban food growing initiatives emerging in Copenhagen, Viola of Grønt Marked noted, “I actually think Danes are very much stuck on the same food habits, on culture and the diet. So yes, they're supporting this business but I don't know truly how much” (V. Capriola, personal communication, May 30, 2024). She compared Denmark to other European countries like Italy or Belgium which have much more established CSAs and various alternative food networks, pointing out, “I think in Denmark you see more of these little businesses popping up, like the farms for mushrooms, because there is more wealth, and in a way, I think it's

also easier to open up a business. And there is very high attention on innovation and new technologies” (V. Capriola, personal communication, May 30, 2024). This suggests that interest and support for plant-based foods, and urban mushroom farms in particular, is more nuanced than reducing meat-consumption or supporting local. Start-ups hold the promise of investment opportunities, technological advancement, and international trade expansion, which is also emphasised in the *Danish Action Plan for Plant-based Foods*. In fact, the report contains a section titled, “Export and internationalisation efforts” as well as, one on “Research, innovation and development”, where the economic opportunities associated with expanding the plant-based foods industry are expounded (Ministry of Food, Agriculture and Fisheries of Denmark, 2023). This also points to why urban fungiculture businesses might emerge in the Danish context more than in other EU countries.

The framing of plant-based diets as kindling for new industry opportunities within the Danish state is perfectly aligned with Food Regime Theory (FRT). FRT acknowledges capitalism’s propensity for continual mutation, resulting in ‘new’ regimes grounded in the same principles of commodification, wealth extraction and accumulation. Its ability to mutate allows the economic system to survive, especially amid pressures to change. High levels of attention on innovation and technology in the Danish context create an illusion of support for alternatives, but there is no choice here. Urban mushroom farms must negotiate capitalist circumstances, regardless of genuine ambitions to localise food production and reduce industrially-produced meat consumption. This also raises questions about the degree to which Bygaard and Funga Farm are truly exemplary of food sovereignty. They are for-profit enterprises. Their ownership model does not necessarily redistribute power or support shared responsibility over food production. There are many valid points of criticism to be made.

However, if we accept that food sovereignty is the horizon worth striving toward, and that thoughtful, practical, and sustainable considerations are the means by which to achieve that aim within the confines of the prevailing corporate food regime, then it follows that some concessions have to be made. No alternative food system can be freed of all capitalist mechanisms while operating within a capitalist reality. Given the circumstances, urban mushroom cultivation is a step in a better direction. Returning to Anna Lowenhaupt Tsing’s provocations, we must remain curious about what mushrooms amid capitalist ruins. We must “look for the noncapitalist elements on which capitalism depends” (Tsing, 2017, p66). We should pay closer attention to alternative articulations of provisioning, and consider what can be learned from them.

5.3.2 Cultures of mushroom consumption

There are of course Danes who love mushrooms, and even regularly forage for them, but a culture of foraging, cultivating and/or consuming mushrooms does not exist in Denmark in the way that it does in Eastern Europe and Asia. Even conventional, large-scale mushroom production is uncommon in Denmark. Henrik Bolding Pedersen, Chief Adviser of Food Industries for Statistics Denmark wrote to me, “Mushroom production in DK is very limited. [There are] only two companies with production and we are not able to disclose statistics for it. I’m sure that the production is not for export” (H. B. Pedersen,

personal communication, July 5, 2024). Thus, not only are mushrooms absent from the country's culinary tradition and its cuisine, but also, they are not commonly cultivated in Denmark, not even using conventional methods. Nikolaj from Bygaard told me,

Denmark is... No matter how delicious I think, no matter how fascinating I think mushrooms are and how much I love a culinary challenge, to cook something I've never cooked before, it's also a matter of changing the food culture in general because Denmark is a champignon, button-mushroom country. Portobello if it's a weekend night, and portobello is just overgrown champignon (N. Vedde, personal communication, November 13, 2023).

This same thread was picked-up by Kyle from Funga Farm. In conversation about other countries, which are home to culinary traditions that celebrate mushrooms, he elaborated,

If you look to Eastern Europe, you have a couple things. You have: a lot more poverty, and you have a lot less development, and you have a lot more remaining forests. The European mushroom consuming culture was a huge part of culture here throughout most of human existence in this area. It's still alive there. And it expresses itself in the fact that I'll have a Danish foraging book and it will tell me that this mushroom is not edible, and then I'll look at other sources and I'll see that, oh, but they eat it in Russia, and they eat it in Romania, and they eat it in Poland (K. Cometta, personal communication, Oct 18, 2023).

When I asked Kyle why it might be that the average person in Denmark has such little knowledge or interest in edible mushrooms he responded, "You, as a gardener, you can probably also see that: why don't people know more about heirloom varieties of vegetables? How come our choices have been limited as we've developed? I think it has a lot to do with industrialisation" (K. Cometta, personal communication, Oct 18, 2023). Indeed, industrialisation and the proliferation of monoculture practices has curtailed the varieties of foods that are commercially produced and thereby available in cities. Notably, 80% of the calories that constitute human diets globally are composed of just thirteen foods—the top five of which are: wheat (20.4%), rice (16.1%), maize (12.8%), soybean (8%) and sugarcane (5.4%) (D'Odorico et al., 2014). These five foods alone constitute 62.7% of the total 80% of these calories. Shrinking crop diversity has a major impact on biodiversity, soil quality, and global ecologies, but also on human health and nutrition. Less crop diversity is veiled by greater 'product' diversity, as the same few plants are processed, packaged, and sold as a variety of different foods beguiling consumers with the illusion of choice. Thus, there is work to be done—not only in how foods are grown, but which foods are grown. Urban mushroom farms can play a critical role here, as they address both sides of this polemic. They create a small loophole: a pragmatic, impactful intervention that is not predicated on radical systemic change. Here I reinvoked Epting's argumentation: "if you want to fundamentally change food systems in order to restore food sovereignty, the realistic ways that could bring it to fruition are not consistent with contemporary views of what it means to be radical. We must make concessions to practical considerations" (Epting, 2018, p. 596). Urban mushroom farms are precisely this sweet spot. They are

pragmatic and feasible, while still illuminating a more ethical way forward.

Kyle's comments also signal a gap in Danish food literacy, and culinary know-how. Enticing a critical mass of people to regularly choose locally-grown oyster mushrooms over swine sausage is more complicated than simply making mushrooms available. The task is entangled in behavioural psychology, education, and habit formation. Respect and appreciation for the tastes, flavours and diversity of mushrooms must also be cultivated over time. This is because,

Food is culture. Especially in a time where we need to transition, eat less meat, a lot of people have this blasé attitude towards it, like, 'Oh, well then people can just eat more beans!' Or, 'We just need to make these simulacrum—you can't believe it's not shredded chicken!' And it's a valid point. But we also need to remember that food is more than meals. It's more than just nutrients because it's a craft, it's art, it's history, it's tradition. It's someone's love language towards the children (N. Vedde, personal communication, November 13, 2023).

Understanding food as love is a critical, albeit an easily forgotten part of this transition. The choices (or impulses) that determine how and what people eat, and by extension, how and what they choose to feed their families, are not motivated by ethics, cost, or health reasons alone. The interviews conducted suggest that comfort, love, and care as crafted through the making and sharing of meals must also be considered in reference to the development of alternative food systems.

5.3.3 Supermarket culture

During my participatory field work at ØsterGRO, I had several exchanges with staff and volunteers about the culinary scene in Copenhagen and food values in Denmark. Over lunch one Tuesday, the topic of farmers markets arose. We discussed why they are not abundantly common in the city, and why they have been historically absent in a country that produces so much food—particularly organic food. Recalling that conversation, my field notes capture the opinion of my interlocutor, who said,

Copenhageners like to visit them, and although they have been attempted to be set up several times, they are never profitable, people go more for the burgers and fries truck than to actually shop for local fruits and vegetables, highlighting that only the chip truck makes money at the farmers market (Fieldnotes, Oct 24, 2023).

As the conversation went on, others added their ideas. A fellow volunteer suggested that “perhaps people don't feel an impetus to go to farmers markets in Copenhagen because you can get so much local organic food in supermarkets” (Fieldnotes, Oct 24, 2023). I felt there was more to unpack, so I pushed the question again: if Copenhageners love organic food, and purportedly love sustainable projects, and community, and all things *hygge* and local; why don't Copenhageners go to farmers markets? The term ‘supermarket culture’ emerged as a possible explanation. My notes state,

‘Copenhageners just love supermarkets’. I pointed out that there are so many of them in Copenhagen, often on the same corner, and he said, that’s because they have to compete so much with each other, and fight for the best locations. He also mentioned that to supply grocery stores in Copenhagen, small, local producers have to produce a quantity that is just not possible for them. They get outcompeted by ‘organic’ producers that are from Chile. ‘Maybe it’s organic, but it’s certainly not local’ (Fieldnotes, Oct 24, 2023).

This comment is paralleled in Kloppenburg et al.’s article, *Coming in to the Foodshed*, where the authors identify “a developing slippage between the terms “sustainable” and “organic”, arguing that organic fruit grown in Central America may be organic but certainly is not sustainably produced, “if the term sustainable is understood to encompass more than on-farm production practices and any reasonable element of social justice” (Kloppenburg et al., 1996, p. 2-3). This points to the complexity involved in doing things ethically in an unethical system. Sustainability cannot be reduced to a singularity. Here it is relevant to recall the conception of food sovereignty as “a process involving persistent, diverse and interconnected struggles” (Desmarais and Wittman, 2014, p. 1156). There are attendant social, political, and cultural struggles that also require addressing if food systems are to become truly sustainable.

My field notes also emphasise a tangle of competing priorities on the ‘sustainability’ agenda. Which ethical dimension of food cultivation should be prioritised? Eating local? Hyper-local? Seasonally? Organic? Vegan? These aspects can, at times, compete with each other—especially in a supermarket, where the average consumer is given little to no information about who grew their food, or where, or how. This becomes even more complex when food systems intersect with personal identity and religious praxis. How should one negotiate eating local while also maintaining a kosher or halal diet? At times these factors may be at odds. Thus, these considerations need to be part of the conversation. Food production must be shaped at the local level, and not exclusively from the top-down.

5.3.4 Unwillingness to pay more for food

The final cultural barrier that emerged through semi-structured interviews and participatory observations was a general unwillingness of consumers to pay more for locally produced, ethical, high quality foods. Nanna, the Farm Manager at ØsterGRO explained,

I don't think that we can change that—that mindset of people and that we just don't pay very much for primary products. We're not interested in paying much for dirty carrots. [...] That's a primary product. But when it comes through the hands of the chefs and it's served on a plate and you have it with a nice glass of wine, someone has processed the products... It's the processing that we pay for (N. Hjortkjær Jespersen, personal communication, Nov 6, 2023).

This comment touches on two key normative cultural values. First, that primary products, especially raw foods that require processing, are perceived as not worthy of paying a lot of money for and are not highly valued. Second, the processing of raw food into an

extraordinary dining experience, is perceived as worth paying a lot of money for, and is highly valued. Whereas a Danish consumer may not be willing to pay 170 DKK (~23 EUR) for 500 grams of raw lion's mane, they may be willing to pay 1299 DKK (~175 EUR) per person for the Michelin Green Star awarded vegan tasting menu at ARK in Copenhagen. Like Nanna said, it's the processing that we pay for. Of course, exercising the privileges of social class and status through patroning these restaurants is also part of the allure. Restaurants have an important role to play in facilitating these experiences. They could help in overcoming the cultural barriers inhibiting mushroom consumption in Denmark by popularising plant-based ingredients, especially less common mushroom varieties. This was echoed in other interviews as well. Speaking about their restaurant clientele, Kyle of Funga Farm recalled, "I found quite early on that they were a wonderful way to get the message out there and to spread the word. Of course we became ambassadors for their restaurants, but they became ambassadors for our product" (K. Cometta, personal communication, Oct 18, 2023). Nikolaj of Bygaard stressed a similar point, highlighting the role of high profile restaurants in developing food culture. "It's kind of a trickle down culture that—you start with Noma and the upper middle aspirational layer of adventurous restaurants, and then hopefully cultural change can happen and trickle down" (N. Vedde, personal communication, November 13, 2023). Those leading the urban fungiculture movement in Copenhagen believe that high-profile chefs and restaurants set culinary trends. Although not accessible to everyone, they believe that trickle-down effects are possible, and that embracing mushrooms as a gourmet food can help turn the culinary tide.

5.4 Production and Distribution Barriers

5.4.1 On being small-scale

The last category of barriers hindering the establishment and success of urban mushroom farms in Copenhagen is production and distribution barriers. Several of the challenges are a result of urban mushroom farms being small-scale in an economy of scale. For example, Kyle of Funga Farm summarised this quite aptly, "When you're a small farm, everything costs more, and your scale is small" (K. Cometta, personal communication, Oct 18, 2023). Being small impacts every aspect of the business, even in ways that may not be apparent at first glance. For example, when referring to the companies that supply substrates to their farm, Nikolaj of Bygaard explained, "because they are used to handling bigger clients than us, bigger customers than us... we need to retain their services. If we opt out of having our standing orders, then it can be difficult to get in because we are a small player in this" (N. Vedde, personal communication, November 13, 2023). Moreover,

The supply network of the substrate is also volatile. We've also had suppliers who've gone bankrupt as well. We sometimes, and I guess that's a part of any procurement process, but we can get tainted substrates, for example, where we get a batch where, 30%, 20%, you see already in the substrate bag, there is some mouldy stuff that's not supposed to be there (N. Vedde, personal communication, November 13, 2023).

The impacts of this volatility and supply-chain variability are acutely felt, and small

mushroom farms are vulnerable to precarity in a way that larger farms are not. These vulnerabilities extend beyond procurement and production, to the processing and distribution stages as well. Viola of Grønt Marked told me, “The old system in Denmark was developed to facilitate big production systems, not only on the agricultural level, but also the processing, and all of that which makes things difficult for those small farms, and makes prices very high, and then it becomes a problem of accessibility” (V. Capriola, personal communication, May 30, 2024).

Despite being relatively small, both Bygaard and Funga Farm are quite productive considering their size. Bygaard can grow up to 1270 kg of mushrooms per week, while Funga Farm grows and sells about 2000 kg of mushrooms per month (about 500 kg a week). To put these numbers into context, the international average of mushroom consumption per capita is 4 kg per year (Bringye et al., 2021). China boasts the highest average rates of per capita consumption in the world at 10 kg per year (De Cianni et al., 2023, p. 2). Many European countries have much lower consumption rates, resulting a continental average of 3 kg per person, per year (Wakchaure, 2011). In Hungary for example, consumption rates are just 1.5kg per person, per year (Bringye et al., 2021). Unfortunately, I was not able to find any information about Denmark’s average per capita consumption rates. However, some basic calculations revealed the following: given Bygaard and Funga Farm’s current rates of production, cumulatively, the farms can produce a maximum of about 90,040 kg of mushrooms per year (assuming perfect conditions and zero spoilage over a 52 week period). The current population of Copenhagen is 662,400 (City of Copenhagen: Statbank). Assuming low rates of per capita consumption, hypothetically, if every Copenhagener consumed just 1.5 kg per person per year, Bygaard and Funga Farm’s efforts alone could supply the city with 10% of its total demand for mushrooms. If every Copenhagener consumed an average of 3 kg of mushrooms per person per year (as is aligned with the European average), they could supply the city with 5% of its total demand. The notion that two, boutique urban producers could supply an entire city’s population with 5% of its total mushroom demand is impressive. It speaks to the high yield of the organisms themselves, but also to the potential of urban farms in addressing numerous issues precipitated by the global industrial food system.

Another way to analyse this data is to consider the neighbourhood scale. Take Nørrebro for example, one of Copenhagen’s central neighbourhoods, which has a population of 79,067 (*Nørrebro (City District, Denmark) - Population Statistics, Charts, Map and Location*, n.d.). Assuming each resident of Nørrebro consumes 3 kg of mushrooms per person per year, these two farms could supply 33% of the neighbourhood’s total mushroom need. Thus, when considered on a neighbourhood scale, the potential neighbourhood-level impact of these initiatives could be tremendous. Imagine; each neighbourhood could have its own little mushroom farm the size of a few shipping containers. It could be located in an unactivated area, such as a parking garage, a rooftop, or the basement of a community centre, and provide meaningful jobs to the local community. It would localise food production, support greater supply-chain reliability and make meat alternatives more available and accessible to all. It would not solve the global food crisis, or the complexities of the corporate food regime, but it could certainly offer a practical nudge in the right direction.

5.4.2 Cost of labour

Whereas aspects of conventional agriculture are industrialised and mechanised in order to improve efficiency, much of the work at urban mushroom farms is still done by hand. Cultivating mushrooms can be quite strenuous and the cost of labour poses another significant production barrier. Reflecting on the early days of Funga Farm, Kyle told me, “We did everything by hand for the first two and a half years, which was extremely labour intensive. And even though we busted our asses seven days a week, ten hour days, we were only able to pump out so many mushrooms” (K. Cometta, personal communication, Oct 18, 2023). He went on to say, “There's a lot of physical work involved until you can really afford an investment when it comes to machinery and infrastructure, you're just going to have lots of man hours, lots of physical labour having to be put into it” (K. Cometta, personal communication, Oct 18, 2023).

Moreover, the additional work associated with being a small grower in a system designed to advantage large-scale production can be quite intense, and the ‘start-up’ mentality of these businesses can precipitate unsustainable working conditions. I asked Nikolaj how their business has endured for so many years despite all of the systemic challenges that Bygaard faces. He replied, “It’s been able to endure because we have relied on mine and Lasse’s¹ free labour for years” (N. Vedde, personal communication, November 13, 2023). Reliance on free labour, or volunteer labour, or just flat-out difficult labour, emerged as a common theme in the functioning of urban food growing initiatives. Nanna from ØsterGRO also told me,

I am the only employed person in the garden because the truth is that growing vegetables inefficiently like we do here: by hand, with help of volunteers... [...] I wouldn't be able to do it without the help, especially on the harvest day and especially in the summer season without the help of the volunteers (N. Hjortkjær Jespersen, personal communication, Nov 6, 2023).

Thus, urban food cultivation, whether using traditional methods or novel ones, cannot escape the reality that growing food is hard work. Farmers can attest to this. These challenges are exacerbated by being small-scale, and operating in production and distribution frameworks that are designed to advantage larger rural producers.

5.4.3 Alternative distribution methods

Being small can preclude growers from selling through conventional retailers. This is an important consideration in a country with a dominant supermarket culture. The minimum quantities and productive consistency required by supermarket corporations is simply beyond the realm of possibility for small producers. Mads from Organic Denmark highlighted these challenges, saying, “We have all these small producers coming out now [...] and they have to build their own network for sales and everything” (personal communication, April 9, 2024). Viola echoed the importance of supporting alternative retailers, in addition to smaller producers, as they depend on each other. She expressed,

1. Lasse Antoni Carlsen is the Founding Director of Bygaard.

The farmers' markets and CSA and all of these alternative networks and platforms are very useful because the risk is minimal [...] things are more accessible because otherwise this small producer would not know where to sell their produce because they cannot access the supermarket system (V. Capriola, personal communication, May 30, 2024).

Urban mushroom farms are a subset of small producers that need to develop their own market—and they certainly have. Interviews revealed that chefs and restaurateurs are the main buyers of the mushrooms cultivated at Funga Farm and Bygaard because they desire (and can afford) regular orders of premium ingredients at a premium price. A thriving restaurant scene in Copenhagen fuels this demand. Kyle of Funga Farm, explained, “if it weren't for chefs who could really appreciate the difference in quality that they were receiving, we wouldn't have a market to sell them at the price that would make the venture make sense” (K. Cometta, personal communication, Oct 18, 2023). There exists a reciprocal relationship, wherein urban farms have created a market for their mushrooms, while chefs benefit from access to exclusive, local ingredients that contribute to the elevated dining experiences they seek to create.

There are also logistical advantages to these relationships. Kyle noted, “The chefs played a really big role because, logistically speaking, when I'm delivering by bike, I couldn't afford to be selling 100 grams to 200 clients. I needed to be selling, you know, 5, 10 kilos to 10 to 15 clients around Copenhagen. That was really important” (K. Cometta, personal communication, Oct 18, 2023). In other words, restaurants provide a loophole to the distribution challenges that result from being a small-scale producer. Having fewer clients placing bigger orders proves more manageable than catering to many customers placing smaller orders. As such, Funga Farm's mushrooms are only available at restaurants. Bygaard on the other hand, does sell direct to consumers at Grønt Marked and also accepts private orders, however, Nikolaj did underscore that “a vast majority of our revenue comes from the restaurant business” (N. Vedde, personal communication, November 13, 2023). Consequently, restaurants are a fundamental player in the success of urban fungiculture initiatives in Copenhagen. Not only do they form a reliable and manageable client base, but they also help promote their mushrooms to a wider audience.

5.5 Results & Discussion Conclusion

Through this case study approach, which included; semi-structured interviews, email inquiry, participatory observation, policy document analysis, and basic statistical modelling, I collected and analysed the data necessary to address the research questions: Why aren't there more mushroom farms in European cities? What are the barriers to establishing and running an urban mushroom farm in 2024?

Case study analysis revealed four key types of barriers: regulatory and economic, governance, cultural and production and distribution related. These key types were initially born out of literatures that engage Food Regime Theory, food sovereignty principles and Path Dependency Theory. These categories help to organise the data, and further

illuminate the structural reasons why urban fungiculture initiatives are not more common across European cities. The barriers are complex, interconnected, and often exacerbate one another. The key results are summarised here:

Urban mushroom farms in Copenhagen do not benefit from access to CAP funding, or national subsidies, and therefore must operate like any other small business on the free market despite the fact that they are primary food producers. There is insufficient public and political awareness about the challenges facing small, alternative, and urban food producers. Additionally, little is known about the capacity of these kinds of initiatives to offer practical, considered steps toward greater food sovereignty in the urban fabric. The processes, procedures and best practices embedded in the Danish food system have historically been oriented toward large-scale, rural, industrial production, while the particularities of smaller, and urban producers have largely been unacknowledged. This has ingrained path dependencies that make alternative ways of food provisioning especially difficult. Many of the challenges associated with urban food production and distribution are intensified by being small-scale. Labour costs are high, selling through conventional retailers is not possible, and securing alternative means to bring the food to market can prove challenging. The Danish context abounds with contradiction, as the overlapping regulatory, economic, and governance frameworks simultaneously enable urban mushroom farms to exist, while also limiting their capacity.

Fungiculture in the city is a form of resistance to the ‘food-from-nowhere’ paradigm (McMichael, 2009). It contests the normativity of industrialised, globalised food production, calling attention to the problematic, unsustainable, and unethical dimensions of the corporate food regime. Even while fungiculture activities in Copenhagen attempt to forge alternative paths, they cannot escape the confines of the capitalist system. They must negotiate these realities. They are for-profit businesses that need to survive like any other business on the free market. This does not diminish their efforts. FRT helps make sense of these oppositional elements, reminding us that the capitalist system is fraught with contradiction. Mushrooms grown in cities, by humans who receive ethical wages, and are connected to the communities for which they provide, are unequivocally ‘food-from-somewhere’ (McMichael, 2009). The urban farms examined in this study employ ecologically sound, sustainable cultivation methods which do not threaten the well-being of future generations—especially in comparison to fossil-fuel reliant industrial agriculture. Most of their sales are direct to restaurant or consumer (i.e. without a middle-man), bridging more intimate producer-consumer relationships, and closing the gap between farm and fork. Their proximate location to Copenhagen’s urban fabric localises food production, reducing the GHGs typically associated with transportation and distribution. These are critical connections to the food sovereignty paradigm. And of course, they grow diverse, nutrient-dense organic mushrooms—a food that holds much promise in the realm of food system transitions.

Documents like the Danish Action Plan for Plant-based Foods, signal government support for the plant-based foods industry. However, the strategies and available funds described in the action plan do not appear to be reaching fungiculture initiatives in the city.

Moreover, the state's approach to promoting plant-based diets and increasing plant-based food production should be scrutinised. A strong focus on economic profit and industry expansion may undermine the net environmental benefits of an uptake in plant-based diets. Furthermore, any changes to food systems and modes of production must be accompanied by cultural change, as meat-centric diets, a lack of culinary knowledge about mushrooms, and a pervasive supermarket culture will damper the efforts of local, plant-based food movements.

In the following section I will expand upon this discussion, offering a few policy recommendations and suggesting opportunities for further research in this field.

6. Recommendations & Final Conclusion

6.1 Policy Recommendations

Because of the applied nature of this research, I can offer a few recommendations as to how Copenhagen, and other cities across Europe, can adapt in order to foster more fertile environments for fungiculture and urban food production initiatives.

Recommendation 1: Greater Information Availability

More information and greater clarity regarding available funding needs to be made available for urban food producers. The fact that I communicated with four different representatives from various EU departments related to CAP and urban planning, and no one could provide a definitive answer on whether urban food producers can access any kind of CAP funding is telling. A consolidated information finding platform would be of great use to emerging urban food growers and could help foster the development of more of these kinds of initiatives.

Recommendation 2: More Culinary Know-How

Publicly funded education about preparing and cooking mushroom dishes would help close the gap in culinary know-how—particularly in contexts like Denmark where historically, a strong culture of mushroom consumption does not exist. This is even acknowledged in the Danish Action Plan for Plant-based Foods, where it states, “It takes continuing education to change the ingrained culture that centres most of its dishes around animal-based ingredients (such as a piece of meat or fish)” (Ministry of Food, Agriculture and Fisheries of Denmark, 2023, p. 17). Armed with better knowledge about how to prepare delicious meals with a variety of mushrooms and plant-based ingredients, the every-day consumer might be more willing and able to choose fungi over flank steak.

Recommendation 3: Funding for Meaningful Participation

Greater alignment between multiple levels of government is needed to facilitate the

inclusion and perspectives of smaller producers, particularly urban producers in policy development and regulatory frameworks. Although there are genuine efforts being made within the EU CAP Network to encourage meaningful participation from a diversity of stakeholders, reliable funding must be made available to cover travel, accommodation, and most importantly—costs associated with farm operation and labour while farmers are engaging in these policy development activities.

Recommendation 4: Suitability of Fungiculture in the City

Information about the suitability of mushroom production in urban areas needs to be made more widely available, and fungiculture must be distinguished from other kinds of food production. Its nuance must be popularised. A pervasive and enduring conception of urban agriculture as a singularity undermines the potential of fungiculture in the city. If policy writers and lawmakers were more aware of the positive impacts of these kinds of initiatives, overtime, barriers to the establishment and operation of mushroom farms might be dismantled.

6.2 Recommendations for Further Research

This research has focused on uncovering and understanding the barriers to establishing and operating an urban mushroom farm in Copenhagen, Denmark in 2024. Some of the findings that emerged through data collection spurred subsequent questions that were beyond the scope of this paper. For example, Kyle of Funga Farm suggested that the social security net provided by the Danish State enabled him to take greater entrepreneurial risk. If Funga Farm as an enterprise failed, he would not have to worry about his family losing access to health care, education, or other public services. This finding adds nuance, shifting the focus from; *what* are the barriers hindering urban fungiculture?, to; despite these barriers, *why* and *how* do these farms emerge? Why do they exist *here* and *now*? These questions open possibilities for deeper investigation into the phenomenon of alternatives to the corporate food regime. It also raises important questions about the relationships between entrepreneurial risk and various political economic systems, as well as the viability of particular means of food provisioning amid the realities of these systems.

Another example of potential research avenues emerged out of my interview with an EU CAP Network representative. They mentioned that environmental groups have long been contending that direct payments through CAP are a very inefficient way of subsidising farming, and that the EU should transition away from this mode of support. Although I argue that urban mushroom producers should have access to greater support, perhaps fighting for inclusion in the current CAP is not the hill to die on. It is critically important to continue probing why, how, and when public money should be spent to support food production. What are the values and assumptions that underpin the funding mechanisms? Who should have access? These are important questions that would be worthy of further research. A more nuanced understanding may help unveil alternate paths forward that are genuinely more supportive of diverse, localised and less corporatised forms of food cultivation.

Lastly, commercial fungiculture initiatives exist in other cities across the European context, and beyond. These activities also warrant further investigation. It would be especially fruitful to conduct a comparative study into the barriers other mushroom farms face in their respective national, regional and municipal contexts. Ongoing case studies would create the opportunity to track patterns, and anomalies across multiple contexts, producing greater knowledge about resistance to the corporate food regime, the ways that alternatives embody principles of food sovereignty, and how path dependence inhibits the emergence of new possibilities.

6.3 Limitations

There are certain aspects of the barriers associated with urban mushroom cultivation in Copenhagen that were not able to be thoroughly addressed through this study. One critical limitation of this research was not being able to understand with sufficient clarity why urban food producers are not able to access certain streams of CAP funding. Additionally, document analysis suggested that alternative, national funding streams should be available to plant-based food producers in Denmark, and so, it remains unclear whether urban farms are simply unaware of viable funding streams, if they are systematically excluded due to their urban nature, or if there are additional, undiscovered obstacles in their way. Regardless, this lack of clarity and unavailability of information is, in and of itself, a critical barrier that was uncovered through this study. A second key limitation was an inability to capture a greater diversity of perspectives, simply because I did not hear back from people, or, they denied my request for conversations. Lastly, a second round of interviews with key informants, as well as additional time in the Copenhagen context may have produced more thorough findings.

6.4 Final Conclusion

The goal of this research was to uncover the barriers inhibiting commercial urban mushroom cultivation in the context of the corporate food regime and ongoing global food crises. NGOs and international aid organisations inaccurately frame these crises as issues of inefficiency and waste. Conversely, academic literature suggests these crises are perpetuated by capitalism. Attempting to address these symptoms within the political-economic framework that produced them in the first place is counterproductive. And yet, forging new paths, completely independent of this domineering framework is at best exhausting, and at worst, impossible. My point is not to incite hopelessness, but to think differently. Radical approaches and revolution are tempting, but they may not be the most sustainable way forward. Afterall, if we do not spend time noticing, supporting, and emboldening a more desirable alternative, what good would a revolution do? What would replace the corporate food regime? We must have the alternative ready, waiting, and working in the wings.

We must allow ourselves to dream, and to be inspired by worldviews that conceive of food differently; ones that celebrate food sovereignty and uphold principles like the Seventh Generation value. With more dedicated policy support, urban food growing initiatives

could have cumulative impacts, while also giving us something practical to do and to work toward. Cities have a critical role to play in this transition. Establishing precedents paves the way for others to follow. Over time, alternative modes of doing might become less alternative. Over time, thoughtful, localised urban food production could become common practice.

This research delves into the specificities of fungiculture because the nature of mushrooms makes them especially well-suited to urban conditions. The practice holds significant potential in reconnecting spaces of production with consumption, localising food growing, and encouraging more sustainable, healthy, plant-based diets. Through this case study, I identified four main kinds of barriers that hinder the success of fungiculture businesses in Copenhagen, Denmark. They are: (1) regulatory and economic, (2) governance, (3) cultural and (4) production and distribution barriers. Lowering these barriers would involve targeted policy interventions, better alignment across multiple levels of governance, and community engagement that emphasises the value of localised food systems.

However, this study is not just about the practicalities of growing mushrooms in cities. It is a call to rethink the broader systems that govern the ways that food production is structured and subsidised, and to question the influence of big agribusinesses in shaping how we eat. By integrating fungiculture into the urban fabric, we can begin to challenge the dominant paradigms of industrialised agriculture and explore alternative ways of living and eating that are more equitable, local, and ecologically sound.

Looking ahead, there is a need for further research about how fungiculture can be better accommodated in the urban fabric, as well as how it can contribute to broader goals of food sovereignty and sustainability. Of particular interest would be studies conducted in cities outside of the European context. As urban areas continue to grow and the pressures on global food systems intensify, the lessons learned from urban mushroom farming could play a crucial role in shaping the future of food production. Ultimately, this research encourages us to remain pragmatically optimistic and to pay attention to alternatives, even in the heart of the city.

7. Appendix

7.1 Sample of the form interviewees were requested to read and sign.

Research Information and Participation Agreement



Researcher: Odessa Kelebay

Contact Information: odessa.kelebay@gmail.com | +43-670-555-2891

Program: Erasmus Mundus Master of Science Candidate in Urban Studies | [4CITIES](#)

About the Researcher: I hold a Bachelor of Arts from the University of Toronto, where I majored in Architecture Design and Theatre Performance. I am now conducting research for my master's degree in Urban Studies through the 4CITIES Erasmus Mundus Program.

Purpose of this Agreement: To ensure that research participants (i.e. you) have the information you need in order to decide if you would like to participate in my research. You are under no obligation to consent if you are not interested in participating.

Research Focus: Sustainable and alternative food systems, with a special interest in commercial urban food growing initiatives. I am currently conducting interviews with people who have expertise in food growing, food policy development and city planning.

My Research Goal: To listen and learn from the real life experiences of those actively contributing to the development and function of various aspects of food systems.

By agreeing to participate in this research, I, _____
acknowledge that: (print full name here)

1. My participation is always voluntary and I can withdraw at any time by contacting Odessa.
2. Any information that I share about my experiences may be used and written about in Odessa's research project.
3. If at any time I share information with Odessa that is private, or that I do not want to be written about, I will clearly indicate that to her.
4. The information that I share in this interview will not be used to harm me, my reputation or the reputation of the company for which I work.
5. Participation means engaging in an informal interview, which will be a length that is mutually agreed upon.
6. If Odessa quotes any information that I share with her, I would like my identity to be:
 - a. kept anonymous: ☐ (check this box)
 - b. It's okay for my name and job title to be disclosed: ☐ (check this box)
7. I consent to Odessa audio recording our interview (please circle): YES / NO

Signature: _____ Date: _____

Email: _____

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