



Beyond Stockpiles: Preparedness in Sweden's Food System

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SGEM08
VT 2026

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Acknowledgements

Completing this thesis would not have been possible without the support of my supervisors Nicklas Guldåker and Jonas Johansson. I am endlessly grateful for the time they have committed to helping me navigate a field very new to me and their continued encouragement throughout the process. I am thankful also to the faculty of the Division of Risk Management and Societal Safety, who have welcomed me into their classrooms and fika conversations. I have been pleasantly surprised to feel so at home amongst engineers, whose methods and ways of thinking have pushed the boundaries of what I consider social science to be. This is true not least for Josefin Lindström Månefjord, with whom I have had the pleasure of sharing an office and, at times, a brain cell, as we have ventured around Skåne to learn about crops, carrots, and cows. It is a joy to work with someone who thinks both so similarly to and differently from me. Thank you also to all of the participants who volunteered their time and knowledge to help me make sense of a rapidly unfolding issue. Their insights are the foundation of this work. Lastly, thank you to the Sambib buffoons and entourage, whose company provided both constructive discussions and laughter-filled breaks. And to Tom, who knows exactly when it's time for tea and to step away from the screen.

Abstract

Events in recent years have prompted a resurgence in Sweden's civil defence planning, with national authorities increasingly focusing on securing the supply of critical goods and services such as food. Yet the societal functions that together uphold Sweden's food system—primary production, manufacturing, distribution, and public meal service—are embedded in complex supply chains shaped by both domestic and international interdependencies. As the Swedish government and national agencies invest in measures such as grain stockpiles and mobile mills, it becomes relevant to question what forms of preparedness are appropriate (and feasible) for such a complex and interconnected sector.

This study therefore investigates the current state of preparedness in Sweden's food system, exploring how preparedness is both understood and enacted across different actors. Drawing on systems thinking, the study is based on a case study comprising 32 interviews with private and public actors representing multiple stages of the food supply chain. The study finds that preparedness is unevenly understood and enacted across a supply chain characterized by misaligned priorities and practices. At the same time, material, temporal, and spatial asymmetries between actors converge such that the system faces a high degree of complex interactions and dependencies. Consequently, while some actors may be prepared to handle the small, everyday crises that typify the food sector, they cannot effectuate preparedness at system-level. The resulting situation is one in which no actor bears sole responsibility for the preparedness of the system, nor can they bring it about. This finding bears consequence for the Swedish government and national agencies' current preparedness approach, which places large responsibility on private food system actors to account for and address their own preparedness.

Word Count: 18.393

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1. Introduction

The last decade has seen no shortage of crises, not least in Europe. In the wake of the COVID-19 pandemic, the Russo-Ukrainian war, and climatic threats, the EU has come to take crisis preparedness more seriously (European Commission 2021; 2025a; 2025b), and Sweden has followed suit. Sweden's 2024 accession to NATO cemented a shift in foreign policy from one of long-standing non-alignment and in January 2026, the Swedish Civil Contingencies Agency (MSB) changed its name to the Swedish Civil Defence and Resilience Agency (MCF), marking a rhetorical and operational shift in crisis preparedness towards war and conflict.

Amidst this armament, the civil dimension of preparedness focuses largely on securing the civilian population's access to critical services (Ingemarsdotter & Eriksson, 2023). After suffering from food shortages and trade disruptions during WWI, the Swedish government decided that the whole economy, including private companies, needed to be engaged in securing societal functions (Ingemarsdotter & Lundén, 2019). Though Sweden dismantled its stockpiles of food and other critical goods in conjunction with its accession to the EU and the fall of the Soviet Union, revived Russian antagonism in Georgia (2008) and Ukraine (2014) has prompted a resurgence in defence planning. Subsequently, the security of supply has come to dominate Sweden's civil defense agenda (Ingemarsdotter & Eriksson, 2023), with food playing a key role.

Indeed, Sweden's national agencies have already begun to take action. In January 2026, MCF distributed the brochure *Preparedness for businesses: In case of crisis or war* which identifies all companies that produce, process, or distribute food as "societally important," meaning that they are crucial in securing societal functions that are necessary to meet basic needs or uphold values and security (Myndigheten för civilt försvar [MCF], 2026a, p.10). Meanwhile, the Swedish Board of Agriculture, at the request of the government, is investing in preparedness stockpiles of grain in northern Sweden (Jordbruksverket, 2025) and the Swedish Veterinary Agency has prompted farmers to take inventory of their resources and dependencies (Statens veterinärmedecinska anstalt, 2025). While agricultural actors invest in stockpiling, actors downstream in the supply chain are advocating for business-friendly approaches that reinforce existing product flows and expand trade (Livsmedelsföretagen, 2025). With the involvement of so many actors, many of them private, public discourse has become bloated with views of what preparedness measures are ideal, feasible, or desirable to take.

In an attempt to orient the discussion, the Swedish Food Agency and Swedish Board of Agriculture published a joint report in 2025 that estimates caloric needs for the population under a national state of heightened preparedness ("höjd beredskap" in Swedish), concluding that there is sufficient domestic production of calories alone, though such a diet would lack certain vitamins and minerals. While the report is a step towards building a more complete picture of capacities of the domestic food system, the authors acknowledge that data on the available supply of resources to meet minimum caloric needs is not a strong enough basis from which to determine how resilient the food system is; the high dependence of the food sector on other sectors, infrastructures, and most importantly, a steady stream of imports, complicates the picture substantially (Livsmedelsverket & Jordbruksverket, 2025, p.40). Evidence from Ukraine, for example, points to the food and agricultural sectors struggling with restricted trade flows due to Russia's blockades of ports (Myndigheten för samhällsskydd och beredskap [MSB], 2023; Sarwar & Rye, 2025). Additionally, during the course of this study, the closure of the Strait of Hormuz has impacted the global trade of mineral fertilizers, with consequences for Sweden's agricultural production (Shokri & Shokri-Kuehni, 2026).

Another recent study finds that though there is sufficient domestic production to fulfill consumption needs of protein in Sweden, only 36% of Sweden's population lives in a region that is entirely self-sufficient, which points to an uneven spatial distribution of production and consumption (Karlsson et al., 2025). However, these types of spatial analyses paint a simplified picture of how food moves from farm to fork. In reality, the food system extends far beyond agricultural production; it depends on production machinery, food-safe packaging, cold chain transportation, and much more (Zurek et al., 2022). Strengthening the preparedness of the food system therefore requires an understanding of the interconnected nature of infrastructures, supply chains, and production systems.

As agencies face pressure to take concrete actions and the government prepares legislation to increase food preparedness (SOU 2024:8, Livsmedelsberedskap för en ny tid), such analytical gaps have resulted in a muddled public discourse dominated by myths around self-sufficiency, degrees of import dependencies, and a need to increase domestic production at all costs (Einarsson & Rööf, 2026). Part of the challenge is a lack of robust methods to model (inter)dependencies within and across infrastructure and service sectors (Lindström & Johansson, 2022) as well as across scales or levels of governance (Rydén Sonesson et al., 2021). While recent research has made headway in studying preparedness in sectors like energy and transport, the food system remains difficult because of several factors: it is not one product or service, but an amalgamation of products (Battersby et al., 2024); its production often involves stages dispersed across companies (primary production, processing and manufacturing, and distribution) (Zurek et al., 2022); it relies on numerous infrastructures and inputs (such as energy, water, and transport) (MCF, 2025); it consists almost entirely of private actors (Ingemardotter & Lundén, 2019), making consistent and comprehensive data collection difficult; and lastly, it is spatial and cultural, with both production and consumption varying across space and time.

Sweden offers an appropriate context in which to study the food system because both production and consumption are distributed unevenly across the country. Spanning nearly 15 longitudinal degrees, Sweden features significant variation in growing zones, with the majority of agricultural production concentrated in the southernmost regions. Yet one third of the population lives in the northernmost two thirds of Sweden's area, a potential epicenter of military activity due to its proximity to Russia. This unevenness is both a feature of and exacerbated by Sweden being a long country, such that the shelf-life of food products and distribution time are relevant factors in both peacetime and wartime planning. These spatial and temporal dynamics force into question the efficiency and effectiveness of various preparedness measures.

With this context in mind, the aim of this study is to investigate the current state of preparedness in the Swedish food system by examining both how preparedness is understood and what actions are being taken (or not taken) in pursuit of it. The study also aims to explore where synergies or contradictions in preparedness arise between actors across the food supply chain. In doing so, the study explores how preparedness emerges at a system-wide level; in other words, whether the flows and relationships between actors result in a food system that is more or less prepared than its constituent parts.

The following research questions will therefore guide this study:

RQ1: *How do different actors in the Swedish food system conceptualize and operationalize preparedness?*

RQ2: *How does the preparedness of actors relate to the preparedness of the system?*

By *conceptualize* preparedness, I allude to understandings of what preparedness is, who does it, and to what end it is pursued. Investigating these understandings is important because, as I will review in Chapter 2, definitions vary across private and public sectors as across research and practice, influencing

how actors and the system operationalize preparedness. By *operationalize* preparedness, I refer to a range of activities such as risk analysis, planning, resource allocation, training, warning, stockpiling, and establishing governance structures (Staupe-Delgado & Kruke, 2017).

In the process of examining these topics, this study contributes empirically and methodologically to the study of preparedness in a system as complex as food. Empirically, it reveals how different food system actors in Sweden understand and enact preparedness. Using systems thinking, these insights are then situated in a system-level analysis that accounts for how interactions, dependencies, and spatial asymmetries shape the emergence of preparedness.

The aforementioned difficulty of studying a complex and interconnected system necessitates drawing analytical boundaries around the system of study. In studying Sweden's food system, I therefore focus specifically on actors operating in four "vital societal functions" (VSFs)—primary production, manufacturing, distribution, and public meal service—which together, but not alone, comprise a significant portion of the food system (MCF, 2026b). This study omits consumers insofar as they do not constitute a VSF, focusing rather on the actors whose work guarantees that food can reach consumers in the first place. Geographically, the study includes food system actors that operate nationally, though all are headquartered in the southern half of the country. While this to a large extent reflects the spatial distribution of Sweden's food system actors, the omission of northern actors remains a limitation in generalizing the results across the country.

Nevertheless, answering these research questions matters because the Swedish government and national agencies are placing large responsibility on private food system actors to account for and address their own preparedness (Ingemarsdotter & Lundén, 2019) with the implication that this will improve preparedness of the system. How these actors understand what preparedness means and subsequently work to enact it therefore has profound implications for the preparedness of the sector, particularly if actors serving as critical nodes in the supply chain have pronounced vulnerabilities.

The thesis is organized into five chapters: Chapter 2 reviews existing literature on preparedness and applies a systems thinking approach to the study of food systems; Chapter 3 applies these insights to the study's methodological approach; Chapter 4 presents the results of the study, organized by research question; Chapter 5 discusses the implications of the results in relation to existing academic knowledge and public policy; and Chapter 6 summarizes these implications and discusses avenues for future research. The data used in this study was collected in collaboration with a PhD student at LTH's Division of Risk Management and Societal Safety, whose scope of work overlapped with the direction for this thesis.

2. Applying systems thinking in the study of food system preparedness

As a concept, preparedness is inconsistently defined and applied, struggling in both theory and practice to factor in the complexity of contemporary society; our infrastructures and services are highly interdependent, with operations and responsibilities often distributed across private and public sectors. The following chapter traces the development of preparedness as a concept and practice, highlighting the potential of a systems thinking approach to inform how we might construct society-wide preparedness that can account for these interdependencies and distributed responsibilities. I review existing literature on food systems to make the case that these conceptual tools are particularly well-suited to studying this sector, but have not been applied concretely, particularly in a Swedish context. On this basis I argue that there remains both an empirical and methodological gap in studying food system preparedness, which this study aims to fill.

2.1 Defining preparedness

Preparedness as a concept was developed principally in a military context during the Cold War but has more recently entered food literature and practice (Pellizzoni et al., 2025), with the European Commission launching the European Food Security Crisis Preparedness and Response Mechanism in 2021 (European Commission, 2021). As a field of study, preparedness is relatively young (Staupe-Delgado & Kruke, 2017), with definitions emerging from practice rather than theory (Kuipers & Welsh, 2017). Meanwhile, myriad disciplines have contributed to the field (King & Mutter, 2014), resulting in a conceptual incoherency (Staupe-Delgado & Kruke, 2017). Top journals publish studies on preparedness to disruptions ranging from conflict, natural disasters, and corporate crises (Kuipers & Welsh, 2017) and, consequently, preparedness is often used interchangeably with readiness, contingency planning, disaster capacity building, or resilience planning (Staupe-Delgado & Kruke, 2017). While this blurring of terms makes comparison of findings across studies difficult, it also offers an opportunity for deeper engagement with what exactly preparedness *is*.

Staupe-Delgado and Kruke (2017) synthesize definitions of preparedness across literature, finding that it is consistently understood as active, continuous, and anticipatory in nature. Hemond and Robert (2012) concur that preparedness is a continuous process rather than an end state, though add that it spans across the crisis cycle, from interventions before crises happen to ensuring recovery afterwards. For Hemond and Robert this definition more closely reflects the trend that “the concept of preparedness seems to be evolving toward a concept of resilience,” (p. 412) which covers the full temporal phases of crises, from anticipation to recovery.

As nebulous as resilience is as a concept, its relevance to the study of preparedness is in shifting it from a bureaucratic tool to an approach to build society-wide capacity to respond to and handle disruptions (Hemond & Robert, 2012). At its broadest, resilience is defined as the capacity of a system to deal with change and continue to develop (Stockholm Resilience Center, 2015). The concept draws on socio-ecological traditions but has found its way into the crisis preparedness space by way of attempting to make sense of complex systems and relations (Alexander, 2013) and is thus more of a paradigm than a “testable body of theory” (Tendall et al., 2015, p. 18). The convergence of preparedness and resilience has occurred in tandem with a shift in views of what the goal of preparedness is: not to prevent disruptions from occurring, but rather to anticipate, respond, adapt to, and coexist with them (Pellizzoni, 2020). Preparedness-as-resilience thereby entails accounting for the complex interdependencies and infrastructural configurations that underpin the functioning of our societies in crises as in everyday life. This study therefore proceeds with a definition of preparedness as the continuous process of planning for and securing

the functioning of societal services through disruptions as well as restoring such functioning after disruptions. In light of the inconsistent definitions of what is being prepared *for*, I use the terms crises and disruptions somewhat interchangeably throughout the study and reflect on the implications of these diverging understandings in Chapter 5.

This shift poses both empirical and methodological challenges, however. Widening the scope of what preparedness is requires in-depth knowledge of how societal services function, such as their vulnerabilities and the key resources they use (Hemond & Robert, 2012, p. 413). If such information can be attained, the next challenge is in making use of it, not just in understanding how the data, together, constitutes a system, but also in understanding how that system interlinks with others (Hemond & Robert, 2012, p. 413). This empirical and methodological challenge is best met with a conceptual approach that can account for these complex configurations and relationships.

At the same time, Pellizzoni et al. (2025) describe a shift in preparedness research and practice from problem-solving to management; this is in part due to the understanding that disruptions are and will continue to be present in our societies. Quarantelli (1998) was among the first researchers to bring management into preparedness literature, mirroring the practice of integrating business continuity into planning. This merger has been present in North American standards (Hemond & Robert, 2012), appears in Finnish practice (Ruggiero et al., 2024), and has been the core of Swedish civil preparedness for decades (Ingemarsdotter & Eriksson, 2023). However, some countries prefer to distinguish between business continuity and civil emergency management (e.g. the UK), and much research continues to treat business preparedness as distinct from preparedness in the public sector (Sutton & Tierney, 2006). The delineation between societal preparedness and business preparedness warrants further investigation, in part because much of preparedness work happens at the interface of the public and private sectors (Ingemarsdotter & Lundén, 2019), but also in light of the paradigmatic shift towards resilience.

2.2 Why systems thinking is necessary to study food system preparedness

2.2.1 *The challenge of understanding the preparedness of societal functions and infrastructures*

As preparedness converges with resilience, it is necessary to employ a society-wide lens that focuses on the delivery of societal services. Yet these services are linked through complex and interdependent configurations of functions and infrastructures that are difficult to grasp.

If preparedness is the process of securing the functioning of societal services, it is crucial to understand how these services are defined. In the context of preparedness, vital societal functions (VSFs) are the activities that maintain the functionality of services (MSB, 2014). The Swedish Civil Defence and Resilience Agency (MCF) has identified 61 such functions, which range from electricity to public transport (MCF, 2026b). VSFs rely on the continued operation of infrastructures such as energy or transport (MSB, 2014, p. 12). While infrastructures can consist of everything from socio-technical to environmental systems (Castán Broto & Robin, 2023), *critical* infrastructures (CIs) are those specifically identified as crucial for health, safety, security, or in ensuring social or economic wellbeing (Zio, 2016). Food is widely recognized as a CI insofar as its absence or failure has disastrous implications for human health and security (Brinkmann & Bauer, 2016).

In practice, CIs enable VSFs, although the distinction between them is not always clear. For example, in Sweden, primary production, manufacturing and distribution of food are recognized as VSFs while food at large is defined as a CI. This blurring between function and infrastructure reflects the complexity of food as a topic at large; it is both an end and the means of society's continuous functioning.

To complicate matters even more, both VSFs and CIs are characterized by interdependencies. For example, a quantitative analysis in the Swedish case reveals that food-related societal functions (primary production, manufacturing, and distribution) are highly dependent on other functions (such as electricity and fuels). At the same time, few other functions are dependent on them; that is to say, electricity is not dependent on primary production to continue. Of course, such an analysis omits the consideration that all personnel involved in upholding VSFs need to eat (MCF, 2025). CIs are similarly characterized by a physical, geographical, and informational interdependency between their constituent actors and components (Rinaldi et al., 2001; Johansson & Hassel, 2010; Cedergren et al., 2018; Rydén Sonesson et al., 2021). Yet CIs themselves are interdependent (Hemond & Robert, 2012) such that adverse events in one cascade through others (Helbing, 2013; Kachali et al., 2018).

These interdependencies complicate the ability to comprehend which components or functions are most crucial in upholding a societal service, necessitating an approach attuned to complexity. Complexity, in this context, is defined by a network of components whose relationships and interactions are inherently incomprehensible (Heylighen et al., 2007). While researchers and practitioners alike are aware of the role of complexity in upholding societal services, they have struggled to address it (Kuipers & Welsh, 2017). For example, the European Commission only recently revised its CI protection legislation to incorporate a systems-focused approach rather than an assets-focused one (Anglmayer, 2021). From an academic perspective, Zio (2016) suggests that a “harmonized, holistic, system-of-systems approach” is necessary to protect infrastructures during crises—a tall order.

2.2.2 *Systems thinking to the rescue*

A systems thinking approach is particularly well-suited to undertaking this task. Systems thinking recognizes the dynamic and complex nature of systems, where systems are defined as groups of “interacting, interrelated, or interdependent components that form a complex and unified whole” (Anderson & Johnson, 1997, p. 2). Rather than define food as an infrastructure, I approach it as a system within which VSFs such as primary production, manufacturing, and distribution are situated. This systems approach allows for analysis of interdependencies and complexities without getting stuck in the circular definitions of infrastructures and functions.

Recognizing that systems thinking is defined variably across disciplines, I take inspiration from Cabrera and Cabrera’s (2023) articulation of the distinctions, systems, relationships, and perspectives (DSRP) theory of systems thinking. I will briefly introduce each of these dimensions before explaining their relevance to the study of food system preparedness.

First, *distinctions* entail defining the boundaries of the phenomenon under consideration (Cabrera & Cabrera, 2023). Because systems interact with their environments and actors may be parts of many systems, it is necessary to draw analytical boundaries to make sense of where the system begins and ends. However, doing so inevitably cuts off part of the system from analysis (Bergström & Dekker, 2014) and so careful attention must be paid in understanding which components or relationships are unaccounted for. Second, *systems* must be understood as a collection of parts that constitute a whole, though the whole cannot be understood without appreciating the differences between its constituent parts (Cabrera & Cabrera, 2023). As such, analyses must consider both micro-level and macro-level viewpoints. Third, systems are composed of many different types of *relationships*—dynamic interactions—between these parts (Cabrera & Cabrera, 2023). Fourth, attempts to understand the system are made from particular *perspectives*, which can lead to misalignments across actors involved in the system (Cabrera & Cabrera, 2023). Differing perspectives reflect that actors within a system make decisions based on local (in relation to the system) conditions

(Cedergren et al., 2018).

Together, these dimensions have several implications for the study of food system preparedness. First, in studying the preparedness of a system, it is necessary to draw analytical boundaries (*distinctions*) while remaining attuned to the ways in which peripheral system components or actors interact with the system. Second, the preparedness of the food system cannot be understood by looking only at the preparedness of its constituent parts (*systems*). Third, it is not just components and actors, but the interactions between them that constitute the food system (*relationships*). This entails considering how interdependencies internal and external to the system manifest. Fourth, actors can only make guesses about the overall preparedness of the food system, since they cannot comprehend the whole from their local vantage point (*perspectives*).

Perhaps the most significant tenet of approaching the food system with these properties in mind is *emergence*, which describes systemic behavior that becomes apparent only through the interaction and relationships between the system's parts (Bergström & Dekker, 2014; Cabrera & Cabrera, 2023). For example, Cedergren et al. (2018) find that resilient behavior at low levels of a system does not necessarily result in resilience across the system. I suggest that preparedness might similarly be an emergent property in the case of food systems, such that the preparedness of individual components of the system might not effectuate system-level preparedness. Overall, this type of systems thinking encourages observation of relationships between components, paying attention to connections and patterns of change, which makes it compatible with studying preparedness (Ruggiero et al., 2024).

2.2.3 Making the case for food as a complex system

A systems approach is also well suited to food, which is increasingly understood as diverse and networked (spanning multiple actors and scales), rather than linear (e.g., following a “farm to fork” logic) (Battersby et al., 2024). Zurek et al. (2022) define food systems as all activities related to producing, processing, distributing, retailing, preparing, and consuming food. This wide scope of activities make the food system vulnerable to both sudden shocks (e.g. disease outbreak, extreme weather, trade disruptions) and long-term stressors (e.g. biodiversity loss, climate change).

Food systems research has been attuned to complexity since the late 90s (Ingram, 2011; Kugelberg et al., 2021) and acknowledges that food systems are composed of interdependent socio-material arrangements, processes, and networks (Yap, 2022). Recognizing these interdependencies is crucial, especially given that food systems manifest across spatial, temporal, and jurisdictional scales (Ingram, 2011; Yap, 2022) and failure to account for these cross-scalar interactions can undermine resilience-improving attempts (Zurek et al., 2022). Conversely, Ericksen (2008) concludes that the inherent complexity of food systems is surmountable by considering these cross-scalar interactions.

Further research has engaged more directly with systems thinking approaches. For example, Kugelberg et al. (2021) acknowledge that studying food systems requires integrated and holistic analysis that takes into account multi-causality, multiple actors, and non-linear supply chains. Wood et al. (2023) call for food systems to be considered as complex adaptive systems, “where interactions and drivers across scale shape outcomes” (p. 22). Lastly, Ingram et al. (2020) recommend systems thinking as a way to “account for complex and dynamic linkages and emergent properties” (p. 9). However, existing research has struggled to apply systems thinking in a concrete and methodical way. While Pellizzoni et al. (2025) recognize the increasing use of systems thinking and complexity theories in the study of food system resilience and food security, the multiplicity of approaches to systems thinking and its application across disciplines has resulted in a fragmented empirical base, especially in the study of resilience or preparedness.

Zurek et al. (2022) corroborate this gap in research; while central tenets of systems thinking such as emergence are acknowledged, they have remained somewhat unexplored. Accordingly, Zurek et al. pose several questions concerning how food system resilience is understood: Can actors shape the system on their own? Conversely, how can “individual food system actors be resilient without the resilience of the underlying system (physical infrastructure, institutional settings, etc.) within which they operate?” (p. 516). Lastly, they ask “How do resilience levels of these different systems interact and influence each other for overall food system resilience?” (p. 526). Overall, they reflect that “tools to systematically identify boarded food system vulnerabilities are currently scant and need to be developed” (p. 516).

2.3 Preparedness in a complex food system

Answering Zurek et al.’s (2022) questions necessitates a deeper engagement with literature concerning how food systems prepare for or respond to disruptions. Due to the aforementioned inconsistencies in defining preparedness and crises, literature on food system preparedness remains fragmented. I therefore draw on two adjacent bodies of literature—food system resilience and security of food supply—adopting insights from each to guide this study.

Food system resilience looks broadly at the capacity for the food system to cope with, adapt to, and recover from change. Much of this is situated in a socio-ecological approach, acknowledging that food is inherently material and grounded in place (Eriksen 2008; Ingram, 2011; Wood et al., 2023). Consequently, most studies examining food system resilience focus on single stages in the food value chain (particularly primary production) or specific dimensions of resilience, struggling to empirically integrate cross-scale or cross-level relations and flows (Tendall et al., 2015). In contrast, positioning (food system) preparedness rather than resilience as the object of study shifts the focus to a civil security context more closely aligned with the practical developments in the case of Sweden. Additionally, while socio-ecological factors are no doubt relevant to preparedness, I seek to include relationships between actors across the food system, which are often omitted from studies of food system resilience.

An adjacent area of research centers on the food supply chain, often rooted in management and logistics studies (Brinkmann & Bauer, 2016). Supply chains in this context are defined as the “linkage of stages in a process from the initial raw material or commodity sourcing through various stages of manufacture, processing, storage, transportation to the eventual delivery and consumption by the end consumer” (Zsidisin & Ritchie, 2009, p. 2). Supply chain risk management considers how upstream and downstream dependencies and relationships between actors influence how disruptions affect businesses, consumers, and systems (Zsidisin & Ritchie, 2009). This approach informs studies on the security of food supply (Persson & Bozzo, 2025) or the resilience of food supply chains (Norrman & Eriksson Ahre, 2024), which explore the complexity and dependencies that characterize the sector (Brinkmann & Bauer, 2016). Yet this research often focuses on the supply chains of specific products or types of foodstuffs (often in relation to particular disruptions), struggling, too, to account for a multiplicity of actor types across the food system (Davis et al., 2021).

Nonetheless, supply-oriented literature emphasizes the flows, dependencies, and relationships between actors, noting that disruptions can occur throughout the system with effects downstream. This complements research on food system resilience, which foregrounds the material and place-based dimensions of food. Together, these insights spotlight that it is both the actors and the relationships between them that must be considered in a study of preparedness in the food system.

2.4 Food preparedness in Sweden

Applications of these insights from research on food system resilience and the food supply chain remain limited in a Swedish context, however. There is extremely limited academic literature about preparedness in Sweden's food system, with the majority of publications on the subject presented through various government publications and policy reports.

For example, in her master's thesis, Levin (2024) systematically reviews publications by the Swedish government, national agencies, and municipalities, examining the implications of food preparedness policies for sustainability. Levin finds that some policy documents rely on an assumption that increasing domestic food production will necessarily improve preparedness, ignoring the impacts of domestic disruptions such as power outages or transportation blockages. She also reflects, as do Lennartsson et al. (2024) in a brief report, that short-term preparedness solutions (such as stockpiling) need to be supplemented with long-term strategies to build food system resilience over time. An article in pre-print (Eneroth et al., 2025) further investigates the trade-offs between preparedness and sustainability, though all three (Lennartsson et al., 2024; Levin, 2024; Eneroth et al., 2025) focus on agriculture as the core of the food system. While a fundamental part, these approaches gloss over how instrumental later stages of the supply chain (e.g. manufacturing and distribution) are in constructing the comprehensive food system.

Norrman & Eriksson Ahre (2024) manage to fill this gap by identifying challenges to food supply chain risk governance, though they do not clearly differentiate between different functions in the system. Their findings are relevant, nonetheless, because they foreground the challenges of governing an ecosystem of private actors. Some of the challenges that they raise include that: competition legislation makes it difficult for private actors to share information or collaborate; actors are unsure under what conditions they could receive exemptions from legislation to respond to crises; actors have diverging views on who should pay for measures such as stockpiling; and the diversity of ownership structures of private companies complicates decision-making processes (p. 48). They also find that while private actors desire more concrete guidance from public agencies, the agencies lack clear goals and direction from policymakers (p. 46).

A recent Master's thesis (Persson & Bozzo, 2025) examining the security of food supply comes closest to methodically examining preparedness in Sweden's food system. The study builds on insights from both public and private actors distributed across the food system, although, like Norrman and Eriksson Ahre (2024), it does not systematically account for the diversity of actors and functions within the system in the research design. The study corroborates several of Norrman and Eriksson Ahre's findings, including that private actors lament a lack of guidance from public agencies, which, in turn, deal with unclear direction from the government. Persson and Bozzo also note a misalignment between the priorities of private actors and the pursuit of society-wide preparedness, which results in an unanswered question about who should be overseeing and financing preparedness, a question which Zurek et al. (2022) also raise with regard to the food system overall. While the privateness of the sector remains a challenge, actors within it also see it as a potential strength in that they are able to respond efficiently to disruptions (Persson & Bozzo, 2025).

Persson and Bozzo (2025) also report that participants view war or disrupted supply chains as a more pressing risk to the security of food supply than climate change. This was in part due to an "awareness of the system's inherent complexity, characterised by the multitude of actors involved, their interdependencies, the uncertainty surrounding the future, and the difficulty of anticipating the full consequences of disruptive events" (p. 41). Based on this finding, the authors emphasize that the security

of food supply should be integrated into the existing system rather than consist of measures only activated in a crisis. They conclude that “preparedness should be viewed as a continuous process incorporated within regular planning and operations to support and sustain resilience over time” (p. 52).

This study provides an important empirical and conceptual foundation for further research on the intricacies and complexities of Sweden’s food system. However, the results that Persson and Bozzo (2025) present arise from a research design centered on stakeholder perspectives of the system, a premise which, in accordance with the *perspectives* tenet of Cabrera and Cabrera’s (2023) DSRP theory of systems thinking, I question. Is it possible (or valid) for individual actors to make assessments about a system of which they can only see one small part? Furthermore, approximately half of Persson and Bozzo’s study participants represent public authorities, and only one primary producer is interviewed. By including several actors across stages of the food system, I hope to capture a more complete picture of the diversity of perspectives and actions, as well as the relations and interactions between actors. More broadly, my study directly investigates the relationship between the preparedness of actors and the system at large.

2.5 Articulating the research gap

As this review of existing literature has shown, preparedness is a multifaceted concept that entails a range of activities and is moving towards a resilience approach. This whole-of-society lens requires that societal functions and the infrastructures that they rely on are understood as interdependent and complex, necessitating a systems thinking approach. Such an approach can help fill the gaps that previous studies on food systems have struggled to engage with concretely, particularly in a Swedish context.

The resultant gap is therefore both empirical and methodological. Empirically, detailed information about how the local parts of the food system envision and enact preparedness is scant. However, this alone will not reveal what is happening across or within the whole system. Methodologically, therefore, there is a need to organize a study aligned with the integrated, systems-thinking approach that food system scholars call for. This requires incorporating Cabrera and Cabrera’s (2023) DSRP theory of systems thinking into the study design and analysis. This study accomplishes this by constructing and carrying out a case study on Sweden’s food system using systems thinking, thus contributing to existing literature on the preparedness of complex systems as well as providing practical insights to a rapidly evolving issue.

3. Methodology

This study features a single-case study design, with the empirical material consisting of 32 semi-structured interviews conducted with actors across Sweden's food system and in public policy. This chapter outlines the ontological and epistemological underpinnings of the study, from which the case-study methodology and data collection technique follow. The implications of the methodological approach are discussed as they relate to data analysis. Ethical considerations are also discussed.

The study was designed together with a PhD student at LTH's Division of Risk Management and Societal Safety, whose scope of work overlapped with the direction for this thesis. This collaboration enabled us to combine our knowledge, skills, and resources to conduct the study on a larger scale than either of us could accomplish individually (Knott et al., 2022). It also encouraged us to minimize our own biases (Bleich & Pekkanen, 2013) and employ investigator triangulation when interpreting and reporting the data (Carter et al., 2014).

3.1 An interpretivist approach

This research is situated within an interpretivist tradition, which seeks to investigate how meaning is made (Schwarz & Reiling, 2024). An interpretivist approach rests on a relativist ontology in which realities are contextually situated, as well as a subjectivist epistemology in which knowledge is socially constructed (Willis, 2007). The purpose of interpretivist research is therefore to reflect understandings of the world rather than to identify universal truths (Willis, 2007).

An interpretivist approach suits this study because it seeks to uncover meaning in relation to existing concepts and practices, in this case preparedness in food systems. It therefore aligns with qualitative methods (della Porta & Keating, 2012) that aim to uncover not only how "research participants understand themselves and their environment but also why they do what they do" (Schwarz & Reiling, 2024, p. 97). Methodologically this entails examining, in addition to what research participants say, how they answer questions and whether answers change or contradict previous ones (Schwarz & Reiling, 2024).

Interpretivist research often uses an abductive logic focused on sense-making (Schwarz & Reiling, 2024) rather than testing existing theories (deductive) or trying to generalize from data (inductive) (Braun & Clarke, 2022; Knott et al., 2022). An abductive logic takes an iterative and investigative approach to research, wherein "concept formation happens *throughout* the research process" (Schwarz & Reiling, 2024, p.100). Because the abductive process is contextually grounded, the aim of this study is not to produce generalizable results (Schwarz & Reiling, 2024). Instead, the study seeks to identify transferable results—findings that can be useful in other contexts (Schwarz & Reiling, 2024). This is important given that the object of study—preparedness in Sweden's food system—concerns a particular phenomenon (preparedness) of a highly contextual system (food) in a specific place (Sweden).

3.2 Methodology

3.2.1 Case study design and rationale

This study employs a single-case study design, which orients around a "focused story about a phenomenon" (Goodman, 2024, p. 62). The phenomenon being studied, in this case, is preparedness in the Swedish food system. This research draws on both interpretivist and process-oriented traditions in designing the case study.

Both interpretivist and process-oriented approaches seek to explore how participants make sense of phenomena (Bartlett et al., 2025). The interpretivist design explicitly rests on the assumption that reality is socially constructed and knowledge is collectively produced through interactions and relationships (Bartlett et al., 2025). The process-oriented approach seeks to understand how processes unfold in relation to people and events, considering also the interplay of spatial and temporal factors (Bartlett & Vavrus, 2017). Both approaches center on contextual meaning-making and respect for the emergent and flexible research designs that characterize most qualitative studies (Bartlett & Vavrus, 2017; Bartlett et al., 2025). Where they diverge, according to Bartlett and Vavrus (2017), is in the extent to which the case is predefined at the outset of the study.

Bartlett and Vavrus (2017) take issue with the tendency for interpretivists to “bound” the phenomenon they study by predefining which theories, variables, and relationships will be relevant. This risks seeing the context around a phenomenon as the container in which it unfolds and constricting the emergent nature of qualitative research. Bartlett and Vavrus also question this approach on the grounds that boundaries are not found, but rather constructed by social actors (and researchers). A process-oriented approach, instead, maintains a flexible design such that methods, theories, and data are not decided at the outset of research, but rather arrived at throughout the process of scientific investigation, which aligns with a contextually grounded abductive logic.

While I acknowledge this tension, I defer to Bartlett and Vavrus’s (2017) concession that some studies are inevitably more pre-structured than others, particularly when the researcher’s time and resources are limited (p. 38). As this is my situation, I draw on both interpretivist and process-oriented approaches by *loosely* bounding the case. Doing so entails clearly defining the units of the phenomenon I study (VSFs within Sweden’s food system) while acknowledging the connections and interdependencies between these and other factors in constituting preparedness in the food system at large. This approach allows the study to proceed with an abductive logic while navigating the confines of a project necessarily limited in resources and scope. It also makes the findings more immediately applicable by aligning conceptual categories with existing practice amongst Swedish agencies working with preparedness.

Most importantly, bounding the case aligns with the practice of drawing analytical boundaries around a system, as is integral to Cabrera and Cabrera’s (2023) DSRP theory of systems thinking. The inherent openness of systems requires a degree of predefinition if any attempt to understand their dynamics are to be made. Ultimately, transparency around how the system (or case study) is defined can in fact enable greater elucidation of which relationships, interactions, and contexts shape it.

3.2.2 Case bounding

In this study, I defined the case boundaries by combining insights from The Swedish Civil Defence and Resilience Agency (MCF) and the Swedish Food Agency. In January 2026, MCF published an updated list of VSFs, which identifies organizations, services, or infrastructures that are necessary to meet and uphold society’s basic needs, values, or security (MCF, 2026b). The list is intended to be used in preparedness plans, to prioritize resources in a crisis, and to guide collaborations among actors within the context of civil defense. In the category Food Supply & Drinking Water, for which the Swedish Food Agency is the responsible national preparedness agency, I selected four VSFs that are adjacent to each other in the food

supply chain: primary production, food manufacturing, food distribution, and public meal service.¹ Table 1 presents a short description of each VSF.

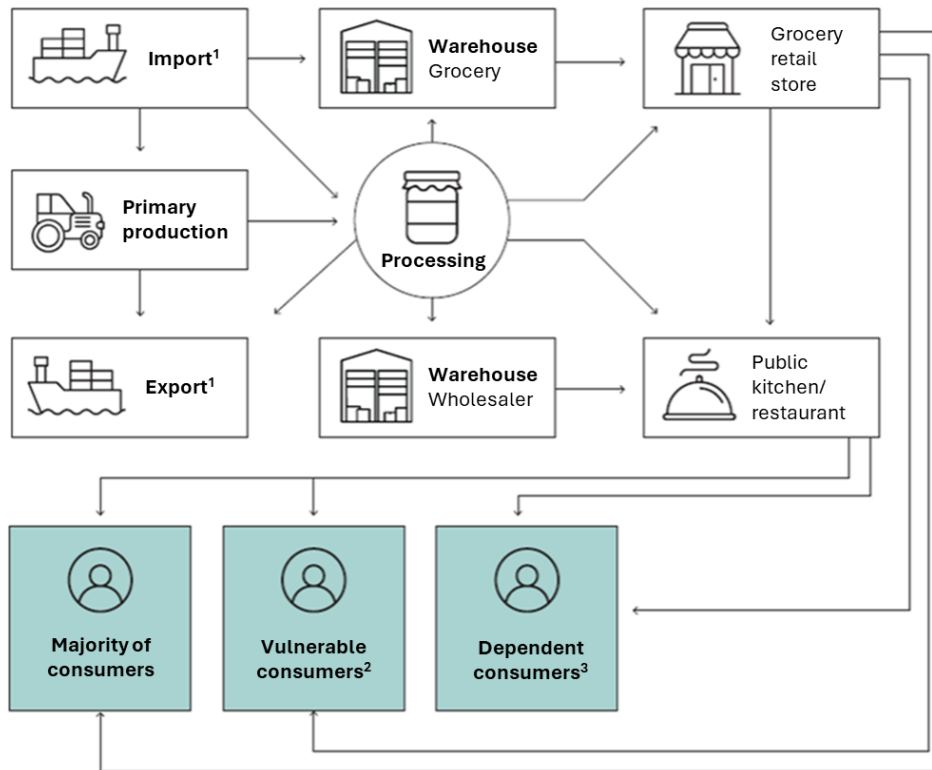
In order to capture the variety of actors that make up these VSFs, I cross-checked these categories against a simplified diagram of the food supply chain in the report [Food Supply in Numbers](#), published jointly by the Swedish Food Agency and The Swedish Board of Agriculture in 2025 (Figure 1). The diagram traces the supply chain from import to delivery to consumers (as well as export) via primary production, manufacturing, grocery and restaurant wholesalers, and retail stores and restaurants. I mapped the VSFs in Table 1 to the diagram (Figure 1), identifying the types of actors that represented each function.

Table 1. Four vital societal functions (VSFs) included in the study

Function	Primary production	Food manufacturing	Food distribution	Public meal service
Description (translated and paraphrased from MCF 2026)	The capacity to uphold production of plants, animals, and fish for human consumption, including securing necessary material inputs and transport	The capacity to prepare and manufacture food with various levels of processing	The capacity to distribute food in the entire food supply chain, from producer to consumer	The capacity to deliver public meals to preschools, schools, healthcare, and care
Examples of actors	Farmers (crops, fruit and vegetables, animals, fish), agricultural cooperatives, plant breeders, etc.	Companies that process (e.g. wash, mill), manufacture (e.g. cook, preserve, assemble), package foodstuffs, etc.	Restaurant wholesalers and restaurants, grocery wholesalers and grocery retail stores, etc.	Municipalities (schools, senior homes, assisted housing) and regions (hospitals)

¹ The category “public meal service” (måltidsservice in Swedish) was previously considered part of the distribution function. In the updated list published in January 2026, MCF presented this category as its own function, which this study does as well.

Figure 1. Simplified diagram of the food supply chain, originally published in *Food Supply in Numbers* (2025); translated



¹ By import and export we mean both trade with the EU and others

² For example people who are economically at risk, have limited mobility, or have specific nutritional needs

³ People who get the majority of their food via public meal service, for example in hospice and elderly care

3.3 Data collection method

3.3.1 Sampling strategy

I used in-depth interviews as the specific data collection method, employing a purposive sampling method since my aim was to include a wide variety of actor types across the entire system (Creswell, 2013) rather than generate statistically representative results (Knott et al., 2022). After bounding the case by identifying relevant VSFs (Table 1) and mapping them across the food supply chain (Figure 1), I sought to capture the diversity of actors within the system, paying attention to product or service, organization size, and geographical location. While I did not want to limit the geographical scope (within Sweden), the actors identified are skewed toward my location in the south, which made it feasible to visit farms and factories in person and also reflects that a large portion of Sweden's food production is concentrated in the south.

Based on this process, prospective participants were identified via existing networks, such as the Centre for food system resilience (FORCE), a research initiative based at Lund University, as well as simple searches in online search engines. In initial outreach emails, relevant organizations were asked to direct interview requests to an employee with insight into supply chains, risk and compliance, or resilience and preparedness. Depending on the organization size and type, this was often the CEO, a supply chain director, or a preparedness analyst. The response rate was 61% (see Table 2). Ten percent of those contacted declined the request for an interview. These were all private actors in the manufacturing and distribution functions

who were substituted with participants filling similar roles in the supply chain. At the end of each interview, participants were asked to recommend other actors or organizations to include in the study, which, through a simplified overlap analysis, helped confirm that the most relevant actors in the system had been contacted. A few recommended actors were not included in the study due to time constraints; these mainly include private companies selling agricultural inputs and trade associations for grocery stores and haulage. All actors in primary production, manufacturing, and distribution are either private companies or associations owned by private members, while all actors in public meal service and public policy are, well, public.

Table 2. Participant yield

Contacted	52	
Accepted request	32	61%
Declined request	5	10%
No response	15	29%

Table 3 details the types of actors included in the study, organized by function. The multitude of actors engaged in the food system makes it difficult to assess what proportion of actors are represented within each VSF. This limitation was mitigated by including trade organizations and cooperatives where relevant and possible, in order to capture an overview of concerns and priorities related to the topic.

Table 3. Completed interviews organized by VSF

Primary Production	Manufacturing	Distribution	Public Meal Service	Public Policy
Associations P1. Agricultural trade association P2. Large agricultural cooperative P3*. Small agricultural cooperative	Trade organization M1. Federation of food companies	Wholesale D1. Restaurant and catering wholesaler D2. Central grocery wholesaler	Municipal meal preparation service C1☐. Approx. 50 kitchens providing meals for schools and senior care	A1. Regional County Board A2☐. Swedish Food Agency A3. Swedish Board of Agriculture
Large farms P4. Animal farm P5**. Potato farm P6. Vegetable farm (greenhouse)	Processing M2. Root vegetables M3. Grain mill M4. Leafy greens M5. Baby food M6. Beverages M7. Dairy M8. Misc. processed foods M9. Condiments M10. Processor of imported raw foodstuffs M11☐. Processor of domestically sourced raw foodstuffs	Grocery store D3. Collection of 4 retail stores	Regional meal preparation service C2. One kitchen providing meals for two hospitals	
Medium farms P7. Crop farm P8*. Organic crop farm	Packaging M12. Liquid packaging machinery M13☐. Packaging of dry foods and powders M14**. Packaging of potato and vegetables	Restaurant D4. Quick-service restaurant		
Small farms P9. Crop farm P10. Organic vegetable farm		Transport D5. Haulage company		

* same person, multiple roles within same function

** same person, multiple roles across functions

☐ two participants representing the same organization

3.3.2 Interviews as a method

In-depth interviews were an appropriate method for this study because they allow for detailed insight into what participants know in addition to how they perceive or define the topic at hand (Knott et al., 2022). Another strength of interviews is that, taken together, they elicit nuance and variation as opposed to aggregations or generalizations (Knott et al., 2022). This was particularly relevant in this study since it includes actors producing different types of goods as well as different actor types across VSFs.

While other qualitative methods such as focus groups similarly elicit nuance in perspectives and explore factors that influence behavior (Creswell, 2013), they are logistically difficult to arrange and deemed unfeasible given that participants represented private companies and would likely be unwilling to share details about their organizations with competitors. Methods such as surveys were also not appropriate because they do not allow for detailed understanding of complex relationships and interactions between participants (Creswell, 2013).

However, interviews are not without limitations. They do not reveal how people will act; participants can only report how they have acted in the past, how they perceive the world at the moment, and what they believe might happen in the future (Bleich & Pekkanen, 2013). Even then, bias and positionality can play a significant role, which are difficult to account for when only interviewing one or two participants at each organization, as was done in this study (Creswell, 2013). These potential implications of these limitations are discussed in Chapter 5.

Interviews were conducted from January to March 2026. Fourteen interviews were conducted in person at the participant's office, often accompanied by a brief tour of the facility, if relevant. The remaining 18 interviews were held online via Zoom or Microsoft Teams, which broadened geographical participation; in Sweden's highly digitized professional context, digital meetings were not judged to pose a significant barrier to participation (Creswell, 2013; Knott et al., 2022). Interviews averaged 75 minutes in duration, with the shortest lasting 45 minutes and the longest 90 minutes. Following each interview, I wrote a reflection summarizing key points and connecting insights to previous data collection, which aided in the analysis process (Knott et al., 2022). Most interviews were with one person, though four included two people in complementary roles. Interviews were conducted in Swedish. Details about when each interview was conducted and whether it was online or in person can be found in Appendix A.

All participants signed informed consent forms, which were sent to them one week in advance of the interview (Murphy & Dingwall, 2007; Creswell, 2013). All interviews were recorded and transcribed the same day using Sunet Scribe, a secure digital service procured by Lund University. The informed consent forms, interview notes, audio files, and transcriptions were all filed securely using the university's data storage service.

3.3.3 Interview guide design

In line with the research questions, I designed an interview guide with the intention of capturing actors' understandings of and actions towards preparedness within the scope of their own organizations, as well as their perceptions and expectations of others (see Table 4). The interview questions were organized thematically and sought to capture a range of insights that would allow for comparison of answers within the scope of each interview as well as across interviews (Creswell, 2013). The aim of this organization was to understand how participants make sense of preparedness as well as whether this sense-making conflicts with the actions they take.

I followed recommendations from Knott et al. (2022) in beginning with easy and broad interview questions before asking specific questions to elicit concrete answers. This semi-structured approach allows the conversation to be guided by what both the researchers and the participants find compelling or intriguing to discuss further while remaining anchored to key themes (Knott et al., 2022). Such an approach was necessary since the study includes a wide range of actor types whose various functions and products I was not deeply familiar with. Indeed, I asked follow-up questions to clarify answers and adjusted the interview guide in real-time to best fit the participant's type of product or service (Creswell, 2013). A detailed interview guide as well as a version modified for public policy actors can be found in Appendices B and C.

Table 4. Summary of interview guide

	Theme	Data type
1	Description of organization, size and scope relative to sector, internal supply chain/process	General information about organization and actor-specific conditions
2	Own and others' roles in preparedness, societal importance	Perceptions and expectations of own organization and others'; knowledge of own organization's capacity, resources, and limitations
3	Upstream and downstream dependencies	Assessment of own organization's (inter)dependencies, needs, and robustness
4	Scenario in which national borders close	Assessment of own organization's preparedness and adaptability
5	Experiences of earlier crises	Own definition of crisis

I designed the interview guide in this order so that participants had reflected on their perceptions and expectations (theme 2) before assessing their own dependencies and capacities (3). This primed them to then assess their preparedness (4) with above in mind.

The scenario (4) presented a situation in which Sweden's borders closed, causing an immediate stop of imports, exports, and travel. I posed questions while the scenario escalated, starting with warnings of a closure and proceeding through one day, one week, one month, three months, and six months of closure, followed by the reopening of borders. As the scenario progresses, interviewees were made aware of potential shortages in material inputs relevant for food production, such as fertilizers, seeds, and water purification chemicals (as detailed in the report *Food Supply in Numbers* by the Swedish Food Agency and the Swedish Board of Agriculture, 2025). The scenario was intentionally not threat-specific, leaving its cause open to several of the risk types that MCF has identified in its national risk and vulnerability assessment (MSB, 2025), including pandemic, war, and trade disruption.

While the scenario is somewhat extreme, the complete closure of national borders removes the possibility of participants speculating about which imports and exports might be restricted and to what extent, which would complicate my ability to compare results across participants. The scenario was included primarily as a safeguard against abstract responses, rather than as a source of conclusive data about their preparedness. The purpose was to give the participants a chance to ground their responses in an event with concrete consequences while challenging their prior assessment of their own capacity (Schoenberg & Ravdal, 2000; Ramirez et al., 2015; Beighton, 2021). Even though the data collected in this part of the

interviews does not reflect actions but rather beliefs about potential impacts and actions, such an approach can provide insights into how capacities, resources, limitations, and dependencies might change over time and in response to disruptions (Öborn et al., 2013; Sampson & Johannessen, 2020).

3.4 Methodological limitations and ethics

3.4.1 Positionality

An interpretivist research approach calls for recognition that it is not possible to remove the research from the context of the phenomenon being studied (Schwarz & Reiling, 2024). Systems thinking similarly places the systems thinker within the system of study, occupying a perspective much like any other component of the system (Anderson & Johnson, 1997). Accordingly, although the interviews concerned people's professional roles and scopes, some topics touched on values and political stances where it became important to be aware of my positionality and practice reflexivity (Knott et al., 2022). I took care not to reveal my own preferences and beliefs about preparedness or food as to not want to influence participants' responses nor make them uncomfortable. Nonetheless, the way in which I have synthesized and interpreted the relevant literature on this topic, designed the study, and analyzed the results is a reflection of how my own experiences and background have shaped my thinking.

3.4.2 Generalizability and transferability

Case studies are situated in a particular time and place and therefore have limited generalizability (Bartlett & Vavrus, 2017). As a data collection method, interviews are similarly contextually contingent and are consequently not replicable in a traditional sense (Knott et al., 2022). This is particularly relevant considering that public agencies released new reports, directives, and policy memos throughout the course of the study's design and execution, necessitating modifications in the process and sample.

However, the strength of such a methodology is in generating highly context-dependent knowledge, which is a valuable pursuit insofar as it can provide strong and illustrative examples of phenomena (Flyvbjerg, 2006). As such, case studies contribute to the "collective process of knowledge generation" (Flyvbjerg, 2006, p. 227). Additionally, the transparency around what constitutes the case can allow results to be transferable to other times and places (Bartlett & Vavrus, 2017), particularly if other cases exhibit the same phenomena (Goodman, 2024). For example, the findings of this study may be relevant in the study of preparedness of food systems in other countries or of other systems within Sweden. Overall, the interpretivist approach calls for measures of methodological rigor that account for the highly context-dependent position of this study, such as maintaining transparency and contextualizing results (Creswell, 2013) as well as triangulating results with the collaboration of another researcher (Carter et al., 2014).

3.4.3 Ethics

All participants signed informed consent forms, which detailed the scope of study, the data processing and storage plan, and the rights of the participant to abstain from answering a question or even end the interview (Knott et al., 2022). I emphasized in my communications that the aim of the study was not to outline individual actors' vulnerabilities but rather to synthesize information across actors to gain a system-wide perspective. Nevertheless, audio files, transcriptions, notes, and analysis were stored in secure folders within Lund University. After completing analysis, audio recordings were deleted and transcriptions

anonymized. Furthermore, the potentially sensitive nature of the data collected informs my choice not to cartographically present system-level results nor the spatial insights I discuss in the following chapter.

3.5 Analysis

I did not adhere to content saturation as an indicator that I had collected enough data, as the goal was not to build a representative base but rather to collect insights from a range of actor types (Knott et al., 2022). This orientation towards nuance, particularity, and differences in responses does not lend itself to saturation in the traditional sense. Rather, *meaning* saturation was used because it emphasizes reaching a deep understanding of issues rather than simply identifying them (Hennik et al., 2017). Additionally, asking interviewees for recommendations for additional participants helped to confirm that relevant actors had been identified (in addition to supplementing the purposive sampling) (Bleich & Pekkanen, 2013). This saturation approach is suited to this study because it encourages the researcher to capture many dimensions of one topic, which is particularly applicable given the range of actor types interviewed.

In line with the abductive logic that is characteristic of interpretivist research (Schwarz & Reiling 2024), analysis began while data was still being collected. This iterative approach helps to build coherence between the analysis and data collection (Luker, 2008; Knott et al., 2022). This was particularly important given the use of purposive sampling coupled with recommendations from participants, which moderately expanded the sample to include different types of organizations that necessitated modifications to the interview topic guide.

Analysis initially took an analog form, wherein I used differently colored sticky notes to organize and collate insights from the data (Luker, 2008). I then moved from descriptive sub-codes to codes to themes (see Table 5), iteratively refining and relabeling what was relevant over the course of the analysis (Braun & Clarke, 2022). In analysis, complete reliability is never possible to achieve (Bleich & Pekkanen, 2013), though I tried to maintain consistency and transparency through investigator triangulation by collaborating with the aforementioned PhD student (Carter et al., 2014).

Results from the study are presented in the following chapter, where they are to some degree generalized by actor type, that is to say, by the VSFs or public policy actors. I use the terms interviewee and actor interchangeably in the empirical analysis, as each interview represents one actor. I refer sometimes to *private* actors, which indicates actors in primary production, manufacturing, and distribution. In discussing public actors, I specify whether I mean public meal service or public policy.

I have chosen not to specify which interviewees are relevant to each finding I present. Instead, I indicate whether a finding is true for a few, approximately half, or most actors interviewed. This approach also aligns with the methodological logic of seeking to uncover meaning in the data rather than reporting responses (Schwarz & Reiling, 2024) and also protects the privacy of interviewees whose responses might make them identifiable. I occasionally include quotes (translated from Swedish) in order to illustrate points; in these cases I specify the source. I later analyze and discuss the results in connection to existing literature in Chapter 5.

Table 5. Thematic codes in relation to results

Sub-Codes	Codes	Themes	Result
lead times, season, harvest	problem-solving, crisis-prone	dimensions of conceptualization	4.1.1
it will be fine, adaptation, recovery, free market	optimism, confidence		
drought, infrastructure sabotage, war, hybrid war, pandemic, accident, power outage, labor shortage, price of inputs, tariffs, trade disruption	identification/definition of crisis		
prioritization, expectations, responsibility, collaboration, cooperation, directives, guidance, roles, support, certification, legal requirement, societally important, competition law	willingness, roles, responsibilities		
perishability, shelf-life, in advance, volume, refrigeration, distribution time, distribution cost, packaging solutions, short/long distances	material limitations	barriers to / opportunities in taking preparedness action	4.1.2
optimized, specialized, automated, alternatives, back-ups, dual-sourcing, margins, generators	input dependency		
profitability, investment, offshoring, family-owned, consortium, foundation, publicly traded, conglomerate, internationally owned	ownership structure		
storage, bulk, stockpiling	stockpiling	preparedness solutions	4.1.2
strengthen material flows, unrestricted trade, capital, profitability, prices, networks, imports, just-in-time	maintain flows		
investment, dual-sourcing, redundancy, supply chains, infrastructure	build redundancy		
transformation, long-term solution	systemic change		
business continuity, crisis management, contingency planning, capacities	concrete preparedness actions	operationalization of preparedness	4.1.3
scenario responses	scenario responses	inconsistencies between conceptualization and operationalization of preparedness	4.1.4
relationships between interviewees	internal flows	system-mapping of flows and dependencies	4.2.1
raw material inputs (food), foodstuffs (ready-to-eat), agricultural inputs, machinery and spare parts, migrant/temporary labor, packaging, fuel	import dependencies		
labor, transportation infrastructure, electricity, IT systems/GPS/payment systems, material inputs, bioenergy, municipal water	domestic dependencies		
co-location		system-wide spatial phenomena	4.2.2
centralization			
clustering			

4. Results

This chapter presents the results of the study, the implications of which the following chapter (5) will discuss and analyze. The following presentation of these results is organized around the research questions: How do actors in the Swedish food system conceptualize and operationalize preparedness (RQ1)? and How does the preparedness of actors relate to the preparedness of the system (RQ2)? First, I will present how interviewees conceptualize and operationalize preparedness (RQ1). I then explore how the inconsistencies amongst and contradictions between responses provide a more nuanced picture of preparedness in the food system (RQ1). I also present a visualization of the relationships between the actors included in the study which reveals the system's high reliance on both imported and domestically sourced inputs, a co-dependency between actors, and that certain actors represent bottlenecks in the system (RQ2). I further nuance this system-level view with interview data about the spatial characteristics that complicate preparedness.

4.1 How preparedness is conceptualized and operationalized in the Swedish food system

As stated in the introduction, the conceptualization of preparedness revolves around understanding what preparedness is, who does it, and to what end it is pursued. The operationalization of preparedness encapsulates activities such as risk analysis, planning, resource allocation, training, warning, stockpiling, and establishing governance structures (Staupe-Delgado & Kruke, 2017).

4.1.1 How food system actors conceptualize preparedness

This section is organized into four themes: (1) preparedness is understood as problem-solving, (2) private actors are confident about their own preparedness, (3) actors associate preparedness with different types of crises, and (4) perceptions about who is responsible for preparedness vary.

(1) Preparedness as problem-solving

Interviewees across primary production, manufacturing, and distribution reflected that the perishable and precarious nature of handling food products leaves little room for error in the sector, and for this reason, both their operations and personnel are accustomed to quick problem-solving.

Private actors operate with short lead-times and are highly susceptible to variations in weather, outbreak of plant or animal diseases, or global trade disruptions. For example, while primary producers often plan their growing seasons months in advance, they are still subject to unpredictable weather conditions and fluctuating prices of material inputs like fertilizers and fuel. One primary producer deals with margins as short as one week to maintain their product flow. These factors can have knock-on effects later in the supply chain, where manufacturers operate with lead times as short as a few hours or a few days. Those that deal with non-perishable products often have more flexibility but are still dependent on successful harvests and timely deliveries of material inputs. Similarly, distributors work within a few days to a week to deliver products from the date of order. As one interviewee reflects, “Compared to companies in other sectors we are used to making decisions and changing operations from one moment to the next since everything in this sector moves so fast.” (M2)

Even public meal service deals with similar timelines. Although they place their orders and set their menus with several weeks of advance planning, they are subject to variations in availability and prices. If a delivery is delayed, they must find an immediate solution because “we never cancel a meal” (C2).

(2) Sense of optimism and confidence amongst private actors

About half of interviewees from private organizations expressed strong optimism about preparedness in general. This optimism manifested through confidence in their own capacities—often exemplified by their ability to survive previous crises—and confidence in the system’s or market’s capacities to withstand crises.

Private interviewees expressed confidence about their own preparedness and adaptive capacities in general, which became particularly pronounced when discussing the scenario in the interview. Interviewees alleged that the situation would work out or that the system would adapt and adjust to a crisis within the span of a few months. However, when reflecting on how their organization fared through the scenario, many claimed that they were reasonably prepared for a crisis event of this scale, despite admitting minutes earlier that they would be unable to operate their business without certain key inputs that were affected in the scenario (such as seeds, fertilizers, spare parts for machinery, or diesel). In discussing this misalignment, interviewees dismissed the scenario as unlikely or asserted that a public agency or the government would have interfered before the situation worsened.

In justifying their optimism, several interviewees referred to their success in surviving previous crises. One manufacturer described how a disruption in their factory required them to halt production for several weeks, but they managed to recover through problem-solving and collaborating with local partners. Several interviewees also mentioned COVID-19, where impacts were described as noticeable but surmountable. The pandemic, along with the other small and frequent crises that plague the sector, demonstrated to many actors that suppliers and clients alike are flexible and understanding. This is reportedly due to a sector-wide awareness of challenges of handling food products, particularly those dependent on international trade flows. As one distributor posited, “Why did [the system] work [during the pandemic]? Well, because we continued just like normal” (D2).

This sentiment occasionally extended to the preparedness of the food system as a whole, with a few private interviewees emphasizing the free market’s ability to resist and recover from crises: “If you look at the market as a system there’s an adaptive capacity which is very fast” (M1). This adaptive capacity is reflected in the logic that “A company that does not deliver cannot exist” (M1).

However, a few interviewees took a more sober view of preparedness, particularly in reference to the long-lasting impacts of previous crises as well as the high degree of dependencies the sector faces. For example, while COVID-19 was described as a confidence-inspiring crisis, the 2018 drought stood out as a devastating event for several interviewees. This was particularly pronounced amongst actors handling animal and meat products, who are, to this day, affected by high meat prices due to shortages stemming from the drought (P4, D2, D3, D4).

(3) Interviewees associate preparedness with different types of crises

The first three interview themes (as described in the previous chapter) were crisis-neutral, meaning that I did not specify a type of crisis when asking about preparedness. By leaving questions about previous experiences with crises until the end of the interview, actors were able to instinctively define and identify crises that they associate with preparedness.

Primary producers discussed preparedness with reference to a diverse range of crises, including drought, labor shortages, high prices or shortages of material inputs, and war. Manufacturers and distributors focused on preparedness for shortages, usually occurring at the scale of the national or international market, as well as infrastructure sabotage in the context of hybrid warfare. A few manufacturers and distributors discussed the need to be equipped to handle accidents or non-antagonistic infrastructure failures, such as losing power, errors in the production process, delayed deliveries, or recalling products due to health and safety concerns.

In contrast, interviewees in public policy as well as public meal service explicitly stated that war is the reference scenario from which they work with preparedness: “It is very clear [from the Swedish Armed Forces and MCF] that it is war that is the reference... earlier we have worked with crisis preparedness. Now we see war as the reference and that everything, all events, even peacetime crises, are worked with if we build robustness for war” (A2). In another interviewee’s words, “we cannot build crisis preparedness and think that we can handle war, but if we can handle war... then we will be decently prepared to also handle other types of crises” (A1).

(4) Heterogeneous understandings of who is responsible for preparedness

Several interview questions concerned roles, responsibilities, and expectations about preparedness amongst different types of actors. Generally, interviewees in manufacturing and distribution perceive an unclear division of responsibilities and expectations around preparedness. Several of these actors expressed seeking explicit instructions about what to do in times of crisis (especially war), primarily regarding whether they would receive prioritized access to resources (water, energy, fuel) and guarantees that their personnel would not receive wartime placements elsewhere. A few interviewees mentioned wanting information about whether they would need to prioritize certain products, increase production, or simplify their production process to better deal with uncertainties or shortages. Accordingly, these actors are waiting for public agencies to give them clear directions and requirements regarding preparedness, which they believe will be accompanied by funding schemes like grants.

This sentiment was to some extent mirrored by primary producers, though they have a long history of applying for investment grants from the Swedish Board of Agriculture to improve various aspects of their organization. Consequently, some forms of financial support for preparedness stockpiling already exist within this sector.

Overall, most private actors expressed a willingness to participate in or contribute to national preparedness efforts, with a few even noting that they had attempted to offer additional services or support during previous crises (e.g. COVID-19). Private actors also mentioned that they actively participate in forums about preparedness and would be willing to explore new product types or streams. One manufacturer even came up with their own standard for handling crisis risk due to frustration at lacking guidance from the government; “We don’t hear anything from our public agencies” so “we work to strengthen our own resilience. Because if something bad happens we want to survive” (M12). Amongst private actors, this sentiment was caveated by not wanting to

be burdened with more regulation, legislation, or reporting requirements, though one actor suggested implementing a preparedness certification akin to a sustainability one.

Public meal service actors were similarly committed to contributing to national preparedness, but cited legal requirements as the reason for doing so. They also operate with a sense of obligation to the populations they serve, as people in senior homes or hospitals tend not to have other sources of food. They therefore did not share the perception that public policy agencies or the government have been unclear in their expectations.

Interviewees from public agencies stated that their roles are to provide support and coordination to other actors without interfering with competition law. One national public agency also noted that they are currently expanding their preparedness offices by aggressively hiring new employees (A2).

4.1.2 Operational preparedness depends on how an actor envisions preparedness

Overall, the results show that interviewees have both synergistic and contrasting ways of conceptualizing preparedness. In order to understand the factors that might account for these similarities or differences, I present three characteristics that interviewees reported as crucial in determining whether they take preparedness actions, and if they do, what types of actions they take. These results draw only on data from interviews with private actors (primary production, manufacturing, and distribution) and not public meal service, because they are required by law to take preparedness action.

Firstly, the nature of the product (such as its perishability and volume), combined with available packaging solutions and distribution cost, influences the feasibility of storage as a preparedness measure. Interviewees across primary production, manufacturing, and distribution struggle with the material or temporal limitations for some products, which cannot be easily stored over time, particularly fresh produce, milk, and meat. Interviewees producing foods with a long shelf-life (such as grains or condiments) were less concerned with these limitations, but still cited storage space as a concern.

Secondly, the company's degree of dependency on inputs (such as raw materials, electricity, fuel, water, or specialized labor) along with the interchangeability of those inputs limits action. In some cases, actors identified alternatives to their dependencies, such as using different energy sources or recycling water, but in most cases, operations have been optimized and specialized, making substitutions technically difficult. Primary producers tended to be less rigid in their dependencies, while manufacturers and distributors had extremely low margins of error.

Thirdly, the company's ownership structure (such as being family-owned, a foundation, publicly traded, part of a conglomerate or a consortium, or internationally owned) reportedly plays a role in the types of decisions made and actions taken towards preparedness. Interviewees working in family-owned businesses as well as in companies owned by international consortiums remarked that they were more easily able to make long-term investments compared to in publicly traded companies, where short-term profitability is prioritized. Such long-sightedness could, in theory, enable planning for and investment in preparedness measures that are not critical to merely daily operations.

Due to these factors, interviewees varied in their visions for how preparedness should take form, or rather which preparedness actions are appropriate to take. Two primary producers (both organic farmers) envision a systemic change in food production as the most viable and sustainable preparedness action. Most primary producers and a few manufacturers favored more short-term solutions; keeping storage of material inputs (such as seeds, fertilizers, packaging, and spare parts) as well as the finished product, if non-perishable. "10% more stockpiles would make a big difference," according to one primary producer (P4).

However, the same actor questioned the feasibility of increasing storage capacity; they observed that the pressure to compete with other producers in the EU has forced them to use every part of their existing facility to its greatest capacity.

For similar reasons, most manufacturers and distributors rejected storage as a feasible preparedness action, preferring to strengthen existing material flows and relationships. These actors do not see investment in storage capabilities as a viable option, because “It would cost an awful lot” (D2). Instead, they focus on “increasing redundancy in the existing natural flow” (D2) because, in accordance with just-in-time logic, “capital must be put to use, not be tied up in storage” (M8). This vision aligns with what interviewees across VSFs cite as a trend towards centralization, effectivization, and automation within the industry, which is reportedly necessary for Swedish food actors to compete on EU and global markets. Within manufacturing and distribution, competitors are frequently acquired, geographical markets are consolidated, and foreign conglomerates have come to occupy large shares of the market. According to interviewees, this trend has advantages for preparedness in that companies are able to make larger investments and swifter moves as well as subsidize parts of the business that are underperforming but provide a critical good or service. However, it also poses disadvantages: foreign-owned companies can more easily pull out of the Swedish market and larger companies can place higher demands on the government to be business-friendly by leveraging their market dominance.

While interviewees entertained discussions about different types of preparedness actions, nearly everyone referred to the prices of food at the end of the supply chain (and by proxy, the profitability of the company) as the most important variable informing preparedness decision-making. At the same time, interviewees tended to assign responsibility or blame to other stages of the food supply chain for squeezing prices. Consequently, as several interviewees mentioned, it is unclear who will be willing to pay the price of taking preparedness actions.

4.1.3 How food system actors operationalize preparedness

These varying factors informing the potential preparedness actions that interviewees could take did not necessarily align with the actions actually taken. In fact, few private actors are taking explicit actions to effectuate preparedness. Despite their eagerness to contribute to national preparedness (as discussed in 4.1.1), private actors were not willing to take actions beyond what is required of them by law, nor were they interested in doing so on their own dime. For most, actions such as increasing storage capacity, installing generators, or increasing redundancy in production lines are too expensive or logistically unfeasible. However, they would welcome financial support from public agencies in taking such actions, if it is to become required by law.

Those that are taking actions to dually source critical inputs, secure alternative supplies, or stockpile report doing so primarily because it is “good business practice,” (P9) regardless of if it contributes to national preparedness. For example, one primary producer invested in a generator in order to “be prepared if something happens, if the power goes out. It would be a catastrophe for us if we lost power” (P4). Another primary producer purchases agricultural inputs in bulk during the off-season and stores it year-round because it is cheaper. Several actors in primary production and manufacturing keep storage of packaging supplies and raw materials where possible if they have the space and are able to purchase in bulk at a discount.

While most interviewees were not investing in physical preparedness, many have developed crisis management teams within their organizations that can be activated when needed. One distribution actor

alluded to having a management structure to prioritize public sector customers in the case of a crisis, but it was not clear if this exists in practice.

The data also revealed that most private interviewees have abilities to adjust their operations in a crisis, but are unlikely to do so unless requested by a governmental agency. These adjustments include using facilities to produce other food (or non-food) products, reusing resources, simplifying production lines by reducing product assortments, or scaling up production by working longer hours. Public policy actors declined to comment on whether they are aware of these capacities or could request these changes to be made in a time of crisis.

Actors in public meal service were the only ones taking concrete actions that are explicitly aimed at improving organizational preparedness. These actors have extensively analyzed the dependencies that are internal and external to their operations, making them acutely aware of their reliance on earlier stages of the supply chain. With these dependencies in mind, they have developed long-term crisis plans that take into account labor availability under crisis, invested in generators, and built infrastructural redundancy.

4.1.4 Inconsistencies between how preparedness is conceptualized and operationalized

Together, the themes that arose in understanding how preparedness is conceptualized and operationalized paint a complicated and, at times, contradictory picture of preparedness. Despite the general optimism and willingness to contribute to preparedness (4.1.1), few actors are taking action to effectuate preparedness, and those that do have done so primarily with the profitability or survivability of their business in mind. This dynamic was illustrated by the fact that private actors often answered questions about preparedness by only considering implications for their own organizations. This became particularly apparent in responses to interview theme 4 (the scenario in which national borders close).

The interview scenario opened with the statement “There are many media reports of a situation abroad that has significant impacts on international supply chains and mobility. Experts warn that Sweden’s imports and exports as well as travel opportunities could be impacted within a few weeks.” When asked how, if at all, they would act in response to such information, most private actors reported that they would inventory their supplies and subsequently hoard input materials and fuels if necessary and possible. Only two actors reflected that others will likely react in the same way, which could quickly exhaust supplies or drive up prices. About half of interviewees also reported that they would activate their internal crisis management organizations and begin meeting regularly.

As the scenario escalates and borders close, actors reflect on or are made aware of potential shortages in raw materials, fuels, and water purification chemicals. Most are adversely affected or need to shut down operations within a span of one week to six months, with the exception of two primary producers who are able to continue production. Despite this bleak outlook (in an admittedly extreme and unlikely scenario), several actors express positive sentiments, assuming that someone with a system-wide view will coordinate and prioritize resources as needed (a reality which public policy actors did not affirm), or that the system will adapt on its own. The scenario responses show that private actors see themselves as responsible for their own initial reactions to the emerging crisis. Once consequences become insurmountable, however, they expect public actors to take action to steer the sector, a sentiment with which public policy interviewees do not align.

When asked about preparedness in such a scenario, one public policy actor responded that “We should have this [system-wide] view. We ought to have this view. And we are working currently to try to build this view” (A1). They suggest that “the question is how fast the food industry could adapt. I cannot answer that question,” (A1) deferring to the sector’s general adaptability and proclivity to problem-solving

as a way forward. Another public policy actor states plainly that “I cannot answer this. This is not one of our planning scenarios” (A2). This actor further declined to answer whether they have mapped vulnerabilities and adaptive capacities of specific food system actors.

4.2 The relationship between the preparedness of actors and the system

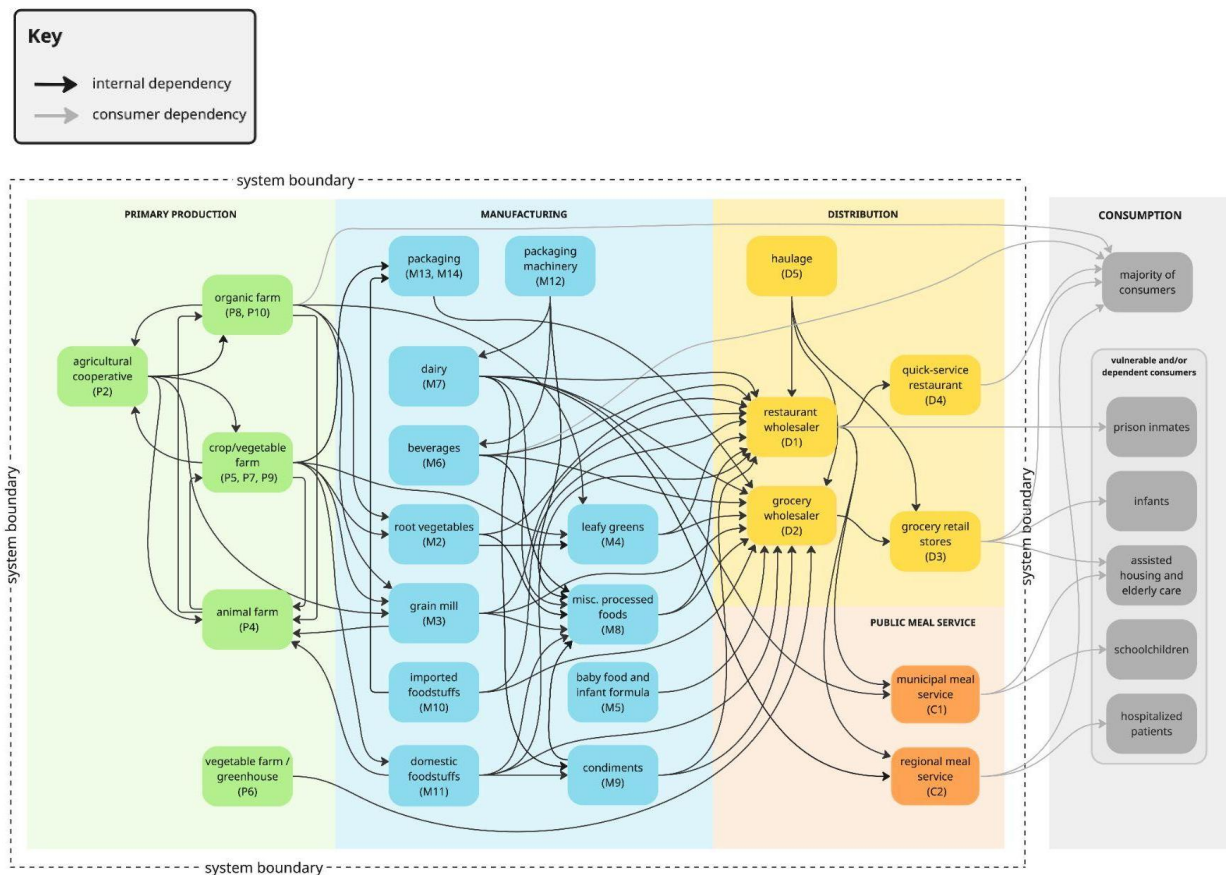
As explored in the previous section, interviewees reported various reasons for taking or not taking preparedness actions. While only a few interviewees communicated a strong confidence in the market’s ability to adapt to a crisis, nearly every interviewee deferred to the *system’s* capacity to absorb an adverse event, or rather for an actor with a system-level view to determine the best course of action. In order to investigate this perception, I examined the self-reported dependencies of each interviewee, connecting flows between the actors included in the study. The results of the subsequent system-mapping are that the Swedish food system—as represented by the actors interviewed in this study—consists of a complex web of internal and external dependencies and flows. I display these system maps before discussing several spatial phenomena that also emerge in the system-level data but cannot be captured in the figures.

4.2.1 System-mapping of flows and dependencies

Figures 2-5 display the interviewees’ product flows and dependencies, including only one step upstream and one step downstream per actor (i.e., only what each actor is immediately dependent on or what is immediately dependent on that actor). The figures are not intended to be a comprehensive account of the flows within Sweden’s food system, but rather reflect responses from the specific actors interviewed as part of the study. The figures also do not assign significance to arrows or cells, so they cannot be used to estimate the weight of each relationship nor the cascading effects of changes in the system. Public policy interviewees (A1, A2, A3) are not included in the figures since they do not fall within the VSFs, nor were the organic agricultural cooperative (P3) and trade organizations in primary production (P1) or manufacturing (M1) because they represent actors’ interests rather than produce goods themselves.

Figure 2 maps the material flows between interviewees and demonstrates three key findings: (1) the actors are not organized in a linear fashion, but are rather connected to each other by a variety of different types of flows (one-way/reciprocal, single/multiple); (2) several actors are reliant on or supply to multiple other actors within the system; (3) restaurant and grocery wholesalers are bottlenecks in the system, as few products from the primary production or manufacturing functions reach consumers without passing through them.

Figure 2. Illustration of flows between interviewees



In order to visualize external dependencies (imported and domestically sourced inputs), I first identified the dependencies for each interviewee, which are summarized by VSF in Table 6. The table forms the basis for Figures 3 and 4, which visualize these relationships and flows in greater detail. Neither the table nor the figures speak to the degree of dependency, only that a relationship exists.

Table 6. Import and domestic dependencies aggregated by VSF

Source	Dependencies	P (n=7)	M (n=13)	D (n=5)	C (n=2)	Total (n=27)
Imported	Ancillary inputs (fertilizers, chemicals, seeds, vitamins etc.)	7 (100%)	9 (69%)	0 (0%)	0 (0%)	16 (59%)
Imported	Migrant/temporary labor	3 (43%)	0 (0%)	0 (0%)	0 (0%)	3 (11%)
Imported	Raw material inputs (food)	0 (0%)	8 (62%)	3 (60%)	0 (0%)	11 (41%)
Imported	Packaging	3 (43%)	12 (100%)	1 (20%)	0 (0%)	16 (59%)
Imported	Machinery and spare parts	6 (86%)	12 (100%)	1 (20%)	0 (0%)	19 (70%)
Imported	Fuels (diesel, petrol)	5 (71%)	2 (15%)	3 (60%)	2 (100%)	12 (44%)
Imported	Foodstuffs (ready-to -eat)	0 (0%)	1 (8%)	2 (40%)	0 (0%)	3 (11%)
Domestic	Labor and expertise	7 (100%)	13 (100%)	5 (100%)	2 (100%)	27 (100%)
Domestic	Transportation infrastructure (vehicles, road and rail networks)	7 (100%)	13 (100%)	5 (100%)	2 (100%)	27 (100%)
Domestic	Electricity	7 (100%)	13 (100%)	5 (100%)	2 (100%)	27 (100%)
Domestic	IT systems, GPS, payment systems	7 (100%)	13 (100%)	5 (100%)	2 (100%)	27 (100%)
Domestic	Raw materials (food)	0 (0%)	10 (77%)	3 (60%)	2 (100%)	15 (56%)
Domestic	Material inputs (wood pellets, feed, etc.)	2 (29%)	3 (23%)	0 (0%)	0 (0%)	5 (19%)
Domestic	Bioenergy (HVO, biodiesel)	0 (0%)	3 (23%)	2 (40%)	0 (0%)	5 (19%)
Domestic	Municipal water and sewage*	0 (0%)	10 (77%)	1 (20%)	2 (100%)	13 (48%)

*Water from own well not included

Figure 3 illustrates the interviewees' high reliance on imported inputs and products. Interviewees across the system are particularly reliant on imported ancillary inputs, raw foodstuffs, packaging, machinery and spare parts, and fuels.

Figure 3. Illustration of interviewees' import dependencies

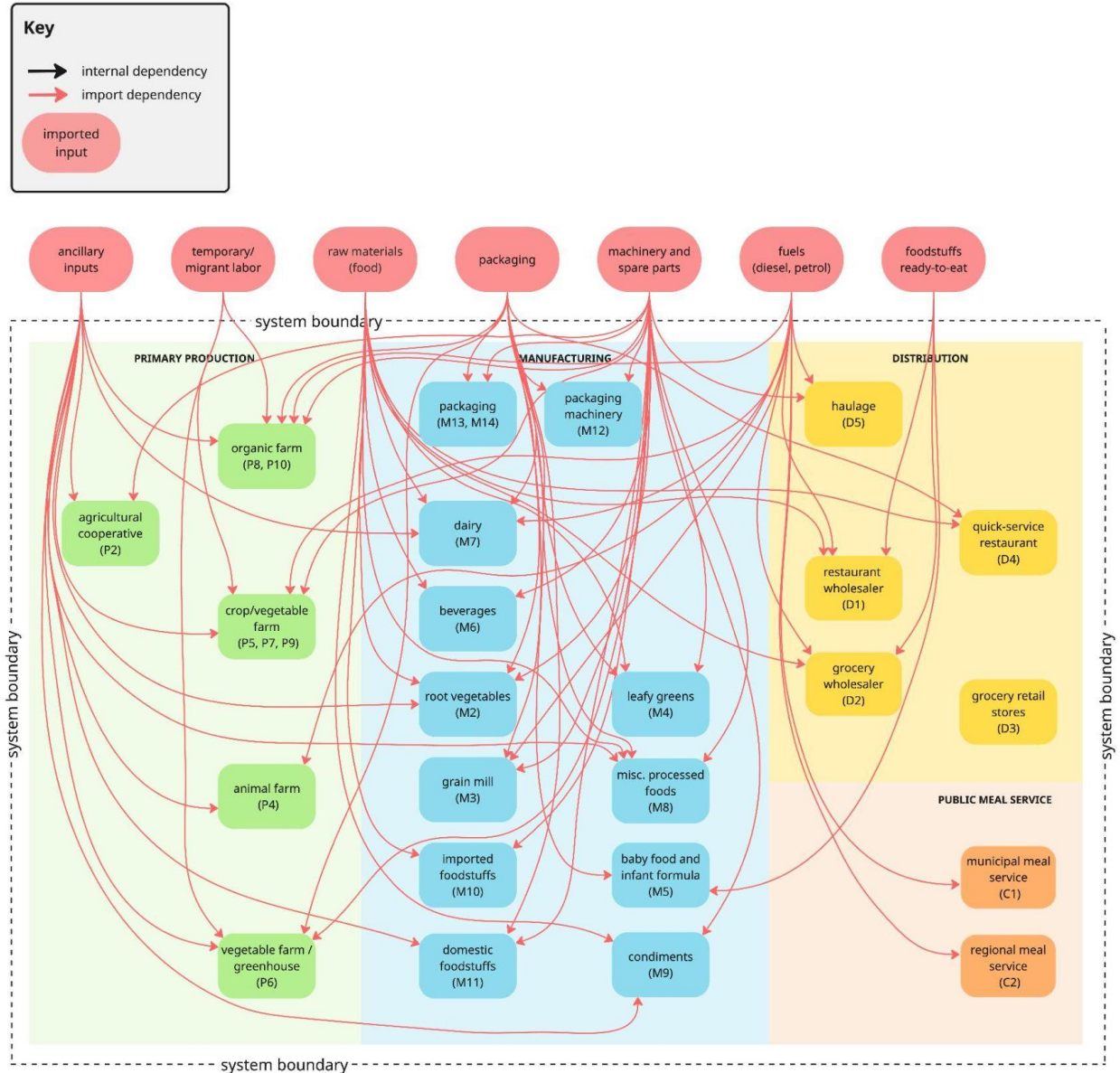


Figure 4 demonstrates that interviewees are similarly reliant on a range of domestic inputs. All interviewees are dependent on labor and expertise, transportation infrastructure (such as vehicles, roads, or railway), electricity, and digital systems or platforms (such as payment systems, GPS, or wireless connections). Many are also dependent on domestically sourced material inputs such as wood pellets or animal feed, as well as bioenergy and municipal water and sewage.

Figure 4. Illustration of interviewees' domestic dependencies

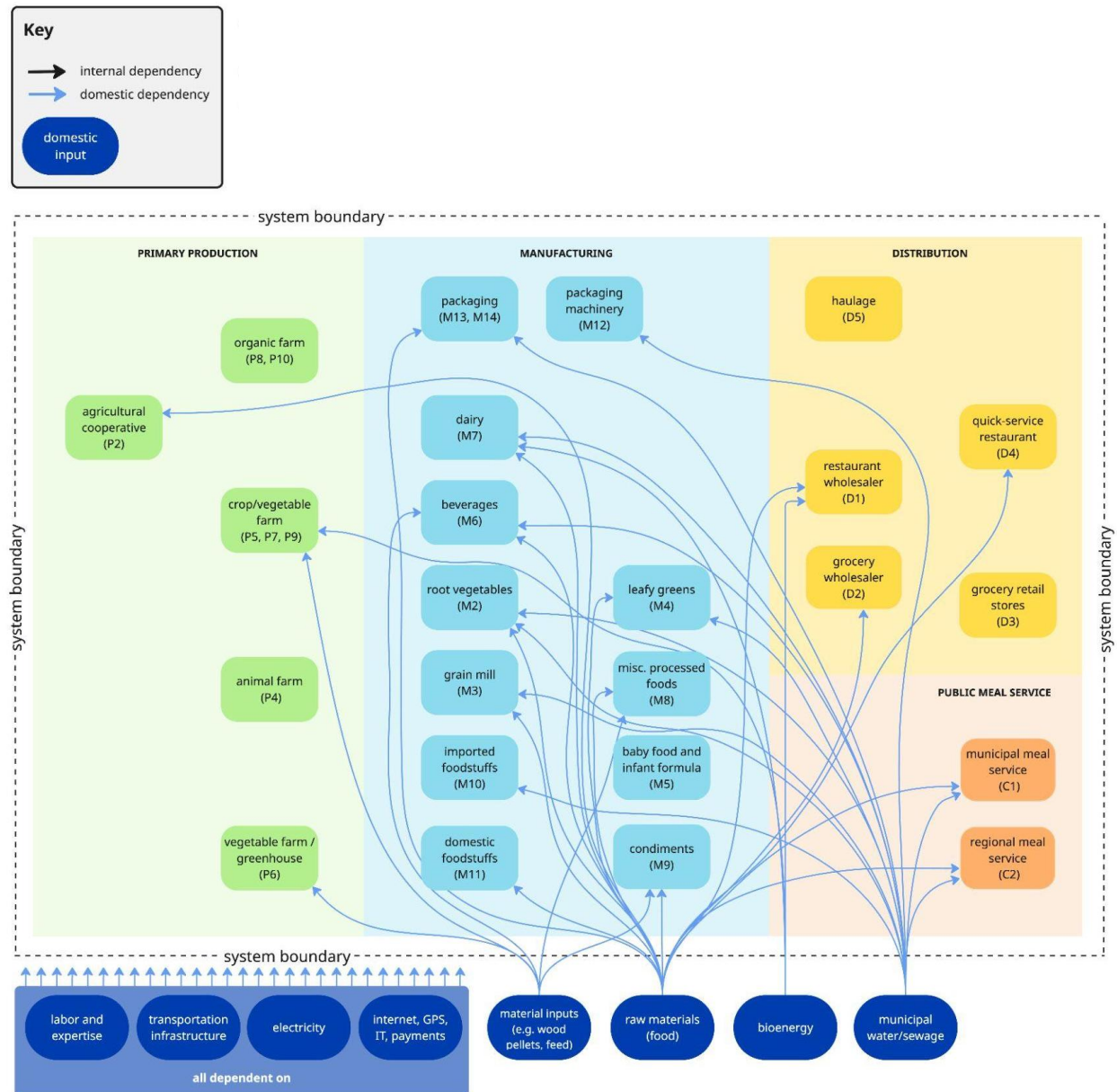
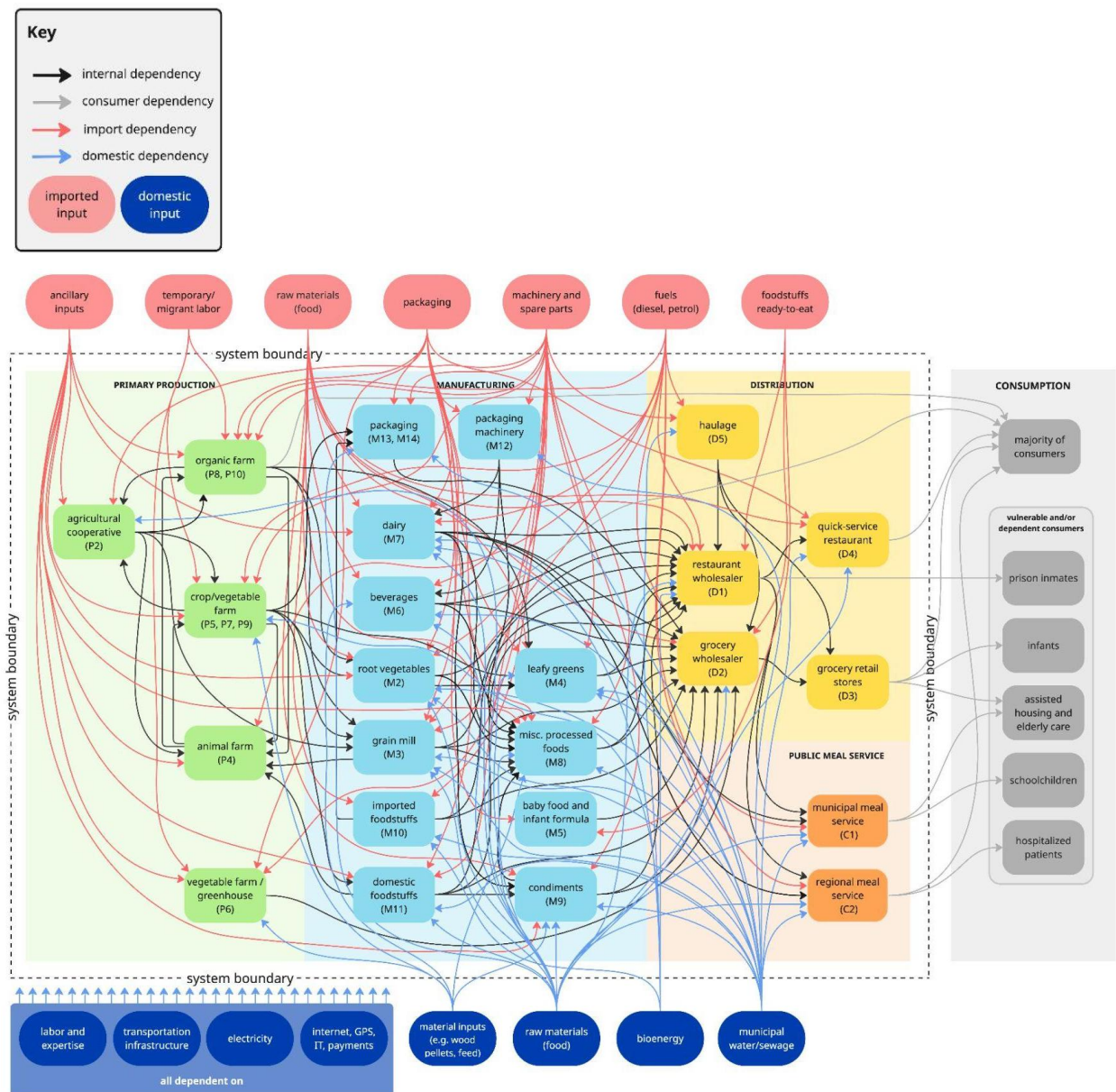


Figure 5 aggregates figures 2, 3, and 4 to illustrate the complexity of material flows and dependencies within the ecosystem of actors interviewed in this study. Again, each arrow points to the existence of a dependency and cannot indicate its degree; nonetheless, the observations made based on the figures above remain true in Figure 5: the system is composed not only of linear flows, actors are dependent on each other, restaurant and grocery wholesalers represent a system bottleneck, and the system is reliant on imports and domestic inputs at every stage. Only two actors deliver ready-to-eat products directly to consumers without the involvement of distribution actors (P10, M6).

Figure 5. Illustration of internal flows between interviewees, import dependencies, domestic dependencies, and consumer dependencies



4.2.2 Spatial phenomena in the system

While figures 2-5 represent the complexity of flows within the food system, they do not capture the spatial organization of these flows. Based on interviewees' own reflections as well as comparison of answers across interviews, three related spatial phenomena emerged: (1) co-location, (2) centralization, and (3) clustering. I discuss each in turn but do not visualize them cartographically due to the sensitive nature of data on the precise locations of facilities.

Firstly, the primary production of crops and the processing facilities that handle them tend to be co-located or geographically contained by variables such as perishability and transportation cost. The data reveal that this clustering of companies that operate within the same product stream both enables and restrains production across VSFs. It enables production by streamlining product flows, reducing transportation time and costs, and encouraging specialization. At the same time, however, it builds interdependency between actors such that if one fails, the other is deeply impacted. Historically, when processing facilities have closed, nearby primary production of the product decreases if there are no alternative facilities, according to interviewees. This is not applicable for every product, of course, but is particularly true of products with large volumes (milk, grains) and high perishability (fresh produce, meat). Coupled with the centralization of industries, some primary production is becoming increasingly specialized and geographically bounded. According to interviewees, this has consequences in a preparedness context because the system increasingly relies on distribution actors to ensure that food reaches consumers across the country.

Secondly, distribution actors, particularly restaurant and grocery wholesalers, have centralized and automated their facilities and networks in pursuit of efficiency. Consequently, interviewees report that the number of warehouses and distribution centers across the country has decreased significantly in the last few decades. The remaining facilities are therefore ever more reliant on a continuous flow of goods to central nodes and dependencies such as electricity and digital systems. Further, the central warehouses for Sweden's major grocery wholesalers are clustered in Mälardalen, a strategic location to efficiently distribute across the country. This creates a critical node that is vulnerable to outages or attacks and is highly reliant on transportation networks.

Thirdly, owing in part to its specialized port, Helsingborg is home to many food system actors, particularly those working with fruit and vegetables. The cluster includes actors from every VSF included in the study, with several concentrated in one part of the city where they share electricity and water infrastructure. While this clustering creates opportunities for industrial symbiosis, circularity, and resource-sharing, it also poses a vulnerability due to the high concentration of actors in a small area and their reliance on the same infrastructures, which lack redundancy. Responsible for handling over 80% of all fresh produce consumed in Sweden, this cluster serves as a critical node in the food system.

Along with the figures, these three spatial phenomena illustrate that the preparedness of each actor cannot be understood on its own. In fact, it is only by taking into account the relations between actors, spatially and with regards to material dependencies, that gaps in the preparedness of the system become apparent. I will analyze these along with the results presented previously in the following chapter.

5. Discussion

The food system at large remains vulnerable to crises because of the complexity of flows between actors, the high dependence on imported and domestic inputs, and the system's spatial asymmetry. Even if food system actors take concrete preparedness actions—which many do not—they are subject to these flows and the disruptions that can cascade through them. Additionally, while actors in public meal service have taken stock of their own dependencies and implemented preparedness measures accordingly, private actors are prepared only for the small, frequent crises that characterize the food sector. This lapse points to business preparedness as insufficient to bring about the society-wide preparedness currently being pursued by the Swedish government and public agencies. This chapter discusses these findings in relation to existing literature on preparedness and food systems.

5.1 Businesses are prepared only for small crises

As the results show, private food system actors operate in a crisis-prone sector with short lead times relative to other sectors; the nature of the products they handle has built a problem-solving capacity within organizations, confirming Persson and Bozzo's (2025) similar finding. This familiarity with crises is in part reflected by how private actors define them: not just as drought, pandemic, and war, but also malfunctioning machinery and delayed deliveries. It is fair to conclude that businesses are prepared to handle the small, frequent disruptions that characterize the sector; they do so nearly every day.

Yet many of these actors also express optimism and confidence about their preparedness for larger crises, a sentiment for which there are several potential explanations. Questioning the optimism is relevant in light of how quickly several interviewees ran into trouble while answering the questions during the interview scenario. While admittedly extreme, the scenario results indicated that some private actors assume that the system or the market at large will absorb crisis shocks (a sentiment which the following section will challenge). Potential explanations for this optimism include that previously experienced crises such as COVID-19 might have simply fallen within their coping capacity as an organization. Indeed, Lindström Månefjord and Johansson (2024) find that despite speculative reporting, Sweden's food sector was not significantly disrupted due to COVID-19. One possible explanation is that the consequences of the pandemic were unevenly distributed globally and concentrated amongst the world's most vulnerable populations (Clapp & Moseley, 2020). Additionally, the businesses that have fared well through previous crises are the ones that have survived and therefore included as participants (Watson et al., 2023); this survivor bias is an unavoidable limitation of the study. However, the optimism can also be explained by a well-documented tendency for individuals to falsely think that they are less susceptible to crises than other people (Enander, 2010). Interviewees might also have been unwilling to imagine undesirable outcomes over which they have no control (Enander, 2010). Admittedly, not every food system actor was optimistic or confident; some are still struggling with the fallout of previous crises.

Perhaps due to (or in spite of) this optimism and confidence, the results show that few private actors are taking steps to effectuate preparedness that go beyond their capacity to solve these small, everyday crises. Those that are investing in stockpiles or building redundancy do so expressly for the sake of their own businesses, unable to account for challenges that emerge in other stages of the supply chain.

5.2 Misalignment of priorities

The high degree of dependencies explains, to an extent, the preference amongst many businesses to secure the continuous domestic and international flow of products rather than stockpile or invest in redundancy. Securing flows has the dual purpose of avoiding crises in the first place and minimizing fallout should one occur. This aligns with the trend in literature and practice that preparedness should aim to reduce the occurrence or impact of crisis events, not just improve capacity to handle or recover from them (Hemond & Robert, 2012; Staupe-Delgado & Kruke, 2017). This finding is also consistent with Persson and Bozzo's (2025) reflection that international trade is an "essential and strategic component of Swedish security of food supply" (p. 50), making strengthened cooperation with trading partners a worthwhile preparedness measure.

However, relying on continued flows and international trade is not without risk because it cannot guarantee that a crisis does not occur or can be sufficiently coped with. If one does occur, businesses must navigate a landscape characterized by just-in-time logistics and effectivization (Ivanov et al., 2014). In such a system, small margins reduce the ability to adjust to disruptions before they cascade (Ivanov et al., 2014), making it difficult to pinpoint which parts of the system are the most critical (Ingemarsdotter & Lundén, 2019). The preference for continuous flows therefore conflicts with the structural conditions of the current food system.

This logic contrasts with the approach in public meal service, which features strategic plans, infrastructural redundancy, and stockpiles aimed to consistently supply dependent populations through disruptions. Actions taken within public meal service demonstrate that it is possible to pursue concrete preparedness measures (albeit only with substantial investment). Yet overcoming the just-in-time and effectivization trend within the rest of the food system is difficult in a sector consisting mainly of private actors, particularly one where competitiveness and growth are prioritized (Kugelberg et al., 2021).

This is further complicated by the domination of large, consolidated private actors across the global food supply chain (Zurek et al., 2022), which interviewees affirmed. Such actors are more easily able to shape and streamline supply and demand, which can reduce diversity and redundancy across the food supply chain (Clapp et al., 2025). These characteristics therefore increase the risks of relying on businesses as the foundation of the preparedness of a society's food supply.

The Swedish food system is thus characterized by misaligned priorities and approaches across two dimensions: firstly, between private actors and public meal service actors, and secondly, between national preparedness priorities and effectivized and globalized supply chains. Indeed, Norrman and Eriksson Ahre (2024) similarly find that Sweden's food supply chains are dominated by different configurations of private and public actors who operate on both local and global levels, resulting in goal-conflicts between actors and societal priorities.

5.3 Business preparedness cannot effectuate system preparedness

This misalignment is problematic given that the future holds a range of possible crises with scopes bigger than what businesses are prepared to handle on their own: infrastructure sabotage and hybrid warfare (as observed in Ukraine) (Sarwar & Rye, 2025), global trade disruptions, or climate changes such as the collapse of the Atlantic meridional overturning circulation (AMOC), which could significantly shorten growing seasons in the Nordics (Nummelin et al., 2026). Critical infrastructure literature additionally warns of the cascading effects of crises such as these due to the interconnected and interdependent nature of the

infrastructures upon which society depends to maintain vital functions like food supply (Rinaldi et al., 2001; Lindström Månefjord & Johansson, 2024).

At the same time, the use of war as the reference scenario for preparedness amongst public agencies necessitates an extended whole-of-society approach, from crisis management to civil defense (Ingemarsdotter & Lundén, 2019). Pursuing such an approach requires understanding how the food system functions internally and in relation to other sectors. In such complex systems, instabilities result from interactions and networks rather than components (Helbing, 2013). Accordingly, the system-level observations in this study illustrate that even if businesses were prepared to handle large crises, they are still subject to complex internal flows, import and domestic dependencies, and fixed spatial configurations. Hence, even public meal service actors, which do take concrete actions, are implicated due to their embeddedness in the system.

The visualization of the internal flows between the actors included in this study (Figure 2) depicts a food system characterized by a variety of relationships between actors, high interconnectedness, and bottlenecks. This cross-scalar complexity of flows between actors is well-documented in food systems literature (Ericksen, 2008; Ingram, 2011; Zurek et al., 2022). However, a reported strength of a diversified and privatized sector with many actors is that there is an inherent redundancy built into the system, as Persson and Bozzo (2025) observe. For example, if a farm goes bankrupt, there are thousands more that can supply the same crop. This logic is what some private actors cite when they express confidence in the market's ability to absorb shocks and respond to crises.

Yet diversity (when understood as redundancy) is only a system strength in localized disruptions affecting few actors or parts of the supply chain. It may fail if all actors face the same crisis simultaneously, particularly when cascading effects are considered (Kachali et al., 2018). This dynamic is illustrated by the drought of 2018, which resulted in poor crop yields across the country; in turn, it necessitated the slaughter of livestock, a shortage which is still observed today due to the long time it takes to raise new generations. This crisis had knock-on effects from primary production through manufacturing and distribution, and has resulted in continued high prices for certain products nearly a decade later.

Even if there were localized disruptions that only affected a few actors, the results show that, at several stages of the supply chain, actors are not particularly diversified. The centralization of operations has created a situation in which very few actors are responsible for securing flows at critical stages in the supply chain. Distributors like restaurants and grocery wholesalers are illustrative examples of this tendency, serving as bottlenecks between earlier stages of the food supply chain (primary production and manufacturing) and consumers. The spatial observations complicate this further, revealing that these actors are often clustered or co-located such that they depend not only on the same types of inputs, but rely on the same infrastructures to operate in the first place. Complex systems researcher Helbing (2013) notes that to be effective, diversity should take the form of a parallel backup system that is “operated and designed according to different principles in order to avoid a failure of both systems for the same reasons” (p. 55), avoiding so-called common-cause failures. This type of functional diversity can increase systemic resilience and make it less likely that all system components fail at the same time, though it admittedly may be practically difficult to implement in a sector like food.

The addition of import and domestic dependencies (Figure 3 and 4) further show that many actors in the food system rely on the same inputs, which again raises the concern of a serious shortage or crisis affecting multiple businesses at once. The interview scenario investigated this possibility, where many actors responded that they would hoard supplies, a behavior which has historically resulted in shortages

and driven up prices, exacerbating crises rather than securing a continued flow of goods (Loxton et al., 2020; Sterman & Dogan, 2015).

While a preparedness measure like advance stockpiling could mitigate this behavior and its impact (Miles & Moore, 2026), few actors report that it is feasible or desirable, mostly owing to the challenges of handling a perishable product as well as the dominance of the industry's just-in-time logic. This trend towards specialization and just-in-time operations is not new, being noted as a potential vulnerability to Sweden's civil defense as early as the 1960s (Ingemarsdotter & Eriksson, 2023) and continues to weaken preparedness in Sweden (Lindström Månefjord & Johansson, 2024). Indeed, sacrificing redundancy for efficiency has been found to be an obstacle to sustaining resilience in food systems across the globe (Huang et al., 2025).

The asymmetrical spatial distribution of food system actors—which helps to streamline flows in peacetime but presents potential vulnerabilities in a time of crisis—complicates the picture further. Evidence from Ukraine shows that co-location and clustering can make facilities particularly vulnerable to attacks or sabotage, in which case not just one but multiple actors are impacted, as are their upstream and downstream relationships (UN Security Council, 2023). These findings illustrate the importance of modularity (decentralizing assets to reduce cascading failures) and infrastructural robustness (equipping components and networks to withstand shocks) (Miles & Moore, 2026). Yet only public meal service actors have invested in these types of measures, and have done so within the scopes of their own organizations, unable to account for asymmetries upstream.

This analysis reflects the fundamentally divergent priorities between private and public actors. Businesses make room for preparedness to the extent that it enables their continued pursuit of profit via surviving small crises, but will not stockpile or invest in redundancies, nor can they account for emergent system-level dynamics. The insufficiency of business preparedness in bringing about system preparedness is problematic when it is the primary policy pursued by public agencies.

5.4 Challenges for the emergence of system preparedness

Private businesses address small crises every day but are ill-prepared for large, society-wide events. At the same time, public agencies expect that the preparedness that businesses build will be the foundation for surviving a crisis as all-encompassing as war. The result of this misalignment is a vacant space between the everyday crises that businesses are prepared for and war, which public agencies use as their planning scenario. This space contains crises such as antagonistic infrastructure sabotage, climatic crises, and trade disruptions, events that will likely impact the food system. Even in a wartime scenario, legal mechanisms go into effect that create different conditions for preparedness: in a state of “heightened preparedness” (*höjd beredskap* in Swedish), the state can appropriate civil resources and facilities. However, the just-in-time logic by which private actors operate today renders this legal mechanism impractical (Ingemarsdotter & Lundén, 2019), and it relies on public agencies having previously mapped critical resources and facilities (the status of which remains unknown). It is hard to say what would actually happen in such a scenario.

Moving forward, the Swedish food system is faced with a difficult governance and responsibility problem. Coppola (2020) reflects that all stakeholders and sectors of a society have a role to play in preparedness. Yet private actors are not willing to invest time or resources on preparedness solutions that don't align with their preferences and constraints, mirroring findings from a Finnish context (Ruggiero et al., 2024). Ingemarsdotter and Lundén (2019) argue that even if private actors are willing to contribute to Sweden's preparedness, they cannot be expected to bear financial burdens that hinder their competitiveness.

Persson and Bozzo (2025) attribute this dilemma to a fundamental “misalignment between market interests and preparedness needs” (p. 47). The resulting gap is one in which private actors account for the majority of the food supply chain, but bear no responsibility for continued functioning of the whole system.

While the results of this study underline the inability of businesses to effectuate system-wide preparedness on their own, I do not intend to suggest that businesses should not be engaged in preparedness work. On the contrary, the current moment presents an opportunity for Sweden to reflect on how the preparedness actions taken now will become “an integral part of the context in which [they] operate, thus generating a new context” over time (Ruggiero et al., 2024, p.12). In other words, preparedness is fundamentally about envisioning and securing the future; acknowledging the limitations of business preparedness alone presents a chance to renegotiate that future (Pellizzoni et al., 2025).

Accordingly, while this study has taken a step towards unpacking the obstacles to society-wide preparedness in a highly privatized sector, there remain opportunities to conceptually develop this work. Abundant literature takes these obstacles as a starting point to explore alternative configurations of food systems, such as shortening supply chains by reducing intermediaries (Nsamzinshuti et al., 2018) or developing local and regional food supply chains oriented towards systemic change (Miller, 2021). Further anchoring the issue of food system preparedness in literature that engages deeply with questions of scale and materiality has the potential to explore pathways for sustainable and long-term strategies to build the system-wide preparedness that Swedish government and national agencies envision.

5.5 Limitations of the study

Naturally, the study is not without limitations. As mentioned in the introduction, the geographical scope of study participants was concentrated in southern Sweden, reflecting my location in the south and ability to conduct in-person interviews but also, to an extent, the spatial distribution of food system actors across the country. Nevertheless, the inclusion of actors based in northern Sweden might have strengthened or challenged some of the results.

The study might also have been strengthened by use of geospatial data about production, manufacturing, distribution, and consumption of food. Analysis of such data could have complemented the system mapping by showing how and in which quantities various products move through the system and across the country. While some such data is available within primary production and consumption, mapping internal flows is difficult since products are processed and manufactured with various configurations of inputs. In addition, the high proportion of private actors in the food system limits data availability, as does security concerns regarding certain facilities, products, and flows.

It was also beyond the scope of this study to include end consumers, as they do not fall under a vital societal function (VSF). However, consumers’ willingness to pay for preparedness or change their consumption habits in a crisis is a critical component of preparedness, as is the recommendation by authorities that households keep stocks of a week’s worth of food and water in the case of an emergency (MSB, 2024). Nonetheless, the study provides valuable insight into the preparedness of the actors whose work guarantees that food can reach consumers in the first place.

6. Conclusion

The aim of this study was to investigate how actors conceptualize and operationalize preparedness in order to gain insight into the current state of preparedness in Sweden’s food system. The study was motivated by

the resurgence of civil defense policy and planning in Sweden, especially as funds pour into equipping national agencies to see over preparedness in various sectors. As such, the study also sought to investigate the dynamics that emerge through the interactions between actors in order to understand how preparedness challenges and solutions manifest at a system-wide level. This goal was informed by insights from preparedness scholarship, which notes the absence of approaches to understand how complex systems adapt and react to various crises (Hemond & Robert, 2012), a challenge that rings particularly true for the study of food systems (Zurek et al., 2022).

The study has drawn on a total of 32 interviews conducted with actors representing four vital societal functions (VSFs) in Sweden's food system—primary production, manufacturing, distribution, and public meal service—as well as public policy actors. Overall, the findings illustrate that Sweden's food system comprises different types of products and services with varying material, temporal, and spatial limitations, such that views on what preparedness is and should entail differ across actors. While enthusiastic about contributing to preparedness, few private actors take explicit actions to effectuate it, envisioning instead a system that will work things out itself or be managed strategically by an omniperspective public agency. However, the system-level findings show the complexity of assuming such a role due to the intricate web of flows and dependencies that characterize the food system, a web which is further complicated by spatial asymmetry. Although public meal service actors stand out for having proactively analyzed risks and planned for possible crises, they, too, are entangled in this web.

Further analysis shows that business preparedness alone does not and cannot bring about system preparedness, which is problematic in light of the scale and scope of future crises. The consequence of this misalignment is also that public agencies cannot rely on independently prepared businesses to serve as the foundation for Sweden's society-wide preparedness.

Although the findings are grounded in the Swedish context, they have broader relevance for preparedness in other countries whose food systems are similarly characterized by high degrees of import dependency and centralization. These insights could also be applicable in the study of other sectors and services within (and beyond) Sweden, such as financial services, pharmaceuticals and medical supplies, or energy, which feature varying constellations of private and public actors.

Finally, the findings point to several avenues for future research. Governance mechanisms to bring about preparedness remain underexplored, particularly with consideration of how vulnerabilities manifest at various scales. While this system-wide analysis is a helpful starting point, future studies could perhaps explore smaller, geographically bounded cases, such as the industrial cluster in Helsingborg or the centralized distributors in Mälardalen. With an understanding of how these clusters fit into the larger system, such research could investigate attributes of preparedness like diversity, redundancy, modularity, or infrastructure robustness with greater detail, perhaps also with consideration of how alternative food system configurations can effectuate greater preparedness.

Overall, the findings suggest that food system preparedness cannot be understood as the sum of independently prepared actors, but rather emerges through how differing interpretations and practices interact across the system. Attending to these dynamics is essential if Sweden seeks to develop a preparedness approach that captures the complex interdependencies and relationships that uphold its most vital societal functions.

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Appendices

Appendix A. List of interviews

#	Code	Actor	Date	Online/in person
1	P1	Agricultural trade association	Jan 28, 2026	Online
2	P2	Large agricultural cooperative	Feb 24, 2026	Online
3	P3/8	Small agricultural cooperative/ Organic crop farm	Feb 13, 2026	Online
4	P4	Animal farm	Feb 19, 2026	Online
5	P5/M14	Potato farm/ Packaging of potato and vegetables	Feb 24, 2026	Online
6	P6	Vegetable farm (greenhouse)	Feb 23, 2026	In person
7	P7	Crop farm (medium)	Feb 2, 2026	In person
8	P9	Crop farm (small)	Feb 19, 2026	Online
9	P10	Organic vegetable farm	Feb 16, 2026	Online
10	M1	Federation of food companies	March 17, 2026	Online
11	M2	Root vegetables	Feb 3, 2026	In person
12	M3	Grain mill	Feb 18, 2026	In person
13	M4	Leafy greens	Feb 3, 2026	In person
14	M5	Baby food	Feb 5, 2026	Online
15	M6	Beverages	Feb 10, 2026	Online
16	M7	Dairy	Feb 5, 2026	In person
17	M8	Misc. processed foods	Feb 4, 2026	Online
18	M9	Condiments	Feb 23, 2026	Online
19	M10	Processor of imported raw foodstuffs	Feb 17, 2026	In person
20	M11	Processor of domestically sourced raw foodstuffs	Feb 10, 2026	In person
21	M12	Liquid packaging machinery	Feb 4, 2026	In person
22	M13	Packaging of dry foods and powders	Feb 9, 2026	In person
23	D1	Restaurant and catering wholesaler	Feb 20, 2026	Online
24	D2	Central grocery wholesaler	Feb 13, 2026	Online
25	D3	Collection of 4 retail stores	Feb 17, 2026	Online
26	D4	Quick-service restaurant	Feb 9, 2026	Online
27	D5	Haulage company	Feb 11, 2026	In person
28	C1	Municipal meal preparation service	Feb 9, 2026	In person
29	C2	Regional meal preparation service	Feb 24, 2026	Online
30	A1	Regional County Board	March 11, 2026	In person
31	A2	Swedish Food Agency	March 2, 2026	Online
32	A3	Swedish Board of Agriculture	March 23, 2026	Online

Appendix B. Interview guide for food system actors within VSFs

In Swedish (translated copy below)

1. Vi berättar om studien och intervjun
 - a. Hälsa välkommen.
 - b. Introducera oss själva.
 - c. Du har fyllt i blanketten om informerat samtycke, vi vill bara påminna om att
 - i. Du kan när som helst välja att inte svara på en fråga, men det är väldigt hjälpsamt för oss om du är tydlig med när det är något du inte vet och något du inte vill svara på.
 - d. Detta är en intervju för datainsamling till forskning, inte en journalistisk intervju. Vi vill att du svarar utifrån din roll och kunskap, snarare än vad du tror vi vill höra eller berätta allmän information kring företaget/verksamheten, utan vi har ganska specifika frågor.
 - e. Vi har sagt att intervjun tar ungefär en timme, och den består av tre delar, och det är viktigt för vår datainsamling att vi hinner med alla delarna
 - f. Har du något bokat direkt efter detta? Av respekt för din tid och för att hinna få svar på alla våra frågor kan vi behöva hålla koll på tiden och kanske avbryta dig om det blir för långa svar på någon fråga, så att du vet det på förhand.
 - g. Nu startar vi inspelningen.
2. Intro och verksamhetsbeskrivning
 - a. Kan du presentera dig själv lite kort, samt beskriva din roll på _____?
 - b. Hur länge har du jobbat i branschen?
 - c. Hur ser er marknadsandel ut ur ett svenskt perspektiv?
 - d. Hur ser er geografiska marknad ut? (lokal/regional/nationell/internationell)
 - e. Och om du ska beskriva kort: hur ser er interna process ut för att kunna leverera den produkten? Det vill säga, vilka steg eller faser har ni i processen (*från råvara till produkt*)?
3. Livsmedelsberedskap
 - a. Hur ser ni på er roll i Sveriges livsmedelsberedskap?
 - b. Har ni förmågor och/eller resurser hos er som kan användas för alternativa syften i en krissituation?
 - c. För några veckor sedan skickade MCF (myndigheten för civilt försvar, före detta MSB) ut broschyren "Om krisen eller kriget kommer - för företag" där de identifierar att verksamheter som producerar, tillverkar eller distribuerar livsmedel är samhällsviktiga. Ser ni er som samhällsviktiga?
 - i. Har ni blivit officiellt utpekade som samhällsviktiga?
 - d. Hur ser ni på myndigheternas (*/det privata näringslivets*) roll när det kommer till livsmedelsberedskapen i Sverige?
4. Beroenden
 - a. Vad är er huvudsakliga produkt(kategori)/tjänst, om vi fokuserar på er svenska marknad?
 - b. Upstream-beroenden:
 - i. Vad är ni beroende av för att kunna leverera (huvud)produkten?
 - ii. För två till tre beroenden:
Du berättade om XXX
 1. Vad hade det blivit för konsekvenser utan XXX?
 2. Har ni något lager av XXX?
 3. Finns det någon backup-plan om XXX tar slut/inte fungerar?
 - c. Downstream-beroenden:

- i. Om du vänder på det - vilka aktörer/personer/produkter/verksamheter är beroende av att ni kan leverera er huvudsakliga produkt eller tjänst?
 - ii. För de viktigaste beroendena downstream: Du berättade om XXX
 1. Vad skulle det bli för konsekvenser om ni inte kunde leverera XXX?
 2. Finns det några externa incitament att upprätthålla er produktion/tjänst?
 - d. Hur identifierar och kartlägger ni som organisation era externa beroenden, som exempelvis de du nämnt här? Har ni all den informationen sammanställd någonstans?
5. Scenario.
- Nu kommer vi presentera ett scenario för dig som vi vill att du försöker tänka utifrån när du besvarar frågorna.
- a. *Det rapporteras mycket i media om en situation i utlandet som har stor påverkan på internationella leveranskedjor och mobilitet. Experter varnar för att Sveriges import och export samt möjligheter att resa in och ut ur landet kan påverkas inom några veckor.*
 - i. Hur agerar ni?
 - ii. Hur stor del av det ni behöver kommer utomlands ifrån?
 - b. *Två veckor senare stängs Sveriges gränser helt. Detta betyder att det är ett totalt stopp på både import och export av alla varor samt reseförbud som gör att ingen kan resa in eller ut ur Sverige. Detta är första dagen med stängda gränser.*
 - i. Hur agerar ni?
 - ii. Vad får det för konsekvenser för er?
 - iii. Vilken typ av signaler hade krävts för att ni ska agera redan vid rapporteringen om att problemet var på väg?
 - iv. Är ni förberedda är ni för en sån händelse?
 - c. Nu har gränserna varit stängda i 1 vecka.
 - i. Vad får det för konsekvenser för er?
 - ii. *Exempel på problem efter en vecka är att det blir brist på växtskyddsmedel och salt (som det inte finns någon inhemsk produktion av).*
 - d. Nu har gränserna varit stängda i 1 månad.
 - i. Vad får det för konsekvenser för er?
 - ii. *Exempel på problem efter en månad är att det kan bli brist på kemikalier för rening av dricksvatten, det finns lager för ungefär en månad.*
 - e. Nu har gränserna varit stängda i 3 månader.
 - i. Vad får det för konsekvenser för er?
 - ii. *Exempel på problem efter tre månader är att beredskapslagret av drivmedel (90 dagar) börjar ta slut, och även brist på gödsel, utsäde och foder.*
 - f. Nu har gränserna varit stängda i 6 månader.
 - i. Vad får det för konsekvenser för er?
 - ii. *Exempel på problem efter sex månader är att natriumhydroxid (lut) till pappersmassatillverkning börjar ta slut, vilket kan påverka livsmedelsförpackningar.*
 - g. Efter 6 månader öppnas gränserna igen
 - i. Vad gör ni nu?

Nu är scenariot slut.
6. Tidigare krissituation
- a. Har ni tidigare varit med om någon större händelse eller kris som har påverkat er verksamhet och förmåga att leverera era produkter/tjänster?
 - i. Hur påverkade det er?
 - ii. Införde ni några förändringar under tiden/efteråt?

- iii. Hade ni förberett er för krisen? Hur?
- iv. Är ni bättre förberedda idag för liknande typ av kris? Hur?
- v. Finns det något sätt ni skulle kunna förbereda er bättre för större kriser och störningar i framtiden?

7. Nu är vi klara

- a. Finns det något mer du vill tillägga?
- b. Finns det andra personer/organisationer ni tycker vi ska prata med?
- c. Har ni några frågor till oss?

In English (translated)

1. We describe the study and the interview
 - a. Welcome.
 - b. Introduce ourselves.
 - c. You have filled in the informed consent form; we just want to remind you that:
 - i. You may at any time choose not to answer a question, but it is very helpful for us if you are clear about when it is something you do not know versus something you do not want to answer.
 - d. This is an interview for data collection for research, not a journalistic interview. We want you to answer based on your role and knowledge, rather than what you think we want to hear or by providing general information about the company/organization; we have quite specific questions.
 - e. We have communicated the interview will take about an hour, and it consists of three parts. It is important for our data collection that we have time to cover all parts.
 - f. Do you have anything scheduled immediately after this? Out of respect for your time, and to ensure we get answers to all our questions, we may need to keep track of time and possibly interrupt if responses become too long, so you are aware of that in advance.
 - g. We will now start the recording.
2. Introduction and description of operations
 - a. Can you briefly introduce yourself and describe your role at _____?
 - b. How long have you worked in the industry?
 - c. What is your market share from a Swedish perspective?
 - d. What does your geographical market look like? (local/regional/national/international)
 - e. And briefly: what does your internal process look like for delivering your product? In other words, what steps or phases are involved (*from raw material to finished product*)?
3. Food preparedness
 - a. How do you view your role in Sweden's food preparedness?
 - b. Do you have capabilities and/or resources that could be used for alternative purposes in a crisis situation?
 - c. A few weeks ago, MCF (the Swedish Civil Defense Agency, formerly MSB) sent out the brochure "If Crisis or War Comes – for Businesses," identifying that companies producing, manufacturing, or distributing food are critical to society. Do you consider yourselves critical to society?
 - i. Have you been officially designated as a critical societal function?
 - d. How do you view the role of authorities (*/the private sector*) in Sweden's food preparedness?
4. Dependencies
 - a. What is your main product (category)/service, focusing on your Swedish market?
 - b. Upstream dependencies:
 - i. What do you depend on in order to deliver your main product?

- ii. For two to three dependencies:
You mentioned XXX
 - 1. What would be the consequences without XXX?
 - 2. Do you have any stock of XXX?
 - 3. Is there a backup plan if XXX runs out or stops functioning?
 - c. Downstream dependencies:
 - i. Conversely - what actors/people/products/organizations depend on you being able to deliver your main product or service?
 - ii. For the most important downstream dependencies: you mentioned XXX
 - 1. What would be the consequences if you could not deliver XXX?
 - 2. Are there any external incentives to maintain your production/service?
 - d. How do you as an organization identify and map your external dependencies, such as those you mentioned here? Do you have all that information compiled somewhere?
- 5. Scenario

We will now present a scenario that we would like you to consider when answering the following questions.

 - a. There are widespread media reports about a situation abroad that is significantly affecting international supply chains and mobility. Experts warn that Sweden's imports and exports, as well as the ability to travel in and out of the country, may be affected within a few weeks.
 - i. How do you react?
 - ii. What proportion of what you need comes from abroad?
 - b. Two weeks later, Sweden's borders are completely closed. This means a total halt to both imports and exports of all goods, as well as a travel ban preventing anyone from entering or leaving Sweden. This is the first day of closed borders.
 - i. How do you react?
 - ii. What consequences does this have for you?
 - iii. What type of signals would have been required for you to act already at the stage when the problem was first reported?
 - iv. Are you prepared for such an event?
 - c. Now the borders have been closed for 1 week.
 - i. What consequences does this have for you?
 - ii. Example: after one week, there may be shortages of plant protection products and salt (which has no domestic production).
 - d. Now the borders have been closed for 1 month.
 - i. What consequences does this have for you?
 - ii. Example: after one month, there may be shortages of chemicals for drinking water purification; stocks typically last about one month.
 - e. Now the borders have been closed for 3 months.
 - i. What consequences does this have for you?
 - ii. Example: after three months, the emergency fuel reserves (90 days) begin to run out, along with shortages of fertilizer, seeds, and animal feed.
 - f. Now the borders have been closed for 6 months.
 - i. What consequences does this have for you?
 - ii. Example: after six months, sodium hydroxide (lye) for pulp production begins to run out, which may affect food packaging.
 - g. After 6 months, the borders reopen.
 - i. What do you do now?

The scenario is now complete.
- 6. Previous crisis experience

- a. Have you previously experienced any major event or crisis that affected your operations and ability to deliver your products/services?
 - b. How did it affect you?
 - c. Did you implement any changes during or afterward?
 - d. Had you prepared for the crisis? How?
 - e. Are you better prepared today for similar types of crises? How?
 - f. Is there any way you could better prepare for major crises and disruptions in the future?
7. We are now finished.
- a. Is there anything else you would like to add?
 - b. Are there other people/organizations you think we should speak with?
 - c. Do you have any questions for us?

Appendix C. Interview guide for public policy actors

In Swedish (translated copy below)

1. Vi berättar om studien och intervjun
 - a. Hälsa välkommen.
 - b. Introducera oss själva.
 - c. Du har fyllt i blanketten om informerat samtycke, vi vill bara påminna om att
 - i. Du kan när som helst välja att inte svara på en fråga, men det är väldigt hjälpsamt för oss om du är tydlig med när det är något du inte vet och något du inte vill svara på.
 - d. Detta är en intervju för datainsamling till forskning, inte en journalistisk intervju. Vi vill att du svarar utifrån din roll och kunskap, snarare än vad du tror vi vill höra eller berätta allmän information kring företaget/verksamheten, utan vi har ganska specifika frågor.
 - e. Vi har sagt att intervjun tar ungefär en timme, och den består av tre delar, och det är viktigt för vår datainsamling att vi hinner med alla delarna
 - f. Har du något bokat direkt efter detta? Av respekt för din tid och för att hinna få svar på alla våra frågor kan vi behöva hålla koll på tiden och kanske avbryta dig om det blir för långa svar på någon fråga, så att du vet det på förhand.
 - g. Nu startar vi inspelningen
2. Intro
 - a. Kan du presentera dig själv lite kort, samt beskriva din roll på _____?
 - b. Hur länge har du jobbat i branschen?
 - c. Hur jobbar ni geografiskt?
 - d. Hur arbetar ni med livsmedelsberedskap just nu?
 - e. Vilka samarbetar ni med?
 - f. Har ni fått något konkret uppdrag just nu?
3. Livsmedelsberedskap
 - a. Hur ser ni på er roll i Sveriges livsmedelsberedskap?
 - b. För några veckor sedan skickade MCF (myndigheten för civilt försvar, föredetta MSB) ut broschyren "Om krisen eller kriget kommer - för företag" där de identifierar att verksamheter som producerar, tillverkar eller distribuerar livsmedel är samhällsviktiga.
 - i. *Hur ser ni på samhällsviktiga verksamheter inom livsmedelssektorn?*
 - c. Hur ser ni på myndigheternas vs. det privata näringslivets roll när det kommer till livsmedelsberedskapen i Sverige?
 - d. Om det blir större kris eller höjd beredskap i Sverige, hur hade ni agerat då?
 - e. Hur stor kunskap har ni om aktörernas omställningsförmåga i kris?

- f. I en krissituation - vad finns det för undantag ni skulle kunna göra för att underlätta för aktörerna inom livsmedelskedjan?
4. Beroenden. Vi har pratat med 30 aktörer inom livsmedelskedjan om deras beroenden.
 - a. Hur kartlägger ni beroenden?
 - b. Samarbetar ni med andra myndigheter för att kartlägga och säkra beroenden?
 - c. Finns det något ni kan göra för att livsmedelsföretagen ska ha bättre koll på eller åtgärder för att säkra sina kritiska beroenden?
 - d. Hur ser ni på att alla är beroende av samma saker? Hur fördelas detta vid en kris? Finns det prioriteringslista? Vad har ni för mandat?
5. Scenario

Hur jobbar ni med scenarier?

Har ni övningar?

Vilka typer av scenarier använder ni?

Tycker ni att man är förberedd för allt om man är förberedd för krig?

I ett scenario där Sveriges gränser stängs helt (totalt *stopp på både import och export av alla varor samt reseförbud som gör att ingen kan resa in eller ut ur Sverige*) hur tror ni att olika aktörer inom livsmedelssektorn skulle klara sig? Hur länge?
6. Tidigare krissituation
 - a. Vilka större händelser eller kriser har påverkat livsmedelsberedskapen tidigare?
 - i. Hur arbetade ni med det?
 - ii. Införde ni några förändringar under tiden/efteråt?
 - iii. Hade ni förberett er för krisen? Hur?
 - iv. Är ni bättre förberedda idag för liknande typ av kris? Hur?
 - v. Finns det något sätt ni skulle kunna förbereda er bättre för större kriser och störningar i framtiden?
7. Nu är vi klara
 - a. Finns det något mer du vill tillägga?
 - b. Finns det andra personer/organisationer ni tycker vi ska prata med?
 - c. Har ni några frågor till oss?

In English (translated)

1. We describe the study and the interview
 - a. Welcome.
 - b. Introduce ourselves.
 - c. You have filled in the informed consent form; we just want to remind you that:
 - i. You may at any time choose not to answer a question, but it is very helpful for us if you are clear about when it is something you do not know versus something you do not want to answer.
 - d. This is an interview for data collection for research, not a journalistic interview. We want you to answer based on your role and knowledge, rather than what you think we want to hear or by providing general information about the company/organization; we have quite specific questions.
 - e. We have communicated the interview will take about an hour, and it consists of three parts. It is important for our data collection that we have time to cover all parts.
 - f. Do you have anything scheduled immediately after this? Out of respect for your time, and to ensure we get answers to all our questions, we may need to keep track of time and possibly interrupt if responses become too long, so you are aware of that in advance.
 - g. We will now start the recording.
2. Intro

- a. Can you briefly introduce yourself and describe your role at _____?
 - b. How long have you worked in the industry?
 - c. How do you operate geographically?
 - d. How are you currently working with food preparedness?
 - e. Who do you collaborate with?
 - f. Have you been given any concrete assignments at the moment?
3. Food preparedness
 - a. How do you view your role in Sweden's food preparedness?
 - b. A few weeks ago, MCF (the Swedish Civil Defence Agency, formerly MSB) distributed the brochure "If Crisis or War Comes – for Businesses," where they identify companies that produce, manufacture, or distribute food as critical to society.
 - i. How do you view critical societal functions within the food sector?
 - c. How do you view the role of authorities versus the private sector in Sweden's food preparedness?
 - d. In the event of a major crisis or heightened state of alert in Sweden, how would you act?
 - e. How much knowledge do you have about different actors' ability to adapt in a crisis?
In a crisis situation - what kinds of exemptions could you make to facilitate actors within the food supply chain?
4. Dependencies. We have spoken with 30 actors within the food supply chain about their dependencies.
 - a. How do you map dependencies?
 - b. Do you collaborate with other authorities to map and secure dependencies?
 - c. Is there anything you can do to help food companies gain better awareness of, or take measures to secure, their critical dependencies?
 - d. How do you view the fact that many actors depend on the same things? How is this managed during a crisis? Are there prioritization lists? What mandate do you have?
5. Scenario

How do you work with scenarios?

Do you conduct exercises?

What types of scenarios do you use?

Do you think that being prepared for war means being prepared for everything?

In a scenario where Sweden's borders are completely closed (a total halt to both imports and exports of all goods, as well as a travel ban preventing anyone from entering or leaving Sweden), how do you think different actors within the food sector would cope? For how long?

6. Previous crisis experience
 - a. What major events or crises have previously affected food preparedness?
 - i. How did you work with these situations?
 - ii. Did you implement any changes during or afterward?
 - iii. Had you prepared for the crisis? How?
 - iv. Are you better prepared today for similar types of crises? How?
 - v. Is there any way you could improve preparedness for major crises and disruptions in the future?
7. We are now finished
 - a. Is there anything else you would like to add?
 - b. Are there other people or organizations you think we should speak with?
 - c. Do you have any questions for us?