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Food and the city: The characteristics of building resilience in local food projects in Rotterdam

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To all who are planting a greener future.

Summary

As all major cities around the world today are witnessing an unprecedented growth in the urban population, it has become imperative to consider building and re-designing existing food networks that are resilient and sustainable to cater to the demands. As an outcome of this, interest in local farming has witnessed a rapid growth over the last two decades. Several alternative urban and peri-urban food production systems have taken shape to enhance the expanse of local food systems of cities. These local food projects need to cope with uncertainties such as sudden spike in demand and change in climatic conditions. Since these initiatives form a part of the local food network, their ability to be more resilient to these uncertainties tend to increase the understanding of how the local food system could work towards becoming more resilient. Therefore, it is important to understand what attributes of local food initiatives make them more resilient. This study aims to articulate the conditions under which urban food projects in and around the city of Rotterdam (the Netherlands) tend to be more resilient and outlines the dynamics of relations between the actors involved under the city's current governance structure.

The five urban food projects chosen for this study were Voedseltuin (a community garden), Volkstuinvereniging Lusthof (allotment gardens for amateur gardening enthusiasts), Natuurluck (small-scale organic farm), Moestuinman (entrepreneur working with local food production) and Rotterdamse Oogst (farmers' market aiming to shorten the link between local producers and consumers). These projects were selected based on their diverse food production practices and their contributions towards local food. Resilience of the projects were assessed using a four-dimensional framework of *preparedness, persistence, transformability* and *adaptability*. To understand where these urban initiatives stand with regards to these parameters, data was collected using a series of interviews and questionnaires for different actors and stakeholders. These stakeholders were divided into four groups, namely the *municipal authorities, consumers, project owners/managers* and *local food producers*. Perspectives of each these groups gave insights and better understanding of the power relation between the stakeholders that work for or against building resilient food projects.

From the research, it was generally concluded that there were four important factors that influence the resilience characteristics of local food projects. *Firstly*, land tenure agreement and availability of the land, *second*, the demand for locally produced food, *third*, use of innovative methods to self-sustain and remain viable and *lastly*, ability of the initiatives to network and form alliances to mitigate potential crisis, financial and local food demand. All these factors are interlinked fundamentally, and the viability of any local food project requires all four stakeholders to work in a synergistic fashion. Since, the primary competitor of local food is cheaper produce from conventional farming practices available in supermarkets, it is important that local food prices remain competitive. The government and *the municipal authorities* can offer financial aids either in-kind or by offering tax subsidies to such projects. The *consumers* need to be given a choice of purchasing local food so that the demand for local food produce is sustained. *Project owners* and *food producers* can work towards teaming up with other initiatives to promote knowledge exchange and create a local. Finally, the *governance mechanisms* can work towards building the infrastructure for the local food system, making it more accessible while also considering the liveability of local producers. Local food projects tend to be more environmentally friendly and cannot replace conventional food production process. It is seen as an undertaking that compliments rather than competes with the traditional means of food production.

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Abbreviations

CAP	The European Common Agricultural Policy
EU	European Union
FS	Food system
GFS	Global food system
IHS	Institute for Housing and Urban Development
LF	Local food
LFS	Local food system
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
RFS	Regional food system
UA	Urban Agriculture
WRR	The Netherlands Scientific Council for Government Policy
WWII	World War II

Keywords

Resilience, (re)localisation, local food projects,

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Chapter 1: Introduction

1.1 Background

How far does food travel before it reaches our homes in the city? It is not very often that we as end consumers think about this aspect of food. Continued globalisation has greatly enhanced the availability of food (Haysom, 2015). For example, apples from New Zealand, almonds from California and Costa Rican pineapples are easily available in almost any other part of the world, including the European markets. Today, the global food system (GFS) serves the majority of the population around the world (Guptill et al., 2017), and access to low-priced food has probably never been easier in history (Godfray et al., 2010). Food is not merely traded among different countries, but the whole food system of producing, distributing, managing and marketing is part of interlinked processes which are shaped by multinational corporations and global institutions (Guptill et al., 2017). However, cities in general do not rely on the GFS alone to feed its inhabitants and they often have their own urban food systems that take shape based on the city's various dimensions, such as population, local climatic conditions, etc. (Dubbeling et al. 2017). The extensiveness, interdependency and complexity of these food systems repeatedly shape cultural, economic and social lives of people involved (Guptill et al., 2017).

As important as food planning is to a city, it has rather received less attention in the field of urban planning in comparison to other aspects such as housing, transport and urban infrastructure (Pothukuchi and Kaufman, 1999; Pothukuchi and Kaufman 2000). Nevertheless, the interest in food planning started to see an upturn because of increased awareness about food systems (FS) being closely coupled with other sectors, such as public health, social justice and inclusivity, local economy, urban resilience and environment (Ilieva, 2016). Planners hold a unique position to contribute to a more equitable FS and increase sustainability in cities and metropolitan regions, by assessing the impacts on land use, sharing knowledge on issues relating to FS and suggesting new concepts for urban and community FS (Ilieva, 2016; Pothukuchi and Kaufman, 2000). The gap between food and planning has been notably addressed among researchers, professionals and planning communities (Morgan, 2009). Both, developed and developing countries, are starting to acknowledge the unfavourable consequences of their current FS, such as the growing prices for basic food, sustainability of the system and food security issues. Furthermore, several countries have actively engaged in urban food policy making, with focus on food strategies, sustainable agriculture and creating a more just FS (Ilieva, 2016).

Food systems in the European Union (EU) have had historical and territorial relevance, making it difficult to make generalizations about it among countries. For instance, land changes among the former East European socialist countries fragmented large-scale agriculture areas. Whereas land for agricultural purposes in the Western European countries increased in size (Van Zanten et al., 2014). Today, the EU's FS is embedded in the global network, meaning a great amount of food is exported and imported from other regions in the world (Rayner et al., 2008). Several countries started looking into a sustainable FS in the region, preserving and maintaining farmlands, which have also become important points to frame the agricultural policies. There have been some changes at the EU and national levels, which mostly include different measures to achieve market regulation by price intervention, providing financial support and exceptions for small-size agricultural businesses. The latter focuses on local trade with an aim to stimulate agricultural activities and strengthen rural development (Canfora, 2016).

In the EU, the city of Rotterdam is home to one of the biggest sea ports in the world and therefore serves as an important link for global and European food networks (Spoelman and Nefs, 2015). Food networks in Rotterdam include global and local food systems (LFS), meaning food produced in urban and peri-urban regions of the city as well as imported food from other countries and regions. The interest in short food supply chains, food produced and distributed locally, resulted in several initiatives aiming to boost the local food network. For example, a commercial urban farming initiative produces food in an abandoned industrial port area, and then used in its own restaurant on site. There are also urban agriculture initiatives which took up social objectives. These initiatives provide either social integration or skill building to unemployed individuals who wish to enter the labour market. In general, these local agriculture projects are producing food either for self-consumption or the food is given to other local initiatives (Schans, 2015).

One of challenges any city with a growing population faces today is the capacity of its own food system to cater to the needs of the populations. In EU, food planning and local production is slowly becoming an integral part of urban planning, to an extent that it can be considered an important social movement of the current century (Morgan, 2009). The city of Rotterdam hosts various urban agricultural projects, ranging from entrepreneurial projects, community gardens and local farms, giving increased attention and support for LFS. However, as food is part of several domains, the city struggles to allocate the right administration unit. For example, looking at food from a green urban space perspective excludes the social aspects of agriculture and the other way around. Thus, one dilemma Rotterdam faces today is how to balance the actors involved local food (LF) with the establishment of short food chain. The cooperation and synergetic alliances between local producers have potential to build a more sustainable and resilient LF system (Schans, 2015).

1.2 Problem statement

Scholars often compare the length of the food chain in regards to the FS and its influence on the cities. For example, the industrialisation of the FS and rapid urbanisation has weakened urban-rural linkages and disconnected cities from its agricultural lands in peri-urban areas (Sonnino, 2009). The 2008 financial crisis influenced price of the food, lowering access to food for some people, and decreasing income for producers (Kneafsey et al., 2013; Morgan and Sonnino, 2010). While environmental and social changes help raising awareness among people to rethink the current FS, making a sustainable and environmentally friendly approach to agriculture important, as well as equity and health of consumers. Many countries and local initiatives started to consider (re)localisation as a more sustainable and resilient solution to current FS, often associated to lower foot miles and production of seasonal food (Morgan and Sonnino, 2010). Although the LFS carries many positive elements, there are others who question if a local food system contributes to improved socio-economic conditions for its urban community.

Many countries rely on global trade to meet their basic needs (Guptill et al., 2017), which leads not only towards the decrease in diversity of production, but also has other social and environmental effects (Rotz and Fraser, 2015). For example, the reliance on technologically-aided, intensified production often drains the soil of its qualities, changes the landscape and reduces security for local farmers (Guptill et al., 2017). For example, farm work is labour-intensive but at the same time to remain profitable payment is low. In addition, the competition in the market creates pressure to continuously increase the production and constantly decrease prices. To meet the demand, producers overuse chemical fertilizers and pesticides, which has

an environmental impact on soil and organisms that come in contact with it (Guptill et al., 2017).

The general public has criticised the global food system for being unequal in its food distribution, having unfair labour practices among agricultural workers, being environmentally unsustainable with extensive use of chemicals, not considering animal welfare and not providing nutritious food to people (Kneafsey, 2010). Concurrently, researchers started looking at different socio-spatial food theories, as alternatives to the current GFS. These include (re)localisation of food production, meaning shortening the food chain between the producers of food and the consumers of food. Shortened food chains are linked in the research to increased access to information, more transparency in the system, reduced vulnerabilities and to build a resilience against the vulnerabilities in the FS (Schipanski et al., 2016; Soninno and Marsden, 2005).

The idea of resilience in FS aims towards reducing reliance on GFS, which is pressured by long-term changes in climate and soil, price volatility, population growth and shifting consumption patterns (Schipanski et al., 2016; Tendall et al., 2015). Resilience, as a concept, is becoming a part of planning and policy discussions. It is also used to understand the capacity of systems, cities or actors to resist or adapt to the change (Dwiartama, 2014). Resilience in the context of FS has been defined as "capacity over time of a FS and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances" (Tendall et al., 2015, p. 19). Achieving resilience requires a shift from profit maximization towards improved management of various elements of FS and multi-level thinking, which is important for (ecological, economic and social) diversity (Hodbod and Eakin, 2015).

Voices in favour of LFS link (re)localisation to improved local identity of food and social life within the community by re-establishing relationships and rebuilding trust between consumers and producers (Fonte, 2008). (Re)localisation, in this context, is defined as a strategy used for building a consumer-producer network around a product (Brunori, 2007), by shortening the food chain. (Re)localisation links products to a geographical location to enhance the value of the products, to address environmental costs of GFS by shortening to the distance food needs to travel to reach the consumer, and creating a more direct relationship between consumers and producers through farmers' markets and other venues (Brunori, 2007; Maye et al., 2007).

Often local food (LF) is associated not only with characteristics like healthy and tasty, but also with diversity, regional identity and potential to influence the production and consumption patterns (Brunori, 2007). For example, LF has the possibility to improve economic viability of the producers by influencing the value of local produce sold. Consumers benefit from accessibility to fresher and authentic agricultural produce of the region and reconnect with the producers. Depending on production scale and method, local production can contribute towards enhancing the environment as it is less taxing on the local ecological system (Smithers et al., 2008). However, (re)localisation has been criticised from social justice and equity perspective, in being limited to those with financial means to participate, excluding part of population with lower incomes and making the LFS more exclusive, hence elitist (Franklin et al., 2011). This outcome is linked to either "inability to serve a diverse population" or "misalignment between programmatic goals and actual outcomes" (Franklin et al., 2011, p. 776).

The LF movement is making an impact on the FS, by emphasising the need for alternatives to the GFS. However, the (re)localisation food movement and the demand for local fresher and organic food has been driven by the personal choice of the consumer and producer, not something necessarily ensured by the state only. As Harrison (2017, p. 43) states: "Claims that we can address our FS's problems through our own individual food politics dismiss the

important regulatory protections that do exist and the essential role of the state in protecting environmental and social justice".

(Re)localisation of the FS in the past few years can be seen as a paradigm shift in food patterns. Though by its the nature, LFS is smaller in scope and scale and local food projects are often run on the basis of voluntary programs and activities, it is seen as response to the GFS. It has also become a movement towards a more just and healthier system, with animal and environmental awareness. It remains unclear to what extent resilience is conceptualised in local food systems, which provides an opportunity for further research.

Although, (re)localisation is influencing food systems, the niche of this study lies in assessing under which conditions and how, if at all, (re)localisation impacts resilience of the LFS. The power dynamics of FS governance is not straightforward. The influence of LFS has been increasing but the power of GFS is still dominant which divides the interests of private business versus communities and individuals. The pressure of finding solutions to the aforementioned problems thus becomes an issue which cannot be addressed by a single entity, sector or project, but is shaped by various actors in government, the private sector, community and consumers. How these actors contribute to a resilient LFS has not been researched into greatly. This research aims to understand under what conditions actors involved in local food projects are able to stay viable and what governance mechanisms are necessary to mitigate the challenges and increase resiliency. This will contribute to understanding of characteristics which can improve or worsen the position of local actors in the local food chain.

1.3 Research objectives

The main research objective is to identify, through different forms of LFS, drivers for (re)localisation of FS and assess to what extent and under what conditions (re)localisation impacts resilience.

The key objectives of this research are:

- to identify and define key characteristics and values of LFS in Rotterdam
- to analyse limits and opportunities for (re)localisation of FS in Rotterdam
- to study under what conditions LFS increases resilience
- to analyse to what extent resilience through localisation is possible with the current governance mechanisms in Rotterdam

The focus of the research is to look into different local food projects in Rotterdam and the actors who initiated a change. Rotterdam is a place where both local and global FS have important roles. The global chain is connected to Rotterdam through the port, while several local actors are trying to look into alternatives to the current FS. This research aims to gain a holistic understanding of conditions that encourage (re)localisation and build resilience of the FS, looking at the phenomena from various stakeholders' perspective and governance mechanisms.

1.4 Research question

The central research question for this study is:

Under what conditions does (re)localisation of food projects in Rotterdam increase their resilience?

The research will look into:

- What are the values, opportunities and limitations of local food systems in Rotterdam?
- To what extend do current governance mechanisms in Rotterdam impact the resilience of local food systems?
- How do actors in local food systems cope and adapt to change to stay viable?

The research question and sub-questions of this research have been formed and adjusted during the literature review, therefore the research does not have provisional research questions.

1. 5 Significance of the study

Food systems has increasing attention in research, looking into the role and the importance it has in shaping our societies locally and globally. Food is central in our lives and often intertwined with other fields like health, employment, education, etc.

The Netherlands plays an important role in agriculture, being one of the leading countries in exporting agricultural products. Rotterdam, as a port city, hosts a range of food businesses. In the past decade, the local government started seeing the importance of the FS and began supporting innovation in business models and food production. Also, when several bottom-up initiatives came into existence, the municipality tried to facilitate the initiatives by promoting urban agriculture and providing help for establishing the initiatives. To some extent, there has been an emphasis at the city level on improving access to local food consumption, which is one of the reasons why the focus of this research is Rotterdam.

It is only recently that researchers started to apply resilient thinking to the study of food systems. The research has focused on understanding uncertainties of the food systems and finding ways to reduce the vulnerabilities. There has not been much research on resilience in short supply chain or research on identifying steps local food actors take to remain viable. Therefore, there is opportunity to better understand the relationship between resilience and local food systems.

The knowledge about different local food projects in the city and their methods to gain resilience can contribute to a richer understanding of conditions and the characteristics of building resilience in LFS. It will also help to interpret how different stakeholders approach LFS and how various actors manage the local food projects. The findings can stimulate discussions about including food in a resilience strategy for the city of Rotterdam or recognising the different characteristics that encourage development of resilient local food systems. For that reason, the contribution of this research lies in linking local food projects to resilience and governance mechanisms that may facilitate or create barriers.

1. 6 Scope and limitations

The scope of this research is a sample of five projects in urban areas of Rotterdam which operate within local food system. Due to the timeframe of this research, the focus is limited to a small number of research units of analysis, which also implies the difficulty to generalise the findings.

The research does attempt to find evidence of resilience in all elements of the food chain, but focuses on actors or projects that initiated a change. The concepts of (re)localisation, local food and resilient thinking have different interpretations, which limits this research to interpret concepts with one definition and its characteristics only. However, this can provide ideas on how to approach the phenomena in future research.

The main research method is conducting semi-structured interviews and distributing a questionnaire, the number of which is also limited to timeframe and availability of the stakeholders and their willingness to participate. The qualitative approach also results in subjective perceptions from different stakeholders. To improve internal validity different sources of data will used. Secondary data will add to the primary data collected in the field and will have to validate the information.

The interviews and questionnaire are conducted in English, which limits the researcher to the stakeholders who can and are comfortable in speaking the language. Limited number of interviews and use of one language only, bounds the research to certain groups and can limit the flow of information.

Chapter 2: Literature review and theory

2.1 Introduction

The starting point of this research is that cities are challenged with continuous urbanisation and a just production and distribution of, and access to food through complex food chains is challenging. In view of this, the context of the study is the (re)localisation process of FS which encourages LF production and mechanisms which support or prohibit it.

The industrial FS, over the last decade, has often been criticized for causing environmental and social problems. Those most frequently mentioned are environmental impacts from global food chains, health and environmental impacts from chemical use, animal welfare, and social inequality from unequal food distribution, lack of nutritious food and unfair labour practices. These criticisms have led to a trend supporting alternative means of food production and consumption, which have interest primarily due to reasons such as, quality, culture, environment and health. (Re)localisation of food production is considered an alternative approach to conventional industrial food production. It is based on the idea that shortening the chain will lead to more equitable, transparent and meaningful liaison between the producers and consumers, as well as improved environment and health (Joassart-Marcelli and Bosco, 2014).

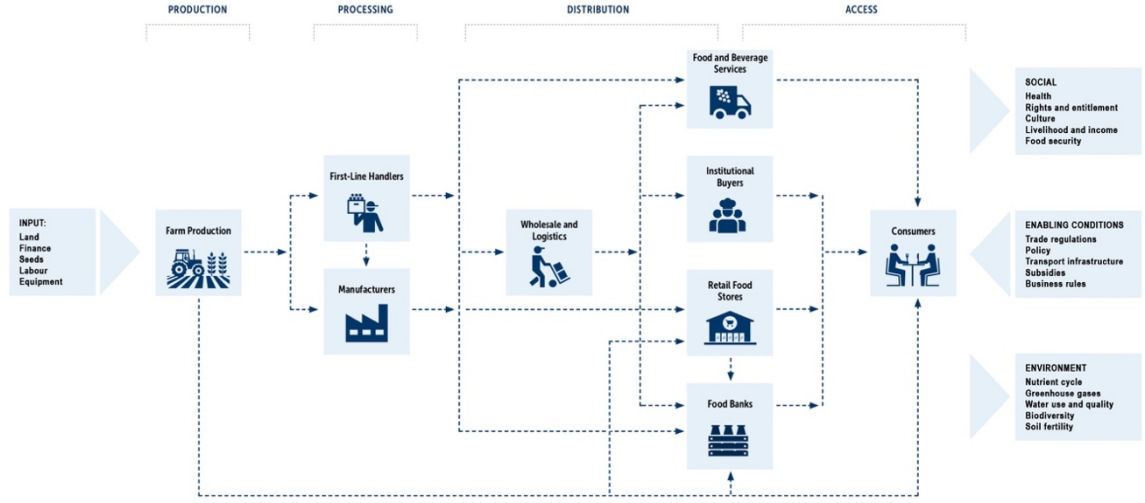
The focus of this study revolves around three concepts, (re)localisation, resilience and governance mechanisms of LFS. This chapter is the theoretical framework for each of the concepts. First the chapter introduces the term FS and discusses different types of FS based on geographical distance between production and consumption. The term (re)localisation is also defined and further discussed in the context of FS by reviewing various academic literature. The first section ends with summarisation of various theories on LFS. Next section discusses the governance mechanism of LFS by discussing which elements or actors involved are governing the (re)localisation process. Subsequently, the last section outlines the concept of resilience in context of the LFS. Finally, the chapter ends with the conceptual framework which illustrates the relationship between all three concepts.

2.2 Food System (FS)

FS is often defined as a chain of processes ranging from production to consumption and disposal, involving different stakeholders who are connected through functional processes and regulatory activities (Pothukuchi and Kaufman, 2000). As shown in Figure 1, the key food chain elements are grouped into production, processing, distribution, consumption and waste disposal which influence the city politically, economically, environmentally and socially (Illieva, 2016). Additionally, they are embedded within complimentary regulations and institutions of the city, which amplify the complex relationship between the elements of FS (Jennings et al., 2015).

Many cities in the world are experiencing rapid urbanisation and growth of the population which has resulted in increased food consumption. Expanding urban areas has impacted land use, resulting in loss of agricultural land while also disconnecting cities from their source of food production. As a result, the cities have become more dependent on the GFS (Sonnino, 2009).

Figure 1: Links among FS components (source: adapted from Jennings et al., 2015 and Zeuli and Nijhuis, 2017)



From geographical perspective FS is represented in different scales:

- Global food system (GFS); a system that operates within long distance and it can extend across the whole world. It is defined by several characteristics, such as diverse production which can be traded in bulks to large retailers, technologically aided, vastness and also considerable effect on ecological footprint (Wascher et al., 2016).
- Regional food system (RFS); a system that is linked to both GFS and LFS. It is characterised by using conventional farming methods and innovation to improve productivity and quality of the produce, working towards more sustainable production (Wascher et al., 2016).
- Local food system (LFS); a system that operates within a shorter chain and it is usually managed by lesser number of people. The chain relies on more conventional and manual methods, while innovation and technology can apply. The relatively small sized farms are selling products in venues such as farmers' markets and strive towards sustainability in food chain (Milestad et al., 2010; Wascher et al., 2016).

Table 1: Comparison global, regional and local FS (source: adapted from Wascher et al., 2016)

	Food chain type	Location	Characteristics	Scale and type
GFS	Global long conventional chains	No spatial boundaries	Large scale and distances between elements Elements of FS spread across the whole world	All scales All intensities of farming
RFS	Regional short/ long conventional chains	Peri-urban and rural	Mainly middle or large scale Large distance between different elements of FS Often part of the GFS, to some extent part of LFS	Includes conventional farming and greenhouses Use of equipment, innovation and machinery
LFS	Alternative/ local/ short food chains	Agricultural land in urban and peri-urban areas	Small-scale Small number of elements in hands of few actors	Focus on small-scale and market niche Often with sustainability principles

Different connections and relationship between components in FS emerge at different scales, in both global and local FS. This research will focus on LFS only. However, we cannot neglect the connections between global and local FS in consumer's choice and market demand.

2.3 (Re)localisation of Food System

The term (re)localisation holds different meanings, depending on the focus of the study. With connection to historical context, (re)localisation is defined as "a return to the greater regional food self-reliance of the past" (Hinrichs, 2003, p. 34). With regards to spatial distance the term is defined as a process "in which locally distinctive quality food products are transferred to regional and national markets" (Maye et al., 2007, p. 6). Fonte (2008) looks at (re)localisation with an aim to reconnect and rebuild relations between producers and consumers, but also as a method to add value by linking food to values associated with the geographical area. Looking from the economical aspect, it is seen as a way to counter the impacts of EU subsidy reforms and trade liberalisation, while also having positive impact on local economy (Maye et al., 2007). In addition, debates on (re)localisation facilitating a new paradigm shift towards territorially based food production in the EU integrate different values of food production, such as social, cultural, environmental and economic, with other entrepreneurial activities, like education, agritourism, conservation, etc. (Soninno and Marsden, 2005; Wiskerke, 2009).

Researchers define (re)localisation differently, however there are some common perspectives in the definitions which are summarised in the Table 2. For the purpose of this research, we follow the definition of (re)localisation that combines Fonte (2008) and characteristics defined by Soninno and Marsden (2005):

> "*A process of changing proximity by linking food production to geographical area while also reconnecting producer and consumer. It is a process which, by shortening the food chain, has socio-economic and environmental impact." (Fonte, 2008; Soninno and Marsden, 2005)*

Table 2: Characteristics of (re)localisation (source: adapted from Soninno and Marsden, 2005, p.195; Wiskerke, 2009, p. 375)

Characteristics	Description
Product relations	"Emphasis on 'quality' linked to region (terroir), tradition; looking for value-added strategies; new producer associations; new socio-technical spatial niches developing"
Consumer relations	"Variable consumer knowledge of place, production, product, and the spatial conditions of production; from face-to-face to at-a-distance purchasing; personal trust based relations"
Economic position of primary producers	"Increase producers' share in consumers' food spending"
Processing and retail	"Local/regional processing and retailing outlets; highly variable, traceable, and transparent; spatially referenced and designed qualities"
Institutional framework	"Local authority facilitation in new network and infrastructure building; local and regional CAP support"
Associational frameworks	"Relational, trust-based, local, and regionally-grounded; network rather than linear-based; competitive but sometimes collaborative"
Environmental sustainability	"Traditional plant varieties and animal breeds adapted to local conditions; low external input production; seasonal products"

2.3.1 Local Food System (LFS)

LFS has different definitions in the literature, which depend on the research focus and subjective interpretations. The complexity of the term, given many different interpretations and definitions, can be overviewed in the Table 3, highlighting important and similar characteristics in different definitions.

Table 3: Different definitions of LFS (source: adapted from Eriksen, 2013 and European Commission, 2015)

Source	Definition: Local food system (LFS)
European Commission, 2015	"A supply chain involving a **limited number** of economic operators, committed to co-operation, local economic development, and **close geographical and social relations** between producers, processors and consumers."
Dunne et al., 2010, p. 46	"Local or community food systems are complex **networks of relationships** between actors including producers, distributors, retailers and consumers grounded **in a particular place**".
Kremer and DeLiberty, 2011, p. 1252	"Efforts to define local food systems are widespread. [...] Thus, local food systems are not merely a delineated **geography** or a flow of consumer goods from production to consumption, they are **natural and social networks** formed through **common knowledge** and understanding of particular **places**, embedded in their localities."
Ostrom, 2006, p. 69	"Most consumers chose to define 'local' in terms of a distance or a **geographical scale** [...] Another group associated it with the characteristics of the farmer or a **relationship with a farmer** [...] Finally, some responses emphasized the **socio-economic benefits** of local purchasing for communities."
Schönhart et al., 2008, p. 244	"There is no single definition of LFS [Local Food Systems] in the scientific literature, but in most cases, **spatial distances** and **personal relationships** between the various stages of the **food supply chain** as well as restrictions to a geographical region are the relevant issues. [...] we follow a narrow definition, in which all activities of the food supply chain - from agricultural food production to consumption - are located within the same geographic region."

Definitions stress the importance of geographical distance between producer and consumer, as well the importance of relations occurring between different elements in the LFS. Moreover, researchers also raise up the issue of 'boundary' in the locality. As seen from Table 3, LFS does not have strictly defined boundaries. However, without a well-defined 'boundary' of the concept 'local', it can be misinterpreted and the vagueness can cause confusion on what is local and what is not (Hinrichs, 2003). For example, Edwards-Jones (2010) gives a general assumption that the perception of 'locality' is adjusted regarding the scale in which the system operates, for example in large countries it is limited to a region, while in a small country it is the country itself. Schönhart et al. (2009) on the other hand defines it as a distance in which a personal network or a relationship between a producer and a consumer can still be established.

Besides the need of defining the boundary when talking about LFS, the definitions share the quality of establishing a relationship network between consumer and producer, emphasising the social aspect of it. Although there is no common definition among researchers, the similarities lead to broad understanding of LFS.

2.3.2 Characteristics of Local Food System (LFS)

In the abovementioned definitions LFS is defined by proximity: geographical proximity and relational proximity. Geographical proximity is used to define the physical or geographical distance between different elements of the food chain. While relational proximity refers to the

network of relationship among different stakeholders in food chain, often through farmers' markets, food networks, etc. (Eriksen, 2013). There are also other characteristics which describe LFS in relation to social, economic and environmental impact. The focus is mostly on building the sense of community, encouraging employment opportunities and adopting to more environmentally friendly production systems (Kneafsey et al., 2013). Together both views explain possible benefits, costs and limitations of a LFS.

Characteristics based on proximity

Geographic proximity

In this context, geographic proximity is defined based on territorial term, meaning a physical distance between different elements of the food chain or a radius within which LFS operates. Defining the boundary in terms of distance or radius is rather difficult as the definition depends on the context and is therefore adjusted to specific case or research (Eriksen, 2013).

Spatial characteristics of LFS often have a tendency to connect LF to food miles, which means the length food travels from production to the market (Eriksen, 2013). Food miles thinking originates from an environmental perspective linking food to its natural territorial area (Coley et al., 2009). The approach was established on an increased recognition that the different edaphic properties lead to diverse food. Therefore, reducing the food miles aims to more explicitly link food to its territorial area of food production and grounding the FS in local ecologies. This is connected to the demand from consumers for better food quality, which benefits have been analysed in growing number of academic literature (ibid.). From early 2000s, food miles have been more often associated to climate change debate and reduction of emissions. "In some ways, this has served to radically shift the food miles argument away from sustainable agriculture production system per se to food distribution and retailing and the use of emissions in transport" (Coley et al., 2009, p. 150), which narrows the responsibility mostly to transportation and fails to address the problems with emitting greenhouse gases from looking at the FS as whole (Eriksen, 2013).

Relational proximity

Relational proximity refers to networks of relationship between different stakeholders or actors involved in the food chain. In other words, LF becomes a connecting element between producer and consumer as the products are exchanged through more direct relationship (Eriksen, 2013). The direct relationship is believed to have also social and economic benefits, including increased transparency and trust (Maye et al., 2007). This translates into purchasing LF from the same farmer, in part taking care of each other (Hinrichs, 2003). The shared care and responsibility through personal and instant connection is an experience that is believed to be only reserved for markets and direct sales, while excluding bigger retail points (Eriksen, 2013). Yet with the increased use of technology, the still relatively direct sale between producer and consumer can travel greater distances, an example are box schemes or other local distribution systems which deliver fresh and locally grown food to consumers (Hinrichs, 2003).

Characteristics based on impacts

Social impact

Kneafsey et al. (2013) correlates the positive social impacts to social interaction which stimulates networking, where people interact and socialise. This has potential to grow into sense of community, meaning establishing social links and improving connections among

several actors in the community (Prové, 2018). Secondly, it also impacts agricultural knowledge. LFS can be used for skill-building and educational purposes, which also has the potential to raise awareness and change consumption patterns. (Kneafsey et al., 2013).

Economic impact

LFS is often associated with economic gains at local level. Kneafsey et al. (2013) acknowledges the difficulty in assessing economic impact especially when collected data might not be transparent or standardized. Nevertheless, shortening the food chain is believed to increase the local sales and employment opportunities in different parts of the food chain, acknowledging the limitation to operating seasonally. Yet, the value of 'local' can potentially open opportunities for other activities like tourism, especially in areas rich in resources in combination with diversity and network (Kneafsey et al., 2013). However, critical voices raise the attention to the possibility that the added value of 'local' might translate to higher prices of products (DuPuis and Goodman, 2005).

From the perspective of the producer, the economic impact of LFS has a different result. Although shortening the chain is believed to bring a greater share of profit for the producer, the direct marketing strategies might have additional financial costs. To reduce labour costs LFS producers often rely on family help, volunteer or casual labour. Also, liveable wages and costs to maintain the infrastructure needed for production, often conflicts with affordability and accessibility of food for those with limited means (Kneafsey et al., 2013).

Environmental impact

Scholars often associate environmental benefits of LFS with reduction in food miles, reduced use of agrochemicals and increased biodiversity in production. Kneafsey et al. (2013) critically look into popular methods of measuring the environmental impacts of conventional agriculture. They believe there is more to consider while evaluating environmental benefits of LFS. For example, although the chain is shortened, local food production might use conventional methods of farming, which still have negative effects. The same applies to food produced out of season, which might have greater impacts than non-local produce (ibid.). Environmentally friendly production is often linked to 'organic' which does not include producers who apply ecological production but are not certified organic producers. It also assumes that organic farms use only environmentally friendly methods (Kneafsey et al., 2013).

Land quality is also another subject discussed in the discourse on LFS, especially within the city. LF projects are often places in abandoned areas, including industrial areas or areas close to traffic, giving a higher chance for contamination of the soil (Prové, 2018).

2.3.3 Critical voices to Local Food

The critical perspectives voice out opinion about associating 'local' in FS to inherently better and preferred choice simply because of its scale, making 'local' a proxy for the 'good'. Born and Purcell (2006) refer to this tendency as a 'local trap' where scholars and activists link local scale with assumptions about being more socially just, sustainable or secure. They further elaborate that assumptions of scale can become a problem when pursuing localisation of FS as a goal, instead of a method to address the problems. Instead, they view the scale as a strategy with good and bad outcomes, depending on the agenda from pursuers (ibid.). Day-Farnsworth (2017) agrees with the 'local trap', but further develops the thought and reasons that "their

scale and place-based nature have made them ideal for experimenting with ways to explicitly integrate values into food supply chains" (Day-Farnsworth, 2017 p. 66).

Many scholars have embraced LFS as a solution to address negative impacts from the GFS. DuPuis and Goodman (2005) look critically into the argument. Their concern lies with localism being based only on the interests of exclusionary and unrepresentative elite society. The authors also caution on characterising FS as local-global binary where 'local' is associated with the standardized and market friendly practices as a defence against the global capitalistic approach. They believe by bringing in a political aspect in the field, it allows one to understand and view a synergistic interaction between LFS and GFS, rather than seeing one resisting the other. In such scenarios, stakeholders can be reflexive about their interests on their own terms about the economic logic of production (DuPuis and Goodman, 2005).

2.3.4 Summary and conclusion of (re)localisation

The overview above frames the complex concept of (re)localisation, which can be understood as a system, consisting of several activities, ranging from production, processing, distribution, retailing and consumption, to interaction between several stakeholders who are embedded within social, cultural, environmental and economic context. In general, (re)localisation is often associated with shortening the food chain. It is a characteristic which is common to LFS. The discussion above also highlights several others characteristics, which are grouped in two different approaches used to assess (re)localisation. Although different, the two approaches share similarities. The common characteristics include benefits from shortening the distance and increasing the producer-consumer relation, as well as linking food to its production area, which does not only add value to the produce but builds relationships among different stakeholders involved in the chain. Thus, in this research (re)localisation is understood not only from geographical proximity, but also from social, environmental and economic impact.

2.4 The politics of localisation

In Europe 'local' is considered an economic stimulant which adds value to agricultural produce and LFS as a strategy to enhance rural livelihood. Over the years EU's subsidy reforms have changed agricultural landscapes by intensifying production and rescaling farmland, all to remain competitive in the global market (Van Zanten et al., 2014). The roots of encouragement of (re)localisation in the EU is linked to the notion to protect rural economies from potential negative consequences of trade liberalization and reform processes of The European Common Agricultural Policy (CAP), the main agricultural policy linking urban centres and farmers (DuPuis and Goodman, 2005; European Commission, 2018).

Over the years EU has taken several steps towards stimulating agriculture, however the focus has been to promote the qualities of territorial proximity, attempting to link food to its territorial origin by labelling food. For example, policy initiatives such as Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) protect and promote products and their geographical origins (Maye et al., 2007). Basing food on cultural and territorial traditions is believed to improve trust from the customers and consumption of fresher and less processed products (Wiskerke, 2009).

At the global level, multinational corporations have power to define the agricultural model for the global trade. This has meant focusing on industrial agriculture and global trade. Yet, at

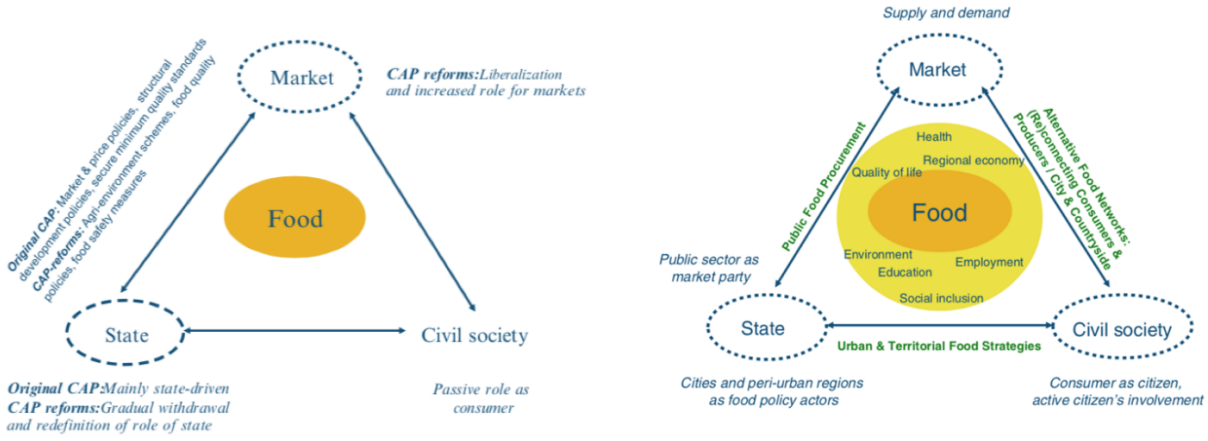
European level, there have been attempts towards promoting sustainability and health, focusing on food quality and safety. Following the new focus, agencies at the EU level set up standards to secure the food safety, European programs attempt to facilitate and link agriculture and people living in urban areas and similar. However, at the local level it is the local government that plays an important role in facilitating LFS through policies and planning (Prové, 2018). Therefore, these processes of local governance are important, especially their role in how and what is supported by helping the development of LFS (Maye et al., 2007). Local government can facilitate LFS through policies and planning (Prové, 2018).

2.4.1 Governance mechanisms in FS

Governance mechanisms in FS involve different actors and their interactions; actors are state, market and civil society where "the state mainly corresponds to public regulation in order to structure collective action, the civil society's governance mechanisms refer for example to active citizen's participation and democratic control. The market, on the other hand, mainly makes use of market regulation mechanisms such as prices and rules for market liberalization or privatization as means to govern market partners' actions" (Lamine et al., 2012, p. 238).

Food is seen as a tradable commodity and economic stimulant, central to shaping of the market. At the same time, it is an important element in state interventions, which with policies address markets, public regulations, farm structures or other. This indicates that the state and the market are key governance mechanisms, while the civil society's involvement is limited to interest groups participation in the policy making process and to the market's individual end user (ibid.). After the WWII, the CAP was put into practice to create European self-sufficiency by increasing food production to provide cheaper food for the growing population and to strengthen the role of agricultural industry. Figure 2 represents linkages and compares the European governance mechanisms during the period around 1960-1985 with governance mechanisms in more recent years.

Figure 2: Outline of governance mechanisms in past and in recent years (source: Lamine et al., 2012)



In old model (Figure 2, left), state has a dominant role as it regulates the price and subsidies, thus interfering in commodity markets. It focuses on structural development to modernize and intensify agriculture (Lamine et al., 2012). The new model (Figure 2, right) incorporates different logic to governance mechanisms, where actors involved in food system do not have a dominant role. The idea behind is to create a balanced system and redefine roles of the

governance, which means not only active involvement of the citizens, but also increasingly important role of government at the local level in developing and implementing food policies (ibid.) In this way, the model discourages the power of the state and focuses on creating an interaction and involvement of various stakeholder groups, which might have different objectives (Prové, 2018).

Local governments are becoming more involved in governance of local food systems, recognising various benefits. Food is a multi-functional element which effects several departments within the municipality. This also mean that food policy becomes integrated in several agendas, including environment, food quality, health, etc. Cooperation among different departments might pose a challenge for policy development, as departments might have different objectives and struggle to find a common way to integrate food issues in their agenda (Lamine et al., 2012 and Prové, 2018).

Involvement of local government

Local government plays an important role in LFS. Food is multi-functional and it touches several sectors within the municipality, including environment, health and energy. These are the topics are also related to the sustainability of the city. This also means that the local government can be involved in all elements of the food chain: production, processing, distribution, consumption and disposal. In addition, it plays an important role in supporting or creating barriers to LFS (Prové, 2018).

The role of local government in LFS is explained in Table 4, however there is only a limited number of examples. One important responsibility the local government has is establishing land use regulations, which influence the location of green and agricultural areas and urban development. Local government can also promote LF projects or activities by providing access to vacant public spaces. Secondly, monetary support from the municipalities can help establish new start-ups or promote LF projects. Thirdly, local government also offer non-monetary support through publicity, reports and strategic documents that value the LFS and promote healthy diet and sustainable lifestyle. This can further lead to policy making (Prové, 2018).

Table 4: Involvement of local government (source: adapted from Prové, 2018)

Involvement	Description/Examples
Documents	Reports or strategic documents include food as a topic which can be linked to agriculture, health, cities and other. This includes repots on how to eat more sustainable, assessments of LFS and strategic plans on producing food within the city
Regulations	Regulations and permits for all elements of the food chain. Land use determines which areas are available for agriculture. Regulations on farmers' markets determine where and when it can operate. Promoting sustainable and healthier diet.
Financial	Providing financial support in form of grants to community gardens. Start-up funds for local food business ideas. Establishing subsidies for seeds and materials.

Involvement of citizens' initiatives

The term 'citizens' initiatives' describes a collective activity within a public domain led by citizens who are actively shaping some aspect of their community. In many cases, the formation of initiatives is a result of a dissatisfaction with the current situation. Initiatives often take a different approach to address local needs in comparison to the public sector and are driven by

a strong a desire to improve liveability in the area (Hassink et al., 2016; Wentink et al., 2017). The various citizens' initiatives, operating within different fields, share similar values and ideas. Most often the initiatives have a clear social objective and wish to empower and educate people. They have their own objectives and try to establish own means of finance, which can help to decrease the dependency on the state's bureaucracies (Hassink et al., 2016).

Local government can be collaborative and often supporting or facilitating the citizens' initiatives. However, the relationship can also be challenging, as it can be difficult for the public authorities to accommodate the expectations and needs of the initiatives in terms of space and support (Hassink et al., 2016).

The politics of consumption

In the past decade, the consumers show an increased interest in local food, often in connection with rediscovering traditions and identity of local production in comparison to industrial and processed food. Consumers tend to associate LF with perceptions of freshness and quality, including factors like supporting local economy and preserving the environment (Aprile et al., 2015; Feldmann and Hamm, 2015).

Although the mentioned factors influence consumers' purchasing behaviour, many consider affordability and convenience as important. Also, consumers' behaviour on food has changed over the past years. Busy lifestyle and inexpensive processed foods influenced on cooking at home, which started occurring less often (Theis, 2017). Local producers who are focusing on small scale and sustainable production struggle to enter the conventional market as they are too small to compete within the market (Day-Farnsworth, 2017). Thus, to enter the conventional market local farmers need to either scale up, mechanisation and reduce biodiversity to lower the production costs, increase the production to meet the demand and to attain profitability (Lawless and Morales, 2017). Farmers seek other options and often use direct marketing where they can ask for a higher price for the small volume of fresh crops (Day-Farnsworth, 2017).

Consumers have also been considered as a force that can impose meaningful social and environmental changes in the food system by their choices of consumption (Eaton, 2017). The current wave, 'alternative consumerism', considers individual acts as methods "to reform existing marketplace and structures of capitalist society" (Lang and Gabriel, 2005 p. 50). While the idea of individual choices intervening in the market is often considered very essential, Lawless and Morales (2017) point out the important role the government has in governance. For example, subsidies for certain production method, land use and regulations on food production and safety can eliminate the choice or steer the food production in a direction which is more preferable.

There appears to be a division between production and consumption. One looking for ways of reducing barriers to the market, while the other focuses also on challenge of accessibility and affordability of food options in supply chains (Day-Farnsworth, 2017).

2.4.3 Summary and conclusion

This part has given a critical overview of the development of food governance mechanisms in context of EU. It is important to understand that historical trajectories in governing the FS. Both, political and economic changes have had an impact on the present day. The relationships within the governance mechanisms changed and the recent interactions consider different actors involved in LFS. The change can be seen as a transition from top-down to an approach where different groups of stakeholders interact together. In addition to the state, consumers and

citizens' initiatives gain power over regulatory mechanisms in aiming for environmental and social security.

To point out, the aim of this study is not to look in great detail at multi-stakeholder involvement in governance. Instead, it is to increase understanding about the conditions that LFS operates in and how various state policies mitigate the market impacts.

2.5 Resilience

The concept of 'resilience' exists in different disciplines where resilience thinking also frames interactions and actions linking different sectors, like ecological and social, and systems at various scales, etc. (Walsh-Dilley, et al., 2016). Resilience thinking evolved mainly from the discipline of system ecology, with one of earlier definitions and applications from Holling (1973), who defined resilience as the ability of a system to absorb changes and still maintain its state. It has been also applied in social psychology where it expresses the ability of a group to revive from a difficulty. It is depicted as emergence of people to self-organise for their survival through crises and unforeseen calamities. Leadership, enrichment of social capital or use of educational expertise are elements which help to mitigate crises (Dwiartama, 2014).

2.5.1 Resilience in context of Food System (FS)

Practitioners, planners and policy makers have an increased interest in addressing resilience in food systems, as a response to perceptions of uncertainties, including climate change, increased food demand, economic crises, growing population, etc. (Tendall et al., 2015).

Resilience in the context of FS has been addressed from different perspectives, a selection of these various approaches is seen in Table 5. These definitions often focus either on an element of the FS or a particular outcome, such as food security. Each element can be subject to unpredictable drivers of change and can be affected in various ways (Tendall et al., 2015).

Table 5: Different definitions of resilience in FS (source: Franklin et al., 2011; Hodbod and Eakin, 2015; Tendall et al., 2015; Toth et al., 2015)

Source	Definition: Resilience in FS
Franklin et al., 2011, p. 774	"Resilience, although a somewhat fragmented literature, can broadly be thought of as **the ability to adapt** and **respond to external impacts**."
Hodbod and Eakin, 2015, p. 474	"However, the **resilience of food systems** is distinct from the broader conceptualizations of resilience in social-ecological systems because of the fundamentally normative nature of food systems: humans need food to survive, and thus, **system stability** is typically a primary policy objective for food system management. However, society also needs **food systems that can intensify sustainably**, i.e., feed everybody equitably, provide livelihoods, and avoid environmental degradation while responding flexibly to shocks and uncertainty."
Tendall et al., 2015, p. 19	"Food system resilience: capacity over time of **a food system** and **its units** at **multiple levels** to provide **sufficient, appropriate and accessible food to all**, in the face of various and even unforeseen disturbances."
Toth et al., 2015, p. 20	"Food resilience is rather an ability of the food system, which enables it to readily **adapt to changes** in external and internal conditions, to **adjust to shocks** to the system. Resilience, for example, is a broader issue, an ability of the system to produce the state of food security under any conditions, in both the short and long term."

Different interpretations of resilience in the FS also translates to scholars struggling to agree on one definition only and therefore applying resilience thinking differently to various aspects of FS. For the purpose of this research, we follow a definition of resilience which is an adaptation from Tendall et al. (2015) and Toth et al. (2015):

> *"The ability of a food system and its units to provide sufficient, appropriate and accessible food to all by adapting to changes in external and internal conditions and by coping with various disturbances to the system." (Tendall et al., 2015; Toth et al., 2015)*

Strategies to enhance resilience in FS are also subject to different approaches. Pingali et al. (2005) suggest strengthening local networks, reinforcing diversity and knowledge from the farmers as intervention strategies to improve resilience. Other researchers link resilience thinking to the multi-functionality of the FS (Hodbod and Eakin, 2015), co-operation between different scales and producers, fairer market and access to agricultural land (Rotz and Fraser, 2015). Focus on producer's side of the food chain, often fails to address societal well-being in the resilience thinking. However, recently scholars acknowledge the social dimension as an element needed for resilience of the whole FS. This view addresses issues such as social justice of different elements of FS and access to appropriate food (Schipanski et al., 2016). In parallel, Tendall et al. (2015) looks into assessment of resilience in relation to food. The emphasis is on looking at the FS as multiple interlinked components at various levels and sectors. Resilience thinking has also been linked to a place-based perspective, looking at the capacity of the communities, developing a framework to analyse the cities in four steps: preparedness, persistence, transformability and adaptability (Davoudi et al., 2013; Mehmood, 2016).

Resilience framework

The four-dimension framework of resilience thinking, developed by the Davoudi et al (2013), helps to evaluate the capacity of (re)localised FS to mitigate and adapt to changes in a more dynamic and holistic way. The changes and vulnerabilities can disturb the sense of safety and protection of actors and projects involved in the LFS. The framework puts a great emphasis on a humans' capacity to plan and anticipate changes (Davoudi et al., 2013).

Preparedness is focused on the ability of the society to learn, meaning learning from past experience and exchanging knowledge among actors involved, working towards a better situation for the people (Mehmood, 2016). Although it is difficult to foresee the impact of the changes and deal with uncertainties of the future, identifying threats and opportunities is an important feature to increase the probabilities of transformation towards resilience (Davoudi et al., 2013).

Looking at vulnerabilities at the preparedness stage of LFS acquiring land is one of often mentioned. There is limited space available in urban and peri-urban areas of the city, causing competition for land between LF projects and other commercial activities, which in comparison might be more profitable. Thus, LF projects are often established on temporarily empty plots, having a rental agreement for the area, which can be terminated at any moment. In addition, LF projects within the city are often located on empty spots in either former industrial areas of the city or in areas close to the traffic road, which can lead to contamination of the soil (Knapp, 2013). Farmers on the other hand have to deal with high land costs to purchase their own plot, which is one of the bigger obstacles in the long term (Ventura and Bailkey, 2017).

In addition, support from the community is also needed both for the establishment and integration of the project, which is needed for the acceptance of the project to the neighbourhood (Knapp, 2013). LF projects can change the way people interact with food and re-establishes the conditions of the community by empowering people through skill building, education and improving health. In addition, they can be a low-cost investment in neighbourhood redevelopment, not only by providing outdoor green spaces but also a space for the possibility of social connectedness (Ventura and Bailkey, 2017). On the other hand, the municipality also plays an important role with its support of LF projects not only with regulations but also with support for establishing the projects in the first place (Knapp, 2013).

Persistence is a characteristic related to robustness of the system, relying on social capital and networks. Increased social capital contributes to a strengthened sense of community (Davoudi et al., 2013; Mehmood, 2016). However, the robustness of the LFS has to align with capability to be adaptable and innovative, otherwise it becomes a disadvantage to the system (Davoudi et al., 2013).

Small scale farmers struggle with profitability and access to the market. Yet, to make the investments worthwhile, farmers need to reach consumers, add value to food produce and establish relationship with local distributors or consumers. With the increased demand for the local products, farmers are able to obtain a higher price for their produce. While the local farmers are usually too small to meet the price and quantity demands, they are better suited in local markets which demand smaller volumes of fresh products. In this way farmers are able to fill the demand while maintaining the higher price for the produce (Ventura and Bailkey, 2017).

A resilient system needs to provide livelihood for the producer to ensure they are economically viable, which is also determined by costs of labour. To reduce the costs, LF projects often engage with community volunteers who help with work. The negative side is limited knowledge of food production from the volunteers which might result in additional efforts and time needed to manage them. There can also be less commitment and reliability of volunteers (Ventura and Bailkey, 2017).

Transformability is an ability to reorganise and regenerate. Although the transformation is uncertain, it is also an opportunity to steer the change in the preferred direction. It is important to point out that a desirable path can reflect the desire of powerful people involved (Davoudi et al., 2013). Yet, the process allows the community to be innovative and improve relationships between groups by empowering people (Mehmood, 2016).

It is important to maintain knowledge of food production by exchanging information on the topic among actors involved in LFS (Toth et al., 2015). Knowledge exchange can be about food production where producers attempt to self-educate themselves about food or aim to re-educate. It is experience, discussion and exchange among actors in formal and informal ways that build up the local knowledge (Fonte, 2008). Local projects are also a place where innovation can be encouraged and scientific theory tested. This includes advancements in food production, but also in distribution (Toth et al., 2015; Ventura and Bailkey, 2017). The characteristics of LFS makes it easier to apply innovation because "their scale and place-based nature have made them ideal for experimenting" (Ventura and Bailkey, 2017 p. 66)

Adaptability is linked to flexibility with additional necessity of resourcefulness. This translates to cross-sector connections and networks which encourage the flow of ideas and resources (Davoudi et al., 2013). This is important especially for community building, as it creates an identity and establishes a solid relationship. At the same time, it contributes to bigger social capital by creating alliances and by expanding a project's networks (Mehmood, 2016). The second element of adaptability refers to efficiency and diversity, which is believed to enhance resilience. Diversity means different functional roles, economies and mixed-use developments (Davoudi et al., 2013).

Farmers increase their viability by having a flexible business model. A multi-functional approach is also an opportunity to combine food production with other activities which help to raise the income. Usually the activities are compatible with food production and range from education, recreation, connection to nature and similar (Spoelman and Nefs, 2015). Some local community projects focus on other goals in addition to food production, including building a community and making a profit. Food production might not be the highest priority, but additional programs might be needed to support the whole project (Ventura and Bailkey, 2017).

On the other hand, the additional activities can expand to distribution or processing, allowing producers to acquire their own label from the LF project (Knapp, 2013). This also means establishing a network. A network of actors is argued to be stronger in achieving goals and is more robust in comparison to individual entity only (Spoelman and Nefs, 2015).

2.5.1 Summary and conclusion on resilience in FS

Resilience thinking in relation to FS does not have a single definition, but there are some similarities among the different definitions. Also, researchers suggest various unlike strategies to increasing resilience in FS. The complexity of the term and the system are often the subject to individual interpretation. In the research, different definitions and approaches were analysed, resulting in a combined definition which is the focus.

Assessing resilience in the food system has been approached on a theoretical level more often than applied to case studies. For that reason, the research adapts the resilience framework with a four-dimensional assessment. The resilience framework puts an emphasis on identifying vulnerabilities of the system to be able to work with opportunities and persisting in the face of crisis. Vulnerabilities are present in different stages and areas of LF projects, yet are important to acknowledge for the system to be able to build upon and become more innovative.

2.6 Conceptual framework

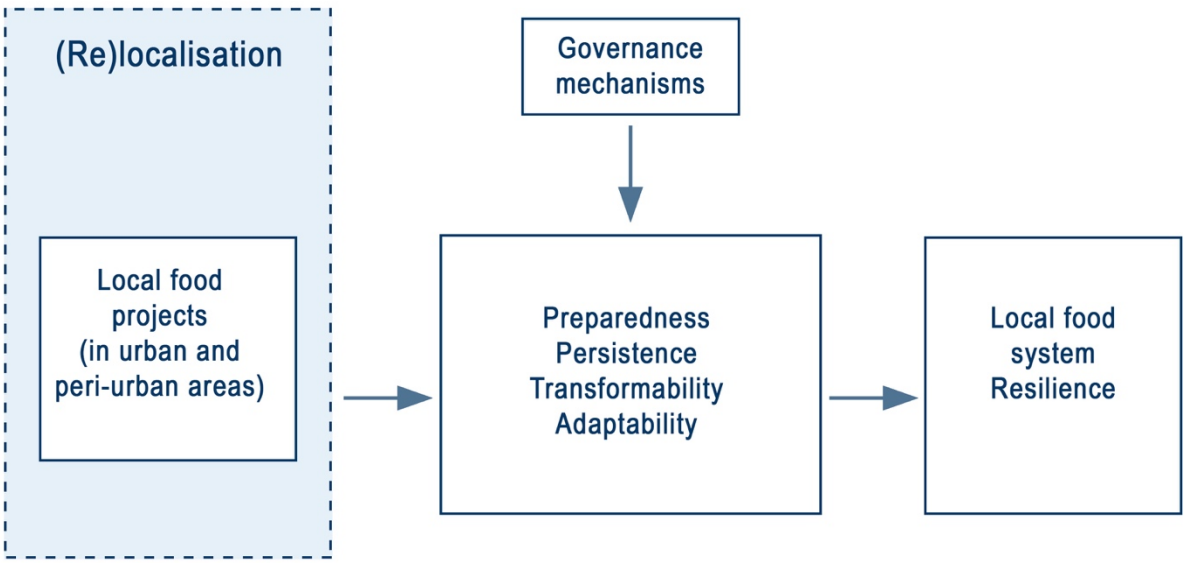
This section is central to the conceptual framework which defines and presents the relationship among the aforementioned theoretical concepts. The main objective of the research is to gain insight to understanding resilience from the perspective of (re)localised food systems. The study seeks to understand how different local food projects have similar or different coping and adaptive capacities, and what are the drivers for (re)localisation of FS in the context of Rotterdam. Due to the diverse range of LF projects, the study was not restricted to one type of LFS, but it examined different projects involved in the local system.

The literature review explains the concepts and their relation to the research topic. Resilience thinking has been applied to planning and policy discussions, also in the context of FS as a response to different uncertainties in the future. The conventional food system is pressured by

long-term changes in climate and soil, price volatility, population growth and shifting consumption patterns (Schipanski et al., 2016; Tendall et al., 2015). (Re)localised system is regarded as a system that reduces reliance on GFS and its vulnerability, thus having a possibility of becoming more resilient. (Re)localisation of food system is considered an alternative to conventional food system by shortening the chain and bringing producer closer to consumer (the geographical and relational proximity). In addition, the concept of (re)localisation is based on the idea that short supply chain will improve environment, health, social and cultural aspects of food chain (social, economic and environmental impacts). The scale and territorial nature of LFS makes it possible to experiment and find more resilient solutions to challenges and changes (Eriksen, 2013; Kneafsey et al., 2013; Day-Farnsworth, 2017). Thus, a resilient system has to have a capacity to anticipate the challenges and plan (preparedness), to resist the changes (persistence) by being innovative (transformability) and by being flexible and moving towards desirable outcomes (adaptability) (Davoudi et al., 2013). However, to be able to achieve that, there are several voices steering the process. Governance mechanisms involve different actors who can support and protect or eliminate choices, opportunities and access. They are important element which influences achieving resilience in the LFS. From the literature review, it is seen that the governance mechanisms influence the coping and adaptive capacities of the projects and dictate the conditions under which the projects can operate.

The relations between these three concepts was explored to gain more insights about how LFS operate within the current governance structure and how they can become more resilient. In the current political and economic environment, it is important to utilise resilient thinking and assess current and future capacity of the food system.

Figure 3: Conceptual framework



Chapter 3: Research Design and Methods

This chapter describes the operationalization of variables, research strategy, data collection methods and sampling strategy. First, the theoretical concepts are broken down into variables with measurable indicators. Further, the research strategy and data collection method is explained. Finally, validity and reliability and the limitations of the research strategy are discussed.

3.1 Revised Research Question

The research question and sub-questions of this research have been formed and adjusted during the literature review, therefore the research does not have provisional research questions.

The main research question is:

Under what conditions does (re)localisation of food projects in Rotterdam increase their resilience?

The research will explore the following questions:

- What are the values, opportunities and limitations of local food systems in Rotterdam?
- To what extend do current governance mechanisms in Rotterdam impact the resilience of local food systems?
- How do actors in local food systems cope and adapt to change to stay viable?

3.2 Operationalization: Variables, indicators and measures

The theoretical concepts, which are described in Chapter 2, are unpacked into measurable tools which are used to answer the research question and define the research in a tangible way. First the main concepts are broken down into variables, which are further unpacked into indicators that can be measured. Operationalization process can be overview in Table 6.

Table 6: Overview of operationalization of theoretical concepts

Main research question	Concept	Variable type	Variables	Sub-variables	Indicators	Description
Under what conditions does **(re)localisation of food projects** in Rotterdam increase **their resilience**?	(Re)localisation of food projects	*Independent Variable*	Proximity	Geographical proximity	Length of food chain	Looking either food meant to be sold within the same community or it is exported.
					Logistics of food distribution	Looking into distribution methods.
				Relational proximity	Involvement in farmers' markets	Looking at farmers' market as point of retail.
					Relationship between consumer and producer	Looking into the relationship between producer-consumer (direct sales of produce vs. distributer, etc.)
			Impacts of local food system	Social	Sense of community	Looking to what extent LFS influences community feeling and social networks
					Skills building	Looking if and to and to what extent does LFS increases the knowledge on food production skills.
				Economic	Sales margin	Looking at the sale margin and livelihood of the producers.
				Environmental	Methods of agriculture	Looking at production method and its intensity.
					Land quality and environment	Looking at land quality and use of pesticide or chemical.
	Resilience in its local food system	*Dependent Variable*	Coping capacity	Preparedness	Land tenure arrangements	Looking at ownership of the land and rental agreements.
					Support (from the community)	Looking at the attitude from the community towards LFS
				Persistence	Demand for products	Looking at the demand for products of LFS
					Employment agreements	Looking at ways of operating: volunteering, employed, etc.
			Adaptive capacity	Transformability	Knowledge exchange among actors	Looking at workshops, meetings, etc.
					Ability to innovate	Looking at the projects that stimulate innovation.
				Adaptability	Multi-functionality and flexibility	Looking at emergence of diverse activities on production site and not just food production.
					Building alliances and network	Looking either producer is part of network with other farmers, sells another people's produce, etc.
	Governance mechanisms	*Mediating variable*	Level of involvement		Financial support	Looking at ways LFS gains financial support.
					Policies and documents on LFS	Looking at presence of different policies: food policy, strategic documents, resilience, etc.
					Attitude towards LF	Looking at attitude towards LF, including support and barriers.

Variables

(Re)localisation of food projects

The concept of (re)localised food projects is defined by two variables: proximity and impacts.

The first variable *proximity* is broken down into two sub-variables: geographic and relational proximity. The second variable *impacts of LFS* is divided into three sub-variables: social, economic and environmental impact.

The operationalization of the variables is based on characteristics from the theory. As the two variables, *proximity* and *impacts of LFS,* described slightly similar, the indicators are limited to two for each sub-variable, limiting to the most important ones which describe the concept.

One of the objectives of the research is to identify and define key characteristics (re)localised food system, meaning looking into local food projects in Rotterdam. To be able to do so, indicators become a guiding point for the data collection method.

Resilience of local food system

To be able to assess resilience in the context of food system, the concept is analysed through four-dimensional framework. It is divided into two variables: coping and adaptive capacity.

The variable *coping capacity* is considered from two perspectives, preparedness and persistence, while *adaptive capacity* is associated with transformability and adaptability.

Together the two variables analyse vulnerabilities and capacity of the projects in the face of a crisis, applying resilience thinking to help to evaluate the current LFS and to assess its ability to cope with disturbances to the system.

Governance mechanisms

Governance mechanisms in LFS are seen as: "the interactions between state, market and civil society."

Governance mechanism can both, support or create barriers to LFS. The aim of the study is not in analysing the governance mechanism to a great extent. At the same time, they cannot be ignored. For that reason, the indicators touch different points of governance mechanisms, with greater emphasis on the municipality and the local actors and consumers, in comparison to other elements. The analysis will focus on their attitude towards LF and presence or absence of regulations, policies and financial support.

3.3 Research methods

A case study research methodology is used as the primary research strategy in this thesis. The objective of this type of research is to obtain in-depth knowledge, which helps to describe and explain the extent of the research problem. A case study approach appears to be a suitable choice since it helps to understand the underlying phenomena in depth and more so because the context, the city of Rotterdam, cannot be isolated from the research (Thiel, 2014).

The case study strategy uses different sources of data and methods of data collection. For the purposes of this work, a mixed method approach is followed where primary and secondary data

is combined to perform the analysis. Applying a mixed method approach offers the benefit of triangulation that improves the validity of the study (Thiel, 2014). The research is looking into the relationships between factors and the extent to which one influences on another by approaching people with direct and indirect experiences or knowledge on subjects of the research. The case study research strategy is expected to provide new insights about the relationship between (re)localisation and resilience of FS under current governance mechanisms.

This research uses a multiple case approach where several different LFS in the urban areas of Rotterdam are analysed. The purpose of the study was not to find a representative agribusiness in the city, but to look at several different initiatives to get a better understanding about what are actors' attitudes towards LF. In addition, a comparative case study approach increases the possibility to increase the validity of the research (Thiel, 2014).

3.4 Data Collection Methods

The research will combine primary and secondary data sources. The primary data collection included semi-structured qualitative interviews, expert interviews, questionnaires. Secondary data sources were also used to triangulate.

Secondary data collection

The secondary data in this research is mainly qualitative and it is summed in the Table 7. The secondary consists mainly of reports and documents from previous analysis on the topic from different perspectives. The secondary data also serves to explore the topic more in detail and get acquaintance with the phenomena, as it consists of "earlier research findings (data) which can be used anew in another study on same or a related subject" (Thiel, 2014, p. 104). In addition, it also provided guidance for designing the interview manual. It is also used for the triangulation of the data. Further, it is helpful to clarify meanings from the primary data sources and to reduce the misinterpretation of the findings (Stake, 2008).

Table 7: Overview secondary data sources

Source of information	Type of data
Online government official sites	Publications, policies, regulations, statistics
Academic literature	Empirical studies on local food systems in the Netherlands or abroad
Municipal reports	Evaluations, research
Online websites	Projects' websites, online articles, newspapers, magazines, blog posts

Statistical data from the municipality was mostly used to gain background information on the city and its population. Policy documents on LF were limited and almost non-existent, thus reports and strategic documents from the local and national government served as guide in understanding LFS in the Netherlands and Rotterdam. Also, reports and strategic documents helped to address food topic from different perspectives. Empirical studies on LFS added to overall knowledge on LFS. Online publications about the local food projects in Rotterdam,

documents and articles about the project were used to refine the content of the research. Other various online websites and articles helped to explore additional information on LFS in Rotterdam and provide different angles to the topic. Due to the timeframe, secondary data was limited to the research questions, findings from the literature review that relate to the concepts and, consequently, operationalization.

Primary data collection

Semi-structured interviews

The main source of data collection is obtained using semi-structured interviews. Interviews are a method often applied, but not limited, to case study research. Thiel (2014) describes interviews as a flexible way to obtain non-factual information. The semi-structured interview is used as a data collection method as the nature of this method enables gathering opinions and perceptions. In addition, this method helps to validate certain facts or information from secondary data sources.

Interview questions were formulated based on the operationalization of the variables, which in addition also framed the focus of the research. An interview manual was made beforehand, helping to conduct the interviews better. Interview manual contained both keywords and fixed elements, such as introduction, questions and conclusion. As the conversation drifted away from the intended path during the interview, keywords were used as a guideline for keeping the research focus in mind, but also allowing flexibility in asking information (Thiel, 2014).

The stakeholders who participated in the interviews had different backgrounds; from producers to distributers, professionals, including actors who were directly and indirectly involved in the LFS. Various stakeholders had different approaches to the LF, different knowledge of the concepts or their expertise and experiences were in sync with one concept more than the other. For that reason, the interviews were adjusted to specific group of stakeholders. To make the data collection easier, the interview had additional supplement questions which helped with flexibility. It made it easier to adjust the focus of the conversation for each stakeholder, deepening on their familiarity of the topic. Also, it was important to take into consideration that interviews had limited time and therefore the dilemma between following the flow and going deeper into the specific topic or following the operationalization framework and covering all three concepts occurred. The location and time of the interview was adjusted to the choice of the stakeholders as it was important to create a good and relaxed atmosphere. In many instances the stakeholders also involved me in their project or showed me around the area to understand their work better.

The initial part of the interviews was centred around the project, initiative or organisation. In most cases this part was necessary for understanding the work better and it also opened a possibility to adjust and ask additional questions linked to the research. In most of the cases, most questions were answered, but the interview did not follow the interview manual order of the questions. The decision was taken as the priority was to concentrate on the flow of the conversation and get more in-depth and additional knowledge about the topic, instead of breaking the conversation and strictly follow the order of the questions.

Following the initial introductory part, the interview focused on governance and resilience. The questions were asked in a way that the respondents could use their knowledge or experience in answering the questions. It was particularly crucial to tweak the questions according to the respondent in this part as, for example, researchers had a different approach to the resilience topic in comparison to the producers. The final part of the interview was centred around LF, identifying values, benefits and limitations of LFS in Rotterdam. The set of questions focused

on two views of LF where stakeholders were asked to provide their own descriptions and explanations. It is important to point out that the aim was to focus on their knowledge, using open and supplement questions which were based on the indicators and adjust them in a way which made it easier to ask about their opinion, expertise and experience from their position in the local food chain.

Questionnaire

In order to get enough information from consumers, a questionnaire was used as an additional method in data collection. It includes a set of closed-ended questions which are based on the literature review and adjusted from Aprile, et. al. (2015). The questionnaire also includes three open questions on the consumers' perception of LF and their preferences between conventional and LFS. Although open questions are not recommended as they are less efficient to analyse (Thiel, 2014), in this case they were used due to the smaller number of respondents and to gain additional information and perspective on LF from the wider audience of consumers. For that reason, the questionnaire consists of a few questions only and was distributed in person to ensure a higher response rate. The aim of the questionnaire was not to provide a representative image of consumers' view on LFS in Rotterdam, but to get a clearer picture about what do consumers, who are a part of the LFS, think about the research topic and what are their food preferences in daily life.

3.5 Sample size and selection

Selection of case studies

For this research, the number of case-studies to five units of analysis. The non-probability sampling method was used, meaning the selection and choice of the units is based on theoretical knowledge (Thiel, 2014).

During the case study selection process criteria was developed in order to gather the relevant information that can help achieving research objectives, which can be seen in Table 8.

Table 8: Criteria for selecting the case studies

Criteria	Explanation
Diversity in food production	Resilience of the FS is also dependent on the food production. It is assumed that the case studies that focus on mono-production of herbs or fruits or similar would not provide enough information to answer the research question.
Focus on LFS	Farms or project which produce food for the global market are not considered in the selection.
No temporary installations of UA	The study wishes to understand the dynamic between different actors in governance of LFS. For that reason, the temporary projects are excluded as it is believed that long term relationship might provide better information on the topic.
Different kinds of LFS	Rotterdam offers LFS which have different focus, aim or type. To understand the resilience of FS it is desired to have various types of projects to understand better the FS in Rotterdam.

The initial list of all possible projects considered for the research was based on secondary data and internet research. Initially the list included various local community gardens initiatives, educational gardens, entrepreneurs and commercial farms working in the city. The request for interviews was sent to the projects, using information attained from the websites. The request informed about the topic of the research, the relevance of the study and asked about a possible visit and interview. At the beginning, the response rate to the request was slow and low due to peak period for the producers. However, the positive feedback of some projects provided a starting point of selecting the projects. Afterwards, the first interviews with the stakeholders, the additional information on local food system in Rotterdam were mentioned. This allowed expending the initial list to other type of local projects. The revised possible projects included various allotment gardens, small-scale farmers, farmers' markets and distributors. The process of sending request was repeated by sending e-mail or calling the contact person, using information found on the websites.

Table 9: Selected projects for the research

Name of the project	Type	Date of the visit
Voedseltuin Rotterdam	Community garden	09.07.2018
Volkstuinvereniging Lusthof	Allotment garden	31.07.2018
Natuurluck	Small-scale organic farm	13.07.2018
Food forest/ Moestuinman	Entrepreneur	16.07.2018
Rotterdamse Oogst	Farmers' market	14.07.2018 and 21.07.2018

The selection of the final five case studies, as seen in Table 9, is a result of information of LFS in Rotterdam, to some extent also recommendations from stakeholders and availably of the people working with the projects. The selection reflects the diversity of LFS in Rotterdam and is not limited to food production only. The desire to have the diversity in case studies reflects the objective of identifying different characteristics of LFS. Only by looking at different elements of LFS I was able to reflect back to the resilience of the food system in Rotterdam. At the same time, the diversity in case studies helps to identify differences and similarities of governance in LFS, which is also in the scope of this research.

Selection of stakeholders

Literature review reveals the complexity of LFS, meaning that the FS is not about food production only, but involves several actors in the process. Following the literature study on LFS of Rotterdam and understanding of the most important variables, it was decided that actors spanning a broad range of interests were preferred in the selection of stakeholders. This helped gain better insight about broader views and impacts the actors have on LFS. For that reason, non-probability purposive sampling method is applied in the selection of the stakeholders, as it is important that the sample provides as much knowledge as possible from various organizations and fields of LFS in the given timeframe (Thiel, 2014).

The stakeholders were grouped based on their involvement in the FS. The groups are based on the theoretical research and adjusted a bit according to the situation in Rotterdam. The five groups are: 1) Project managers/ owners, 2) Actors of LFS, 3) Organisations, 4) Municipality and 5) others.

It was difficult to place some stakeholders in a certain group as the distinction between them was not very clear. For example, some stakeholders are at the present part of civil society, but were previously working as producers, thus might answer the questions according to their experiences from past also. To simplify the work, it was a personal choice to divide them according to the current or main position, which can be seen in the Table 10.

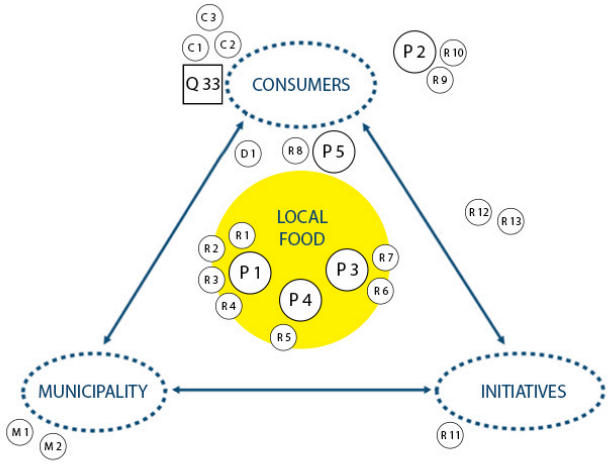
Table 10: Stakeholder divided into four groups

Group	Explanation
Project managers/ owners	Farmers, managers, entrepreneurs
Actors of LFS	Volunteers, consumers
Organisations	LFS distributors, farmers' markets, province initiatives, local initiatives
Municipality	Municipality employees, food policy actors
Other	Researchers, consumers

The first group includes actors who are involved in the LF chain. This mainly means farmers, either professional or hobby farmers who either own or rent the area where they produce their food and community gardens. Farmers' markets are also considered in this group, because they are a physical place were producers have a chance to interact with their consumers. The second group is focused more on organizations which are focused on networking or transitioning to LFS, which means actors who are setting up new distribution system, organisations focused on establishing LFS network by organising debates to address problems, providing financial help or information. Among the third group are municipality employees working with the food topic, including the ones who were part of reports and documents on LFS. Lastly, in the group of other are researchers and consumers who also play a role in the chain.

First step to finding the suitable stakeholders was internet research. It was relatively fast to identify the first round of potential stakeholders through internet research of different local food initiatives in Rotterdam. Email addresses and telephone numbers were also easily accessible and served as a contact method. Initially the response rate to the interviews was low due to holidays and the peak period for the farmers, work displacement or for other reasons some stakeholders were unavailable. To increase the chances and build my own network, I participated in events focused on local food and volunteered at different local initiatives. Both methods increased the number of interviews. A snowball method was also applied, asking interviewees for additional references (Thiel, 2014). Initially, the plan was to do interviews with consumers as well. However, the difficulty of getting consumers to participate in the interview resulted in selecting the questionnaire as a method, taking less time from the people. The questionnaire was distributed twice at the farmers' market until reaching the desired number of answers. All the stakeholders were guaranteed confidentiality.

Figure 4: Respondents according to stakeholders' groups



The data collection resulted in 19 interviews and 33 answered questionnaires, as seen in Figure 4. Due to low respondents' rate, there are only few stakeholders in two groups; mainly researcher and municipality. The difficulty in the first group was the no one responded to either my contact or to snowball method. There were several attempts to get in touch with specific people but were not fruitful in the end. The low response rate for the second group is also due to the limitation in addressing LF within the municipality. The people, who a few years ago, worked on strategic documentation on LFS were displaced and working on different topics or in different cities. This also indicates the challenge of addressing LFS within the government organisations due to frequent changes in staff and officials.

3.6 Validity and reliability

The strategy chosen for this research does have its limitations, which were addressed while conducting the research. The reliability and validity of research can be questioned in the case-study based method due to a smaller number of research units. One of the most frequently used techniques to mitigate this limitation is to apply the triangulation strategy. This means using several different sources of data or applying diverse methods to collect and process the data (Thiel, 2014). To increase the validity of information, the secondary data was applied to data collection and analysis.

One of the limitations of the case study based approach is the difficulty in generalising the findings, as the method is limited to small number of units. To increase the possibility of generalisation of certain information, multiple case studies were used to analyse LFS in Rotterdam. It is believed that a comparative case study approach increases the possibility of generalizing the findings of the research, which can still be limited due to small sample size (Thiel, 2014). Sharing the findings with experts and fellow researchers enhances the validity and reliability of the research (Thiel, 2014), but time limitation prevented it. However, the research was peer reviewed with feedback on the findings.

Reliability of the research findings can be improved by providing a detailed description of data collection method and its analysis. This also increases the possibility of replicating the research. A method commonly used is called 'case study protocol' which documents all steps and choices made while conducting the research (Thiel, 2014). Due to the short timeframe, the number of units of analysis was limited. Yet to ensure the reliability of the research a process of activities was documented and data from fieldwork was kept.

Chapter 4: Research Findings

This chapter presents the main findings based on an analysis of data collected during fieldwork by means of semi-structured interview, questionnaires and secondary data.

The first part of the chapter focuses on the LFS in Rotterdam by describing the main characteristics from primary and secondary data. The second part describes and analyses the findings based on different cases that were chosen as the unit of analysis for the study and explains the relationships among the three main concepts, (re)localisation of food projects, resilience of the LFS, and governance mechanism. The variables and indicators defined in the Operationalisation table (see Table 6) in Chapter 3 serve as a tool to discuss the similarities and differences of the case studies.

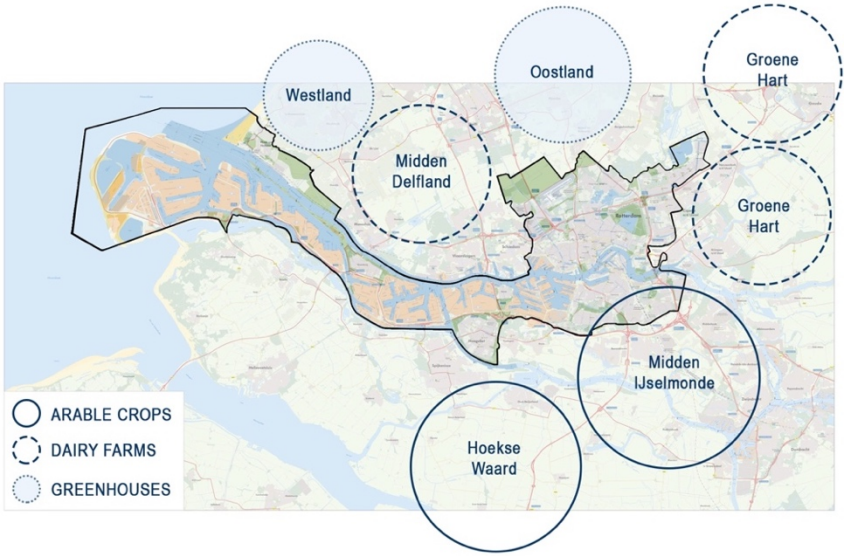
4.1 Rotterdam and Dutch food system

Background on Rotterdam

Rotterdam is located in the Dutch province of South Holland, within the Rhine-Meuse-Scheldt river delta in close proximity to the North Sea. A river, the Nieuwe Maas, runs through the city and divides Rotterdam into a northern and a southern part. Rotterdam is the second largest city in the Netherlands, with a total population of slightly under 640,000 in 2018. Its densely populated area is also home to a large percentage of people with diverse backgrounds (CBS, 2017; Gemeente Rotterdam, 2018).

Rotterdam plays a significant role for the Netherlands due to its port. The Port of Rotterdam is one of the major ports of the world and the largest in Europe. It also plays an important role in the food industry since a large amount of food is either exported, imported or processed in the port of Rotterdam, making it a significant link in the global trade network for the convenient food system (Holland, 2017; Kruit, 2015). For this reason, a lot of food is also produced in the surrounding areas of Rotterdam, in the province of South Holland. As illustrated in Figure 5, this includes arable land in South Rotterdam, dairy farms in North-West Rotterdam and greenhouse horticulture production in North and North-West Rotterdam, areas known as Westland and Oostland (Schans, 2015). At the same time, Rotterdam is a hub for innovation and attracts entrepreneurs and businesses in several food-related areas (RFC, 2018).

Figure 5: Agricultural production around Rotterdam (source: adapted from Schans, 2015)



Dutch food system

The Dutch food system has undergone changes over the past decade: the industrialisation of food production, the globalisation of the food chain and different consumption patterns have greatly contributed to those changes (Hebinck et al., 2015). As a result of the global chain, a wide variety of food from all over the world is increasingly available in the Netherlands, while the majority of food locally produced is exported. The food industry focuses heavily on export and re-export, something that is also stimulated by the government. Attention has also been given to innovation and innovative business models, to nature conservation and sustainable agriculture (Holtslag, 2010; Zuid Holland, 2018).

The food industry around Rotterdam consists of dairy farms, arable farms, glasshouse horticulture and intensive livestock farming, adding up to approximately 65,000 Dutch farms and horticulture operations in 2014 (Hebinck et al., 2015). However, the power relations in the food chain have been changing over time. As illustrated in Table 11, in the past decade non-agricultural players have become more powerful and increased their influence in the chain. For example, the major supermarkets have gained influence over the production part of the chain by introducing their own store brands, their own quality standards, efficient distribution systems and wielding greater purchasing power. As noted in the report 'Towards food policy' published by Vries et al. (2016):

> *"Where in the past agricultural organisations, national government and knowledge institutes jointly determined Dutch agricultural policy, today non-agricultural players (seed and feed companies, the food processing industry, traders and supermarkets), consumers, NGOs and international organisations also play an important role*" (Vries et al., 2016 p.12).

This leaves farmers with little influence on decision making and uncompetitive local distribution systems. To find their way in the system farmers are trying to build networks and create alternative models in order to have more power in the system.

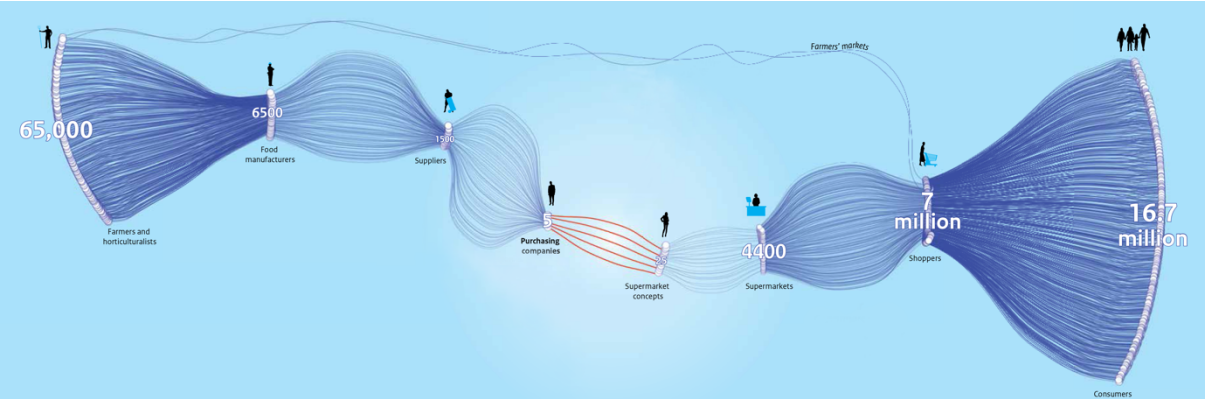
Table 11: Dominance in the food chain in the Western supply chain (source: adapted from Vries et al., 2016)

Period	Farmers	Industry	Retail	Food service
< 1900	Dominant	Minor	Very minor	Dominant (domestic)
1900 – 1950	Declining (except WWII)	Dominant	Minor	Declining (except WWII)
1960 – 1970	Rebuilding (subsidized)	Dominant	Emerging	Minor
1980 – 2000	Declining	Declining	Dominant	Emerging
2000 – 2010	Returning (?)	Uncertain	Dominant	Emerging

The centralisation of power in the Dutch food system in 2014 is illustrated on the following page. As seen in Figure 6, compared to 65,000 farmers there are only five purchasing companies, whose power is growing. This divides the chain into several thousand small businesses on one side, involved in production, manufacturing and distribution, ranging from

family businesses and listed companies to cooperatives, while in other parts of the food chain the bigger companies are dominating the market. This centralisation of power is arguably why retailers can also influence manufacturers and to some extent consumers by deciding which products are available. Supermarkets can then be considered a hub that has control over which products reach the consumer, giving the retailers power over manufacturers and producers as well (Geurts et al., 2017; Vries et al., 2016).

Figure 6: Concentrations within the Dutch food chain (source: Geurts et al., 2017)



Role of consumers

Consumers in the Dutch food system have been shifting their food consumption habits. An important change has been placing more weight on processed food, mostly available in the supermarkets. Supermarkets became a place where a large share of the household food budget is spent, due in particular to their convenience. The average Dutch family spends about *10-15% of their income on food* (Geurts et al., 2017).

There is also a smaller but growing portion of consumers who emphasise sustainability in food production or choosing a healthier diet, as a response to globalisation and to the rise of the organic food industry. The increase is noted in the report: *"Consumer spending on sustainable foods (including organic foods) increased in recent years. Sustainable foods contributed to 7% of total food spending between 2013 and 2014, and for 8.2% in 2015"* (Geurts et al., 2017, p. 58).

The role of the government

Government has been involved in Dutch agriculture, with a focus on agricultural productivity and attaining the current prominent position. However, the government has not yet created a food policy, although food, as a topic, is part of several areas and institutions, for example agriculture, health, trade, environment, etc. The country has implemented the policy developed at the EU level, in which the primary foci are the production sector and rural development. At the same time, private regulations have been gaining in importance with the aim of providing additional transparency by setting up a certification system for specific food products or production methods (Vries et al., 2016).

Recognising the importance of food in the country and its position in the global food system, The Netherlands Scientific Council for Government Policy (WRR) prepared the document 'Towards food policy' in 2014. The document stresses the need for a food policy, instead of addressing food-related topics in several fields, each with different objectives. The document also points out the importance of having a resilient food system. Degradation of soil, people's

health and loss of robustness as well as the connection to the global food chain where global problems also have a direct effect on the Netherlands are all considered as vulnerabilities of the food system. The document thus stresses the need for diversity both among stakeholders and among producers, which can be achieved by knowledge exchange and innovation. It also addresses the importance of interdependence among different actors and elements of the chain when solving the problems (instead of food production only): *"A transition towards an ecologically sustainable, healthy and resilient food net will require action and cooperation from both the business world and civil-society organisations. Government should encourage this and remove potential barriers."* (Vries et al., 2016, p. 12).

4.1.1 'Local' agriculture in Rotterdam

Local agriculture in Rotterdam has grown in the past ten years. The growth was especially noticeable between 2010 and 2014, when Alexandra van Huffelen was working in the municipality of Rotterdam as an 'Alderman for sustainable development, inner city and public spaces'. As alderman, she put great importance on outdoor spaces and greening of Rotterdam, encouraging Urban Agriculture (UA). This encouraged researchers and expert organisations to form networks and start a discussion, as well as small initiatives to become part of UA, such as community gardens, educational gardens, allotment gardens and a few commercial farms. The most active organisations were 'Transition towns' and 'Eetbaar Rotterdam', which aimed to promote agricultural networks and provide guidance for urban farms in Rotterdam; however, their presence in the Rotterdam UA scene has almost disappeared. Although the above-mentioned initiatives are no longer active, recently new initiatives with similar goals have emerged. One such is 'Voedselfamilies', a network of innovators and leaders in the province of South Holland which connects people who are seeking sustainable and innovative solutions in the food chain. In contrast to organisations, several small initiatives which started functioning over 10 years ago are still operative, some even growing. Based on information given by the municipality in 2014, the Deltametropolis association and LOLA architects mapped the green areas in Rotterdam, including UA projects. As seen in Figure 7, several smaller initiatives were placed all over Rotterdam, including the inner parts of the city.

Figure 7: Urban nature map Rotterdam in 2014 (source: Deltametropool and LOLA Architects, 2016)

The role of the local government in Rotterdam

In 2012 the municipality of Rotterdam, together with aldermen, issued the strategic document 'Food & the City' as part of the 'Programme for Sustainable Rotterdam'. The document focused on supporting regional products and stimulating local UA initiatives in Rotterdam, illustrating the ways in which UA contributes to the municipality's policy objectives. In addition, describing actions that the municipality wishes to take in order to further improve elements besides food production, they considered benefits of UA such as health, a sustainable economy and spatial quality. The document also puts an emphasis on describing good practices of UA, meaning already existing local food projects which were initiated by local people (Gemeente Rotterdam, 2012).

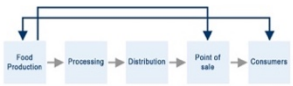
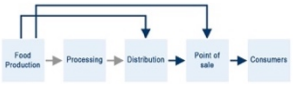
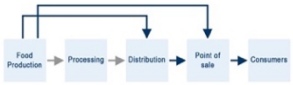
Though the document's emphasis was on the development of the LFS in Rotterdam, there were other politicians who did not consider UA as a subject the municipality should deal with. To illustrate, UA was seen as a place of food production only, dismissing additional benefits. That was further supported with statistics indicating that sufficient quantities of fresh food were already produced in the surroundings of Rotterdam, thus there was no need to cultivate food within the city.

Despite the divided opinion, the municipality recognised the multi-dimensional opportunities that UA provides. Yet there is very little evidence showing actions taken forward regarding the stimulation of UA (Spoelman and Nefs, 2015). The strategic document 'Food & the City' does exist, but it is not in use. People who worked on the document were relocated to different departments and UA lost a part of its newly gained attention in the municipality.

4.2 The overview of the research units

Rotterdam is home to several local food projects. Some originate from social movements, others were created by local farmers or other actors who wish to create an alternative to the current food system. An overview of the research units is given in Table 12.

Table 12: Overview of research units

Name of the project	Location	Type of the project	Type of food chain
Voedseltuin Rotterdam (Food Garden)	Keilehaven	Community garden	
Volkstuinvereniging Lusthof	Schiebroek	Allotment gardens	
Natuurluck	Zevenhuizen	Small organic farm	
Moestuinman (Food Forest project)	Kralingen	Entrepreneur	
Rotterdamse Oogst	Noordplein	Farmers' market	

The local food projects chosen as research units operate within a short food chain, making them a part of the (re)localised food system. The focus of the projects is in shortening the food chain, providing better livelihoods for farmers, increasing contact with consumers and using environmentally friendly production methods. The objectives of the projects are similar to the characteristics of (re)localisation discussed earlier, in Chapter 2.

The selected local food projects have been operating for several years and project leaders have different experiences and methods in staying viable on the market. Assessing the projects using the four-dimensional framework of resilience thinking helps to evaluate the steps that producers are taking to mitigate the vulnerabilities and adapt to challenges. Assessing resilience of the five local projects might provide some additional insights, as well as improve understanding which characteristics help to build resilient (re)localised food system.

The selected research units are: Voedseltuin Rotterdam (Food Garden), Volkstuinvereniging Lusthof, Natuurluck, Moestuinman (Food Forest project) and Rotterdamse Oogst. Below is a description of the cases, describing the ownership, size, type of employment and objectives.

Voedseltuin Rotterdam

Figure 8: Location Voedseltuin Rotterdam

Location: Keileweg 9 (Gedempte Keilehaven)

Initiator: Stichting De Voedseltuin

Area: The Voedseltuin is located in the harbour area, covering approx. 6500 m2 of land.

Opening hours: The garden is open for visit every day throughout the whole year.

Employment: The volunteers work on the garden 4 days a week. Director and two managers working from 4-16 hours weekly.

Land tenure: Renting land from the municipality. Land tenure agreement must be renewed every 5 years.

Type of food production: Permaculture

Objective: The foundation has two goals. One is to produce healthy fresh food for the clients of the Food Bank and the volunteers. The other is to offer a reintegration place for people with various social difficulties.

Figure 9: Voedseltuin Rotterdam (photos from fieldwork)

Volkstuinvereniging Lusthof

Figure 10: Location Volkstuinvereniging Lusthof

Location: Hazelaarweg 39 (Rotterdam)

Initiator: association VTV Lusthof

Area: The complex of VTV Lusthof has about 142 gardens, ranging from 100 to 400 m2 in size. The complex includes community building, parking spaces and playground.

Employment: Association board is run by at least 5 members who volunteer. Members of the garden need to volunteer annually for 18 hours

Land tenure: Land tenure agreement must be renewed every 5 years.

Type of food production: Based on individual choices. However, environmentally friendly.

Objective: To connect people with the same interest in amateur gardening. Using a leisure activity to contribute to the conservation of the nature and build a community.

Figure 11: Volkstuinvereniging Lusthof (photos from fieldwork)

Natuurluck

Figure 12: Location Natuurluck

Location: Zuidplasweg 22 (Zevenhuizen)

Initiator: René van der Horst

Area: The farmland of 0.8 hectares is located in Zevenhuizen, 12 km northeast of Rotterdam centre.

Employment: The owner is full-time farmer. His partner helps and they have occasional help from the volunteers.

Land tenure: Farm land is owned by the farmer, who bought the land and establish the farm in 1986.

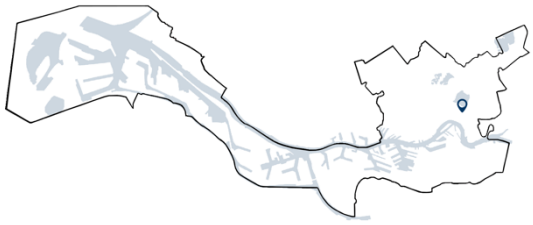
Type of food production: Certified Organic Biodynamic agriculture. They grow about 40 different crops every year, mostly growing in open ground, but they also have a small greenhouse and arch tunnels which prolong the growing season.

Objective: Growing organically in connection with the soil. The importance of taking care of and looking at the soil as a living organism.

Figure 13: Natuurluck (photos from fieldwork)

Food forest/ Moestuinman

Figure 14: Location Food Forest



Location: Oudedijk 15 (Rotterdam)

Initiator: Max de Corte

Area: Different per project

Employment: Entrepreneur working with private actors. Occasional help from volunteers.

Land tenure: Working with private actors. The entrepreneur works with improvement of unused green spaces for an exchange of using the area for the garden (implementing edible gardens, community gardens, food forests, natural playgrounds and green schoolyards).

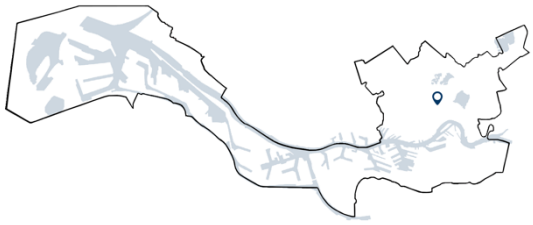
Type of food production: Permaculture

Objective: Involvement in local food supply to raise awareness and sustainability, at the same time looking at the options of self-sufficient local food projects.

Figure 15: Food forest (photos from fieldwork)

Rotterdamse Oogst

Figure 16: Location Rotterdamse Oogst



Location: Noordplein

Initiator: Non-profit organisation

Area: The market is located in Noordplein, every Saturday. The size of the market varies from 13 to 50 participants.

Employment: Farmers rent a stall to sell the produce. Manager paid for communication, marketing and organisation of the market.

Land tenure: Renting the area of a public square from the municipality.

Type of food production: Farmers' market

Objective: To strengthen the short supply chain by creating a market place and organising the events in the middle of the city, close to the consumer.

Figure 17: Rotterdamse Oogst (photos from fieldwork)

4.3 Findings and analysis

To achieve the objectives and answer the research question, the research applied a mixed method approach, drawing on a combination of secondary data and primary data. The secondary data played a role in preparation for the interviews, setting the ground for the research and to validate the information from primary data collection.

It included newspaper and magazine articles, social media posts, web pages and important documents and reports regarding the food topic, both on the local and national levels. Primary data included semi-structured interviews and questionnaires which were administered in person. The interviews were recorded with the approval of stakeholders and later transcribed. The questionnaires included a section with an ordinal scale and three open questions. The data from the questionnaire was partly analysed using Excel and answers to open questions were transcribed and together with interviews coded and analysed using the Atlas.ti program.

4.3.1 (Re)localisation of the food system

Short food chains in the Netherlands have a wide network of local agro-businesses and even though food is often talked about, the definition of the term 'local food' was differently defined among the stakeholders. It was particularly interesting to define the term 'local' among distributors and among consumers, as their definition of local has a greater influence on food sold and consumed. Among consumers 75% of them defined 'local' either as the whole country or an area within a 50-km radius of Rotterdam, while distribution enterprises consider 'local' only the food that is cultivated, processed and traded within a 50-km radius of the city.

Table 13: Definition of 'local'

Source	Food grown in the Netherlands	Food grown in Rotterdam	Food grown within a 50-km radius from the city centre	Other
Consumers (33)	36% (12)	9% (3)	49% (16)	6% (2)
Distributers (2)	/	/	100% (2)	/

It is interesting to observe that very few consider the city as an area for food production. Rotterdam is densely populated and green areas are insufficient for food production. The province of South Holland, with current food production, could be about 40% self-sufficient. However, currently much production is oriented towards export. This indicates the need to depend on other food systems or the need for change in the direction of greater self-sufficiency (Voedselfamilies, 2017).

It is important to understand what the term 'local' means and how much area it covers. The research and data obtained on local food can vary depending on the definition. At the same time, it can influence the involvement of municipalities in local food projects if the definition is too broad.

Considering the definitions from distributors and consumers, and looking at (re)localised food projects, the question arises as to what the benefits, opportunities and limitations of current local food systems are for different people in Rotterdam.

Values of LFS

Consumers: Of the consumers surveyed, consumers' perception of local food influences their purchasing decisions, hence the decision either to engage in the LFS or not. Consumers who shop at the local farmers' market evaluated which characteristics they find important when buying food in general. Analysing the data from the questionnaires, the three most important attributes were taste (88%), environmentally friendly production methods (79%) and fair treatment of producers (70%). Several people also found it important to know where food comes from (64%) and to support local farmers (63%).

In general, respondents in favour of LF link it with characteristics such as good quality, availability of seasonal food and better taste. Consumers that have a positive attitude towards LF also consider it as more honest and social, as explained by *Consumer I*:

> *"Food that brings consumer and producer closer to each other, instead of anonymous food in the supermarket." (Consumer I)*

Several consumers also focus on impact on the environment. In their view LFS is less industrial and more environmentally friendly by using less packaging and pesticides. Some also believe that large corporations have negative consequences on the environment and think buying local will decrease their influence. Others prefer having a relationship with their food producer and also prefer buying food at the market as they trust farmers more in comparison to the supermarket.

Distributors: Local distributors wish to create an alternative system, taking into an account benefits of local production by shortening the chain. As explained by *Distributor I* the consumers know where the food comes from, the system is transparent and the consumer gets to know the farmer's story and knows the quality of the food.

> *"[…] a local regional food system where you know where your food comes from and where you also have contacts with suppliers. It is also a social chain." (Distributor I)*

Municipality's initiative representative: During the interview, the representative of the municipality's initiative indicated that Rotterdam is an important city in the food system. As a distribution hub, it is a place where there is large turnover in relation to the FS. The initiative perceives the local food sector as important for the regional economy and its focus is on new business models for the future. It is not about producing LF for local people, but about transitioning to a new economy, and the innovation, development and growth of companies to remain competitive.

Others: Volunteers working on the community garden value the food produced as they know where it comes from. As mentioned by Volunteer I the value of LF is not only in the taste but also in the feeling of what it took to grow it:

> *"I prefer food from here, not only because it tastes better, but it is the feeling around it. Like we have been working hard to grow it. And it is as local as you can get it." (Volunteer I)*

In addition, the benefit of having gardens in the city increases the availability of the green spaces in the city, as explained by *Volunteer II*:

> *"Especially in this area, there is not much green space. It is a completely industrial area, you see. I think it is the lungs for this area." (Volunteer II)*

Opportunities of LFS

Consumers: Consumers believe that buying LF from the farmer improves their own consciousness on food, in terms of understanding where it comes from, production methods and efforts farmers put into growing the crops. By buying food from the market many feel that they are supporting the current and future generation of farmers. A similar observation was made during the interview with one of the producers who mentioned that the interest in LF is increasing, especially among younger and more educated people, who are beginning to appreciate the quality of the food they consume.

Some consumers also engage in growing their own food by having their own small garden or as volunteers in community gardens. Several consider growing their own food for reasons such as shortening the chain or showing their children the process.

Distributors: The distributors believe that the LFS has an opportunity to grow, especially as the awareness among consumers is growing. This also means that people are becoming more sensitive to what is happening in the FS, which offers an opportunity for the LFS to develop. The fair price argument gives the farmer an opportunity for a better margin. Because of the

pricing system some vegetables are cheaper in comparison to the supermarket, while dairy products are more expensive. This is due to the method of production, which in the distributor's opinion makes a product higher quality, as explained by *Distributor I*:

> *"But on cheese and milk and yogurts, bread and meat, we are more expensive than the supermarkets. And it is partly because of our higher margin on […] And on the other hand, because the quality of the products that we sell is much higher. It is also different category, it is not like factory cheese, it is farmer's cheese. And there are higher producing costs, so purchasing cost is also higher, sale price." (Distributor I)*

Municipality's initiative representative: One of the ways to remain competitive is to be innovative. The initiative representative sees the importance in having lots of ideas and taking more risks. In connection with LF that applies to the farmers. *Municipal official II* believes that many farmers need certainty to guarantee their income; however, that certainty also stifles innovation.

> *"It is important to have a lot of ideas and take more risks. […] And you need farmers who are willing to think with you, to brainstorm with you. So, we need a different mentality from some farmers […] and they are guaranteed to have a certain income and that their milk will be bought. I don't think that creates a lot of innovation, that certainty." (Municipal official II)*

The opportunity for the current LFS to tackle this key challenge is in volume, meaning scaling up, and in cooperation, building a network. *Municipal official II* believes that several small producers should come together and create a platform with bigger volume and create the mass.

> *"If they want to survive and they want to grow, they need to become bigger and not stay in a niche, unless you have a product that is so special that everybody wants it, then you can afford to stay small. But I think in order to survive and to become compatible with supermarkets." (Municipal official II)*

Another opportunity of the LFS is in its multi-functionality, as the food topic can be addressed from several different perspectives. For example, the initiative representative works together with the health department looking at developing business models to encourage people to eat more healthily or at technology and innovation, such as vertical farming or seed breeding.

Others: An interviewee involved in researching food sees the current times as an opportunity for LF as it is debated more often in public. People talk about transparency of the FS and the impact that monoculture has on the landscape and the quality of food. The same thought was expressed during the interview with the local initiative representative, where *Initiative manager I* suggested that knowing your farmer should become very common among people:

> *"You know, everyone knows who their dentist is, who is their GP … But you don't know your farmer. Who is your farmer?" (Initiative manager I)*

Stepping away from food production, some LF projects are socially important as they connect people and have an influence on community involvement, according to *Municipal official I*, who works on the issue. People are not only connected with the activity but also gain a sense of accomplishment because the garden belongs to the community. In addition, the system indirectly gives people who volunteer at the community gardens an opportunity to reinvent themselves and discover unknown qualities within themselves, thereby empowering people.

This multi-functionality is an important factor to consider in terms of opportunity, as LF is multi-faceted and this provides an opportunity to build a network with stakeholders from different areas.

Limitations of LFS

Consumers: One of the limitations of the LFS is the distribution of the produce. Among consumers there are several who prefer the convenience of the supermarket, including *Consumer II*:

> *"Used to go to the farmer/market when I lived in Wageningen. But I go mostly to the supermarket in Rotterdam (convenience and price)." (Consumer II)*

This duality is noticeable in the answers. Although people generally have a positive attitude towards LF and harbor some reluctance towards the convenient food system, many nevertheless prefer the convenience and prices of the supermarkets for everyday shopping, going to farmers' markets occasionally as a weekend activity. This indicates the limitation of the LFS in term of the logistics of distribution and accessibility, as expressed by *Consumer III*:

> *"Both have their disadvantages supermarkets are generally not local but are efficient in terms of distribution […] Buying from the farmer directly, on the other hand, enables you to support local farmers. New initiatives [...] offer good opportunities for buying local food without having to travel to farmers directly." (Consumer III)*

Although not spoken of in great detail, some consumers find LF a bit expensive and sometimes unaffordable for their budget. They associate the higher price with smaller-scale production. While some might not be able to afford LF from the farmer, they acknowledge the benefits of the short chain, as explained by *Volunteer I*:

> *"At this moment, I think it is very expensive. For a good reason. I don't have a lot of money myself, so I don't buy food locally. But if I had money, I would definitely buy local foods, because it is just really crazy that we buy our food [...] from South America." (Volunteer I)*

Distributors: The interview with a representative of one of the new initiatives confirms the limitations of the LFS. Consumers who are used to the rhythm of the supermarkets don't often buy from farmers. It is people who are willing to change their grocery shopping habits, who at the moment number only a few. To be accessible to more people, the local distribution system needs to grow. This is not only a need but also one of the challenges in future. In distributor's opinion, to be able to grow the local distribution system, the challenge is also that local farmers understand their consumers and produce LF that consumers value.

Municipality's initiative: During the interview, *Municipal official II* also pointed out the challenges of the LFS in the province. The key one lies in distribution and logistics, especially of small volumes, and inefficient systems in comparison to supermarkets.

> *"What we hear all the time […] distribution and logistics is considered as a problem. […] They are looking for ways of getting their product to consumers without many links in between and then it is logistically inefficient. There are logistic solutions, but they are inefficient and expensive, because the volumes are small." (Municipal official II)*

Others: According to *Researcher I* the limitations for the current LFS are in logistics, meaning how to reach consumers. To be able to scale up the local food production, there is the need for innovation in the area of distribution, which also includes local producers teaming up to make a distribution network. Another limitation for the LFS is the land. There is pressure on land around the city and it is very expensive to buy or to lease it:

> *"The pressure on land is very big, especially directly around the city. Sometimes they are owned by development companies who want to build there as soon as the regulations are changed. Converting land use. It is very difficult to get long-term*

leases directly around the city. There is a lot of speculation going on […].” (Researcher I)

Summary: Values, opportunities and limitations of (re)localisation

As mentioned above, there is a lot of (local) food produced in the province of South Holland and the food production supplies different markets, local and global. The values of local food systems have been discussed with various groups, who each define ‘local’ food from their own perspective. However, the lack of a common definition can challenge the organisation of local farmers’ networks. A local business that identifies local food as ‘Food grown within a 50-km radius from the city centre’ will collaborate with farmers within that radius, while another might expand the network to the whole province or country. Although people who participated in data collection hold different definitions, the majority regard food from the city and surroundings or from the country as local. Different views on the current LFS in Rotterdam and the focus of their opinion reflects what various groups find important in the (re)localised system. A summary of the findings is presented in Table 14

Table 14: Overview of different perceptions on LFS in Rotterdam

Group	Values	Opportunities	Limitations
Consumers	• Trust • Tastier and “honest” food • Lower packaging • Social interaction / Contact with farmer • Addressing consumers’ demand for seasonal and fresh food	• Supporting farmers • Involvement in food production through volunteering and community gardens • Increasing awareness about food	• Convenience of the supermarkets • Distribution system • Price
Distributor	• Knowing where food comes from • Knowing your farmer • Quality of the food	• Increased awareness of food production • Better margin for the farmer	• Rhythm of the supermarkets • Scaling up • Understanding consumer’s needs
Municipality’s initiative	• Important for regional economy	• Potential for innovation • New business models for local producers, start-ups • LF platform • Multi-functionality of the food system	• Small scale • Distribution and logistics in reaching more consumers • Lack of innovation in some cases
Others	• Knowing where food comes from • Better taste • Green spaces in the city	• Awareness on food • Empowering people • Multi-functionality of the food system	• Logistics in reaching more consumers • Availability and price of the land

In general, many respondents value LF and are aware of its importance. As stated by *Case study respondent VII*:

“Food, especially in the city, is our most direct connection to nature.” (Case study respondent VII)

Consumers' perception of local food influences the decision where to buy food. Several consumers that completed the questionnaire are partly involved in the LFS as they were visiting the local farmers' market where the data collection took place. This also gives a perspective from people who consider LF as one of many possible choices. The analysis of data suggests that particular attention is given to the quality of food, i.e. taste, freshness, method of production and seasonal consumption. Trust is one of the factors that drives consumers to prefer food from the farmer and visit the farmers' market, which allows them to interact and support the farmers. One significant factor among consumers is also the environmental costs that food and its packaging have. The increased awareness is also a driver for some to consider supporting the LFS.

Yet there are some respondents who consider local food and food from the farmers' market too expensive and not convenient enough. They find these elements as a big limitation for LF. The price of food in supermarkets is lower in comparison to food bought directly from farmers. Although difficult to compare these two systems, for some consumers financial considerations are a driver of decisions in daily shopping. For others are the limited distribution possibilities of LF. However, the individual choice of consumers is shaped by the structure of the system. This thought was also considered among few respondents. In their perception, the big supermarkets have a big influence and power in making decisions about the food system. Some respondents consider the need for facilitating the local food chain to reach more people and grow.

Currently, the small scale and logistics are one of the bigger limitations of a (re)localised food system and were mentioned by several respondents. The conventional food system has a huge logistics system behind it and the LFS cannot compete with that. To improve the logistics, LFS needs an infrastructure, including regulations and finance which would make LF affordable and accessible while also providing a livelihood for a farmer. Lowering the prices of local food, especially for the small-scale producers is not sustainable. For this reason, new initiatives focused on LF are looking into ways to develop a new system from inside and build upon that. While the municipality's initiative focuses mainly on developing new business models for food producers regardless of their scale, there are several other initiatives which focus on shortening the chain. They see opportunities in a (re)localised system not only for the farmer but also for people. Some initiatives want to connect food origins and motivate consumers to connect to the food producer. The idea behind this is to focus on developing an alternative food system which offers more choices for the consumer.

The local food system is linked to several areas and the multi-functionality of the system provides an opportunity to collaborate with different stakeholders.

4.3.2 Resilience of the local food system

The case studies selected for this thesis started their local food projects or business for a variety of reasons. For example, the community garden with social goals focuses on food production for a specific group of people, helps socially disadvantaged people, and builds additional activities around food, while entrepreneurial individuals produce food for either their own consumption or to earn a living, and thus LF production becomes a lifestyle. Distributors are also an important element of the LFS. They help producers reach more consumers by changing the system from the inside and offer an alternative to current food distribution and trade.

The projects also have their own ways of staying on the market for several years. During the interviews, different sources of disturbances were also mentioned, such as land tenure

agreements, support for the projects, demand for the produce and competition with the conventional system. LF projects often face different problems and appear to be vulnerable, but at the same time they are often also quite resilient. Projects adapt, transform and persist in their own way, if at all, to different sources of challenges.

The section below compares different cases and how they prepare, persist, adapt and transform to be more resilient towards challenges.

Preparedness: Land tenure agreements

The findings from the interviews have shown that the land tenure varies among the projects. According to the respondents, there is a limited amount of land available in Rotterdam. Most of the time the agricultural projects within the city are located on empty and unused plots for a temporary period. What is striking is that several community gardens were established during the period of economic crisis when the building industry was on hold and empty plots in the city of Rotterdam were available to UA initiatives. However, as the crisis has passed, the gardens are competing with the building industry and can be vulnerable to forced relocation.

Community gardens: The community garden Voedseltuin, located in the harbour area, rents the previously vacant land from the municipality for a symbolic fee. The tenure agreement is renewed every five years and has been renewed once since its beginning. According to the respondents during the interviews, the municipality extended the tenure agreement because the global crisis delayed the development of some areas in the city. However, the renewal negotiations always bring some uncertainties to the project, as explained by *Case study respondent II*:

> *"Because there is also the possibility that in 1.5 years they will say "we don't want you in this neighbourhood". Technically it is a possibility. Then we have to take this away or fight." (Case study respondent II)*

Allotment gardens: The tenure agreement for the allotment gardens has changed over time. Initially people signed the rental agreement for 10 years. The recent renewal is for only five years. Respondents speculate that the reason might be due to possible changes in the future, which were not defined. However, the area for allotment gardens is protected by Rotterdam's airport policy, which limits building and human activities in the areas around the airport, thus indirectly also protecting the allotment gardens.

Small-scale farm: The farm land is owned by a farmer who bought the land in 1986. The farmland of 0.8 hectares is located in Zevenhuizen, 12 km northeast of the city of Rotterdam. Small-scale farm also deals with problems of land tenure, mostly to do with land ownership and the high price of the land. In the interview the farmer explained the difficulties in acquiring a loan to purchase the land and the farm. That was mainly due to the preconditions for loan approval. Initiative manager I has a similar view and believes that financing to purchase land is problematic and may affect the land tenure. High land prices might push farmers into a certain way of farming to be able to pay off debts. In addition, new farmers or farmers who are changing the production towards organic farming as explained have difficulties in getting a loan, as explained by *Initiative manager I*:

> *"If the bank really wants to know beforehand what your earnings will be the next 10 years and you just don't know because you are changing your business. […] They don't offer you a loan." (Initiative manager I)*

However, there are some banks which aim to invest in rural development and assist farmers in obtaining a loan, as explained by *Case study respondent IV* when asked about difficulties in establishing the farm:

> *"I didn't get financing from the banks here. But I did get financed from the alternative bank, Triodos bank in Zeist. So, that was the first problem. And second problem, at first you always have to show that you can pay your bills." (Case study respondent IV)*

Entrepreneurial projects: Food projects done by the entrepreneur are mainly for self-consumption. Working differently from farmers, one of the principles that the entrepreneur follows is finding access to land without buying or renting it. For that reason, the entrepreneur prefers to work with private organisations. This means the private entity benefits from any improvements made to unused green space in their location, while the entrepreneur commits to maintaining the space in exchange for the use of the area and the harvest. The preference for collaborating with a private organisation is evident in this case and explained well by *Case study respondent VI*:

> *"There is an ethical thing about having a public space and using it for private business. […] Because when you have privately owned plots then there is one person or organization that I am talking to. You can have a good plan and either agree or you don't and both sign." (Case study respondent VI)*

Farmers' market: A private organisation runs the weekly farmers' market, renting the area of a public square from the municipality. A consequence of being privately managed is years of tenure agreement negotiations trying to find a solution that fits both parties involved. One explanation for this is that the market, especially at its beginning, was an innovative thing and it did not fit in the general scheme for farmers' markets as they started as a private organisation organising events which were half festival and half farmers' market. Another explanation given is that the market changes size weekly. The rental agreement has been discussed for several years. This year, the organisation has been given an opportunity to show if their alternative rental agreement works better. This means that instead of renting the whole square area, the rental agreement depends on the number of stalls.

Preparedness: Support (from the community)

The municipality has an influence on the support of local food systems, either financially through funding, through policies or through city development planning. The latter also determines the green spaces in the neighbourhoods. This means a UA project with support from the municipality has a higher chance of being mapped as a green area and remaining in the same location. During the interviews, it was also noticed that a project which serves a community well and is integrated into the area is more likely to receive additional support from the neighbourhood. The strong link between the project and the community additionally increases the pressure on the municipality to understand what the purpose is and what the advantages of the local food projects are and why there is a need for them to remain. Among those is *Initiative manager I*, who further agrees that the city government has the power to help and promote a local food project, if that is in their interest:

> *"You need to help the new system to develop in a way. And I think we are building that awareness and that maybe also strategies to get there, but it is still not … government is now getting aware of how it works, and they want a change and they are thinking about what to do. But it takes time." (Initiative manager I)*

Community garden: The community garden operates mainly with the purpose of offering support for a specific group of people, which can include socially disadvantaged people,

unemployed or similar. At the same time, it also receives support from both the municipality and the community. A few years ago, the municipality wanted to upgrade the area and get a little movement by opening the garden to the people. The municipality built a new path, making it easier for strollers and bicycles. They also covered the costs of bringing in material to fill, raise, and level the ground in the harbour area. In addition, municipal officials also often mentioned the community garden in local and international circles. The good relationships between the municipality and the project helps to build up support, but as mentioned by *Case study respondent I* it is not easy to achieve. The explanation is that the area is part of a harbour transformation project, thus making the area profitable for future developments. Convincing the municipality of the social potential of the community garden, which does not generate profit, was not simple and continues to make the project vulnerable.

> *"For them we are only … We don't make money for the government. […] But now they understand the social part of our NGO and they see that we also connect our neighbours. We are really a connector in this area. And there are a lot of activities happening here." (Case study respondent I)*

Support is also provided from the volunteers who have worked in the garden for several years. The dedication and work they put into it makes them feel a part of it, making the garden theirs as well. Furthermore, private partners also (financially) support the community garden by adopting a circle, meaning a part of the garden. However, the small scale of the project limits the support to the people who are either working in the food system field or know about the project.

Allotment gardens: The area where the allotment gardens are located belongs to the municipality. The main arguments in favour of having support is that the municipality likes to have the activity in the area and the board members are doing their best to make the place lively. However, the municipality mainly communicates through a federation, which helps with managing finances and setting the rules. Although there are several allotment gardens in the city, the system they are working in, set by the federation, separates units instead of helping them to collaborate and network among themselves.

Small-scale farm: In the case of the organic farm, the discussion often compared the organic way of food production to conventional food production. In this case, the respondent suggested that the government should offer support to stimulate locally produced organic food, for example, through alternative taxation schemes. The current rules and regulations on farming make it more difficult for organic farmers to survive. The interviewee believes in the need to stimulate local and organic food by making it more attractive, for example, by regulating it differently as the impact on the environment is reduced in comparison to conventional farming. This also suggests that small-scale farms find it harder to gain support from the upper levels. On the other hand, new distribution initiatives focus on supporting local small-scale farmers by setting better margins for the farmers and reaching a larger group of consumers. The farmer mentioned two local distributors with whom he collaborates. Local distributors get the vegetables from the farmers and distribute them to the consumers. They either create subscriptions to 'food bags' or provide online shopping platforms and collection points without having to make a subscription.

Entrepreneurial projects: The entrepreneur works mainly in collaboration with a private entity, which means that having support from private stakeholders is the most important for the project to stay viable. To maintain transparency, *Case study respondent VI* likes to work on the relationship, which also means shared support:

"So, I see the relationship as a business and also as an entrepreneur or volunteer or whatever I do, I am always looking for relationships, working together. […] We help them to get funding. It is a cooperation, working together. […] I want to have the cards on the table and be honest and be open." (Case study respondent VI)

Farmers' market: During the interview, the respondent reflected on the importance of support. Although there have been negotiations, the idea of a local farmers' market is generally supported by the municipality, to an extent that the market is often presented as a local and sustainable project in Rotterdam in the media. During a difficult period when the market's operating hours were about to be reduced, the community came together and worked towards keeping the market open by creating a petition. Although it is difficult to quantify the impact the petition had on the negotiations, the community support definitely had some influence, as *Case study respondent VII* explained:

"When we were in trouble […] even the pub, where I have never been, they started collecting signatures from their customers and people writing letters to the mayor and that was in the papers. So, that was really moving. Because normally you cannot measure that you are doing something with the community. But when you are in trouble, you can measure the number of signatures and you can measure the number of letters." (Case study respondent VII)

Summary: Assessing preparedness

The findings show how prepared selected LFS projects are to deal with the land tenure challenges and how much support they have, as seen in Table 15.

Table 15: Overview of preparedness

Project	Land tenure agreements	Support
Community garden	• Land tenure agreement must be renewed every 5 years • Rent: small symbolic amount • Uncertainties about rent agreement before extension	• Support from the municipality to upgrade the area • Project mentioned on local and international levels by municipality • Getting support from the municipality was not always easy • Volunteers working for several years • Private partners providing financial support
Allotment gardens	• Land tenure agreement must be renewed every 5 years • The area is protected by the Rotterdam's airport policy	• Little support was observed
Small-scale farm	• Farm land is owned by the farmer • Difficulties obtaining a loan	• Little support from the government on organic production • Support from new distribution initiatives
Entrepreneurial projects	• Works mainly with (various) private organisations • Commitment to improving the area and maintaining it in exchange for the use	• Support from private clients
Farmers' market	• Renting the area of a public square from the municipality • Years of tenure agreement negotiations	• Support from the municipality on the project • Support from the community, especially noticed during difficult times

Uncertainties in land tenure are mostly noticed in the community garden project, allotment gardens and the farmers' market, i.e. those projects that have a rental contract or agreement with the municipality. These projects are using plots which were left empty due to the economic crisis. Short-term rental agreements involve a certain degree of uncertainty as the municipality can relocate them at any given time and use the area for development. Re-establishing the garden in a different location takes time, as a new garden has to be designed. It might also take time to find new volunteers from the area, people who are motivated enough to work with the projects. The findings from the interviews also show that these leaders have different strategies to use in negotiations; either by fighting and not giving up or trying to do their best for the community beforehand to have higher chances of staying. This highlights the importance of having support. A good relationship with the municipality is essential. When a project works well for the community and has additional benefits beside food production, planners are more likely to map it as a long-term green area. Also, having support from the community and the neighbourhood can put additional pressure on the municipality during the negotiations. Thus, it can be argued that community support is an important factor in achieving better resilience of this type of project.

Land tenure agreements are less of a problem for entrepreneurial projects, as the entrepreneur tries to avoid high purchasing or renting land prices by working with private individuals in using the land for free. However, small-scale farms have to deal with high land prices, carrying a lot of debt on the land.

It is important to have support from consumers and distributors to remain viable, especially distributors who are trying to give a better margin to local farmers and increase the number of local food consumers. On the other hand, the entrepreneurial project's main support comes from the private companies that are interested in this kind of project.

Land is expensive and this is a problem. According to *Researcher I*, owning land is a challenge, land in the city is scarce and expensive, and especially after the crisis the competition for empty areas has increased:

> *"The pressure on land is very big, especially directly around the city. Sometimes they are owned by development companies who want to build there as soon as the regulations are changed. […] There is a lot of speculation going on and you also need to find the right organisations to get land, as a local producer. The market is very tough for buying and leasing." (Researcher I)*

To conclude this assessment, there are certain challenges that projects must overcome to access publicly owned land. Land tenure represents a vulnerability, where support from the community makes the project stronger. Projects that own their land may rely on themselves to finance it, but support from different initiatives helps to increase their margin and financial independence. Others rely on finding alternative ways in which they can produce food and avoid renting or owning the land.

Persistence: Demand for produce

Community garden: The majority of the food produced is given to the Food Bank. As the supply of fresh food was always a problem, they recently implemented coupon cards for the people living in the area, who can come to the garden and harvest their own food. There is a demand for fresh vegetables and not only from the Food Bank. The respondent also mentioned a change among volunteers: after the initial doubtfulness towards local food they started appreciating the taste of fresh local food and are happily taking more of it home. To increase the demand for the produce, the community garden started collaborating with six other food

businesses. Together they wish to create a brand, connecting the products with the story of people working in the garden.

Allotment gardens: In recent times, there has been increased demand for renting a plot; however, the demand for food production varies from member to member. There are some who are using the gardens for relaxation and planting flowers rather than for growing food, while others prioritise food production, having 100 square meters or more available land. The community implemented composting on their gardens, helping members improve the soil. Also, plants are sold at low price to members. At the same time, concern about the quality of the soil has been raised during the interview. Due to the proximity of the airport, several planes use the airspace above the garden, and some members are concerned about the pollution of water and soil. This influences the number of people using the garden for food production.

Small-scale farm: As one of the few of its kind, the organic horticulture farm has been in business more than 30 years, meaning there has been sustained demand for the produce. Initially the farm had a small shop, but because of a shortage of labour to manage the shop, the business now works together with several distributors. According to *Case study respondent IV*, the demand for the produce has been rising as regionally grown vegetables are becoming more desirable. For instance, in the town where the farm is located, over a period of 30 years the demand has grown from 1% to 4% of the population:

> *"When I started, it was about 1% who bought organic food. I think it is now about 4%. At the beginning, I had a shop and [the town] has 6000 inhabitants, so 1% is 60 people and I had 50 for my shop. When it is 4% it is 200-250." (Case study respondent IV)*

Although there is a demand for the produce, it comes from a small group of consumers who are willing to pay a higher price for the produce compared to the conventional system. To build trust among people the farm had to be certified as organic, with labels from private entities. It is interesting to know that it is almost necessary to have the labels to indicate your way of production.

> *"It is the only way you can show the rest of the world that you are a certified organic. […] They need assurance." (Case study respondent V)*

The respondent also mentioned that the logistics of reaching the clients are not always easy. Also, growing and harvesting what is expected can be difficult. This can be challenging, especially for the consumers who want certainty which cannot be given, as the production depends on the weather.

Entrepreneurial projects: The entrepreneur works with different types of food projects, including 'food forest system', edible gardens and community gardens. The focus here is on demand for his projects and knowledge. The entrepreneur works with six 'food forest system' gardens, which were set up in collaboration with the private entity. The location and the partnership for these projects were not difficult to find, due mainly to the drive the entrepreneur has and the small size of the projects.

Farmers' market: When the market started operating it was a new thing that the market focused on local food and connection with the farmers, making it interesting for a specific group of people. Now the place has become more mainstream, with all kinds of people visiting the market, which is important for the farmers who are selling their produce. Some have been at the farmers' market for 10 years, coming year round regardless of the weather and temperatures, while others have not persisted and stopped coming after a few times. To attract more people the farmers' market has a 'live show' where different artists come to sing or perform. There is also a person responsible for managing the market, sharing information, creating posters and fliers. In addition, social media is used to make the market more personal

and show the people behind the food production and their passions for it. These actions are believed to be needed to attract more people.

Persistence: Employment agreements

Community garden: People working in the community garden are there on a voluntary basis and they have the opportunity to work at the garden four days a week. In exchange for volunteering, the municipality of Rotterdam gives financial support to unemployed workers, which helps getting volunteers to stay. In general, the garden welcomes everyone into their family. After the initial trial phase, they make a voluntary contract, in which people make a commitment to come and work in the garden.

In addition to the volunteers, three people are employed and have the main responsibilities for managing the garden, from financial to organisational. There is a part-time director working four to eight hours a week and two additional people who work two days a week showing people what to do and managing the business and networks. The employment time limits the work that can be done for the garden. According to *Case study respondent II*:

> *"We can do much more with this, but that costs time." (Case study respondent II)*

Allotment gardens: The gardens are run and taken care of by members, i.e. the people renting the plots. According to the rules of the allotment gardens, members must volunteer for 18 hours a year. These hours are used for canteen services, repairs and general maintenance of the common areas, such as the association's building, composting, the greenhouse, outside areas of the complex, etc. The board responsible for the place consists of a minimum of five members who are elected for three years. Although the work of the board members is voluntary, the responsibilities are numerous and sometimes it takes the equivalent time of a full-time job.

Small-scale farm: The farm is a family business operated by the owner and his partner. Information on off-farm income of the spouse was not obtained during the interview. Occasionally volunteers help at the farm. They also have an intern who works once a week and learns about their way of food production.

Entrepreneurial projects: The entrepreneur works on several things, all connected to food and food production: the community garden, edible forest gardens, implementing edible gardens for people, etc., to name just a few. Many of these projects are set up in collaboration with the private company, which offers the land to use and together they apply for funding of the project. To take care of the project, the entrepreneur mainly works by himself, especially as many of the projects, particularly food forests, do not need much care. There are also volunteers that help out when needed. There is only one project which needs a permanent volunteer who has to come daily, while the rest mostly assist with implementation of new projects.

Farmers' market: From the outset organisers of the market wanted to make it self-sustaining, meaning there would be no need for external funding. To make that happen, farmers rent stalls and some, for extra costs, also electricity. Due to its success, farmers insisted on having a weekly market. The manager is responsible for the marketing of the project, communication, renting stalls from a company and working with people who help with electricity. The manager also mentioned that for the market to thrive it is important that farmers can make enough money in the market. Indirectly the market also influences employment by referencing people to farmers looking for help.

Summary: Assessing persistence

Persistence thinking in the LFS looks into how the system can increase its ability to continue in the face of a crisis. To make the project profitable and repay investments there must be demand for the products and people with different employment modes able to deal with additional expenses. The case studies and steps which were taken in order for producers or projects to persist on the market are summarised in Table 16.

Table 16: Overview of persistence

Project	Demand for products	Employment agreements
Community garden	• Implementing coupon cards for people from Food Bank • Encouraging volunteers to use more fresh vegetables • Collaborating with others to establish a brand of the garden	• Volunteers working up to four days a week, unemployed volunteers get financial support for volunteering work • Three people are employed, for 8 – 16 hours per week, and have the main responsibilities in managing the garden
Allotment gardens	• Increased demand for gardens • Control of the soil and water quality • Starting mandatory composting and free compost use for the members • Selling seeds to the members at small price	• People rent a plot which they take care off • Members need to volunteer annually for 18 hours • Association board is run by volunteers, who answer to the federation and municipality
Small-scale farm	• Becoming certified organic producer • Collaborating with local distributor initiatives	• Operated by the farmer and his wife • Occasional help from volunteers • Offer an opportunity for an internship
Entrepreneurial projects	• Projects are intended for self-consumption	• Entrepreneur works mainly by himself, collaborating with private businesses for projects • Volunteering network was set up and volunteers help with implementing new projects • Permanent volunteer is needed at only one project
Farmers' market	• From a specific group of people coming, the market became more mainstream • The market has 'live show' where different artists come to sing or perform • Spreading posters and fliers • Using social media to talk about producers and their love to local food	• Farmers rent a stall to sell the produce • Manager paid for marketing, communication and organisation • Renting stalls from a company • Indirect influences on employment

Having demand is necessary for the producers and managers to continue working in the field. The majority of the case study units have experienced an increase in the demand for products or plots to grow the crops. It is an interesting trend to observe: although the projects are different and people interested in the produce come from various groups, the projects share a shift to a more mainstream trend of the LFS and not one accessible to only a specific few. An interesting fact comes from allotment gardens, where the popularity of owning the garden has increased over the years, to such an extent that the municipality decided to let only people from Rotterdam rent a plot. At the same time, individuals who wish to have access to fresh food without paying rent have found other ways, like volunteering for an exchange of daily crops.

To decrease the costs and be able to make a living, selected projects, from community gardens to commercial farms, mainly have volunteers who help. As all of the projects operate on a small scale, any additional paid help can significantly reduce their earnings. Therefore, volunteers are always welcomed, in exchange for either produce or knowledge. Additionally, family members often help to reduce the costs. As described, there is usually a single person who is fully employed or the employment hours of a single person are divided among a few, as in the case of the community garden. The difficulties of selling the produce are described by *Case study respondent VII*, who also explains that paying additional help is not as easy as it might sound:

> *"Of course, sometimes I try to sell something myself […] But then you see how hard it is when you want to pay somebody who is selling for you. These are good exercises to understand how hard it is to make money." (Case study respondent VII)*

To sum up the assessment, demand for the products is necessary for the projects to survive. There has been an increase in demand to an extent that some projects are looking for ways to reach more consumers more frequently and more easily. To increase the profit, the workforce in the majority of the projects is volunteer-based or family members assist, which reduces costs of an additional person employed. The projects have different methods to repay the volunteers, either in natural goods or knowledge, which are well accepted.

Transformability: Knowledge exchange among actors

Community garden: One of the goals of the community garden is to transform the consumer into a producer, because they believe that anyone can contribute something towards alleviation of a lack of fresh food, as noted by *Case study respondent I*. To gain the necessary knowledge they organise workshops on food production and edible food, exchanging and building up knowledge.

> *"Everybody can do something about their lack of food. And we learn a lot about growing your own food. Maybe somebody has a garden or a balcony and you can also grow your own food there." (Case study respondent I)*

Allotment gardens: Although the garden complex works as a separate entity, they have workshops for members from outside the association, which also raises awareness about the problems. Generally, members of the association help each other with the skills they have.

Small-scale farm: At the beginning, in the first decade, the farm had visitors from all over the world. They wanted to know how to transition to organic farming or learn about composting, etc. The farmer himself keeps trying new things he reads about and he is keen to share his knowledge with interns who are seriously interested in the organic farm business.

Entrepreneurial projects: The entrepreneur is connected to a network of like-minded people who are thinking about (local) food systems. There are several ways in which they work together and exchange the knowledge they have. One of the ways is through the entrepreneur giving lectures and workshops on permaculture or gardening, thus sharing the knowledge with new actors. Another way is collaboration and working together, which also means that people from different backgrounds come together, share their knowledge, and the group together applies this to the projects. This knowledge exchange has also been fruitful and resulted in funding for a new project.

Farmers' market: People involved in the market often discuss how to approach the LFS as they have little power in comparison to the conventional food system. Additionally, they collaborate

with other farmers in an organisation which has been formed recently. There like-minded people have organised meetings and talk about working on different food systems, as explained by *Case study respondent VII:*

> *"The current food system is so powerful, so strong, so dominant. With the small producers, we talk about how to change this. Not only with these people, also farmers that are not on the market, who are more innovative. The network in the whole province. […] And everybody who is working on different food system can join." (Case study respondent VII)*

Transformability: Ability to innovate

Community garden: Innovation in the garden is part of their business model. The community garden project is becoming a place for testing new innovative ideas, which are mainly focused on sustainability. For example, because of a lack of water and electricity, the garden has implemented circularity to generate the resources. To heat their container house, the projects implemented 'Biomeiler', a system of wood chips which warms up to 60 degrees. It is a system which uses composting wood and creates a compost heap from which the heat is extracted. Using a heat exchanger, the heat can also be used for warming water (Voedseltuin, 2017). In addition, there are projects funded by 'Rotterdam resilience, water sensitive project' testing ideas on how to retain water and slowly give it back to the city. Being a hub of innovation helps them be more independent, allowing a new way of collaborating with the municipality, as explained by *Case study respondent II:*

> *"So, we do it differently and then we say: 'Local government, you can be our partner. […] We are not dependent. You can work with us'." (Case study respondent II)*

Allotment gardens: Innovation in the allotment gardens has a smaller role. Although the association is keen on implementing new ideas in the place, it is not a priority. The focus is more on creating a good environment for the community. Over the past couple of years, solar panels, a machine for composting and a playground have been added.

Small-scale farm: When starting the food production business and deciding to adhere to biodynamic agriculture, they were the only ones in the area using this philosophy. Although the way of growing food might not be seen as innovative, it was definitely a different approach to treating soil fertility and plant growth. It was also an approach that sparked curiosity and gave additional value to the produce. Also, the farm has recently created a web page to share their story and reach more clients.

Entrepreneurial projects: The projects and the entrepreneur demonstrate a certain need for innovation, a desire to test and to find out how things can work better. It is possible to say there is a certain level of innovation in projects; food forests are an innovative approach to food production within the city of Rotterdam. The motivation behind the entrepreneur is to test ideas on a smaller scale which could later be implemented on a larger scale outside the city.

Farmers' market: At its beginning, the market had a different approach to the food system, making it innovative in its branch, which was not as welcomed as hoped for. Thus, the farmers' market needed to reinvent itself and operate as festivals, with farmers selling their produce. Managers of the farmers' market are always trying to find innovative approaches to making it a weekly market and find new ways of reaching the consumers. One of those approaches is to offer live music performance at the market. Another is to use social media to show the people who make the food and their passion, what is different in their approach to the FS, etc.

Summary: Assessing transformability

The transformability part of resilient thinking, as shown in Table 17, investigates to what extent projects collaborate with other actors and what their own abilities to innovate are.

Table 17: Overview of transformability

Project	Knowledge exchange among actors	Ability to innovate
Community garden	• Several workshops on food production and edible food organised annually	• Innovation is part of their business model • Implementing circularity approach
Allotment gardens	• Workshops for members on gardening are organised • Members help each other with skills	• Innovation is not a priority
Small-scale farm	• In the first decade of operating several people came to learn • Farmer is keen to teach interns interested in this way of food production	• The way of growing food might not be seen as innovative; it was definitely a different approach to treating soil fertility and plant growth • Created a webpage to share their story and reach more clients
Entrepreneurial projects	• Connected to a network with like-minded people • People from different backgrounds working together on project	• Need and desire for innovation • Innovative approach to food production within the city • Testing ideas on a smaller scale before proposing to implement them on a larger scale outside the city
Farmers' market	• Discussions with people involved about approaches to the LFS • Part of a network which meets and talks about working on a different FS	• Combining festival and farmers' market • Using social media to share stories and connect farmers to consumers

Knowledge exchange among different actors is a necessary part of transformability, for people to keep learning, share views and keep innovating. Many turn to workshops as a medium to exchange knowledge or to teach people about permaculture, composting and similar topics related to sustainable farming. The knowledge exchange is not only about teaching. By organising meetings, discussions or new ideas might occur. What is interesting is that sometimes transitioning to more innovative ideas can be challenging for both the people who transition and for the people who regulate the transition. Exchanging knowledge can not only prevent mistakes but also help the next person in the same situation, which was also explained by *Initiative manager* I:

> *"[T]he steps he is taking and decision he is making are of course his steps and his decision, but they are also steps and decisions which are also really general. […] He is also facing issues, hurdles, things that don't help him and don't make it easy for him to change. […] It is also a learning process. So, you will make a mistake here and there. And you will run a risk. Is that risk only yours or do we have to provide like a fund or an interest, something which is in place to facilitate it?" (Initiative manager I)*

This is especially important in combination with innovation. Some of the projects are very much involved in innovation, and testing new ideas on a smaller scale. *Researcher I* pointed out why innovation on a smaller scale is important:

"If you can also see this kind of innovation and see if that works, you could maybe give them a plot of land that is 10 times bigger in the outskirts." (Researcher I)

Apart from the allotment gardens, which are under a public entity, the other cases were already innovative in their beginnings. Their approach to the LFS was different and they needed innovative thinking to continue their business. For example, the community garden has to keep finding innovative ways to fund their project. Others use social media platforms to share their story and reach the wider consumer range. What is interesting is that there is a lot of innovation happening at the production level, yet in general there is a need for innovation at the distribution level. Distribution was mentioned as an element of the LFS in need of more innovative approaches. Although there are companies which are part of the innovation in distribution, a bigger network of consumers and producers is needed to make it work, as also explained by *Researcher I*:

"It is really good all that they do, but we need a lot more. And of course, for it to really work, they really need to scale up and have more consumers and more producers linked. Because now they have too little on both sides, so it is hard to make a profit." (Researcher I)

To conclude, combining knowledge exchange and innovation is important to build resilience for the local farmers. They are both very connected. New knowledge produces innovation and innovation produces the knowledge. As seen in the selected cases, the majority of them have had innovative approaches to LF business since the beginning and stress the importance of innovating and exchanging knowledge with other actors. Although the producers are quite innovative on their own, there is room for more innovation and exchange in other elements of the food chain.

Adaptability: Flexible business model/ Multi-functionality of agro-business

Community garden: In order to fund the community garden, a business model was developed in which food produced in the garden is given away for free to the Food Bank. The secondary services, such as innovation, projects and education provide income for the garden. This multi-functionality of agro-business includes commercial companies which sponsor parts of the garden, partners who work on innovation and teach. Also, in their business model they do not rely on just a single partner but rather have several.

Allotment gardens: The gardens follow general rules that are set by the federation and some by the association itself. According to *Case study respondent III* the association has a fixed idea on how they want to run their gardens.

"We like to start with an amount and we like to close with a little bit more to make investments, but not with too much. […] We use it to invest into things we have here on the garden. […] For the solar panels. And for some machines for the compost, so that anyone can use it." (Case study respondent III)

Small-scale farm: The farmers earn their living by selling the produce. As selling things personally was difficult to organise and took time, the farmer does not rely on a single trading system, but currently collaborates with several suppliers and distributors; from natural food shops, to online shops, to online distributors, organic wholesalers, etc. In addition, the farmer rents out part of the land for the cultivation of flowers to other private individuals.

Entrepreneurial projects: Food production is a tool and not a goal in the case of entrepreneurial projects. This means that the entrepreneur works in several areas connected to food, which is possible due to the multi-functionality of UA, as explained by *Case study respondent VI*:

> *"The nice thing about urban farming is that it is multi-functional. There are a lot of things you can point to in that. Nature, yes we are doing that. Social, yes we are doing that." (Case study respondent VI)*

In this case, multi-functionality also means giving lectures and workshops on vegetable gardening, permaculture, composting, etc. Or designing and implementing edible gardens for people, and the same for food forests, community gardens and natural playgrounds. The multi-functionality of UA gives the entrepreneur a chance to work in the field, find funding from different organisations with different focuses, and have a chance to survive working in a niche.

Farmers' market: The market has followed the same idea from the outset: to bring local food from around Rotterdam to the inner city; to reconnect with the farmers and the neighbours. To bring the market to the city, the project has been flexible in its form and it is finding different ways to bring people to the market. Yet, not everyone can sell their products at the market and the manager has strict rules on who is welcomed, in order to follow their initial goals. This in turn makes it difficult to make big changes as farmers are afraid of losing business.

Adaptability: Building alliances and network

Community garden: The main goal of the community garden was to provide food for the Food Bank and over the years its network grew. The garden works with other local organisations as well, giving them food from the garden. But collaboration with other organisations does not end with receiving food. Together they collaborate on creating proposals for projects. An example is a pitch for financial support, teamwork of six different companies where everyone is working with food. In addition, they also collaborate with neighbours and planners, testing innovative ideas together. Recently they were also part of an 'International Architectural Biennale' event where they participated in talks and debates.

Allotment gardens: As an association, the gardens are a self-sustaining unit with a limited network. They wish to collaborate with other allotment gardens in Rotterdam for the purpose of making administrative things easier, but at the moment each set of gardens is a separate unit.

Small-scale farm: In this case, the alliances are mainly with the consumers and distributors. Distributors in particular are the voice of the farm, sharing the stories on social media and spreading the word.

Entrepreneurial projects: Even though at the beginning the entrepreneur used to work alone, there was a recognition that it is necessary to collaborate and build a network. In this case, the network is seen as an organic network of individual people working together as a group and the network keeps on changing. In addition, the respondent mentioned pilot projects that successfully gained funding for implementing their idea and they are a result of collaboration of community gardens, entrepreneurs, business people and local government. Furthermore, *Case study respondent VI* is also convinced that the collaboration of individuals as a network can be the future of the food business:

> *"I think that is the future of business. That we are all individuals but working together as a group. […] People have their own business and are working together." (Case study respondent VI)*

Farmers' market: The farmers' market manager has a network based on trust, which also involves a lot of responsibility in bringing the right farmers to the market. The importance of honest relationships was stressed a few times by *Case study respondent VII*:

> *"The customers trust me in choosing the right people. So, sometimes you hear like a rumour that someone is doing something dishonest. That is, for me, the worst thing that can happen." (Case study respondent VII)*

As mentioned before, apart from building its own network at the farmers' market, the manager is also a part of a network based on local farmers in the province. This is also important in order to exchange ideas and to have alliances. The group of alliances goes beyond the market itself. To mention a few, the shops around the market have increased in sales during the market's days and real estate agents welcome the market by telling their clients about it.

Summary: Assessing adaptability

In the face of a crisis, the cases need to have the ability to be flexible or adaptable, to build their resilience. Selected case studies approach multi-functionality differently. Multi-functionality in this case was analysed as the ability to have either a flexible business model or additional activities beside food production to generate income. As the cases are so different from one another, it was difficult to pick one definition only and apply it to all. Thus, we have to look into individual cases to understand better how resilience is built through adaptability.

To be self-sustaining the community garden has developed a business model where one part of the business follows the primary goal of giving food to the Food Bank and the secondary part is where the additional money comes to the project. This requires time and ideas from the management, but at the same time gives the project the independence needed to make it stronger. Operating in this way helps to build networks and gain alliances; not working with one partner creates new collaborations, alliances and sources of income, having a greater chance of support in case of challenges. This is interesting to see as it gives an impression that flexibility is necessary to have alliances from different circles, meaning various partners and sources of income.

In some cases, it seems that it can be more difficult to include multi-functionality of the business, because of the influence of other factors, some mentioned above. For many of the cases, in this situation the networks and alliances help in voicing the problems. One such network comes from the initiative of the province of South Holland, including Rotterdam; a government-supported network which focuses on LF and serves as a connector between people and the government. As explained by *Initiative manager I*, their goal is to bring up interesting topics that farmers can discuss and work on solutions or connections.

> *"What we try to do with the network is to help front runners to know each other and to help each other and to get to know what they need […] It is like nurturing them, open them and we do like different things. We organised a couple of events. […] And during the events, we choose the topic and then we try to create like a working conference. […] People are working on something and work on solutions, connections." (Initiative manager I*)

Others who do not wish to be a part of a network have other methods of finding alliances; that can mean having several distribution partners or alliances from other professions. LF distribution is an important element of a FS: with its own network, it also serves as a connector between people and the farmers. Small-scale farmers use different ways of distribution and through them build their network of groups of consumers. The farmers' market is an example of having a strong group of alliances. It is important to note that the networks are beneficial to

both partners involved. For example, farmers and distributors have a direct effect on helping each other, while the farmers' market indirectly influences other businesses in close proximity. An overview of different approaches can be seen in Table 18.

Table 18: Overview of adaptability

Project	Multi-functionality and flexibility	Building alliances and network
Community garden	• Primary service is to give food to Food Bank, the secondary is to innovate, create other projects and provide education • Does not rely on a single partner, but has several	• Works together with other local organisations • Collaborate on creating proposals for projects • Participated in talks and debates
Allotment gardens	• Gardens have to follow the rules that are set by the federation and some also by the association itself • A fixed idea on how they to manage gardens and no wish to have a profit	• Self-standing unit with limited network
Small-scale farm	• Does not rely on single trading system, but collaborates with several suppliers and distributors • Renting out part of the land for the cultivation of the flowers	• Alliances are mainly the consumers and distributors
Entrepreneurial projects	• Working in several areas connected to food • Finding funding different organisations with different focus	• An organic network of individual people working together as a group • The network keeps on changing • Collaboration for project proposals
Farmers' market	• Flexible in its form • Strict rules on who can sell at the market	• Trust from consumers to bring the right farmers to the market • Part of farmers' network of the province • Alliances from people having business in close proximity of the market

To sum up the assessment, several projects have been adapting to changes and looking into new ways of bringing business to the projects. Some rely on innovative ideas of business models, other look for different ways of distributing their food and some do little to be flexible. One trend that is seen in the majority of the projects is that they often do not rely on a single partner.

Assessment matrix

Resilience assessment has used the four-dimensional framework, which has provided an overview of steps the projects have taken to overcome challenges. Table 19 presents resilience scores for the projects. The scoring system also illustrates what is the focus of the projects and how actors prioritise different elements when dealing with vulnerabilities of the project. The projects were given a score 'low', 'medium' or 'high' depending on the number of steps taken to deal with the challenges. For a detailed matrix see Annex 6.

The matrix (Table 19 and Annex 6) is based on qualitative data which was attained using the semi-structured interview and was explained in the previous sections of this chapter. It is important to point out that the assessment is a result of stakeholders' perceptions.

Table 19: Matrix resilience

	Voedseltuin Rotterdam	VTV Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Land tenure	LOW	MEDIUM	MEDIUM	LOW	LOW
Support	HIGH	LOW	LOW	LOW	HIGH
Demand for products	HIGH	MEDIUM	MEDIUM	MEDIUM	HIGH
Employment agreements	MEDIUM	MEDIUM	HIGH	HIGH	MEDIUM
Knowledge exchange among actors	HIGH	MEDIUM	LOW	MEDIUM	MEDIUM
Ability to innovate	HIGH	LOW	LOW	MEDIUM	LOW
Multi-functionality and flexibility	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM
Building alliances and network	HIGH	LOW	LOW	MEDIUM	HIGH

- Voedseltuin Rotterdam appears to be very vulnerable when it comes to land tenure as it is dependent on local municipality's decisions about land use. However, to increase its resilience in the case of challenges, the project has an increase focus on building alliances, working with innovation and increase the demand for their service. This helps to increase resilience of the projects to some level.
- Volkstuinvereniging Lusthof is also located on public area and rents the land. The land use in that area is protected by the airport policy which keeps preventing land use change. This to some level lowers the uncertainties about the land tenure. The garden is used by hobby farmers and operates within strict rules given by the federation. Thus, the innovation and multi-functionality is low, while interactions and knowledge exchange is limited to the community.
- Natuurluck is privately owned and the farmer has taken on a loan, which increases the vulnerability. To improve the financial situation, the farmer works with occasional

volunteers and interns. In addition, part of the farm land is rented out. The farmer works independently and collaborated with local distributors to reach consumers. This appears to make the farm dependent on the network with the distributors.

- Moestuinman uses privately owned areas which also increases the vulnerability of the projects. Yet, the projects entrepreneur works with are intended for self-consumption and testing innovative ideas. This seems to also indicates that possible loss of the project does not impose as big as a vulnerability in comparison to the farmer. The entrepreneur is part of different alliances and networks.
- Farmers' market uses the public area. Thus, its existence is to some extent dependent on the support from the municipality. Yet, support from the community seems to work in favour of the market as it also attracts more people and consequently increases the demand for the produce as well.

4.3.3 Governance mechanisms

What kind of governance involvement is necessary to make local agriculture viable and to increase resiliency? The local food system operates in parallel with the global system. To close the gap between prices and the food production costs of the GFS, many local farmers have to intensify and scale up their production. There are also LFS actors who utilise market niches to create an alternative system, but this is an entrepreneurial idea in the free market where the structural issues related to access and viability are not really mitigated. Government continues to have a role in mitigating the inequalities that result from the dominant market system.

The resilience of projects working within local food chains depends on governance mechanisms that create either opportunities for local food system projects and actors or barriers and limitations. The different levels of interaction between the actors involved in LF projects and local authorities arose during the data collection. Government involvement in terms of staff time and policy, and the lack of it, helps to explain the position, power and interests that stakeholders have in the local food chain in Rotterdam.

Involvement in LFS

Municipality: The rise of LF initiatives is a result of a political era that favoured urban agriculture, which in Rotterdam resulted in issuing the strategic document 'Food & the City' and the establishment of new groups that launched LF movements. However, after a change of administration the focus of the new aldermen was different. That also meant that the department in charge of the Food & the City strategic document was dismantled and staff were relocated to new positions, so there was nobody left to actively work on implementing the strategy, as also explained by *Municipality official II*:

> *"We had this policy called 'Food & the City', but that was initiated by the other departments, about the public space. And it was initiated in a different political era. Here we have an administration for four years and then a new administration comes. […] And then the new administration comes and then for them it is less important and they don't do anything active about it." (Municipality official II)*

This is a challenge for stakeholders involved in the local food chain as the interest of the local government can change with the new alderman. In addition, the general structure within the

municipality can pose a difficulty as the issue of food is divided among several departments, making it more challenging for local actors to find information. In 2016, the municipality appointed a contact person for questions on urban agriculture and gardens, who helps in finding information on the topic.

The department of economics is actively involved in food, focusing on stimulating collaboration, new employment opportunities and entrepreneurship in the region of Rotterdam to stay competitive. However, the focus of the department is not on local or global actors, but on start-ups that address innovative ideas.

Province initiative: Financed by the province of South Holland, a new initiative was established recently. The 'Voedselfamilies', translated as "food families", focuses on a short supply chain. The focus, as explained by *Initiative manager I*, is on addressing important and abstract topics of LFS:

> *"We organised a couple of events. Like four or five this year. And during the events, we choose the topic and then we try to create like a working conference at this fair. […] It is more like a network activity. It has a specific focus on sustainability, affordability and healthy food." (Initiative manager I)*

The initiative is important for the LFS and the actors as it acts as an element in between government and LF producers. Furthermore, it also created a space where producers can address important issues, communicate and create a network, giving farmers an opportunity to learn from each other.

Producers: The majority of the case studies in the research have strong leaders with the vision and dedication to drive the projects forward. The project's leaders are the ones driving it forward and looking at innovative ideas to keep the project viable. For instance, the local farmers' market leader has been negotiating on rental price and permit for several years, similarly to the farmer who believed in his idea of food production even when people around were doubtful.

Rules and regulations

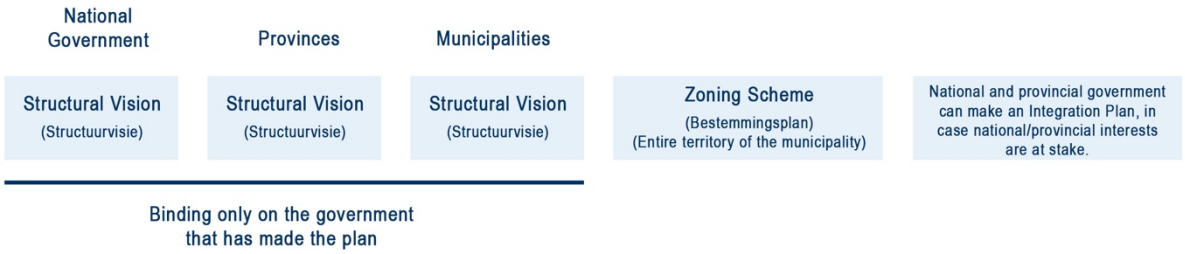
This section briefly discusses the governmental regulations pertaining to the LFS. Dealing with the challenges of regulations in depth is beyond the scope of the research. Nevertheless, the section looks into the regulatory environment and discusses its influence on the local projects analysed.

The regulatory environment in the Netherlands is under the strong influence of the EU Common Agricultural Policy (CAP). The CAP budget is allocated among sustainability development, innovation, direct payment and rural preservation. Since 2014, a change in the CAP has allowed member states to decide where to allocate the funds. The additional change is the creation of The Small Farmers Scheme, which indicated that the CAP 2014-2020 has started acknowledging small-scale farmers, as the allocation of the direct payment can be directed to them as well. However, the allocation of the funds is left to the goodwill of the individual country (European Commission, 2013). The European Commission document on The Small Farmers Scheme does not define the size of the farm eligible for funds, but limits the maximum payment to 1250 EUR (European Commission, 2017a). However, the scheme is not applied in the Netherlands (European Commission, 2017b).

Furthermore, one of the issues perceived by young Dutch farmers is the availability of land to buy or to rent. Land use regulations have been a part of the Dutch planning system since the end of WWII and are updated with changes every few years. The purpose of these regulations

is to accommodate needs for urban expansion and, at the same time, conserving nature and agricultural production. For example, the agricultural area in Randstad, the economic centre in the central-western Netherlands, has been protected to ensure agricultural activity. However, the area protected for agriculture has shrunk to facilitate urban development (Levkovich and Rouwendal, 2016). For the most part spatial planning decisions are made on national, provincial and local levels, as illustrated in Figure 18. At national level, spatial decisions are focused on the interest of the entire country, while provincial interests are balanced between urbanisation and the protection of green areas. The municipalities have control over the zoning scheme within the established land use plan. This gives municipalities the power to regulate the land use plans with zoning rules, which are the most binding and guiding tools in spatial planning (Government of the Netherlands, 2013; MLIT, 2015).

Figure 18: Local Governments and Spatial Planning System (source: adapted from: MLIT, 2015)



Availability and price of the land were often mentioned during the interviews and this has been discussed in the section on resilience. Land in the city is scarce and farmers often compete with the building industry. The price of the land is high and local food system projects within the city more often rent than own the land. However, the examples of community gardens being relocated due to building plans show uncertainty for those who rent. The interviewees speculate that it is a good relationship with the municipality and social capital which help the allocated areas to remain regulated as a green area.

The urban fringe faces similar problems with land availability and pricing, which can affect the type of production, as explained by *Initiative manager I*:

> *"The price of land is an issue. Because it is high and that pushes farms into a certain way of farming. […] Some farmers start to become a little bit smaller, sell land to make a better financial position for themselves. But others are expanding the farms to be able to have a new farming system, which needs a little bit of scale to be efficient and profitable." (Initiative manager I*)

Farmers require a loan to buy the land, which can be difficult. The interviewee suggests that some farmers might have to scale up and intensify the production to access financial support. Thus, it can push some farmers to focus on production only, not sustainability.

Embracing sustainability, farms that produce biologically can apply for 'green funds'. 'Green funds' is a tax incentive scheme which allows a lower interest rate for the investors (NCFI, 2001; NL Agency, 2010). In addition, there are other opportunities for biological farms. *Researcher I* explained during the interview about other services and funds which favour organic farming and offer the possibility for food producers to buy or rent land. Two mentioned during the interview are the 'National Forest Service' and 'Natuurmonumenten'. The National Forest Service leases the land to local producers under shared values on protecting the nature.

"The National Forest Service - they have land here, also forest areas which are in a process of transformation. They want to do other things there and they are open to suggestions from local producers. […] if they also realise some nature values." (Researcher I)

Natuurmonumenten is a land trust association which leases parts of the land they own to producers with nature values, such as biodiversity and landscape values.

"There is also the land trust, like 'Natuurmonumenten'. […] They have a lot of land … well, they have some land around Rotterdam and they are also leasing part of that land to local producers under certain conditions. If you produce in a way that is also good for nature, meadow birds for example, then they can provide some land for a really good price." (Researcher I)

Following the trend and demand for organic production, farmers started to transition from conventional farming to alternative practices. The alternative practices focus on the importance of locality of the food and environmentally friendly production methods. Yet, for the farmers the transition to organic farming also means several regulations and steps that need to be taken. A transition takes two years of organic production before the products can be certified organic. The transition time means two years of lowered production. Farmers take a risk due to the possibility of mistakes in trying to produce organic and lower profit. After the transition, farmers have to pay for yearly inspections and labels. Having a label is important for the farmers to prove their methods of production and increase the transparency of the system, as explained by *Case study respondent V*:

"It is the only way you can show the rest of the world that you are a certified organic. […] They [people] need assurance." (Case study respondent V)

Small-scale farmers sometimes struggle to meet strict regulations. During the interview, *Case study respondent 7* discussed the difficulties for farmers as the same regulations apply for both small farmers and big companies. In the case of the farmers' market, the food safety regulations prevent small farmers from selling certain processed foods or make it more difficult. Some of these difficulties were observed by *Case study respondent VII*:

" If you make a pizza in your house and you bring it to market to sell, you have to cool it down first and then you have to keep it cool on market, until the moment you present it. Then you can present it for 2 hours uncooled. And after these 2 hours you have to throw away what you didn't sell. Those are the same rules that apply to frozen pizzas or pizzas from supermarkets or big companies. […] And there are many, many examples of these rules that are not in favour of small producers." (Case study respondent VII)

The analysed projects within the city deal with fewer regulations as they are mostly producing food intended for self-consumption. Therefore, interviewees mentioned little regarding regulations, referring mainly to regulations on using the public space and quality of the soil. For example, community garden project gives fresh local food away and does not wish to engage in selling the produce as that would mean more regulations.

Financial support

One of the challenges local food projects have to face is financing. To stay viable, actors involved in the local food chain seek financing in different ways, either by applying for funding from different organizations or participating in competitions with innovative ideas.

Local farmers have to find solutions to deal with the gap between prices and production costs. The low margins leave small farmers struggling to cover the costs of food production, let alone be sustainable and innovative in production. Farmers have a weak negotiating position in comparison to the power of the five biggest supermarkets in the Netherlands (Oxfam Novib, 2018). The products have to meet big certain supermarket standards, which can be challenging because of climate change and long droughts or excessive rain. A report from DutchNews writes about a farmer struggling to sell produce which did not meet supermarket standards. The produce was too small as the result of a long period of drought (DutchNews, 2018).

Entrepreneurs and farmers seek different solutions to improve conditions in the local food chain, as explained by *Initiative manager I*:

> *"Farmers are very much looking for higher margins. And some farmers are creating new food chains. So, they try to cut out the usual suspects and get to the customers more directly, so they get a better share of the whole chain." (Initiative manager I)*

Some farmers opt for direct sales or find companies focusing on the local food chain, i.e. distributors that focus on reaching the consumers more directly and eliminate steps in the chain. Although the shorter chain provides a better margin for the farmers, direct sales through an on-farm shop can be challenging. The farmer interviewed mentioned the necessity to stop the on-farm sales because the management and sales took up too much time. It can be challenging for the farmers to manage both farm work and the sale of the produce. This is also a consequence of limited financial and management skills, whereas local distributors and farmers' markets are more specialised in promotion and finding ways of reaching consumers (DG AGRI, 2015). Farmers struggle to find ways to make a sustainable living without entering the alternative market. The governance of food infrastructure creates limitations and barriers for local small-scale farmers to sell their produce in the supermarkets, where larger amounts and lower prices are desirable.

In contrast to farmers, the community garden has the option of employing a manager. In this way, a person with management skills is responsible for developing a business model for the project and finding different financial sources. One of the financial sources the garden works with is finding sponsors, which requires the projects to have a good image and business plan.

Having a manager provides time and the option to develop a network, collaborate with others, participate in competitions and develop innovative ideas. One of the finance channels for innovative ideas that address social issues in the city is the municipality's initiative entitled 'CityLab 010', Rotterdam's laboratory for social innovation. It is a competition-based award and apart from a monetary prize, it offers an opportunity for the citizens to be involved in developing the public space (Bronsveld, 2016). In addition, the community gardens often receive some financial support from the municipality. The multi-functionality of food allows them to apply for funding from different departments. For example, the municipality's housing department offers funds to the project related to neighbourhood development, which community gardens qualify for.

The multi-functionality of local food projects also allows entrepreneurs to apply for funding. On a national and city level, there are many private funds that finance projects of social or natural interest. In contrast, local farmers mostly receive financial assistance through subsidies. The province initiative 'Voedselfamilies' helps to provide information on available subsidies from the EU for innovation in the food chain that stimulates a short food chain. This is aimed at opening the door to entrepreneurs and innovators to test new ideas in the field of sustainable agriculture. In addition, there are subsidies which encourage young farmers to invest in more

sustainable production methods. However, as mentioned before, the recipients of the subsidies might not necessarily be small-scale farmers.

Summary: Governance mechanisms

The governance mechanisms are linked to different characteristics of the (re)localised food system, elements of resilience, as well as the involvement of various stakeholders. The involvement of the government in the local food system is both cross-sectional and cross-level, meaning some regulations are decided on all three levels: national, provincial and municipal. In addition, there are different departments, such as housing, planning and agriculture, involved in the governance of the LFS. One of the bigger challenges in the public sector is the change of political leaders, occurring every four years. The attention given to LF projects depends on the politicians and their interest.

The governance of land represents one of the common constraints for actors involved in the local food chain. The land is difficult to acquire due to high prices and ever-increasing demand from the building industry. As the regulations are decided at the local level, the municipality holds great power over land use. The extent to which the municipality has favoured local food projects in the city varies from project to project. Some areas used by community gardens can remain regulated as 'green' while the land use in other areas changes and gardens need to be relocated due to redevelopment plans for the area. This uncertainty around land use within the city undermines the protection of food production within the city and increases the vulnerability of these projects. Small-scale farmers also face financial challenges in acquiring the land. The data analysis illustrates the difficulties that farmers face in getting a loan and measures they take to remain viable. High interest rates become an additional burden for small-scale farmers and might lead to the need to intensify farming or scale up. There are, however, banks that favour sustainable and local production, thus offering farmers better terms for loans.

One of the important findings from the data analysis is the differing amount of regulation for different types of projects. For example, there is a distinction between regulations for projects with a social focus, such as community gardens, and regulations for small-scale farms. It appears that community gardens or LF projects intended for self-consumption require less regulation in comparison to local farmers.

During the interviews, regulations for community gardens and allotment gardens were limited to the soil quality and land use regulations. As produce is intended for self-consumption or given away for free to the food banks, there are not many regulations restricting the projects. Furthermore, as one of the interviewees mentioned, the purpose of the community gardens is not the quantity of food produced but the social capital the project has. Therefore, if the project were to start selling food, the number of regulations would increase. In the interviewee's opinion, that would also require a professional farmer, which would diminish the purpose of the community garden.

In comparison, small-scale farmers have more regulations to adhere to. There are strict restrictions, like food safety, food production method, manure use and labelling of the produce. Often the same rules apply to all food producers, regardless of their size. This can limit small-scale farmers, for whom the regulatory burden can make production too expensive or difficult to carry out.

Agricultural rules are developed in accordance with the CAP. Among others, the CAP also aims to improve the situation of farmers by providing direct payments and subsidies. Recently, the importance of small-scale farmers in the EU has been recognised. However, the CAP

funding scheme for small farmers is not applied in the Netherlands. There are other funds, but knowledge and time are needed to find and apply to them.

To sum up, the actors involved in local food systems try to establish an alternative food system to the conventional one. The choices of direct sale or collaboration with local distributors also indicate the limitations of the current system, pushing local actors to consider different options and be innovative to ensure better margins for themselves. The conventional system is criticised for buying produce at prices below the cost of production. The governance or lack thereof influences the decisions of LF actors and steps taken to remain resilient.

Chapter 5: Conclusions and recommendations

The research aimed to identify under what conditions (re)localised food system tend to be more resilient. To answer the research question, previous chapter analysed five local food projects and various actors involved in short food chain in Rotterdam.

The data analysis looked into three concepts. The first section summarised the characteristics of (re)localised food projects, considering views from various groups involved in short food chain. It provided an overview on different perceptions and to some extent defined characteristics of (re)localisation. The second section has established the relation of (re)localised projects to resilience. The assessment of resilience was done using a four-dimensional framework, looking at preparedness, persistence, transformability and adaptability of local food projects. Thirdly, the analyses focused on governance mechanisms of local food system. The section has shown the involvement of specific groups in local food system and, to some level, recognised the importance of governance mechanisms in building a resilient local food system.

5.1 Local food system in Rotterdam (SRQ-1)

The theory defines (re)localisation as a process where the producers and consumers reconnect, food is linked to geographical location and the short food supply chain has impacts on society, economics and environment (Fonte, 2008; Soninno and Marsden, 2005). Looking at the characteristics of (re)localised projects in Rotterdam, the farmers and managers aim for similar things as mentioned in the theory. Although the goals of each project might vary, they aim towards improving access to fresh food, connecting producers and consumers, using environmentally friendlier methods of food production and improving liveability of local small-scale farmers.

Rotterdam has witnessed an emergence of local projects, initiatives and entrepreneurs working with local food. The variety of practices and stakeholders involved challenged the definition of local food system in Rotterdam. In the theoretical part of the thesis, it was noticed that the vagueness of defining the boundary of 'local' can influence the definition, both in practice and theory (Edwards-Jones, 2010; Hinrichs, 2003; Schönhart et al., 2008). When defining 'local' in the context of FS in the Netherlands, it is important to consider the scale of production. There are several local producers who intensify their production method, have less diversity, use greenhouses and scale up. These are also the farmer who are located in the close proximity of the city. Yet the research has shown that the consumers surveyed and other actors interviewed mostly consider small-scale farms, which are using less extensive production methods, as local. The lack of common definition can influence the focus of policy makers, establishment of small local farmers' network and consumers' perception of LFS in Rotterdam. The research has shown that Rotterdam has an important role in food industry, especially because of the port, which sometimes drives the focus of the governance. The municipality's initiative supports local producers to innovate and create new business models that result in scaling up the production. There has been little attention given towards supporting local agriculture for local consumption.

In addition, the findings from the interviews and questionnaires show that local food in Rotterdam is not necessarily accessible and affordable to everyone. Although the data was collected among people who participate in the local food system, there were some actors who found food unaffordable. In addition, several among them preferred the convenience of the

supermarkets. While others believed that their food choices have an impact and might stimulate the change of the current food system to become more local. Yet, the individual choices are shaped by the structure of the current food system. The current infrastructure that limits the accessibility and affordability of the local food.

The insufficient local distribution system and difficulty to access the market pushed towards the development of alternative distribution systems. Although in small-scale, the entrepreneurs are working towards bridging the distance between producers and consumers. The alternative distribution system wishes to offer better margin to the farmer and reach more consumers. Better margin helps to ensure an income for a farmer, yet result in higher price which might not be affordable for everyone. This calls to balance the need to improve market access to market for small-scale farmers while ensuring liveable wages and access to local food for the consumers. Several respondents agreed that the current local distribution system faces challenges sure to small volumes and inefficiency, in comparison to supermarkets. To reach more people, they believe the system needs to grow. This again opens a discussion on current food infrastructure and its support towards local food, which is discussed more in the next sections of the chapter.

5.2 Resilience of the local food system in Rotterdam (SRQ-3)

The theoretical framework helped to identify possible challenges for local food projects in achieving resilience. Resilience of the system is linked to the ability to cope with disturbances by adapting to external and internal changes (Tendall et al., 2015; Toth et al., 2015).

One of the common challenges of the local food system in Rotterdam is the land tenure agreement. Available land is scarce, especially in urban areas. The continued urbanisation and need for housing represents a challenge for land use planning. The analysis confirms the challenges in acquiring land for local food projects. The land prices increase the vulnerabilities of some farmers who have to carry the load of paying off the loan over several years. This can force some farmers to consider intensifying the production or scaling-up. While farmers' market, community and allotment gardens within the city use the public area for their projects and have to establish a rental agreement with the municipality. Actors working within community gardens believe that support from the community and good relationship with the municipality can help ensuring their stay. They believe that having support from the community can help the projects by putting additional pressure on the municipality. However, examples from the other projects show the vulnerability of land tenure for community projects also. Ultimately the municipality has the power in land use planning and decides on green areas within the city.

Data analysis from the research presents several steps producers take to remain viable. To reduce costs LF projects often work with volunteers (Ventura and Bailkey, 2017), which is also a common practice in Rotterdam. However, municipality of Rotterdam offers unemployment benefits to unwaged citizens of Rotterdam in exchange of volunteering work. This means several volunteers choose to work in community gardens in exchange for the benefits. In general, the interviewed actors find local government supporting their projects. However, at the same time little help is given and it takes lots of time to implement changes.

The theoretical framework established several challenges the local food projects have to overcome to become more resilient. Yet, that the driving force behind selected projects are the leaders who continue to work with their projects and find ways to be flexible and adapt to the

situations. The data analysis shows that the leaders work towards finding solutions to problems, try to find support from other sectors and do not rely on government support only. However, although the individual leaders are working towards building a resilience in their projects, the projects are quite fragile because of governance mechanisms.

5.3 (Re)localised food projects and their resilience under the current governance system (SRQ-2)

The data analysis on governance mechanisms reveal the important role the government has in establishing the projects and building resilience. To some extent the governance was already discussed in the sections above, but this section further elaborates on some of the points already mentioned.

The opportunities, limitations and challenges of the local food system are also a result of governance mechanisms. The local government in Rotterdam has an interest in LFS, however there are elements of governance that often limit the local food projects in building their resilience.

The local government has an important role in governance of the LF by providing infrastructure, rules, regulations and finance. The change in political administration can affect the governance, as it is dependent on the alderman. In recent years, municipality's initiative has been actively involved in food system, aiming towards innovation and scaling up. These start-ups projects and farms focus on fitting into new model by also exporting new knowledge and agricultural technology. While innovation is important to keep the projects resilient, there is less focus on short food chain or (re)localisation of the food system.

To provide an alternative for small-scale local farmers, entrepreneurs are trying to establish an alternative food system with shortened food chain to improve the consumption of locally grown food and provide better livelihood for the producers. The local distribution initiatives help farmers improve their margin and build their resilience. However, it is important to look at the need in establishing an alternative system rather than becoming part of the existing food system. Firstly, local farmers struggle to deal with gap between costs of production and buying price from the supermarkets. Income of farmers is dependent on the produce they sell and small-scale farmers are limited to certain price range due to small volumes of production. Any reduction in price means difficulties to remain viable. Secondly, local producers struggle to compete with processing and distribution systems of large supermarkets. The inefficient system and small volume production can limit farmers in reaching a larger number of consumers and is limited to those who can afford higher prices of organic and local products.

The limitations of the local food system often become a reason for consumers' choice in price and convenience of supermarkets. Yet all these elements are a result of structural factors of food system, which gives five big supermarkets in the Netherlands the power to decide which food can enter the market and at what price. As a result, abundance of food is offered to the consumers at a minimum price, thus often limiting small-scale food producers to enter the conventional market, limiting the accessibility and affordability of local food. The insufficient infrastructure of the current food system pushes both consumers and producers to seek alternatives. The governance mechanism that would create opportunities for local food system and small-scale farmers, would give consumers also an option of choice.

5.4 Reflection on local food system and resilience

From the analysis of the five local food projects it was seen that each of these projects had their own mechanism to be resilient. While they were seen to have different aims, the fundamental challenge they faced were with regards of land tenure, challenges in reaching consumers and economical gains to remain viable. Although these projects shorten the link between the producers and consumers, they still need to address several challenges. Compering the five cases, the research shows different methods the projects take to stay viable. To secure land tenure, some work towards having a good business model and support from the community, while others seek for different methods of distribution to increase the demand for their produce. Every project has its own approach in addressing the possible challenges, yet all five projects are quite fragile in overall assessment of the resilience.

One of the findings of the research reveals that different types of local food system have different regulations and financial support. Although the municipality is in favour of local food projects, the governance mechanisms do not necessarily help in achieving resilience. Secondly, although the projects are working within the same (re)localised system, different regulations apply to different types of LF projects. This makes it more difficult for some to remain viable, while others receive more attention and support.

The research has shown a divide among the type of production. Projects which produce food for self-consumption or give it away to organisations like Food Bank deal with less regulations and can get more funding. While small-scale farmers deal with more regulations and know of less options in getting additional financial aid.

The research shows that the governance mechanisms provide conditions under which the system can build its resilience. Resilience of LF projects does not depend on the actions of the individual actors, but also on the structure of the system in which they operate. The right infrastructure, financing and regulations can provide accessibility and affordability for the LF and viability for local food producers. Thus, it is the structure of a system that shapes the decisions and by providing the right governance, the local food system might have a better chance in increasing its resilience.

5.5 Recommendations

Local food planning has not been considered nor prioritised in long-term city plans. Yet, as seen in the research it is important to start considering LF as part of the planning practices as there is an increased demand and several benefits in having a LFS.

One of the biggest challenges is establishing an infrastructure for a local food system which would help LF projects to become more resilient. Land tenure has been identified as one of the main challenges. In order to secure the land for small-scale local farmers, municipality would need to, firstly, consider local food projects as an important part of the city and, secondly, protect the land through zoning plans. However, land protection might not be sufficient. As seen from the research, small-scale farmers struggle to acquire a loan for buying the land. Therefore, an alternative purchasing system would have to be develop or reduced taxation for small-scale local food producers. By making a local food system attractive and more accessible, farmers have a choice to choose their production method.

Secondly, small-scale farmers face several and different regulations which often limit them. The regulations are not specific on the size of the farm, thus make it hard for small-scale

farmers to enter the food system. Having a policy which would recognise the importance of small-scale farmers in the food system and would adjust existing regulations to benefit local farmers more.

In the research, the local food system is divided among liveability of farmers and affordability for consumers. To reach more consumers, while preserving the price, the local government should consider implementing different types of programs to make fresh local food more affordable for low-income groups. In addition, currently supermarkets have a power to negotiate the price of the produce. As part of liveability and affordability program, the government should establish a minimum price for local produce and offer incentive to supermarkets which sell locally produced food from the small-scale farmers.

The thesis has focused on only a few local food projects in Rotterdam. Yet, Rotterdam has a diversity of the projects and initiatives operating in urban and peri-urban areas. A first step towards building resilience in the local food projects is recognising them as an important element of the city.

5.6 Recommendations for further research

This work focused on how the relationship dynamics between (re)localisation and resilience under the current governance structure in the city of Rotterdam influence sustenance of local food projects. Albeit this study was done using five different small-scale urban food projects, a natural progression of this work could be to understand if the lessons learnt can be extended to larger farms also, looking at the regional food system. Further understanding the distribution channel between the producer and consumer while also adjusting to market demands for the products opens avenues for further research in this topic.

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Annex 1: Primary data sources

Information on selected project for the research

	Name	Location	Year	Size (m2)	Collective/ individual	Type of participation	Type of production	Land tenure	Labour	Date of the visit
P1	Voedseltuin Rotterdam	Keilehaven	2010	approx. 6500 m2	Collective	· 3 people hourly employed · Volunteers	Permaculture	Land owned by the municipality	Collective	09.07.2018
P2	Volkstuinvereniging Lusthof	Schiebroek	1962	142 gardens, (100-400 m2)	Collective	· Volunteers	Based on individual choices	Land owned by the municipality	Collective	31.07.2018
P3	Natuurluck	Zevenhuizen	1986	0.8 hectares of farmland	Individual	· Full-time farmer · Occasional volunteers	Organic Biodynamic agriculture	Owner	Individual	13.07.2018
P4	Food forest/ Moestuinman	Kralingen	2013/ 2014	Depending on the project	Individual	· Entrepreneurship	Permaculture	Using private land	Individual	16.07.2018
P5	Rotterdamse Oogst	Noordplein	2009	/	Collective	· Renting a stall · Employed manager	Local food (50 km around the city)	Land owned by the municipality	Collective	14.07.2018 and 21.07.2018

P1 | Voedseltuin Rotterdam: https://www.voedseltuin.com/ [Accessed 24.11.2018]

P2 | Volkstuinvereniging Lusthof: https://www.vtvlusthof.nl/ [Accessed 24.11.2018]

P3 | Natuurluck: http://www.tuinderijnatuurluck.nl/ [Accessed 24.11.2018]

P4 | Food forest/ Moestuinman: http://www.moestuinman.nl/ [Accessed 24.11.2018]

P5 | Rotterdamse Oogst: http://www.rotterdamseoogst.nl/ [Accessed 24.11.2018]

Information on stakeholders

	Project manager/ owner	Actors of LFS	Organizations	Municipality	Other	Role in research	Date of the interview
R1	x					Case study respondent I	09.07.2018
R2		x				Volunteer I	09.07.2018
R3	x					Case study respondent II	09.07.2018
R4		x				Volunteer II	09.07.2018
R5	x					Case study respondent VI	16.07.2018
S6	x					Case study respondent IV	13.07.2018
R7		x				Case study respondent V	13.07.2018
R8			x			Case study respondent VII	21.07.2018
R9		x				Case study respondent III	31.07.2018
R10		x				Case study respondent VIII	31.07.2018
R11			x			Initiative manager I	25.07.2018
R12					x	Researcher I	23.07.2018
R13					x	Researcher II	18.07.2018
D1			x			Distributor I	10.07.2018
M1				x		Municipal official I	05.07.2018
M2				x		Municipal official II	20.07.2018
C1					x	Consumer	07.07.2018
C2					x	Consumer	07.07.2018
C3					x	Consumer	07.07.2018
Q33					x	Consumer	14.07.2018 21.07.2018

Annex 2: Interview manual

Introduction:

1. Presentation of myself and Masters course
2. Thanking the interview participants for taking their time
3. Explanation of purpose of the interview
4. Brief outline of the research topic
5. Explain the focus of the interview, their contribution to the research and explain about confidentiality of the data
6. Request for the recording of the interview
7. Conduct the interview. Questions are based on the expertise of the interviewees
8. Ending the interview with possibility of comments or questions
9. Ask for a possibility of contacting them again if needed
10. Ask for other helpful contacts for the research
11. Offer a possibility of a transcript review
12. Final thank you

Annex 3: Interview questions

Experts
Name of respondent:

Position within the LFS:

Date and place of the interview:

General questions:

- Can you tell me more about your involvement with local food system?
- How long have you been working with the topic?

Level of involvement:

- How would you describe the current food system in Rotterdam?
  - Do you see interest in LF growing?
  - Do you believe the topic is important for the city?
- What is the position of LF projects in the current FS?
  - Are people interested in doing things locally/ working in LFS?
  - How can LFS compete with the supermarkets?
- What is the government's attitude towards LFS?
  - Do you believe the current political system offers opportunities for LF?
  - Do you see encouragements from the government?
- To what extent is municipality involved in LFS?
  - Has a municipality issued a policy for the local food production?
  - What kind of financial support can a LFS receive? (grants, subsidies, etc.)
- What are the bureaucratic processes in establishing a local food project in Rotterdam?
  - What are the regulations for local food projects?
- What is the focus in the research on the LF topic?
  - If you were to research the LFS, which topic would you address first?

Coping & Adaptive capacity

- What are the key challenges or opportunities for local agriculture in the future?
  - What are the main challenges LF will have to face?
  - What are the key opportunities for LF?

- What is your view on the current conventional system in comparison to LFS?
  - What are the issues local farmers are facing today?

- What would build or strengthen the food production within the cities?
  - What would stimulate LF production in Rotterdam?

- What would make the current food system more sustainable? Or resilient?
  - Where does the local food production stand in resilience thinking?

- What do you think determines the success of a local food system?
  - What would strengthen the network among people involved in LFS?

- Which type of food systems will we need in the future?
  - What would the optimal food system look like for you?

Drivers for (re)localisation

- What is your view on competitiveness of LF?
  - How do you increase the availability/ affordability?

- To what extend does LFS increase the connection between producers and consumers?
  - How can a LFS reach more consumers?

- How important are the following factors?
  - Connection with the producer
  - Label of the products

- What impacts does the LFS have on:
  - Job opportunities
  - Community involvement
  - Awareness of local food
  - Increased network
  - Decreased use of pesticides and other chemicals
  - Increased diversity in food production
  - Increased availability of green spaces within the city
  - Presence on social events

Other

- Is there anything else that you wish to comment or add?

Producers/ initiatives in LFS

Name of respondent:

Name of initiative/ project:

Date and place of the interview:

General questions:

- Can you tell me more about your project/ initiative? (operating time and objectives)
- What is idea behind the establishment of the project/ initiative?
- To what extent are you involved in LFS?
  - What are the elements of LFS that you are promoting?
  - What are your reasons for becoming part of LFS/ behind your food production methods?

Level of involvement:

- How would you describe the current food system in Rotterdam?
  - Do you see interest in LF growing?
  - Do you believe the topic is important for the city?
- To what extent is municipality involved in LFS?
  - Do the regulations support or limit the goals/ objectives of the project?
- What is the main financial source for the project?
  - Do you receive any kind of financial support? (grants, subsidies, etc.)
  - What is your business model?
- What were the bureaucratic processes in establishing a local food project in Rotterdam?
  - Did the regulations limit or support the establishment of the project?
- What regulations do you need to follow as a local food projects?
  - Do you face any restrictions due to regulations?
- What is the government's attitude towards LFS?
  - Do you believe the current political system offers opportunities for LF?

Coping & Adaptive capacity

- Do you own or rent the land?
  - Was it difficult to buy the land? / What rental agreement do you have?
- How many people work on the project?
  - How many people are employed? / What is their role?
  - Do you have volunteers? / What do volunteers do?

- What kind of production method do you follow?

- Where do you sell your produce?
  - What influences the price of the products?
  - Who are your clients?

- What is your opinion on affordability of LF?
  - How do you compete with the prices from supermarkets?
  - What is your view on the current conventional system in comparison to LFS?

- Do you have other activities in the farm?
  - What are off-season activities?

- Do you collaborate with other farmers/ local businesses/ initiatives as well?
  - What is the nature of the collaboration?
  - What would strengthen the network?

- Do you attend workshop/ share your knowledge with others involved in LFS?
  - What is the attitude from the community about the project/ LF?

- Do you consider incorporating innovation into your project?

- What are the key challenges or opportunities your project/ initiative will face in the future?
  - What are the main challenges?
  - What are the key opportunities?

- What do you think determines the success of a local food system?

<u>Drivers for (re)localisation</u>

- To what extend does LFS increase the connection between producers and consumers?
  - How can a LFS reach more consumers?

- How important are the following factors?
  - Connection with the consumer
  - Labelling the produce

- What impacts does the LFS have on:
  - Job opportunities
  - Community involvement
  - Awareness of local food
  - Increased network
  - Decreased use of pesticides and other chemicals
  - Increased diversity in food production
  - Increased availability of green spaces within the city
  - Presence on social events

<u>Other</u>

- Is there anything else that you wish to comment or add?

Annex 4: Questionnaire

Questionnaire used for data collection

FOOD AND THE CITY

My name is Maja Mercina and I am a current Masters student in Urban Management and Development (HIS) at Erasmus University in Rotterdam. Currently, I am conducting research on local food system. This questionnaire will help to understand consumers' perspective towards local food.

The information is intended for academic purposes only and will be treated confidentially. I would like to thank you for taking your time in answering the questions.

SECTION 1: IMPORANT CHARACTERISTICS IN FOOD CHOICE

1. Which of the following do you consider very important, moderately important and less important when buying a food product?

	less important	moderately important	very important
Taste			
Appearance			
Convenience			
Price			
Food is sold close to the place of production			
Fair treatment of producers			
Direct contact with producers			
Supporting local farmers			
Where food comes from			
Environmentally friendly production methods			
Traditional production methods			
Absence of pesticides			
Buying seasonal food			
Buying locally grown food			
Food is labelled as organic			
Food is labelled as local			

SECTION 2: DEFINITION OF LOCAL FOOD

2. How would you define local food?

- Food grown in Netherlands
- Food grown in Rotterdam
- Food grown within 50km from the city centre
- Food bought from farmers
- Food labelled with place of production
- Other:_____

SECTION 3: PREFERECES

3. Where do prefer to buy your food? (e.g. from a farmer, supermarket, grow the food yourself) Please explain.

_____

_____

4. Why do you come to the farmer's market?

_____

_____

5. If you had an opportunity, would you grow the food yourself? Please explain.

_____

_____

6. Do you want to add or comment more on local food and your view on it?

_____

_____

Thank you very much for your time!

Annex 5: Resilience assessment

Assessing resilience using four-dimensional framework

		Voedseltuin Rotterdam	Volkstuinvereniging Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Preparedness	**Land tenure**	▪ Land tenure agreement must be renewed every 5 years ▪ Rent: small symbolic amount ▪ Uncertainties about rent agreement before extension	▪ Land tenure agreement must be renewed every 5 years ▪ The area is protected by the Rotterdam's airport policy	▪ Farm land is owned by the farmer ▪ Difficulties obtaining a loan	▪ Works mainly with (various) private organisations ▪ Commitment to improving the area and maintaining it in exchange for the use of the area	▪ Renting the area of a public square from the municipality ▪ Years of tenure agreement negotiations
	Support	▪ Support from the municipality to upgrade the area ▪ Project mentioned on local and international levels by municipality ▪ Getting support from the municipality was not always easy ▪ Volunteers working for several years ▪ Private partners providing financial support	▪ Little support was observed	▪ Little support from the government on organic production ▪ Support from new distribution initiatives	▪ Support from private clients	▪ Support from the municipality on the project ▪ Support from the community, especially noticed during difficult times

		Voedseltuin Rotterdam	Volkstuinvereniging Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Persistence	**Demand for products**	▪ Implementing coupon cards for people from Food Bank ▪ Encouraging volunteers to use more fresh vegetables ▪ Collaborating with others to establish a brand of the garden	▪ Increased demand for gardens ▪ Control of the soil and water quality ▪ Starting mandatory composting and free compost use for the members ▪ Selling seeds to the members at small price	▪ Becoming certified organic producer ▪ Collaborating with local distributor initiatives	▪ Projects are intended for self-consumption	▪ From a specific group of people coming, the market became more mainstream ▪ The market has 'live show' where different artists come to sing or perform ▪ Spreading posters and fliers ▪ Using social media to talk about producers and their love to local food
	Employment agreements	▪ Volunteers working up to four days a week, unemployed volunteers get financial support for volunteering work ▪ Three people are employed, for 8 – 16 hours per week, and have the main responsibilities in managing the garden	▪ People rent a plot which they take care off ▪ Members need to volunteer annually for 18 hours ▪ Association board is run by volunteers, who answer to the federation and municipality	▪ Operated by the farmer and his wife ▪ Occasional help from volunteers ▪ Offer an opportunity for an internship	▪ Entrepreneur works mainly by himself, collaborating with private businesses for projects ▪ Volunteering network was set up and volunteers help with implementing new projects ▪ Permanent volunteer is needed at only one project	▪ Farmers rent a stall to sell the produce ▪ Manager paid for marketing, communication and organisation ▪ Renting stalls from a company ▪ Indirect influences on employment

		Voedseltuin Rotterdam	Volkstuinvereniging Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Persistence	**Knowledge exchange among actors**	▪ Several workshops on food production and edible food organised annually	▪ Workshops for members on gardening are organised ▪ Members help each other with skills	▪ In the first decade of operating several people came to learn ▪ Farmer is keen to teach interns interested in this way of food production	▪ Connected to a network with like-minded people ▪ People from different backgrounds working together on project	▪ Discussions with people involved about approaches to the LFS ▪ Part of a network which meets and talks about working on a different FS
	Ability to innovate	▪ Innovation is part of their business model ▪ Implementing circularity approach	▪ Innovation is not a priority	▪ The way of growing food might not be seen as innovative; it was definitely a different approach to treating soil fertility and plant growth ▪ Created a webpage to share their story and reach more clients	▪ Need and desire for innovation ▪ Innovative approach to food production within the city ▪ Testing ideas on a smaller scale before proposing to implement them on a larger scale outside the city	▪ Combining festival and farmers' market ▪ Using social media to share stories and connect farmers to consumers

		Voedseltuin Rotterdam	Volkstuinvereniging Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Persistence	**Multi-functionality and flexibility**	▪ Primary service is to give food to Food Bank, the secondary is to innovate, create other projects and provide education ▪ Does not rely on a single partner, but has several	▪ Gardens have to follow the rules that are set by the federation and some also by the association itself ▪ A fixed idea on how they to manage gardens and no wish to have a profit	▪ Does not rely on single trading system, but collaborates with several suppliers and distributors ▪ Renting out part of the land for the cultivation of the flowers	▪ Working in several areas connected to food ▪ Finding funding different organisations with different focus	▪ Flexible in its form ▪ Strict rules on who can sell at the market
	Building alliances and network	▪ Works together with other local organisations ▪ Collaborate on creating proposals for projects ▪ Participated in talks and debates	▪ Self-standing unit with limited network	▪ Alliances are mainly the consumers and distributors	▪ An organic network of individual people working together as a group ▪ The network keeps on changing ▪ Collaboration for project proposals	▪ Trust from consumers to bring the right farmers to the market ▪ Part of farmers' network of the province ▪ Alliances from people having business in close proximity of the market

Annex 6: Matrix Resilience

	Voedseltuin Rotterdam	VTV Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Land tenure	LOW (-) Municipality owns land	MEDIUM (±) Municipality owns land The area protected by airport policy	MEDIUM (±) Land owned by the farmer Bank loan	LOW (-) Land owned by private organisations	LOW (-) Municipality owns land
Support	HIGH (+) Support from municipality, volunteers and private partners	LOW (-) Little support was observed	LOW (-) Little support for organic production	LOW (-) Little support was observed	HIGH (+) Support from municipality (use of the area) and the community
Demand for products	HIGH (+) Expending the network of consumers Collaborating to establish a brand	MEDIUM (±) Demand for the gardens has increased Food production dependent on individual choice	MEDIUM (±) Increased number of consumers Working as a farmer for more than 30 years	MEDIUM (±) Intended for self-consumption only Several gardens	HIGH (+) Increased frequency of the market Using different tools to promote the market
Employment agreements	MEDIUM Three people employed Volunteers	MEDIUM Volunteers	HIGH One person employed	HIGH One person employed/ self-employed	MEDIUM One person employed Several farmers renting stalls
Knowledge exchange among actors	HIGH Several workshops on food production	MEDIUM Workshops for members on gardening	LOW Not attending workshops. Offering to teach the interns	MEDIUM Participating in workshops and teaching about food production	MEDIUM Part of the LF producers who meet and discuss various aspects of LFS
Ability to innovate	HIGH Innovation is part of the business model	LOW Innovation is not a priority	LOW Innovation is not a priority	MEDIUM Testing new ideas on small scale	LOW Innovation is not a priority
Multi-functionality and flexibility	HIGH Business model focused on several activities	LOW Following strict rules	MEDIUM Not replying on one distributor Renting out part of the land	MEDIUM Working in several different areas	MEDIUM Flexible in form but working within strict rules
Building alliances and network	HIGH Collaborating and working together with several people	LOW Self-standing unit	LOW Alliances could be consumers and distributors	MEDIUM Collaborating and working together with several people	HIGH Part of a province network Alliances from people having business in close proximity

Scoring system:

- *Land tenure*: based on the land ownership. Projects that own the land and do not have a loan got a *'high'* score, while projects that rent got a *'low'*.
- *Support*: based on the number and extent of different sources, showing support. Projects having support from municipality and community scored higher than projects where little support was observed.
- *Demand of the products*: assessed both the actions the projects took to increase the demand and demand for their services/products. Projects with several actions taken to increase the demand for production and service got a *'high'* score.
- *Employment agreements*: from economical perspective, meaning lesser people employed higher the resilience. The choice has been made as additional employees also mean higher expenses and can become a challenge. Projects with many people employed got a *'low'* score.
- *Knowledge exchange among actors*: the number of workshops, meetings and similar events focusing on lectures or debates on local food. Projects organising several workshops or meetings with other actors got a higher score in comparison to the ones rarely participating in these kinds of events.
- *Ability to innovate*: the amount of focus the projects dedicate to innovation. Projects involved in innovation projects or testing new innovative ideas got a *'high'* score.
- *Multi-functionality and flexibility*: looking at the emergence of different activities on the production site. Projects involved more activities than food production got a *'high'* score.
- *Building alliances and network*: assessing either the project is part of network with other farmers, sells another people's produce, etc. Projects involved in a network got a higher score compared to the ones working very independently.

Annex 7: Matrix (re)localisation

	Voedseltuin Rotterdam	VTV Lusthof	Natuurluck	Food forest/ Moestuinman	Rotterdamse Oogst
Geographical proximity	Short chain: Consumer becomes producer. In addition they give food away at the pick-up points.	Short chain: Consumer becomes producer.	Short chain: Reaching consumers through a local distributor	Short chain: Consumer becomes producer.	Short chain: Reaching consumers through a farmers' market
Relational proximity	Giving food away for free to Food Bank and NGOs. People with coupons from Food Bank can come to the garden and pick the fresh vegetables.	/	Online shopping with pick up points or subscription to 'food bags' Less contact with the consumers. But they created a web page as consumers wanted to know their farmer.	/	Farmers' market, this also means direct contact with the consumers
Social impact	Impact: Offering a reintegration place for people with various social difficulties. Empowering people by teaching them new skills and integrate them to the society.	/	People in the neighbourhood know who the farmer is and recognise his farm. More people from the area started buying fresh vegetables from him.	/	Increased sense of community. Neighbours came together and tried to help the project in difficult times
Economic impact	The produce is not intendent for sale. The projects has additional ways to generate income, which are less focused on food production.	/	Selling produce through local distributor results in improved sale margin. If the price of the produce is lowered, the farmer could not sustain himself.	/	Improved sale margin for farmers. Initially the market was monthly, but farmers wished to have it weekly
Environmental impact	Production of fresh food. The project tries to be sustainable.	Dependent on individuals. But in general, environmentally friendly production method.	Farmer gives a lot of focus on keeping the soil healthy. No use of pesticides	No pesticides. Some projects are self-sustainable and do not need anything.	/

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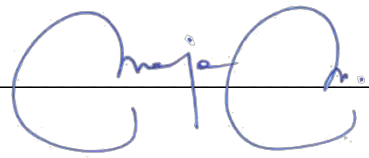
Your Signature(s) : 

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