

The Glass Ceiling



Radical Imaginaries of Spatial Justice
in Westland's Horticultural Landscape

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Radical Imaginaries of Spatial Justice in Westland's Horticultural Landscape

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Abstract

This thesis investigates the intersection of spatial justice, autonomy, and radical imaginaries within the Westland agro-industrial greenhouse cluster in the Netherlands. As a global hub of Controlled Environment Agriculture (CEA), the region is celebrated for its innovation and productivity in addressing food security amid rapid urbanization and ecological crises. However, its productivity masks urgent socio-environmental challenges that are proliferated by the spatial configuration, including fossil fuel dependency, complex supply global chains, precarious migrant labour, and increasing automation, making the cluster vulnerable to systemic disruptions.

Combining socio-spatial and historical analysis, the work interrogates the region's socio-technical lock-in and its dialectical relationship with spatial injustices. Through interviews, media- and literature review, and scenario thinking, the study identifies and assesses "radical imaginaries"—alternative future visions for agriculture in Westland grounded in ecologism, autonomy, and commons-based values. The findings suggest that the socio-spatial and material practices associated with these imaginaries support spatial justice and autonomy. Drawing on this, the thesis presents policy recommendations for increasing spatial justice, including an inclusive participatory planning approach for the Westland municipality. Next to this, a speculative spatial project integrates insights from the researched imaginaries, commons-theory and agro-ecology to formulate a reconfiguration of the socio-spatial logic that allows for a diversity of nature-inclusive food landscape typologies.

Ultimately, the thesis contributes to the discourse on post-industrial agricultural futures, offering insights into the role of design as a mediator between nature and culture. Besides, by politicising spatial planning and design, the research contributes to a body of work advocating for democratic, resilient, and ecologically balanced agri-food systems.

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Preface

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Last but not least:

Birgit and Thijs, my parents, for their unconditional support in my journey as a student at TU Delft, directly and indirectly, and my brother and friend **Freek**, who was always there for a laugh.

Ultimately, I would like to dedicate this thesis to the people fighting for justice and peace in our beautiful but skewed world.

*Het K-woord is nu wel lang genoeg beschermd
Omdat het voor het kleine groepje prima werkt
Ik profiteer er zelf ook van, dat is niet erg
Dat maakt mijn mening niet in 1 keer minder sterk*

*Ik ben niet onder de illusie dat ik zelf
Meer recht heb op de mazzel die ik heb geërfd
Dan iemand die toevallig op een stukje erf
Geboren is waar bij van de honger sterft*

*Ik weet ook niet hoe we verder moeten
Maar in godsnaam, laat ons verder zoeken
Een afslag van deze gekke route
Gaat pijn doen, gaat niet lekker voelen
Maar misschien moeten we effe boeten*

Motivation

The motivation for commencing this project and spending almost a whole year of my life on just about everything there is to know about the Westland horticulture landscape is manifold.

First of all, I have had a fascination for the area since the beginning of my studies in Delft. Regularly cycling through the area, the spatial qualities and highly operational workings of the greenhouse dominated landscape, as well as the not-to-be-missed light pollution seen from afar often sparked curiosity. How could such a significant area specialise itself to this particular method of agriculture? Why do norms and conceptions on spatial quality that I am familiar with seem to barely matter here?

Then there is the love for food, cooking and an increasing interest in where all the beauty that is readily available in the local supermarket actually comes from. Not having had much to do with agriculture in my upbringing, I have taken this until recently as almost for granted. Besides a growing concern in my social circles for eating less or no animal products, I have a rising interest in the dependent relationship humanity has with its environment - or 'nature' - through food. It is striking to think about the fact that the majority of the things I eat, I would not be able to grow or produce myself without help of some sort, and to reflect on the enormous cognitive distance there is between me and, quite simply put, the stuff that keeps me alive. I think this (socially produced) cognitive distance between man and environment is emblematic for the various crises we face today, especially in the country with the popular phrase 'God created the earth, but the Dutch created their own land'.

Finally but certainly most importantly, I have a growing concern for the future of our home planet. Despite worries about a rather distressing political climate, a changing physical climate, and recent worsening of the horrors of war and genocide, I also seek to maintain hope for the near future. With my extremely lucky position of being born in The Netherlands and having almost finished a broad education at university, I want to contribute my time and skills to imagining transformations of our ways of thinking and doing towards something that is within the planetary boundaries and justice frameworks. How can we re-imagine our lives, spaces and culture when we take a critical look beyond the paradigm of infinite economic growth? Where better to start with this aim than in the context I know best, the region I have been living for almost eight years now, Zuid-Holland.



I.

Introduction

In this chapter, the reader is introduced to the urgency of the thesis and the site at which it is located.

Urgency

The urgency of this thesis stems from the mounting pressure on industrial agri-food systems to transform in the face of deepening ecological, social, and economic crises (McGreevy et al., 2022). The Westland horticulture cluster, emblematic of high-tech, export-driven agriculture, highlights both the successes and limitations of industrial food production. While it has positioned the Netherlands as a global agricultural powerhouse, it simultaneously contributes to environmental degradation, socio-spatial inequalities and a rigid governance structure resistant to systemic change. These dynamics are not isolated but reflect broader global tensions between food security, environmental sustainability and social justice.

At the international level, the thesis engages with pressing policy frameworks such as the Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). The Westland case also intersects with the Paris Agreement by highlighting the need to drastically reduce greenhouse gas emissions within agriculture—one of the world's most carbon-intensive sectors. Regionally, the thesis connects with the European Union's Common Agricultural Policy (CAP), which aims to foster sustainable agriculture, support rural communities, and protect the natural environment.

Locally, the Dutch government has articulated explicit goals for *duurzame landbouw* (sustainable agriculture), including: increasing sustainable production, preparing agriculture for climate change, and reducing greenhouse gas emissions. Despite these ambitions, current practices in Westland show how market-driven innovation often overshadows structural reforms needed to achieve these goals.

This thesis argues that meeting these interconnected objectives requires more than technological fixes; it demands a reimagining of the food system itself, of which the Westland horticulture cluster is a significant element. By exploring radical imaginaries and alternative future scenarios, the research highlights new pathways that can inform spatial policies and design aimed at ensuring a just, resilient, and ecologically grounded agri-food transition—locally in Westland, and globally.





[Imagery ESRI]

Site

The thesis is situated in the region of Westland, in Zuid-Holland, the Netherlands—a unique and highly developed area located between the cities of The Hague (Den Haag), Delft, and Rotterdam, stretching towards Hoek van Holland along the North Sea coast. Officially established as a municipality in 2004 through the merger of several smaller towns (De Lier, 's-Gravendijke, Monster, Naaldwijk, and Wateringen), this administrative change was, in part, a response to expansion pressures from the municipality of The Hague (IJsselstijn & Van Mil, 2016).

The Glass City

Westland is widely recognised for its exceptional density of greenhouses. The region is home to the largest continuous cluster of glass greenhouses in the Netherlands—and one of the largest in Europe—covering approximately 2,300 hectares. These greenhouses create a landscape where seasons appear absent and the night sky is illuminated by a characteristic orange glow, emanating from the artificial lighting used in year-round horticultural production.

Historically a patchwork of rural farming villages, Westland benefited from a mild coastal climate and fertile clay soil, which once supported vineyards and potato fields. Over time, however, traditional agriculture has been largely replaced by an innovative and intensive agribusiness sector focused on the cultivation of vegetables, fruits, cut flowers, and ornamental plants (Vollering, 2023).

In addition to its primary production activities, the Westland economy revolves around the logistics, processing, and export of horticultural goods, supported by a range of related services. The spatial configuration of the region reflects this economic orientation, with a high proportion of business parks and extensive transport infrastructure designed to support efficient flow of goods.

Communities

This thesis explores the interrelations between these economic dynamics and the spatial organisation of the region, as well as the roles played by different communities within this. These include human actors: greenhouse business owners, (international) horticultural workers, local residents, and other actors involved in the broader horticultural economy. Next to that, more-than-human actors considered in the thesis include local flora and fauna and the ecosystems they are part of, crops grown in the greenhouses, and the pollinators that are crucial for the production of these crops.

Greenhouses in The Netherlands

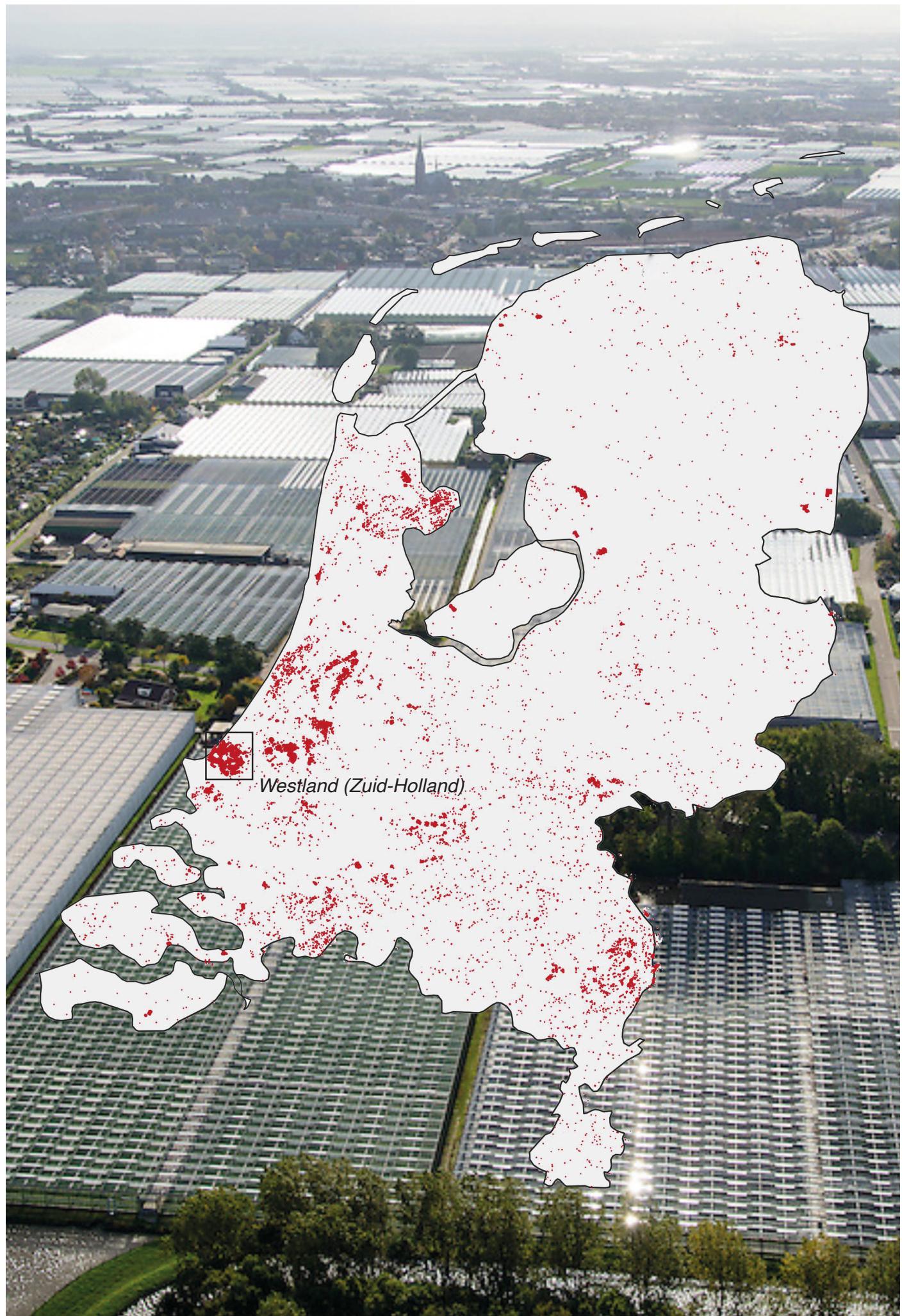
The map shows the geographical location of the project and the extent of greenhouse agriculture in The Netherlands. The aerial image represents a typical Westland production landscape with greenhouses, family homes, logistics infrastructure and low density towns embedded within the polder structure.

Data: Nationale EnergieAtlas

[Aerial image by Siebe Swart, 2013]

Legend

■ greenhouse





II.

Problematisation

In this chapter, the reader is introduced to the broader and contextual issues that this thesis engages with. Furthermore, the hypothesis, research aim and research questions are presented.

A Crisis of the Imagination

In discourse about the ‘Crisis of The Imagination’, the argument is made that we are suffering from a deficit of imagination for social change as we struggle to picture a desirable future in facing the present day crises (Ghosh, 2016; Haiven, 2014).

Visions of sustainable futures often swing between dire climate disaster scenarios and techno-optimistic ideals, such as “smart cities” that promise optimized urban systems and technological solutions for environmental challenges (Miller, 2020; Oomen et al., 2021). Smart city narratives – or “smart agriculture” for that matter – frequently emphasize technological fixes to address inefficiencies and meet carbon targets. These narratives however overlook deeper lying issues like consumption patterns, production practices, and the socio-spatial impacts of modern urbanisation patterns.

Our expectations and assumptions about the future - “imaginaries” - shape how we act in the present (Beckert, 2013; Pelzer & Versteeg, 2019). They influence how we perceive, imagine, and address sustainability challenges, often reflecting dominant narratives and power structures that determine whose knowledge is valued, shared, or amplified (Turnhout et al., 2019). If these hegemonic framings go unchallenged, such future expectations can become self-fulfilling prophecies, perpetuating existing problems. This has significant ethical, political, and justice implications, reinforcing the sense of an inevitable, predetermined future, therefore fostering a societal paralyzing sense of powerlessness (Baibarac-Duignan & Medeşan, 2023).

Contextual Issues

The Westland horticulture cluster, renowned as a global hub for Controlled Environment Agriculture (CEA), is seen as a critical site of agricultural innovation and productivity in the Netherlands. This region is self-proclaimed as pivotal and inspirational in addressing global food security challenges amidst growing urbanization, the climate- and ecological crises, and resulting resource scarcity. However, beneath its celebrated efficiency and technological advancement lie pressing socio-environmental issues that demand immediate attention.

The intensification of production within this cluster since the 1950s has given rise to a set of interconnected socio-environmental and economic issues that threaten its sustainability and equity. The cluster's dependence on fossil energy-intensive greenhouse systems, complex global supply chains, a precarious migrant labour force, together with a rising demand for increasing labour automation, underscores its vulnerability to systemic disruptions (Abou Jaoude & Muñoz Sanz, 2025). With a national political crisis on the currently interfering interests between agricultural productivity and environmental justice, as well as recent scrutiny on sustainable agricultural practices and human rights compliance, it is essential to critically assess the systemic inequities and hidden externalities embedded within the territorial organisation of this horticulture cluster. These can be summarised along the following four lines.

Environmental Externalities

The sector's extensive dependence on artificial lighting, heating, synthetic inputs and water resources raises concerns about carbon emissions, resource and energy scarcity and pollution. Current policies focus on increasing efficiency of the current system, but often neglect the long-term ecological implications of such intensive practices.

Socio-Spatial Inequities

The industry depends heavily on a transient, often marginalized migrant workforce. These workers frequently experience substandard living and working conditions, limited legal protections, and social exclusion. This disparity not only perpetuates systemic injustices but also threatens the resilience of the sector. Next to this, local struggles for alleviating housing shortages are counteracted by a rigid spatial dominance of greenhouse land-use plans.

Economic Pressures and a Surge of Automation

Due to the major share of production that is being exported from Westland, a business consolidation is happening in order to keep up with increasing global competition. Together with a rise of automation of labour, this risks further marginalizing human labour, while also deepening the socio-economic divide between local stakeholders. The shift to digital platforms and algorithm-driven management systems exacerbates the precarity for already vulnerable groups.

Governance Inertia and Incompetence

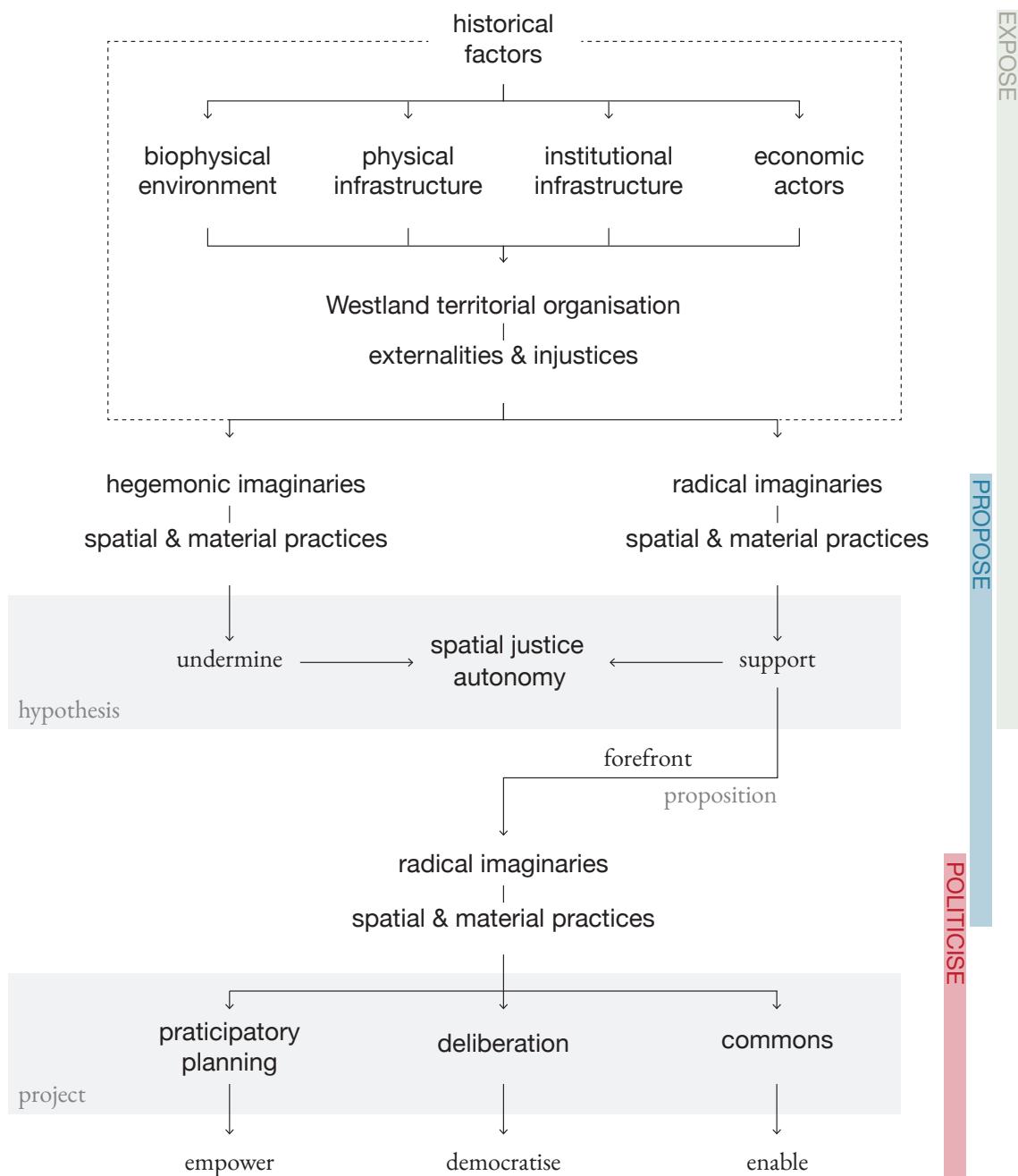
Existing governance often prioritizes economic growth over sustainable development and spatial justice. There is a misalignment between socio-environmental needs and current planning practices in Westland. This misalignment underscores the need for deliberative, participatory spatial planning processes that address intersecting environmental, social, and economic challenges.

Hypothesis

Engaging with imaginaries of alternative futures for the Westland horticulture landscape in order to explore the diverse other ‘ways-of-doing’ could inform a transformation of spatial practice. These ‘radical imaginaries’, collective imaginations that challenge hegemonic techno-optimistic visions, are hypothesised to support the values of spatial justice and autonomy in Westland.

The position of the hypothesis within the broader research context is shown in the diagram on the right. In the upper part of the diagram, the effect of historical factors on the territorial organisation of Westland is represented. This organisation causes different externalities and injustices, which influence hegemonic and radical imaginaries and their associated spatial practices. Next, the hypothesis of the thesis is represented: that hegemonic imaginaries for the future of the Westland horticultural landscape and their associated spatial practices undermine spatial justice and autonomy, while radical imaginaries and their associated spatial practices support spatial justice and autonomy.

The proposition of the thesis, to forefront radical imaginaries in spatial planning and design praxis, brings them to the projective part of the thesis. That is, rethinking spatial planning with the concepts of participation and deliberation to empower sub-altern perspectives and democratise the urban planning of Westland. Commons is proposed to enable the spatial and material practices associated to the radical imaginaries. The diagram is framed in the same way as the methodological framework – that is presented later – through the consecutive actions for radical urban practice: ‘Expose - Propose - Politicise’ (Marcuse, 2009).



Research Aim

The aim of this research is to critically analyse and expose the socio-spatial and systemic injustices embedded in the territorial organization of the Westland horticulture cluster and to explore transformative possibilities for achieving spatial justice and autonomy through the inclusion and negotiation of radical imaginaries in spatial planning and design.

Alternative, radical imaginaries that challenge the established order are often dismissed as unrealistic utopian dreams unsuitable for practical implementation in planning and policy. This dismissal is reflected in academic research which tends to examine these climate imaginaries primarily through abstract theoretical lenses rather than studying their potential to affect concrete change through policies, grassroots action, or institutional transformation. Scholars have also generally overlooked the crucial role of varying social and political contexts in both shaping these imaginaries and determining their reception. The fate of alternative imaginaries varies significantly: they may be appropriated and diluted by mainstream institutions (as seen in corporate green-washing), rejected as infeasible or too limited in scope.

This thesis seeks to address these research gaps by examining how alternative imaginaries emerge and endure within the context of the horticultural food landscape of Westland, with the goal of understanding their true potential as catalysts for transformation. More broadly, the research aspires to contribute to interdisciplinary discourse by:

- Examining alternative, sustainable agri-food systems in the Netherlands and their socio-spatial implications;
- Advocating for the empowerment of marginalized communities and perspectives, both human and more-than-human, in spatial planning and governance processes;
- Reflecting critically on the agency and responsibility of spatial designers in addressing issues of spatial (in)justice and envisioning equitable futures.

Research Question

How can radical imaginaries inform spatial planning and design interventions to rethink the Westland horticultural landscape towards spatial justice and autonomy?

Sub-Research Questions

Limits

- [1.1] What historical factors have shaped the territorial organisation of the Westland horticulture landscape up until now?
- [1.2] What are the consequences of the above for spatial justice and autonomy?

Imaginaries

- [2.1] What are radical imaginaries for the future of the Westland horticulture landscape and what are the socio-spatial practices associated with these?
- [2.2] Could these associated spatial practices undermine or promote spatial justice and autonomy?

Praxis

- [3.1] How can radical imaginaries inform spatial planning to rethink the Westland horticultural landscape towards spatial justice and autonomy?
- [3.2] How can urban design interventions facilitate this?



III. Theoretical Framework

This chapter explains the theories underpinning the research, why these theories were selected and how they support the research questions. The chapter is divided into two parts: first the key theories underpinning the full research are elaborated on: Spatial Justice, Socio-Technical Transitions, Radical Imaginaries. Secondly, the guiding theories are presented, theories that shaped the thinking in parts of the thesis.

Key Theory 1: Spatial Justice

In light of the present-day multiplicity of crises that have come about from humanity's unsustainable practices, the core idea of justice is about the deep question of how we can live together as humans and inhabit our planet sustainably. The role of space and therefore inherently also that of spatial planners in this question is addressed by the notion of Spatial Justice.

Spatial Dimension

The notion of Spatial Justice seeks to integrate the dimension of space into the moral and legal framework that aims to balance individual rights with the common good. The need for Spatial Justice stems from the recognition that space is not a passive setting for human activity, but is actively produced, shaped, and contested through social processes, power relations, and institutional practices (Lopez et al., 2024a).

Urban Planning and Policy

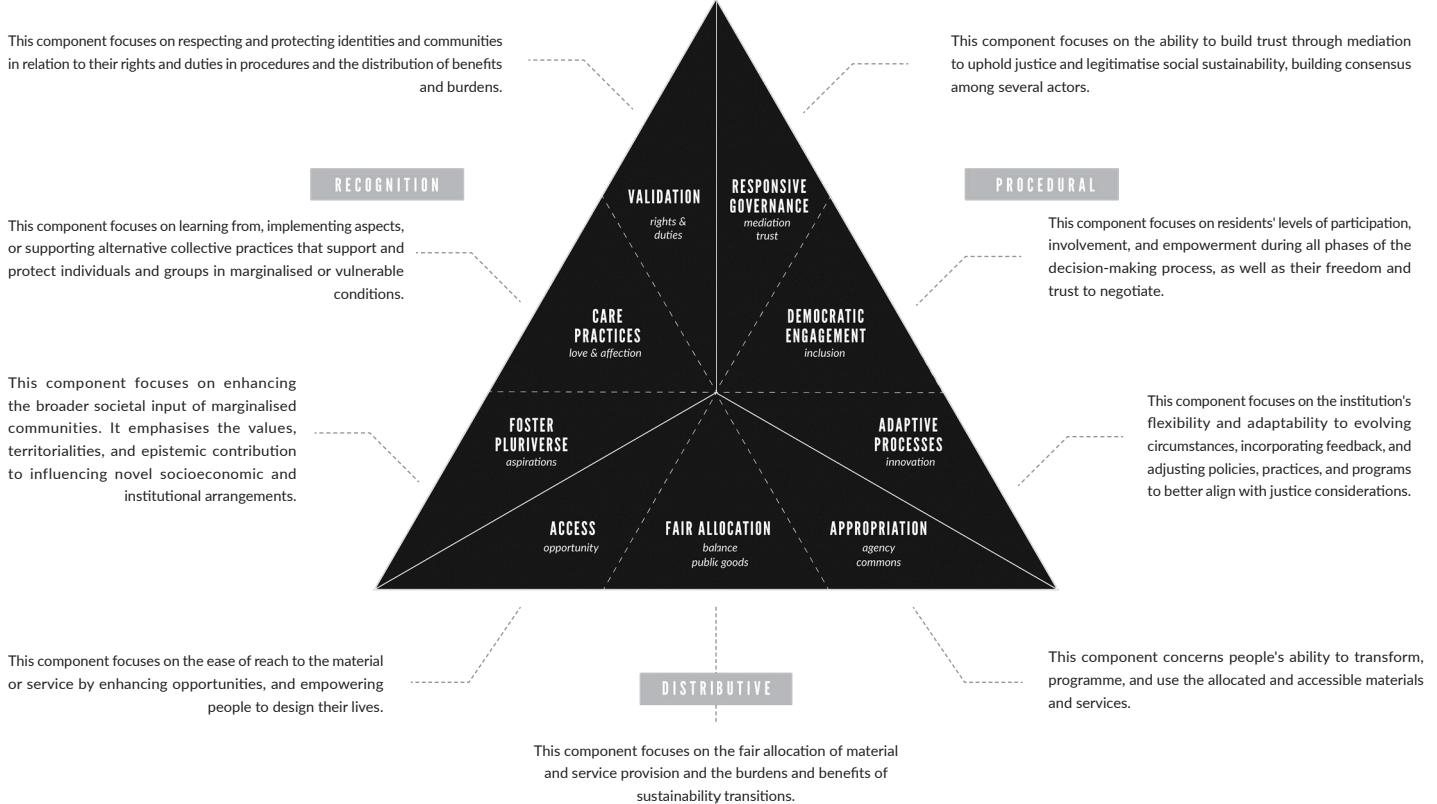
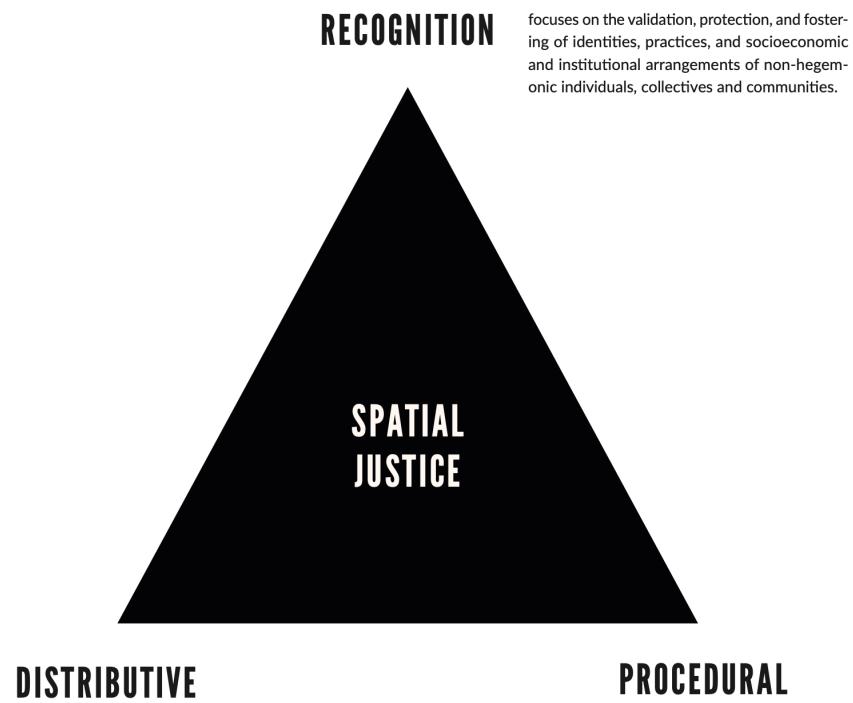
The need for Spatial Justice in urban planning and policy practices stems from the recognition that space is not a passive setting for human activity, but is actively produced, shaped, and contested through social processes, power relations, and institutional practices (Lefebvre, 1991). Next to that, justice is the foundational virtue of social institutions. Therefore, any law or institution, no matter how well-organised, economical or well-arranged, must be reformed or abolished if it is unjust (Rawls, 1971).

Not a Substitute

In one of his writings developing the notion, based on preceding theories by Harvey and Lefebvre, Soja states that spatial justice "seeks to promote more progressive and participatory forms of democratic politics and social activism, and to provide new ideas about how to mobilise and maintain cohesive coalitions and regional confederations of grassroots activists" (2010a). It is a way of looking at justice from a critical spatial perspective. Therefore, Spatial Justice is not a substitute or alternative to social, economic, environmental, ecological, or other forms of justice (Soja, 2010b).

Utilisation in this Thesis

The notion of Spatial Justice is utilized throughout the thesis in multiple ways. Firstly it is utilised as a lens to analyse and understand present socio-spatial disparities related to horticultural practices. Next to that, the notion is applied in the qualitative assessment of a scenarios-thinking exercise that translates imaginaries to speculative spatial and institutional configurations. And finally it serves as guide to the representation of radical imaginaries of the Westland territory in proposals for planning and designing for a socio-technical transition towards sustainability.



The spatial justice conceptual model shows that spatial justice has three dimensions: recognition, procedural and distributive justice. The dimensions include three components each, which bottom figure elaborates on.
(Figures copyright Lopez et al., 2024a, p.7 & 14)

Key Theory 2: Autonomy

In Western tradition, the notion of individual autonomy as a fundamental moral and political value is a modern concept. The emphasis on an individual's capacity for self-governance, detached from their position in a metaphysical order or their role within social structures and political institutions, emerges primarily from modernist humanism, which significantly influences much of contemporary moral and political philosophy (Christman, 2020).

Communal Autonomy

Opposite to the Western, individual perspective, Escobar (2017) is drawing from the Latin American notion of *autonomía*, along with the parallel notion of *comunilidad*, or the recrafting of communal forms of being, and their associated practices. *Autonomía* refers to scenarios where communities engage with one another and external entities (e.g., the State) through structural coupling while maintaining their autopoietic nature, that is, capable of producing and maintaining itself by creating its own parts. This dynamic is often observed in communities with a place-based (but not place-bound) and relational foundation to their existence, such as indigenous and peasant communities. However, it can also apply to various other communities globally, including urban groups striving to organize alternative life projects.

“In fact, the key to autonomy is that a living system finds its way into the next moment by acting appropriately out of its own resources.”

Varela, F. J. (1999).

Territorial Autonomy

More specifically, in the context of agriculture, recent scholarship on autonomy could be compared to the interpretation of Escobar, scrutinizing the definition of autonomy as self-governance and independence. For example Jansen (2022) suggests to focus on analysing the level and nature of dependencies in concrete social, political, cultural and environmental relations that shape the territory of rural areas, that result in whether one is a “peasant,” a semi-proletarian, a simple commodity producer, a capitalist farmer, or something in between.

Human Autonomy

On the scale of the greenhouse farmer and worker, autonomy is seen as a crucial need for meaningful work (Martela et al., 2021). This is underpinned by extensive scholarship self determination theory and basic psychological human needs within the context of motivation, development and wellness (e.g. Ryan, 2017).

Utilisation in this Thesis

In conclusion, I propose to use a critical and multi-levelled definition of autonomy throughout the thesis, to serve as a lens for analysing multiple scales: the autonomy of the region or territory as an agricultural production area, the communities of farmers as place-based social and economical actors, and the individual farmer or worker as first and foremost a human with psychological needs.

Next to that, autonomy as a value is applied in the assessment of a scenarios-thinking exercise that translates imaginaries to speculative spatial and institutional configurations. And finally it serves as guiding value in proposals for planning and designing for a socio-technical transition towards sustainability.

Key Theory 3: Radical Imaginaries

“the capacity to form internal images or ideas of objects and situations not actually present to the senses, including remembered objects and situations, and those constructed by mentally combining or projecting images of previously experienced qualities, objects, and situations”

“Imagination”,
Oxford English Dictionary

“Imaginaries” can be described as collective frameworks of understanding that guide and give meaning to political and social practices, institutions and technologies with and through the corresponding values, symbols, norms, institutions and social relationships (Asara, 2018; Boelens et al., 2016). Imaginaries delineate what is feasible, desirable and thinkable: they help us make sense of the world and our place in it; they tell us how we live and work, and how we ought to live and work; they are what enables us to act and interact with others (Taylor, 2002, p. 91). This notion draws on an understanding of the imagination as genuinely creative in social, material, and symbolic expressions (Adams et al., 2015) and therefore as important in the shaping of collective visions.

While Taylor discusses imaginaries as widely shared across different societies, more recent scholarship emphasises that imaginaries are both multiple and competing (Jasanoff, 2015; Death, 2022). Alternative, new imaginaries can “defamiliarise” the present and expose the possibility for “being otherwise” (Death, 2022, p. 244), in a process of continuous political contestation. Or described as a fundamental recognition of “—the fact that other social groups understand and act in the world differently from ‘us’ [and each other]” (Pickering, 2017).

Political (Climate) Imaginaries

In the face of the environmental crises, scholars have studied “climate imaginaries” to understand different social responses and collective visions of dealing with environmental crisis and the possibilities for adaptation and sustainability. The concept of “political imaginaries” offers a framework for analyzing how the relationship between democracy and climate change is constructed across different contexts. Machin (2022) identifies three distinct types of political imaginaries.

The first, “skeptical imaginaries,” posits that democracy is inherently too slow and ineffective in addressing the urgency of climate change, leading to its potential obsolescence. The second, “rational imaginaries,” which currently dominates, advocates for reforms that render democratic processes more “ecologically rational” through enhanced representation and deliberation. While this approach underscores the adaptability of democratic institutions and communities in responding to ecological crises, Machin (2022) critiques its instrumentalization of democracy, reducing participation to a mechanism for achieving predetermined environmental outcomes and eroding democracy’s open-endedness.

The third, “radical democratic imaginaries,” by contrast, foregrounds the pluralistic and contestatory nature of democracy. This perspective envisions democracy as a dynamic process revitalized through the ongoing formation and negotiation of alternatives, thereby supporting both democratic vitality and a more equitable socio-ecological transformation. Unlike the rational imaginary, the radical democratic imaginary does not align democracy with an environmental agenda but instead allows the agenda to emerge through democratic contestation (Smith, 1998). In this view, climate change becomes a catalyst for deepening democratic practices and amplifying marginalized voices, whose contributions are essential to the policymaking process (Machin, 2022).

Radical Imaginaries

Radical imagination is defined as the ability to imagine everyday life and social institutions not as they currently exist but as that which might be brought into being. The radical imagination is therefore situated in place and emerges from the process of forming ideas of alternatives and 'acting otherwise' in alternative spaces of social reproduction, different spheres of values, and novel forms of social cooperation (Haiven, 2014; Haiven & Khasnabish, 2014).

Radical imaginaries are collective future visions. In work on for example the Indignados movement in Madrid, Asara (2018) untangles three common and interlinked radical imaginaries. These are embodied and actualized in participants' social practices, and are further orienting their future visions: commons, autonomy and ecologism. For example, "their ecologism re-imagines habitation and urbanism. Participants want to create a green public space in the vacant lot, and long for 'a completely different model for a city, another model of mobility', foreseeing the multiplication of (green) public space, pedestrianisation, and the use of participatory planning criteria." (Asara, 2018, p. 153).

From Imaginary to Reality

Finally, it is essential to examine how radical imaginaries become embedded in processes of spatial production or transformation. A body of research focuses on the *performativity* of spatial imaginaries—an approach that moves beyond a purely representational understanding of discourse. As Watkins (2015, p. 517) argues, this perspective of performativity challenges the notion that materiality is fixed and that actors operate outside discursive power structures. Instead, it highlights how spatial imaginaries both legitimize and are reproduced through socio-spatial and material practices (Davoudi, 2018, p. 103). Crucially, when imaginaries are rooted in the socio-spatial practices of movements, they differ from related concepts such as frames, values, or ideologies by situating actors within the very discourses they enact (Watkins, 2015). Or, in other words, the imaginaries are embodied and actualised in the movements' practices of transforming the space (Asara, 2018, p. 5).

Utilisation in this Thesis

The notion of (radical) imaginaries is utilized throughout the thesis in multiple ways. First it is utilised as a lens to analyse and understand the diverse future visions for Westland and agriculture in the Netherlands more broadly. Next to that, the notion is applied in a scenarios-thinking exercise that translates various imaginaries to speculative spatial and institutional configurations. This is an exploration of the ways radical imaginaries can be represented in and negotiated through (speculative) design and storytelling, and how this can give insight into potential spatial (in)justices inherent to some imaginaries.

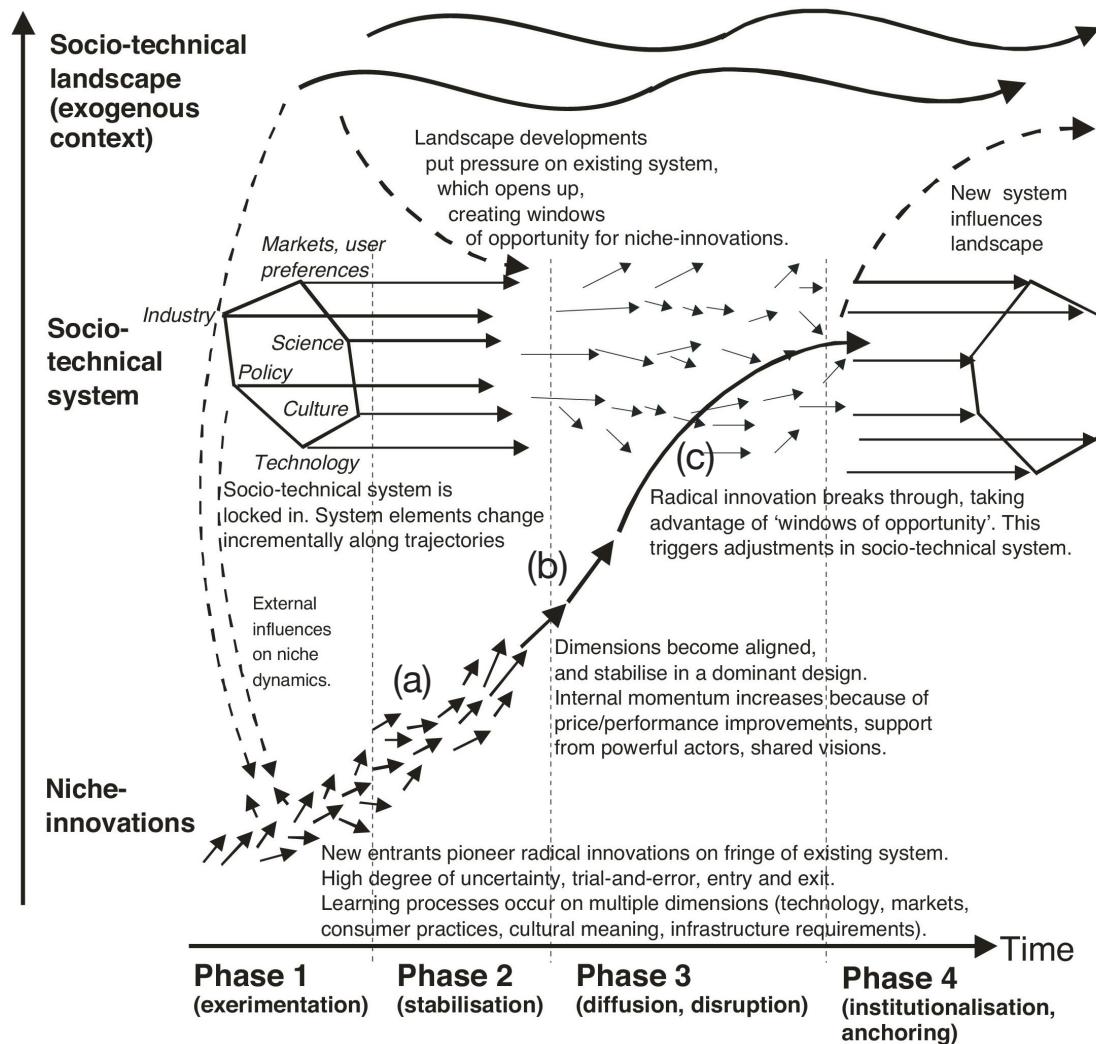
Guiding Theories

Socio-Technical Systems, MLP and Transition

Socio-technical systems theory is a framework used to understand how societal needs are fulfilled through a complex interplay of both technological and social elements. These systems are not purely technical; rather, they are comprised of technologies, user practices, cultural meanings, public policies, business models, markets, and infrastructures that evolve together over time. What makes them "socio-technical" is that they function through the coordination of multiple actors—such as firms, governments, consumers, and NGOs—whose behaviours are shaped by rules, norms, and institutions. These systems tend to stabilise into specific configurations that are resistant to change, as their many components become tightly aligned and reinforced over time, which are called regimes (Geels, 2004; 2019).

The Multi-Level Perspective (MLP) is a theoretical model developed to explain how transformations in socio-technical systems occur. It emphasizes that transitions are not driven solely by technological innovation but emerge from the dynamic interactions among three analytical levels: niches, regimes, and the socio-technical landscape. Niches are protected spaces where radical innovations can be developed without immediate market pressures (e.g. research labs, demonstration projects, or grassroots experiments). The regime represents the dominant system, stabilised by aligned technologies, policies, consumer practices, and institutional rules. Meanwhile, the landscape refers to the broader, exogenous environment that changes slowly over time – such as cultural shifts, geopolitical events, macroeconomic trends, or ecological crises – and puts pressure on the regime (Geels, 2002).

A socio-technical transition describes the process by which a niche innovation gradually disrupts and replaces an incumbent regime. This transition typically unfolds in four phases. In the first phase, radical innovations emerge in niches and are developed through trial and error. These early-stage projects are often uncertain, fragmented, and face high risks of failure. In the second phase, some innovations stabilize as they gain a foothold in specific market niches, supported by learning processes, codification of knowledge, and growing networks of actors. The third phase involves broader diffusion of the innovation, often facilitated by landscape-level pressures that destabilize the existing regime, creating "windows of opportunity" for the new system to grow. This phase is characterized by competition, resistance from incumbent actors, and political, economic, and cultural struggles. In the final phase, the new socio-technical system becomes institutionalized – embedded in laws, consumer behaviour, and everyday routines – and replaces (part or all of) the old system. This process takes decades and is shaped by interactions among various actors, technologies, institutions, and cultural discourses (Geels, 2004; 2019).



The general dynamic of the multi-level perspective unfolds as follows:

(a) innovations emerging within niches gradually gain internal strength and momentum; (b) as these niche innovations evolve, combined with broader landscape developments, they begin to exert increasing pressure on the established system and its regime; and (c) when this pressure leads to destabilization of the regime, it opens up opportunities for the niche innovations to break through, spread more widely, and ultimately disrupt or transform the existing socio-technical system.

(Figure from Geels, 2019)

Guiding Theories

Space-Technology Nexus

The “space-technology nexus” in the context of Swyngedouw’s (1992) work refers to the intricate interplay between spatial configurations and technological systems, particularly how they are co-produced and co-evolved within the capitalist production process. This relationship highlights that space, like technology, functions as a productive asset. Specific spatial configurations—through their location, infrastructure, and institutional setup—enhance the productive capacity of capital.

It also explains how monopolization of specific spatial and technological arrangements enables the generation and appropriation of surplus value. For instance, improved spatial configurations (e.g. transportation networks) create new economic advantages. As capital seeks to overcome spatial barriers, it simultaneously creates new configurations, reterritorializing the space and forming new space-technology nexuses. This reflects capital’s need to revolutionize the production process continually, and in this creative process, destroy old configurations: creative destruction (Schumpeter, 1943).

This theoretical body is relevant to utilize for the analysis of the dialectical relationship between greenhouse agriculture (circulation of capital) and the Westland territorial organisation.

In dissecting the historical changes in capital and spatial configuration, I propose to use the four distinctive forms of territorial organisation that Swyngedouw (1992) describes:

1. natural goods: natural resources (although already transformed by human interaction), work of nature, environmental conditions (e.g. clean air);
2. collective goods and infrastructure: both public and private structures and infrastructures, equipment, living labour;
3. institutional and regulatory infrastructure: public institutions or private coalitions regulating the circulation of capital and exercising forms of (geo)power;
4. cultures of production and reproduction: referring to the characteristics of human activities and labour (skills, knowledge) and the cultures of social reproduction (care).

Thinking along these four forms can help in understanding the interdependencies between commodity flows, labour markets, resource extraction, power relations, urbanization processes, and automation technologies as what Moore (2015, p.10) calls “products and producers of spatial configurations” promoting capital accumulation (Abou Jaoude & Muñoz Sanz, 2025).

Extended Urbanisation

Schmid and Topalovic (2023) describe extended or planetary urbanisation as a historical process distinct from the broader history of human settlements. It represents a relatively recent phase tied to capitalism, rooted in Western anthropocentric rationality and the division between society and nature. Characterized by industrialisation and the commodification of space, time, and experience, urbanisation has gradually unfolded since the Industrial Revolution, particularly in the core zones of colonial empires, affecting both central and peripheral regions unevenly.

Planetary urbanisation marks the latest chapter, emerging from shifts in the global capitalist system, including the globalisation of finance, communication, and production networks, and the collapse of state socialism. By the late 20th century, these changes transformed the planet into a space of extractivism and commodification, leading to severe environmental and social consequences. This “space of effects” destabilizes spatial arrangements, exacerbates climate and socio-economic crises, and undermines the very conditions necessary for life (Schmid & Topalovic, 2023).

Operational Landscapes

Operational landscapes serve as the metabolic “hinterlands”, forming the material foundation of the urbanized geographies that underpin extended urbanization (Brenner & Katsikis, 2020). These landscapes, primarily dedicated to the production and circulation of primary commodities, are deeply entangled with more-than-human systems. They are the spaces where nature becomes “a universal means of production,” providing the subjects, objects, and instruments of production while functioning as an integral part of the production process in its entirety (Smith, 2008). Through the operationalization of these landscapes, nature is both produced and actively engaged in production. As such, operational landscapes play a pivotal role in mobilizing nature for the generation and circulation of surplus value within the capitalist world ecology (Moore, 2015).



IV.

Conceptual Framework

This chapter introduces the reader to key operational concepts, guiding the planning and design approach and strategy.

Concepts

Participatory Planning

Participatory planning, as shaped by the communicative turn in planning theory, emphasizes dialogue, collaboration, and consensus-building as central to the planning process. Advocated by scholars such as Healey (1997), Innes (2010), and Forester (1999), this approach challenges traditional top-down, technocratic models of urban planning. Rather than relying solely on technical expertise or bureaucratic procedures, communicative planning calls for inclusive, democratic processes where diverse stakeholders, including community members, experts, and policymakers, actively contribute to shaping planning outcomes.

At the heart of this approach is the creation of communicative spaces where participants' values, needs, and knowledge are recognized and integrated into the planning process (Rocco et al., 2024). These deliberative settings aim to foster mutual understanding through continuous dialogue, negotiation, and reflection, making planning more transparent, adaptive, and responsive to the complexities of social life.

Polycentric Governance

Participatory planning also intersects with the concept of polycentric governance, a framework developed by Ostrom (2010). Polycentric governance refers to the organization of decision-making across multiple, semi-autonomous centers of authority that function both independently and collaboratively. This model values the inclusion of actors at different scales and acknowledges that diverse governing bodies can effectively manage shared resources and address complex challenges through coordination and cooperation.

The alignment between participatory and polycentric governance lies in their shared commitment to inclusivity, decentralization of authority, and the recognition of diverse voices. Both frameworks promote the empowerment of communities, especially those traditionally marginalized in planning processes. By incorporating these principles, participatory planning contributes to spatial justice and supports the development of more equitable and sustainable urban environments (Rocco et al., 2024).

Ultimately, these inclusive approaches reflect broader goals of social sustainability. It not only seeks to resolve immediate urban issues but also to strengthen community agency, build social capital, and foster long-term resilience and well-being.

The Commons

Commons is a social system within which resources (i.e. the common goods) are shared through the action of commoning. Commoning is a form of cooperation and non-hierarchical social practice, motivated by shared values (De Agnelis, 2017, p. 121). Many resource systems, such as freshwater in The Netherlands, are organised as commons, with public interests as the main driver. As a model for agricultural governance it has been not been generally practiced since the privatisation of agricultural lands.

In his famous critique on the concept of the commons, Hardin (1968) refers to a supposed law-like tendency whereby, when individuals are allowed to use a natural resource without regulation and without collective ownership, they tend to exploit it as much as possible for their own benefit—even if this comes at the expense of its long-term

sustainability and the common good. As a result, if too many people use the resource in this way, it becomes overexploited and ultimately unusable for everyone.

As a response to this "tragedy of the commons", Ostrom (2015) formulates principles for governing the commons to prevent this from happening. These include for example participatory decision-making and fair sanctions.

Food Sovereignty

Food sovereignty is a transformative concept in agri-food systems that emphasizes the rights of people, communities, and nations to define their own food, agriculture, and land policies, prioritizing local needs, cultural appropriateness, and ecological sustainability over global market forces. Unlike food security, which focuses on access to sufficient food, food sovereignty asserts the power of communities to democratically manage resources such as land, water, and seeds, and to engage in food production, distribution, and consumption based on their own values and priorities (van Hemert, 2023). Key principles of food sovereignty include:

- The right to healthy and culturally appropriate food produced through sustainable, agroecological methods.
- The prioritization of local and national economies and markets, promoting self-sufficiency and reducing reliance on long-distance trade.
- Democratic control by food producers, distributors, and consumers over food system policies and resources.
- The promotion of social justice, equity, and gender equality within food systems.
- The recognition and integration of traditional knowledge and practices in food production (Nyéléni Forum, 2007).

Food sovereignty as a movement thus seeks to transform agri-food systems by centering ecological sustainability, local control, and social justice, challenging the inequities and environmental harms of industrialized, globalized food regimes (Patel, 2009; Wittman, 2011)

Agro-Ecology

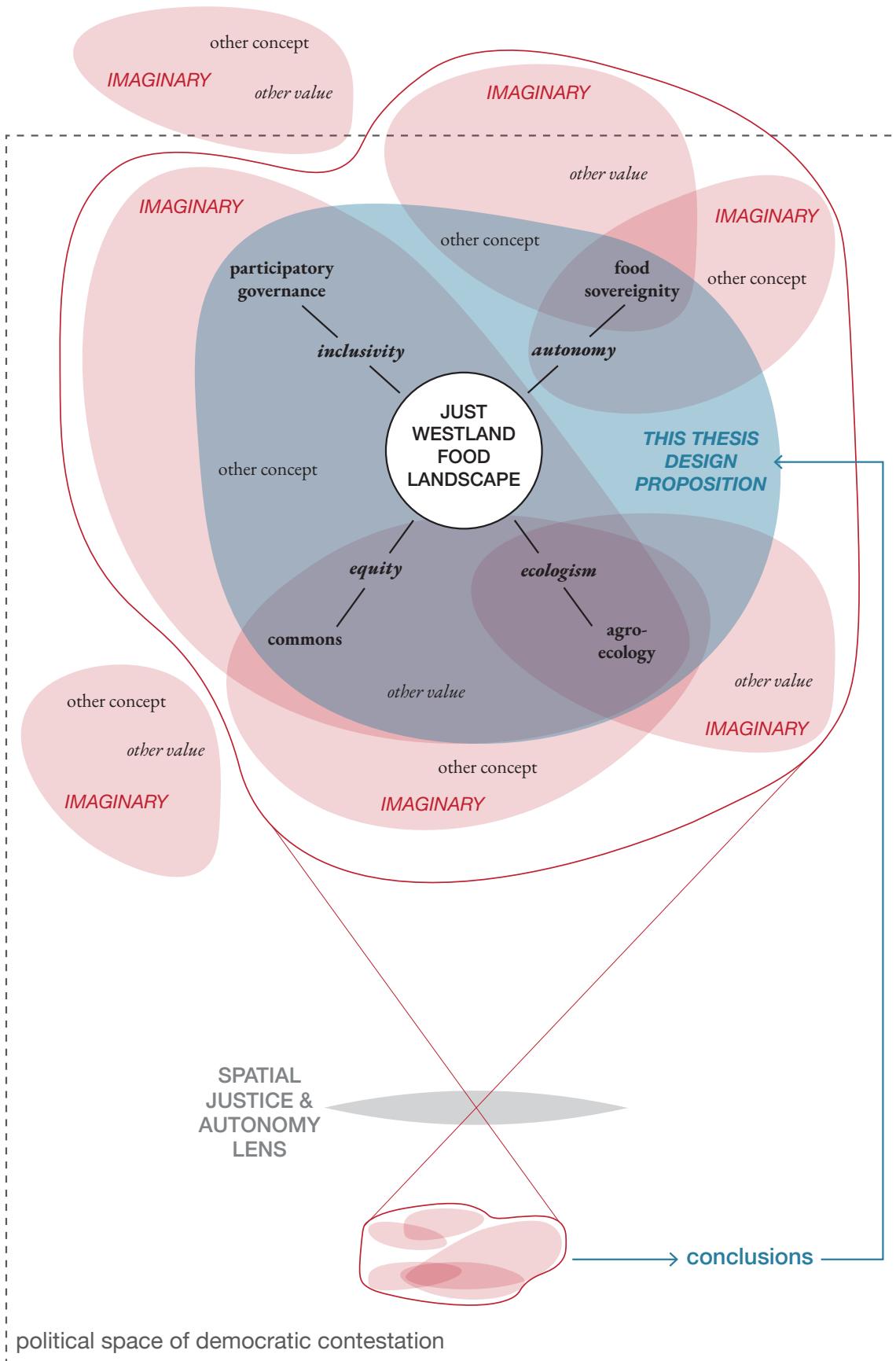
Agroecology addresses food production and consumption as integrated systems, focusing on the ecological, economic, political, and socio-cultural processes essential for sustainable transitions. As a branch of sustainability science, it links agricultural and food systems to two key interpretations of agroecology: environmentally sound farming and social movements for food security and sovereignty. These practices and movements are seen as integral to agroecological research and development. In this context, agro-ecology encompasses not only biological sciences but also environmental and social sciences, treating food systems as socio-ecological systems. Agroecology thus emerges as a theory and practice of "human food ecology" or "the ecology of food systems." (Helenius et al., 2019)

Conceptual Framework

The conceptual framework explains the relations between the theories, values and concepts of the thesis. This thesis has two operative conceptual scales, which are [1] the socio-political space where multiple imaginaries coexist, and [2] a design proposition for a transition towards a spatially just food landscape in Westland, which itself is an imaginary.

The diagram represents a socio-political space of contestation, of which a part is democratic. This is the first operative scale of this thesis. Within this political space, multiple imaginaries for the Westland region coexist. Imaginaries are composed of values and concepts. This is a simplification of imaginaries, for the purpose of this exercise. Some imaginaries are competing because they are based on values and corresponding concepts for socio-spatial organisation that do not support each-other (Jasanoff, 2015; Death, 2022). This thesis aims to analyse multiple imaginaries through a spatial justice lens. Within the scope of this thesis, it is not possible to analyse all, however. Therefore the diagram shows a selection of imaginaries being analysed.

The conclusions from the analysis inform the second operational scale of this thesis: a thesis design proposition for a just food landscape in Westland. The proposition is based on values and corresponding concepts which are part of some of the existing, analysed imaginaries, but also part of the value system of myself. This makes the design proposition an imaginary itself. Therefore the act of proposing it is inherently political.





V.

Methodology

This chapter introduces the reader to the methodological approach taken, the methods used per research question, as well as the relations between the methods in a research flow outline.

Methodological Approach

The approach of the methodology of this thesis is based on ontological and epistemological stances of the author. These stances inform a certain philosophical perspective, a system of generalized world-views that shape the beliefs guiding human action. The formulation of the methodological approach was assisted by the guide on the right page, and can assist the reader in understanding the reasoning below.

Ontology

The ontological stance taken in this thesis is relativist. Relativism posits that truth is context-dependent and emerges from subjective experiences and interpretations (Moon & Blackman, 2014). More specifically, when realism and relativism are not seen as a dichotomy but rather as a spectrum with multiple in-between stances, the thesis' ontological stance incorporates elements of critical realism and bounded relativism as well.

Epistemology

Epistemological beliefs shape how researchers relate to their subject of study. The epistemic stance taken in this thesis is subjectivist. This includes an *emic* approach, which is grounded in relativism. The approach underscores the importance of engaging directly with individuals to grasp their subjective experiences, while recognizing that the researcher may influence the data. Such interaction is considered essential for developing deep insights into the phenomenon under investigation. For example, the main role that imaginaries have in the thesis are a manifestation of the subjectivist approach.

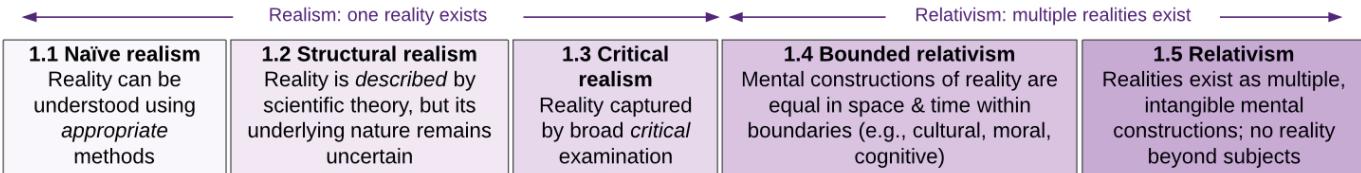
Philosophical Perspective

The philosophical perspective is significant because, when made explicit, it exposes the underlying assumptions made about the work. These assumptions influence decisions related to the research's purpose, design, methodology, and methods, as well as how data is analysed and interpreted (Moon & Blackman, 2014). At the Delft University of Technology (and in the Netherlands more broadly), Urbanism is an interdisciplinary activity that involves planning and designing sustainable, inclusive urban spaces through the integration of design (pragmatic perspective), social sciences (critical perspective), and physical sciences (positivist perspective) (Rocco et al., 2009; Rocco, 2024).

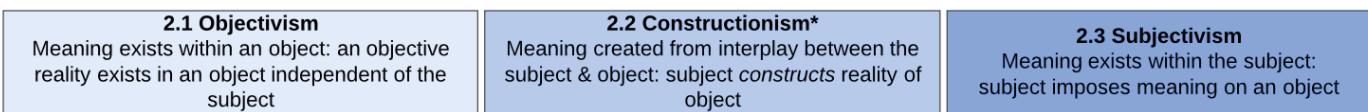
The philosophical perspective within this urbanism thesis is therefore multiple, since the research questions have distinct applications that correspond with the above mentioned three intersecting disciplines of urbanism and with the application types shown in the figure on the right.

Research questions 1.1, 1.2 and 2.1 could be described as 'to understand', with an underlying constructivist perspective. Research questions 2.2 is more in between 'to understand' and 'to emancipate', with a corresponding critical theory perspective. Finally, the research questions 3.1 and 3.2 are related to planning and designing for a more just future. Therefore the philosophical perspective of that part of the research could be characterised as emancipatory and participatory while taking a pragmatic or positivist approach—designing physical and institutional infrastructures.

1.0 ONTOLOGY: What exists in the human world that we can acquire knowledge about?



2.0 EPISTEMOLOGY: How do we create knowledge?



3.0 THEORETICAL PERSPECTIVE: What is the philosophical orientation of the researcher that guides their action/research?

Knowledge acquisition is deductive, 'value-free', generalizable ← → Knowledge acquisition is inductive, value-laden, contextually unique

Application: to predict

3.1 Positivism

Natural science methods (posit, observe, derive logical *truths*) can be applied to the social sciences

3.2 Post-positivism

Multiple methods are necessary to identify a *valid* belief because all methods are imperfect

3.3 Structuralism The source of meaning comes from the formal structure found in language & can apply to all aspects of human culture

Application: to understand

3.4 (Social) Constructivism Meaning making of reality is an activity of the individual mind

3.5 Interpretivism Natural science methods cannot apply to social science; interpretations of reality are culturally derived & historically situated

3.5a Hermeneutics

Hidden meaning (of language) exists in texts, practices, events & situations, beneath apparent ones

3.5b Phenomenology

The essence of human experience of phenomena is only understood when the researcher separates their own experiences

3.5c Symbolic interactionism

The researcher must take the position of those researched (interaction) by sharing language & other tools (symbols)

Application: to emancipate or liberate

3.6 Critical theory Research & theory should be used to change situations (focuses on power relations, critiques assumptions & evolves)

3.6a Emancipatory

The subjects of social inquiry should be empowered

3.6b Advocacy or participatory

Politics & political agendas should be accounted for

3.6c Feminism

The world is patriarchal & the culture it inherits is masculine

Application: to deconstruct

3.7 Post-structuralism Different languages & discourses divide the world & give it meaning

3.8 Post-modernism Truth claims are socially constructed to serve interests of particular groups, methods are equally distrusted; might not be possible to arrive at any conclusive definition of reality

Application: any or all

3.9 Pragmatism All necessary approaches should be used to understand research problem

A social science research guide encompassing ontology, epistemology, and philosophical perspectives. When read from left to right, the elements reflect a multidimensional continuum (e.g., epistemology ranges from objectivism to subjectivism). Within each branch, elements are arranged based on their alignment with those in the other branches, allowing for vertical coherence when read from top to bottom (or vice versa)—for instance, aligning critical realist ontology with constructionist epistemology and interpretivist philosophical perspectives. Subcategories (e.g., 3.5a-c and 3.6a-c) are to be understood as nested under their respective parent categories (e.g., 3.5 interpretivism and 3.6 critical theory).

(Figure by Moon & Blackman, 2014, p.2)

Methods Overview

An overview diagram of the methods per research question and the corresponding outcomes is shown on the right page. Based on his work on going from critical urban theory to radical urban practice by Marcuse (2009), the thesis methodology is framed around the three actions 'Expose - Propose - Politicize'.

Expose – Analyse the root causes of the problem through a clear and comprehensive evaluation. Assess the strengths and weaknesses of the existing system, the nature of the issue, and its intersection with urbanization and capitalism. Correspondingly, highlight the marginalization and injustices embedded within urban contexts (Brenner et al., 2009).

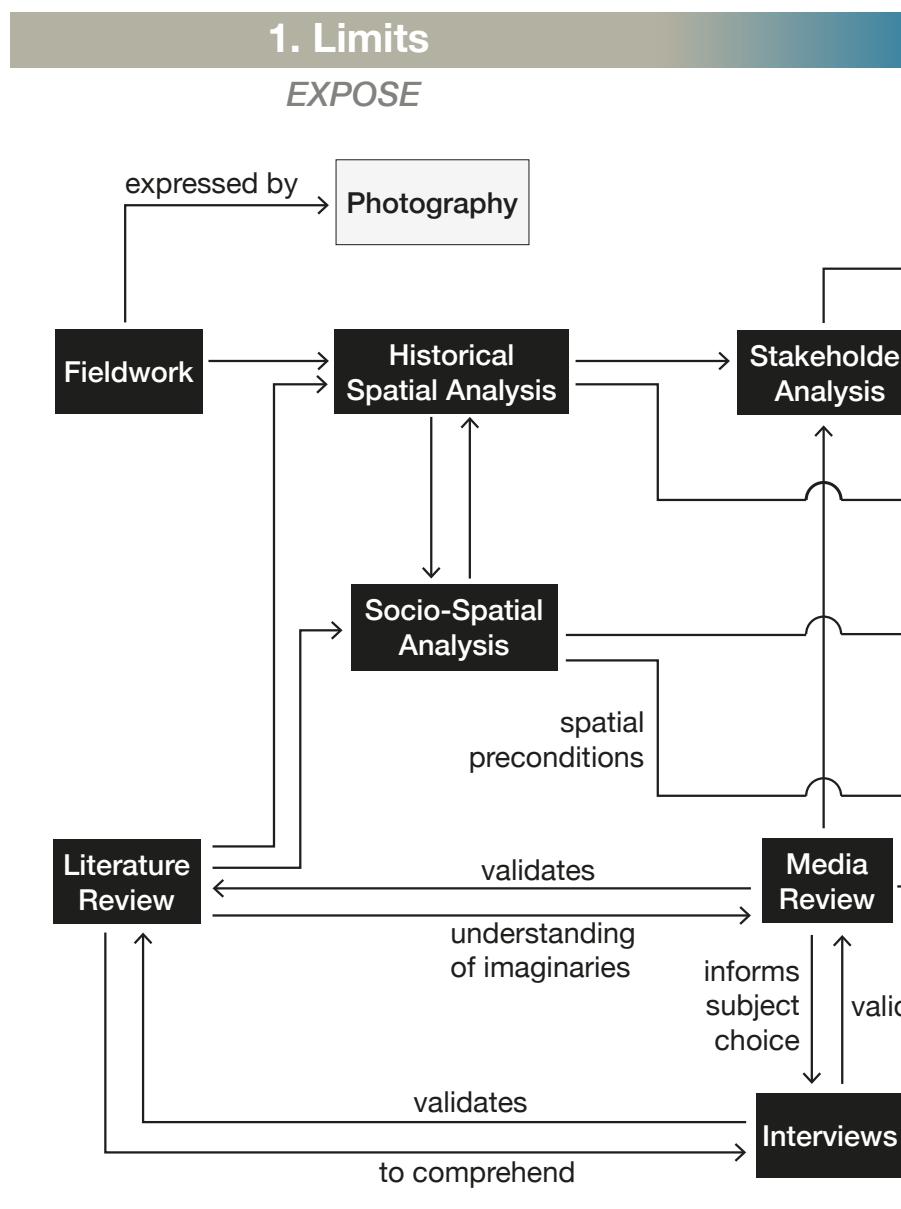
Propose – Emphasise the importance of engaging with those directly affected to develop proposals, set targets, and devise strategies. Examine evolving socio-political dynamics, socio-spatial inequalities, and institutional structures. Formulate solutions that address the problem at its core.

Politicize – Clarify the political implications of the findings and proposals, linking them to informed, actionable steps. Address organisational strategies and the practicalities of everyday political engagement (Marcuse, 2009).

EXPOSE		PROPOSE		POLITICISE	
Limits		Radical Imaginaries		Praxis	
RQ 1.1	RQ 1.2	RQ 2.1	RQ 2.2	RQ 3.1	RQ 3.2
What historical factors have shaped the territorial organisation of the Westland horticulture landscape up until now?	What are the consequences of the above for spatial justice and autonomy?	What are radical imaginaries for the future of the Westland horticulture landscape and what are the socio-spatial practices associated with these?	Could these associated spatial practices undermine or promote spatial justice and autonomy?	How can radical imaginaries inform spatial planning to rethink the Westland horticultural landscape towards spatial justice and autonomy?	How can urban design interventions facilitate this?
Literature Review					
Historical Spatial Analysis					
Socio-Spatial Analysis					
Media Review					
Fieldwork					
Photography					
Interviews					
Stakeholder Analysis					
Scenarios-Thinking Speculative Design					
Spatial Justice & Autonomy Assessment					
Policy Recommendations					
Speculative Urban Design					
<ul style="list-style-type: none"> Understanding of the Westland horticulture historical context and path-dependencies Exposing and documenting socio-spatial (in-)justices and disparities (critical mappings, drawings, visual essay) Understanding of the consequences of Westland socio-spatial organisation for spatial justice Inferences for further research into imaginaries and for (policy) design 		<ul style="list-style-type: none"> Understanding of stakeholders and their power dynamics Documenting of radical (agricultural) imaginaries for Westland (what, why, by who) Four speculative scenarios for Westland based on imaginaries Spatial Justice-assessment of scenarios Needs and opportunities for more just horticultural landscape and spatial planning 		<ul style="list-style-type: none"> Overview of policy recommendations for enabling spatial justice Inclusive, just urban planning proposal for Westland Radical project that rethinks Westland spatial logic on multiple scales, that facilitates a patchwork of plural spatial nature-inclusive programmes Governance system facilitating the above spatial logic 	

Research Flow Outline

The research flow, how different methods are related to each other and follow from other methods, is shown in the diagram below. The research starts with literature review and first fieldwork. Next, spatial analyses and subsequent stakeholder analysis, media review and interviews followed. Feedback loops to previous methods are important to notice. For example, literature review on imaginaries informed an understanding of imaginaries, taken to the media review. Then, the media review partially informed the subject choice of the interviews, which again validated both literature review and media review. Finally, the insights from literature review were also used to comprehend interview data and insights.



■ primary method

secondary method / input

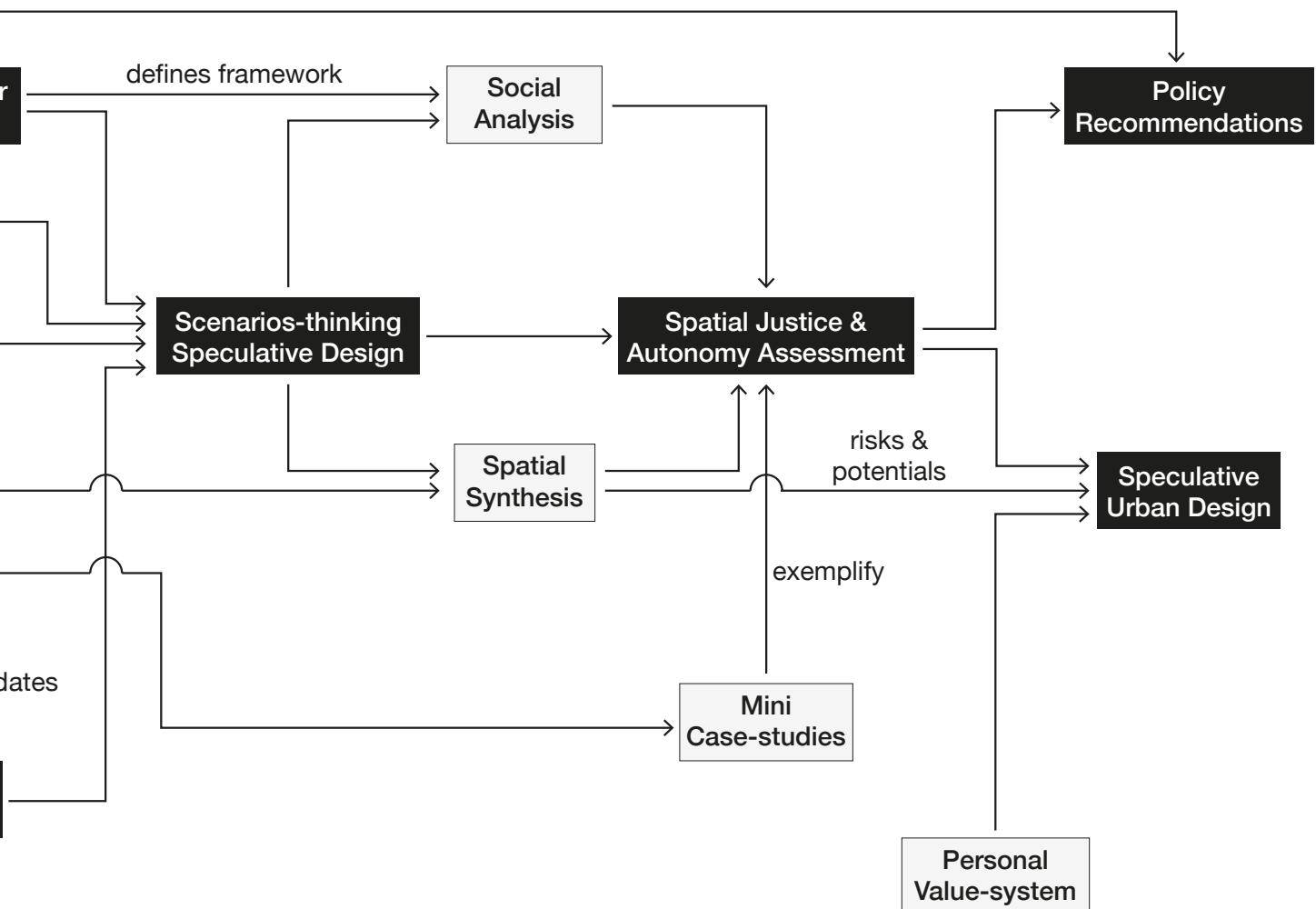
→ feedback loop with specific description where necessary

2. Imaginaries

PROPOSE

3. Praxis

POLITICISE



Imaginaries Research

This section will elaborate on the methodological approach and process followed in researching radical imaginaries.

Interviewees

The research into radical imaginaries is primarily based on interviews with different people that, when coming into initial contact with them, exposed clear ideas of alternative spheres of value and/or ways of ‘acting otherwise’ within the context of agriculture, horticulture and Westland (Asara, 2018).

Five interviews were performed, with the following persons, in the following order. Their personal data is kept withdrawn due to privacy considerations.

1. Land van Ons CSA farm coordinator 1;
2. Land van Ons CSA farm coordinator 2;
3. Toekomstboeren ambassador/writer;
4. Westland greenhouse family business owner (2.3 ha, potted plants) that is one of the first to build on-site accomodation for international workers;
5. Hoogheemraadschap water quality commissioner (and former greenhouse cropping systems consultant in Westland).

Interview Structure

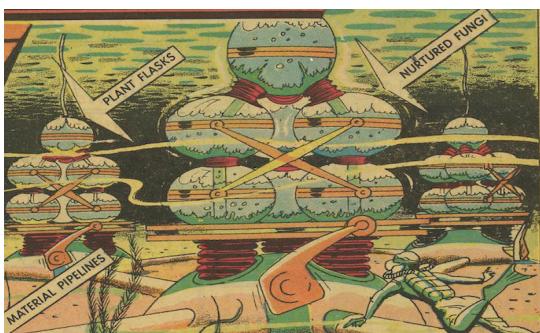
The interviews were semi-structured to allow for raising context specific topics and asking deepening questions. The interviews did however follow a similar general structure:

- Socio-spatial and material practices, initiatives and their role within this;
- Value spheres and motivation for the practices, role and/or initiative;
- Recognition of autonomy as a value within the practices, role and/or initiative;
- Relation to local communities or social institutions;
- Relation to or views on governmental (wrong)doings and practices;
- Systemic challenges and barriers for the practices, role or initiative;
- Imagined systemic alternatives, question made more specific based on interviewee role and previous answers;
- Imagined socio-spatial and material practices that correspond to these systemic alternatives.

Triangulation

The research methodologically triangulates these interviews with media and literature review to ensure validity of the results, despite the limited amount of interviews conducted. This process is also shown in the methods flow diagram on the previous page.

Scenarios Thinking as a Method



Excerpts from the *Closer Than We Think* comic series, ran by the Chicago Tribune in the early 1960s. The comics explored high-tech future scenarios, including for the way food is produced.

[Comics by Arthur Radebaugh in Chicago Tribune, 1961 (top) and 1962 (bottom)]

Memories of the Future

Peter Schwartz characterizes a scenario as a compelling and plausible vision of the future. Not really a prediction, but structured exploration of uncertainty that broadens our understanding of current trajectories. Schwartz developed this expertise as part of Shell's Scenarios Team in the 1970s, where, under the guidance of Pierre Wack, alternative futures were constructed to inform strategic decisions beyond linear, business-as-usual thinking (Schwartz, 1991). A similar approach was employed by the RAND Corporation, where Herman Kahn used scenario thinking and game theory to analyze extreme Cold War contingencies, including nuclear conflict. By objectively analysing and modeling such unthinkable futures, Kahn (2007) challenged the prevailing logic of Mutual Assured Destruction.

While the contemporary food system may not pose existential threats on that scale, it is still marked by uncertainties. Demographic growth, rising affluence, localist movements, and shifting consumer health priorities all generate contradictory pressures—called *driving forces* in scenarios planning. Many actors must navigate complex decisions with long-term effects: greenhouse owners for example need to decide whether to enhance efficiency and scale or to invest in differentiated, niche markets. In such a landscape, individuals and organisations often feel disoriented, and agency appears limited.

Scenario thinking is particularly effective in such contexts of uncertainty and complexity. As Swedish neurobiologist David Ingvar (1985) suggests, scenarios function as “memories of the future”—narratives that simulate experience and thus prepare decision-makers to recognize and respond to unfolding developments. Shell’s methodology, in particular, does not aim for a singular, definitive future. It rather develops a spectrum of explorative and decision scenarios that enable strategic preparedness across multiple possible outcomes, of which far-reaching global climate policy could be an (however constantly shelved) example.

Critical Uncertainties

A common method for developing scenarios involves identifying two *critical uncertainties*. These are key unpredictable factors likely to shape the future, and using them to define a set of axes (Schwartz, 1991). For envisioning the future of the food industry and its landscapes, two such uncertainties stand out. For this project, the uncertainties concern the scale of the food market and the consumer attitudes towards food technologies.

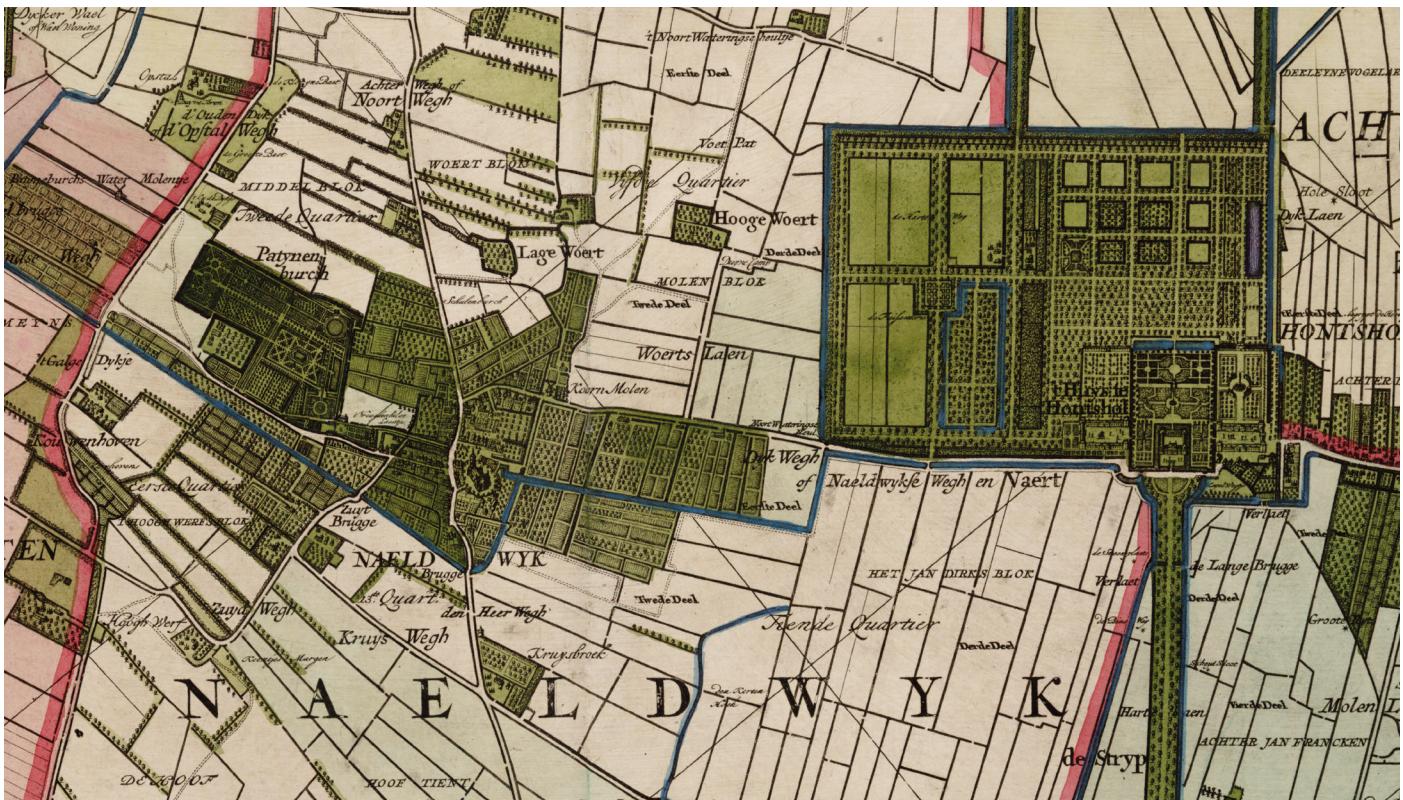


VI.

Limits

This chapter is about the process for answering research questions 1.1 and 1.2:

- [3.1] How can radical imaginaries inform spatial planning to rethink the Westland horticultural landscape towards spatial justice and autonomy?
- [3.2] How can urban design interventions facilitate this?



Excerpt from Kruikusaar that shows Huis Honseleerdijk and fruit orchards around Naaldwijk.
[Map by Kuukius, N. & J. 1712, Hoogheemraadschap Delfland]

Beginnings

Buitenplaats Honselersdijk

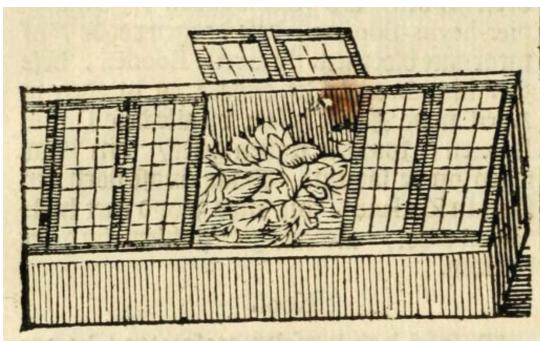
During the 16th and 17th century, the wealth of The Netherlands greatly increased due to massive global colonial, military and political domination and exploitation activities. For wealthy Dutch citizens and royals, Westland was a popular region to invest their overseas profits and have large garden estates built. These estates, 'buitenplaatsen', have arguably played a major role in planting the seeds for the development of horticulture in Westland.

The owners of buitenplaatsen would employ gardeners to design, care for and farm elaborate gardens as well as fruit-orchards that would regularly neighbour the gardens. The style and designs of the gardens were often inspired by Italian paradise gardens, or 'hortus conclusus'.

Huis Honselersdijk, built by royal and stadholder F.H. van Oranje in the second half of the 17th century, was the most prominent in the region. Located just two hours by horse and carriage from the court in The Hague, and later to be nicknamed “Versailles of the North”. The perfect rectangular was seen as the ultimate and ideal shape of buitenplaats gardens (Van Den Broeken et al., 2018, p. 166). The stadholder’s wife Amalia van Solms and secretary Constantijn Huygens designed the gardens together with the palace architects. For easy transportation of building materials, supplies and also the garden’s harvest, Amalia commissions the construction of the Nieuwe Vaart in 1643, towards The Hague centre (IJsselstijn & Van Mil, 2016, p.94)

Descartes

Huygens was a very close friend of René Descartes, who lived in the area around that time. Descartes is well-known for his work on mathematics and the Cartesian grid (x/y-axes) as a tool to embrace



Controlled environment growing techniques deployed in Huis Honselersdijk gardens: coal-heated rooms and low glass structures.

[drawings in van der Groen, 1699]

complexity. The book in which the method is published is the result of a research program in which Descartes wanted to “unify the sciences and establish all knowledge on a single universal method, eliminating scholasticism, mythical explanations, occult forces, hidden qualities, and intrinsic purpose.” The aim: “make ourselves masters and possessors of nature”. The quote is from Descartes’ *Discours de la Méthode*, a book published in 1637, at the height of the “tulip mania” gripping the Dutch merchant class: as the first investment craze in The Netherlands, it combined botanical science and horticulture with speculative capitalism (Driessen, 2020).

The First Greenhouses

In 1699, Jan van der Groen, head gardener at Honselersdijk, writes *Den Nederlandtsen Hovenier*. In the book, he celebrates how the smell of flowers and fruits contrasted with the stench of urban sewers. Next to that, he describes how tropical plants imported from the many overseas colonies were kept in coal-heated rooms, both to admire and research. After the wealthy citizens and nobility left their Westland estates due to the collapse of the colonial empire and the resulting declining economy, the expertise in vegetable and fruit production cultivated in the Honselersdijk garden was formalized and disseminated, along with the design of the first physical structures, precursors to greenhouses, to create optimal climatic conditions for horticulture (van der Groen, 1699).

The conditions among which the first historical traces of horticulture in Westland surface, are interesting to compare with current conditions and conceptions. First, there is a parallel with the current capital and energy intensive alteration and cultivation of the ‘natural’ landscape. Within a culture where ideas on ‘exact’ science and man’s domination of nature were gaining traction, the rectangular estate gardens where exotic plants imported from across the globe were kept, are a testament to the colonial nature of horticulture. The global scale of current horticultural activities in Westland lies in the export oriented market dynamics, an aspect that the next section will dive in deeper. Finally, one cannot ignore the resemblance of these gardens with the Cartesian, grid-like urban morphology of present-day Westland greenhouses.





Development of the
greenhouse architecture
throughout the 19th and 20th
century.
[photographs by author, at
Museum Westland]

A Global Market

Westland's agricultural production and the underlying territorial organisation has long been in dialectical relationship with international food markets. A trade connection with the United Kingdom can be seen as a first significant factor that changed the type and scale of production in Westland. In 1823, the Nederlandsche Stoombot Maatschappij established a connection between the ports of Rotterdam and London. Among the goods that were exported to the prosperous and rapidly industrialising Brits were potatoes and table grapes – a luxury at the time – from Westland (Barendse, 1951). When the UK government liberalised trade on agricultural products and later the Nieuwe Waterweg canal to Rotterdam was completed in 1872, exports grew further (Schoor, 2013). Soon after, another export market in Germany was established, through the completion of the Boxtel-Wesel railway, connecting the infrastructure of both countries (Soest, 1991).

The phasing out of potatoes and further specialisation into horticulture in Westland, was caused a development on the other side of the Atlantic at the end of the 19th century. After the opening of North-America for colonists and the rapid expansion of rail infrastructure, the European market was flooded with cheap agricultural produce. This caused the European Agricultural Crisis (1878-1895). Farmers across Europe had to adjust their cropping plans and transition to a reality that suddenly was influenced by a global market (IJsselstijn & Van Mil, 2016: 17).

Globalised Horticulture Production and Trade

The map shows the location and export value of eight countries to which The Netherlands exported the most vegetables in 2021, both for non-EU and EU exports (zoom in). It also shows data from 2024 on major greenhouse clusters locations and size.

Data: The Growth Lab at Harvard University (2021) & Tong et al. (2024)

Major greenhouse clusters

- ▲ 100-1.000 ha
- 1.000-5.000 ha
- 5.000-10.000 ha
- 10.000-50.000 ha
- ▲ 82.155 ha

↙ The Netherlands vegetable exports (non-EU)

→ The Netherlands vegetable exports (EU)



Scale-up Stimulus

The recent decades have seen a significant horizontal consolidation in terms of the amounts of greenhouse businesses, as well as a steep rise of the productive area per business. The Common Agricultural Policy and national policies, for example the Regeling Reconstructie Oude Glastuinbouwgebieden (RROG), have focussed on providing incentives for the scaling-up of operations.

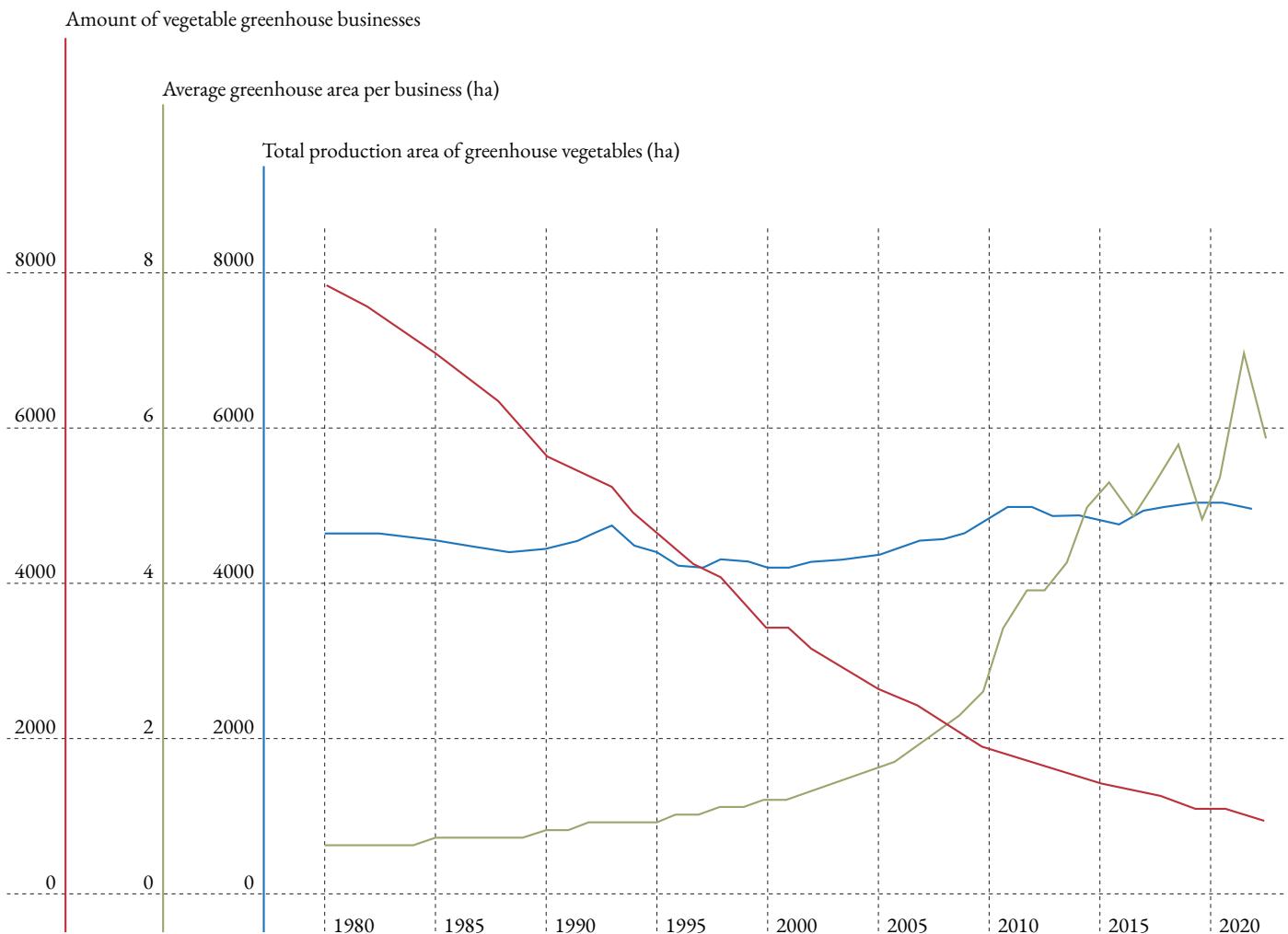
The number of greenhouse vegetable growers decreased by 85 percent between 1980 and 2017. The productive area that the remaining growers use at the same time increased by a factor of 7. The ten largest greenhouse vegetable companies had almost 10 percent of the total greenhouse vegetable area in the Netherlands in their hands in 2017.

The scale-up in the cultivation of greenhouse vegetables has taken off in almost 40 years. The number of greenhouse vegetable growers decreased from almost 8 thousand to 1.26 thousand in 2017, a decrease of about 85 percent. At the same time, the area of greenhouse vegetable cultivation increased by 7 percent to almost 5 thousand hectares (CBS, 2018). This is shown in the graph on the right.

Trends of scaling up

The graph combines data of the amount of vegetable producing greenhouses, average greenhouse area and the total productive area of greenhouse vegetables to show the horizontal consolidation of the sector over time.

Data: CBS (2018) & WUR Agrimatie (2024a)

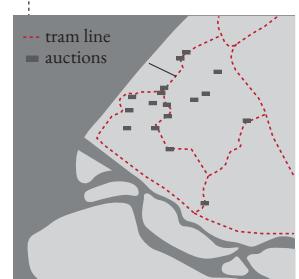
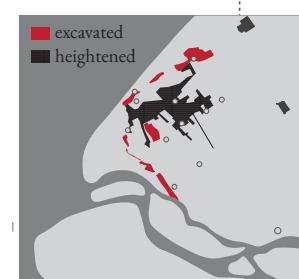
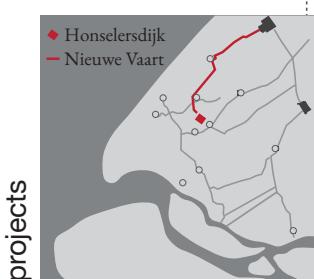
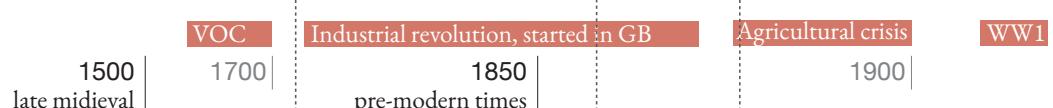
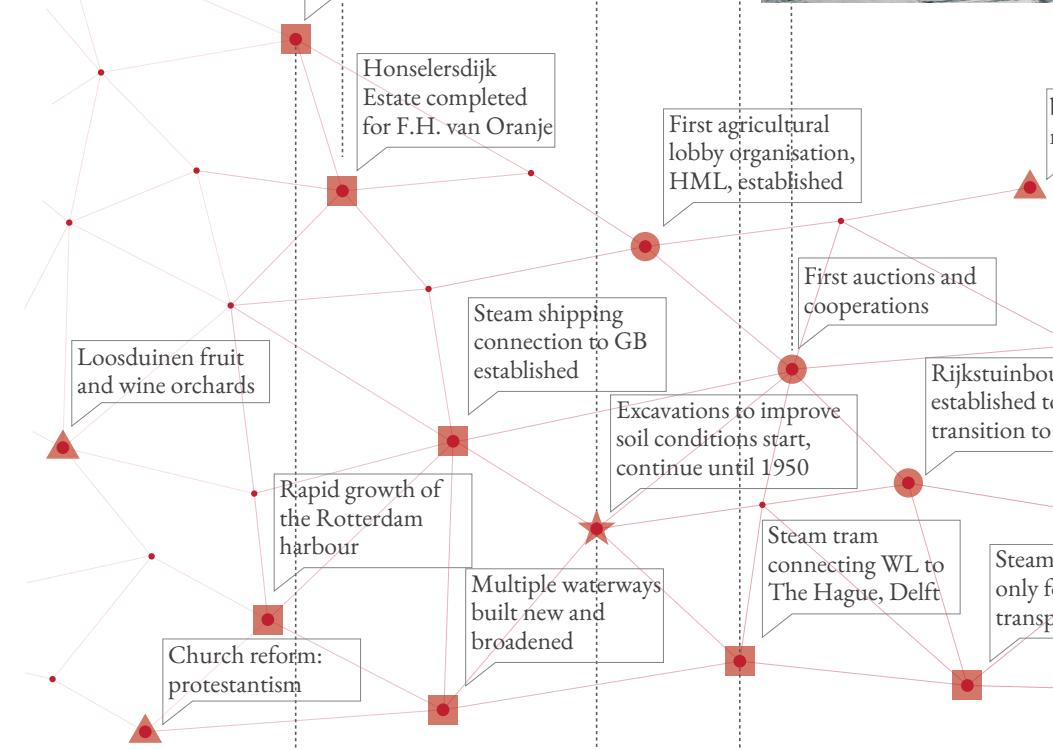
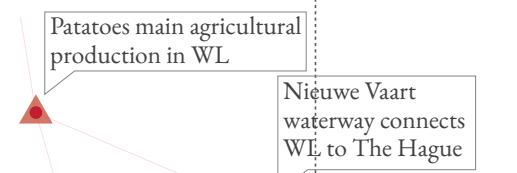
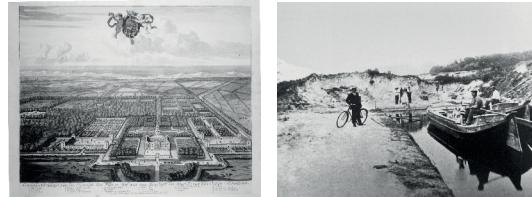


niche

the formative phase where the greenhouse technology and dominant culture of horticultural production was yet to become established

regime

greenhouse production place in Westland inst. economically, cultural



The Socio-Technical Lock-In Throughout History

The investigation combines the pathways of socio-economic developments, historical data and corresponding spatial projects with the rationale of the socio-technical lock-in. It argues that because of path dependency, the possibility of radical innovation or transformation has become increasingly limited.

Data: CBS (2024c)

on starts to take its
stitutionally,
ally and spatially

lock-in

where decisions become increasingly
predetermined and 'locked' into a
path-dependent pattern:

landscape

the system becomes established and spatially and
culturally manifested; system expands through
self-enforcing mechanisms; innovation is incremental



biodynamic farming
movement (Steiner)

new school
to help WL
new crops

tram used
for harvest
port

Warehouse greenhouse
largely adopted

Road transport
takes over in WL

Groningen gas field
discovered and
operationalised

Gas heated
greenhouses
adopted

National greenhouse
areas scale up policy
(RROG)

Rotterdam
port expansion

FloraHolland
Auction built

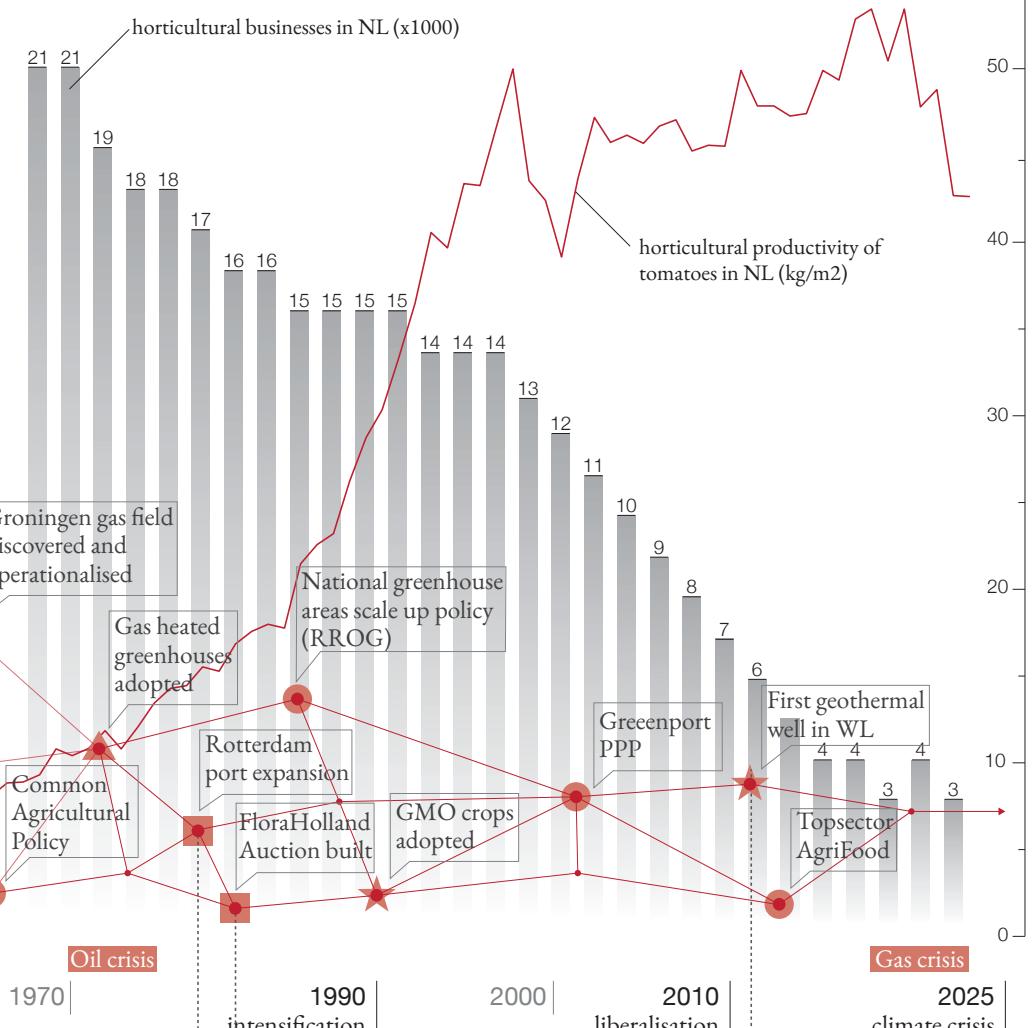
GMO crops
adopted

institutional infrastructure

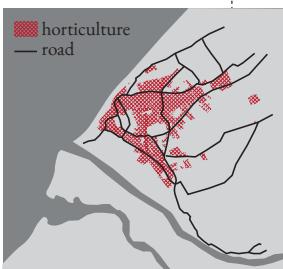
collective goods & infrastructures

cultures of (re-)production

natural goods



horticulture
road

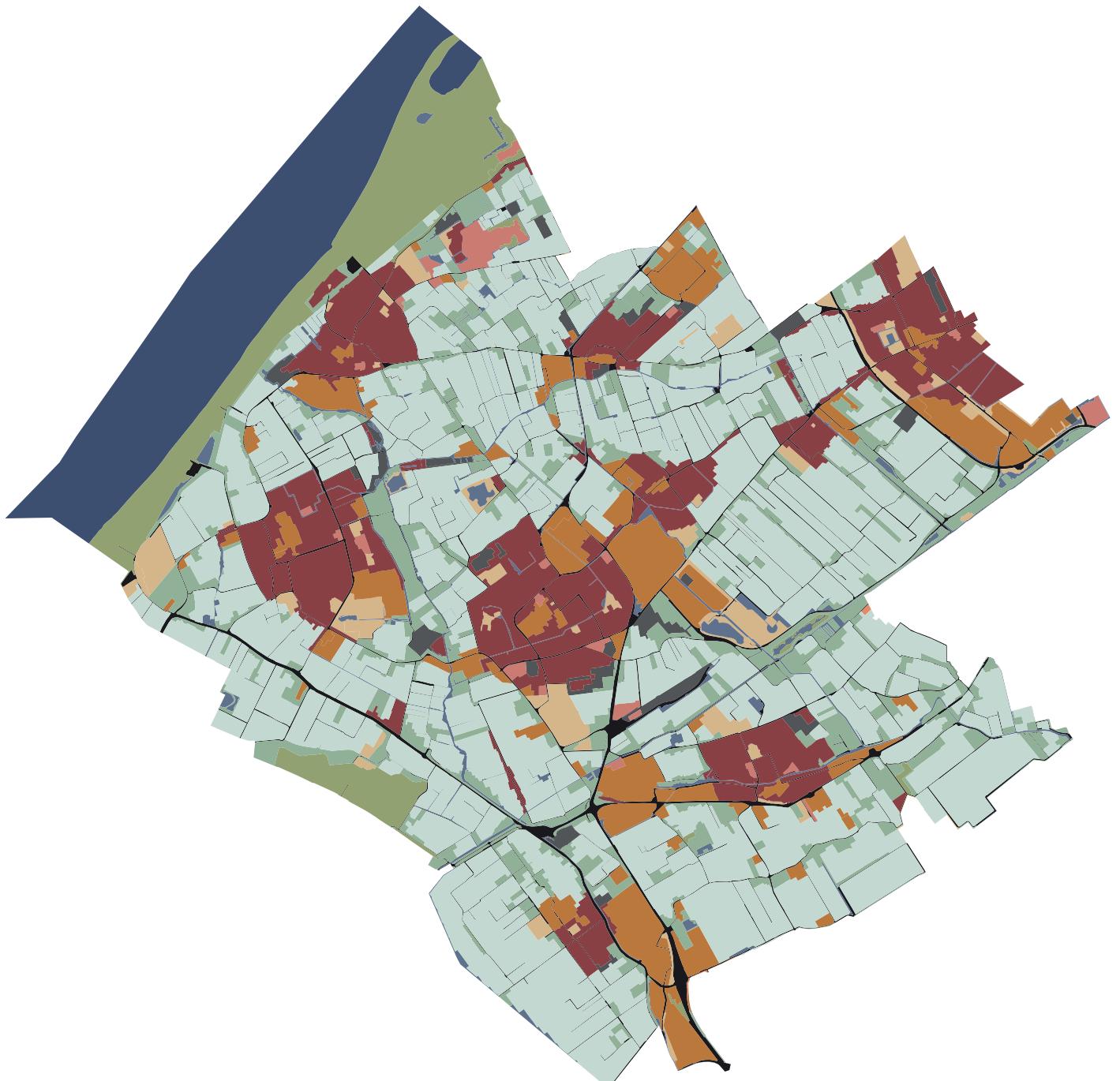


Land Use

Land use analysis for the municipal area of Gemeente Westland. The shares of land for horticulture, industry and road infrastructure reflect the highly determinate nature of the region.

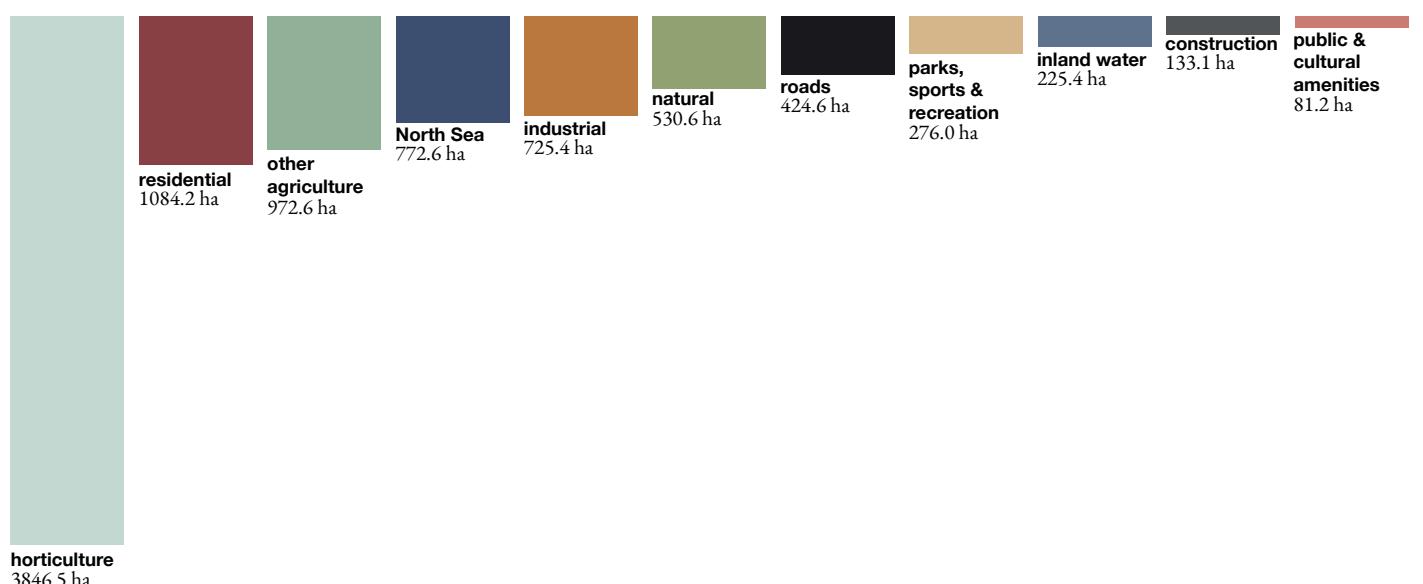
Data: CBS BBG 2017.

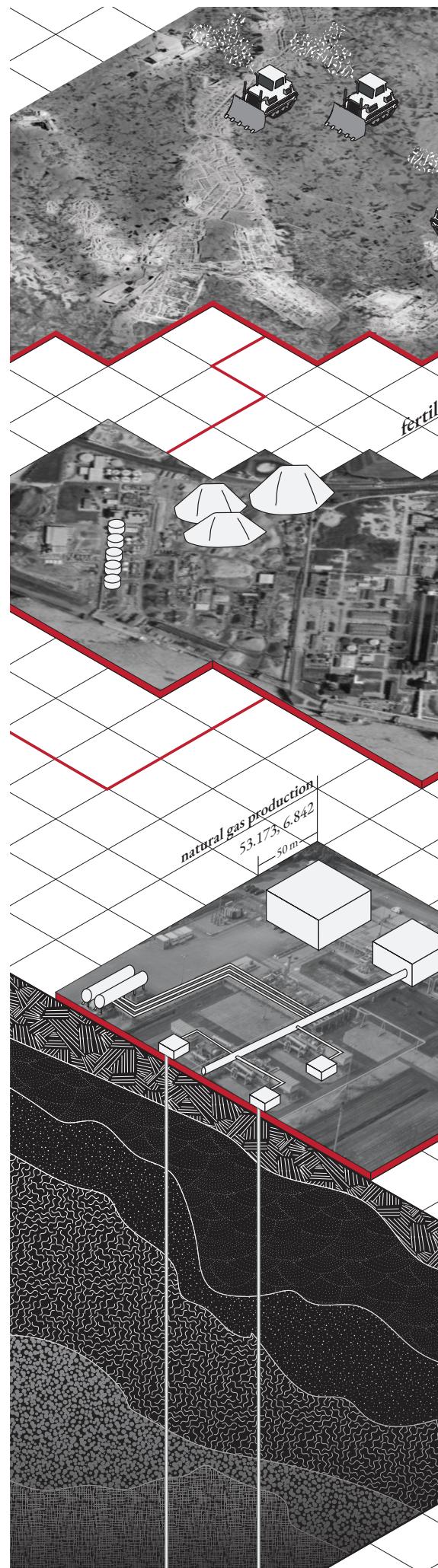
0 | 2 km N



Gemeente Westland

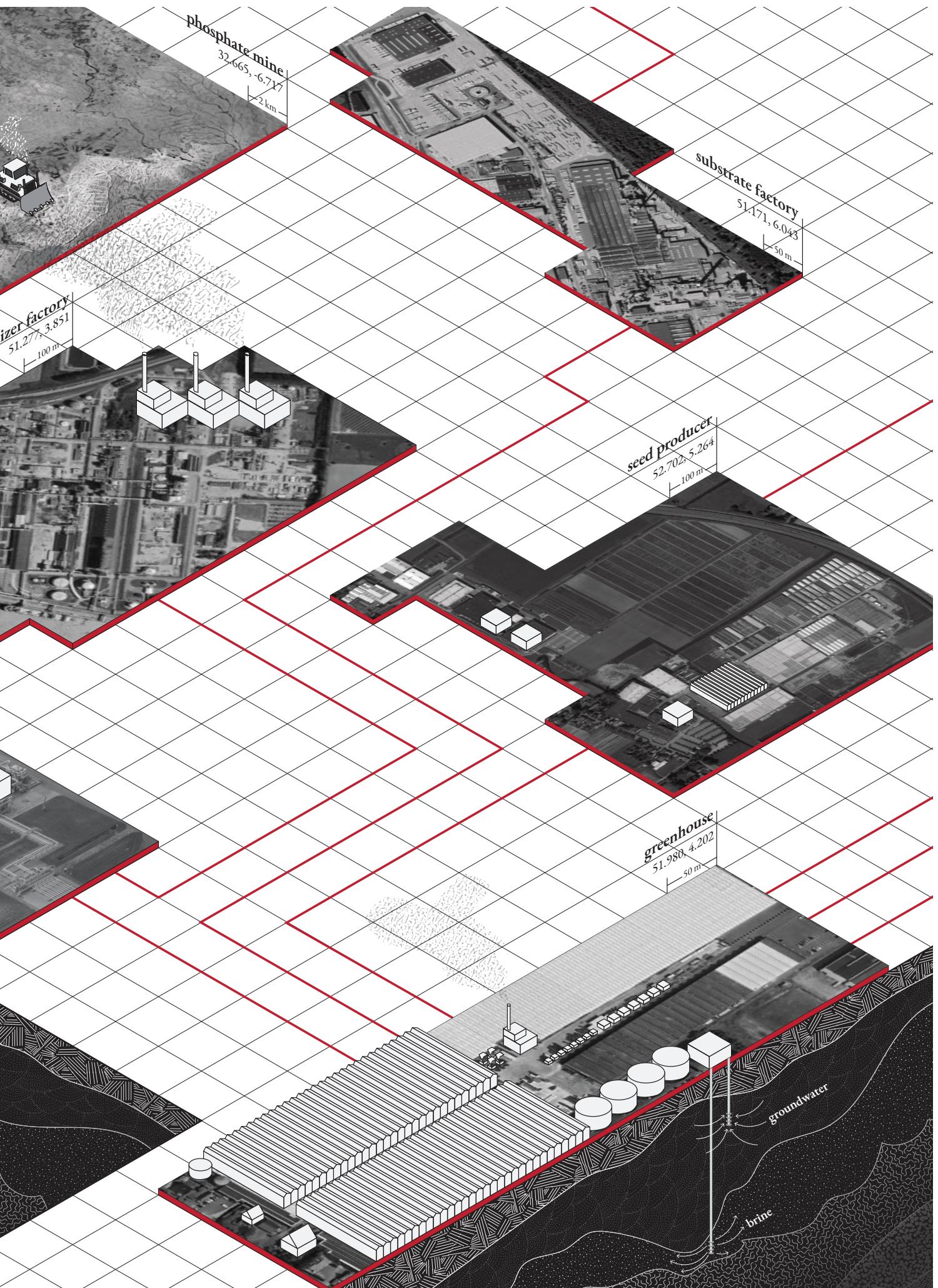
9059 ha



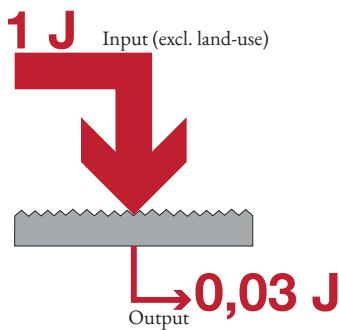


The Industrial Ecology of Greenhouses in Westland

The drawing investigates the relation between the greenhouse and other spatial products of horticultural activities, e.g. factories, labs and mines.



Gas-Powered



Horticulture's energy input/output ratio
(Smit, 2018)

Natural gas usage

Total NL	29.7 billion m ³
(9.6%)	2.85 billion m ³
Horticulture sector	
GDP (2023)	
Total NL	€ 994 billion
(1%)	€ 9.92 billion
Horticulture sector	
Export (80%)	
Export	€ 9.92 billion
Export	(80%)

Horticulture's gas usage, contribution to GDP, and exports share (Smit, 2024; CBS, 2024a)

Horticulture is the most energy demanding sector within Dutch agriculture. The sector is highly dependent on natural gas, primarily for heating greenhouses to support year-round production. This heating is often integrated with combined heat and power (CHP) systems, which simultaneously generate electricity. The electricity is either used to light greenhouses or fed back into the national grid. Additionally, carbon dioxide produced from burning natural gas is partially captured and injected into the greenhouse atmosphere to stimulate plant growth. In 2023, the greenhouse sector consumed 2.85 billion cubic meters of natural gas—accounting for approximately 9.6% of the Netherlands' total gas consumption of 29.7 billion cubic meters (Smit, 2024; CBS, 2024a). The map on the right pages shows the countries from which this natural gas is imported. The Netherlands extracts and trades gas as well, shown as 'exports'.

Energy-Efficient?

The input-output ratio of agricultural sectors was analysed by Smit (2018), where all energy-demanding inputs and the outputs in terms of nutrition were taken into account. This calculation shows that the input-output ratio is actually the lowest of all agricultural sectors.

Despite these energy demands, steepening gas prices and geopolitical precarity, renewable energy sources remain limited within the sector, comprising only 11.9% of total energy use in 2024. One notable shift towards energy sustainability is the adoption of geothermal energy, which currently saves approximately 200 million cubic meters of natural gas annually—equivalent to 6% of the sector's total former gas use (Glastuinbouw Nederland, 2024). According to Glastuinbouw Nederland (2024), geothermal heat has the potential to supply up to half of the sector's future heating needs.

Economic Significance

Economically, the greenhouse horticulture sector contributed 1% to The Netherlands' GDP in 2022, amounting to €9.92 billion out of a total GDP of €994 billion. The sector accounts for around 1% of national employment (CBS, 2024b). Besides, the sector is strongly export-oriented: approximately 80% of the added value in 2022 was linked to the export of vegetables, flowers, and plants (WUR Agrimatic, 2024c).

Gas Imports & Infrastructure

Gas infrastructure in the Netherlands and Westland (zoom in). Exports and imports are indicated by volume.

Data: CBS (2024) & Chappin (2024).

- gas imports and exports
- greenhouses
- gas pipelines

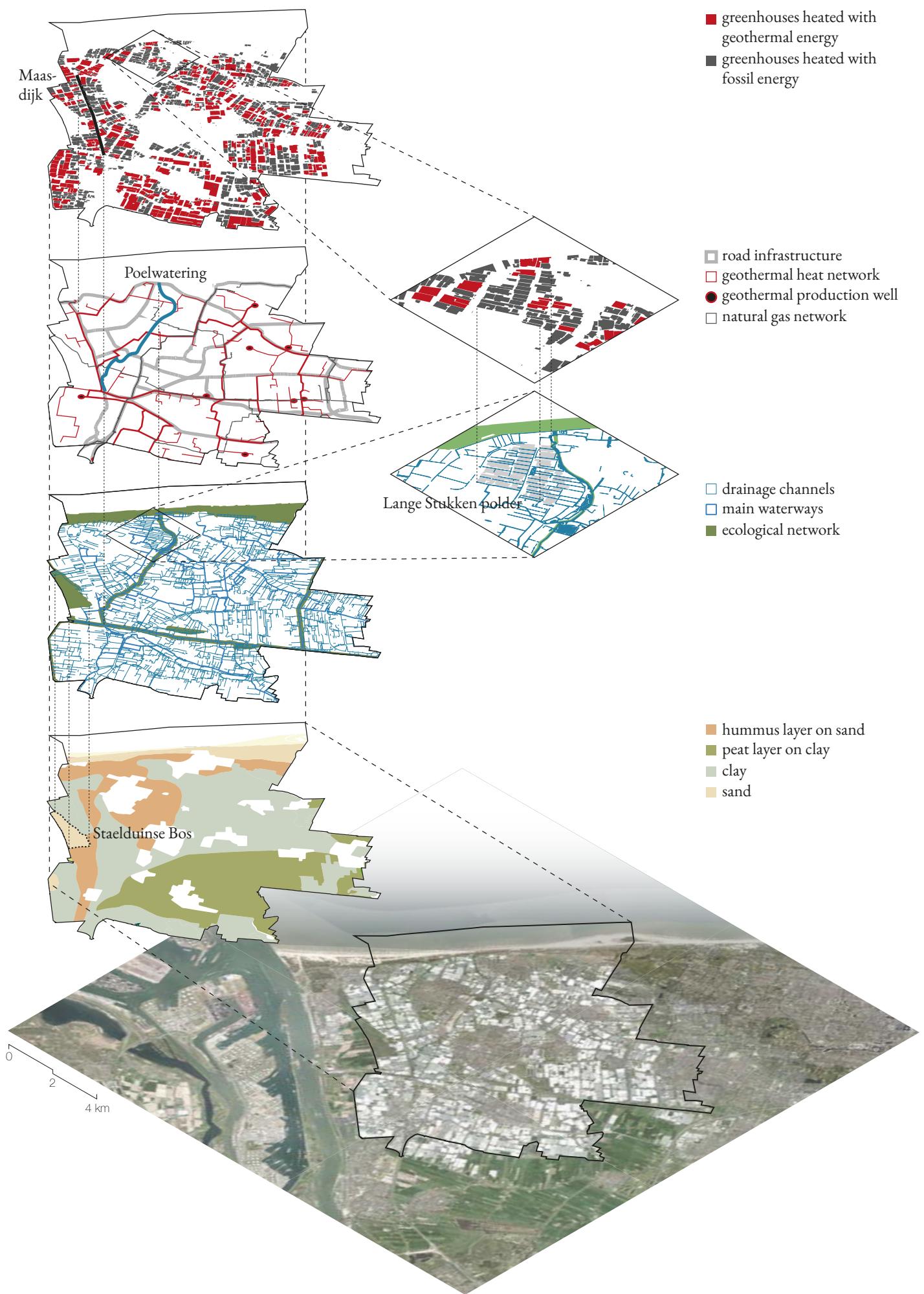
0 | 75 km | N



Polder Water Structure as Spatial Straitjacket That Limits Scaling Up

The drawing investigates the relation between the scale and morphology of the greenhouses, the infrastructure and the polder water structure.

Westland municipality



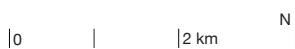
Water Toxicity Pressure

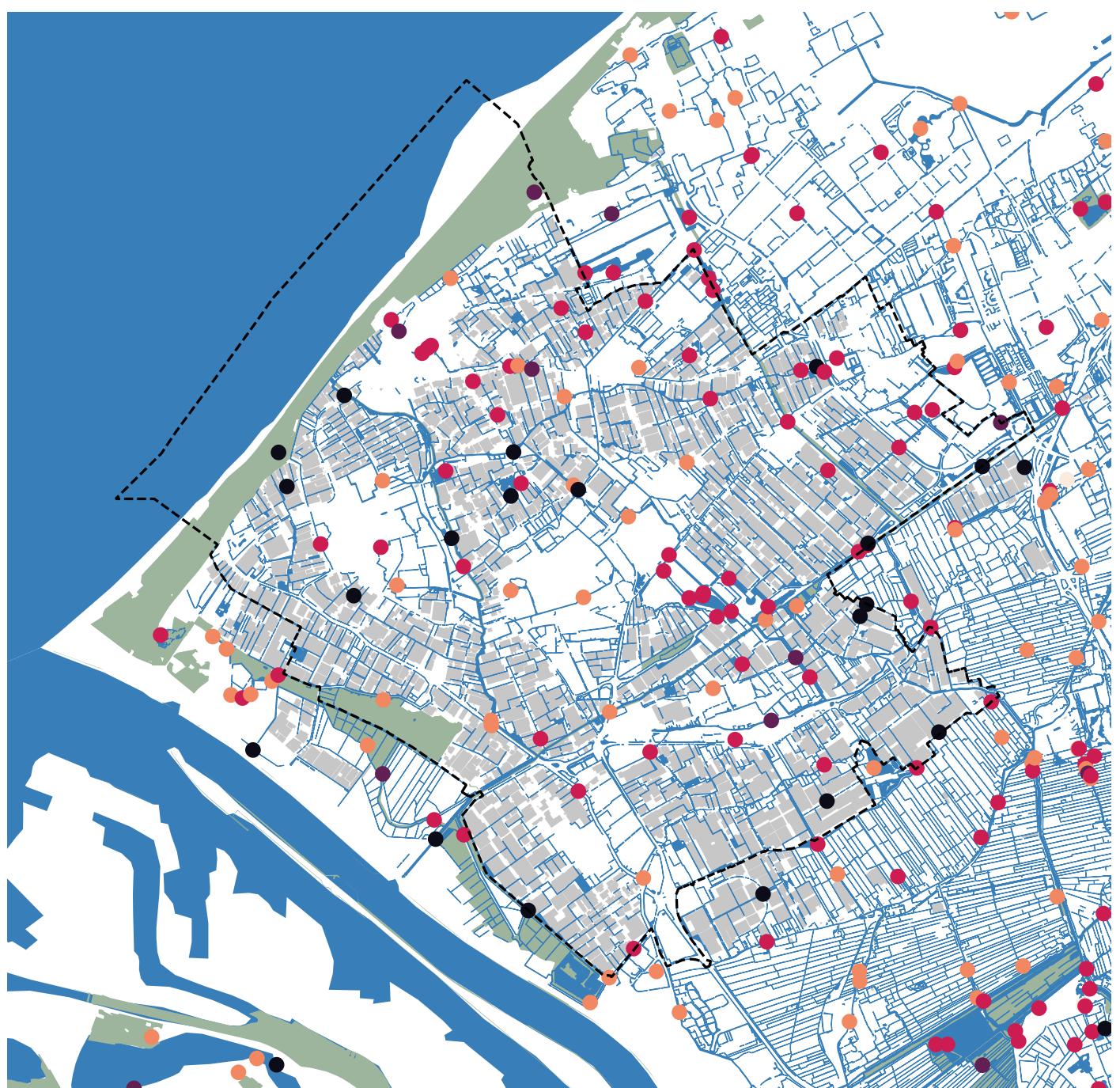
The map shows toxicity measurements for the surface water. Toxicity is a measurement that accounts for the different toxic substances individually, plus the extra toxicity due to reacting substances. The substances measured are ammonium ((NH_x), metals, PAHs (polycyclic aromatic hydrocarbons), plant protection products and other organic environmental pollution. Toxicity puts pressure on the water ecology and poses health risks for local residents.

At the site of the purple and black dots, aquatic life is highly affected by toxins. As a result, the number of animal and plant species may decrease, or even disappear. Aquatic life is a measure of water quality.

Data: Stowa in Atlas Leefomgeving (2022)

- Municipality Westland
- Natura2000 and NatuurNetwerk Nederland (NNN)
- greenhouses
- water
- no toxicity
- little toxicity
- medium toxicity
- high toxicity
- extremely high toxicity





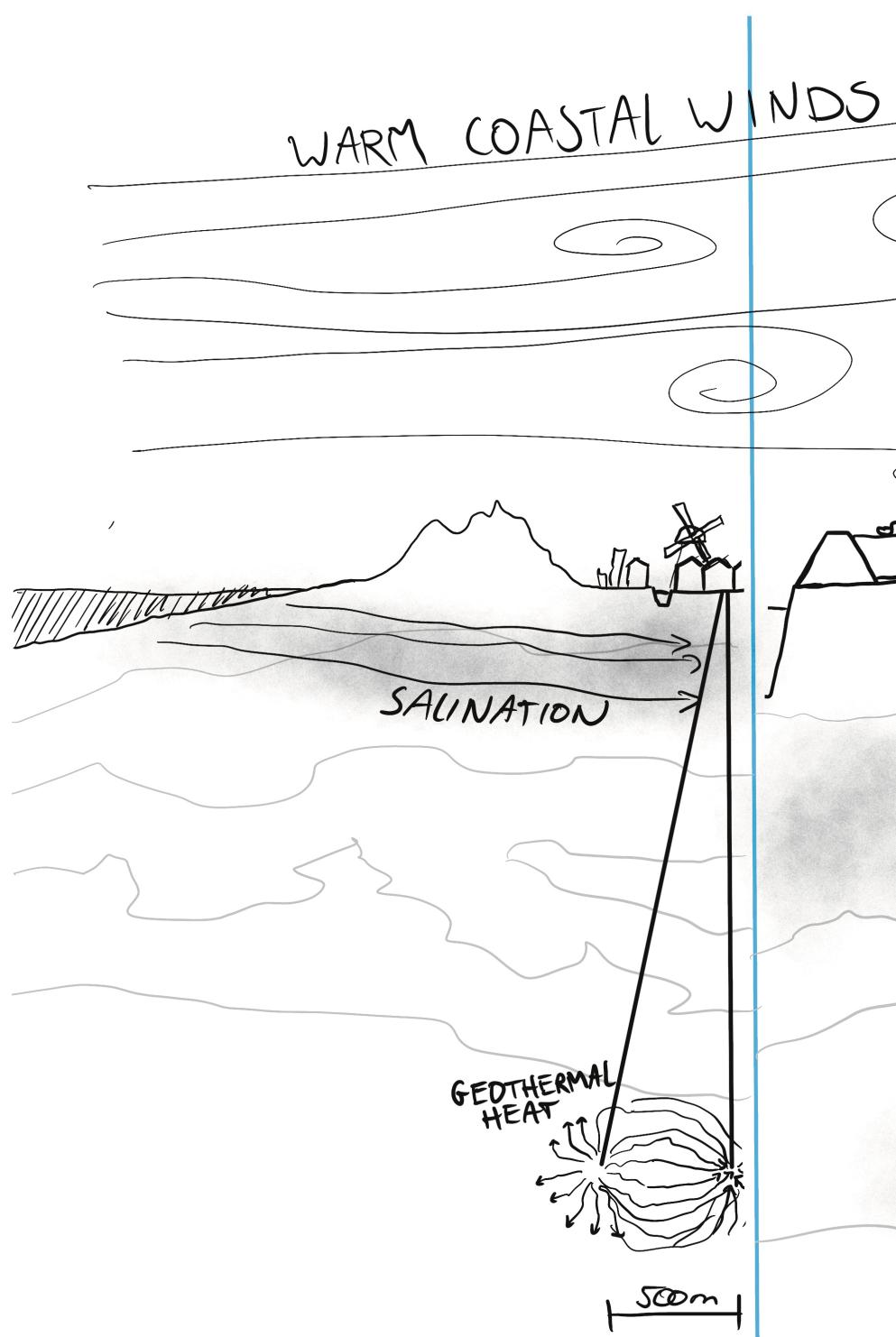
Cartesian Morphology

The drawing highlights the Cartesian urban morphology that is common in Westland, that is a result of the interplay between polders, historically persistent infrastructure and the orthogonal structure of the greenhouses.

- a. one of the few housing projects especially developed for labor migrants in Westland
- b. water basins for irrigation of the surrounding greenhouses
- c. a major horticulture management consultancy office or "growth firm"
- d. fast food restaurants
- e. major flower export company
- f. N213 regional road connecting to the Rotterdam port via A20-A4-A15 highway

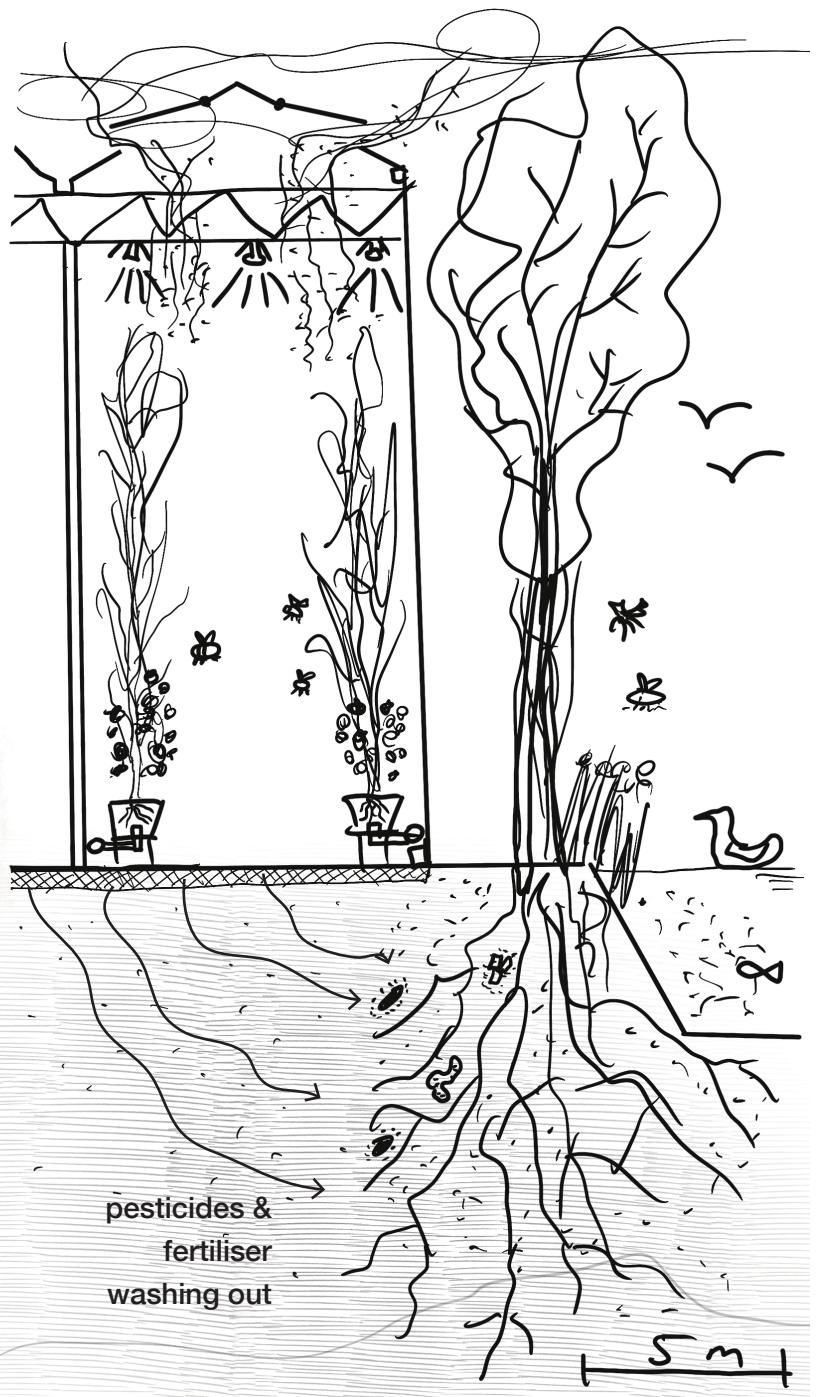
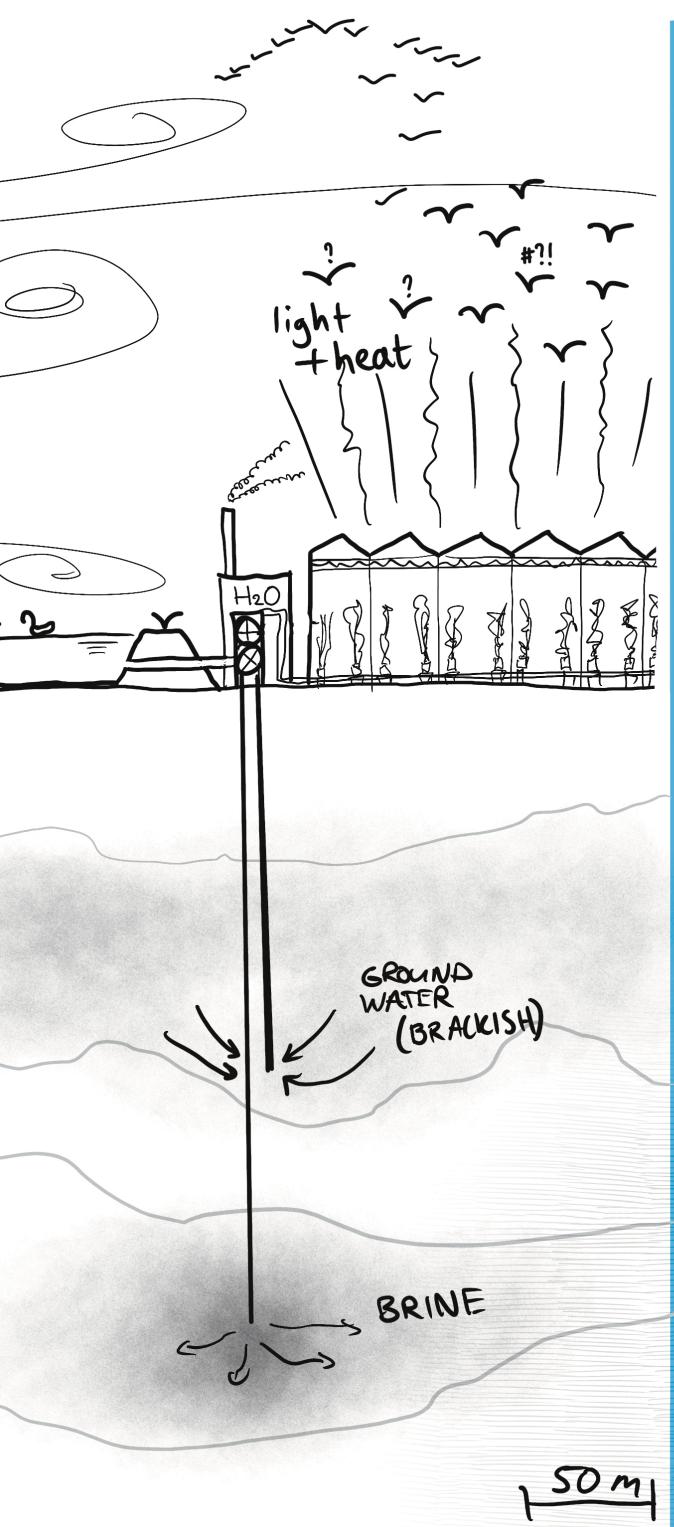


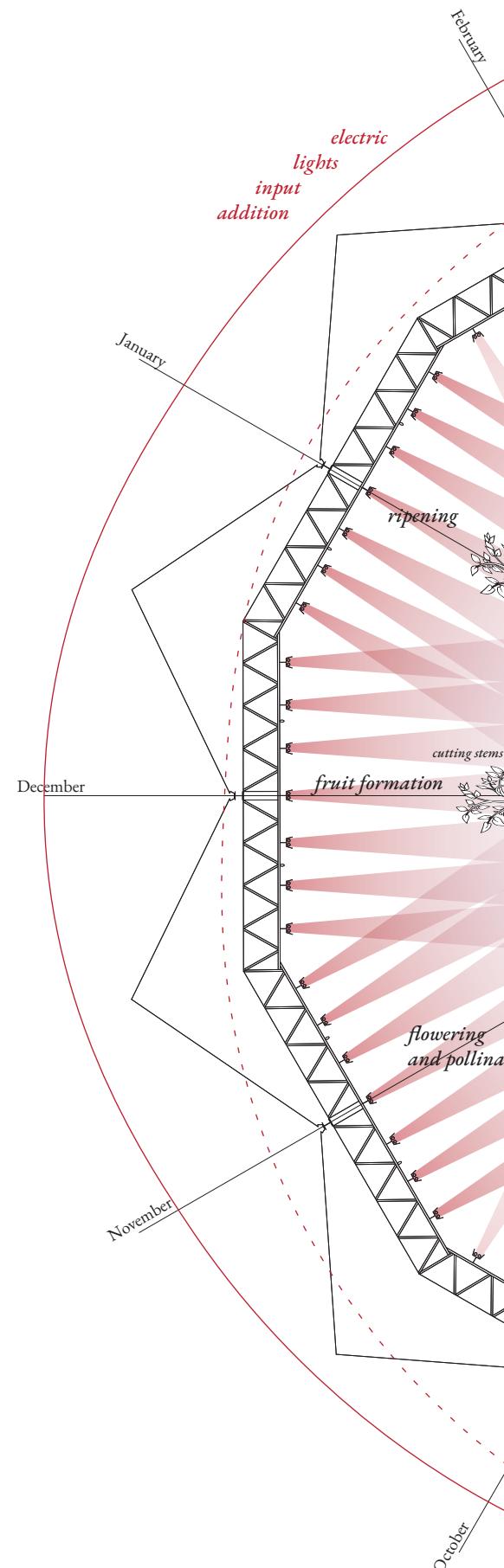




Hybridity of Nature and Horticulture

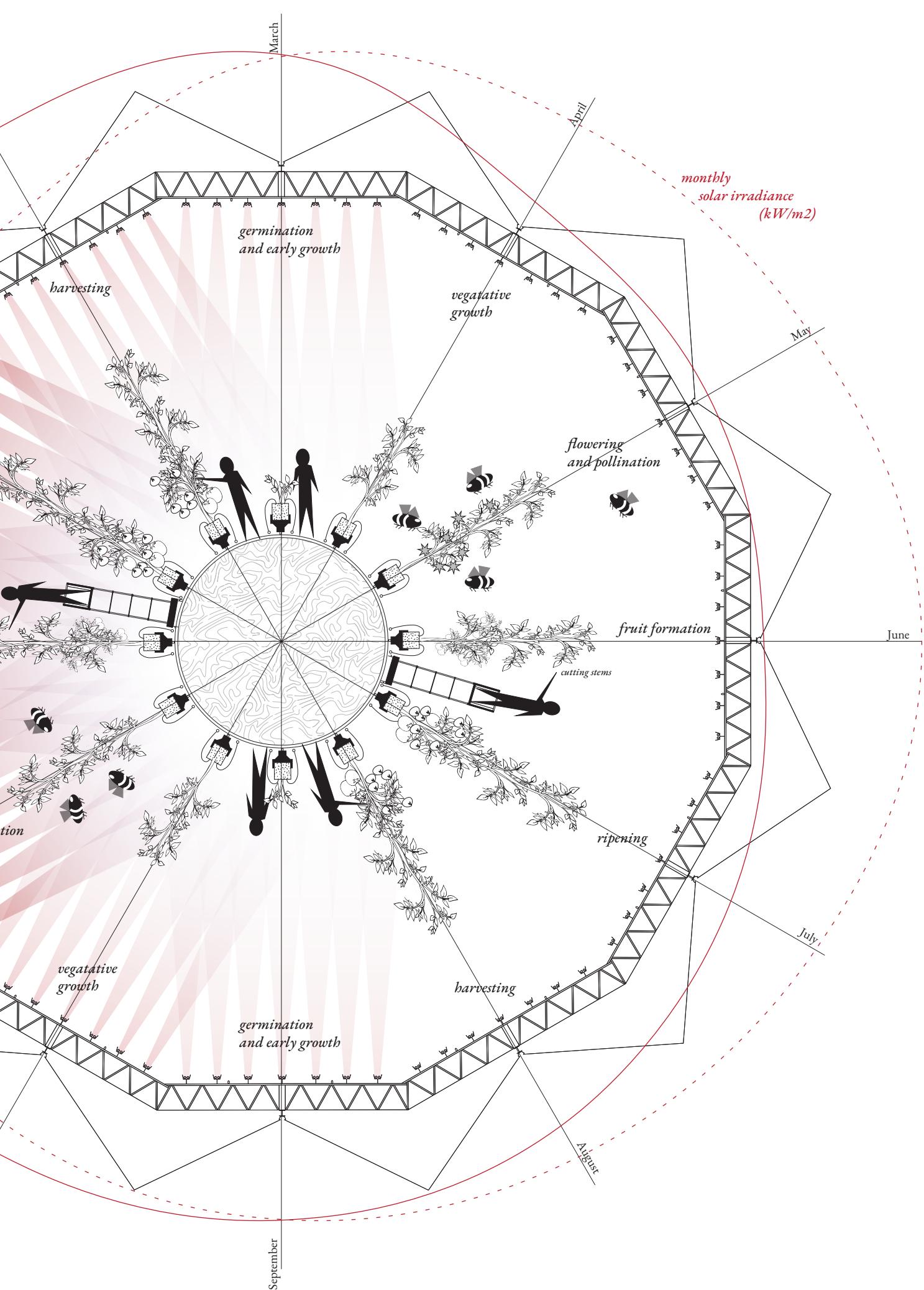
The section shows different scales at and ways in which the horticultural activities are related to and affecting the more-than-human environment.

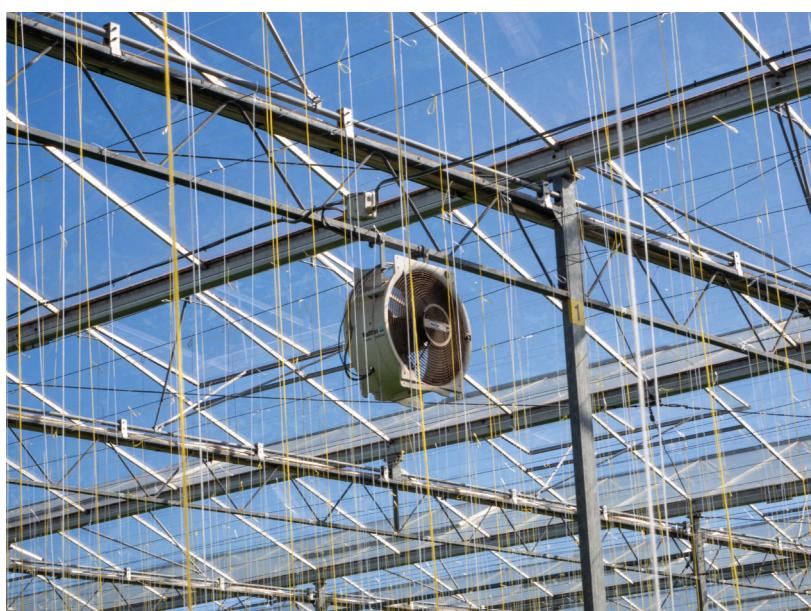
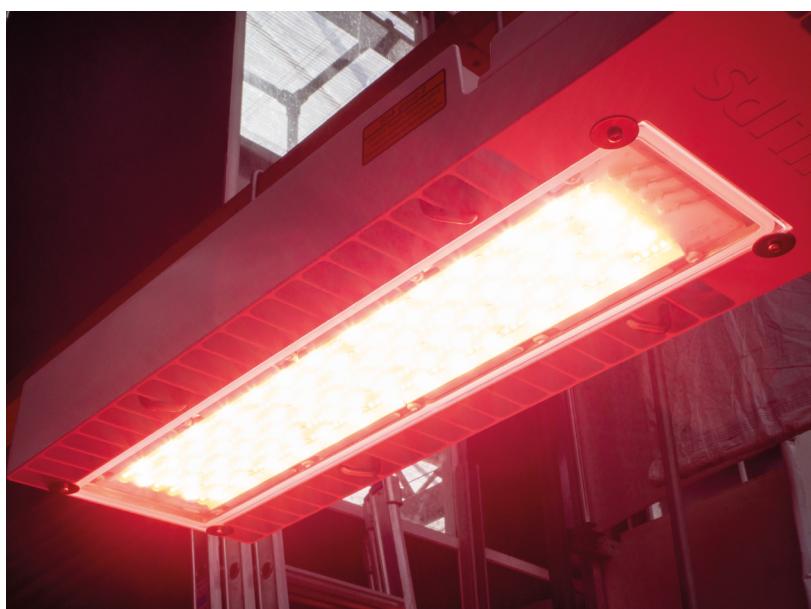




A Year-Round Industry

Through heating, lighting, industrially produced or robotic pollinators and year-round labour, the greenhouse is operational year-round. This drawing shows the plant stages throughout the year, the light input needed for photosynthesis, and the associated labour activities.



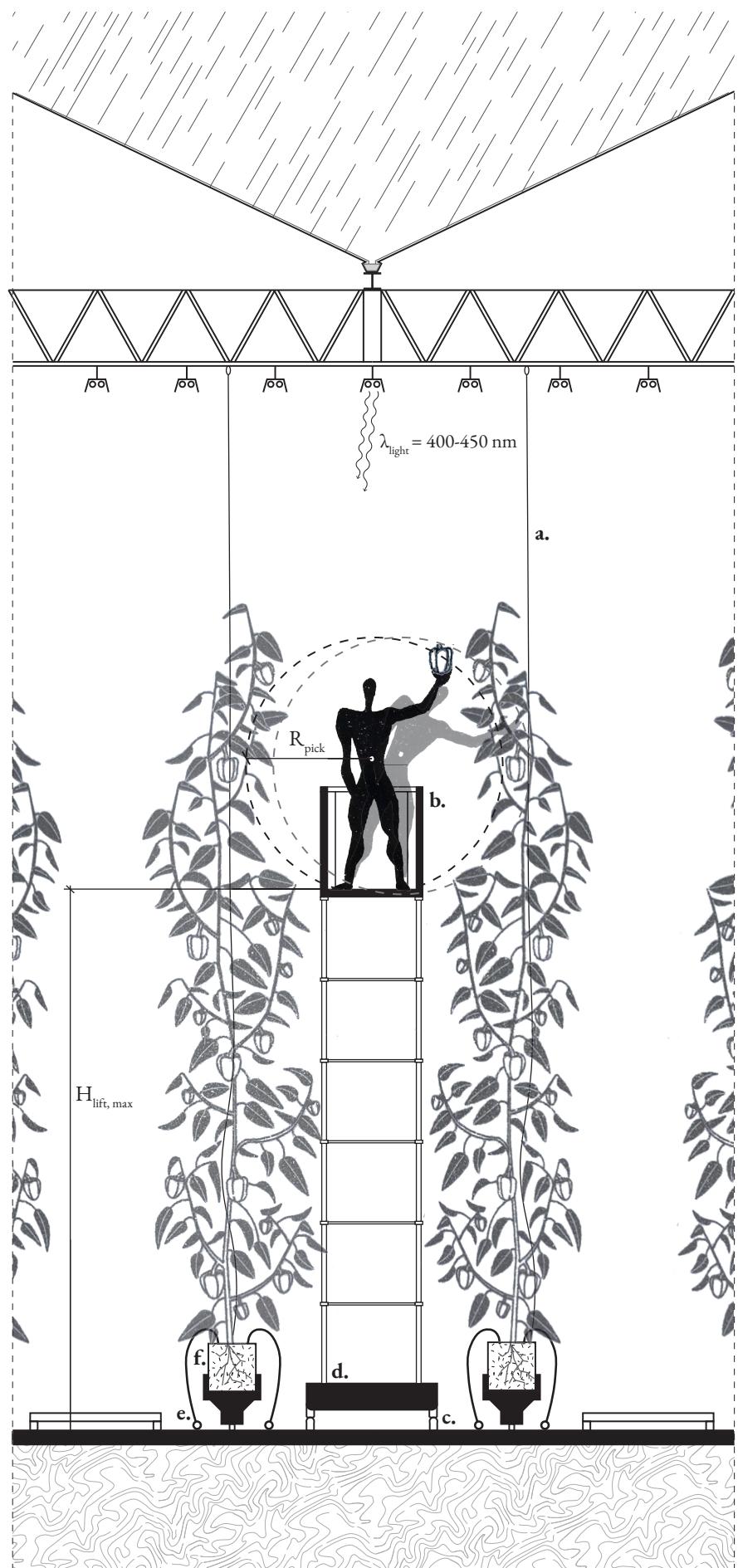


Indoor climate control elements. From top to bottom:
gas powered heater fan, led lighting element, air
circulation fan.

[photographs by author]

(More-than-human) Work

Despite horticultural and technological innovations to both minimise the interrelationships with the natural outside and minimise labour costs, the industry is heavily dependent on the work done by humans and crops. This drawing shows a typical work environment in a greenhouse for bell-peppers.



a. suspension rope

c. guiding rails

e. irrigation piping

b. aerial lift unit

d. automated guided vehicle (AGV)

f. rockwool substrate

Solanum lycopersicum

tomato, 西红柿, tomate, طماطم, 토마토

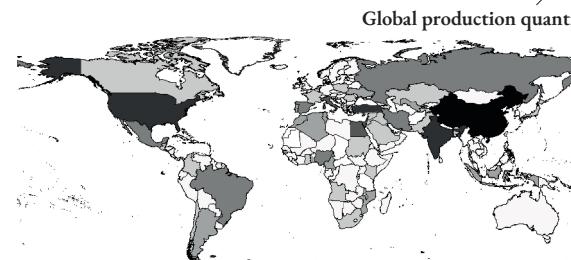
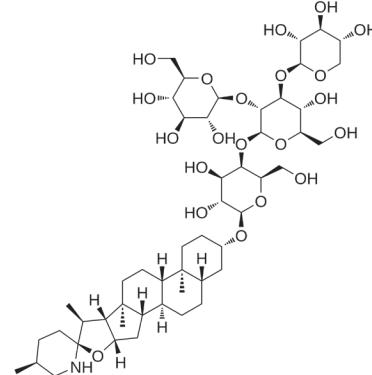
The word "tomato" is derived from the Spanish "tomate," which itself comes from the Nahuatl word *tomatl* ['tomatl], meaning "swelling fruit." The species name *lycopersicum*, meaning "wolf peach," traces back to the ancient physician Galen, who used it to describe a plant that has never been definitively identified. In the 16th century, Luigi Anguillara speculated that Galen's *lycopersicum* might refer to the tomato. Although this identification was incorrect, the name *lycopersicum* eventually became the scientific term for the tomato.

Etymology

Biology

The tomato, scientifically known as *Solanum lycopersicum*, is a plant that produces an edible berry commonly used as a vegetable in cooking. It belongs to the nightshade family, which also includes plants like tobacco, potatoes, and chili peppers. Native to western South America, the tomato was domesticated by various Mesoamerican peoples, including the Aztecs, and was introduced to Europe during the Columbian exchange in the 16th century by the Spanish. Due to large scale cultivation and breeding, there currently exist more than 10,000 of cultivars, differing in size, color, shape, and taste. Tomatoes are vulnerable to a variety of pests, including insects and nematodes, and are prone to diseases caused by viruses, mildew, and blight fungi.

Tomatine
is a glycoalkaloid, found
specifically in the stems and
leaves of the tomato plant



101.500.000.000 kg

total produce in 2022

Tomato Case Study

The tomato is the most cultivated vegetable in greenhouses worldwide, and the Dutch tomatoes are exported around the world. This investigation dissects the different aspects to the tomato as a horticultural product.

Data and sources:

De Visser et al., 2012

Utnariu & Butu, 2015

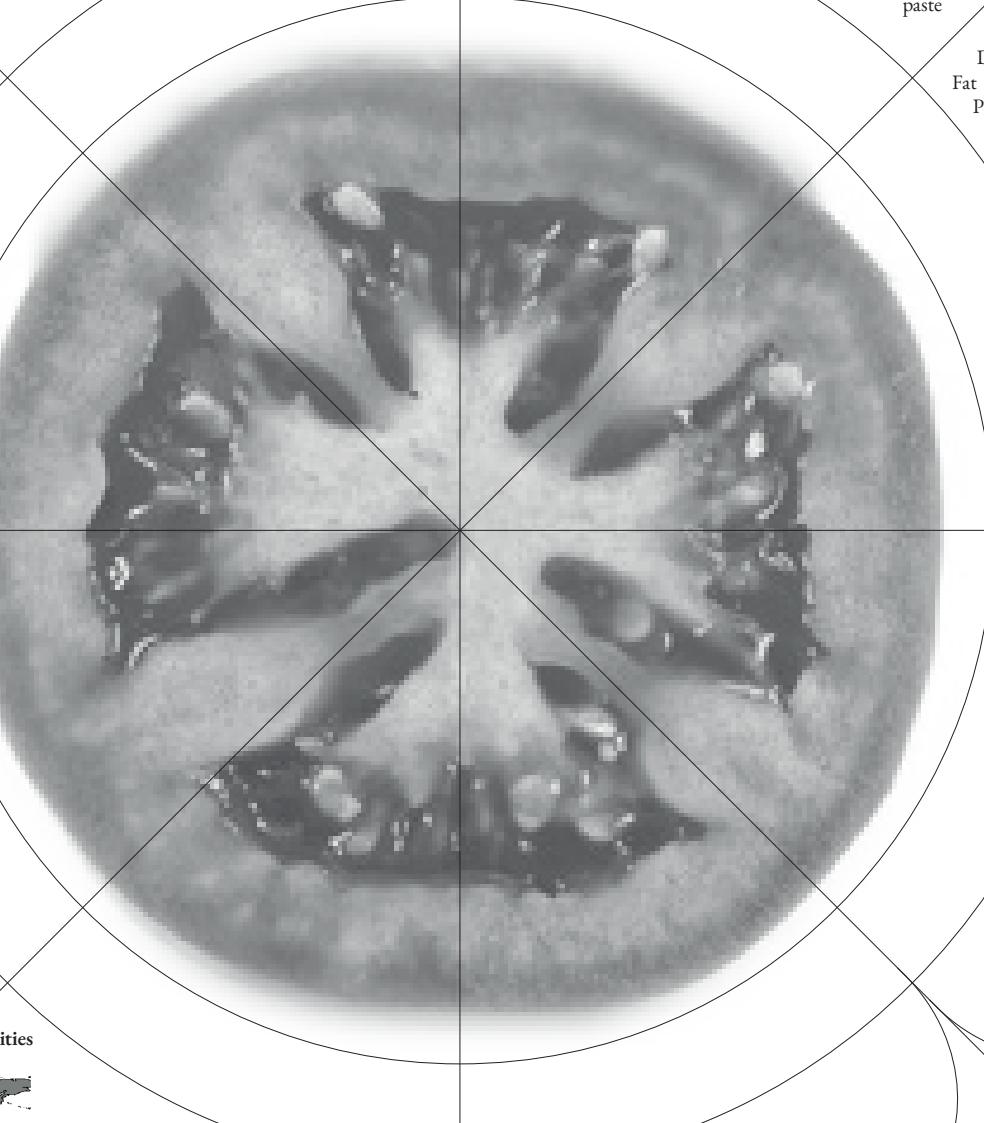
Pedala et al., 2023

FAO & Our World in Data, 2023

Carboncloud, n.d.

rsicum

माटर



Carbon footprint

1.810 kg CO₂e per tonne (full life cycle)

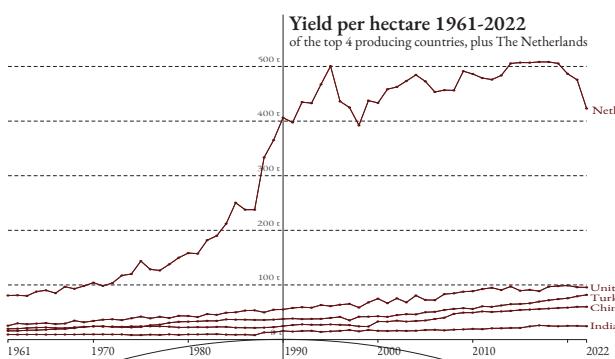
460 kWh
of electricity mostly
for lighting

620 m³
natural gas for
heating

66.8 m³
of water

for
high-tech
greenhouse
cultivation

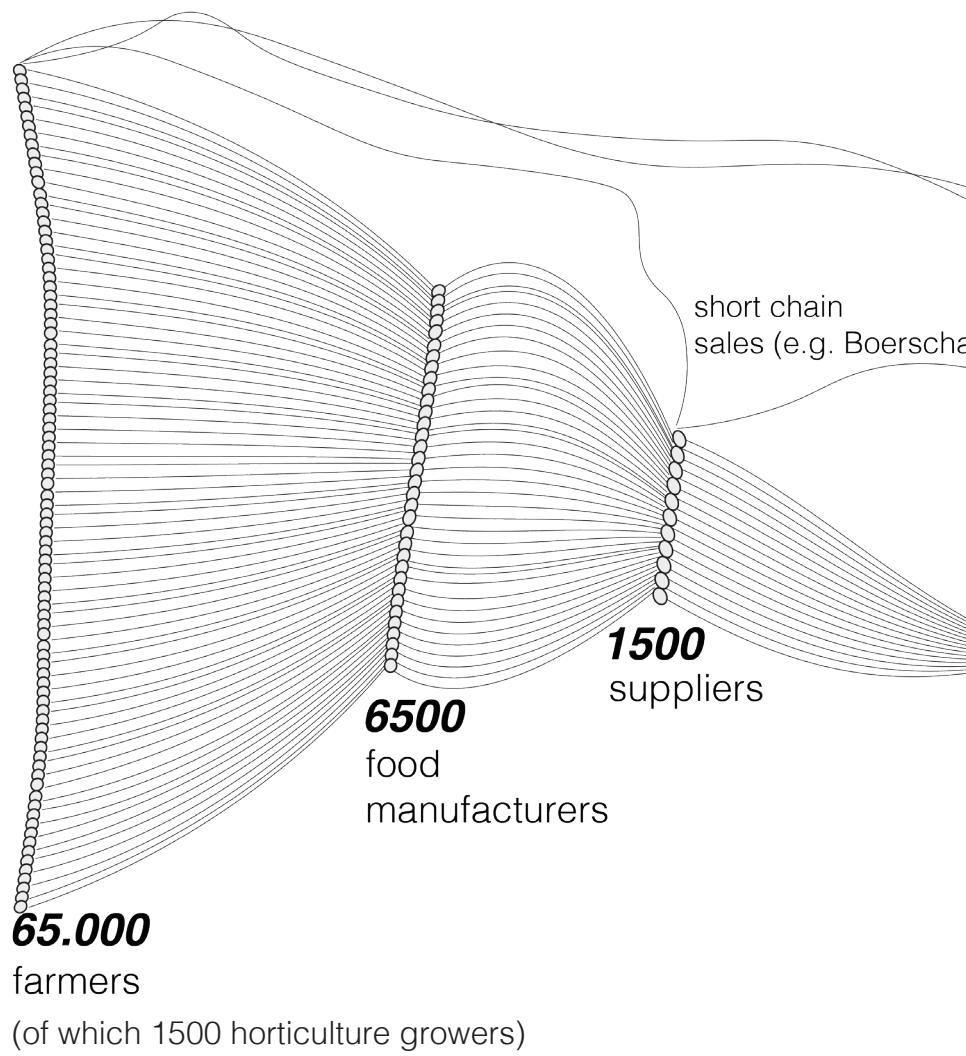
Production inputs per tonne



Common products

Product	Value/100 g (unit)
sauce	74 kJ (18 kcal)
ketchup	3.9 g
canned	2.6 g
paste	1.2 g
Phytochemicals	0.2 g
Energy	0.9 g
Carbohydrates	94.5 g
Sugars	0.2 g
Dietary fiber	0.9 g
Fat	0.9 g
Protein	0.9 g
Water	94.5 g
Magnesium	11 mg (3%)
Manganese	0.114 mg (5%)
Phosphorus	24 mg (3%)
Potassium	237 mg (5%)
Lycopene	2,573 µg
Vitamin A equiv.	42 µg (5%)
β-Carotene	449 µg (4%)
Lutein/zeaxanthin	123 µg
Thiamine	0.037 mg (3%)
Niacin	0.594 mg (4%)
Vitamin B6	0.08 mg (6%)
Vitamin C	14 mg (17%)
Vitamin E	0.54 mg (4%)
Vitamin K	7.9 µg (8%)

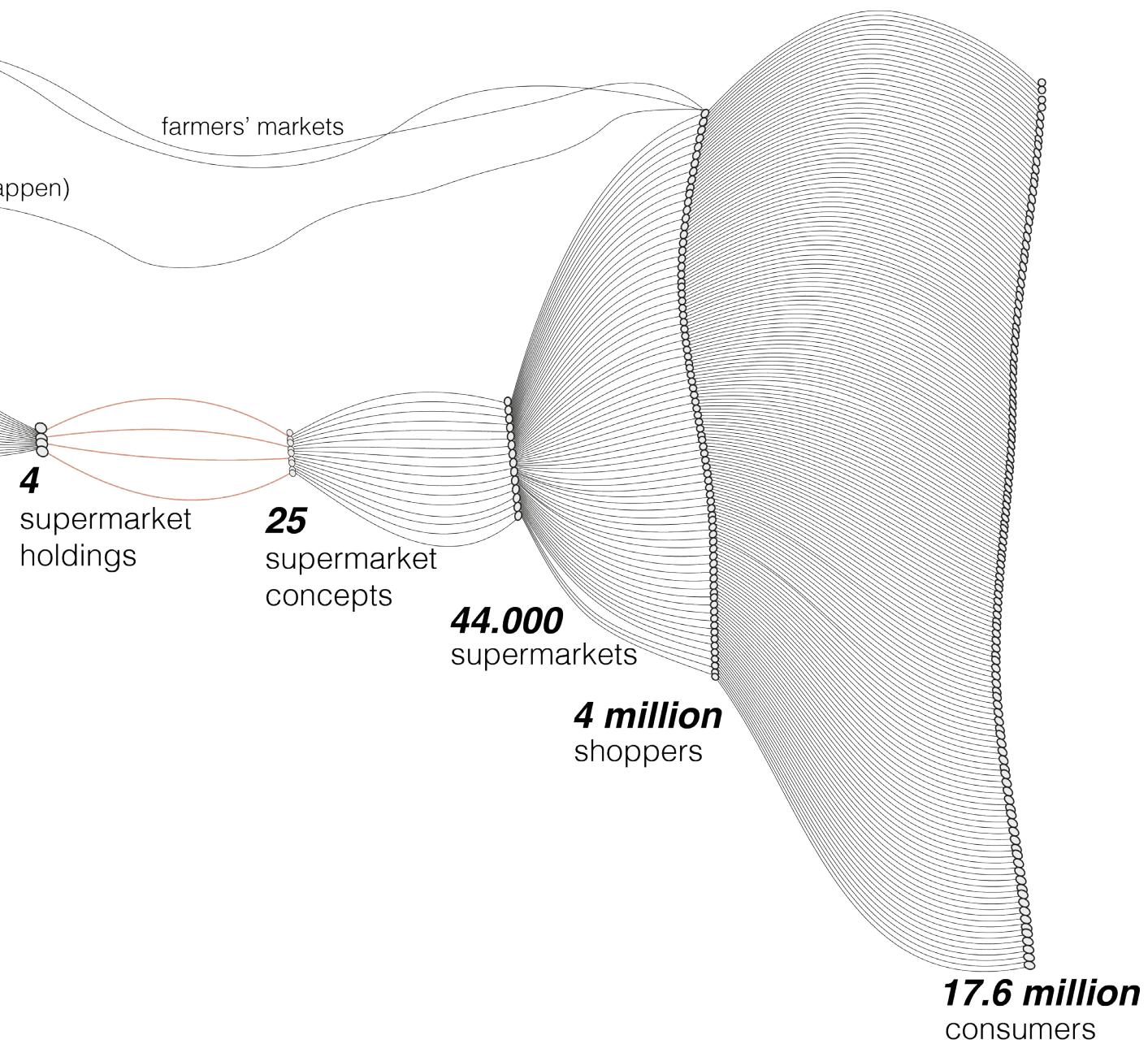
Nutritional Value



Hourglass Food-Chain

The strong concentration of power in the food chain gives supermarkets a great deal of power in determining pricing.

Data and based on:
PBL, 2014



Living Labour

Unlike the dairy and meat sectors, horticulture has largely been excluded from EU direct support payments to producers—subsidies that have enabled investment in labor-saving technologies. Consequently, horticulture remains the most labor-intensive segment of Dutch agriculture (OECD, 2015, p.127).

Historically Indispensable

"I think you cannot maintain an industry that can only run on foreigners. Then it is better to move production abroad as well.

If Westlanders are really so proud of their greenhouses, they should go and work there themselves. But then you shouldn't want a job that gives Friday afternoons off, and a company car."

Jaap van Duin in NOS (2024), Economist and writer of the historical book 'Geschiedenis van het Westland'

The first labour migration to Westland began very early. It started at the end of the 18th century, with migrants primarily coming from Germany, particularly from regions where Dutch was already spoken. These workers were not limited to Westland but were active throughout the Netherlands. They were known locally as "Hannekemaaiers," a term derived from their primary task of mowing grass. At the time, they constituted a minority of the workforce, and the degree of dependence on migrant labor that characterizes the present-day sector had not yet developed. Nevertheless, traces of this early wave remain visible, as many of these workers settled permanently in the region. German-origin surnames, still commonly encountered in Westland, are a testament to their descendants' continued presence (van Duijn in van Tilburg, 2022).

While more recently undocumented migrants –mainly from Morocco and Turkey – represented an important factor of the Netherlands' greenhouse economy during the 1980s and 1990s, since the EU expansions in 2004 and 2007, regular CEE migrants – particularly Poles, Romanians, and Bulgarians – have taken over their role (Siegmann et al., 2022).

'Regulated Precarity'

Having EU citizenship rights does not avoid a high degree of precarity among CEE migrant workers in horticulture. In its report on "The State of Fair Work," The Netherlands Labour Authority (NLA, 2017) highlights a rising risk of underpayment, excessive working hours, and exploitation, particularly within the employment agency and horticulture sectors. Migrant workers from Central and Eastern European (CEE) countries are disproportionately affected. These exploitative practices are often linked to legal loopholes that are strategically exploited by unscrupulous employers to reduce labour costs (NLA, 2021).

Siegmann et al. (2022) identify multiple insecurities that occur for horticultural migrant workers in their article 'Migrant Labour in Dutch Agriculture: Regulated Precarity'. Employment insecurity, low income, wage discriminations, flexible contracts and health hazards (e.g. exposure to chemicals) are the main insecurities migrant workers face, together with rare possibilities for training and skill reproduction. Growers will usually hire farmworkers via employment agencies that offer attractive, interlinked employment, accommodation, transportation, and medical insurance contracts—'package deals' that reduce the employment agency's labour costs (Oudejans, 2020), but exacerbate the power imbalance between employer and employed. This also increases the risk of homelessness and excessive medical costs in case of unemployment (Aanjaagteam Bescherming Arbeidsmigranten, 2020).

"[W]hy would [growers] actively try to shift cheap labor away from the production process and into higher-skilled, higher paid jobs?"

Polish greenhouse worker
as quoted in Williams (2019)

The Burdened

An interview with a grower and the research by Siegmann et al. (2022) confirm that the structure of the agri-food chain is proliferating these precarious situations because of a 'race to the bottom'. Powerful supermarket holdings and International Buying Groups in the middle of the 'hourglass shaped value-chain' (PBL, 2014) determine low pricing for growers. Growers' response to this downward pressure is to pass it on to migrant workers (Siegmann et al., 2022).

First Steps Towards Justice?

Despite automation being a new factor in the proliferation of labour disparities (Abou Jaoude & Muñoz Sanz, 2025 p.36), special inspectorate commissions like the Commission Roemer show a larger scale societal urgency to address the precarity of migrant workers in the horticulture sector. The municipality Westland is one of the few municipalities that provides civil registration for international workers and has recently instigated policy to facilitate on-site housing for workers, which aims to relieve pressure on surrounding cities (Schravesande, 2025).

One interviewee grower has gone through the 'extensive and difficult' regulatory process of building housing units on the greenhouse site for his seasonal employees from Poland, who he has been permanently employing for over fourteen years. Training and integration into local society is not a desirable option however, according to the grower. "Horticulture, of course, is not the best-paid work. So when workers try to build a life here [in Westland], it is difficult. Then I prefer them to build up a life there [in Poland]."

Collage of news and opinion headers on labour migration in The Netherlands, on top of an image of Kafra Housing park in Venlo. Kafra is part of OTTO Work Force, a large employment agency for international workers.

[Headers from NRC, Groene Amsterdamer, NOS, Trouw, Dutchnews. Background image copyright Rob Engelaar/ANP]

■ REPORTAGE

Het Westland is economisch afhankelijk van arbeidsmigranten. Waarom werd Wilders hier toch de grootste?

■ NIEUWS

Meer dan helft van de mensen die op straat slapen, is arbeidsmigrant

March 6, 2024 [Senay Boztas](#)

■ REPORTAGE

Hoe Stichting Barka dakloze arbeidsmigranten bijstaat: 'Het is een kwestie van volhouden'

■ ACHTERGROND

Grip op migratie. Welke migratie?

Voorbij de xenofobe oneliners

Zondag, 08:04 • Aangepast dinsdag, 17:49

Dakloze arbeidsmigranten in bossen rond Venlo: 'Dit was niet onze droom'

■ NIEUWS

Meer dan helft van de mensen die op straat slapen, is arbeidsmigrant



Labour activities list at a zucchini greenhouse.

[photograph by author]



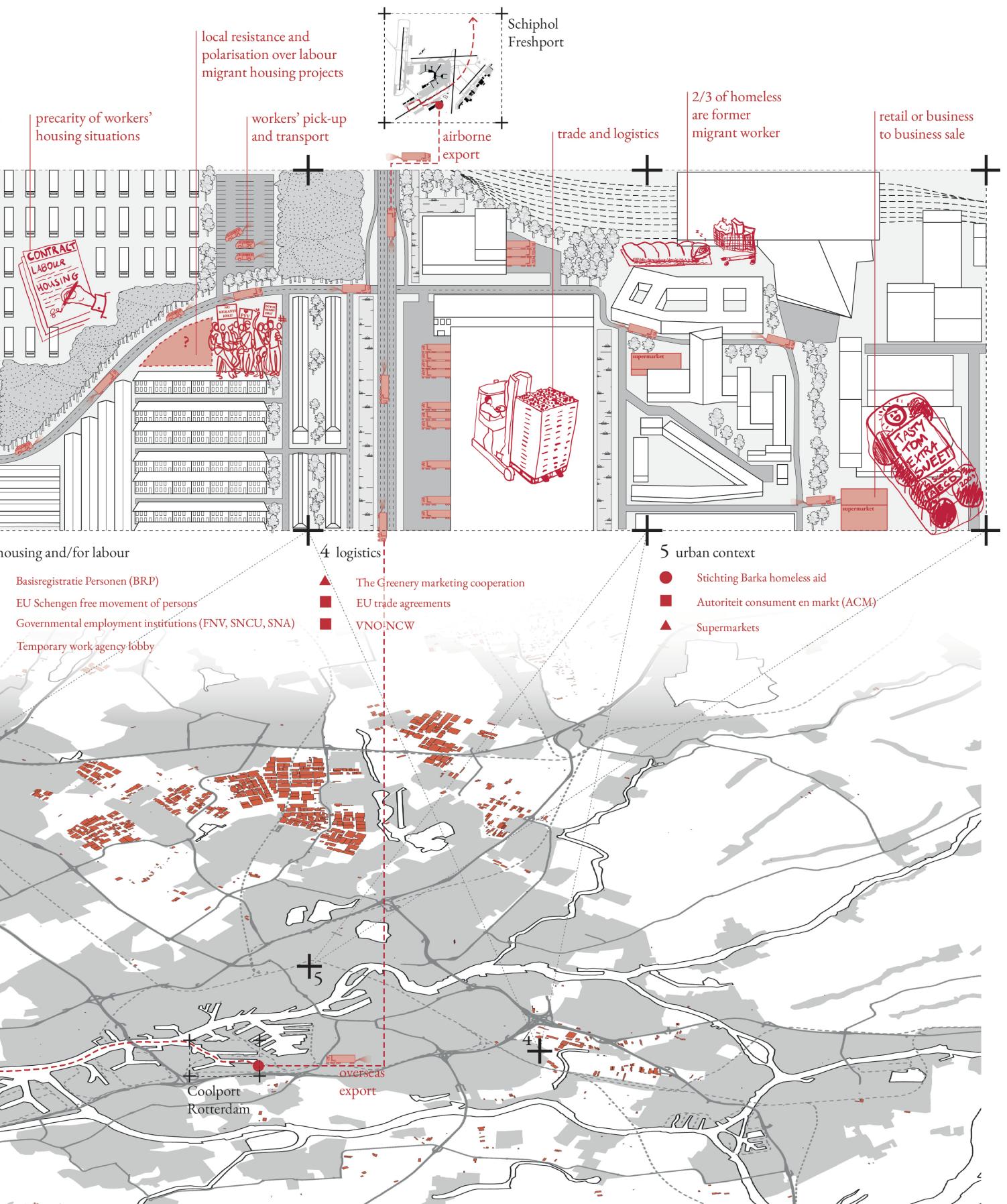
Workers' personal items at a potted plants packaging workplace.

[photograph by author]



Patchwork of Socio-Spatial Disparities

The drawing synthesises the investigated disparities and shows them in a conceptual patchwork of typical urban and rural environments in the region which are related to horticulture. For each patch, the location is highlighted on the map, the institutional and regulatory infrastructure is listed, and the red sketches visualise the social tensions and problems.





VII.

Imaginaries

This chapter is about the process for answering research questions 2.1 and 2.2:

[2.1] What are radical imaginaries for the future of the Westland horticulture landscape and what are the socio-spatial practices associated with these?

[2.2] Could these associated spatial practices undermine or promote spatial justice and autonomy?

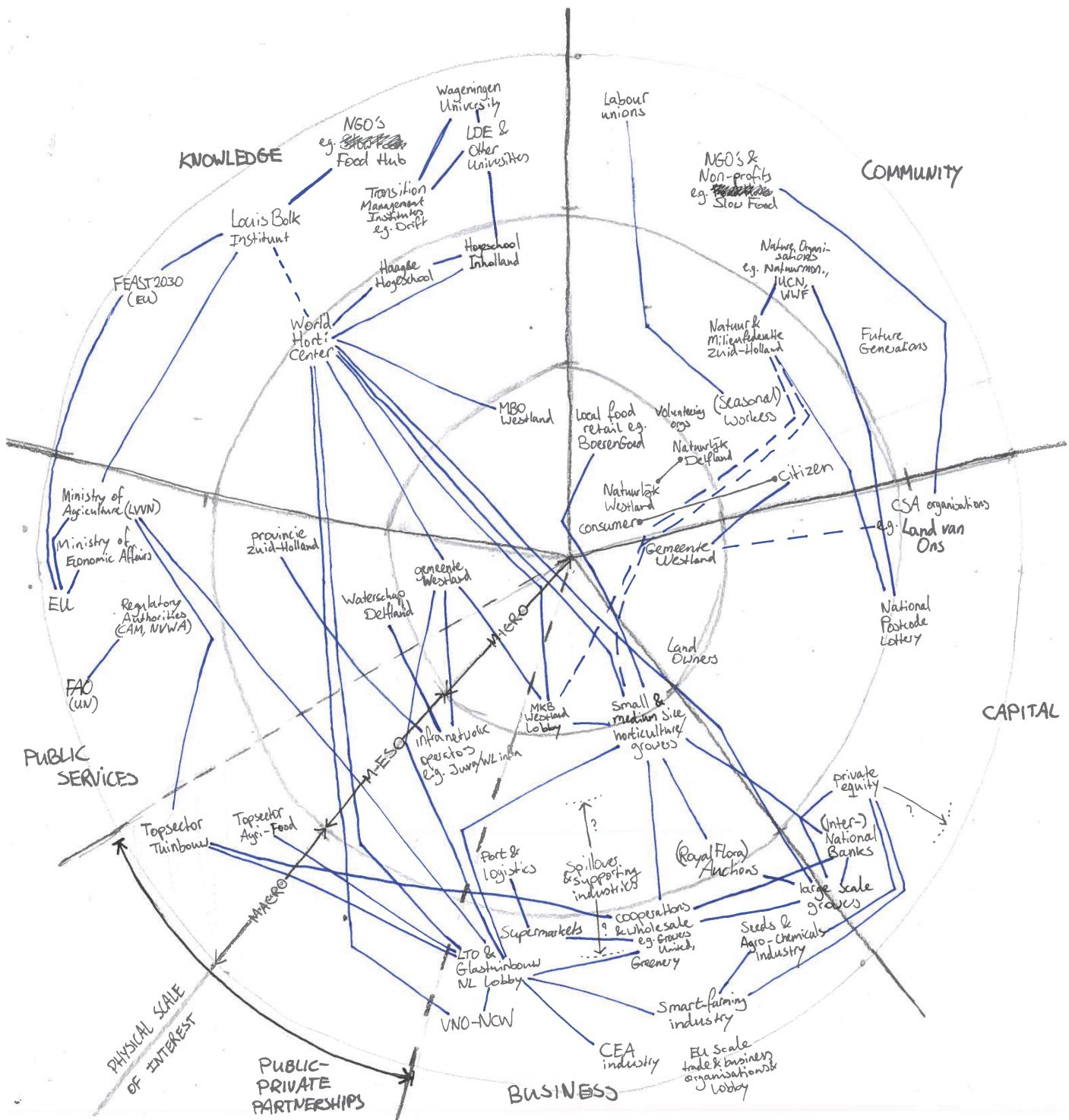
Stakeholders

Before engaging with imaginaries for the Westland region and the socio-technical system of horticulture, it is imperative to gain an understanding of the actors involved and their power relations.

The drawing on the right visualises the stakeholder network ordered by scale of interest and divided into five sectors:

- **Knowledge:** where knowledge is produced and education happens;
- **Community:** otherwise known as the 'civic' sector, including citizens, NGOs, activist movements, future generations and more-than-human stakeholders;
- **Capital:** the actors that financially facilitate economic activities, including banks, land owners, public investment funds, private equity.
- **Business:** national and multi-national companies or holdings, business lobbies.
- **Public Services:** elected officials, (inter-)national and regional institutions, services, regulatory authorities.

The distinction between public and businesses is not that clear within the context of the Westland horticulture sector, since many public-private coalitions or partnerships exist, notably the Topsector Tuinbouw and Agri-food.



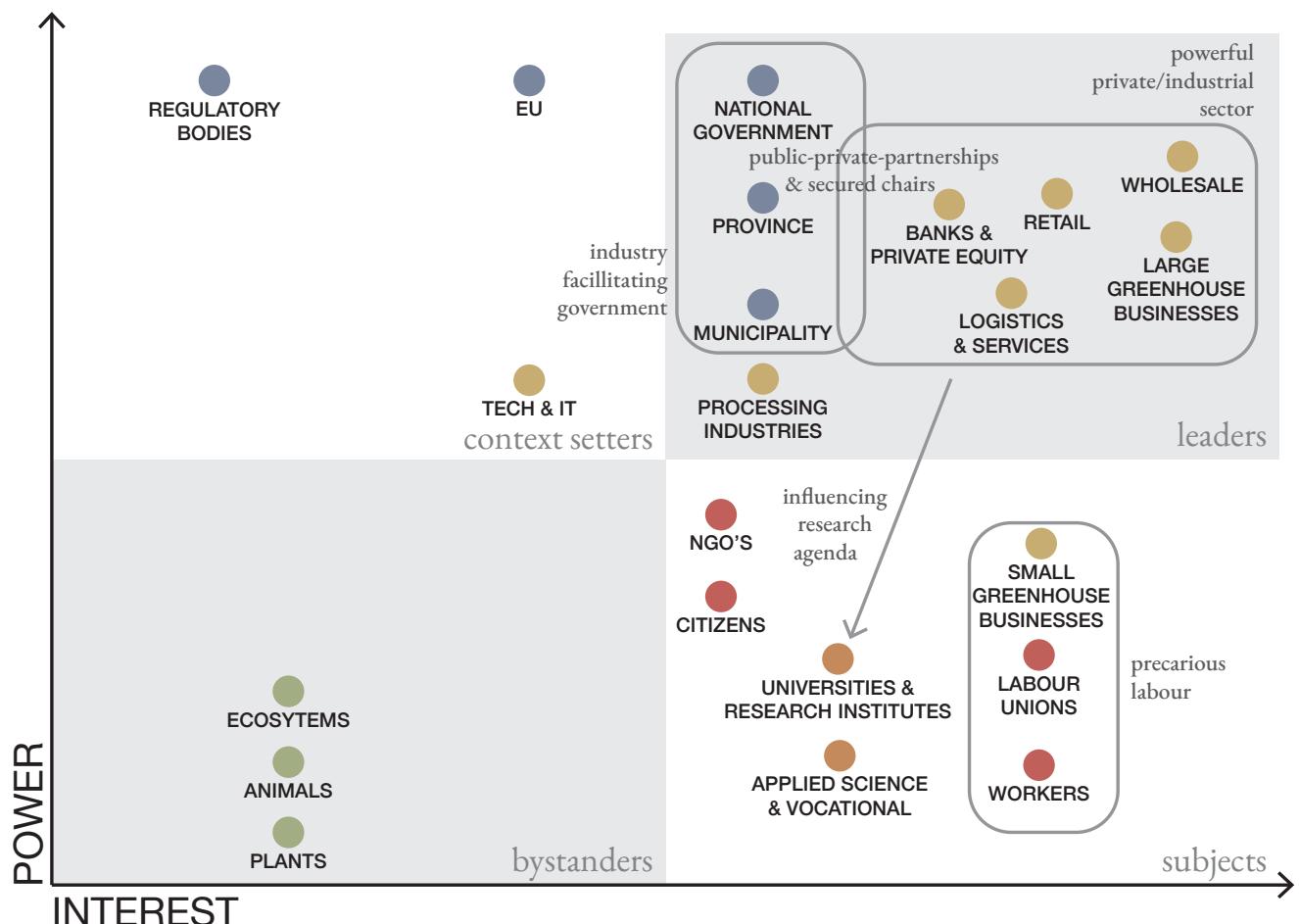
Relationship

— Collaboration
--- Conflict

Stakeholders Power & Interest

Stakeholder relations go beyond conflict and collaboration, and also have to do with positions of power and interest. The more power to bring about change a stakeholder has, the higher it is positioned in the diagram on the right. The more interest a stakeholder has in a change in situation, the more to the right it is positioned. Relevant stakeholder groups are shown, and their relationships of power to other stakeholders.

Currently, private and public stakeholders have great power in determining socio-spatial configurations through policy, regulation and collaboration. Through secured chairs and public private partnerships, greenhouse private sector representatives are facilitated in influencing public policy by governments. In a way, citizens are sidelined in deciding about the spatial future of Westland's horticultural landscape. Smaller businesses and labour are marginalised but would have high interest in more just futures. The representation of more-than-human actors is restricted to functional relations such as recreation, freshwater supply and coastal defence. Finally, the research and educational agenda of knowledge sector is partly influenced by private sector interests, undermining neutrality and independence.



public

civic/community

private

knowledge institutes

more-than-human

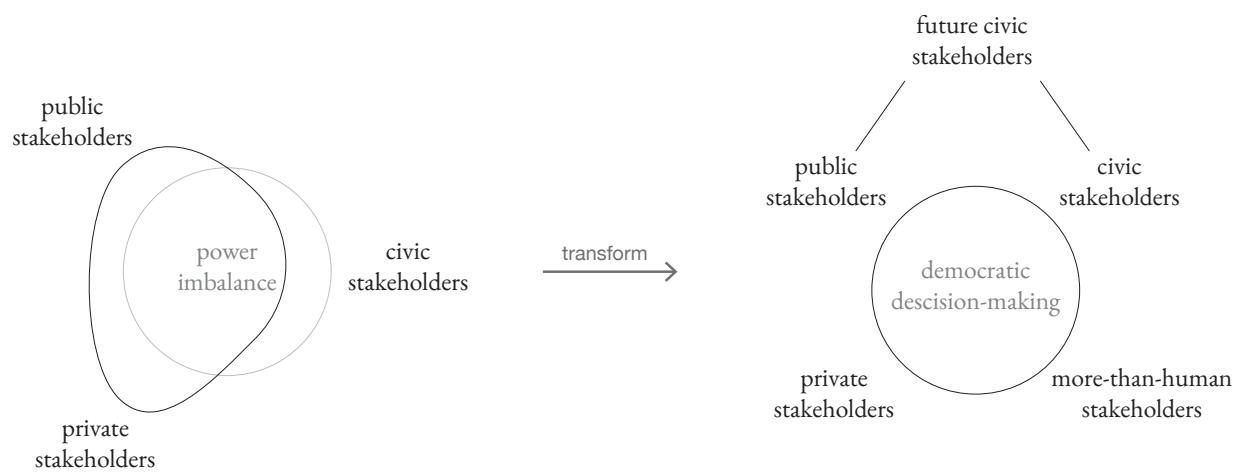
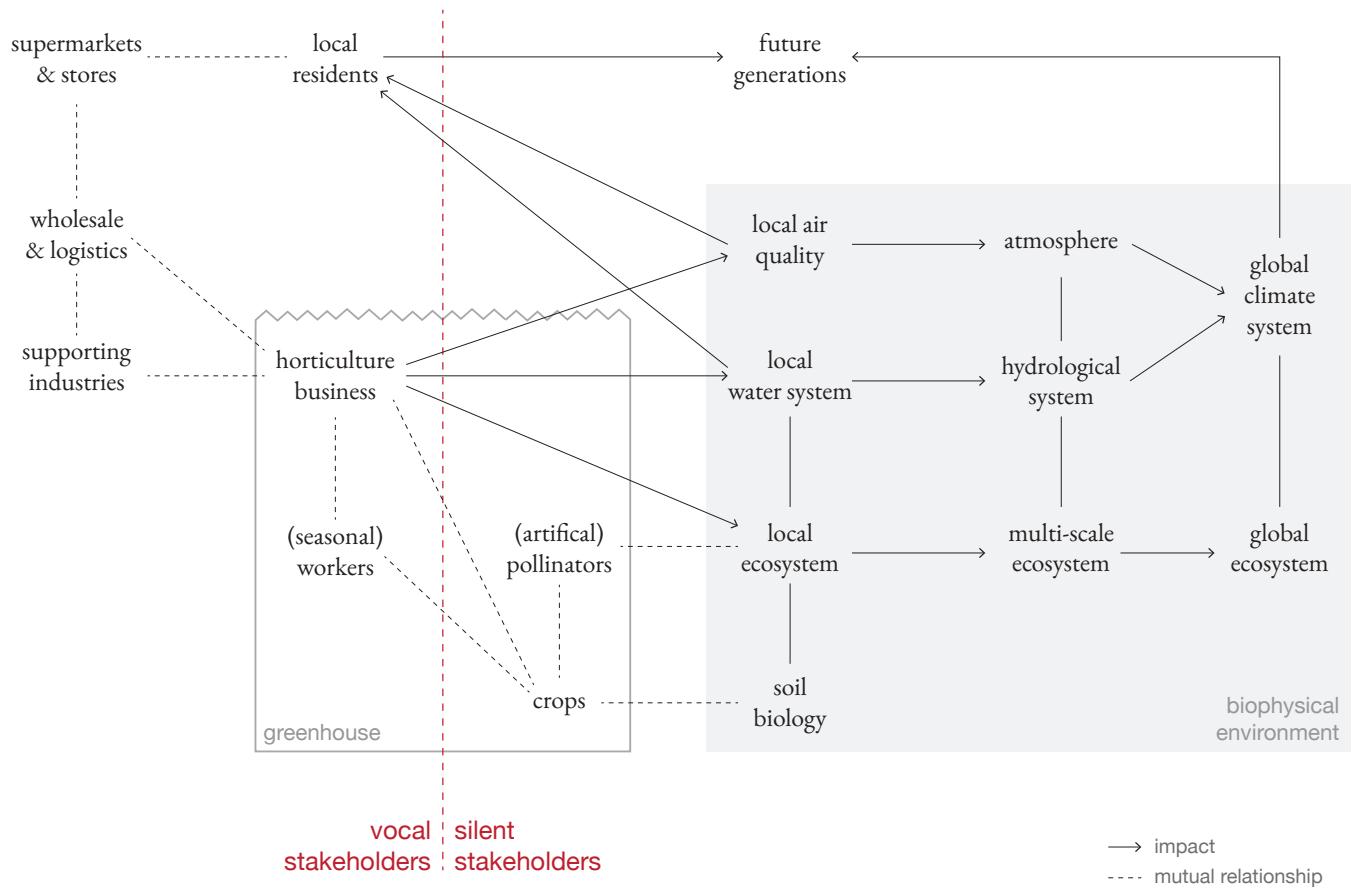
actor group

↑ relationship of power

Power Imbalance

When positioning crucial stakeholders in relationship to the biophysical environment that supports the functioning of both horticultural businesses and life more generally, we can draw the first conclusion. There are vocal stakeholders that are currently represented in the liberal democracy, whereas silent stakeholders are not. These are stakeholders nonetheless and therefore need to be represented.

It can also be concluded that there is a power imbalance between public, private and civic/community stakeholders. To resolve this, more inclusive democratic, deliberative decision-making procedures are necessary.



New Agri-Food Models

Need for Nature Inclusive Models

In the Netherlands, an emphasis on increasing productivity and reducing costs has led to the rise of monoculture, which adversely affect the environment, particularly by reducing biodiversity, degrading water quality, and diminishing the appeal of the landscape. Besides recent scholarship on agriculture, the Dutch Government, as well as NGO's and more business focussed platforms (e.g. the World Economic Forum (WEF)) all encourage actions towards nature-inclusive farming models (De Lauwere et al., 2024). In nature-inclusive agricultural practices, a distinction can be made in two broad groups: "sustainable agriculture" and "sustainable agrifood systems".

Many different sustainable agricultural production and management models are around, with diverse origins and backgrounds. These production models generally emphasise reducing or even removing external, industrial inputs, enhancing biodiversity, promoting climate resilience, while however mainly relying on technological and market-based solutions to address environmental concerns. Conversely, models of "sustainable agri-food systems"—such as agroecology, alternative food networks, and permaculture—present more ambitious visions for systemic transformation. These approaches go beyond implementing environmentally sustainable practices, aiming to reshape the broader food system by challenging corporate dominance, promoting local governance, advancing food sovereignty, and prioritizing social justice. Rooted in grassroots movements, these models emphasize ecological sustainability alongside social equity and economic viability (Zhang, 2024).

Community Supported Agriculture

The social aspect of food and agriculture is cultivated by the Community Supported Agriculture (CSA) movement. Often deploying nature inclusive production and management practices, CSA fosters a direct collaboration between consumers and farmers (Balázs et al., 2016; Opitz et al., 2019). Under CSA type models, consumers invest in a local farm by purchasing a share of the anticipated harvest prior to the planting season (Hinrichs, 2000). This upfront payment provides farmers with essential working capital and financial stability. In return, consumers receive a regular supply of the farm's produce throughout the season (Hanson et al., 2019). Next to that, consumers voluntary working on the farm is often part of the agreements. As a strategy for sustainable local community development, CSA reduces the carbon footprint associated with long-distance food transportation, fosters social connections, and bolsters local agriculture (Fomina et al., 2022).

Grass-roots Initiatives

In The Netherlands context, several examples of grass-root agricultural initiatives that could very well be classified as nature inclusive and community supported are starting out and operationalising (e.g. Heerenboeren, Lenteland, Land van Ons, Toekomstboeren, Aardpeer, Onze Groentenboer).

These "food cooperatives" utilize alternative land-ownership models through cooperative and citizen investment structures. Ecological and social benefits are prioritised over financial returns, for example in the form of surplus agricultural products, nature regeneration projects or expanding farm area and operations. Due to the small scale and financial bottlenecks of these food cooperatives, they are not expected to bring about a systemic change in the short term,

but the projects could be seen as “catalysts for change” (Van Dedem in Schulte, 2024).

Imaginaries of Change

The following spread collages selects insights and quotes from different imaginaries about alternative agri-food models and their application in Westland. They are ordered along several thematics that occurred frequently in the interviews, conversations, readings and media review.



Planting of fruit trees at Heerenboerderij Boxtel
[Photograph by Walter Herfst, 2016]



Grown fruit trees at Heerenboerderij Boxtel
[Photograph by Paulien van de Loo, 2018]

“Finding land is made difficult by rigid zoning plans or a rigid interpretation thereof. For future-proof agriculture

land security is the most important prerequisite.”

■ Land scarcity report Toekomstboeren (Bakker, 2024)

“A sustainable land tenancy law [is needed].”

■ Toekomstboeren ambassador

LAND SCARCITY

“Exploring the added value of agroecology to challenge the apparent contradiction between agriculture and nature.”

■ Land scarcity report Toekomstboeren (Bakker, 2024)

NATURE-CULTURE FALSE CONTRADICTION

“Nature-inclusive CSA initiatives could very well be **combined with low-technology, unheated greenhouses.**”

■ Former horticulture consultant and waterschap Delfland commissioner

“What makes something like a farm meaningful as a place is the idea that all sorts of things are going on there [...] and that it is also **gezellig**. That it is not just about producing industrially as efficiently as possible, but also about **relationships** between people, between people and animals, about taste, about family.”

■ C. Driessen, cultural geographer WUR (Schuengel, 2022)

“More **connection** between people and the land and people where their food comes from.”

■ Toekomstboeren ambassador

SOCIAL VALUE OF AGRI-FOOD

“Together with the participants of the fieldlab, we gradually understood that the initial ambition of initiating food system transformation needed to be downscaled to a more pragmatic aim of

(re)building social ties in the region and connecting local citizens and farmers, who have become disconnected through the expansion of capitalist agriculture and neoliberalism.”

■ (van Oers et al., 2024)

■ interview

■ media review

■ literature review

Frequently Occurred
Themes in the Researched
Radical Imaginaries

an work on policy, but it will never be foolproof and can
mes go wrong. I think there is also a great
onsibility among citizens themselves.”

Toekomstboeren ambassador

ONS

ships [between farmer, citizen and nature], we can make land
ood production more sustainable. **The commons**
ortunity for this regeneration.”

Toekomstboeren (Bakker et al., 2022)

“The profits of the
investments [of people
in the CSA] are
biodiversity.”

Land van Ons farm coordinator 1

“Indians thought seven generations ahead when
making decisions. We guarantee soil fertility for at
least **seven generations to come.**”

Biodynamisch Grondbeheer (Schulte, 2025)

“Now, farmers with a nice [nature-inclusive] initiative
are **sent from pillar to post** at various
departments at the municipality.”

Toekomstboeren ambassador

FAILING GOVERNMENTS

“Citizens should take action themselves. The
government does nothing, or very
little.”

M. Visser, Lenteland management (Schulte, 2025)

] residents of
ore important than
ts. There must be a
produce, in
e social
guaranteed”
ulture consultant and
lfland commissioner

ECOLOGICAL STEWARDSHIP

“I was active in an association to show
that **there is indeed**
nature in Westland, but it
is hard to see when you drive through.
In Westland, there is a dominance at
work, people have their blinders on
for nature. It's a lot about making
money.”

Land van Ons farm coordinator 1

“Automating agro-ecological farming requires
embedding its ethos into designed tools to balance
production with **ecological care.**”

(Ditzler & Driessen, 2022)

“The lessee [farmer] is **very**
autonomous, but does have to take
into account tests against Land van Ons
principles around ecological balance.”

Land van Ons farm coordinator 2

AUTONOMY

“On the ‘plantation’, there are no more autonomous
farmers, because **the goal of scaling up**
justifies the means.”

C. Driessen, cultural geographer WUR (Schuengel, 2022)

“In terms of autonomy, for us it is not so
much about the freedom to do what you
want, but **taking into account**
others and in connection with
relationships around you.”

Toekomstboeren ambassador

Untangling Imaginaries

Engagement with radical imaginaries concerning the agri-food system and the Westland horticultural landscape yields several important insights. Firstly, certain thematic concerns emerge consistently across various imaginaries. Additionally, these imaginaries are frequently articulated through pragmatic propositions or embodied in practices of “acting otherwise” (Asara, 2018). Lastly, the imaginaries often appear interrelated and intertwined through shared concepts, visions, or practices. For each identified thematic, I will ‘untangle’ (Asara, 2018) the associated imaginaries and the corresponding socio-spatial practices.

Land Scarcity

Addressing land scarcity is widely imagined as a fundamental precondition for enabling the adoption of nature-inclusive farming practices. Several interviewees indicated that acquiring suitable land remains one of the most significant challenges for such initiatives. In the Netherlands—and particularly in Westland—land prices are prohibitively high, and tenancy contracts are typically short-term. This poses a considerable barrier for nature-inclusive farming, which often involves long-term goals and developments that are incompatible with short-term leasing frameworks. A commonly proposed solution is the implementation of sustainable land tenancy regulations designed to provide farmers with long-term tenure. A key element of such regulation would involve resolving the existing conflict in zoning plans between agricultural and ecological uses—an issue that leads to the next thematic concern.

False Contradiction Nature-Culture

The perceived contradiction “nature — culture” between agriculture and nature conservation is regarded as deeply embedded in societal norms and reinforced by existing environmental zoning regulations. Current land-use typologies fail to accommodate agricultural practices that actively contribute to or regenerate local ecologies. The imaginary of diverse “naturecultures” (Haraway, 2003) is thus translated into proposals advocating for more inclusive zoning categories within planning frameworks. For example, one interviewee proposed the establishment of a low-technology, nature-inclusive greenhouse typology as a sub-category within horticulture zoning.

Failing Governments (and the Power of Citizen Initiative)

Many interviewees cited governmental inertia and incompetence in facilitating a transition toward nature-inclusive agriculture as a primary motivation for their participation in citizen-led initiatives such as Land van Ons, Toekomstboeren, and Lenteland. Despite widespread disillusionment with government efforts, the interviews and media reviewed reveal a strong collective desire to contribute to the common good, particularly through practices of ecological stewardship.

Ecological Stewardship

Ecological stewardship is a central theme across many radical imaginaries. It encompasses both care for the immediate natural environment and responsibility for the health and well-being of present and future generations. Within initiatives such as Land van Ons, increased biodiversity and improved nutritional outcomes are considered the primary ‘return on investment.’ One interviewee suggested introducing a “license to produce” as a regulatory

mechanism, which would incorporate ecological and social responsibility into horticultural business models.

The Social Value of Agri-Food Systems

Another significant driver for the adoption of nature-inclusive practices lies in the recognition of the agri-food system's social dimensions.

Many imaginaries critique the disconnection between consumers and the land, as well as the people responsible for food production—a separation attributed to capitalist and industrial logics. Re-establishing these social relationships, for example through community-supported agriculture or farmers' markets, is imagined as a means of downscaling and re-grounding the food system.

The Commons

Commoning—the collective stewardship and sharing of resources—is seen as a vital mechanism for re-scaling the food system towards socially meaningful and community-rooted practices. Moreover, it is presented as a response to governmental failure, as commons-based farming allows communities to assume responsibility where the state or private actors have proven inadequate.

Autonomy

The theme of autonomy recurs across multiple scales and contexts within the imaginaries. Nature-inclusive, community-supported agriculture (CSA) practices are imagined to foster greater autonomy for farmers and greenhouse operators by reducing dependence on capitalist input and market structures. Interviewees also articulated a relational understanding of autonomy—one that involves engaging with others in mutually supportive and balanced ways. This aligns with Escobar (2017) and Varela's (1999) conceptualization of autonomy as the capacity to interact with external systems through structural coupling while maintaining an internally coherent, self-producing (autopoietic) identity.



Scenarios

Building the Scenarios

Critical Uncertainties

A common method for developing scenarios involves identifying two *critical uncertainties*. These are key unpredictable factors likely to shape the future, and using them to define a set of axes (Schwartz, 1991). For envisioning the future of the food industry and its landscapes, two such uncertainties stand out.

The first concerns the global market. Recent shifts in the positions of major trading blocs on free trade versus protectionism, along with changing centres of supply and demand, are transforming international trade. The Netherlands, long positioned as a key agri-food exporter and logistics hub, may either scale up its role or pivot toward smaller-scale, self-sufficient production—each path implying vastly different spatial and economic outcomes.

The second uncertainty lies in consumer attitudes. Will society embrace new, advanced food technologies, or will demand for ‘authentic’ and more traditionally produced food prevail? Currently, both trends coexist. Products such as the Dutch Weed Burger, which merges technological innovation of seaweed products with artisanal preparation, exemplify this duality. Yet these developments remain fragile, with reputational risks and food safety incidents capable of triggering rapid shifts in consumer trust.

The axes-system, shown below, its main function is to order different concepts, governance types, spatial characteristics and agricultural practices per scenario. This helps in gaining an understanding of the different ‘story elements’ that constitute the narratives for each scenario.

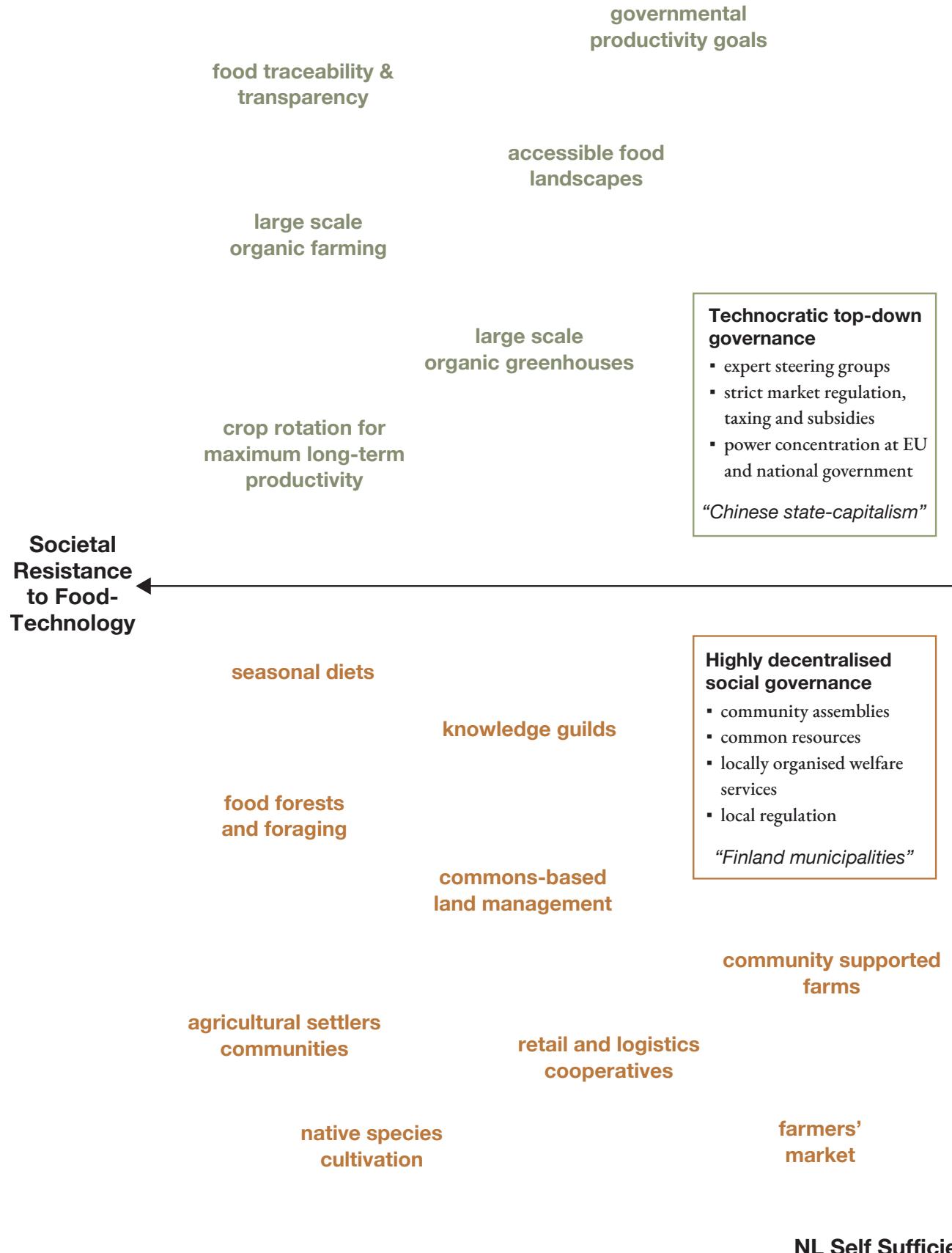
Radical Imaginaries

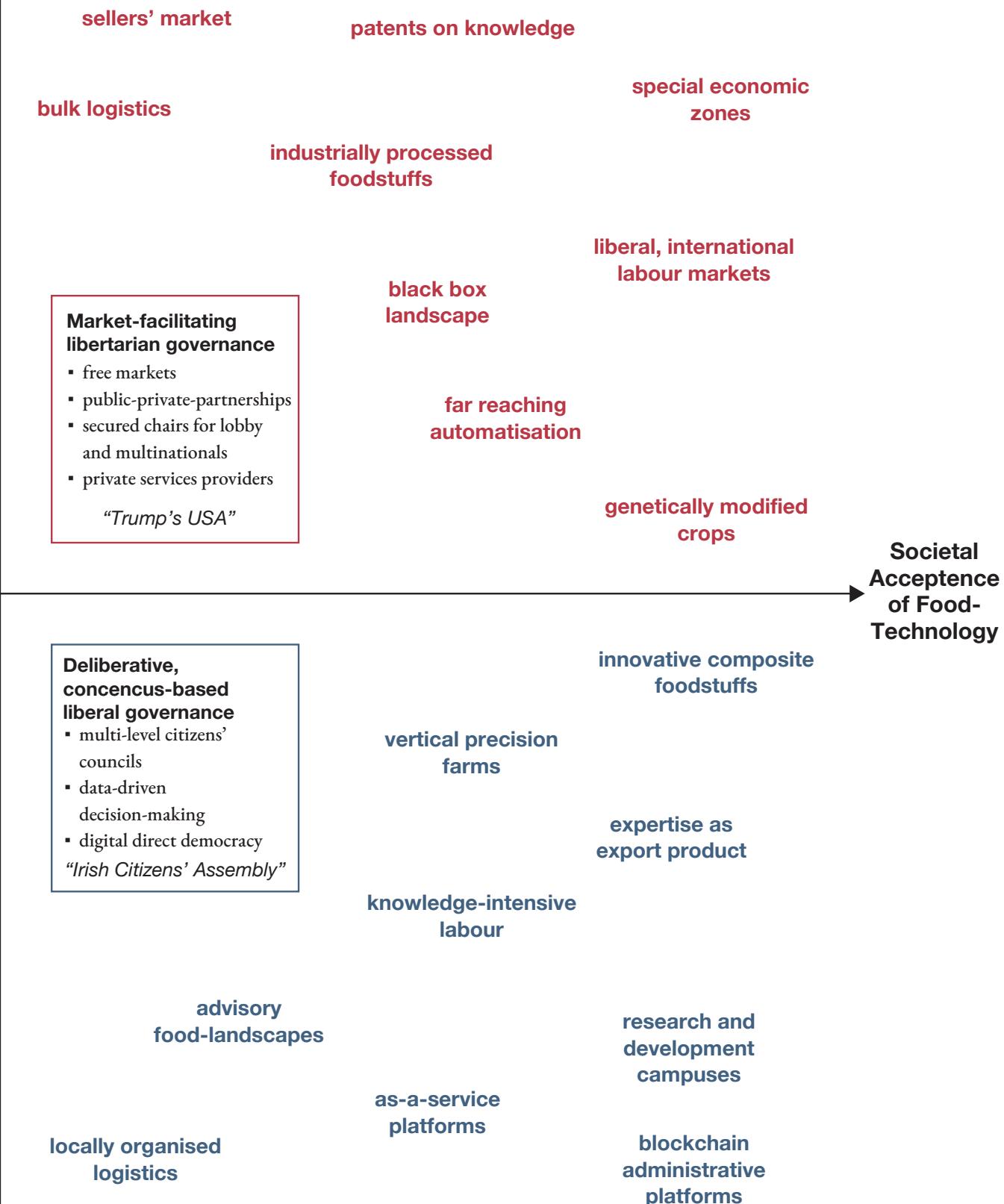
The aforementioned themes of ecological stewardship, the social dimension of agriculture, commons and autonomy have influenced the conceptualisation of mainly the scenarios that are local and low-tech.



The Axis-System

NL International





The Scenarios

This scenario explores a combination of a high productivity, export oriented agri-food sector and low-tech, strictly regulated organic practices.

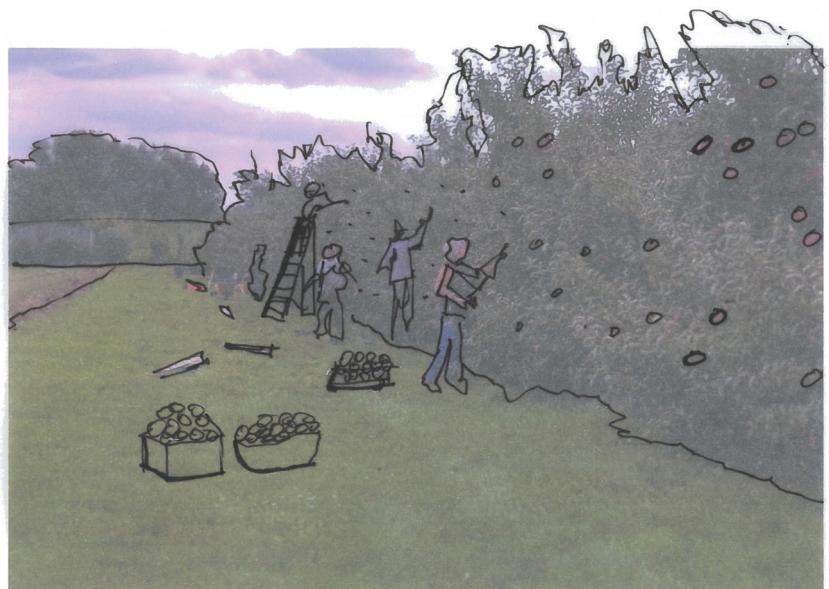


“ORGANIC FANTASTIC”
SCENARIO 1



SCENARIO 3

“HOME GROWN”



This scenario explores a combination of a low productivity, locally oriented food market and low-tech, nature inclusive agricultural practices.



“SUPERSIZE ME” SCENARIO 2

This scenario explores a combination of a high productivity, export oriented agri-food sector, and high-tech, little regulated horticultural practices.

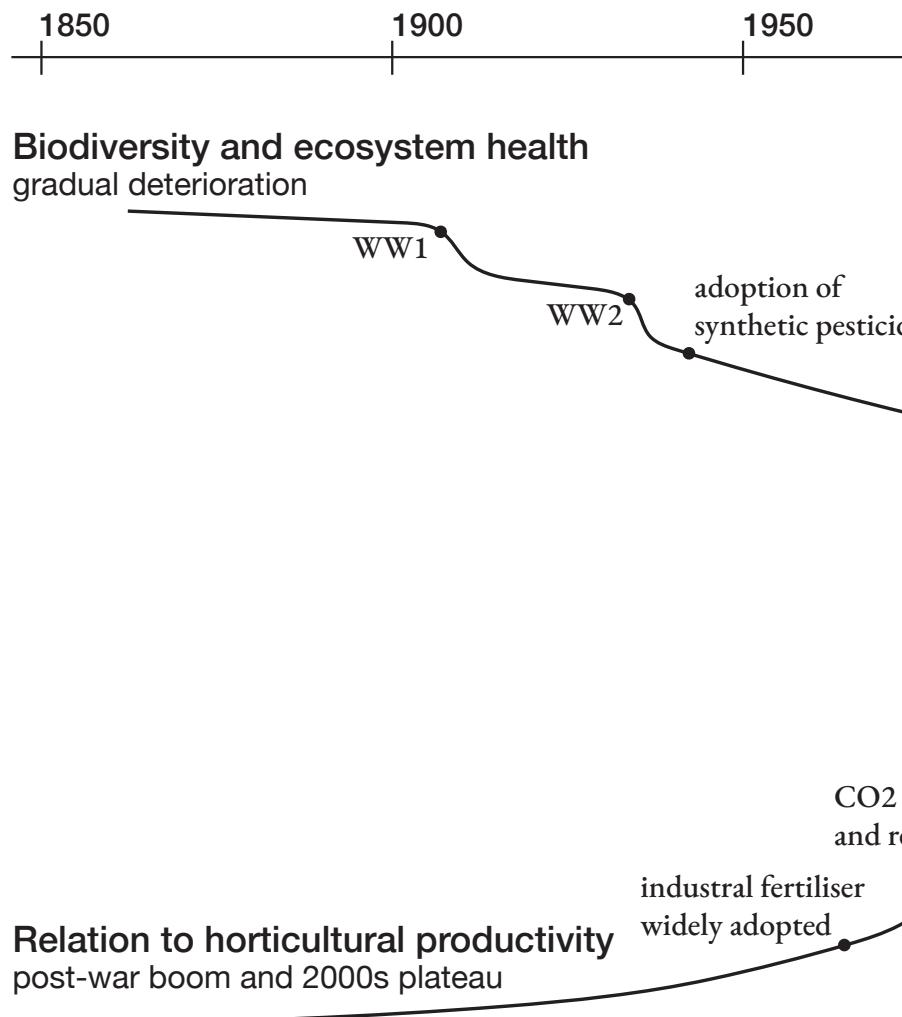
SCENARIO 4 “VEGGIE VALLEY”



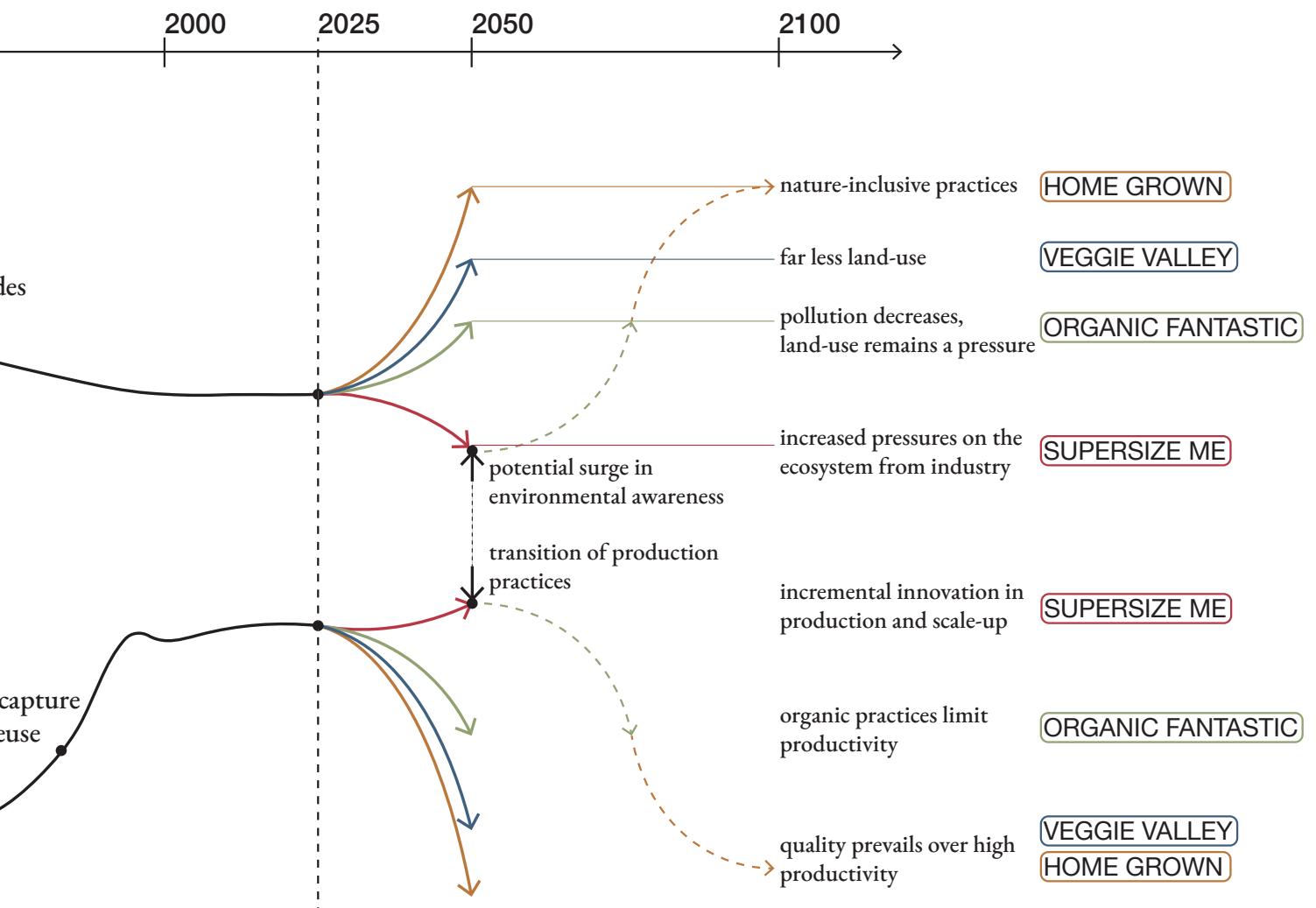
This scenario explores a combination of a low productivity, locally oriented food market and very high-tech agricultural practices and food system.

Scenario Relations

The drawing shows two trends that are crucial to the conceptualisation of the scenarios, namely ecosystem health and horticultural productivity. Per scenario, the envisioned course of the trend is shown.



Drawing concept based on Meyer et al., 2015, p.102.
Data from Jukema (2023), Nationaal Dashboard Biodiversiteit (2025)



Spatial Variables and Constants

A central variable within the scenarios is land use. The Dutch national statistics agency (CBS) defines a broad array of land use categories, from which a relevant subset has been selected for this analysis. The socio-economic configuration of the food system in each scenario influences the spatial extent allocated to "horticulture," "other agriculture," "roads," and "industrial" land uses. These are designated as the primary variable land uses, and their estimated spatial requirements have been specified per scenario. Secondary variable land uses include "natural," "residential," "parks, sports and recreation," "inland water," and "public and cultural amenities." The allocation of these secondary land uses is adjusted based on the space occupied by the primary variables in each scenario. Certain land uses, such as construction zones and the North Sea, are assumed to remain constant across scenarios. In this way, each scenario is associated with a distinct, characteristic land-use barcode. Additionally, it is important to represent the types of horticultural and agricultural practices envisaged in each scenario, as these differ. These practice types are derived from a more detailed specification of the CBS categories and are indicated using varied hatching patterns.

Scenario 1

In this scenario, "other agriculture" occupies a greater share of land due to the envisioned expansion of low-tech, open-field organic farming. This increase comes at the expense of land traditionally used for horticulture. A modest increase in land allocated to industrial purposes is also assumed. Given the scenario's emphasis on stringent environmental protection, the area designated for natural land uses has slightly expanded.

Scenario 2

Scenario 2 anticipates a substantial increase in land dedicated to horticulture, as well as industrial areas and road infrastructure. These expansions occur at the expense of other land uses. The scenario presupposes a regulatory context with minimal environmental constraints, which is reflected in a reduced allocation for natural land uses. Additionally, it envisions a mono-functional greenhouse landscape devoid of integrated residential spaces, resulting in a decline in residential land use.

Scenario 3

This scenario imagines a significant expansion of land dedicated to "other agriculture," while horticultural land use is considerably reduced. Given the localized and small-scale nature of the food system, industrial and logistical land uses are nearly absent, allowing for a substantial increase in natural areas. It is further envisioned that more people will reside in rural areas, leading to an increase in residential land use characterized by more extensive housing typologies.

Land-Use Barcodes per Scenario

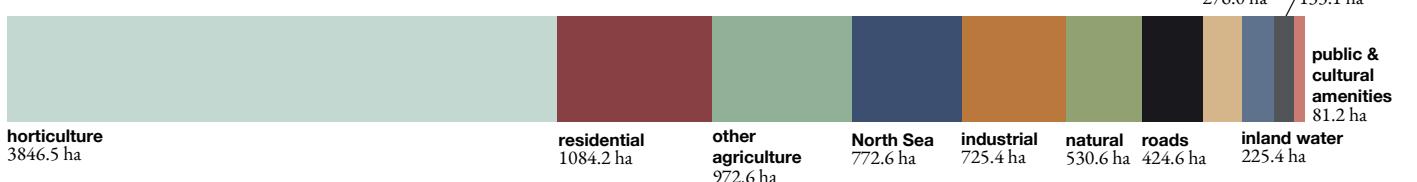
The 'barcodes' show the shares of land-use types in the Westland municipality per scenario, in comparison to the status quo. The total area of the municipality equals 3846.5 ha.

Data: CBS Existing Land Use (2025)

Scenario 4

Scenario 4 shares similarities with Scenario 3 but includes a higher proportion of land devoted to high-tech, specialized horticulture. In addition, this scenario anticipates increased spatial demands for food processing and research facilities, leading to a larger industrial land use footprint.

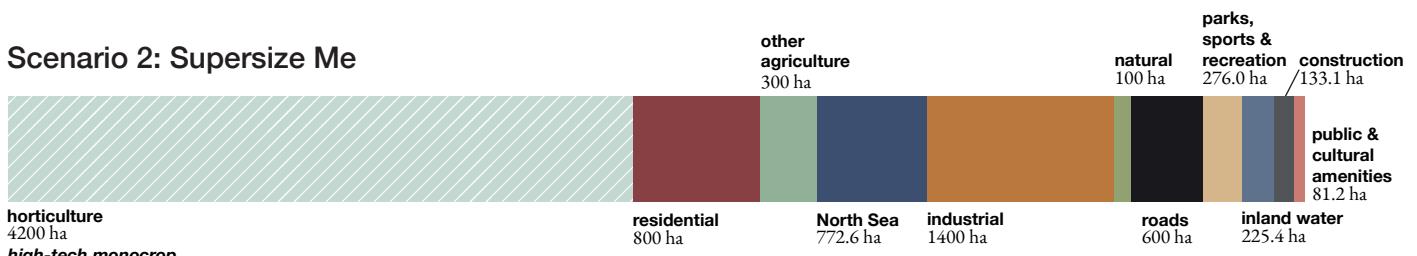
Status Quo



Scenario 1: Organic Gigantic



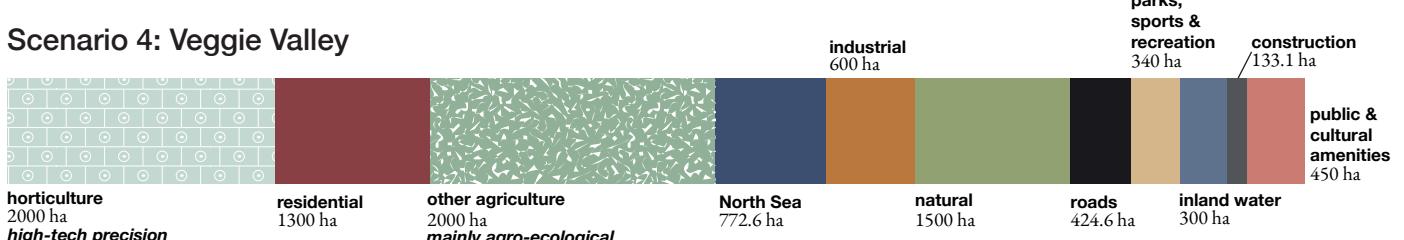
Scenario 2: Supersize Me



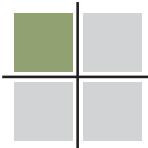
Scenario 3: Home Grown



Scenario 4: Veggie Valley



Scenario 1: “Organic Fantastic”



This scenario explores a combination of a high productivity, export oriented agri-food sector and low-tech, strictly regulated organic practices.

Setting the Stage

Several worldwide food scandals have made consumers suspicious of technological modification of food. The Netherlands' good reputation for food safety is paying off and the Dutch agriculture sector is focussing on the global market, where demand is high for safe and organically produced food. This is carefully orchestrated by a powerful Ministry of Agriculture and Food, and it's Agri-Food investment fund. Age-old techniques such as crop rotation, ecological fertilisers and pesticides are adapted to facilitate large scale farming. Together with an endeavour into intensive sea farming in the North Sea, these developments help The Netherlands retain a large surplus on the trade balance sheet for agricultural produce.

With initiative and financial support from the Ministry of Agriculture and Food, Westland businesses have pioneered by investing in the country's first-ever organic seaweed farms, just off the coast. This is where technical and agricultural know-how from horticulture is applied in a completely novel environment. The geothermally heated, large scale greenhouses remain in the landscape, while older, smaller scale businesses have to make place for the booming organic farming sector. To handle an even larger production volume of the region, extra logistical and food-processing industrial areas are built along the important transport routes N213 and A20. Due to the recent food scandals, consumers want to know who's responsible for their meals and how they are produced, so producers use their sites as marketing vehicles in combination with recreational routes and experience centres.

Socio-Spatial Developments

Large scale organic farms and greenhouses dominate the landscape.

Municipality and the province regulate and operate a resource supply and collection system that ensures certified organic agricultural inputs (fertilisers, pesticides) and waste output recycling.

Strict nature conservation laws have required Westland municipality to preserve existing natural conservation areas. In order to prevent ecosystem decline due to fragmentation, some new ecological corridors are developed, but this is the bare minimum.

Space is very scarce, but there is a need for more logistics and processing areas. Even these areas are made agriculturally productive with greenhouses on the enormous logistics buildings rooftops.



Scenario 1: “Organic Fantastic”



Agriculture & Food

- greenhouses
- town
- large scale organic farms
- central supermarkets

Infrastructure

-  main road
-  logistics area
-  new logistics area
-  ring road capacity increase
-  organic farm experience route

Ecology

- existing ecological areas
- minimal new corridors

Key Projects in this Scenario



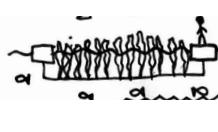
The Organic Agriculture Congress & Experience Centre is used by the sector for marketing the high quality produce to clients from across the world.



The Organic Agriculture Experience Cycling Route starts from the Centre and enables visitors to see where their food is grown and made.



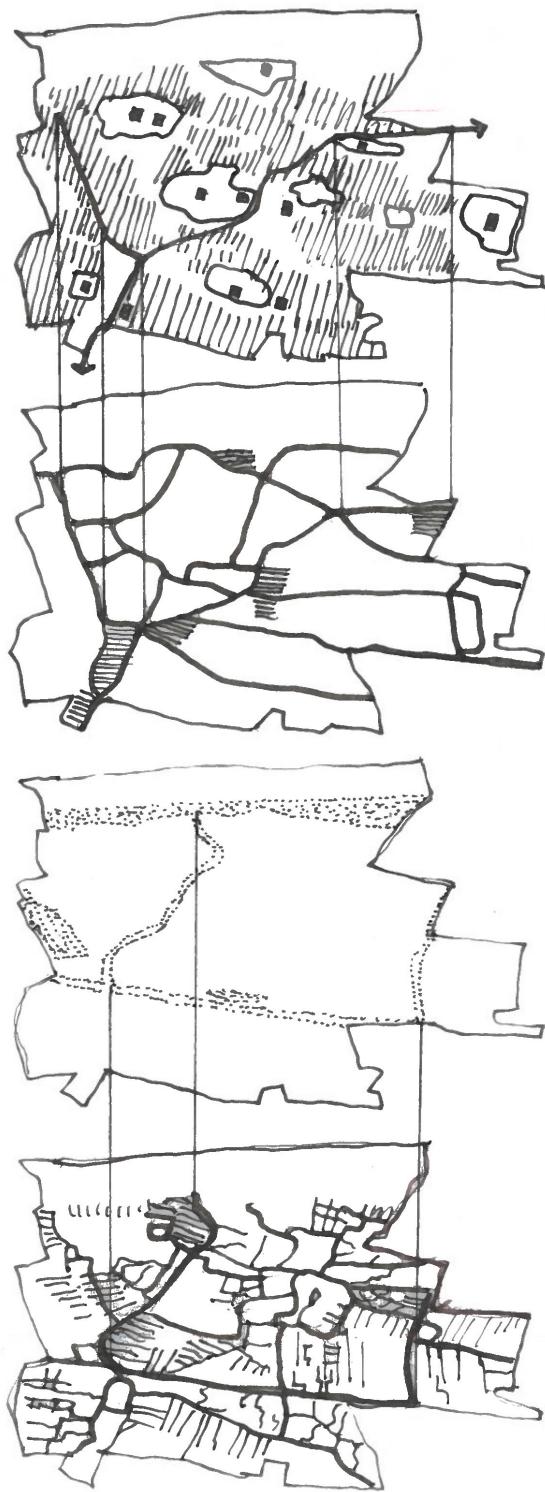
A new, large organic fertiliser fermentation plant is built by the municipality and province to centralise, control and optimise the local agricultural resources system.



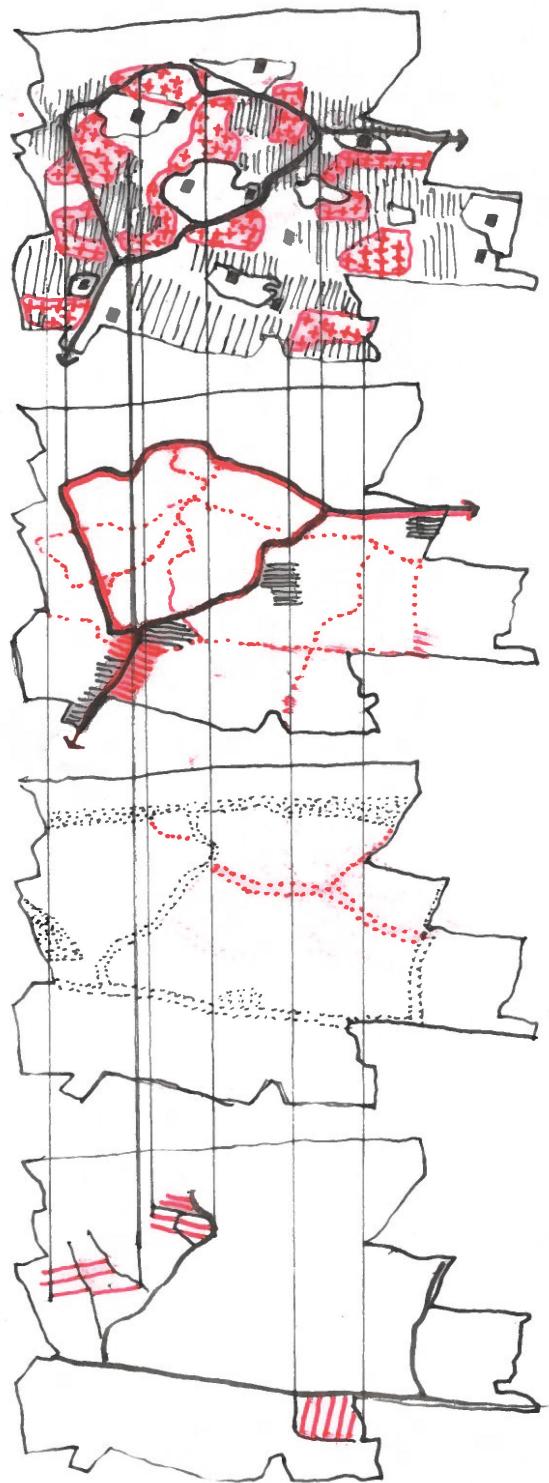
To meet the high national agricultural export goals and growing global demand for seaweed, the Ministry of Agriculture and Food together with Westland businesses has built an industrial organic seaweed farm on the coastline.

Water System

- main waterways
- /// drainage structure
- reparcellation necessary



Status Quo



Scenario

Scenario 1: “Organic Fantastic”



Agriculture & Food

- greenhouses
- sea farm on-shore site
- ▨ organic vegetable farms
- ▨ geothermally heated greenhouses

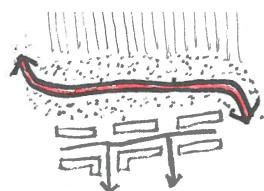
Infrastructure

- logistics hub
- new logistics & processing industry
- organic fertilizer production
- organic agriculture experience route
- ▨ farm site projection

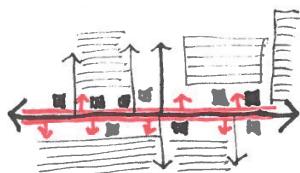
Ecology

- status quo ecological network
- ecological corridor
- ↑ access to farm

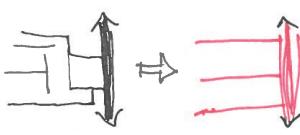
Spatial Arrangements & Relations



The scarce ecological developments in this scenario are multifunctional as recreational route and buffer between greenhouses/agriculture and housing.



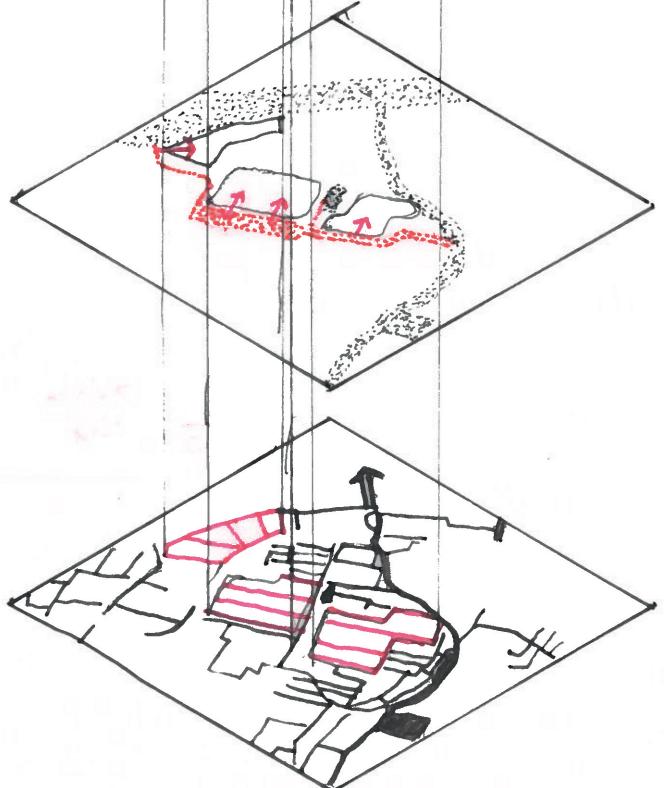
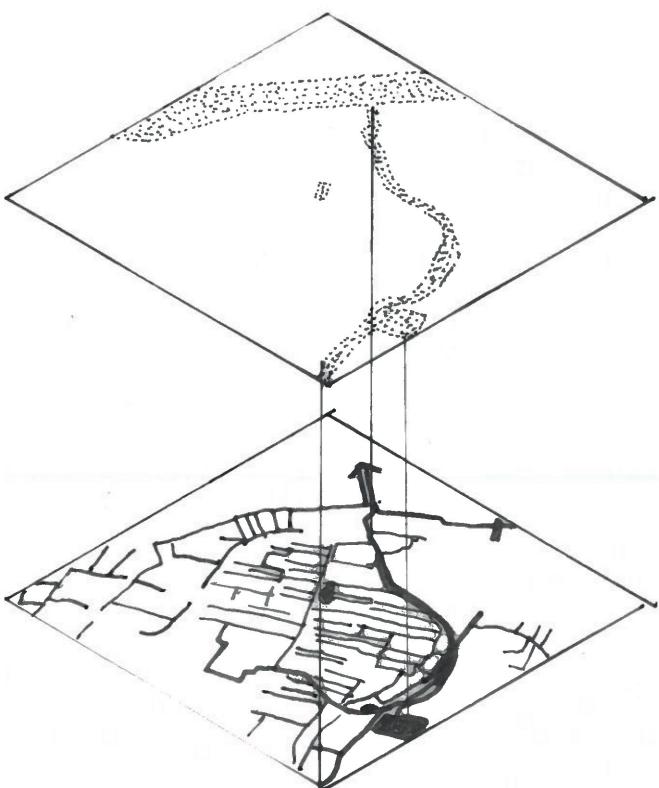
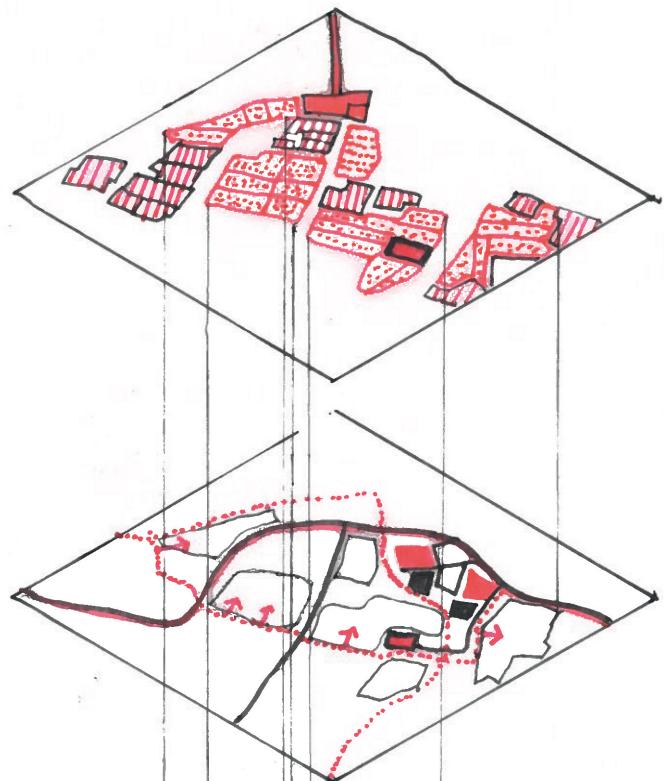
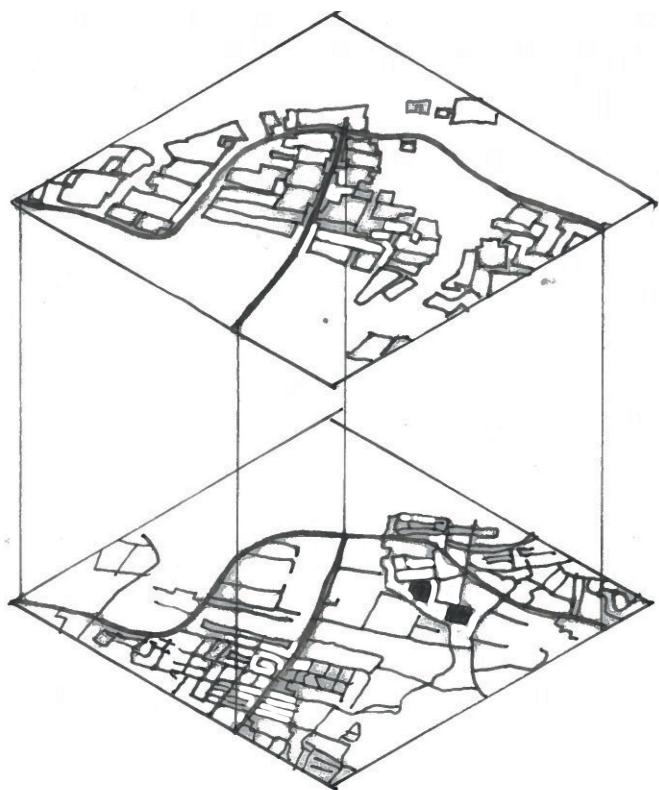
The increased scale of operations and logistics puts pressure on the ribbon single family housing morphology that is prevalent in Westland.



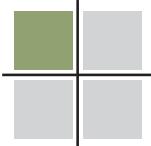
Especially the northern Westland small scale and irregular parcellation needs to change for the increase in scale and mechanised farming.

Water System

- ↑ pumping station
- reparceling of drainage to facilitate mechanised farming



Scenario 1: “Organic Fantastic”



An Impression

Consumer

Cycling the Westland Organic Horticulture and Agriculture Experience Route, where she encounters the farm where the cauliflowers she eats every winter season come from.



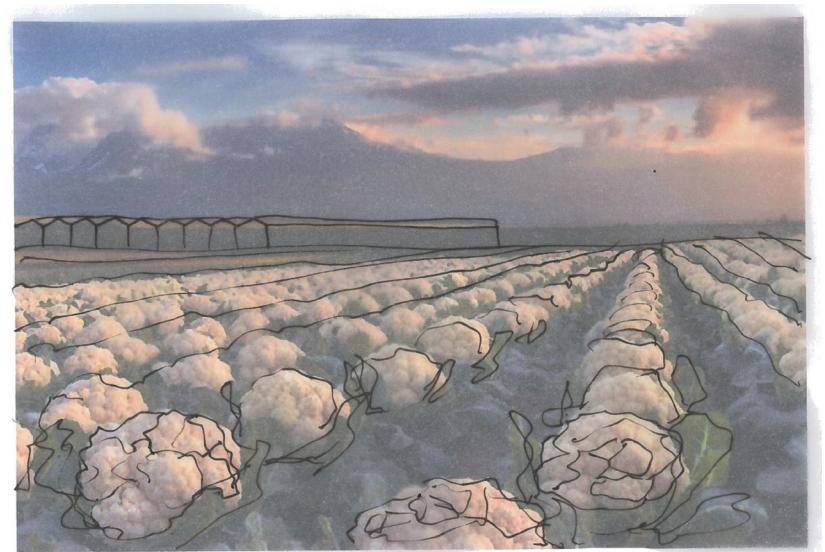
Farmer

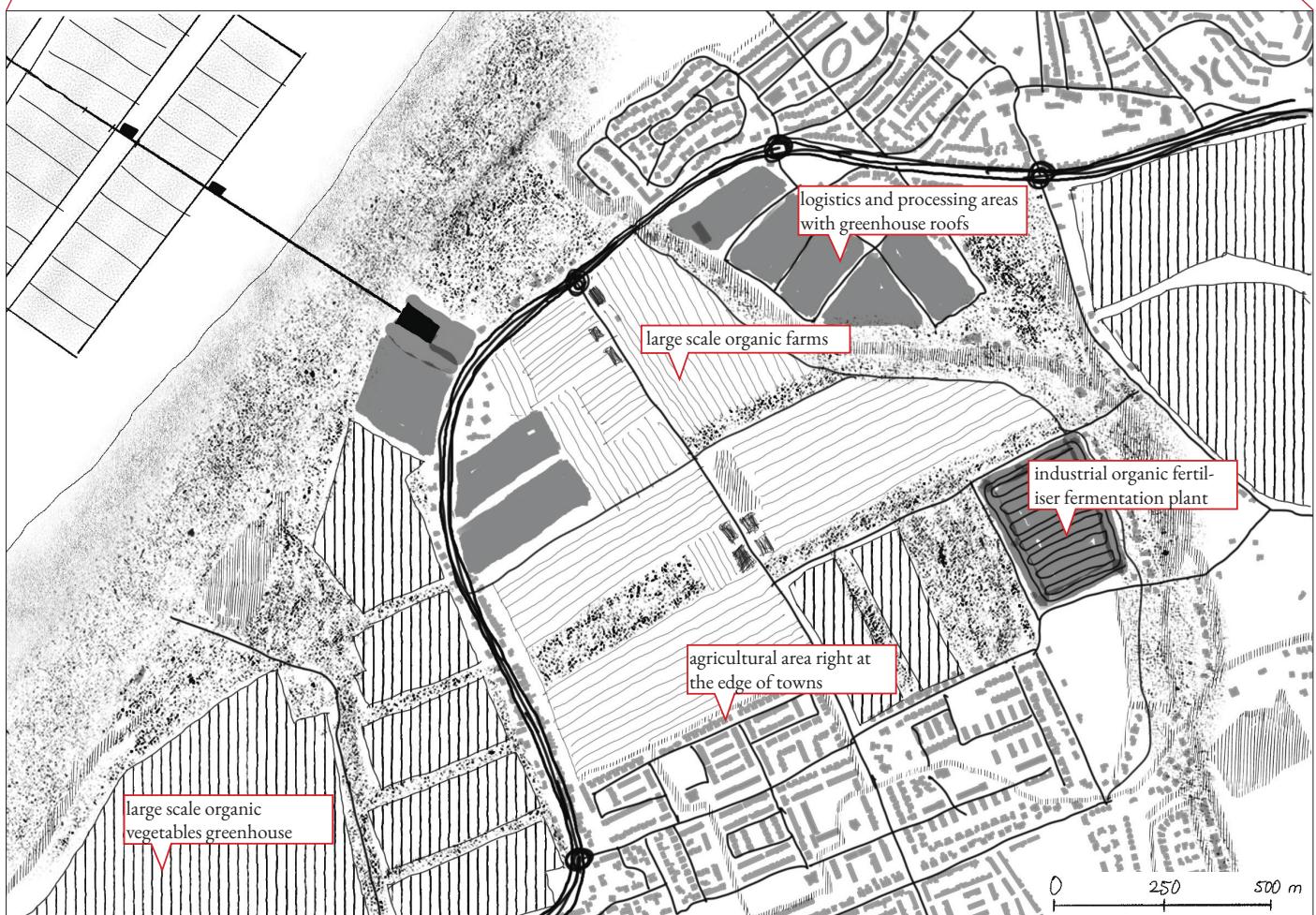
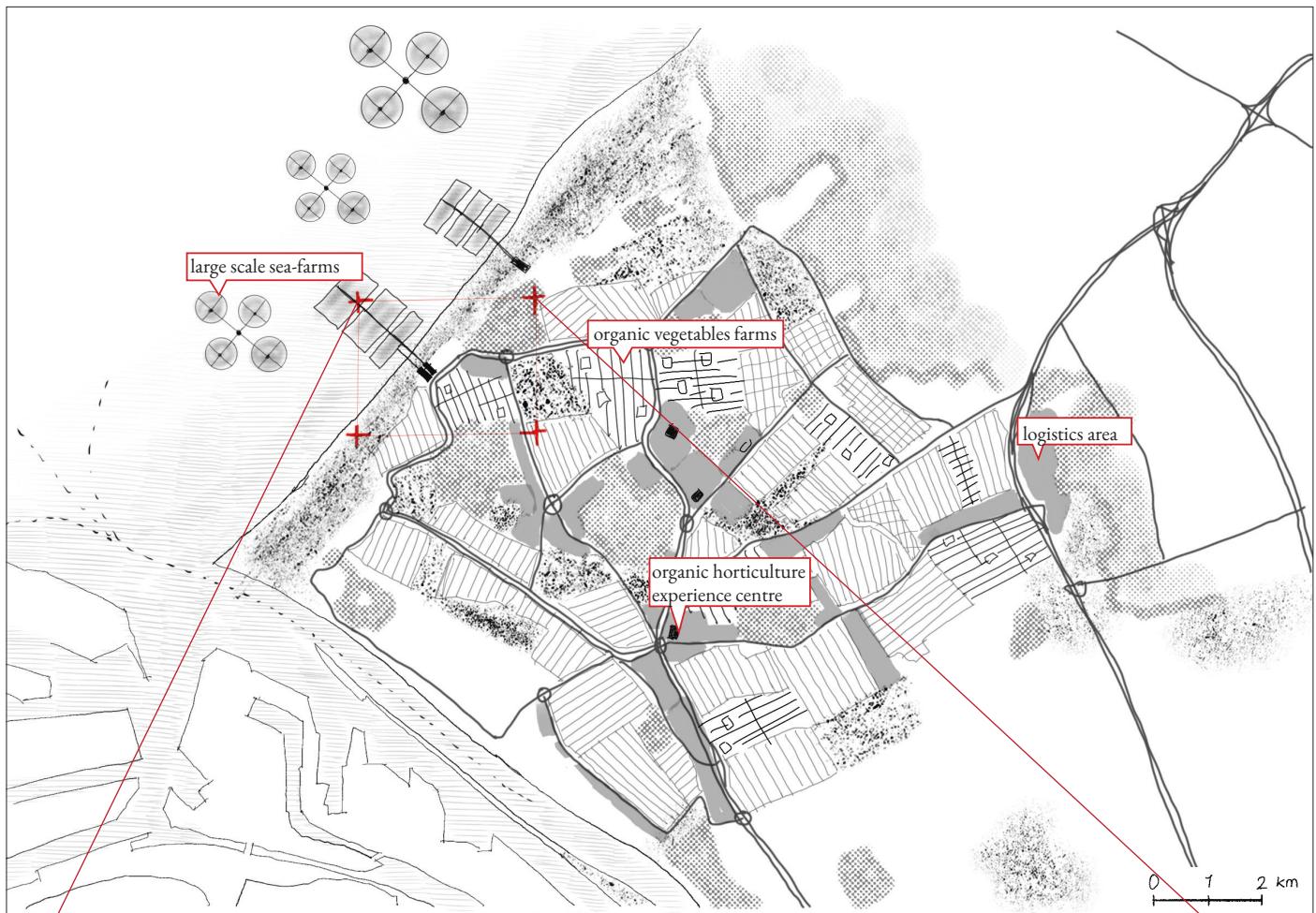
Harvesting the late summer produce. This is the one of the six harvests of the year, part of the crop rotation pattern that is prescribed by the national government for this farm.



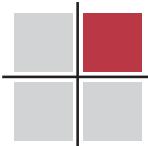
Crop

In a large mono-crop field, adjacent to a greenhouse. Growing fast due to the amount of organic fertiliser that is being used.





Scenario 2: “Supersize Me”



This scenario explores a combination of a high productivity, export oriented agri-food sector, and high-tech, little regulated horticultural practices.

Setting the Stage

In light of an increasing global demand for food security that is independent of a less and less predictable climate, The Netherlands is fully committing to functioning as a global ‘agri-food hub’. Struggling farmers and family businesses across The Netherlands have sold their land to multinational food holding companies for offers they could not refuse. These multinationals are now running much larger scale, specialized agricultural zones. Environmental requirements have been loosened in many areas — which were assigned ‘sacrifice zones’ — to facilitate this. Processing the commodities into high-value products increasingly occurs in the Netherlands as well, yielding higher profits per volume. Air transport remains profitable for many foodstuffs, while trains carrying different food products travel daily to sales markets in Asia and Africa via the New Silk Routes. As a result, storage and processing industries cluster around international gateways—airports, ports, and rail terminals.

Westland, being close to the port of Rotterdam, has further scaled up vegetable production and processing. It has even taken over Italy as the world's largest canned tomato producer. The greenhouse landscape has become larger scale and more mono-functional, and industrial and logistical areas have expanded. The enormous water usage of the industry did not combine well with the increasingly saline groundwater in the area. To fix this, a large desalination plant has been built on the coast, that provides a reliable supply of pouring water for the greenhouses, even in the very arid periods that are more common these days.

Socio-Spatial Developments

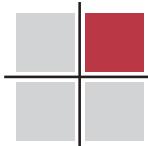
Integration of plots into large special horticulture zones a single product category is produced.

The space for processing industries and logistics is expanded.

Hypermarkets are the default retail typology. These are located at the edge of towns, by the main road, so they are mainly accessible by car.



Scenario 2: “Supersize Me”



Agriculture & Food

- /// greenhouses
- town
- industrial greenhouse zones with specific business & product categories
- hypermarkets on the edge of towns by main roads

Infrastructure

- main road
- ≡ logistics area
- high capacity logistics road network
- zone-centralised logistics & transfer hubs (example zone footprints drawn)

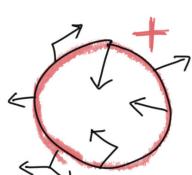
Ecology

- existing ecological areas
- ↗ fragmentation due to extensive industrial & logistical infrastructure

Water System

- main waterways
- /// drainage structure
- desalination & water pumping station
- zone-centralised private water collection & treatment facilities

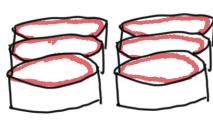
Key Projects in this Scenario



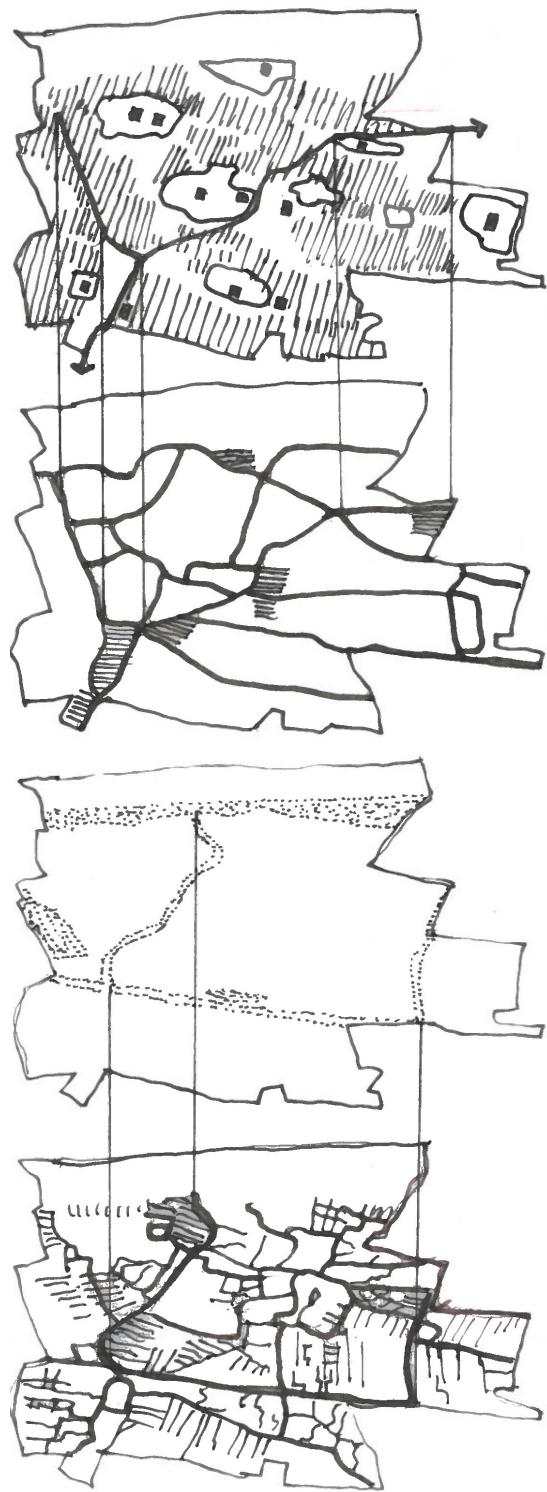
The municipality invested in increasing capacity of the N213-N211-N220 main road ring.



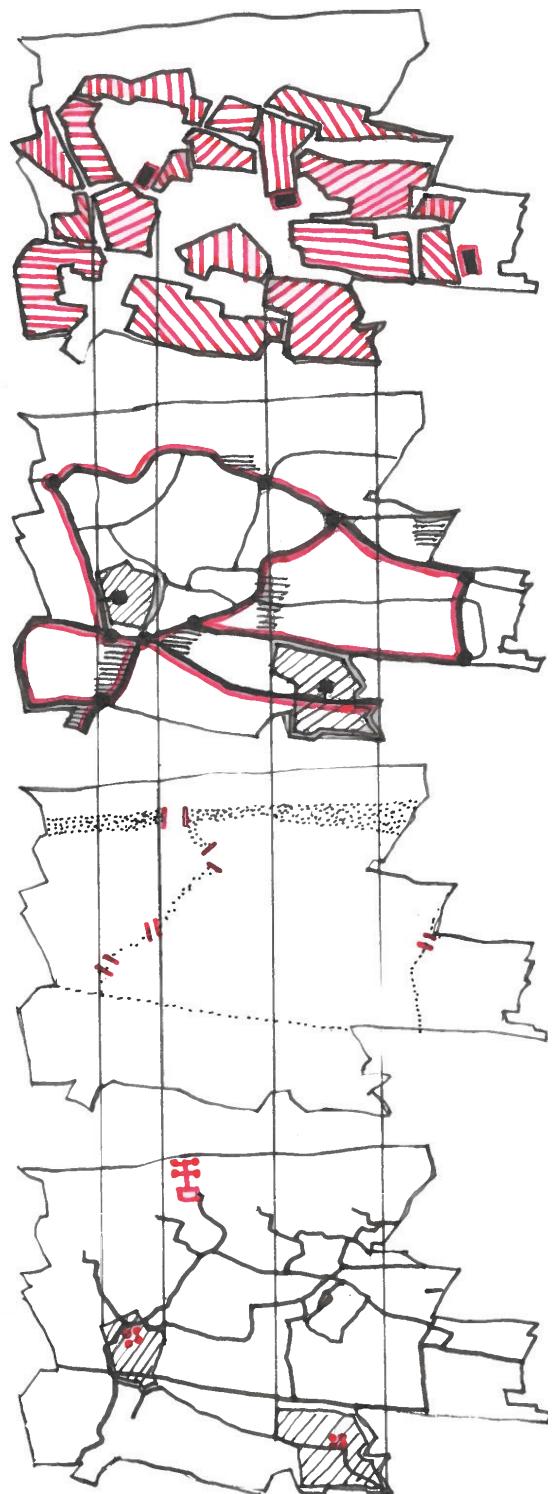
The desalination plant is built to supply freshwater to all the horticultural production zones. This does require a lot of energy, which partly is supplied by the greenhouses gas fuelled power plants.



The Waterschap has together with companies built more large rainwater tanks. These buffer rainwater in case of heavy rain. Otherwise the drainage system would not cope.

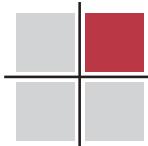


Status Quo



Scenario

Scenario 2: “Supersize Me”



Agriculture & Food

□ greenhouses

□ XL greenhouses

□ specialised zone

Infrastructure

■ logistics hub

■ zone specific logistics hub

□ automated product collection and packaging

■ food processing factories

Ecology

■ status quo ecological network

□ fragmentation of & pressure on ecological network

Water System

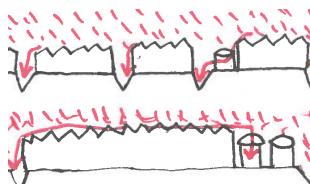
↑ pumping station

□ freshwater distribution

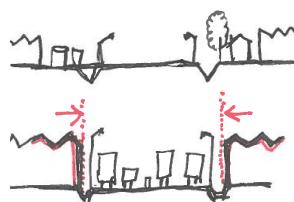
●● rainwater buffer tanks

↑ desalination plant

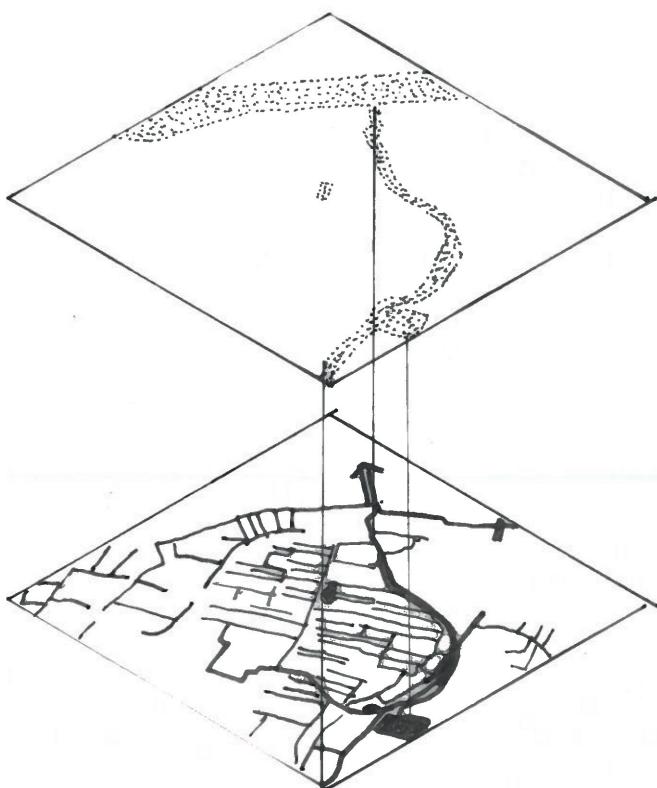
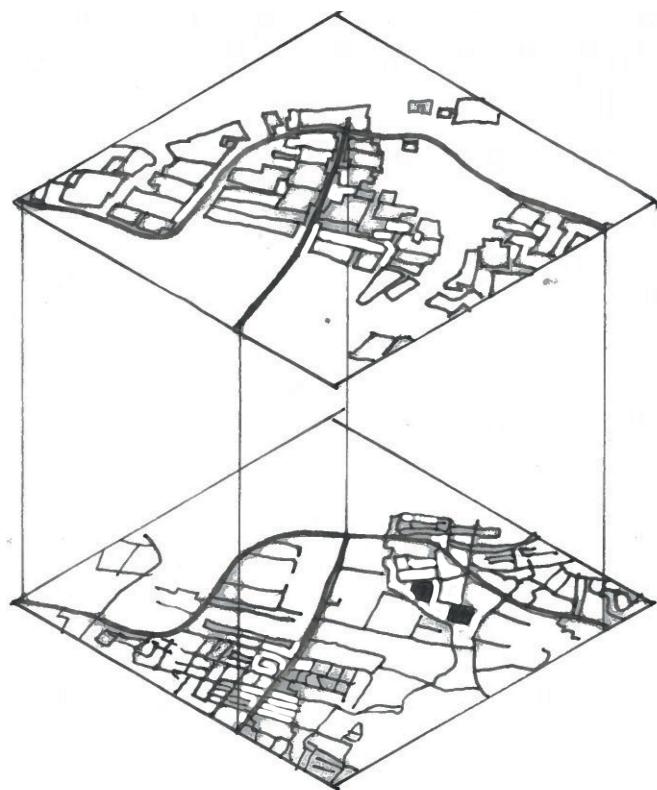
Spatial Arrangements & Relations



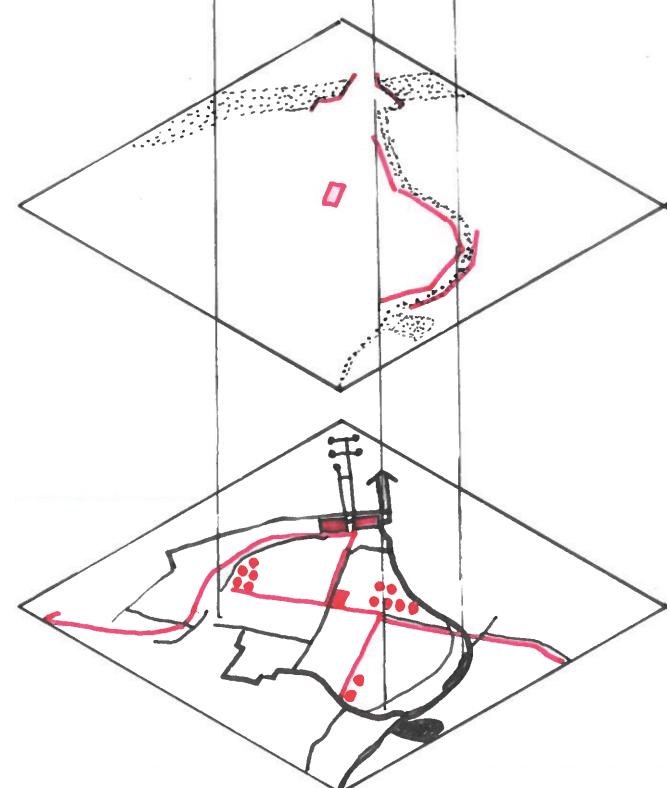
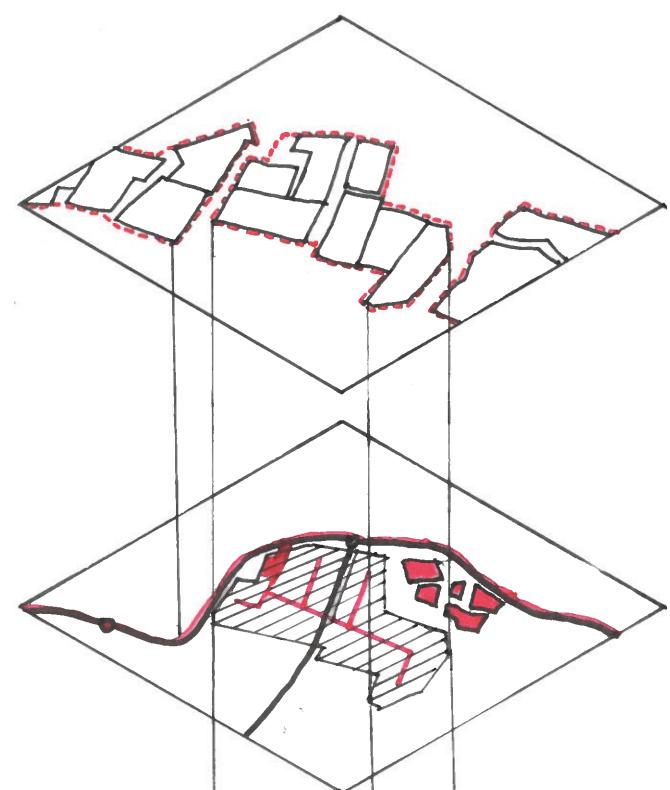
Larger plots and greenhouse areas means less drainage channels. Therefore, water tanks are needed to buffer rainwater.



Family houses and other functions are sacrificed to maximise the plots.



Status Quo



Scenario

Scenario 2: “Supersize Me”



An Impression

Consumer

Came by car to the Hyper AH for groceries. This is the only option in Westland for buying food, but they do have a lot of choice! At the self service checkout, there's no employees helping her. Contact with other costumers is very limited.



Farmer

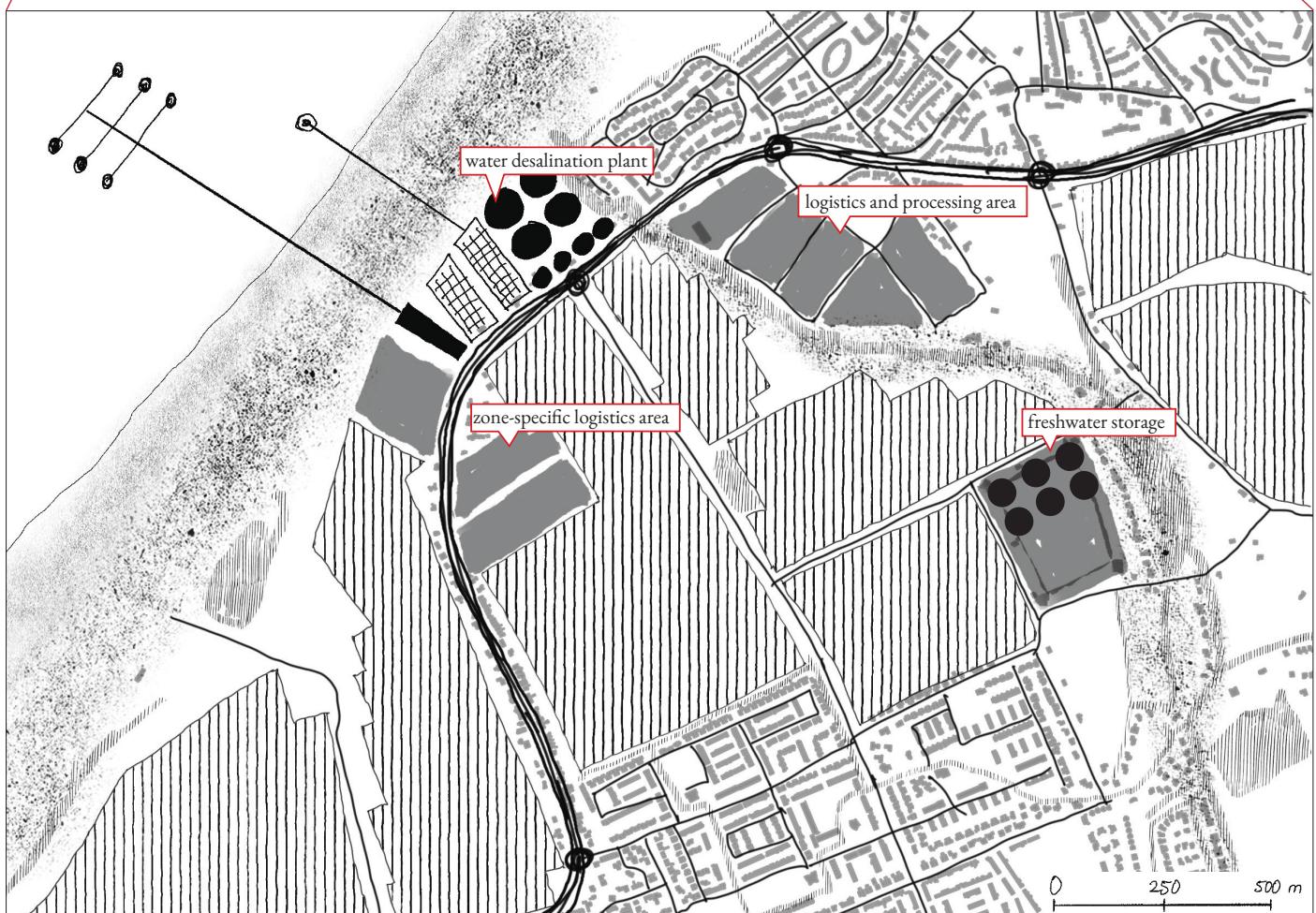
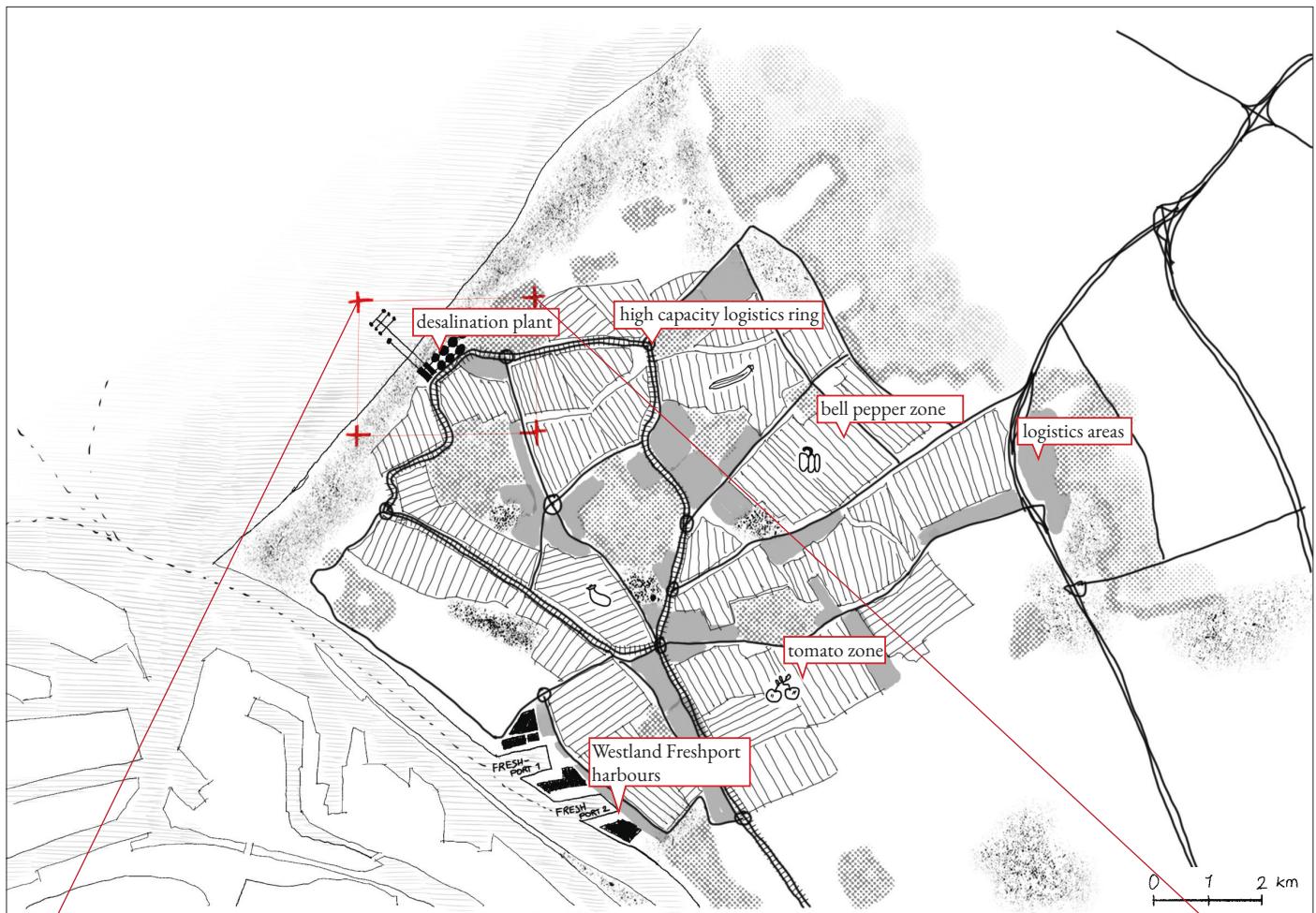
Overseeing the visual quality check of the newly harvested vegetables. This needs to be done by workers, but all other processes have been automated.



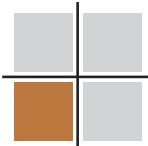
Crop

In one of the bell-pepper zone greenhouses. The water and nutrients are fed into the substrate it grows on. This is computer-controlled.





Scenario 3: “Home Grown”



This scenario explores a combination of a low productivity, locally oriented food market and low-tech, nature inclusive agricultural practices.

Setting the Stage

The demand from abroad for Dutch food products has almost fully collapsed because of protectionist and restrictive bilateral measures. In a society that is built up from small but very close-knit communities, people prefer trusted products and retreat to smaller circles for their groceries. Produce goes in many cases directly to the consumers via community supported agriculture models. Farms are cooperatively owned and managed. The local market, where growers and buyers meet weekly, forms another foundation of the food trade. Food miles guide logistics pragmatically, shaping diets based on travel distance. A 30-kilometer radius can supply a full local diet, boosting rural diversity. Seasonal eating becomes essential in this scenario: fruit in summer and autumn, sprouts and stews in winter.

In Westland, the landscape has scaled down. Small plots with diverse crops and food forests form an ecologically rich cultivated landscape. Greenhouses are sometimes still in use for production without heating, or for community functions and markets. The appreciation for horticultural and ecological know-how present in Westland has culminated in a horti-ecology guild, with an educational centre that is visited by apprentices from around the country. Now that efficiency and low prices are no longer decisive factors, there's more room for developing ecologically valuable landscapes.

Socio-Spatial Developments

People's full diet is supplied locally by approximately a 30 km radius. This means the production landscape is very diverse.

Some abandoned greenhouses and farm parcels have attracted settlers communities to start cooperative agro-ecological farms.

The spatial divide between agriculture and nature is no more: nature-inclusive farms and food forests are interspersed with green recreational areas and natural areas.



Scenario 3: “Home Grown”



Agriculture & Food

/// greenhouses

□ town

ME agro-ecological farms

food forests

farmers' markets & cooperative supermarkets

Infrastructure

□ main road

⠇ logistics area

□ close-meshed, slow local traffic network

Ecology

⠚ existing ecological areas

⠚⠚ extensive ecological network

Water System

⠚ main waterways

/// drainage structure

□ dense drainage patterns

□ wetlands network

Key Projects in this Scenario



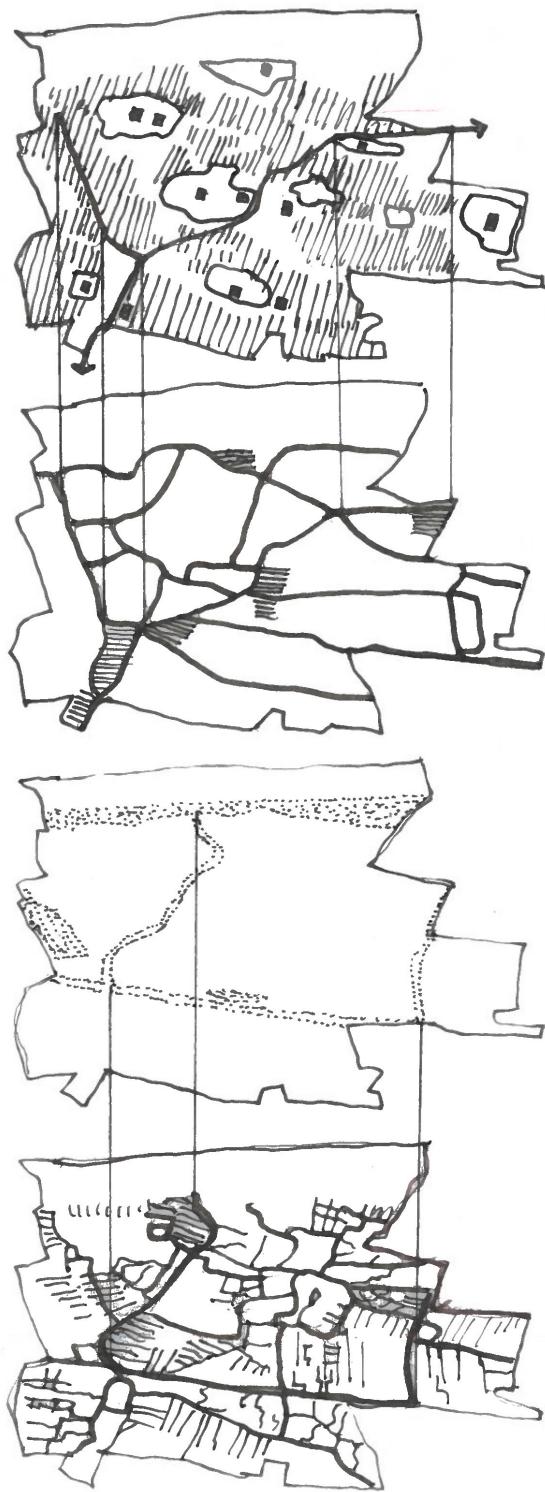
Since Westland was the least green municipality, it has invested heavily in an extensive nature network.



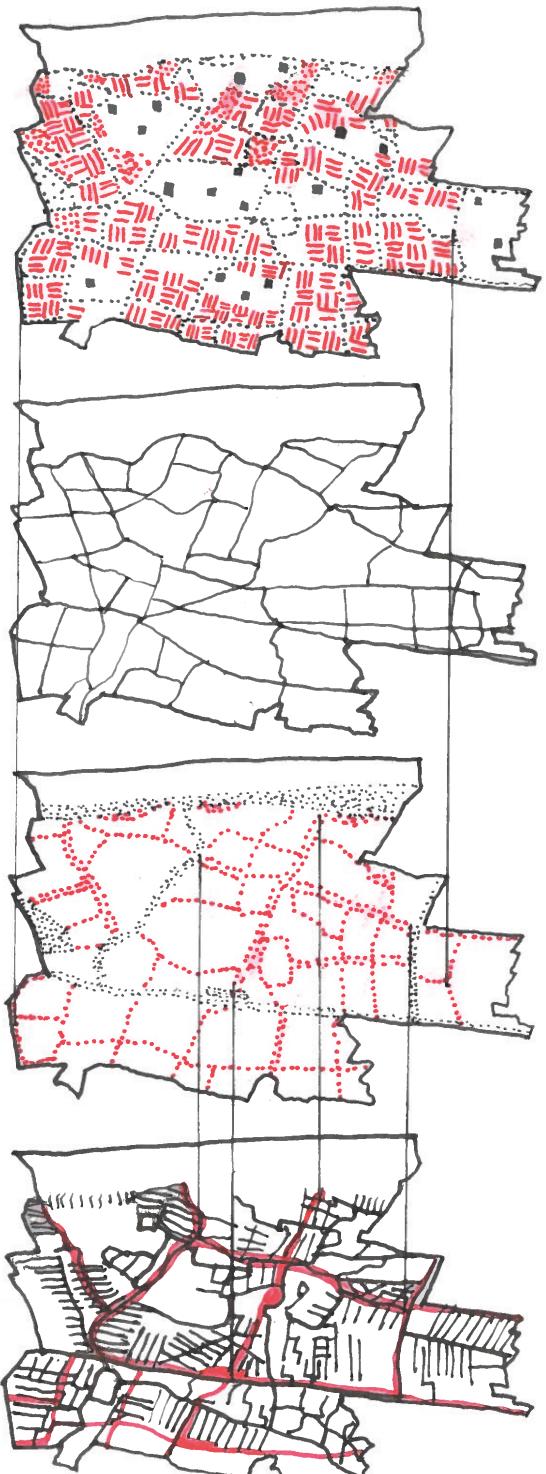
Some of the canals have been widened and transformed to wetlands areas, embedded within the new nature network.



Most products are transported by (electrical) cargo bikes or small vehicles. For this, the road network has been adapted to slower traffic by creating a close meshed network.



Status Quo



Scenario

Scenario 3: “Home Grown”



Agriculture & Food

- /// greenhouses
- town
- agro-ecological farms
- farmers' market
- cooperative store
- food forest

Infrastructure

- main road
- ≡ logistics area
- ↓ farm access from main road
- slow traffic & cycling network

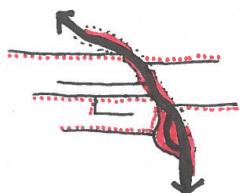
Ecology

- existing ecological areas
- extension of coastal nature area
- extensive ecological network
- food forest

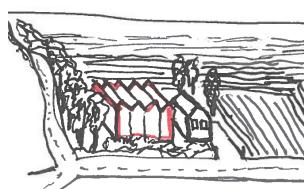
Water System

- main waterways
- /// drainage structure
- wetlands
- drainage channels combined with ecologically valued landscape elements

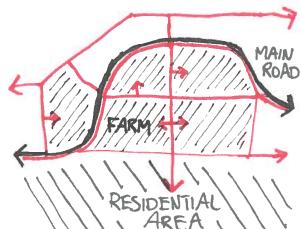
Spatial Arrangements & Relations



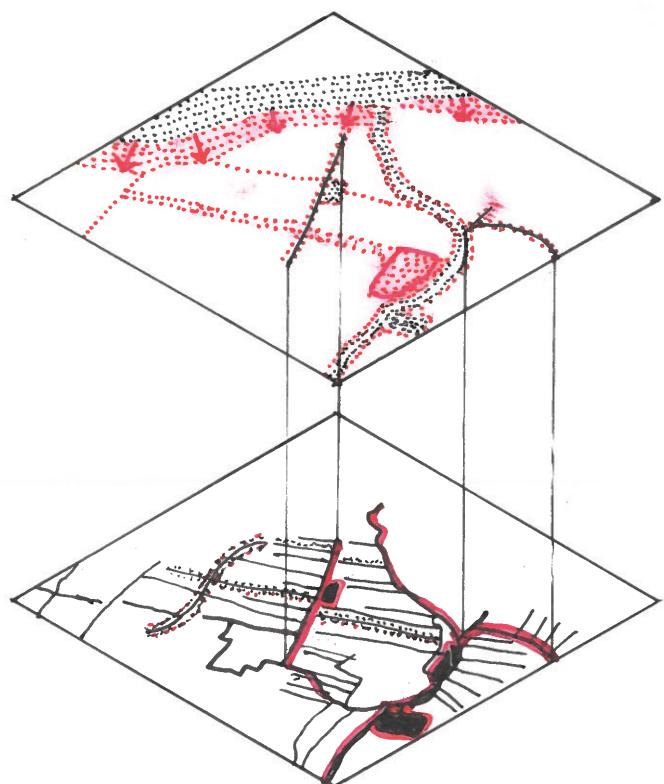
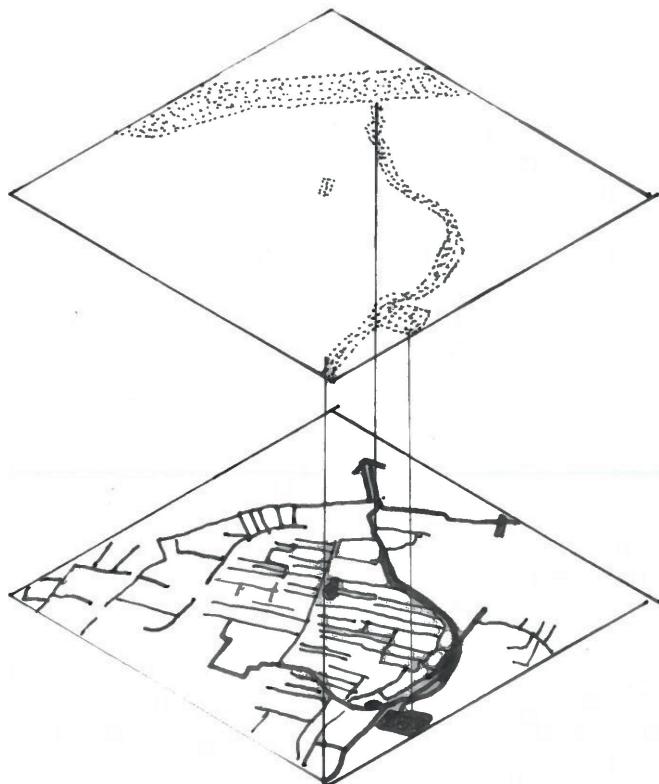
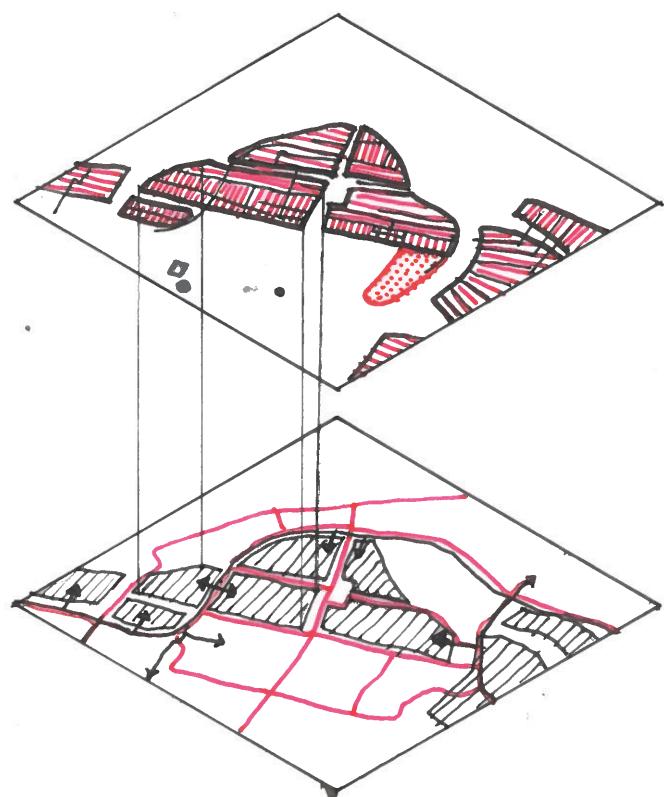
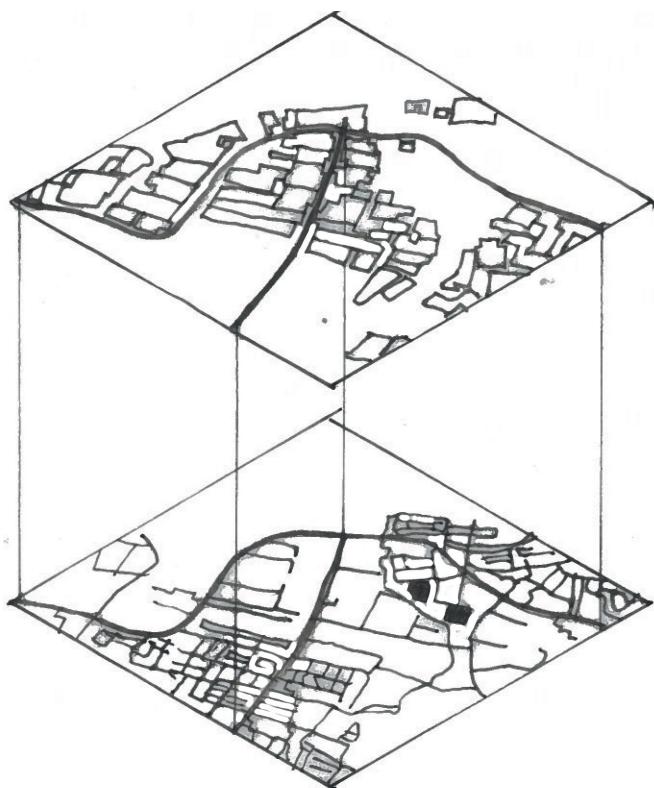
Small scale landscape elements (e.g. hedgerows) follow the drainage structure. Larger canals are surrounded by natural embankments/wetlands.



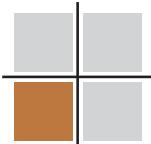
Greenhouses are still in use but are smaller and unheated. They provide protection for saplings and extend the growing season for some crops.



The farms are highly accessible, since nearby communities are involved in the operations. The extensive cycling network is connected to the farms.



Scenario 3: “Home Grown”



An Impression

Consumer

Cycling to the local farmers' market in a former greenhouse. It's here two times a week. If you need something during the other days, you could also visit one of the close-by farmers or the cooperative store in town.



Farmer

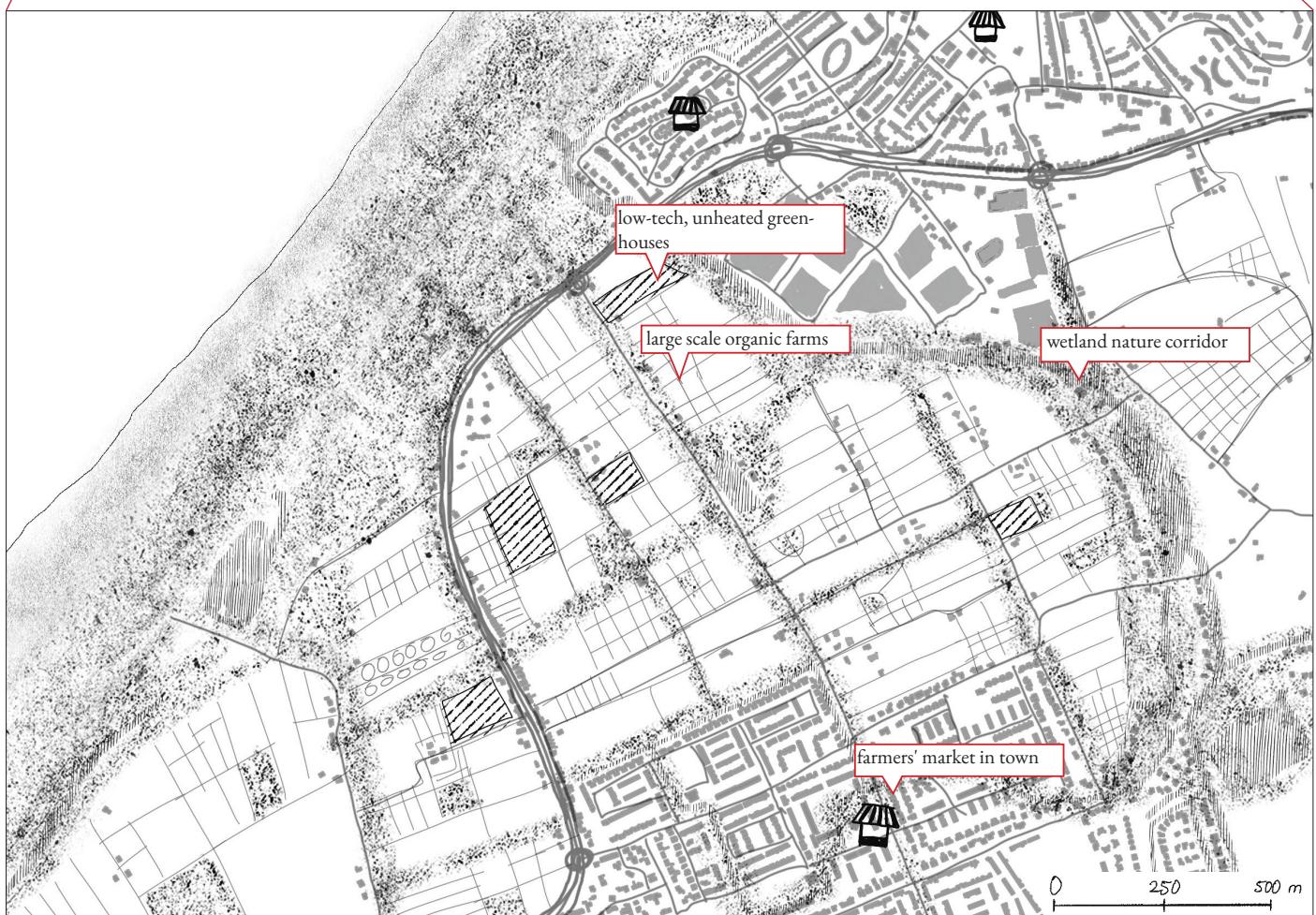
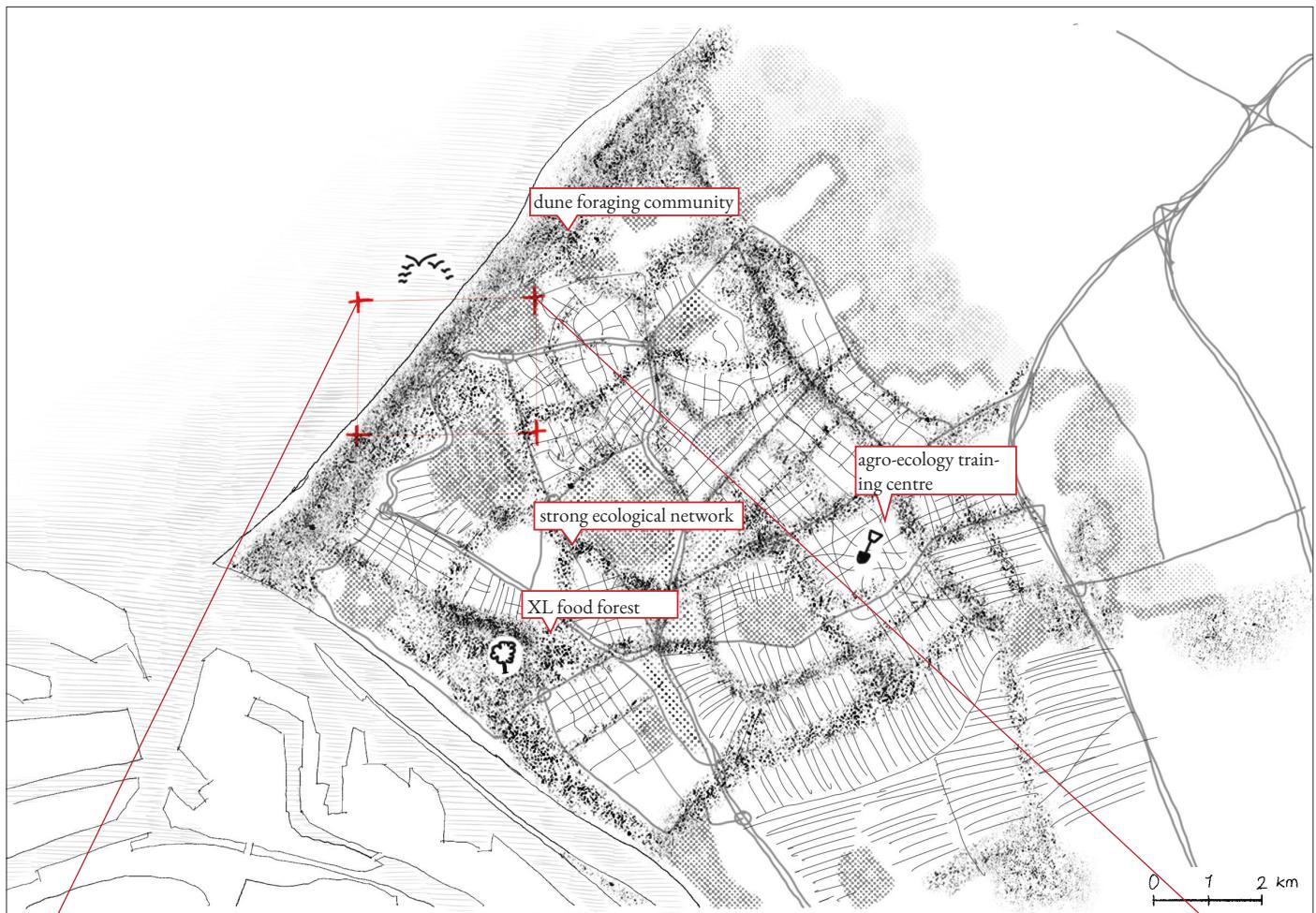
Today is summer harvest day! Managing volunteers from the farm-cooperative that help with picking produce from the fruit orchard.



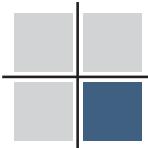
Crop

Being planted in one of the new food-forests in Westland. After 5 years of development, humans will start picking the fruits and herbs from this forest.





Scenario 4: “Veggie Valley”



This scenario explores a combination of a lower productivity, locally oriented food market and very high-tech specialized agricultural practices and food system.

Setting the Stage

Strict conservation policies and efforts to prevent deforestation have reduced the land available for food production. High transport costs and trade tariffs make global food trade infeasible, cutting off the Netherlands from traditional food sources in other countries. As a result, food must be grown or produced locally. To meet the varied demands of consumers, production is now diverse, relying on smaller-scale but very high-tech cultivation methods. Knowledge and expertise are widely shared across public and private sectors, and big data helps with complex participatory policy-making processes.

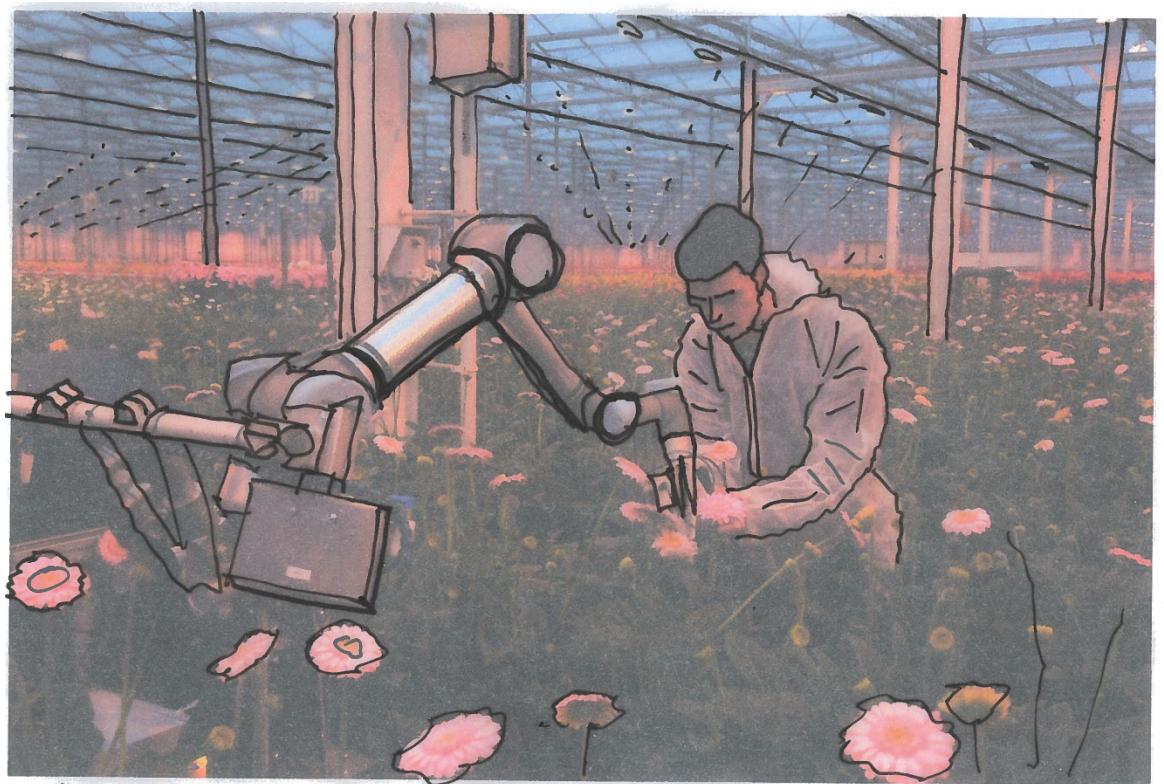
Businesses in Westland that once focused on mass production now convert their process knowledge into revenue. While sales may have declined, producers are exploring ways to optimize their own production and exporting knowledge. The ‘black-box’ landscape has shifted to an advisory space, showcasing innovative projects. Precision vertical agriculture towers populate a green landscape. People also experiment at home with urban allotment gardens, for which ‘farmers as a service’ platforms provide flexible labour.

Socio-Spatial Developments

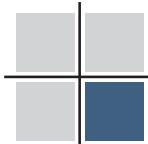
The sales of knowledge and advice about horticulture across the world is the main economic factor now. Several food-tech start ups and larger companies have settled in Westland in business-campus environments.

The space that came free due to decreased production is transformed to parks and recreational areas and allotment gardens. This has increased the spatial quality a lot.

Bottom-up digital blockchain-platforms have taken over the logistics that supermarkets used to manage. Citizens now manage and plan the local food system themselves in participatory governance processes.



Scenario 4: “Veggie Valley”



Agriculture & Food

- /// greenhouses
- town
- ☒ geothermally heated greenhouses
- vertical precision agriculture towers
- Veggie Valley innovation campuses
- ☒ alternative raw materials farms (e.g. algae)

Infrastructure

- main road
- ⠇ logistics area
- ☒ high tech processing & supporting industries areas

Ecology

- ☒ existing ecological areas
- ☒ recreational nature & park developments
- ☒ new ecological corridors

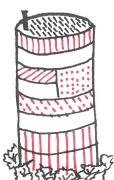
Water System

- main waterways
- /// drainage structure
- ☒ saline water farms

Key Projects in this Scenario



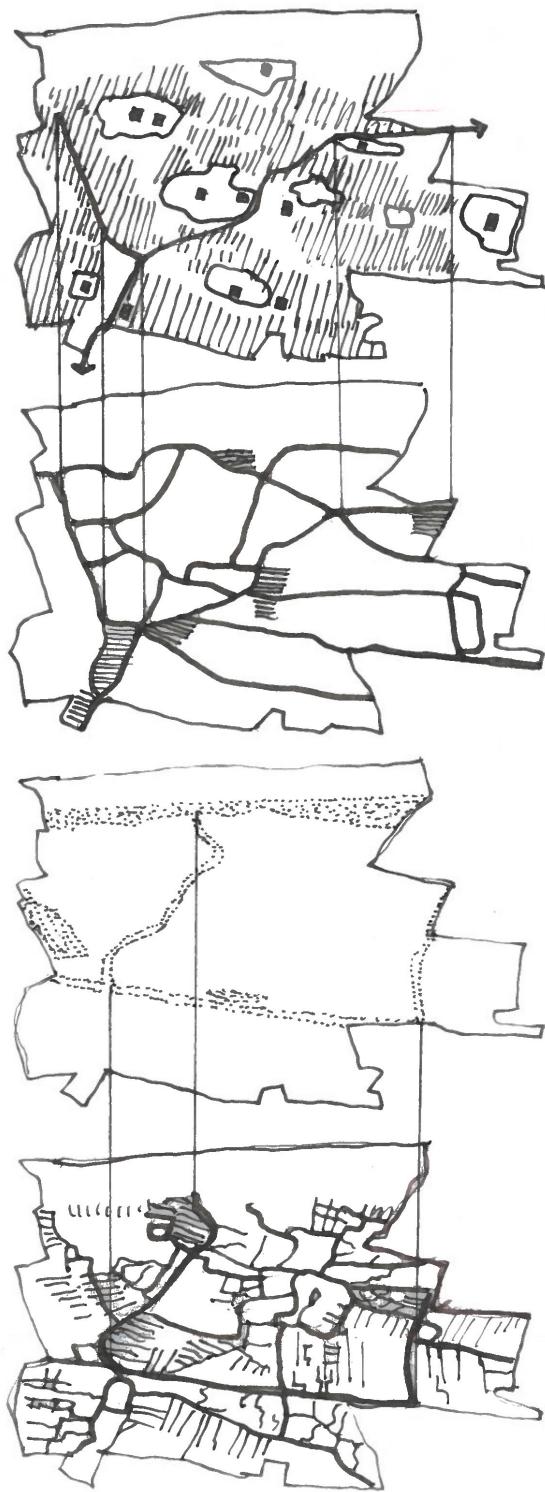
Veggie Valley Innovation Campuses are hotspots for knowledge exchange and research into new food tech



Vertical farming towers provide space for food-tech companies and knowledge institutes collaborative research and development.



Saline algae farms use seawater to grow algae. This is further used in the production of composite foodstuffs.

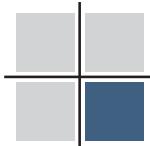


Status Quo



Scenario

Scenario 4: “Veggie Valley”



Agriculture & Food

- greenhouses
- algae farm
- ▨ geothermally heated greenhouses
- vertical precision agriculture towers
- ▨ veggie valley innovation campus
- ▨ allotment gardens

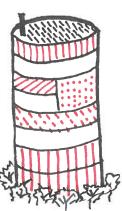
Infrastructure

- logistics hub
- food processing factories
- hotel (innovation campus visitors)
- food neighbourhood pickup hub

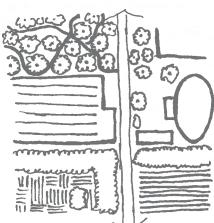
Ecology

- ▨ status quo ecological network
- ▨ expansion of dunes & new park developments

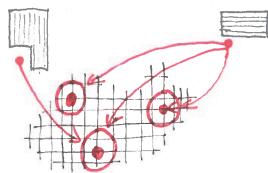
Spatial Arrangements & Relations



Vertical agriculture towers house various food-tech start-ups and specialised precision agriculture research groups.



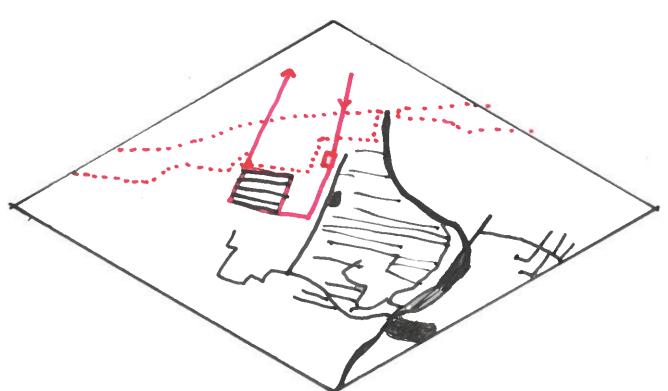
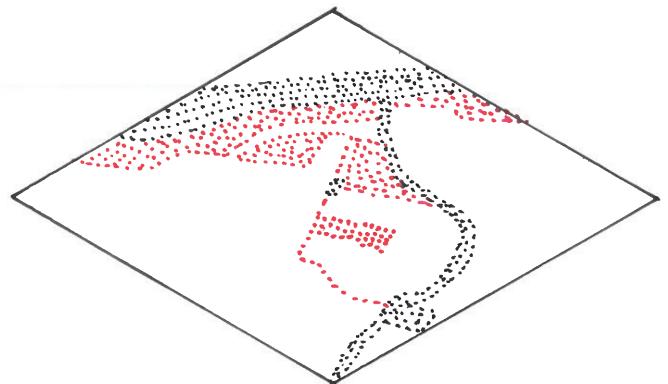
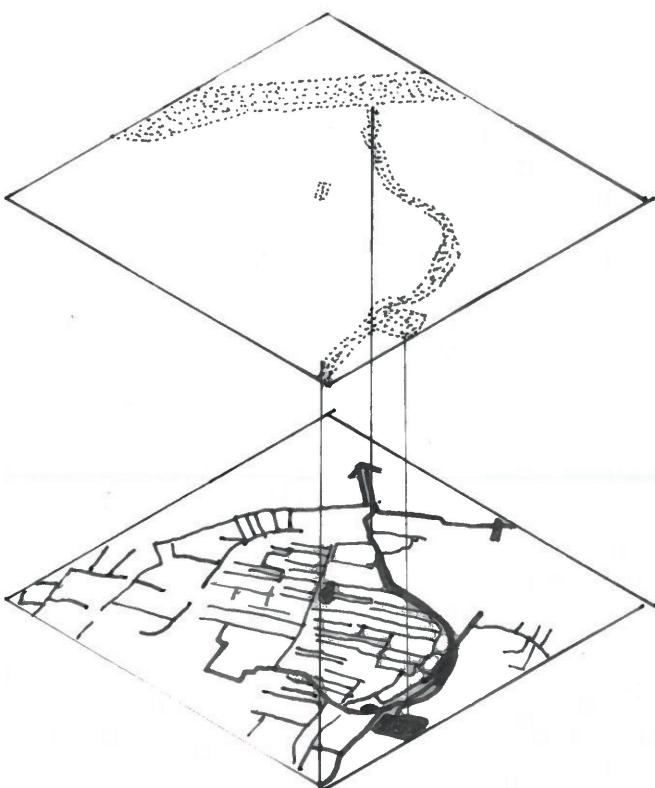
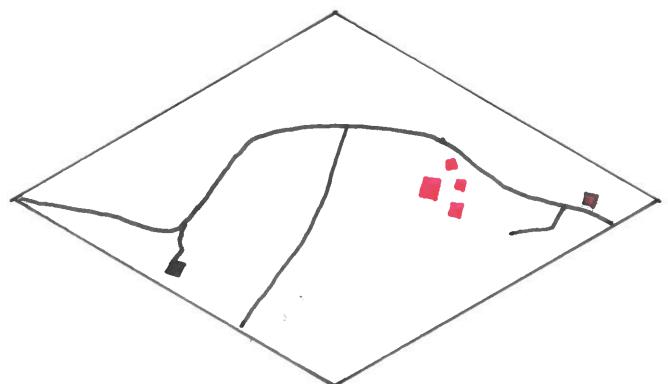
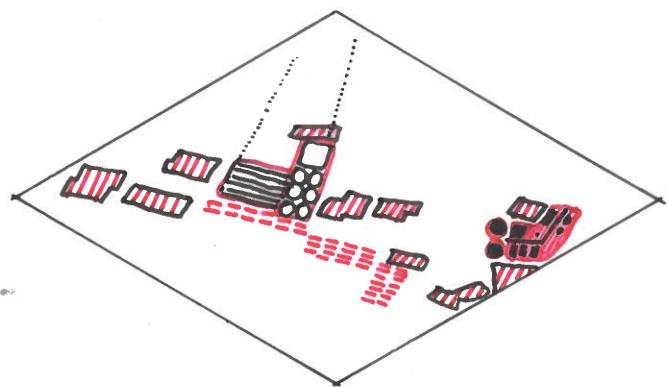
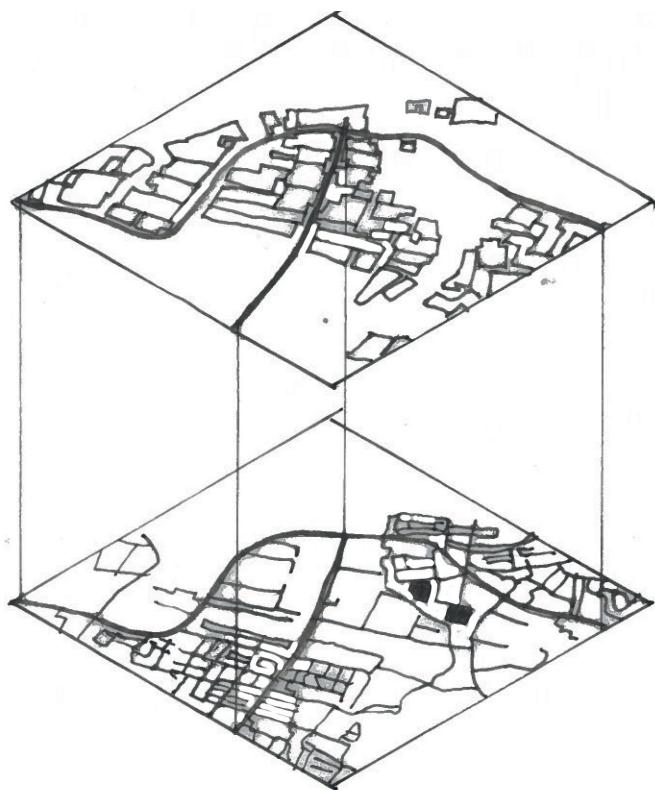
Greenhouses that remained, as well as the innovation campuses and algae farms are embedded in green, park environments.



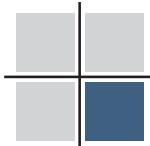
Produce and processed products are directly transported to local food pickup hubs. This is done by digitally managed logistics services cooperatives.

Water System

- ↑ pumping station
- ▨ polder given back to dune landscapes
- ▨ seawater system for algae farm



Scenario 4: “Veggie Valley”



An Impression

Consumer

At the neighbourhood allotment garden. There is a lot to harvest, but little time. Therefore he makes sure a local farmer-as-a-service does the remaining work tomorrow.



Farmer

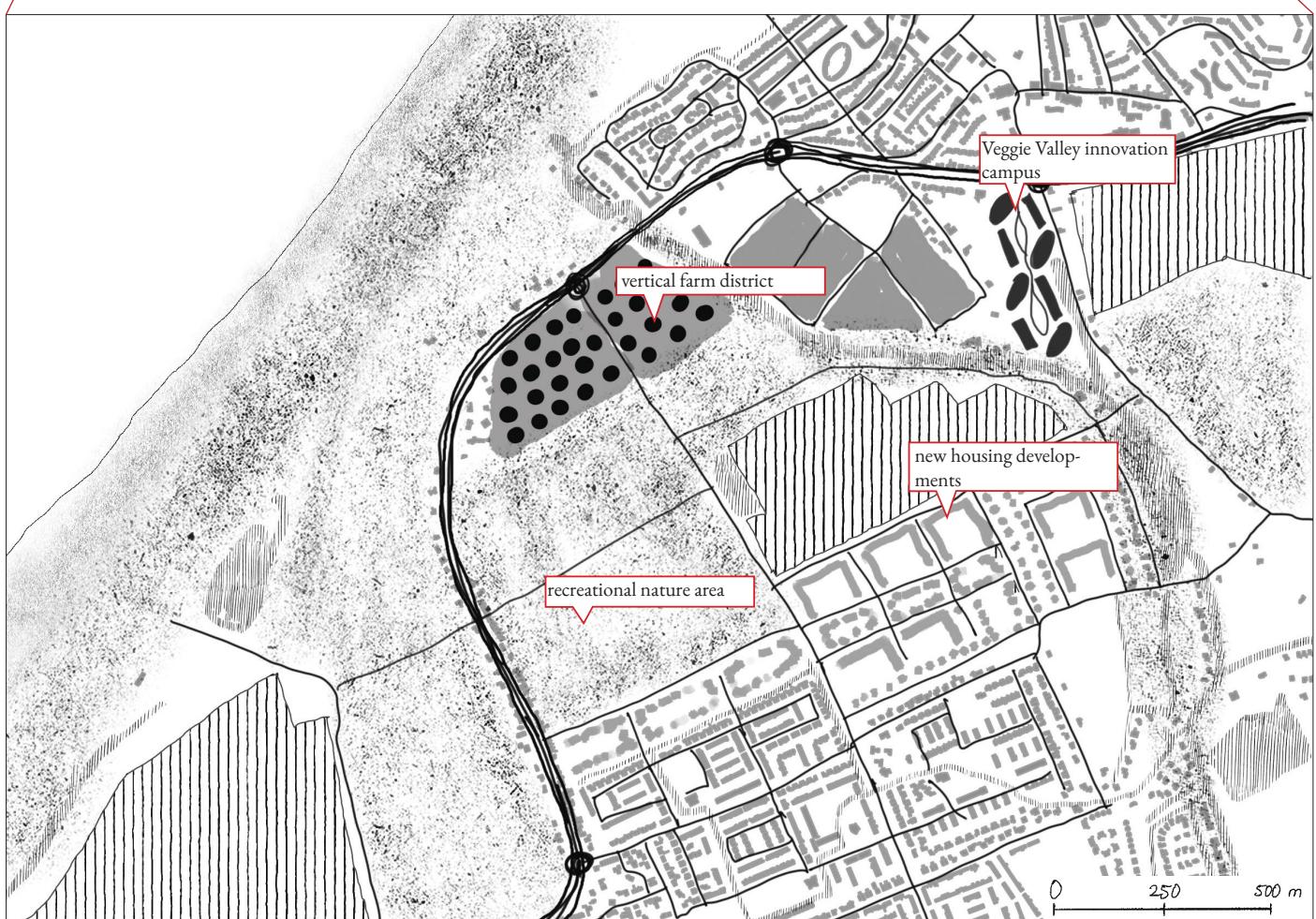
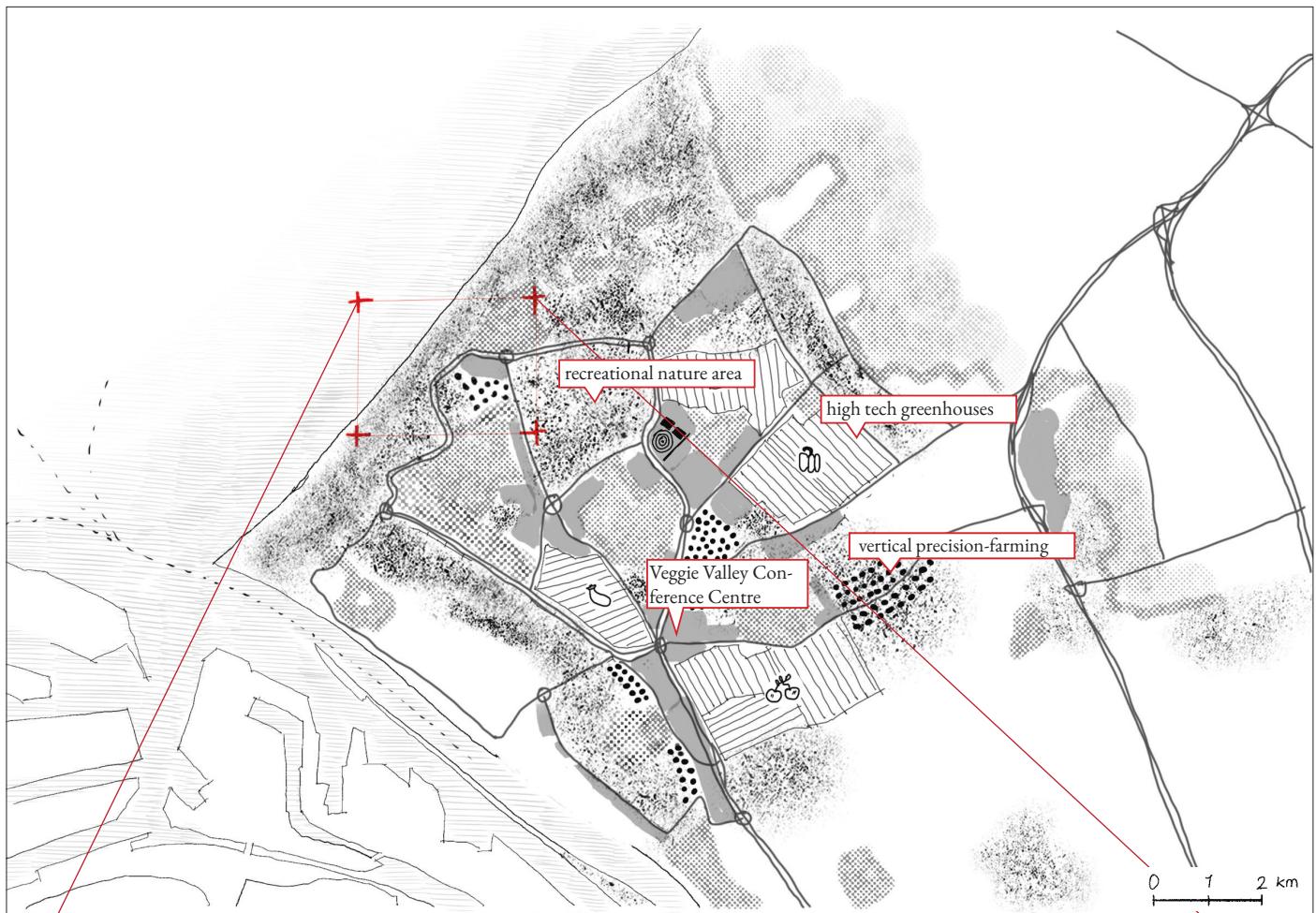
Testing the new version of the precision crop-care robot. It should be able to detect prematurely ripe fruits and pick them.



Crop

Growing in one of the vertical agriculture towers.

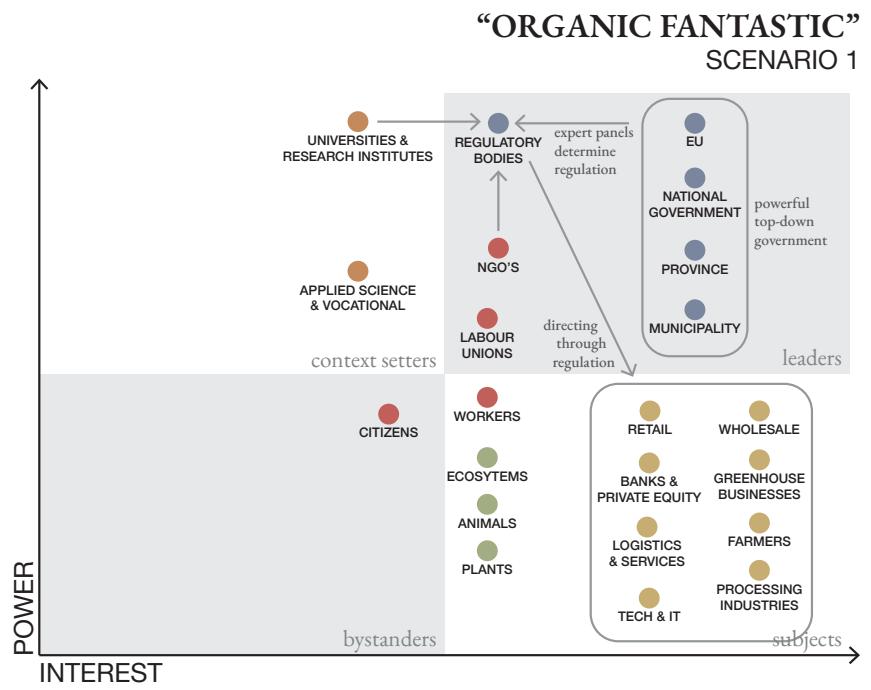




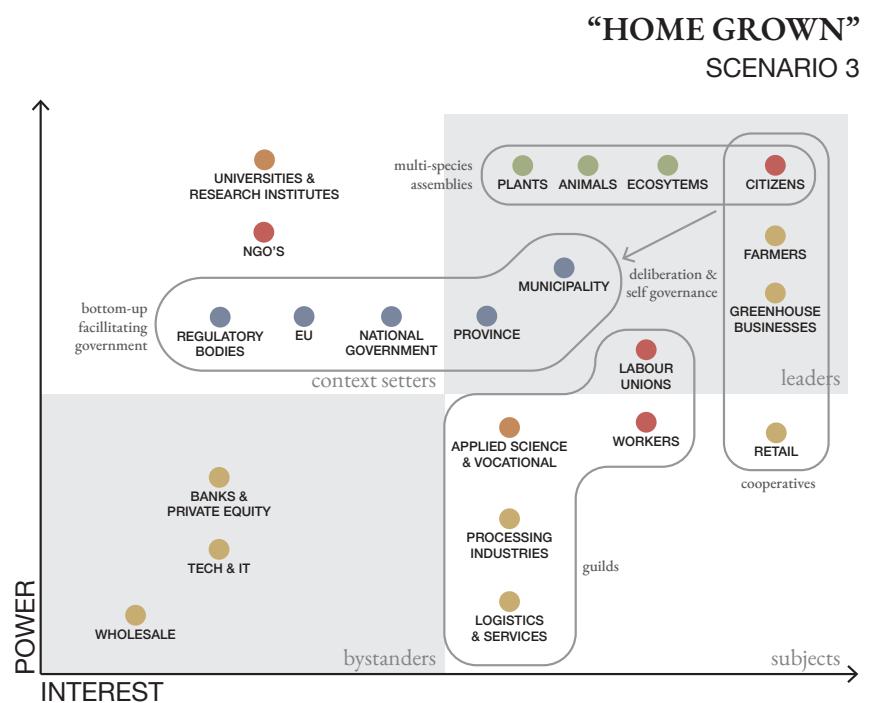
Stakeholder Power and Interest

The configurations of stakeholder power and interest relations per scenario are investigated on this page.

The public sector is top down and very powerful in this scenario. Through extensive regulatory and subsidies infrastructure, the private sector is directed towards certain production and processing practices that comply with the high standards set by EU and FAO for food safety, quality and environmental impacts. Labour unions have gained more power and have integrated workers' rights into this regulation packages, which has improved the situation for workers. Citizens are bystanders in this scenario, but food quality and safety is high.



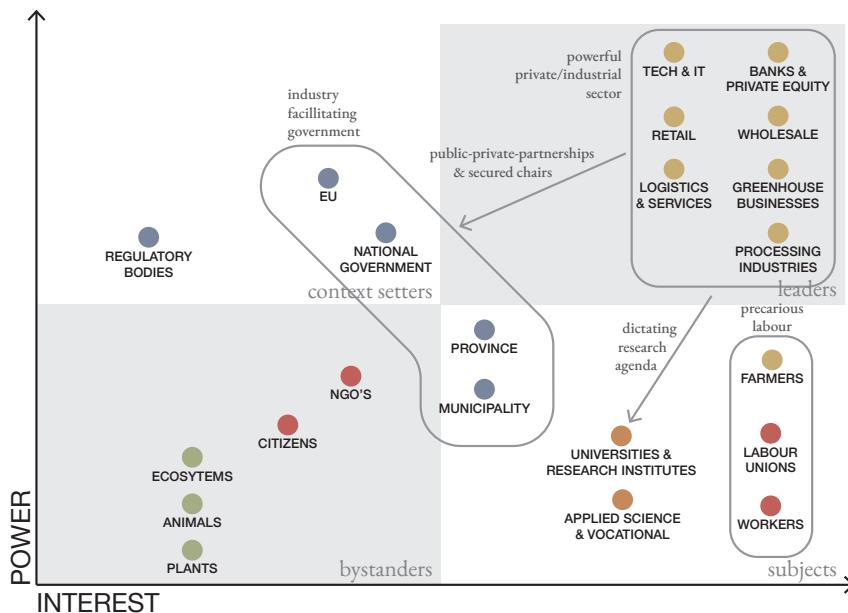
This scenario explores bottom-up governance through local deliberation. Agricultural production retail are cooperatively owned and managed. Know-how and services are embodied in guilds, which provide local economic activities related to agriculture. More-than-human actors are seen as equally important in decision-making and represented in multi-species assemblies.





“SUPERSIZE ME”

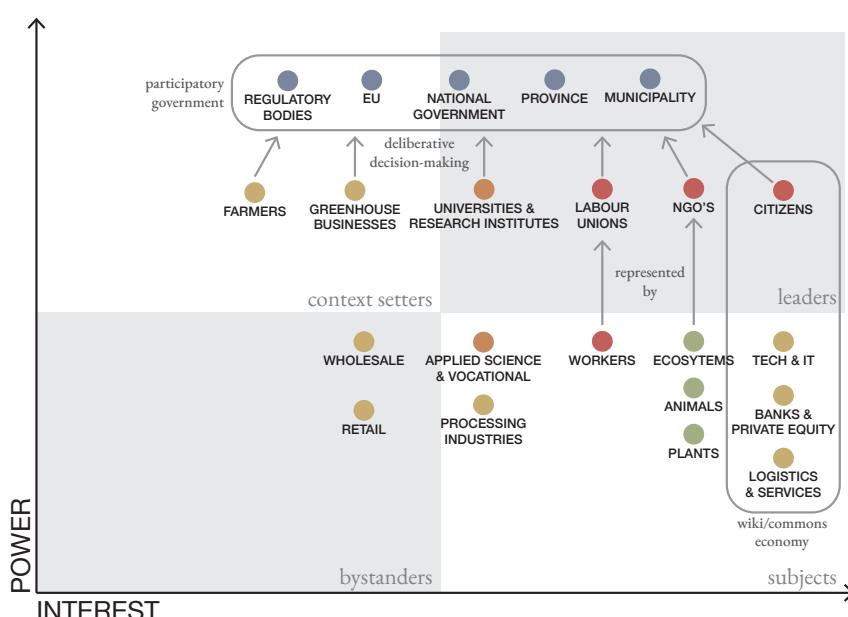
SCENARIO 2



This scenario includes a powerful industry. Through public-private-partnerships and secured chairs in decision-making bodies, the private sector influences the direction public sector. The global scale of operations requires cheap, precarious labour. Agricultural knowledge institutes research is directed by private interests. This and other knowledge is privatised through an extensive patenting practice. Ecosystems, citizens and NGO's have very little power.

“VEGGIE VALLEY”

SCENARIO 4

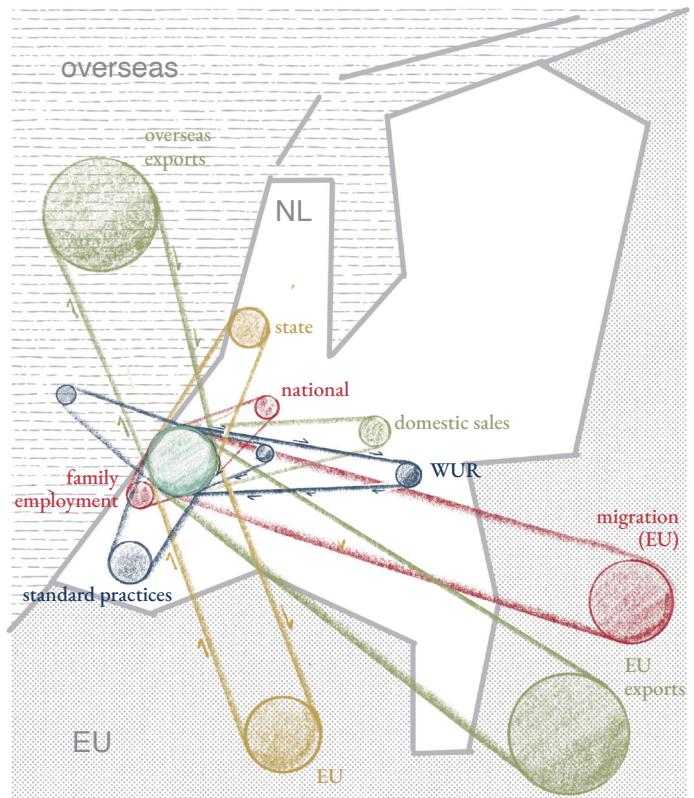


In this scenario, knowledge institutes, NGOs, and the government hold significant influence, shaping key policies and frameworks. At the same time, citizens actively participate in decision-making processes, ensuring inclusive polycentric governance. Local food logistics, services, and financial systems are largely citizen-organized, operating through digitally managed commons-based models and wiki-style platforms that emphasize collaboration and shared responsibility.

Regional Autonomy

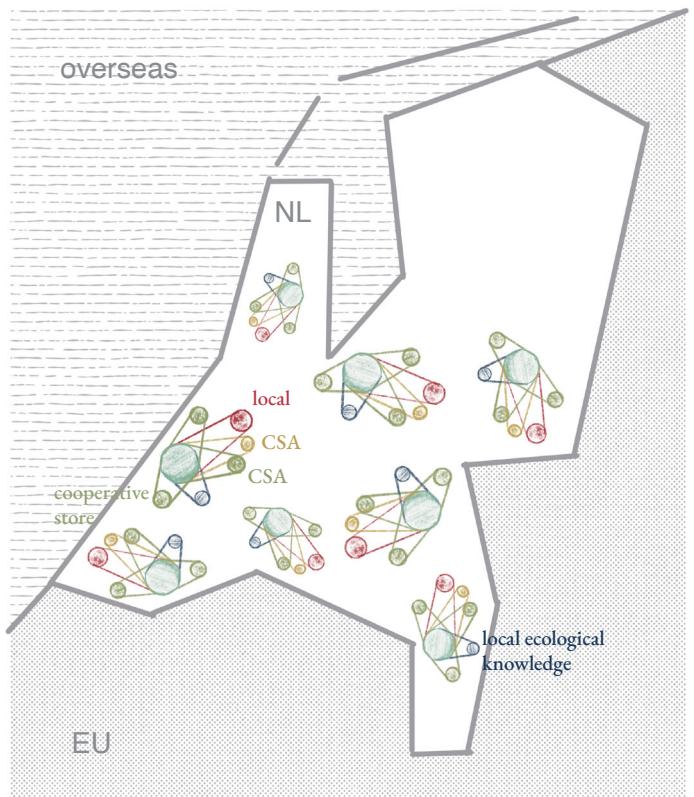
Each scenario has implications for the degree and scale of autonomy of various actors in the food system through the interrelationships of knowledge, capital, labour and food (products). But what if we consider this more regionally, with the Westland municipality food system as a single actor? How does Westland interact with the rest of the world? What is the scale of this interaction? The drawings aim to investigate these questions.

“ORGANIC FANTASTIC”
SCENARIO 1



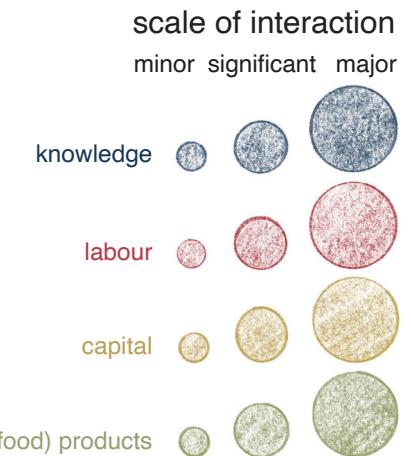
In scenario 1, the transnational relationships are manifold and of large scale: circulation of products, capital and labour migration. Knowledge is produced and regulated within a framework of standardised practices. The state and EU have a lot of control over the region with subsidies and taxes. Westland as a region is therefore **far from autonomous** in this scenario.

“HOME GROWN”
SCENARIO 3

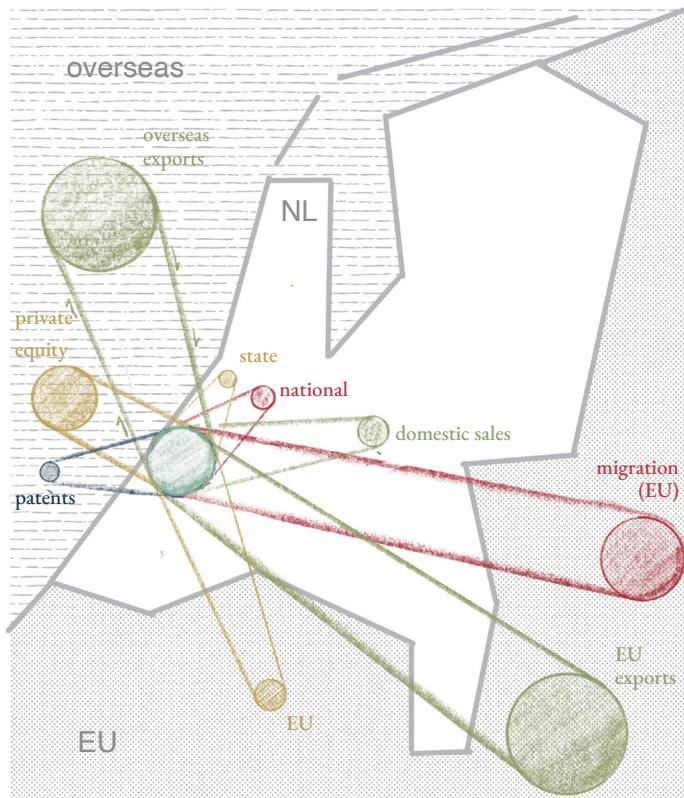


In scenario 3, the scale of the interrelations is very small and the nature of them is highly public. Labour, knowledge and capital are all locally organised. Products are not shipped further than the region itself. Therefore, in scenario 3 Westland is **highly autonomous** as a region.

The drawings are based on an investigation in Schmid & Topalovic (2023, p. 227)

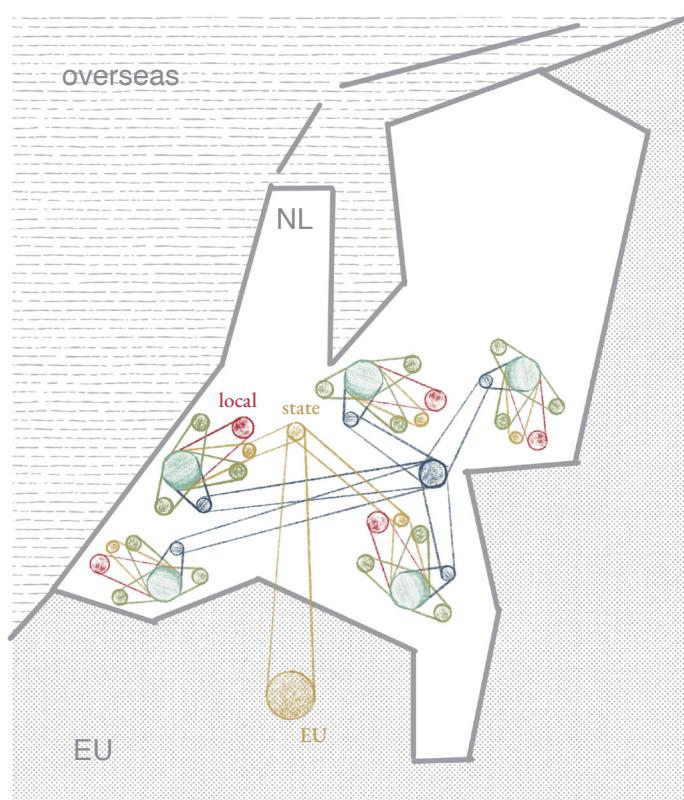


“SUPERSIZE ME” SCENARIO 2



In scenario 2, the circulation of products, capital and labour migration are international and of large scale. Knowledge is produced and regulated within privately managed environments and conditions. Private equity and shareholders shape the flow of capital. The scale and amount of interrelations are less than scenario 1, since control is more centralised at private actors. This could be interpreted as a scenario with a more autonomous region. The private nature of the relationships however does make Westland as a region **privately autonomous, publicly subordinate** in this scenario.

“VEGGIE VALLEY” SCENARIO 4

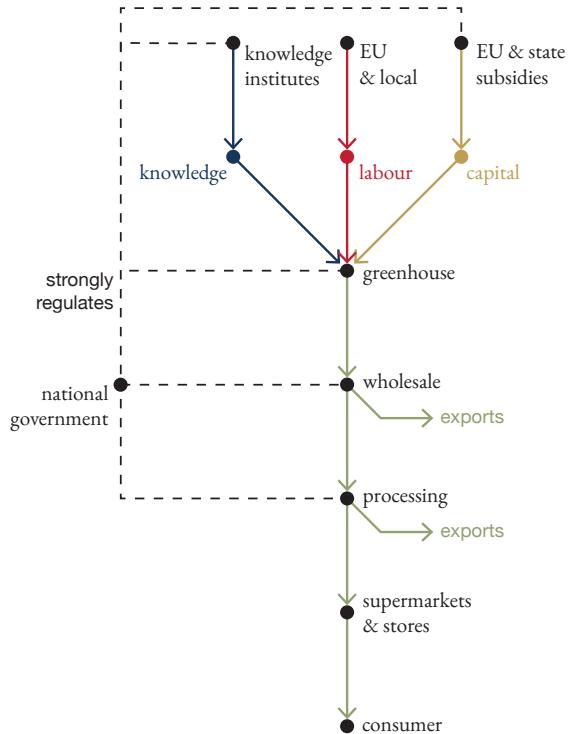


In scenario 4, the scale and nature of interrelationships are different per factor. Labour is locally organised with as-a-service-platforms, and products circulate mostly regionally, but some very specific products are sold on a national scale. The circulation of capital happens at a larger national scale through the state. The scale of knowledge is global, because knowledge is now the main 'agricultural' export product of the country. Together with state subsidies, the revenue from this knowledge-market is facilitating the local and more autonomous nature of the region. In this scenario, Westland is therefore **conditionally autonomous**.

Actor Autonomy

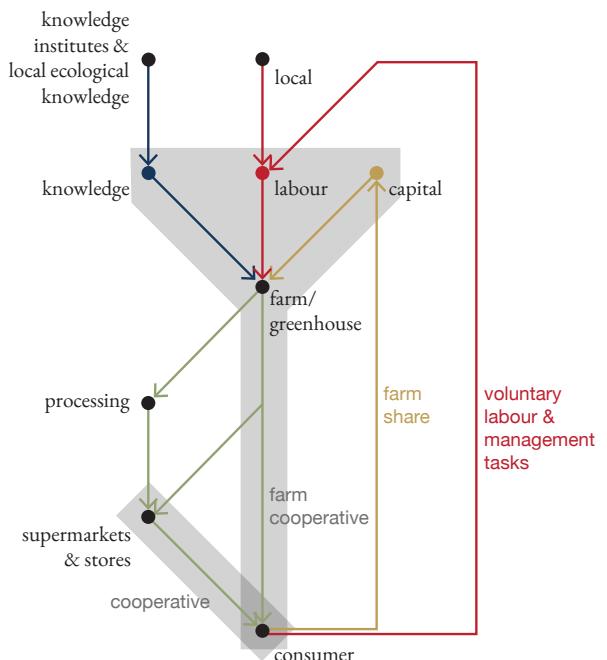
Per envisioned scenario, the diagrams show the relations between different actor groups/roles within the food value chain, and how the flows of knowledge, labour, capital and produce are defined by these relationships. In grey, collaborations, corporations or assemblies of actor groups/roles are shown.

“ORGANIC FANTASTIC” SCENARIO 1

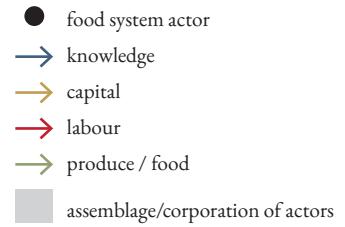


Here, the national government strongly regulates the flows with regulation, subsidies and market planning. The value chain is linear, with strict division in roles.

“HOME GROWN” SCENARIO 3

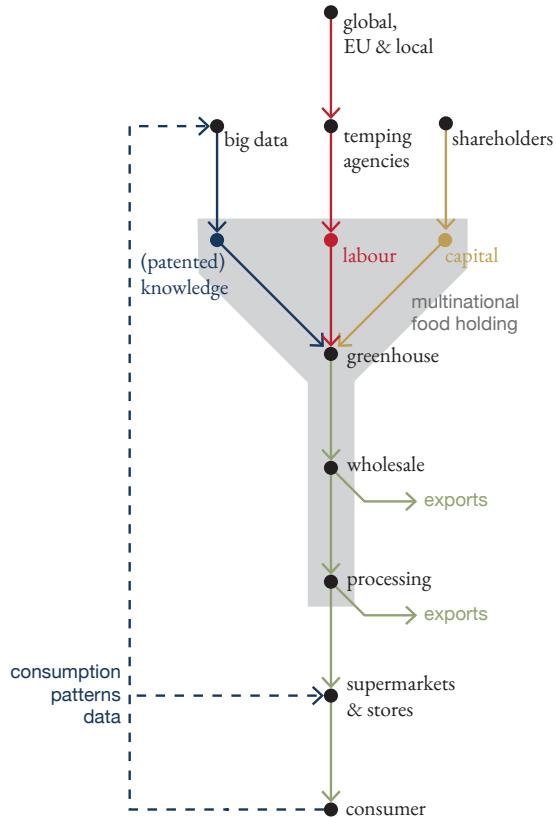


This scenario shows more integrated roles from production to consumption. The consumer is also part of the retail cooperative and the farm cooperative, through voluntary labour and capital investments. The interesting thing here is that more relationships actually increase the autonomy of the system.



“SUPERSIZE ME”

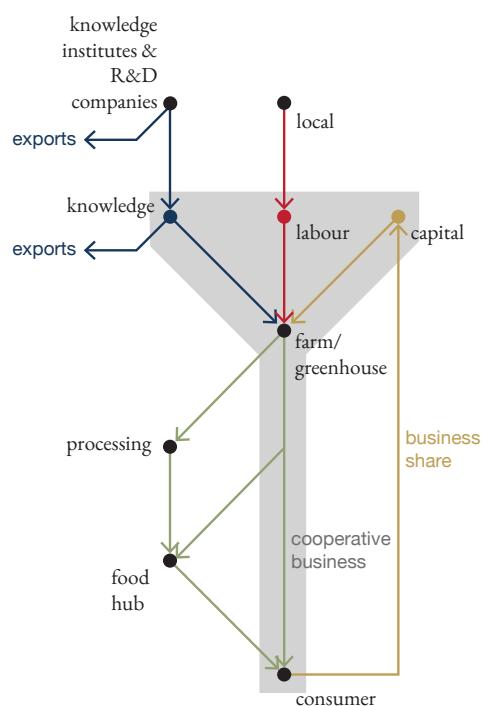
SCENARIO 2



This scenario envisions the multinational food holding as the central powerful actor group, controlling all flows throughout different steps in the food value-chain. Knowledge for example is extracted from consumer data, and know-how is patented for private use. Control over the flow of labour is outsourced to temporary work agencies.

“VEGGIE VALLEY”

SCENARIO 4



This scenario sees more integrated roles than scenarios 1 and 2, but less than 3. High tech food businesses are cooperative and citizens are shareholders. The flow of knowledge is determined by the large export value of it, whereas the actual production of food is less labour intensive and labour is therefore more local.

Assessing Spatial Justice & Autonomy

Justice Dimensions

The general approach to the assessment of the scenarios is guided by the spatial justice concept. Based on the three dimensions of justice, I have formulated specific interpretations for this projective scenarios-thinking and food system context, which are:

- **Recognitional justice:** respect for the values of humans, animals, and plants, all of which possess an inherent right to exist on our planet within an ecological and evolutionary system.
- **Procedural justice:** transparent and equitable decision-making: How are all voices heard and considered in the decision-making process, and how are all interests—human, plant, animal, and ecosystem—taken into account?
- **Distributional justice:** A fair distribution of benefits and burdens among people, for instance as expressed in financial costs, healthy living environments and employment opportunities.

The above dimensions correspond with the Spatial Justice conceptual model (Lopez et al., 2024) that is described in the theoretical framework. The underlying framework for the assessment and evaluation of the scenarios on spatial justice and autonomy is based on the Spatial Justice Benchmarking Tool by Lopez et al. (2024b), which is shown in full in Appendix B. This tool was adapted for use in this thesis context with the following two alterations.

Different Scope

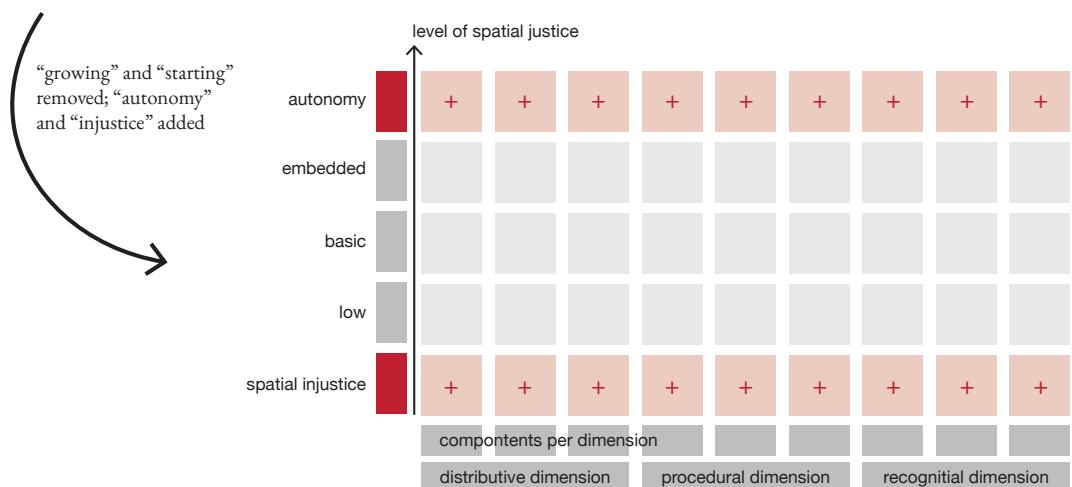
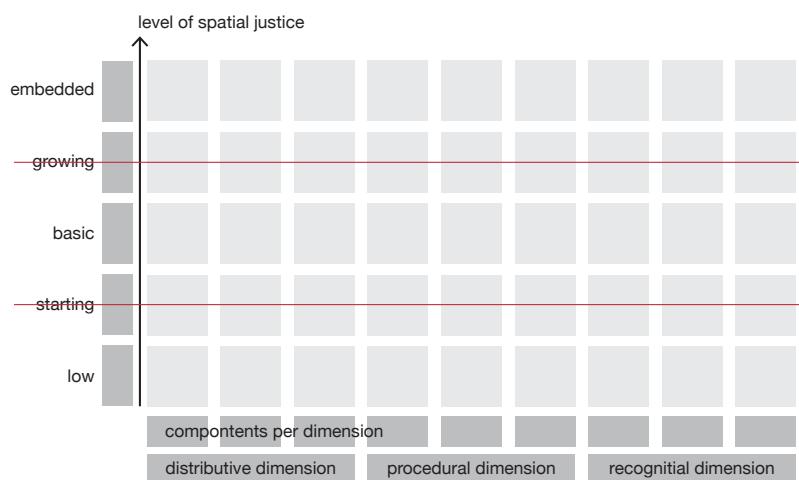
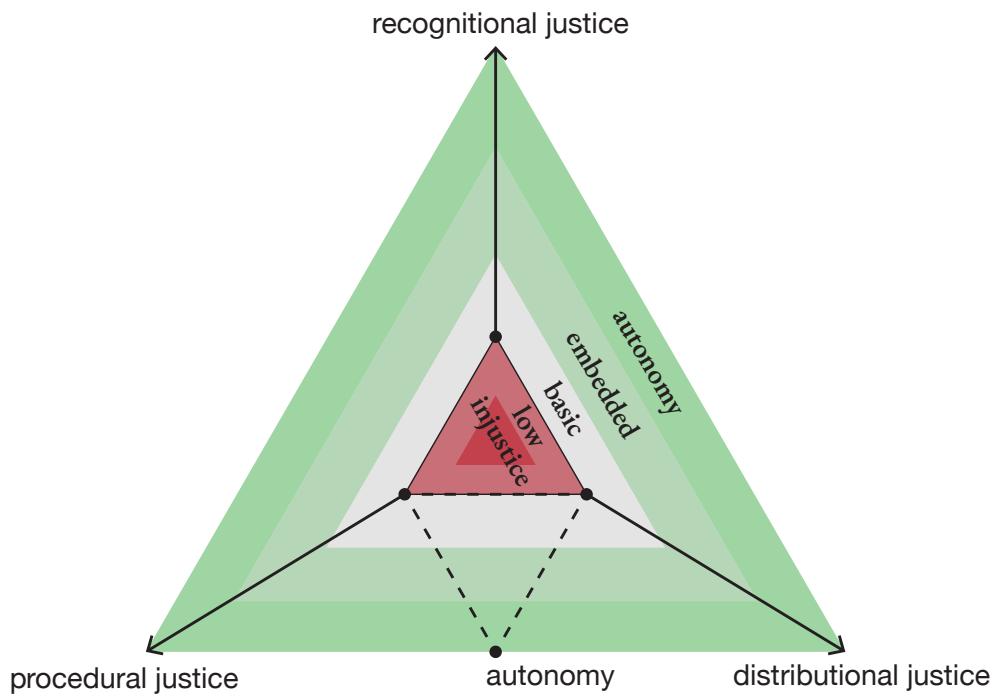
First of all, the original benchmarking tool is developed "for measuring application of justice considerations in urban governance x and planning of a city or region, assisting evaluation and reflection. It defines "levels of justice", from "Low" to "Embedded", by assigning a score of the attainment of what is being assessed against the highlighted components of the Spatial Justice Conceptual Model." (Lopez et al., 2024). To adapt it to speculative spatial configurations and urban governance scenarios, the descriptions of the various levels have been altered slightly. The alteration of the text boxes focussed on describing the level of justice in (speculative) situations in the scenarios, instead of the consideration of justice in spatial planning documents. This way, the scope of the tool has changed to speculative socio-spatial design with scenarios.

Autonomy

In the assessment of the scenarios, autonomy is seen as both an extra, complementary dimension of spatial justice and as a value that constitutes a "supreme level" of spatial justice. This rationale is exemplified in the diagram on the top right. It shows the three dimensions of justice, and the "levels of justice" at which a situation can be assessed on. These levels are autonomy, embedded spatial justice, basic spatial justice, low spatial justice or spatial injustice.

Broader Evaluation Levels

Since the scenarios speculate on radical futures where severe spatial injustice or on the other hand autonomous governance or spatial design and planning could occur, these instances have to be considered in the assessment. Therefore, the levels "growing" and "starting" spatial justice are removed, and "spatial injustice" and "autonomy" were added. This alteration is visualised on the bottom right.



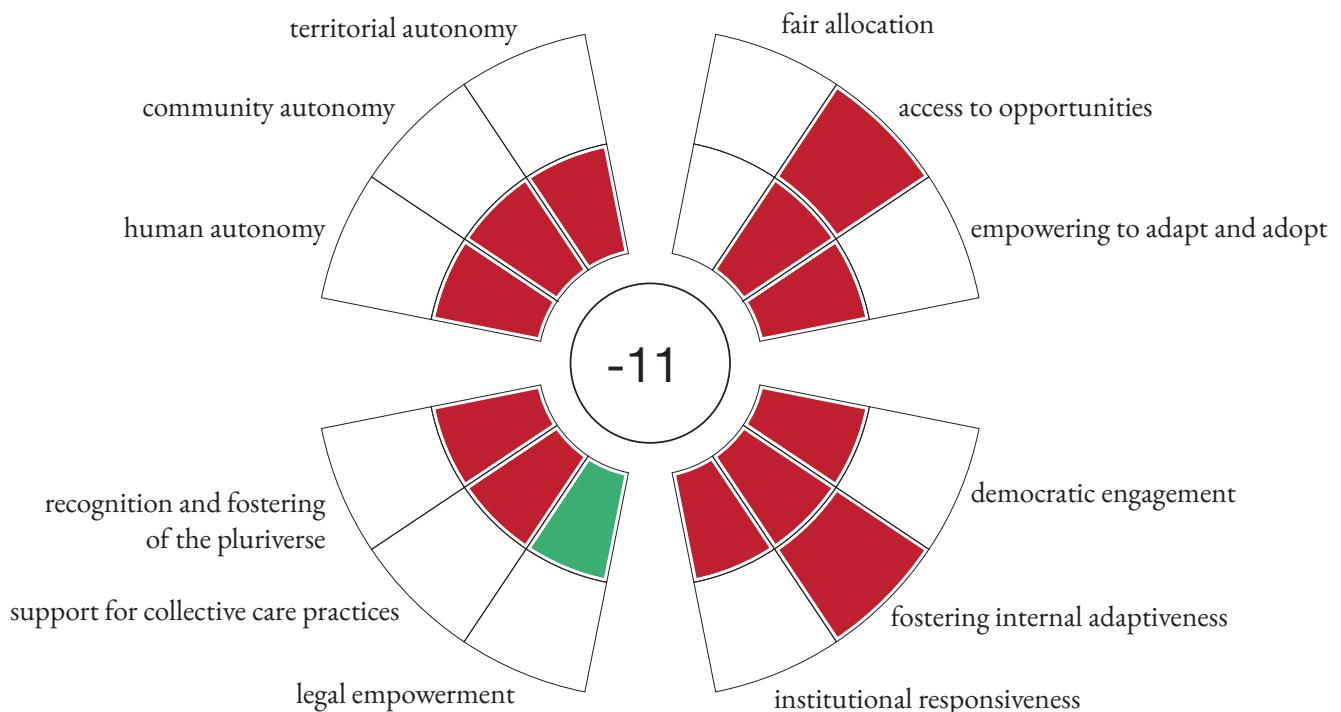
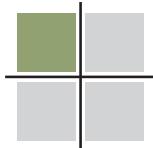
Framework

Adapted from Lopez et al. (2024). For the original framework and the process of adaptation, see Appendix B.

AUTONOMY	There is fair allocation of benefits and burdens across the city. This allocation is autonomously and democratically decided upon across several scales and is representative of the needs and capabilities of the communities and environment.	The access to benefits and burdens across the city is autonomously and democratically decided upon across several scales and is representative of the needs and capabilities of the communities and environment.	Citizens have autonomous agency in the appropriation of benefits and burdens across the city, according to the needs and capabilities of the communities and environment.	Citizens have an autonomous and decisive role in decision-making processes through deliberative democratic models across several scales.
	There is fair allocation of benefits and burdens across the city in decision-making processes.	There is equal access to benefits and burdens across the city in decision-making processes.	There are broad and thorough considerations for the appropriation of benefits and burdens across the city in decision-making processes.	Citizens are broadly engaged in decision-making processes on all topics and across scales.
	There are partial considerations in decision-making processes about the allocation of benefits and burdens across the city.	There are partial considerations in decision-making processes about the access to benefits and burdens across the city.	There are partial considerations about the appropriation of benefits and burdens across the city.	Citizens are partly engaged in decision-making processes on some, pre-determined topics (policies, regulations, standards, etc).
	There is little to no consideration in decision-making processes for how benefits and burdens are distributed across the city.	There is little to no consideration in decision-making processes for the access to benefits and burdens across the city.	There is little to no consideration for the appropriation of benefits and burdens across the city.	Citizens are minimally engaged in decision-making processes. If there is any engagement, it is not actually taken into account in policy, planning and projects (tokenism).
	The spatial distribution of benefits and burdens is utilised as a means to exclude one or more communities from access to the benefits and/or to impose burdens disparately.	There are efforts to narrow people's ability to reach and benefit from key opportunities, with implications for affordability, availability and connectivity.	Individuals and groups are actively limited in the appropriation of benefits and burdens across the city.	Citizens are actively excluded from decision-making processes through non-democratic means (e.g. executive orders, industry advice groups, regulatory scrutiny boards (EU)).
	JUSTICE COMPONENTS PER DIMENSION <hr/> FAIR ALLOCATION This component focuses on ensuring that resources are fairly distributed to address inequality. It concerns the material or service provision of public goods, basic services, cultural goods, economic opportunities, and healthy environments.	ACCESS TO OPPORTUNITIES This component highlights efforts to enhance people's ability to reach and benefit from key opportunities. It concerns affordability, availability, connectivity, etc.	EMPOWERING PEOPLE TO ADAPT AND ADOPT This component emphasizes empowering individuals and groups to actively shape and utilise available resources. It concerns the design, programming, and openness to people's agency.	DEMOCRATIC ENGAGEMENT This component focuses on the ongoing involvement of citizens in decision-making processes. The easiness of people to approach the governing institution(s).
JUSTICE DIMENSIONS <hr/>	DISTRIBUTIONAL JUSTICE			

	<p>There are diverse possibilities for internal processes to adapt towards justice. Citizens autonomously and democratically decide on how, for who, and what/ where is being addressed per process.</p>	<p>The governing institution facilitates autonomous citizen decision-making processes on addressing stakeholders in fair, transparent, and sustainable ways.</p>	<p>The governing institution facilitates autonomous citizen decision-making processes on validating disadvantaged individuals and groups in laws and regulations.</p>	<p>The governing institution facilitates autonomous citizen decision-making processes on recognising and including practices of marginalised or non-hegemonic collectives and groups.</p>	<p>The governing institution facilitates autonomous citizen decision-making processes on profound transformation of values to enable novel socioeconomic and institutional arrangements, advocating for considering the values, qualities, and unique socio-spatial dynamics of non-hegemonic cultures and communities.</p>
	<p>There are diverse possibilities for internal processes to adapt towards justice. These processes of adaptation clearly specify how, for who, and what/ where is being addressed.</p>	<p>The governing institution(s) addresses external stakeholders in fair, transparent, and sustainable processes.</p>	<p>There are specific and executed considerations for validating disadvantaged individuals and groups in laws and regulations. There is an acknowledgment of disparities.</p>	<p>There are specific and executed considerations to recognise practices of marginalised or non-hegemonic collectives and groups.</p>	<p>There are specific and executed considerations for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles.</p>
	<p>There are possibilities for internal processes to adapt towards justice and these processes of adaptation clearly specify how it is being addressed.</p>	<p>The governing institutions have partial considerations for addressing external stakeholders in fair, transparent, and sustainable processes, and there is evidence of this in the execution of these processes.</p>	<p>There are partial considerations for validating disadvantaged individuals and groups in laws and regulations.</p>	<p>There are partial considerations to recognise practices of marginalised or non-hegemonic collectives and groups.</p>	<p>There are partial considerations for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles.</p>
	<p>There are very limited possibilities for adapting internal processes (procedures, values, standards, etc) towards justice inside institutions, but the process is not transparent.</p>	<p>The governing institutions have a general concern for addressing external stakeholders in fair, transparent, and sustainable processes, but there is little to no evidence of this in the execution.</p>	<p>There is a general concern for validating of disadvantaged individuals and groups in laws and regulations.</p>	<p>There is a general concern to recognise practices of marginalised or non-hegemonic collectives and groups.</p>	<p>There is a general concern for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles. There is an acknowledgment of their existence and relevance.</p>
	<p>There are no possibilities for adapting internal processes (procedures, values, standards, etc) towards justice inside institutions.</p>	<p>The governing institutions do not address external stakeholders in fair, transparent, and sustainable ways.</p>	<p>There is no consideration for validating disadvantaged individuals and groups in laws and regulations.</p>	<p>There is no consideration to recognise practices of marginalised or non-hegemonic collectives and groups. Some practices of non-hegemonic groups are directly or indirectly counteracted.</p>	<p>There is no consideration for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles.</p>
<p>FOSTER INTERNAL ADAPTIVENESS This component focuses on governing institutions' internal flexibility and adaptability to evolving circumstances, incorporating feedback, and adjusting policies, practices, and programs to better reflect justice considerations.</p>	<p>INSTITUTIONAL RESPONSIVENESS This component focuses on how the institution address external stakeholders. It concerns ensuring that processes are fair, transparent, and sustainable, in views to uphold justice and that it legitimises social sustainability.</p>	<p>LEGAL EMPOWERMENT This component emphasises the importance of legal frameworks in recognising and protecting the intrinsic value and dignity of individuals and groups as moral agents.</p>	<p>SUPPORT FOR COLLECTIVE CARE PRACTICES This component highlights actions to sustain and uplift collective efforts and everyday practices in disadvantaged communities, such as solidarity networks and the management of communal resources.</p>	<p>RECOGNITION AND FOSTERING OF THE PLURIVERSE This component calls for a profound transformation of values to enable novel socioeconomic and institutional arrangements, advocating for considering the values, qualities, and unique socio-spatial dynamics of non-hegemonic cultures and communities.</p>	
<p>PROCEDURAL JUSTICE</p>		<p>RECOGNITIONAL JUSTICE</p>			

Scenario 1: “Organic Fantastic”



EXAMPLE BOX: Manure Crisis



Farmer protesting against manure reduction measures.
[Photograph by Garstman/ANP, 2024]

A recent development in Dutch agriculture that closely aligns with the themes of Scenario 1 is the anticipated manure surplus crisis, often referred to as the "mestcrisis." This situation arises from the Netherlands phasing out its exemption to the European Union's Nitrates Directive between 2023 and 2025. Previously, Dutch farmers were allowed to apply more organic fertilizer than the EU standard, but with the exemption ending, they face stricter limits on manure application (Aan de Burgh, 2024).

This crisis highlights issues of fair distribution of benefits and burdens in light of strong regulation. While the broader agricultural sector may benefit from increased environmental compliance and potential market advantages, individual farmers bear the burden of adapting to new regulations, which may include reducing livestock numbers or investing in manure processing technologies. Access to opportunities is also uneven; larger farms with more resources are better positioned to adapt, whereas smaller operations may struggle. Furthermore, the agency of farmers to adapt is constrained by regulatory frameworks and the need for significant capital investment, limiting their ability to independently manage and utilize resources.

DISTRIBUTIONAL JUSTICE

Fair allocation/distribution of benefits and burdens? For example welfare, health, nutrition and energy.

Fair distribution of access to opportunities?

Do people have agency to adapt and adopt resources through appropriation?

The distribution of benefits and burdens in this scenario is uneven. While large agribusinesses and the national economy profit from export-led organic farming and sustainable energy use, local communities bear the costs—such as land pressure, environmental strain, and the displacement of small farmers. On the other hand, the access to and distribution of nutrition is relatively fair.

Access to new agricultural opportunities largely favours established, well-resourced actors, excluding smallholders and marginalized groups.

Moreover, the top-down governance by the Ministry of Agriculture and Food limits local agency, leaving little space for grassroots innovation or the appropriation of resources by alternative models of food production.

PROCEDURAL JUSTICE

Who is involved in decision-making? Also more-than-humans?

How is the involvement designed?

Are decision-making procedures transparent and flexible to adapt to justice considerations?

Decision-making is primarily concentrated within the Ministry of Agriculture and Food, which sets strategic priorities, allocates funding, and defines regulatory frameworks. This centralised governance structure favours state-aligned, capable actors, such as large-scale agribusinesses and export-oriented producers. Small-scale farmers, migrant workers, and local communities have limited or no influence on shaping the agricultural system. More-than-human actors are considered only in terms of their contribution to the efficiency and market appeal.

The design of involvement prioritizes efficiency, control, and alignment with national economic objectives over inclusivity or dialogue.

RECOGNITIONAL JUSTICE

Is the diversity of values of humans, animals and plants recognised and their dignity protected?

Are collective care practices supported?

Are non-hegemonic values, cultures and practices recognised and fostered?

With strict environmental and food regulation, the governments protect the value of humans, animals and plants in this scenario. But together with strong top-down control over the food system, it could limit a diversity in practices and cultures of production in Westland.

The focus of policy is largely on efficiency and marketability for Westland. This could limit the support of collective care practices. For example, there could be not enough space and capital to sustain community gardens or solidarity networks.

The system privileges state-aligned approaches to agriculture, leaving little room for alternative, locally-driven, or culturally diverse practices.

(HUMAN) AUTONOMY

Are humans self-determinate to act according to their needs and capabilities (e.g. in meaningful work)?

Are communities capable of producing and maintaining themselves by creating and arranging its own parts?

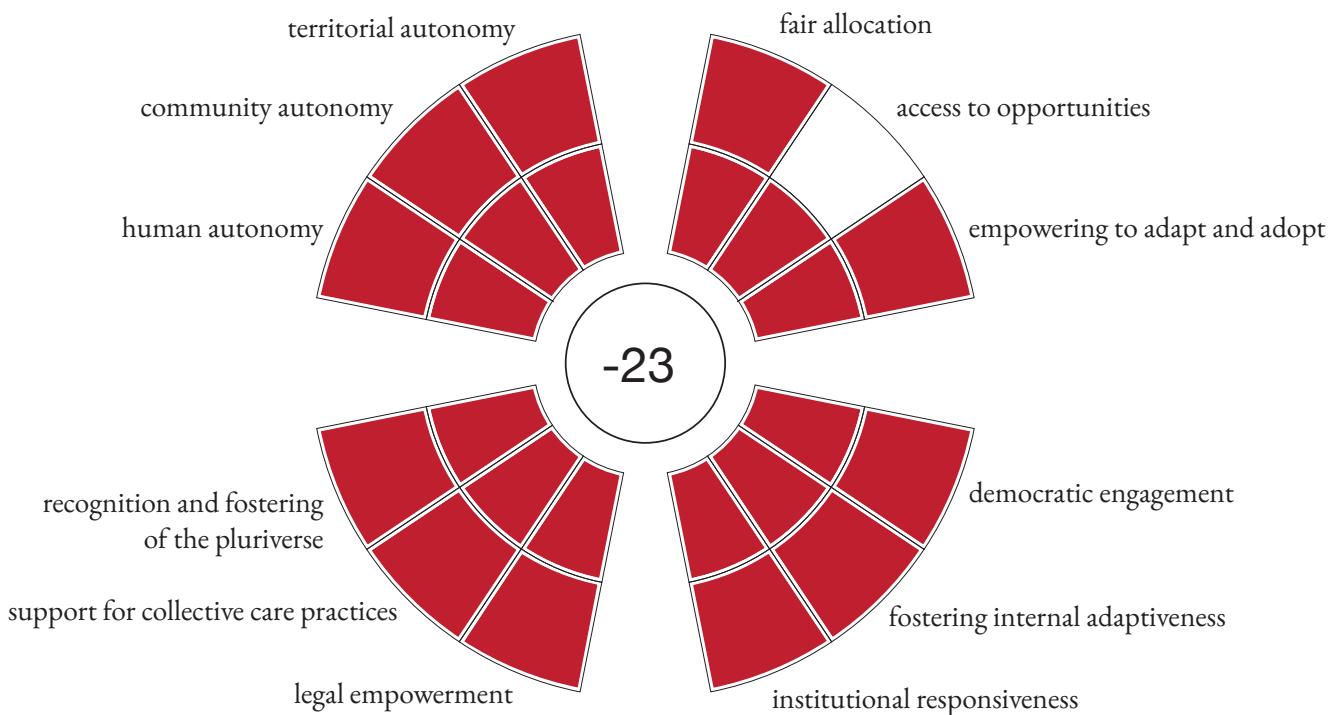
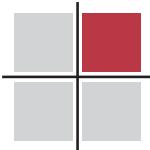
What is the nature of social, political, cultural and environmental relations that shape the territory?

Especially farmers are not able to act according to their needs and capabilities, as decision-making is controlled by the Ministry of Agriculture and Food, limiting autonomy.

Communities, particularly small-scale farmers and marginalized groups, lack the capacity to produce and maintain themselves independently, as the system favours larger agribusinesses and state-driven agendas.

The social, political, cultural, and environmental relations shaping the territory are hierarchical and technocratic, with a strong focus on export-led growth and efficiency, side-lining local needs and cultural diversity.

Scenario 2: “Supersize Me”



EXAMPLE BOX: CAFOs in California



Waste pits at CAFO farms.
[Photograph by McArthur, 2025]

A specific case of multinational food companies pressing environmental and social burdens on local communities, involves concentrated animal feeding operations (CAFOs) in California, USA. CAFOs are frequently operated or supplied by multinational meat and dairy companies. These facilities produce vast amounts of untreated animal waste, stored in large pits or ponds and applied as fertilizer. The resulting air and water pollution disproportionately affects nearby communities, often low-income or communities of colour, leading to undrinkable water, health issues, and degraded local environments. This pattern of environmental injustice is well-documented in regions where industrial agriculture is concentrated, highlighting how the burdens of pollution and resource depletion are shifted onto vulnerable populations while corporations reap the economic benefits (Chrisman, 2020).

Latinx people in California are disproportionately likely to live in communities with dangerously elevated levels of nitrate in the water, from runoff of chemical fertilizer and manure from industrial farms. Most of these communities are low-income as well, and can little afford to buy bottled water if their tap water is not safe (EWG, 2020).

DISTRIBUTIONAL JUSTICE

Fair allocation/distribution of benefits and burdens? For example welfare, health, nutrition and energy.

Fair distribution of access to opportunities?

Do people have agency to adapt and adopt resources through appropriation?

The distribution of benefits and burdens is highly unfair in this scenario, as financial benefits are generated for private actors by imposing large burdens on the Westland communities and environment—scarcity of space and energy, pollution, unhealthy food.

In this scenario, power over the access to opportunities is mainly in the hands of private actors and their shareholders. This could have large negative consequences for fair access to opportunities.

This scenario sees many resources (e.g. fresh water) controlled by private actors and their shareholders. This highly limits the agency of people to adapt and for local communities to influence the direction of agricultural practices or resource use.

PROCEDURAL JUSTICE

Who is involved in decision-making? Also more-than-humans?

How is the involvement designed?

Are decision-making procedures transparent and flexible to adapt to justice considerations?

The decision-making is highly exclusive of citizens, NGO's, more-than-humans because mainly market actors determine the direction of public policy in this scenario.

If there is any, the democratic involvement of citizens or others is likely to be tokenism, that is, with little or no intent of actually incorporating the input.

Decision-making procedures are not particularly transparent or flexible, as the system prioritizes economic growth and competitiveness over social or environmental justice, making it slow or even unable to adapt to emerging justice concerns.

RECOGNITIONAL JUSTICE

Is the diversity of values of humans, animals and plants recognised and their dignity protected?

Are collective care practices supported?

Are non-hegemonic values, cultures and practices recognised and fostered?

The diversity of values of humans, animals, and plants is not fully recognized, and their dignity is not explicitly protected. The system is mostly focused on efficiency rather than the intrinsic value of more-than-human life.

Collective care practices are not supported, as the focus is on large-scale, industrialized agriculture, and decision-making is concentrated in the hands of multinational corporations, leaving little room for community-driven care models.

Non-hegemonic values, cultures, and practices are overlooked, as the system favors globalized, high-tech agricultural approaches, sidelining local, traditional, or alternative practices in favor of uniform, market-driven solutions.

(HUMAN) AUTONOMY

Are humans self-determinate to act according to their needs and capabilities (e.g. in meaningful work)?

Are communities capable of producing and maintaining themselves by creating and arranging its own parts?

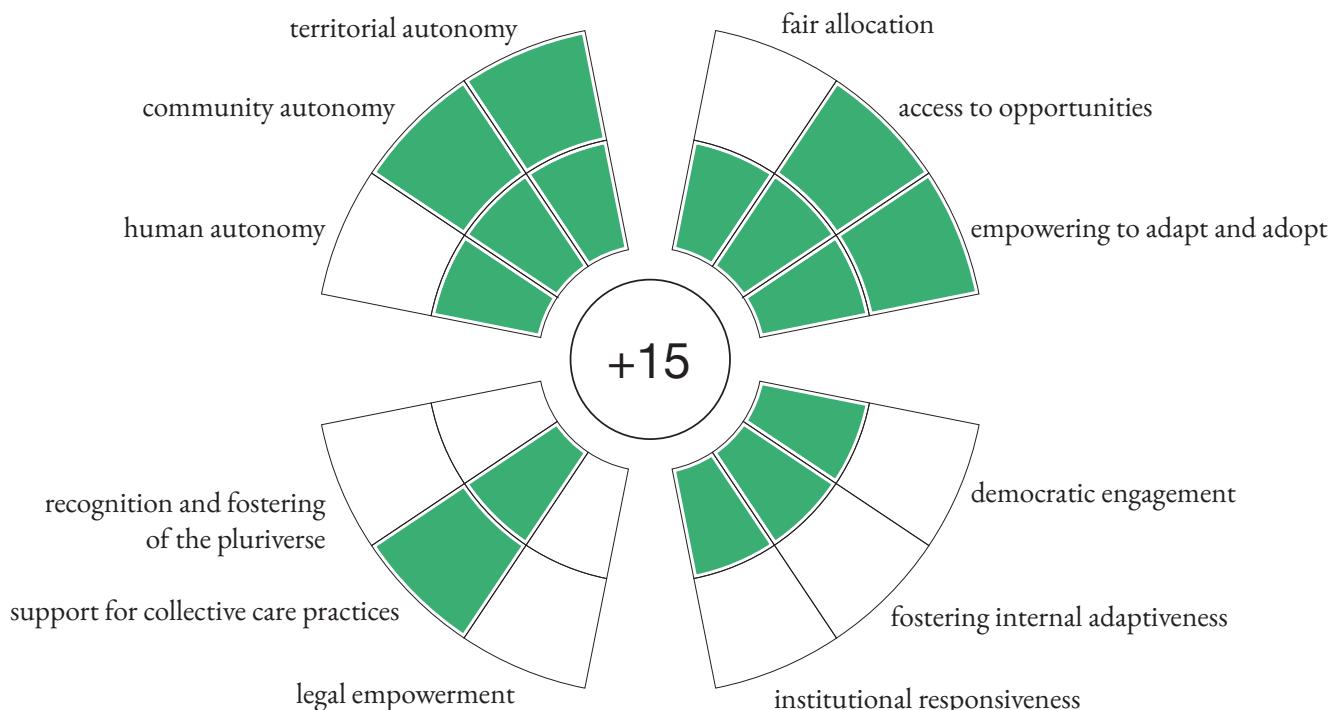
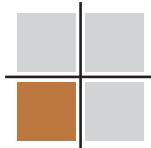
What is the nature of social, political, cultural and environmental relations that shape the territory?

There is a very high chance of precarious labour conditions in this scenario, as multinational corporations provide most of the work but also control these conditions.

Communities are not capable of fully producing and maintaining themselves, as land and resources are increasingly controlled by large corporations, leaving local populations reliant on external forces for their livelihoods.

The social, political, cultural, and environmental relations shaping the territory are dominated by a technocratic, market-driven approach, where power rests with multinational actors and the state, while environmental and cultural diversity are subordinated to economic efficiency and forces of global trade.

Scenario 3: “Home Grown”



EXAMPLE BOX: Andhra Pradesh



Farmer in Andhra Pradesh, India.

[Photograph by UN Food Systems, 2021]

Andhra Pradesh, India is a leading example of how transitioning to an agro-ecological food system can enhance spatial and social justice. The programme has reached 1.05 million farmers and farmworkers across 3730 villages, with a vision to enrol all 6 million farmers and farmworkers and cover all the crops by 2027, and complete the transformation by 2030 (Kumar, 2021).

By supporting smallholder farmers to adopt sustainable, community-driven farming, the transition has:

- empowered small farmers and improved their livelihoods;
- promoted fairer distribution of benefits and greater community participation;
- strengthened local food networks and economies;
- increased opportunities for women and marginalized groups;

This case demonstrates how agroecological transitions, when supported by policy and community engagement, can lead to more equitable spatial and social arrangements in food systems, directly addressing issues of resource distribution, participation, autonomy and justice (Sinclair et al., 2019, pp. 24-26).

DISTRIBUTIONAL JUSTICE

Fair allocation/distribution of benefits and burdens? For example welfare, health, nutrition and energy.

Fair distribution of access to opportunities?

Do people have agency to adapt and adopt resources through appropriation?

The allocation of benefits and burdens is relatively fair, as the local food system supports health, nutrition, and ecological welfare through seasonal diets, low-impact farming, and shared stewardship of the land. The burdens—such as lower productivity and limited access to global goods—are more evenly distributed across society and accepted as trade-offs for sustainability and autonomy.

Access to opportunities is more equitable, with small-scale farming, local trade, and community-based education offering inclusive pathways. The access is however quite limited geographically due to the very local scale of the food economy.

People have strong agency to adapt and adopt resources through appropriation, as the system is decentralized and community-driven. Individuals and groups actively shape their food environments and contribute to their maintenance and evolution.

PROCEDURAL JUSTICE

Who is involved in decision-making? Also more-than-humans?

How is the involvement designed?

Are decision-making procedures transparent and flexible to adapt to justice considerations?

Decision-making is highly localized and participatory, involving farmers, consumers, community groups, and local institutions. More-than-human actors are considered integral to decision-making. Democratic engagement for larger scale governance could be limited due to the local nature of communities.

The involvement is designed around collective governance structures, such as cooperatives, guilds, and local assemblies, which foster inclusive deliberation and shared responsibility. Rigid, small social networks may however limit the internal adaptiveness.

Decision-making procedures are grounded in face-to-face interactions and ongoing dialogue, which requires extensive administrative efforts to remain transparent.

RECOGNITIONAL JUSTICE

Is the diversity of values of humans, animals and plants recognised and their dignity protected?

Are collective care practices supported?

Are non-hegemonic values, cultures and practices recognised and fostered?

In Scenario 3, the diversity of values of humans, animals, and plants is actively recognized and their dignity is respected through nature-inclusive farming and ecologically sensitive land use. More-than-human life is seen not just as a resource but as a co-constitutive part of the food system.

Collective care practices are integral, with community farming, knowledge-sharing, and cooperative maintenance of land forming central aspects of daily life. These practices reinforce social cohesion and shared responsibility.

Local traditions, ecological knowledge, and alternative food traditions are not only preserved but seen as essential to resilience and autonomy in this. Non-hegemonic values, cultures, and practices could therefore be recognized and fostered.

(HUMAN) AUTONOMY

Are humans self-determinate to act according to their needs and capabilities (e.g. in meaningful work)?

Are communities capable of producing and maintaining themselves by creating and arranging its own parts?

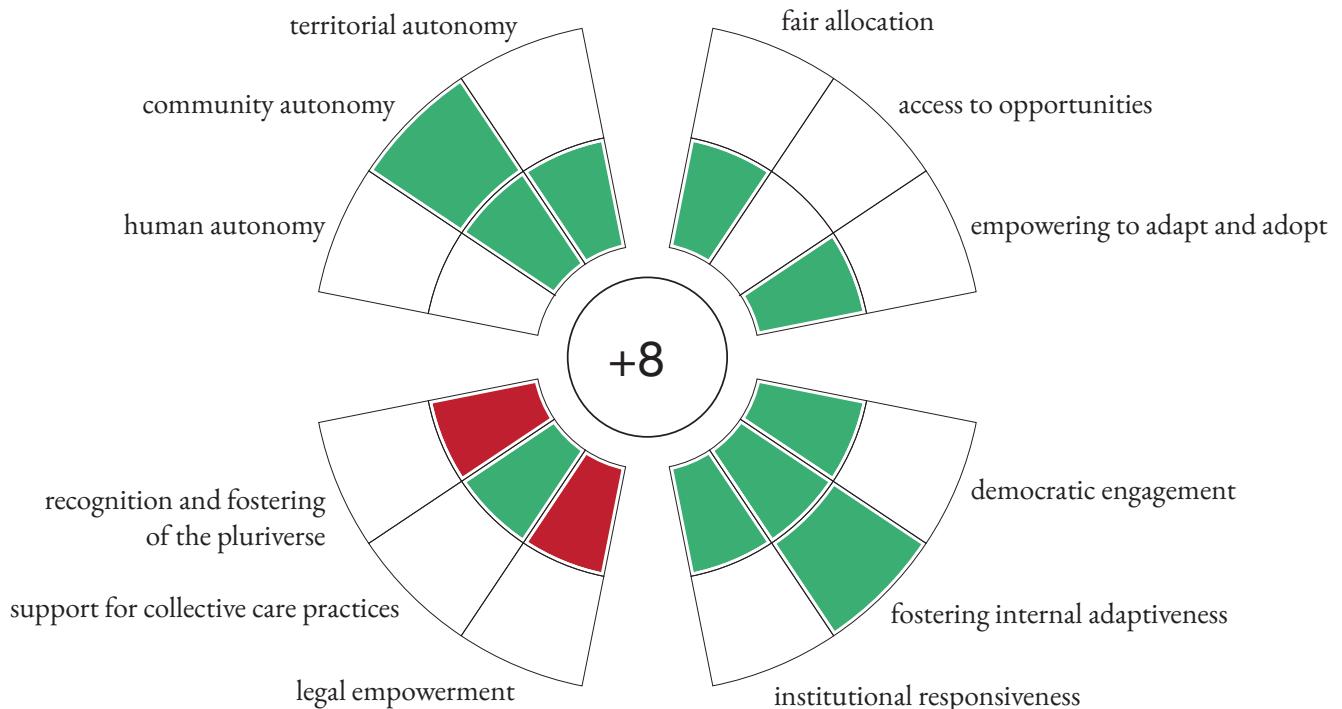
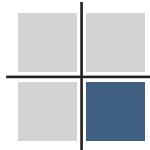
What is the nature of social, political, cultural and environmental relations that shape the territory?

Humans are largely self-determinate, engaging in meaningful work aligned with their needs, values, and ecological context. Farming, trading, and knowledge-sharing are purposeful activities rooted in care and community.

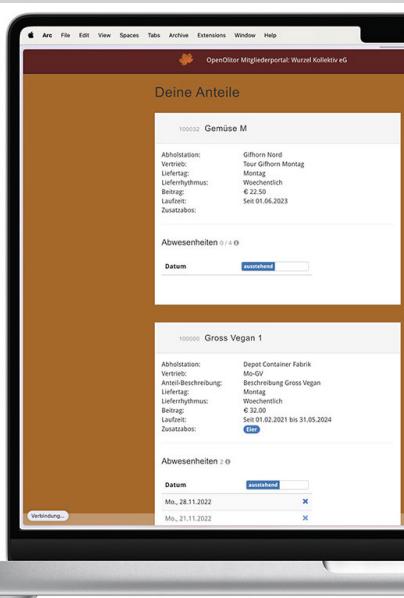
Communities are capable of producing and maintaining themselves through localized food systems, cooperative structures, and shared ecological stewardship. They actively shape and sustain their environments based on interdependence and self-organization.

The territory is shaped by relational, place-based social, political, cultural, and environmental dynamics. Trust, reciprocity, and ecological ethics underpin interactions, fostering a resilient, inclusive, and context-sensitive mode of territorial governance.

Scenario 4: “Veggie Valley”



EXAMPLE BOX: OpenOlitor Open Source Software



The OpenOlitor Platform
[Image by OpenOlitor & Reset, 2024]

OpenOlitor is a commons-based digital platform designed explicitly for community supported agricultures (CSAs), providing open-source tools to manage member subscriptions, deliveries, invoicing, and communication. Used by over 15 CSA groups across Europe, it embodies collaborative governance and shared digital infrastructure (Lucks, 2024).

OpenOlitor exemplifies how commons-based digital platforms can empower CSAs to operate efficiently while preserving their cooperative ethos. By combining open-source development with shared governance, it offers a replicable model for sustainable, community-driven food systems.

On the other hand, the openness and accessibility for usage and especially (deciding about) the development of platforms like these is conditioned by a certain digital literacy and continuous learning.

DISTRIBUTIONAL JUSTICE

Fair allocation/distribution of benefits and burdens? For example welfare, health, nutrition and energy.

Fair distribution of access to opportunities?

Do people have agency to adapt and adopt resources through appropriation?

The allocation of benefits and burdens is relatively fair, with healthy nutrition and local food access prioritised through advanced but localized production systems. However, the complexity of high-tech infrastructure may impose uneven burdens, on those less equipped.

The distribution of access to opportunities is broad but conditioned by access to education, digital tools, and participatory platforms.

People do have agency to adapt and adopt resources through appropriation, especially through flexible tools, for example “farming-as-a-service” platforms, and open-source innovation. However, this agency operates within a highly mediated digital environment that can both empower and limit autonomy depending on individual capacities.

PROCEDURAL JUSTICE

Who is involved in decision-making? Also more-than-humans?

How is the involvement designed?

Are decision-making procedures transparent and flexible to adapt to justice considerations?

Participatory platforms and data-driven tools facilitate collective governance, allowing for more inclusive input into food system decisions, while more-than-human considerations are integrated into decision-making through for example virtual reality.

Open-source data systems, advisory platforms, and structured participatory processes, enable continuous feedback and collaborative experimentation. This setup encourages deliberation and adaptive planning.

Decision-making procedures are transparent and designed to be flexible, relying on accessible platforms, data and participatory tools. However, the complexity of these systems may limit accessibility for some, requiring ongoing efforts to support inclusion and justice.

RECOGNITIONAL JUSTICE

Is the diversity of values of humans, animals and plants recognised and their dignity protected?

Are collective care practices supported?

Are non-hegemonic values, cultures and practices recognised and fostered?

More-than-human actors are still largely viewed through a utilitarian lens—focused on enhancing agricultural efficiency and environmental outcomes rather than as intrinsic stakeholders with inherent rights.

Collective care practices are supported, particularly in the form of collaborative learning platforms, and open-source knowledge networks. Solidarity networks could be organised digitally.

Non-hegemonic values, cultures, and practices are partially recognized and fostered, especially through the openness of innovation platforms and participatory governance. The overall framework does lean heavily on technological solutions, potentially limiting the prominence of more traditional or culturally specific food practices that don't align with the high-tech focus.

(HUMAN) AUTONOMY

Are humans self-determinate to act according to their needs and capabilities (e.g. in meaningful work)?

Are communities capable of producing and maintaining themselves by creating and arranging its own parts?

What is the nature of social, political, cultural and environmental relations that shape the territory?

Individuals could experience a relatively high degree of self-determination, particularly in terms of engaging with food production in meaningful ways. The work is more knowledge-intensive and locally rooted, allowing for more agency than in conventional industrial systems. Again, this is conditioned by high accessibility to education and digital literacy.

Communities show a strong capacity to produce and maintain themselves. The food system is decentralized and locally oriented, with technologies and data infrastructures enabling communities to design, manage, and adapt their own productive environments.

The territory is shaped by relations that are characterized by communality and adaptability, shared responsibility, and learning.

Comparison

Distributional Justice

In terms of distributional justice, Scenario 3 presents the most equitable model: access to healthy food, land, and livelihoods is widely shared, and the burdens of food production are minimal and locally managed. Scenario 4 performs moderately well—while high-tech tools provide opportunities, disparities may still exist based on access to knowledge and digital infrastructure. Scenario 1 displays uneven distribution: while economic benefits accrue to agribusinesses and the state, local communities bear the burdens of environmental pressure and displacement. Scenario 2 illustrates a highly inequitable model, where profits concentrate among multinationals while communities and ecosystems are forced to absorb the burdens through degraded environments, limited work options, and exclusion from land and decision-making.

Procedural Justice

Procedural justice is strongest in Scenario 4, where decision-making is participatory, data-informed, and decentrally distributed across public and private actors. People have access to governance tools, and diverse voices can shape outcomes. Scenario 3 also performs well, with community-based decision-making and an emphasis on local knowledge and cooperative governance structures. Scenario 1 and Scenario 2, by contrast, are marked by top-down, technocratic governance. In Scenario 1, the Ministry of Agriculture controls the system with limited room for grassroots or community input, while in Scenario 2, corporate interests dominate, and procedural transparency is minimal. In both, more-than-human perspectives are not structurally included in decision-making processes.

Recognitional Justice

Recognitional justice is most fully realized in Scenario 3, where the intrinsic value of humans, animals, and plants is explicitly respected. Because the food system is guided by ecological principles, biodiversity is nurtured, and non-human actors are acknowledged as part of a coexistent landscape. Scenario 4 also demonstrates significant recognitional justice, though in a more techno-centric way; advanced technologies and data systems allow for detailed attention to environmental needs, and non-human life is valued as part of complex adaptive systems. In contrast, Scenario 1 acknowledges ecological health of the region primarily as a vessel for its economic or branding benefits (organic food exports), while more-than-human values are not given intrinsic consideration. Again, scenario 2 fares the worst in this regard: ecosystems and non-human life are subordinated to economic productivity, and the creation of 'sacrifice zones' suggests a systemic disregard for intrinsic human and more-than-human values.

Autonomy

Autonomy is most strongly expressed in Scenario 3, where individuals and communities have significant control over their food systems and livelihoods. People engage in meaningful work grounded in ecological stewardship, and community networks manage local markets, production, and landscape care. The territory is shaped by socially embedded, culturally rich, and ecologically grounded relations. Scenario 4 also supports a relatively high level of autonomy, though it is mediated by access to technology and data systems. Individuals can experiment

with food production, and communities are involved in shaping their environments through participatory tools and platform-based collaboration. However, reliance on technical infrastructure may limit autonomy for those lacking access or expertise. Scenario 1 offers limited autonomy; while organic practices suggest some local engagement, the top-down governance and export-oriented focus restrict the ability of people and communities to shape the system according to their own needs. The social fabric is subordinate to economic and regulatory logics. Scenario 2 reflects the lowest autonomy: most land is controlled by multinational corporations, labour is largely de-skilled or displaced, and the region functions primarily as a node in global supply chains. Social and environmental relations are shaped by industrial efficiency rather than community agency or ecological reciprocity.



VIII. Praxis

This chapter includes the design process that unfolds in answering research questions 3.1 and 3.2:

[3.1] How can radical imaginaries inform spatial planning to rethink the Westland horticultural landscape towards spatial justice and autonomy?

[3.2] How can urban design interventions facilitate this?

The chapter comprises two parts, the policy recommendations and the radical project.

Recommendations

A Spatially Just and Adaptive Framework

As accommodated for in the scenarios-thinking exercise, there are multiple spatial and institutional conditions in Westland which are subjected to various complex and temporal uncertainties, for example the global food market, local socio-political climate or the actual climate and related sea-level rise. Instead of proposing a definitive design or master plan, the final part of the thesis looks into spatial design methodologies that can propose inclusive strategies and indeterminate conditions that can allow for an adaptive, holistic approach to tackling the complex spatial justice challenges of the horticultural landscape of Westland.

From Creative Destruction to Adaptation

The other supposed impact of allowing for an adaptive, holistic approach to planning, is related to theory of Swyngedouw (1992) about the production of space by capital and the other way around. It poses that space, like technology, functions as a productive asset. Specific spatial configurations—through their location, infrastructure, and institutional setup—enhance the productive capacity of capital.

For instance, changed spatial configurations (e.g. transportation networks) create new economic advantages. As capital seeks to overcome spatial barriers, for example by building a new vegetables distribution centre, it creates new spatial configurations. This reflects capital's need to revolutionize the production process continually, and in this creative process, destroy old spatial configurations: creative destruction (Schumpeter, 1943).

When allowing for adaptive, inclusive design strategies, the process of creative destruction of assets is limited, since the plan for reconfiguring the space takes into account existing capital and assets by allowing for gradual transition or retrofitting of spaces towards new configurations that align with sustainability and justice values.

Policy Actions

Coming from the synthesis of preceding research and design in this thesis, multiple needs to attain spatial justice in Westland are identified. These needs are to be addressed through policy, for which the table on the right proposes directions for action. Furthermore, key stakeholders in developing this policy are identified, together with possible synergies between policy actions. Below, some already existing examples of the impacts of successful policy action are mentioned.

Neighbourhood Community Restaurants

Healthy and sustainable eating presents a significant challenge within the current food system, where nutritious food is often more expensive and unhealthy options are widely available. In 2021, 50% of Dutch adults were overweight, with 14% classified as obese. This issue contributes to rising healthcare costs, amounting to €8 billion annually (€11,500 per person) (Hecker et al., 2022), while 30% of all food is wasted (Voedingscentrum, n.d.). Individuals with low incomes (14% of the population) face additional barriers to accessing healthy food. Furthermore, an increasing number of people live alone, which contributes to the consumption of unhealthy ready-made meals.

Across the Netherlands, volunteers are initiating local food projects, supported by policies such as the City Deal for a Healthy and Sustainable Food Environment and the Healthy and Active Living Agreement (GALA). An example of this are community restaurants, where residents can access nutritious, home-cooked meals at cost price, have many positive effects. These initiatives foster social connections, reduce health disparities, and promote the consumption of locally sourced food (Agenda Stad, 2024). Successful examples are multiple, with Social Urban Garden Rotterdamse Munt as a reference that combines gardening with collective meals, social events and reproduction of knowledge through workshops.

Potential spatial synergies are existing community and neighbourhood organisations, urban agriculture and food system actors with food surpluses. Policy requirements are structural funding and accessibility and inclusivity.

Area Cooperative

The instalment of an area cooperative can help democratising zoning plan changes. The cooperative includes farmers, nature organisations, recreational entrepreneurs and all others who want to contribute to the development of the area. Entrepreneurs and social organisations that agree to the target vision and contribute to its realisation can become members of the area cooperative. Private individuals who want to participate can join one of the organisations participating in the cooperative. The target vision can then facilitate bottom-up input and collaboration in the actualisation of the zoning plan by municipality officials. This is in contrast with the mere retrospective feedback citizens can currently provide to zoning plans. An important policy requirement is the recognition of the legitimacy of area cooperative target visions in zoning plan processes.

A successful example of this model is the Rhoon Gebiedscoöperatie (n.d.), where a new zoning plan that includes nature-inclusive agriculture has been accepted after deliberative description-making of the cooperative on this.

	Need for spatial justice	Addresses	Policy actions	Key Stakeholders	Synergies
1	fair distribution of benefits of horticultural production (=healthy nutrition, knowledge reproduction, social networks)	distributional justice, regional-, communal-, individual autonomy	<ul style="list-style-type: none"> foster community supported agriculture initiatives (e.g. by giving priority to horticultural land sales in zoning plans) and cooperative local food retail business models 	<ul style="list-style-type: none"> CSA organisations municipality residents greenhouse businesses 	6
2	fair distribution of the burdens of horticultural production (= CO2 emissions, pollution, scarcity of public space and spatial quality, low biodiversity and damaged ecosystems)	distributional justice	<ul style="list-style-type: none"> instigate a governmentally issued 'licence to produce' that prescribes local environmental and social responsibility into the business operations (e.g. limited pesticide usage/containment): this can for example lower taxing on products remove tax benefits on fossil fuel usage while correspondingly subsidising transitions to geothermal energy or unheated nature-inclusive greenhouse/open field cropping, to protect small greenhouse businesses' and farmers' livelihoods in the transition 	<ul style="list-style-type: none"> national government ministry of finance province greenhouse businesses waterschap scientific monitoring 	1
3	respecting and protecting the rights and values of all horticultural workers	recognitional justice, individual autonomy	<ul style="list-style-type: none"> mandatory civil registration of international workers: enables health insurance and monitoring long term contract possibility together with possibilities for agricultural practice based-education / training in less busy months housing on-site or within Westland municipality 	<ul style="list-style-type: none"> international workers greenhouse businesses municipality labour unions 	1
4	fostering (collective) care practices that support and protect individuals and groups in vulnerable conditions	recognitional justice, communal autonomy	<ul style="list-style-type: none"> foster and support (new initiatives for) solidarity networks by combining it with community gardening and restaurants, collective meals, and arts and crafts (Reference: Social Urban Garden Rotterdamse Munt) 	<ul style="list-style-type: none"> community centres, gardens and stores (e.g. Boerengoed) municipality 	1
5	foster the appropriation of automation technologies for social and ecological care	distributional justice, individual autonomy	<ul style="list-style-type: none"> support inclusive research into and design of agro-ecological/horticultural automation technologies that enable meaningful hybrid agricultural work 	<ul style="list-style-type: none"> national government WUR and other knowledge institutes farmers and workers 	3
6	include more diverse horticultural and agricultural definitions in zoning plans and environmental regulation	procedural justice	<ul style="list-style-type: none"> diversify zoning plan classifications to include agro-ecological or nature-inclusive practices as well as intensive/high tech closed environment greenhouse-practices to remove the dichotomy between agriculture and nature and with that broaden the toolset of spatial planners 	<ul style="list-style-type: none"> municipality nature-inclusive farming experts ecology experts urban planners 	1,6
7	democratic engagement of citizens, workers and more-than-human stakeholders in envisioning a future Westland	procedural justice, regional-, communal autonomy	<ul style="list-style-type: none"> "Glass New Deal 2040": participatory planning project to co-design the spatial future of Westland through the UP2030 planning cycle area cooperatives (reference: Gebiedscoöperatie Buijtenland van Rhoon) 	<ul style="list-style-type: none"> see next page 	



STAKEHOLDERS

are involved in every step

- greenhouse owners & farmers
- local citizens
- intergenerational representatives
- (international) horticultural workers
 - by scouting community representatives
 - through labour union
- more-than-human representatives
 - Natuurmonumenten
 - Milieudefensie
- business representatives
 - LTO & MKB Westland
 - Greenport
- Food system NGO's
 - Food Hub
 - Slow Food Network
- local community networks
- knowledge institutes
 - WUR, TUD, EUR
 - Louis Bolk Instituut
 - DRIFT

Planning for Glass New Deal 2040

As one of the policy actions, I propose to adapt the UP2030 Planning Cycle (Rocco et al., 2024) to the Westland context, and work towards a 'Glass New Deal 2040' that fosters Spatial Justice. The cycle includes *co-design*. Just as polycentric governance promotes the distribution of authority across multiple centres, participatory and co-design approaches decentralize the design process. They disrupt the conventional designer-centric model – where a few experts make key decisions – by sharing design authority among all participants. In this way, design itself becomes a resource that can be shared and appropriated, increasing distributional justice even.

This democratization of design empowers community members by recognizing them as co-creators who bring valuable insights and creative contributions to the table (Rocco et al., 2024).

HOW? Activities

- scalability assessments
- interventions
- evaluate transfers

WHO? Facilitators

- municipality Westland
- Zuid-Holland

HOW? Activities & Methods

- inclusive public consultations
- community mapping
- equity impact assessments

WHO? Facilitators & Responsibilities

- municipality Westland: facilitate
- scientific experts: provide facts-based analysis

EVALUATION
AND ADJUSTMENT

9

IMPLEMENT
& TEST
PROTOTYPES

8

CO-DESIGN
INTERVENTION

7

HOW? Activities & Methods

- prototype farms
- prototype public spaces
- pilot labour projects
- share findings beyond Westland (UPTAKE)

WHO? Facilitators & Responsibilities

- municipality project leads

HOW? Activities & Methods

- public space design excursions
- repurpose and retrofit existing buildings and infrastructure
- devolve the scope to town scale

WHO? Facilitators & Responsibilities

- urban designers and planners
- architects

HOW? Activities

- besides effectiveness
- inclusiveness
- moral imagination
- participatory
- refine governance
- financial mechanisms

WHO? Facilitators

- strategic design
- municipality Westland
- Zuid-Holland

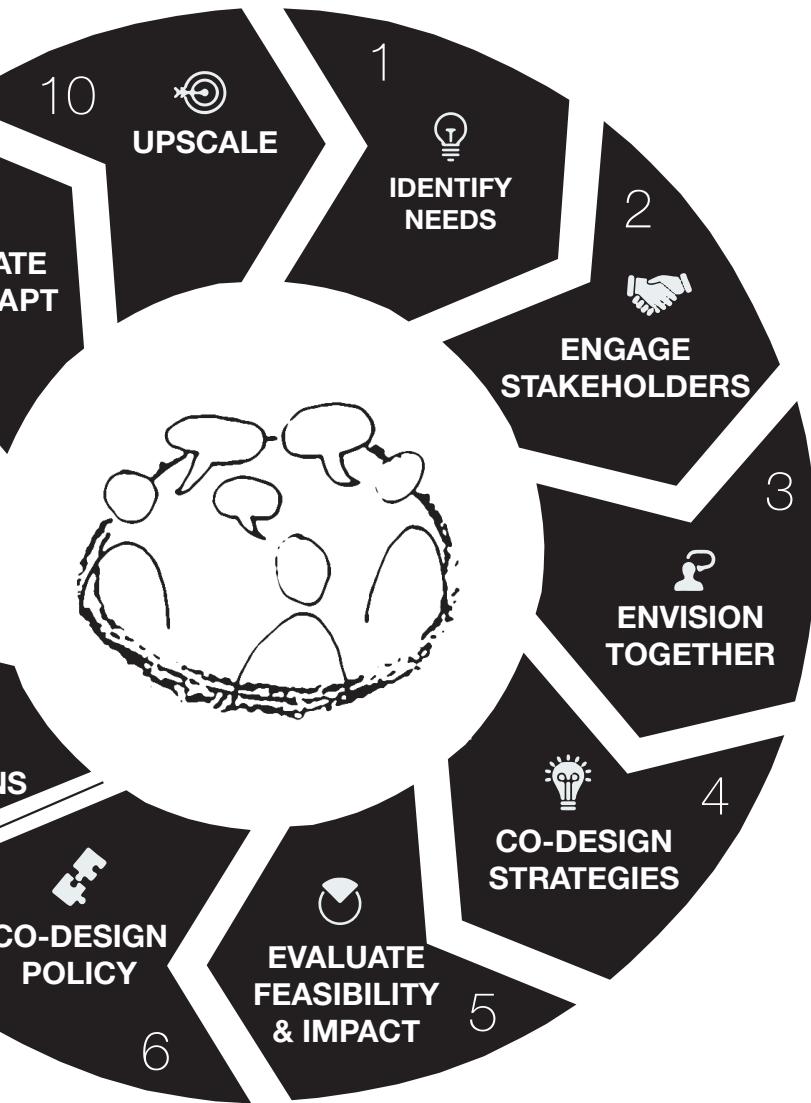
devolution of the scope:
parallel processes for towns



& Methods
ments of strategies and

ability

ors & Responsibilities
estland & province



HOW? Activities & Methods

- inclusive public consultations
- community mapping
- GIS-based analysis
- digital engagement platforms
- spatial justice indexing
- public space audits with stakeholders

WHO? Facilitators & Responsibilities

- municipality Westland: facilitate
- scientific experts: provide facts-based analysis and input

HOW? Activities & Methods

- detailed stakeholder mapping
- scouting stakeholder representatives (e.g. community activists, lobbyists, nature associations)
- train stakeholders in participatory skills (UPSKILL)

WHO? Facilitators & Responsibilities

- municipality Westland: campaign and facilitate

HOW? Activities & Methods

- artistic contributions
- storytelling workshop
- scenarios thinking
- multi-species parlement
- design living labs and experiments (UPGRADE)

WHO? Facilitators & Responsibilities

- visual design-thinking designers
- storytellers
- ecologists
- municipality Westland: facilitate

HOW? Activities & Methods

- multidisciplinary design teams per theme
- serious games
- legislative theater
- integrate insights from living labs

WHO? Facilitators & Responsibilities

- strategic designers
- municipality Westland & province Zuid-Holland: facilitate

HOW? Activities & Methods

- digital twin modelling
- equity impact assessment
- evaluate living labs empirical evidence

WHO? Facilitators & Responsibilities

- economists, urban planners, environmental analysts

ies & Methods
iveness: design for equity,
ing workshops
udgetting
nance arrangements and
nisms (UPSCALE)
tors & Responsibilities
nners, policy advisors
Westland & province
d: facilitate



Radical Project

Premise

As final imaginative exercise, the radical project completely rethinks the configuration of the horticultural landscape, hence the preposition 'radical'. This way, I want to contribute to the discourse on just and healthy food landscapes.

The project aims to give insight into a spatial future for Westland that is not only based on the conclusions drawn in this thesis. It is also based on a set of values and premises to which I associate as a designer and thinker. These I will use as a starting point for the radical project, so they are explained below.

Food System within Planetary Boundaries

The planetary boundaries framework draws upon Earth system science. It identifies nine processes that are critical for maintaining the stability and resilience of the Earth system as a whole. Of these processes, six of the boundaries have been transgressed by human activities, creating the risk of large-scale abrupt or irreversible environmental changes which pose existential risks for human civilisation. Examples of transgressed boundaries are biosphere integrity (e.g. biodiversity), CO₂ concentration, biogeochemical flows (phosphate and nitrogen) and freshwater change (Richardson et al., 2023). The current horticultural activities in Westland contribute to the transgression of not only these examples. The premise for the radical project is that the reduction of the excesses towards a food system that operates within planetary boundaries will become the main priority for (inter-)national and local governments as well as the horticultural industry within Westland.

Healthy Nutrition as a Common Good

Strong evidence indicates that food production is among the largest drivers of global environmental change by contributing to climate change, biodiversity loss, freshwater use, interference with the global nitrogen and phosphorus cycles, and land-system change. The EAT-Lancet Commission brings together scientists and experts from various fields of human health, agriculture, political sciences, and environmental sustainability to develop global targets based on the best evidence available for healthy diets and sustainable food production within planetary boundaries. Within the boundaries of food production, the reference diet can be adapted to make meals that are consistent with food cultures and cuisines of all regions of the world. A significant part of the diet is ascribed to vegetables and fruits (Willet et al., 2019). Another premise for the radical project is that Westland, as an important producer of fruits and vegetables, will take on a crucial role in adopting the food-system towards this sustainable diet, since a core ambition for the cluster is formulated as follows: "working on safe and healthy food for ourselves and soon 9 billion people worldwide" (Greenport Westland, n.d.).

Active Citizenship for Democracy

The final premise is based on my belief in democracy as an equitable and fair system for decision-making, and the presumption that a functioning democracy on whatever scale requires active citizenship. Already stressed as a cornerstone of democracy by Aristotle and J.S. Mill, research has shown that a shift in citizens' activities from contestation towards collaboration led to the uptake of citizen-driven discourses and activities in spatial planning (Mattijsen et al., 2019).

Commons Corridors

The project suggests the establishment of Commons Corridors throughout Westland. These corridors will be connecting natural zones, serving as backbones where several nature-inclusive and public functions can attach to. Smaller scale landscape features that improve ecological and landscape quality, such as hedgerows, tree-lines or ditches, spread out from or connect to the corridors.

The hypothesised impact of the project is as follows. The creation of the corridors aims to shift the paradigm from viewing nature as something that must be preserved and protected from human influence to embracing the idea of synergy between ecological regeneration and care and human activities such as horticulture. How would this hypothesised impact become reality? This is explained by the three principles of the Commons Corridors.

Connecting Natural Areas

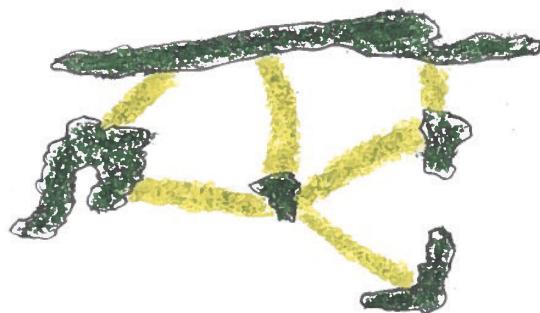
First of all, by creating ecological corridors and stepping stones between existing natural areas, the resilience of the local ecosystem is heightened and biodiversity increased. A healthy ecological network usually is comprised of assigned core areas, corridors inbetween these areas, and buffer zones between other, conflicting land-uses (Bloemmen, 2004). A crucial role in ensuring spatial cohesion in the ecological network of the region is therefore that of corridors.

Environmental Stewardship

One way to promote sustainability is by engaging people in local environmental stewardship—actions by individuals or groups with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes (Bennett, 2018). A promising approach is to extend farmers' roles to include environmental care, creating synergy between agriculture and nature conservation. By doing so, a synergy between agricultural practices and nature conservation is made. Nature-inclusive farmland or horticulture can start to serve as ecological corridors, preserving the cultural landscapes while rethinking the environmental impact of farming. Because stewardship operates within complex socio-ecological systems, continuous monitoring, feedback, and attention to trade-offs are essential. This approach requires active collaboration among farmers, governments, local communities, and other stakeholders. Shared responsibility can help foster a deeper collective commitment to protecting nature and current and future generations, fostering recognitional and distributional Spatial Justice.

Democratic Decision-Making

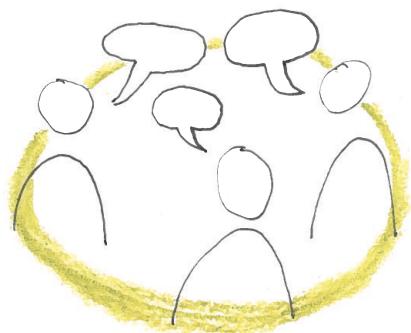
The shared responsibility over the Commons Corridors is manifested in democratic decision-making procedures. By planning and managing the corridors and adjacent nature-inclusive farming plots through deliberative citizen assemblies, diverse voices – especially those of farmers, local communities, and more-than-human stakeholders – are actively involved. This inclusive approach builds trust and legitimacy, balances interests and supports local knowledge and experiments. Next to that, it fosters accountability, because transparent and participatory governance encourages ongoing monitoring and adaptation, reinforcing the shared responsibility over the Commons Corridors. This way, it is ensured that the procedural dimension of Spatial Justice is integrated into the governance of the Corridors, and that the communities caring for the land have autonomy.



Connecting natural areas



Environmental stewardship



Democratic decision-making

Commons Corridors Spatial Concept

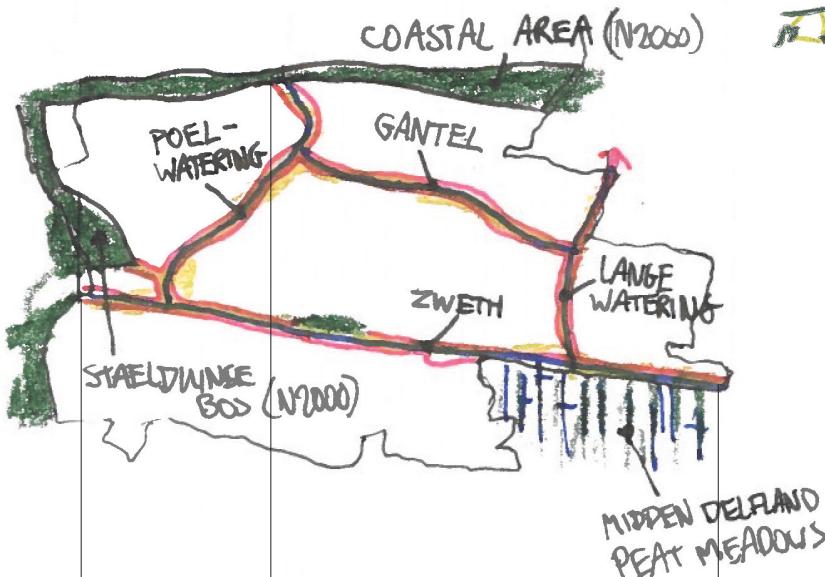
The Corridors are established along current NNN corridors and the Gantel waterway, which is not part of NNN.

The functions that contribute to biodiversity are established adjacent to the corridors, to widen the corridors. These are mainly nature-inclusive, CSA horticulture and agriculture plots. Next to that there are public and collective functions such as educational facilities and farms, community centres and farmers' market

The decision-making system is decentralised and based on local deliberative citizen assemblies.

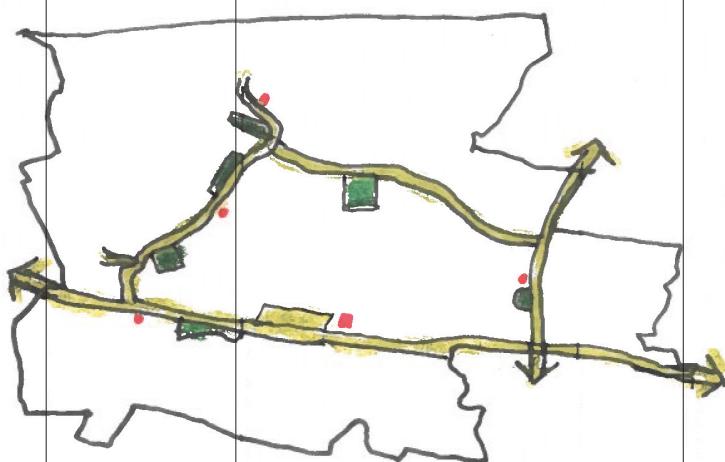


Connecting natural areas



■ natuurnetwerk nederland (NNN)

■ existing natural area



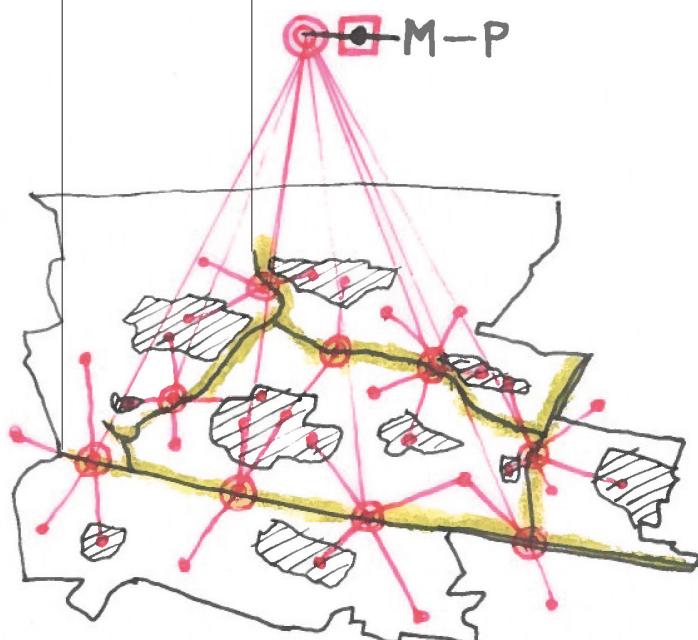
■ multifunctional public programming

■ new natural area

■ nature-inclusive horticulture/agriculture



Environmental stewardship



Democratic decision-making

■ town

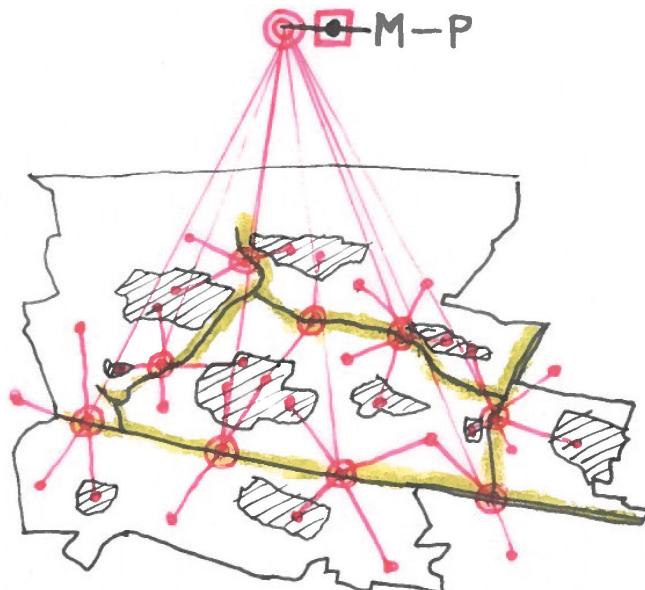
■ local citizen assemblies

■ commons corridors forum

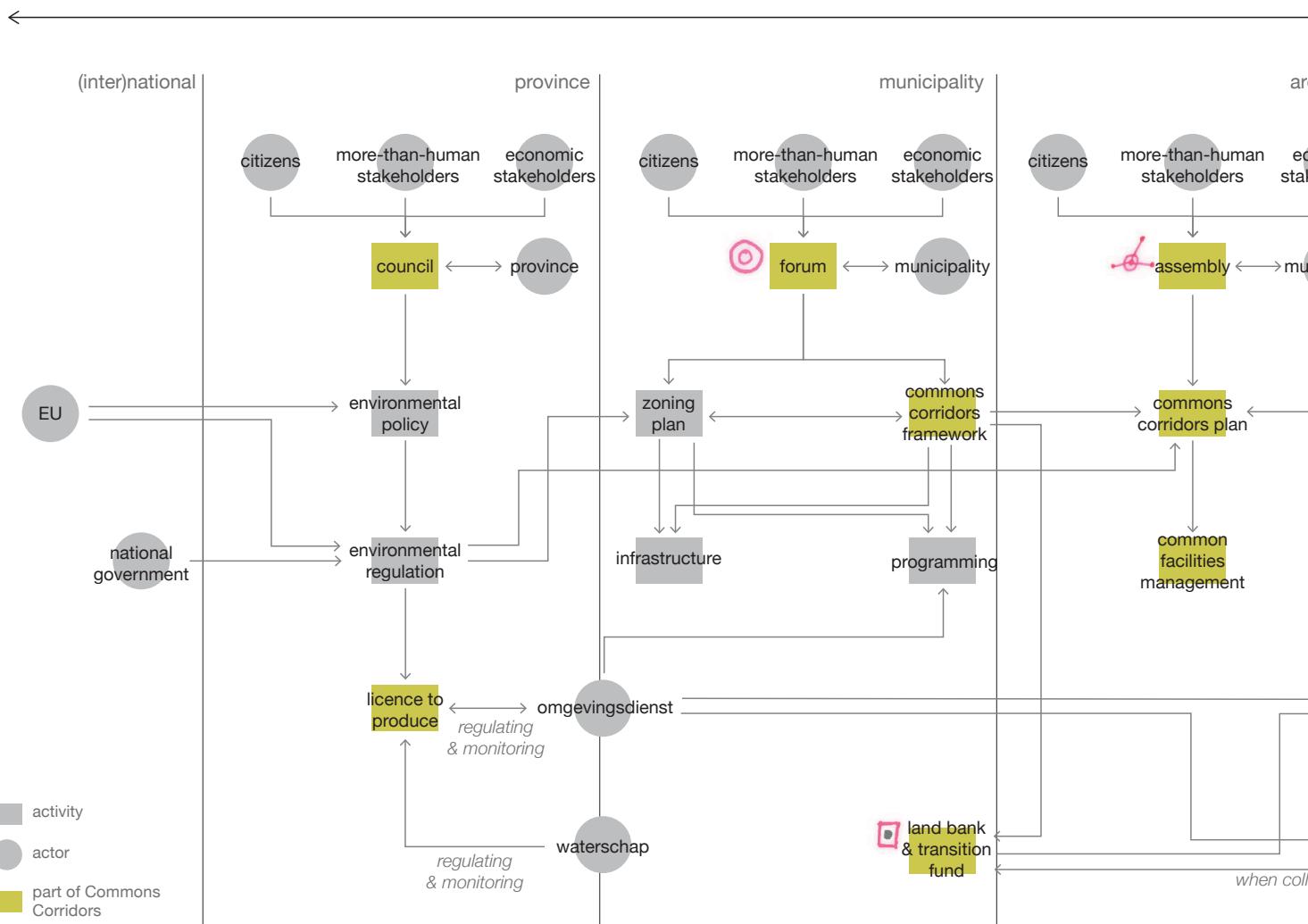
■ commons corridors land and transition fund

■ municipality Westland

■ province Zuid-Holland



-  town
-  local citizen assemblies
-  commons corridors forum
-  commons corridors land and transition fund
-  municipality Westland
-  province Zuid-Holland



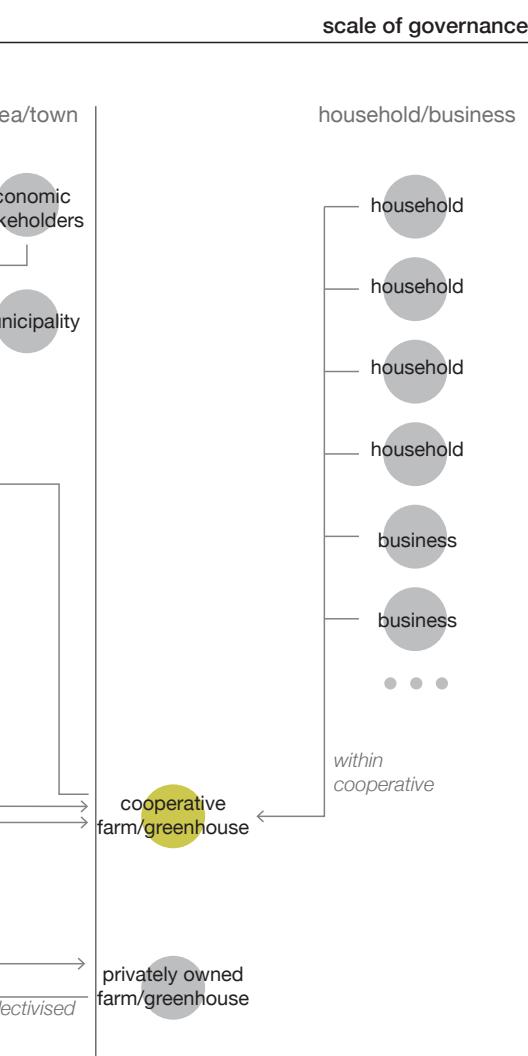
Governing the Commons Corridors

In his essay *The Tragedy of the Commons*, Hardin (1968) highlighted the dangers posed to shared resources, or "the commons," when individual interests override collective responsibility. He argued that when resources are pooled without effective regulation, they are prone to overuse and exploitation. A well-known example he gives is of farmers who allow their cattle to graze beyond the land's carrying capacity, leading to the degradation of the commons to the detriment of all, while a few benefit. In response to such tragedies, common lands were often either transferred to government control or privatized (Hardin, 1968). Hardin's argument underscores the importance of participatory decision-making in this context.

Principles

The system of the Commons Corridors is based on the concept of polycentric governance and the principles for governance of the commons by Ostrom (1990), as well as the Handbook for the Commons by Toekomstboeren (Bakker et al., 2022). Per principle from Ostrom, I elaborate on the adaptation, which is represented in the governance system diagram on the left.

- 1. Clear boundaries:** a clear separation is made between common land and private land. The land fund (stichting) would facilitate in holding the Commons Corridors land. Per CSA farm, an independent fund could be established, or the land could be incorporated in the general land fund.
- 2. Context specific rules:** the activities that are allowed on the land need to be formulated by local assemblies, within national and provincial environmental regulation.
- 3. Participatory decision-making:** citizens, more-than-human representatives and farmers (and other economic actors relating to the commons) are involved in multi-level decision-making procedures, following the UP2030 participatory planning cycle.
- 4. Good monitoring:** the conditions and capacities need to be monitored across scales. This is done by the farmers as well as the environmental service (Omgevingsdienst) and water board (Waterschap).
- 5. Fair sanctions:** the actors are held responsible if the established rules are broken by imposing sanctions through conflict resolution.
- 6. Conflict resolution:** a means needs to be developed for dispute resolution in the Forum, within the private, civil and public laws.
- 7. Right to organise:** a clear legal system for the functioning and monitoring of the commons is established by the Commons Corridors framework, which together with environmental regulation sets the boundary conditions for the activities that can be planned in the Common Corridors local plans.
- 8. Larger networks:** the local assemblies system is integrated into the Forum, which is integrated into the municipal governance system. I also propose to have a citizen council in the Province to participate in shaping the environmental policy.



Commons Corridors Development

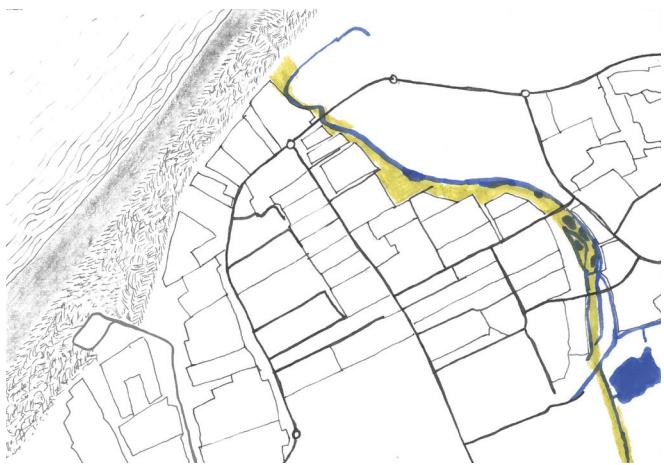
The phasing on the right page illustrates a possible integration of the Commons Corridors spatial logic in the Lange Stukken polder between Monster and 's-Gravenzande.

Municipality Conflicts

In the first stages of incorporating horticultural plots into the corridors, the municipality is in a conflicting situation, as being the actor that is transferring ownership of the parcels from private to the commons. This requires an empowerment of the municipality executive power, which is however legitimised by a significant simultaneous empowerment of citizens through multi-level participatory decision-making bodies, ultimately increasing justice.

-  geothermally heated, circular large scale greenhouse
-  nature-inclusive horticulture
-  nature-inclusive mixed farm
-  agro-forestry
-  commons house
-  commons corridor
-  residential areas
-  North Sea
-  coast
-  dunes
-  greenhouse parcel

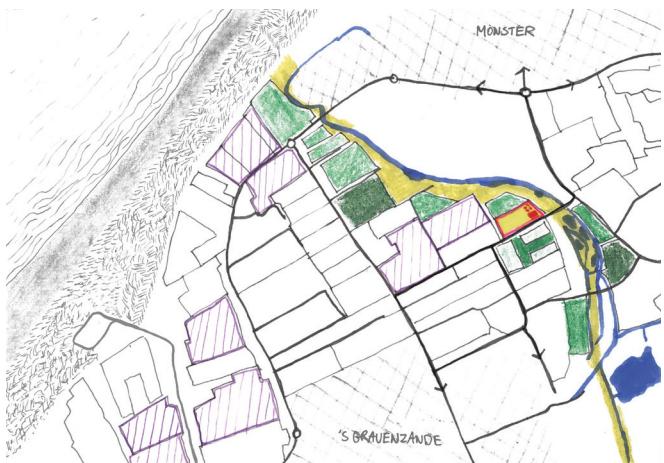




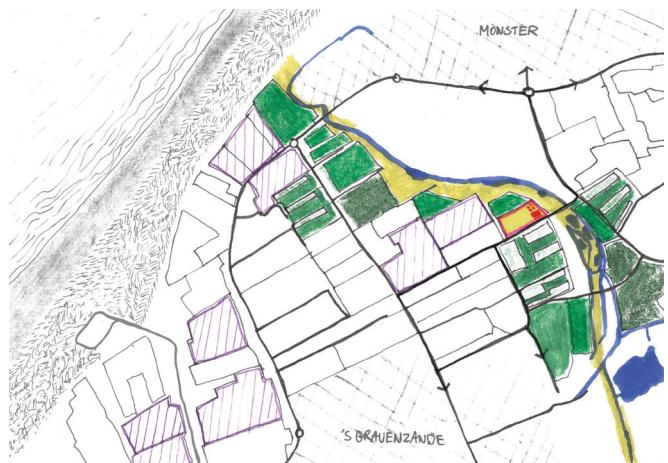
2025 — commons corridors established



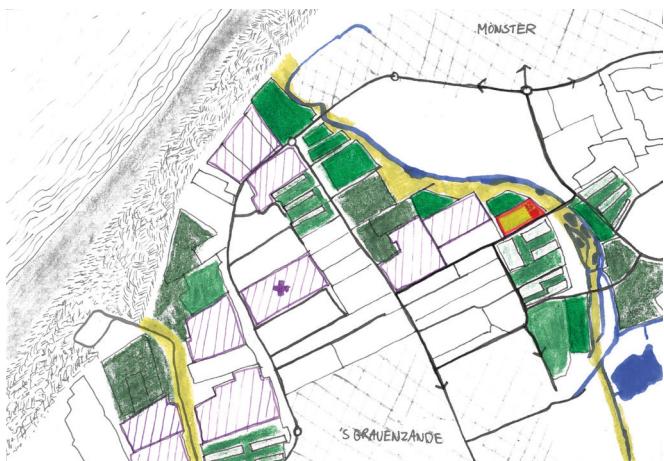
2026 — commons house built, deliberative planning processes start



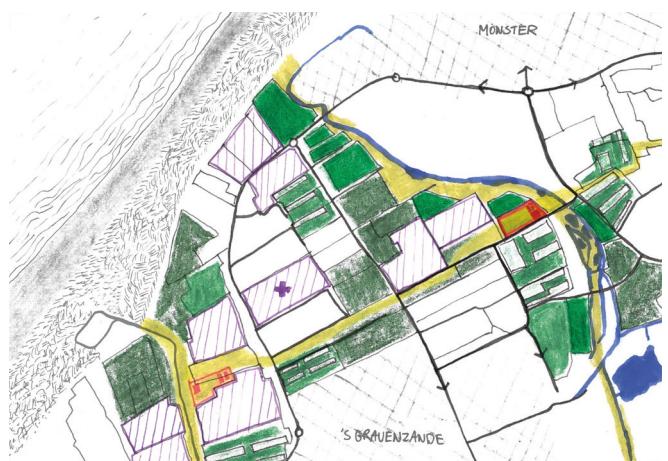
2030 — first adjacent nature-inclusive agriculture and horticulture plots are operational
geothermally heated greenhouses transition to circular practice



2035 — more plots have transitioned to nature-inclusive agriculture and horticulture practices



2040 — a new commons corridor initiative is established by enthusiastic neighbours
another greenhouse is coupled to the geothermal heat network

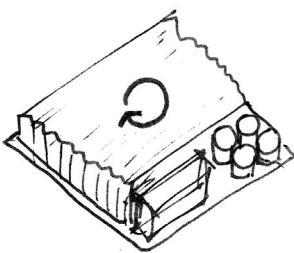


2050 — the commons corridors become increasingly networked and more plots adopt nature-inclusive practices

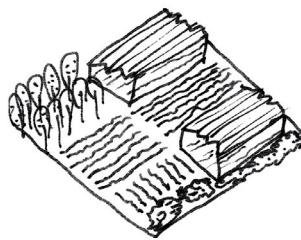
Patchwork of Typologies

The spatial logic allows for multiple landscape typologies alongside the corridors to develop, where the specific land-uses and functions are to be decided by the local assemblies, within the limits and goals of the framework imposed by the forum. The drawing on the right page visualises a potential configuration of typologies, where more extensive, nature-inclusive farming is located directly along the corridors (e.g. food forest typology), and more intensive, nature-exclusive functions are located between the corridors (e.g. high-tech greenhouses). Public programming is always located directly adjacent to the corridors to also function as a space that mediates between human activities and the natural environment.

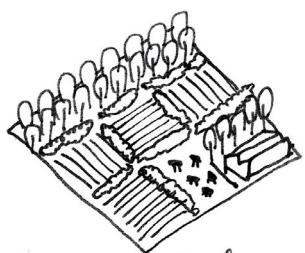
- geothermally heated, circular large scale greenhouse
- nature-inclusive horticulture
- nature-inclusive mixed farm
- agro-forestry
- commons house
- commons corridor
- residential areas
- North Sea
- coast
- dunes
- greenhouse parcel
- road
- inland water



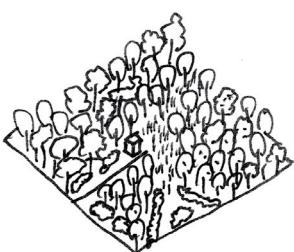
circular high-tech greenhouse



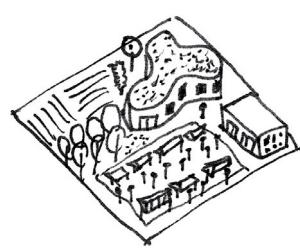
nature-inclusive horticulture



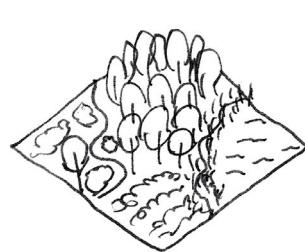
nature-inclusive mixed farm



agro-forestry/food forest



public programming
(Commons House, market)



natural area



Discussion

Limits

The *Limits* chapter investigates the historical evolution and socio-spatial dynamics of the Westland horticultural landscape through a spatial justice and autonomy lens. Drawing on historical mapping, fieldwork, and socio-spatial analysis, it traces how colonial legacies, economies of scale, and neoliberal governance have shaped the spatial logic of horticultural production and labour in the region.

This analysis was situated within socio-technical systems theory, highlighting path-dependency as a key mechanism to understand the current situation in Westland. Historical analysis showed that sustained infrastructural investments, consolidation of agribusinesses, and the prioritisation of export-oriented growth in recent governance have produced a dominant regime that restricts the system's transformative potential towards possible sustainable and socially just practices (Geels, 2004; 2019). Literature review and interview data highlighted the importance of the heritage of horticulture in the socio-technical system. Further research into the socio-technical dynamics of Westland's horticultural industry can integrate historical analysis-frameworks on heritage to further investigate this.

The data also shows that smaller and aspiring horticultural businesses have limited options of altering practices due to a need for competitiveness and solvency, operating within a tightly circumscribed space shaped by globalised value chains and financial dependencies. This situation aligns with what Stock and Forney (2014) identify as *neoliberal autonomy*: a limited form of agency wherein actors appear to make independent decisions but are in fact operating within narrow market-defined parameters. In contrast, *actual autonomy*—defined by the capacity to make decisions and work together towards realising collective values and interests is largely foreclosed in the current system.

The aforementioned neoliberal dynamics have transformed Westland into a 'highly operationalised and infrastructuralised controlled growth environment' (Abou Jaoude & Muñoz Sanz, 2025). Despite high tech greenhouse's apparent imperviousness and isolation from the natural outside, the research showed that horticulture is strongly interwoven with the natural systems of its immediate outsides in a paradoxical more-than-human assemblage. For example, the greenhouses pollute the local water system with toxic ecocides but are simultaneously dependent on the ecological functioning of this very system. Technoscientific substitutions of otherwise natural more-than-human work — such as industrially produced bumblebee pollinators and mineral soil substrates — are presented by sector parties as ways of enhancing the capacities of natural systems or mitigating their exhaustion and degradation. This phenomenon could be described as done so by Muñoz Sanz and Katsikis (2024), signalling the exhaustion and collapse of natural systems due to increasing operationalisation and industrialisation driven by the urge for endless growth.

Furthermore, the investigations show that Westland's horticultural industry is part of a complex global industrial ecology — including natural gas extraction, rock wool substrate production, and phosphate mining — highlighting its socio-ecological footprint and more-than-human dependencies beyond the local scale. Westland's contradictions and vulnerabilities in both local and global socio-ecological relations and material flows resonate with discourse on planetary urbanisation and the city-hinterland question (Brenner & Katsikis, 2020), as well as research on the invisibility of industry's implications on sustainability in other localities (Liu et al., 2013;

Swyngedouw, 2013). Further research could dive deeper into the spatial and ecological footprints of Dutch horticultural operations across the globe, potentially unpacking systemic inequalities due to increasing technological efficiency and complexity in Western countries while exacerbating socio-ecological issues in the Global South.

At the social level, Westland's horticultural industry contributes to growing local inequalities and undermines human autonomy. The horticultural activities rely heavily on the flexible labour of migrant workers, who face precarious labour conditions, unbalanced power relations and exploitation in situations of 'regulated precarity' (Siegmann et al., 2022). Media and literature review highlighted that while local communities experience housing shortages and diminished access to public space, these burdens sometimes are falsely linked to migrant workers in xenophobic narratives, seemingly heightening pressure on local politics and impeding fair decision-making and procedural justice. Limited research scope and depth on this phenomenon stresses the need for further research on the (perception of) relations between horticulture, migratory labour and land scarcity.

In sum, the chapter reveals how the Westland horticultural production landscape exceeds its ecological, social, and spatial limits, raising critical concerns about the system's long-term viability and questioning its capacity for change towards sustainability and justice within current preconditions.

Imaginaries

The *Imaginaries* chapter explored what radical imaginaries for Dutch agriculture and for Westland as a horticultural region exist, and how these both shape and are shaped by socio-spatial and material practices. Drawing from interviews with alternative agricultural initiatives in The Netherlands (e.g. Land van Ons and Toekomstboeren), literature and media review as well as stakeholder analysis, the research unveiled and engaged with more situated, alternative agricultural practices and visions.

The data reveals that the radical imaginaries explored in this research actively challenge capitalist configurations of the food system, foregrounding autonomy as a central theme across scales and contexts. Initiatives such as Land van Ons exemplify this through cooperative economic models, commons-based land ownership, and democratic decision-making, reflecting a broader struggle for control over the food system by both producers and consumers. These practices resonate with discourses on food sovereignty and are mirrored in imaginaries of nature-inclusive, community-supported agriculture (CSA), which seek to reduce dependency on capitalist inputs and market structures. Interviewees further articulated a relational understanding of autonomy—not as isolation, but as mutual engagement and interdependence. This perspective aligns with Escobar's (2017) and Varela's (1999) notion of autonomy as the ability to remain internally coherent and self-producing (autopoietic), while interacting with external systems through structural coupling.

Furthermore, the researched communities take initiative where governments fail, as they see policy-makers across governance scales struggle to bring about a systemic change within agriculture and horticulture towards sustainability. These findings confirm and extend various writings on how communities are pre-figuring alternative futures in the absence of broader state support (Celermajer et al., 2024)

as well as on how the withdrawal of the state from public services has contributed significantly to the rise of collective self-organisation as a means of addressing local welfare gaps (Atkinson et al., 2017; Mullins & Moore, 2018), often in response to market developments anticipated by governments that have failed to materialise (De Moor, 2025).

In conceptualising their material and socio-ecological practices, the researched imaginaries advocate for ecological stewardship and reject nature-agriculture dichotomies often deeply embedded into and operationalised by governments in for example land-zoning and agricultural regulation. The imaginary of diverse "naturecultures" (Haraway, 2003) is thus translated into proposals advocating for more inclusive land-zoning typologies within planning frameworks.

The speculative design exercise of scenarios-thinking demonstrated how these imaginaries could translate into different socio-spatial configurations, land-use patterns, and governance models, contrasting them with more techno-optimistic, capital intensive neoliberal narratives. A qualitative assessment of the scenarios, based on the three dimensions of spatial justice (i.e. distributional, procedural, and recognition justice) and autonomy as a fourth dimension was performed. The results show that spatial scenarios which include socio-spatial and material practices of the researched radical imaginaries offer critical insights into more equitable, sustainable, and democratic futures for Westland, and are therefore essential to be integrated into design and planning discourse about the region.

Praxis

The *Praxis* chapter proposes two additions to the discourse about the socio-spatial future of Westland. Through the development of [1] a policy advice including a participatory planning strategy and [2] a multi-scalar urban design project, the chapter illustrated how radical imaginaries could inform inclusive planning and transformative socio-spatial interventions in Westland. Integrating the research conclusions with insights from spatial justice theory and inclusive planning frameworks, the policy advice proposes seven key themes on where to take action towards a more just food landscape in Westland.

One of these recommendations places the assignment of planning for a spatially just Westland in the hands of local policymakers and citizens. The proposal includes the adaptation of the UP2030 participatory planning cycle to the Westland context, unpacking specifically what stakeholders and activities are important in each phase of the cycle in order to plan for the future.

Next to these recommendations, the radical project takes a more projective and ideological stance, situating insights from radical imaginaries on commons, ecological stewardship and local democratic decision-making into a spatial proposal for Westland. It proposed spatial logics and a governmental framework for enabling plural and spatially just agri-food landscapes in Westland through the establishment of Commons Corridors. As a whole, this chapter articulates how, through designing planning frameworks and socio-spatial relations, radical agri-food imaginaries can be institutionally supported and materially grounded in the horticultural landscape of Westland.

Implications

The thesis points to the need for urban policy frameworks that confront the systemic externalities of export-oriented agri-industrial regimes. In contexts like Westland, this means moving beyond sectoral support measures and toward integrated policies that embed environmental accountability, social equity, and labour protections into the regulation of land, infrastructure, and food production. Policy should explicitly support forms of commons-based land tenure, cooperative farming models, and localised governance to foster greater autonomy and ecological care. Furthermore, policies must acknowledge and mitigate the unequal global socio-ecological dependencies of horticultural production, which are currently obscured in spatial decision-making about it.

For planning practice, the findings advocate for a more inclusive, situated, and politically engaged mode of spatial governance. The dominant technocratic and growth-driven planning approaches must be reoriented to accommodate plural land-use typologies, ecological interdependencies, and community-led practices.

Participatory planning models — such as the adapted UP2030 cycle — offer concrete pathways for embedding procedural and recognition justice in the governance of agri-industrial landscapes like Westland. Planning practice must also cultivate institutional capacity to enable experimentation and transitions towards situated socio-ecological practices.

Theoretically, this research contributes to debates on the spatiality of socio-technical transitions, the city-hinterland metabolic question, spatial justice of agri-food systems and the politics of autonomy within a spatial context. It calls for rethinking autonomy not as liberal individualism or market-based flexibility, but as a spatial and collective capacity to act in line with shared values, towards collective interests and within ecological constraints. It also suggests that urban theory and planning thought must take seriously the more-than-human entanglements of operational landscapes like Westland and the role of design in articulating alternative socio-ecological futures. By integrating radical imaginaries into spatial analysis and design, this research positions speculative planning as both a critical and generative tool in navigating systemic transformation.

Limitations

The first limitation of the thesis closely relates to design agency. The thesis does not propose a definitive proposal as a solution, because the spatial and institutional conditions in Westland are subjected to various complex and temporal uncertainties, for example the global and local socio-political climate or the actual climate and related sea-level rise. Instead, the thesis looks into the agency of spatial design methodologies that can propose inclusive strategies and indeterminate conditions that can allow for an adaptive, holistic approach to tackling the complex challenges of the horticultural landscape of Westland.

Secondly, the thesis is theoretically limited in the several scientific disciplines it touches upon, for example the agricultural sciences, political economy, public governance, and environmental sciences. The insights from these disciplines that are utilised in this thesis are based on brief, compendious literature review because of time limitations and scope. Therefore I see a clear limitation in the theoretical validity of the work.

Besides, there are clear methodological and empirical limitations to the thesis due to the limited amount of interviews. There were five interviews with different types of stakeholders, which were semi-structured, implying limited validity. Efforts were made however to triangulate insights and conclusions through literature and media review.

Finally, the ethical limitations of the thesis are significant. The horticultural activities in Westland rely heavily on a marginalised and transient migrant labour force. This unfortunate fact made it difficult to include these communities in ethically and methodologically sound ways for me as a masters' student with limited time and resources. Therefore the research on this theme is only based on one interview with a grower that employs four Polish workers, together with media and literature review.

Conclusion Statement

This thesis argues that the Westland horticultural landscape embodies a profound contradiction: it is simultaneously a symbol of technological progress and a site of systemic socio-ecological exhaustion. Through a critical analysis of its spatial, ecological, and labour regimes, the research reveals how path-dependent infrastructural investments, global market integration, and neoliberal governance have entrenched a production system that undermines both spatial justice and autonomy. The region's dependency on extractive inputs, migrant precarity, and rigid land-use regimes reflects a broader agri-industrial logic that privileges efficiency and scale over care, equity, and resilience. Within the horticultural system of Westland, autonomy — understood not as isolation, but as the capacity for self-determination in relational, socio-material systems — is consistently curtailed at the levels of farmers, workers, and ecosystems.

In contesting this dominant regime, the thesis foregrounds the importance of radical imaginaries and situated practices that prefigure alternative agri-food futures. These grassroots initiatives, through practices such as commons-based land stewardship, nature-inclusive cultivation, and democratic governance, re-politicise the food system and reclaim space for plural, ecologically embedded forms of cohabitation. Their visions challenge the technocratic dichotomy between nature and agriculture and expose the limitations of neoliberal food systems. Rather than offering a blueprint, this thesis proposes an approach to spatial transformation grounded in participatory design, collective autonomy, and the institutional recognition of commoning practices.

For policymakers and planners, this research highlights the urgent need to recognise the structural injustices embedded in the current agri-food regime of Westland and to support transformative initiatives that already demonstrate more democratic, ecologically grounded, and spatially just alternatives. It challenges the prevailing focus on high-tech innovation as the primary vector of change and calls for governance and planning frameworks that prioritise autonomy, justice, and inclusive participation. Embracing radical imaginaries as a conceptual tool could allow for the integration of socio-ecological and spatial justice dimensions into the planning and design of these landscapes that might otherwise be primarily understood through technical and economical lenses.

Future research should delve deeper into the trans-scalar ecological footprints and socio-political entanglements of Dutch horticulture, particularly in relation to the Global South. Further exploration of how imaginaries translate into spatial practice — and how they may be institutionally legitimised or obstructed — is needed. Investigating the role and agency of spatial professionals, planning cultures, and land governance mechanisms in either facilitating or hindering socio-ecological transformation would further enrich the discourse on post-capitalist agri-food futures.



X.

Reflection

On Process and Methods

Spatial Justice

Engaging with theory of spatial justice has learned me a great deal about the agency and responsibility of the urbanist, which extends far beyond drafting and evaluating plans. The space that is transformed through these plans has a crucial role in determining social processes. And these processes are inherently about how we live together with each other and other species. I feel more properly equipped with the right metaphorical 'glasses' to be able to focus on how spatial plans influence the distribution of burdens and benefits of people's life together, but also to think about the recognition of diverse needs and trajectories of those affected by these plans, and finally about the fairness of the very decision-making processes that these plans are a direct result of. There is still much to learn in terms of practical application of spatial justice considerations and on how current spatial planning practices might proliferate injustices. This calls for my continuous learning about critically engaged research design practices.

Speculative Design

At first, my perception of speculative design and scenarios thinking was mainly shaped by methodologies that investigate spatial-material scenarios to for example gain insights into potentials for attaining a circular economy (e.g. the maximisation method). These methods rarely engage in socio-political dimensions of the issue. During this thesis however I have learned that speculative design is also a very powerful tool for dealing with socio-political uncertainties and gaining insights into what could be more or less desirable and spatially just futures. The method can translate radical concepts and values into spatial projections that might seem inherently different than what actually could happen, but the insights from it do have value in determining how space acts as both a medium for and producer of certain (future) disparities. Therefore I aim to further engage with, learn about and apply the method of speculative spatial design in the rest of my professional career: thinking in extremes to prevent excesses.

On Research and Design

This thesis required a continuous dialectical interplay between research and design. I learned that this process sometimes demands taking speculative steps in design that may feel premature or uncertain. Yet, by drawing or visualising ideas early on, even if only tentatively, I was better able to clarify the directions for further investigation. Through back-casting, I would ask myself: *What do I need to know to confidently draw this, or to discard it?* This mental back-and-forth between hypothesising and fact-checking can be difficult to navigate and often felt counter-intuitive. However, over the course of the thesis, I developed a clearer understanding of how this cyclical process works for me personally. It typically begins with a concise but broad investigation into the overarching topic, followed by the identification of key sub-themes or components. These elements are then explored through provisional sketches or diagrams, which were deliberately created before conducting deep research into each part. These early visualisations function as a kind of ‘research brief’, helping to define where more focused inquiry is needed. The insights from this targeted research are then synthesised into a more refined drawing or diagram, which serves to articulate the broader issue. This synthesis, in turn, informs the next round of research—completing and renewing the cycle.

On Transferability of the Results

In reflecting on the transferability of this thesis’s findings, it becomes clear that the concepts and methods explored, particularly around spatial justice, autonomy, and radical imaginaries, hold relevance well beyond the case of Westland. I see the method of scenarios thinking to translate imaginaries to socio-spatial configurations that are qualitatively assessable and comparable, as a result of the thesis. I think this way of negotiating different imaginaries, informed by grounded research, is transferable to other design contexts. While the scenarios and analyses were deeply grounded in the specific socio-environmental and economic dynamics of the Dutch agri-food system, the broader principles informing this work – such as questioning dominant techno-optimistic spatial narratives, exposing structural disparities, and engaging with alternative ways of doing – offer a critical framework for addressing similar issues in other regions shaped by extractive, industrialised agriculture or horticulture. That said, any application of these ideas must be carefully attuned to the local context. Social, political, and ecological specificities – each with embedded power relations – should be critically examined to avoid reproducing (part of) the very dynamics this thesis seeks to challenge. The aim of further applications of the methods should be not to prescribe fixed solutions, but to offer tools and approaches for re-imagining spatial practices in ways that centre equity, plurality, and care.

On Societal Relevance and Implications

This project is of significant societal relevance as it interrogates and exposes the socio-environmental injustices embedded within the Westland horticulture cluster's functioning. Despite its reputation as a hub of high-tech agricultural innovation, Westland is characterized by systemic inequities that disproportionately affect marginalized groups, particularly migrant labourers. By critically analysing the socio-spatial injustices inherent in this context, the project contributes to a deeper understanding of how these inequalities are perpetuated and seeks to amplify the often-silenced voices of these communities.

The project further engages with the urgent global challenge of transitioning to sustainable agri-food systems. By scrutinizing the ecological externalities and resource-intensive practices of Controlled Environment Agriculture, it highlights the limitations of techno-optimistic narratives that prioritize efficiency and productivity over equity and environmental sustainability. This critical approach contributes to the public debate on more holistic and inclusive models of food production that address both social and ecological dimensions.

Finally, the project relevance lies in the philosophical debate on what our relation is to nature. Eco-centric philosophies are gaining more and more attention, leading to critical questions about for example intensive agricultural production and genetically modified crops. The historical and botanical role of the greenhouse, of entrapping and exhibiting plants from colonies around the world, can be critically assessed in shaping our Western dualistic worldviews.

On Scientific Relevance

Analysing the role of imaginaries in the production of space is not new discourse within urbanism and architecture studies, yet it could be argued that there are still some missing gaps. Particularly when it comes to radical imaginaries that challenge the status quo, there is a tendency to go about these as utopian visions that cannot serve practical (planning, policy) applications.

Current research mainly focuses on analysing alternative (climate) imaginaries in theoretical terms, without fully examining how these imaginaries can create real-world change through policy adoption, grassroots movements, or institutional reform. Additionally, researchers often don't adequately consider how different societies and political systems both generate and respond to these alternative imaginaries in unique ways.

This thesis aimed to contribute to addressing these knowledge gaps by investigating how radical imaginaries could be negotiated within design and planning contexts, ultimately evaluating their potential to drive meaningful change. In my case study design was important to consider democratic and participatory principles of spatial planning. It also highlights the need for spatial planning as a critically engaged practice in fostering spatial justice beyond urban contexts.

On Ethical Considerations

Throughout this research, I had to maintain a balanced approach that respected the needs and perspectives of all parties involved, while remaining vigilant about potential biases - including my own. I am aware of biases that this work might carry due to certain privileges I hold, due to the Dutch nationality I was born in and my Western cultural background, together with my position as a researcher and designer working on the topics of spatial justice and marginalised perspectives.

In all interactions with subjects during interviews, it was imperative to uphold the highest standards of professionalism, respect, and empathy, particularly when addressing sensitive topics.

The research prioritised both participant rights and academic rigour, ensuring research validity while maintaining ethical integrity. The interview procedures were conducted within the guidelines of TU Delft's Ethics Committee and following TU Delft data management standards. Strict ethical guidelines were followed, including comprehensive informed consent processes where participants were briefed on the study purpose, benefits, and potential risks. Participants retained the right to withdraw from the study at any point. Personal identities were disclosed only with explicit written consent (see Appendix C), and finally research findings were reviewed with participants. Throughout the process, careful consideration was given to prevent any potential harm to participants, whether physical, psychological, or social in nature.

On the Relevance to the Studio

The project aligns with the Transitional Territories studio's focus on developing new forms of inhabitation, co-existence, and care within altered environments. By exposing socio-environmental injustices in Westland's horticulture cluster, it critiques unsustainable practices and dominant ideologies while advocating for participatory and democratic planning frameworks.

The project shares the studio's commitment to treating altered environments as spaces of potentiality, emphasizing retrofitting assets, designing with natural processes, and fostering regenerative and inclusive futures. It also explores the interplay of form, processes, and performance in critical environments, offering a situated radical project that mediates the conflicting values of production and conservation. Through this, the project embodies the studio's universalist yet contextually grounded approach to transformative spatial practices.

On the Relevance to the Urbanism

My project aligns closely with the core objectives of the Urbanism track, drawing on its multidisciplinary approach that integrates urban design, landscape architecture, spatial planning, and engineering. By addressing the socio-environmental challenges within Westland's horticulture cluster, the project topic critically engages with the interplay of natural and man-made conditions to propose equitable and sustainable development pathways.

Through its analysis of Westland's altered landscapes, the project reflects the track's emphasis on working across scales—from regional systems to localized interventions—while responding to global trends such as climate change, resource scarcity, and the energy transition. It also engages with local dynamics, including spatial inequities and environmental degradation, proposing innovative, justice-oriented frameworks for planning and management.

The project exemplifies the academic skills promoted by the Urbanism track by combining critical analysis with visionary proposals for sustainable and inclusive spatial practices, embodying the track's mission to prepare urban researchers and designers who can address contemporary urban and rural challenges with contextual sensitivity and transformative ambition.

On the Relevance to the AUBS MSc

The project exemplifies the core principles of the AUBS Programme, reflecting its emphasis on integrating multidisciplinary perspectives to address complex challenges in the built environment. By critically engaging with the socio-environmental and economic dynamics of the Westland horticulture cluster, the project draws on architecture, spatial planning, and engineering expertise to propose sustainable and just solutions for rural spatial development.

The project aligns with the programme's international orientation and Dutch tradition of multi-disciplinary collaboration, blending knowledge and skills from design, physical and social sciences, and technology. It responds to global and local challenges such as climate change, resource scarcity, and socio-spatial inequities, showcasing the ability to analyse and design for diverse contexts.

By keeping an independent academic attitude and supporting a self-directed exploration of Westland's critical environments, the project aligns with the programme's educational emphasis on personalized learning and research-driven design. It also reflects the outward-facing ethos of the programme, connecting domain-specific expertise with societal partners and interdisciplinary insights to advance sustainable, inclusive, and innovative spatial practices.

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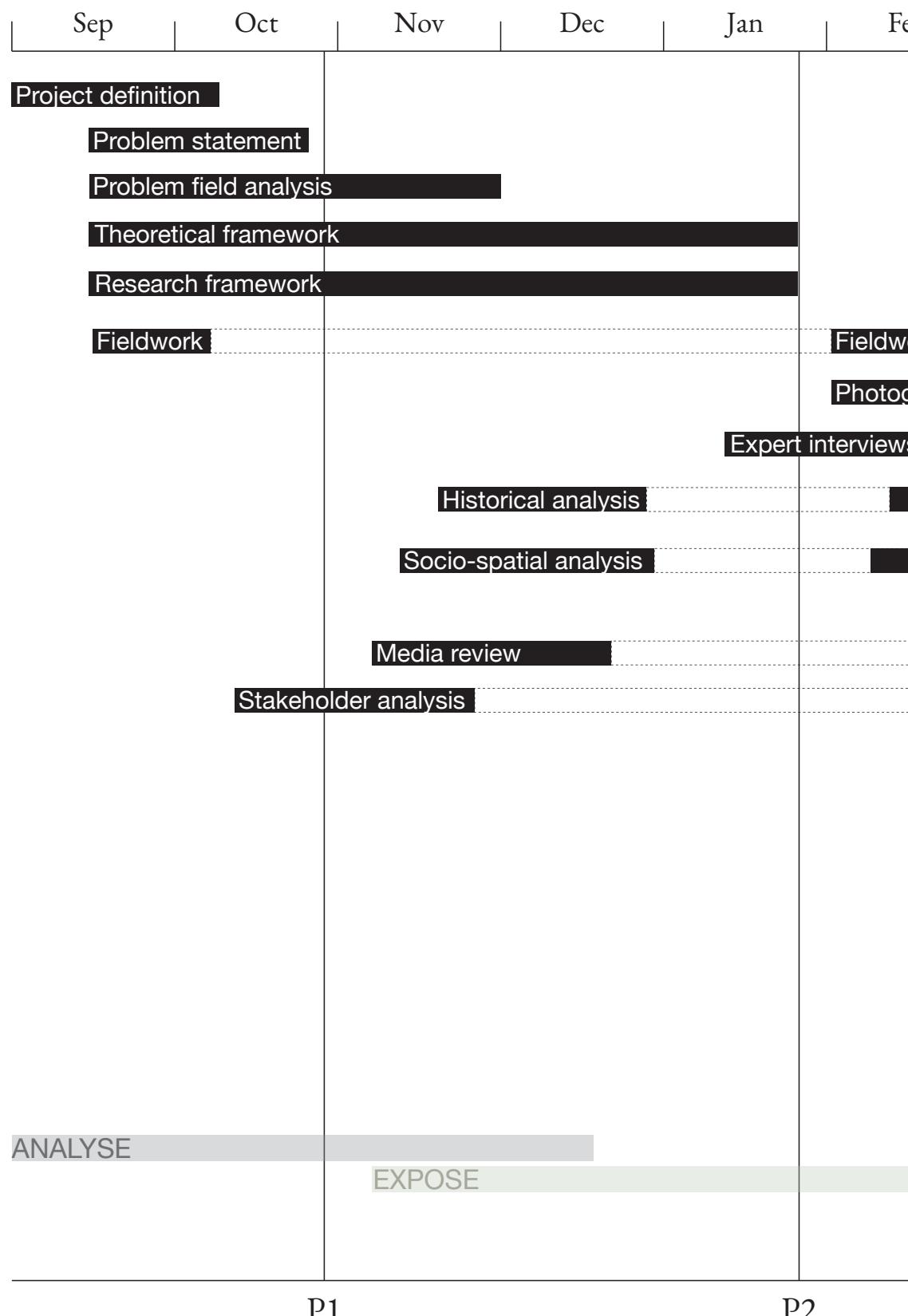
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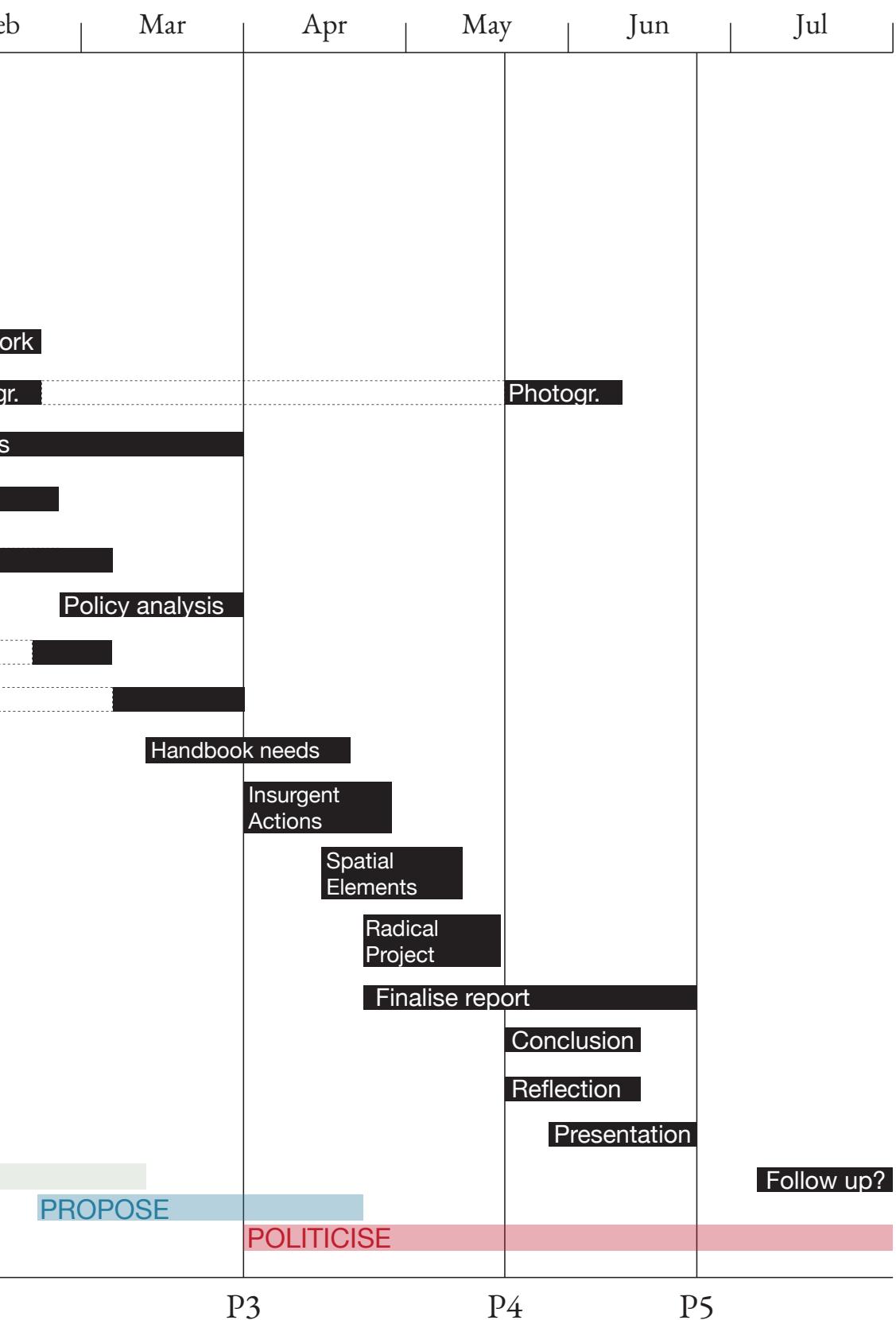
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Appendix



Appendix A: Thesis Planning



About:

The Spatial Justice Benchmarking Tool (SGBT) is a qualitative evaluation tool designed to measure the application of justice considerations in urban governance and planning of a city or region, assisting evaluation and reflection. It defines "levels of justice", from "Low" to "Embedded", by assigning a score of the attainment of what is being assessed against the highlighted components of the Spatial Justice Conceptual Model.

The tool serves to spark discussion and reflection based on Spatial Justice considerations. Using this lens, it is possible to pay greater attention to aspects that redistribute benefits and burdens, engage people and be more responsive in policy and decision-making processes, and recognise the needs and aspirations of disadvantaged individuals, groups, and communities.

How to use this tool:

- 1) Start by clarifying what you're assessing. Review the vision statement provided above to keep it in mind throughout the process.
- 2) Go through each column on the right. Each column represents a component of the Spatial Justice Conceptual Model (SJCM).
- 3) Discuss how well the vision statement aligns with each component and assign it a rating from "Low" to "Embedded".
- 4) Use post-its to write down any ideas or recommendations discussed by the group. Place these directly onto the relevant component for easy reference.

Contact and more information:

Roberto Rocco
Juliana Gonçalves
Hugo López



Download the online version of the Spatial Justice Benchmarking Tool



Download the Spatial Justice Handbook



Download the Spatial Justice Conceptual Model



From Lopez, H., Rocco, R., & Gonçalves, J. (2024). The Spatial Justice Benchmarking Tool: Evaluation Board. Zenodo. <https://doi.org/10.5281/zenodo.14042015>

DISTRIBUTIVE DIMENSION

LEVEL	COMPONENT 1	COMPONENT 2	COMPONENT 3
LOW	<p>FAIR ALLOCATION</p> <p>This component focuses on ensuring that resources are fairly distributed to address inequality. It concerns the material or service provision of public goods, basic services, cultural goods, economic opportunities, and healthy environments.</p>	<p>IMPROVE ACCESS TO OPPORTUNITIES</p> <p>This component highlights efforts to enhance people's ability to reach and benefit from key opportunities. It concerns affordability, availability, connectivity, etc.</p>	<p>EMPOWER PEOPLE TO ADAPT AND ADOPT</p> <p>This component emphasizes empowering individuals and groups to actively shape and utilise available resources. It concerns the design, programming, and openness to people's agency.</p>
BASIC	<p>There are considerations about the allocation of benefits and burdens across the city. It specifies where service or material is being allocated.</p>	<p>There are considerations about the access to benefits and burdens across the city. It specifies where or what service or material is being addressed.</p>	<p>There are considerations about the appropriation of benefits and burdens across the city. It specifies where or what material and/or service is open to change.</p>
GROWING	<p>There are considerations regarding the allocation of benefits and burdens across the city. More than one dimension of Spatial Justice is considered. This is evidenced in specifications of what/how is redistributed.</p>	<p>There are considerations about access to benefits and burdens across the city. More than one dimension of Spatial Justice is considered. This is evidenced in specifications of what/how is made accessible.</p>	<p>There are considerations about the appropriation of benefits and burdens across the city. More than one dimension of Spatial Justice is considered. This is evidenced in specifications of what/how is open.</p>
EMBEDDED	<p>There are considerations regarding the allocation of benefits and burdens across the city. All dimensions of Spatial Justice are considered. This is evidenced in specification of what, how, and who is being considered.</p>	<p>There are considerations about access to benefits and burdens across the city. All dimensions of Spatial Justice are considered. This is evidenced in specification of what, how, and who is being considered.</p>	<p>There are considerations for the appropriation of benefits and burdens across the city. All dimensions of Spatial Justice are considered. This is evidenced in specification of what, how, and who is being considered.</p>

Appendix B: Spatial Justice Benchmarking Tool

PROCEDURAL DIMENSION			RECOGNITION DIMENSION		
COMPONENT 1	COMPONENT 2	COMPONENT 3	COMPONENT 1	COMPONENT 2	COMPONENT 3
There are considerations on how people are engaged in processes. All dimensions of Spatial Justice are considered. This is evidenced in the specification of what/where, how, and who is being considered.	There are considerations on how internal processes adapt towards justice. All dimensions of Spatial Justice are considered. This is evidenced in the specification of what/where, how, and who is being considered.	There are considerations for aspects of Spatial Justice in the government's actions. All dimensions of Spatial Justice are considered. This is evidenced in the specification of what/where, how, and who is being considered.	There are considerations for validating disadvantaged individuals and groups in laws and regulations. All dimensions of Spatial Justice are considered. This is evidenced in the specification of who, what/where, and how is being considered.	There are considerations to recognise practices of marginalised or non-hegemonic collectives and groups. All dimensions of Spatial Justice are considered, evidenced in the specification of who, what/where, and how is being considered.	There are considerations for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles. All dimensions of Spatial Justice are considered, evidenced in the specification of who, what/where, and how is being considered.
There are considerations on how people are engaged in processes. More than one dimension of Spatial Justice is considered. This is evidenced in specifications of how, and who or what/where is being considered.	There are considerations on how internal processes adapt towards justice. More than one dimension of Spatial Justice is considered. This is evidenced in specifications of how and who or what/where is being considered.	There are considerations for aspects of Spatial Justice in the government's actions. More than one dimension of Spatial Justice is considered. This is evidenced in the specifications of what/where, and who or how is being considered.	There are considerations for validating disadvantaged individuals and groups in laws and regulations. More than one dimension of Spatial Justice is considered, evidenced in the specifications of who, and what/where or how is being considered.	There are considerations to recognise practices of marginalised or non-hegemonic collectives and groups. More than one dimension of Spatial Justice is considered, evidenced in the specifications of who, and what/where or how is being considered.	There are considerations for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles. More than one dimension of Spatial Justice is considered, evidenced in the specifications of who, and what/where or how is being considered.
There are considerations about how people are engaged in processes (policies, regulations, standards, etc.). It specifies how or who is being engaged.	There are considerations on how internal processes adapt towards justice. It specifies how it is being addressed.	There are considerations for aspects of Spatial Justice in the government's actions. It specifies what, where, how or who is being addressed.	There are considerations for validating disadvantaged individuals and groups in laws and regulations. It specifies who is being validated.	There are considerations to recognise practices of marginalised or non-hegemonic collectives and groups. It specifies who is being recognised.	There are considerations for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles. It specifies who is being addressed.
There is a general concern about how people are engaged in processes (policy, planning, projects, etc.).	There is general concern about how internal processes (procedures, values, standards, etc.) adapt to promote justice inside institutions.	There is a general concern for aspects of Spatial Justice in the government's actions.	There is a general concern for validating of disadvantaged individuals and groups in laws and regulations. There is an acknowledgment of disparities.	There is a general concern to recognise practices of marginalised or non-hegemonic collectives and groups.	There is a general concern for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles. There is an acknowledgment of their existence and relevance.
There is no consideration for how people are engaged in processes (policy, planning, projects, etc.).	There is no consideration for how internal processes (procedures, values, standards, etc) adapt towards justice inside institutions.	There is no consideration for aspects of Spatial Justice in the government's actions.	There is no consideration for validating disadvantaged individuals and groups in laws and regulations.	There is no consideration to recognise practices of marginalised or non-hegemonic collectives and groups.	There is no consideration for aspirations, values, or livelihood of marginalised or non-hegemonic communities or diverse lifestyles.
DEMOCRATIC ENGAGEMENT This component focuses on the ongoing involvement of citizens in decision-making processes. The easiness of people to approach the institution.	FOSTER INTERNAL ADAPTIVENESS This component focuses on the institution's internal flexibility and adaptability to evolving circumstances, incorporating feedback, and adjusting policies, practices, and programs to better reflect justice considerations.	INSTITUTIONAL RESPONSIVENESS This component focuses on how the institution address external stakeholders. It concerns ensuring that processes are fair, transparent, and sustainable, in views to uphold justice and that it legitimises social sustainability.	LEGAL EMPOWERMENT This component emphasises the importance of legal frameworks in recognising and protecting the intrinsic value and dignity of individuals and groups as moral agents.	SUPPORT FOR COLLECTIVE CARE PRACTICES This component highlights actions to sustain and uplift collective efforts and everyday practices in disadvantaged communities, such as solidarity networks and the management of communal resources.	RECOGNISE AND FOSTER THE PLURIVERSE This component calls for a profound transformation of values to enable novel socioeconomic and institutional arrangements, advocating for considering the values, qualities, and unique socio-spatial dynamics of non-hegemonic cultures and communities.

Appendix C: Interviews Informed Consent Form

Verklaring Onderzoek, Doel Interview en Vertrouwelijkheid

datum 17-02-2025

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd "**Glass Ceiling: Radical Imaginaries of Spatial Justice in Westland's Horticultural Landscape**". Dit onderzoek wordt uitgevoerd door Bram Terwogt onder begeleiding van dr. Víctor Muñoz Sanz van de TU Delft als een Master Thesis project voor master Architecture, Urbanism and Building Sciences (AUBS) track Urbanism (Stedenbouwkunde).

Over het onderzoek

Het doel van dit onderzoek is te achterhalen welke verschillende toekomstbeelden voor de (glas)tuinbouw er zijn in de Nederlandse samenleving en wat voor inherente waarden, werkwijzen en organisatiestructuren hierbij horen, en ten slotte wat deze zouden kunnen betekenen voor een ecologisch en sociaal rechtvaardige ruimtelijke inrichting van de Westland regio (Zuid-Holland). Het gesprek zal ongeveer 30 - 45 minuten in beslag nemen. De data zullen gebruikt worden voor de ontwikkeling van het Master Thesis onderzoek.

Onderwerp en doel van het interview

U wordt gevraagd om beschrijvingen te geven van uw of uw organisaties visie op de toekomst van de landbouw, indien mogelijk specifiek voor de (glas)tuinbouw in het Westland. Sommige vragen kunnen gaan over (uw visie op) de volgende onderwerpen:

- werkwijzen, (landbouw)praktijken en/of organisatiestructuren van u of uw organisatie;
- omgang met en eventueel huisvesting van medewerkers en/of vrijwilligers;
- rol en vertegenwoordiging van de omgeving/natuur in uw besluitvorming en werkwijzen;
- barrières die u of uw organisatie tegenkomt in het realiseren van uw doelen.

Het doel van het gesprek is om te begrijpen welke ruimtelijke, maatschappelijke en/of beleidsmatige structuren of veranderingen ervoor nodig zouden zijn om de doelen van uw toekomstvisie realiteit te laten worden. Het gesprek wordt in audio opgenomen en/of genoteerd door Uitvoerende Onderzoeker – Bram Terwogt.

Vertrouwelijkheid en minimalisatie van risico's

Zoals bij elke online activiteit is het risico van een databreuk aanwezig. Wij doen ons best om uw antwoorden vertrouwelijk te houden. We minimaliseren de risico's door de volgende maatregelen:

- Gegevens worden geaggregeerd en geanonimiseerd. Alleen conclusies van interviews worden opgenomen in het onderzoek, tenzij deelnemers direct toestemming hebben gegeven om identificeerbare gegevens op te nemen.
- Alle contactdocumenten, e-mailadressen of gevoelige gegevens worden opgeslagen op de servers van de TU Delft. Na afloop van het onderzoek op 20-06-2025 worden ze vernietigd. Deze informatie wordt niet gepubliceerd of gedeeld met anderen dan de hoofdonderzoekers en de verantwoordelijke onderzoekers. De namen of de naam van de instelling zullen alleen worden gebruikt in het onderzoek als deelnemers toestemming hebben gegeven door het ondertekenen van het toestemmingsformulier.
- Opnames en interviewnotities worden vernietigd nadat de gegevens zijn samengevoegd en getranscribeerd.
- De uiteindelijke masterscriptie in de vorm van een verslag zal openlijk beschikbaar zijn op de online repository van de TU Delft onder de CC BY licentie.

Uw deelname aan dit onderzoek is volledig vrijwillig, en u kunt zich op elk moment terugtrekken zonder reden op te geven. U bent vrij om vragen niet te beantwoorden. U kunt zich op elk moment afmelden voor het onderzoek door contact op te nemen met de hoofdonderzoeker of de verantwoordelijke onderzoeker. Deelnemers hebben recht op toegang tot de resultaten van uitgevoerd onderzoek en op het opvragen, corrigeren of wissen van persoonlijke gegevens.

Het verdergaan met het onderstaande formulier betekent dat u met bovenstaande verklaring instemt.

Contactgegevens

Uitvoerende Onderzoeker – Bram Terwogt (b.f.c.terwogt@student.tudelft.nl)
Verantwoordelijke Onderzoeker – Dr. Víctor Muñoz Sanz (V.MunozSanz@tudelft.nl)

GELIEVE DE JUISTE VAKJES AAN TE KRUISEN	Ja	Nee
A: ALGEMENE OVEREENSTEMMING - ONDERZOEKSDOELEN, TAKEN VAN DEELNEMERS EN VRIJWILLIGE DEELNAME		
1. Ik heb de informatie over het onderzoek gedateerd 17-02-2025 gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	<input type="checkbox"/>	<input type="checkbox"/>
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	<input type="checkbox"/>	<input type="checkbox"/>
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent: een audio-opgenomen interview/gesprek dat na transcriptie verwijderd zal worden; en/of geschreven notities door Uitvoerende Onderzoeker Bram Terwogt;	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik begrijp dat ik gecompenseerd word voor deelname aan het onderzoek in de vorm van een waardevolle ervaring en een kopie van het eindrapport.	<input type="checkbox"/>	<input type="checkbox"/>
5. Ik begrijp dat de studie op de datum van de eindpresentatie van het master thesis project, op 20-06-2025, eindigt.	<input type="checkbox"/>	<input type="checkbox"/>
B: MOGELIJKE RISICO'S VAN DEELNAME (INCLUSIEF GEGEVENSBESCHERMING)		
6. Ik begrijp dat mijn deelname de volgende risico's met zich meebrengt: eventueel mentaal ongemak door het bespreken van politieke onderwerpen, zoals sociale rechtvaardigheid. Ik begrijp ook dat deze risico's worden geminimaliseerd door de mogelijkheid om op elk moment zonder opgaat van reden uit het onderzoek te stappen.	<input type="checkbox"/>	<input type="checkbox"/>
7. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden en mijn persoonlijke en/of professionele reputatie aangetast kan worden.	<input type="checkbox"/>	<input type="checkbox"/>
8. Ik begrijp dat binnen de Algemene Verordening Gegevensbescherming (AVG) een deel van deze persoonlijk identificeerbare onderzoeksdata als gevoelig wordt beschouwd, namelijk: politieke standpunten specifiek landbouw en sociale rechtvaardigheid gerelateerde onderwerpen. Deze zullen geaggregeerd en geanonimiseerd worden.	<input type="checkbox"/>	<input type="checkbox"/>
9. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk: - aggregatie en anonimiseren van data; - veilige opslag met beperkte toegang op TU Delft servers; - transcriptie van opnames; - vernietiging van de audiobestanden; - de mogelijkheid om op elk moment zonder opgaat van reden uit het onderzoek te stappen; - de mogelijkheid op elk moment zonder opgaat van reden gegevens in te zien, aan te passen of te verwijderen.	<input type="checkbox"/>	<input type="checkbox"/>

Appendix C: Interviews Informed Consent Form

GELIEVE DE JUISTE VAKJES AAN TE KRUISEN	Ja	Nee
10. Ik begrijp dat de persoonlijke informatie die over mij verzameld wordt en mij kan identificeren, zoals naam, contactgegevens en locatie, niet gedeeld worden buiten het studieteam.	<input type="checkbox"/>	<input type="checkbox"/>
11. Ik begrijp dat de persoonlijke data die over mij verzameld wordt, vernietigd wordt op de datum van de eindpresentatie van het master thesis project, 20-06-2025.	<input type="checkbox"/>	<input type="checkbox"/>
C: PUBLICATIE, VERSPREIDING EN TOEPASSING VAN ONDERZOEK		
12. Ik begrijp dat na het onderzoek de geanonimiseerde informatie gebruikt zal worden voor het ontwikkelen van het master thesis project en de eindrapportage hiervan.	<input type="checkbox"/>	<input type="checkbox"/>
13. Ik geef toestemming om mijn antwoorden, ideeën of andere bijdrages anoniem te quoten in resulterende producten.	<input type="checkbox"/>	<input type="checkbox"/>
14. Ik geef toestemming om mijn naam te gebruiken voor quotes in resulterende producten.	<input type="checkbox"/>	<input type="checkbox"/>
D: (LANGDURIGE) OPSLAG, TOEGANG EN HERGEBRUIK VAN GEGEVENS		
15. Ik geef toestemming om de geanonimiseerde data van de interview(s) die over mij verzameld worden gearchiveerd worden in de TU Delft Education repository opdat deze gebruikt kunnen worden voor toekomstig onderzoek en onderwijs.	<input type="checkbox"/>	<input type="checkbox"/>
16. Ik begrijp dat de toegang tot deze repository onder de CC BY licentie valt.	<input type="checkbox"/>	<input type="checkbox"/>

Handtekeningen

Naam deelnemer

Handtekening

Datum

Ik, **de onderzoeker**, verklaar dat ik de informatie en het instemningsformulier correct aan de potentiële deelnemer heb voorgelezen en, naar het beste van mijn vermogen, heb verzekerd dat de deelnemer begrijpt waar hij/zij vrijwillig mee instemt.

Naam onderzoeker

Handtekening

Datum

Contactgegevens van de onderzoeker voor verdere informatie:

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