Performative Landscape

A New Paradigm for Energy Transition Through Farmers' Community Engagement and the Transformation of the Zeeland Delta Landscape

TU Delft | Faculty of Architecture and the Build Environment
Pietro Bernardini 6316506, Nynke Krabbenborg | 5276497, Anastasia Stolyarova| 6161723, Sarah Mae Tönsmann | 6251544

Delft University of Technology
Faculty of Architecture and the Build Environment
MSc Architecture, Urbanism and the Building Sciences
Urbanism Track

Authors

Pietro Bernardini | 6316506
Nynke Krabbenborg | 5276497
Anastasia Stolyarova | 6161723
Sarah Mae Tönsmann | 6251544

Supervisors

AR2U086 Spatial Strategies for the Global Metropolis Research and Design Studio
Ir. Francesca Rizzetto, Dr. Diego Andres Sepulveda Carmona

AR2U088 Spatial Strategies for the Global Metropolis Research and Design Methosology for Urbanism
dr. Roberto Rocco
dr. Juliana Goncalves

TU Delft | Architecture and the Built Environment

Performative Landscape

A New Paradigm for Energy Transition Through Farmers' Community Engagement and the Transformation of the Zeeland Delta Landscape

Abstract

Zeeland is a land of production of food, energy and resources. Its very nature is deeply rooted in the Dutch people's historical ability to reshape the landscape and harness its potential for economic benefit. Today, it faces slow demographic decline, is largely covered by agricultural land and sits at the heart of a thriving transnational port economy and embedded within the Delta region, an area defined by dynamism and uncertainty.

Complex processes driven by climate change - such as sea level rise, soil salinization and the depletion of soil quality - raise urgent questions about the future of many agricultural zones and the rural communities that depend on them. These are farming communities that have inhabited the region for centuries, now thrust into a structural condition of uncertainty, shaped by evolving ecological processes that are often hard to predict or fully understand.

At the same time, they are communities with clear socio-economic needs and aspirations, which sometimes clash with broader environmental pressures and global dynamics. Yet, they also hold significant potential: as landowners, they are well-positioned to convert or diversify their agricultural practices toward renewable energy production, carving out a vital role in the green economy of the future.

"What's missing is a clear and stable vision for my future and my farm," says Peter, a Zeeland farmer. That is exactly what Performative Landscape: A New Paradigm for Energy Transition Through Farmers' Community Engagement and the Transformation of the Zeeland Delta Landscape seeks to offer.
Our team of designers and researchers developed a new long-term vision, ambitious yet grounded, that emerged from an intensive and focused process of research and designs. It aims to sustain regional productivity, reinforce the economic resilience of farming communities, address environmental challenges and unlock the full potential of the land for renewable energy. It proposes a new model for productive landscapes, rooted in local consumption, circularity, economic autonomy and the integration of agriculture with clean energy generation.

Key words: energy transition, performative landscape, dutch delta landscape, farmers' empowerment, rural community engagement

Report Structure

Methodology approach

This work aims to analyze, understand, and interpret - through a design-oriented lens - a complex process such as the energy transition, relating it to its spatial dimension at the regional scale and to the needs of the communities living within and affected by it. In order to achieve this, it was necessary to adopt an integrated approach that combines research and design, with the ambition of merging qualitative analysis with quantitative, technical, and spatial methodologies.

The diagram presented at the bottom of the page attempts to synthesize the methodological approach adopted throughout the project, linking it to the structure and table of contents of the report, which follows its logic and organization. It serves as a guide to offer a clear interpretation for anyone interested in the project and to explain its logical and procedural foundation.

In general terms, Performative Landscape is the result of a continuous dialogue between a research process based on a deductive approach and a more fluid and dynamic engagement with the design dimension. The deductive process begins with a general observation of the energy transition, first through the global problem statement and research question, which are then refined at the regional scale with corresponding regional problem statements and research questions. These are finally anchored to the local community through two distinct problem statements, derived from a spatial-quantitative analysis (spatial problem statement) and a social-qualitative one (social problem statement), which together inform the central project research question that initiates the design phase.

In parallel, the design process connects with the research component, yet unfolds in a more open-ended and exploratory manner, through scenario-building, thematic deep-dives, zoom-ins, and broader reflections that reflect the ambition to move fluidly across multiple spatial scales.

Looking at the report chapter by chapter, it begins with a general introduction linking the topics of energy, landscape, and the communities inhabiting it, and concludes with a global problem statement and research question.

The focus then shifts to the Zeeland region, the Delta territory, and its agricultural communities, leading to a refined regional problem statement and question.
The following chapters delve into a detailed analysis of Zeeland's farming community, explored through both socio-economic and spatial-urban lenses. These analyses generate the social and spatial problem statements respectively, whose synthesis results in a final project research question. This question acts as the conceptual hinge between the research and design phases and introduces the visioning and regional planning chapters.

The design process - discussed in detail in the following pages - begins with the formulation of multiple future scenarios for Zeeland, one of which is fully developed into the vision called Performative Landscape. This vision includes defined actions, design guidelines, and a focused project intervention in the area of Middelburg. The project then broadens its scope once more to reflect on possible future perspectives and the overall research and design journey undertaken.

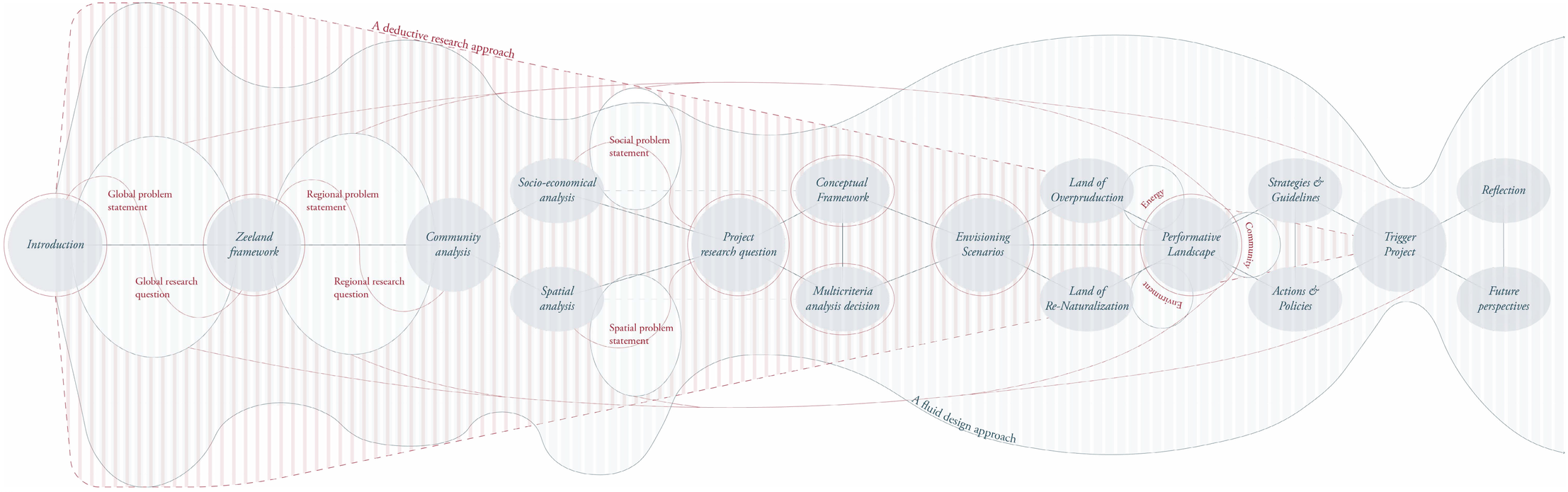


Figure 0.1 Methodology

Table of Content

Chapter 1

Introduction

Global urgency meets local territory

Energy Transition as a Global Process

Global urgency meets territory

We are living in the Anthropocene - a geological epoch in which the impacts of human activity on the planet have reached unprecedented levels. Planetary boundaries are being continuously exceeded due to human actions, emissions, and their consequences. Processes such as climate change, ocean acidification, pollution, water and resource depletion, land degradation, and biodiversity loss are clear and undeniable examples. Addressing these issues represents one of the greatest challenges humanity will face in the coming decades and centuries.

Energy production and consumption play a central role in shaping these dynamics. It is undeniable that a transformation is needed in the lifestyle of the energy-intensive Western society - one that reduces consumption and adopts environmentally sustainable practices. At the same time, a systematic overhaul of current energy infrastructures is crucial, moving toward a fully renewable model. In 2023 alone, the energy sector was responsible for producing 37.4 billion tons of CO_2 - a record high that highlights the urgency of accelerating the energy transition. This transition is also a fundamental component of the broader concept of sustainable development, as emphasized by SDG 7: „Ensure access to affordable, reliable, sustainable and modern energy for all.“

The energy crisis that began in 2021 - and was further intensified by the outbreak of the war in Ukraine - has brought public attention back to the energy issue, which cannot be separated from today's socio-political dynamics and the impacts of the climate crisis. Energy has become a global concern, and the search for new models of production and consumption is now central to the contemporary debate. While renewable energy production in Europe is ahead of many other regions in the world, greater efforts are needed to accelerate the shift and move away from traditional, fossil fuel-based infrastructures.

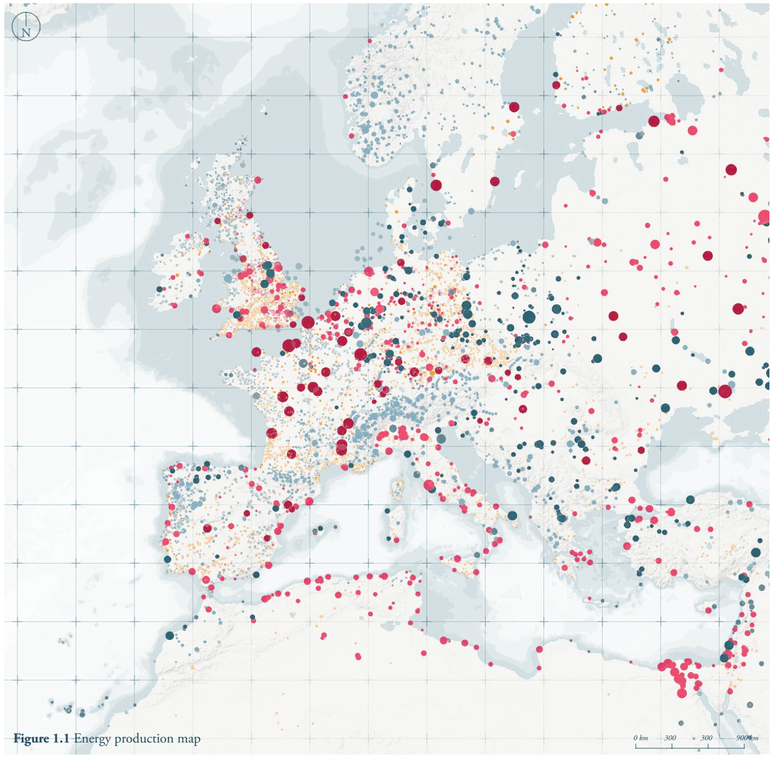


Figure 1.1 Energy production map

Landscape of energy production

Energy Transition as a Social Spatial Challenge

Global urgency meets territory

Renewable sources require more land than the current methods of generating energy. Unlike traditional sources, such as coal or gas power plants, which are relatively compact and capable of producing large amounts of energy within a limited footprint, solar and wind installations demand significantly more space. For example, replacing a single gas-fired power plant may require dozens of times more land area covered with solar panels or wind turbines, often spread across rural or offshore areas.

The potential for harnessing solar and wind energy is spatially uneven—certain regions are much more suitable than others due to climate, geography, or land availability. This disparity creates geographical inequality and calls for a carefully designed spatial strategy, as well as a coordinated dialogue between regions and stakeholders to ensure fair distribution and mutual benefits.

In densely populated and spatially constrained countries like the Netherlands, nearly every piece of land already serves a purpose, whether for housing, agriculture, nature conservation, or infrastructure.
Introducing new elements such as solar farms, wind parks, or energy storage systems leads to overlapping interests and spatial competition, triggering conflicts between farmers, environmentalists, investors, local residents, and public authorities.

Renewable energy infrastructure changes both the visual and functional character of landscapes. This is not only a technical issue, but also a cultural one: how will the perception of place, local identity, and people's connection to their land evolve when energy infrastructure becomes part of their everyday environment?

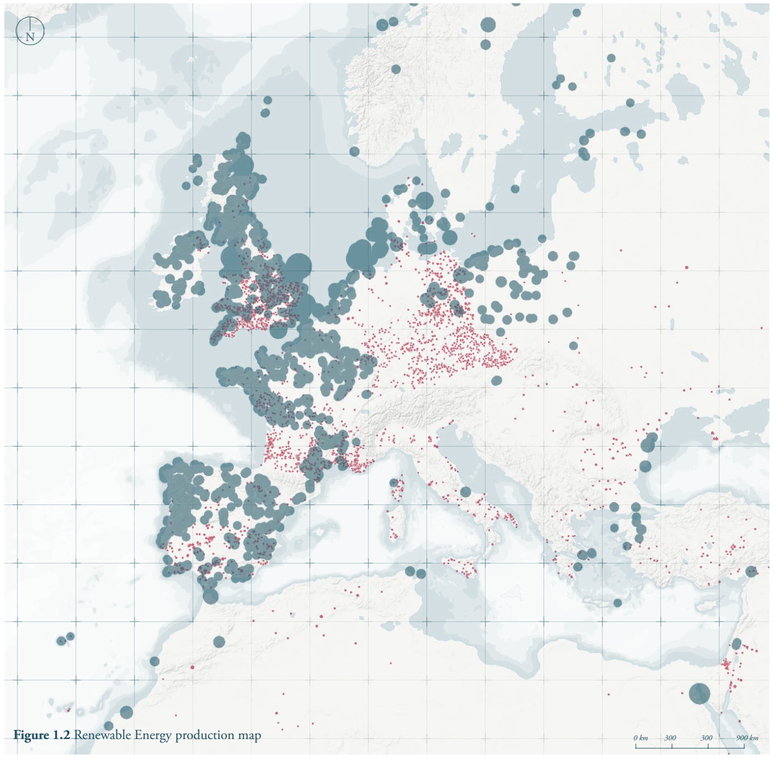


Figure 1.2 Renewable Energy production map

Landscape of renewable energy

The Power of Space: Land as the Most Valuable Resource

Global urgency meets territory

The energy transition implies a gradual shift away from fossil fuels toward renewable energy sources. However, the production of renewable energy is inherently tied to land and spatial considerations.

Any decision related to the energy transition is, by nature, a spatial project. The graph on the right presents a comparative analysis of the land area required for different types of electricity production. As we can see, technologies based on wind and solar energy require significantly more space compared to traditional fossil fuel–based sources. This is a key characteristic of renewable energy: its spatial intensity. A successful energy transition requires the availability of large amounts of open land.

However, land is always a social and political resource. It is owned, inhabited, and used by people. Therefore, questions of land use and transformation inevitably lead to conflicts of interest. The spatial footprint of renewable energy infrastructures, such as wind turbines and solar parks, not only competes with existing land uses like agriculture or housing, but can also fundamentally alter the visual identity, character, and cultural significance of landscapes.
This transformation can provoke resistance from communities who feel that the spaces they identify with are being overwritten or industrialized. In this context, local communities and landowners become critical stakeholders in the energy transition. Their participation, consent, and engagement play a decisive role in implementing spatial strategies for a sustainable future.
Therefore, inclusive design approaches and innovative technologies, such as agrivoltaics, floating solar, or multi-functional infrastructure, are essential to mitigate tensions, allowing for synergy rather than competition between energy production, landscape preservation, and community values.

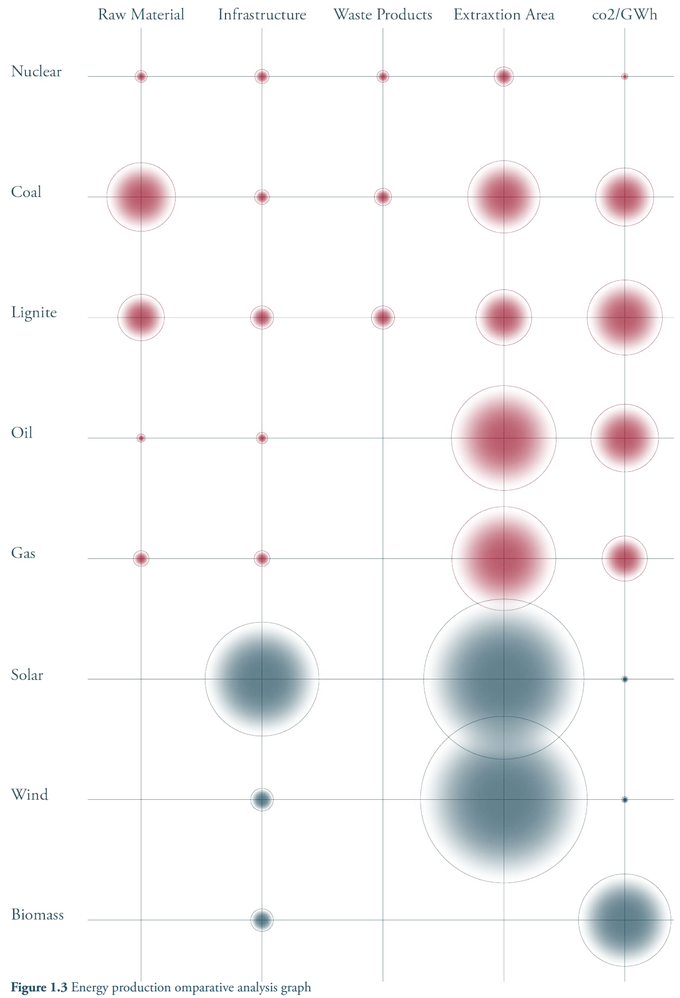


Figure 1.3 Energy production omparative analysis graph

A Social & Spatial Project

Global problem statement

The energy transition is a fundamental and necessary process for the future of the planet. It is intrinsically connected to space and territory, where energy sources are located, and to the local communities that inhabit those places.

It is both a spatial and social project, and it must aim to engage with and respond to the needs of the natural and human environments it intersects. To be fully realized, it should align with a new model of society where the gap between large-scale producers and consumers is reduced in favor of a high-level commitment to the complete decarbonization of production processes and the preservation of the biosphere.

Despite the efforts of recent years and the ambitious goals set by frameworks such as the European Green Deal and the SDGs, the energy transition is still marked by short-sightedness and a lack of ambition. It does not yet fully address the needs of either society or the planet. From a spatial perspective, the placement of new energy infrastructures often interferes with habitats, flora, fauna, and the delicate balances of local ecosystems. It struggles to integrate with the biosphere, creating imbalances on both an ecological and landscape level.

Moreover, it is often managed through a traditional top-down approach, which creates a disconnection between policy objectives and the lived realities of people in these territories. Local communities, those who bear the consequences of land-use changes, environmental degradation, and economic transformations, are stripped of decision-making power, excluded from participatory processes, and left with no real say in shaping their future. Rather than participating actively, they are forced to adapt - not by choice, but as a response to external pressures such as political mandates, corporate interests, and shifting economic conditions that favor large-scale actors and powerful lobbies.

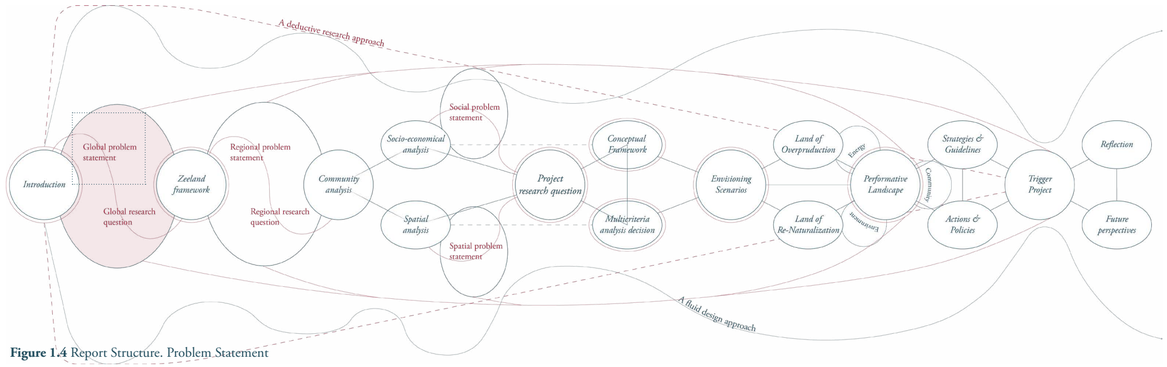


Figure 1.4 Report Structure. Problem Statement

Energy transition is a spatial process.

It is intrinsically tied to territories and their communities.

However, it often overlooks the needs of local residents and the landscapes it transforms.

A just energy transition must bridge this gap by prioritizing local empowerment and strengthening resilience.

Energy Transition for Planet and Communities

Overarching research question

Is it possible to develop a model for the energy transition that is both socially and spatially sensitive and positive? Can we imagine a clean, green production system that integrates harmoniously into the landscape and coexists with the diverse species that inhabit it? Is a transition possible that involves the most marginalized members of society, helping them emancipate themselves from an increasingly expensive energy market, while also convincing the most skeptical and disengaged of the need for climate action?

With the hope that a socially just and truly sustainable energy transition is indeed possible, the following pages present an attempt to imagine how such a process might take shape, using the Dutch province of Zeeland as a case study. Through a combination of qualitative and quantitative approaches, grounded in a continuous dialogue between design and research, this work proposes a vision that aims to define new, practical ways of engaging with the challenges of the energy transition. What is needed is a paradigm shift: spatially, by reimagining the productive landscape, and socially, by proposing a new model of energy production and consumption that breaks down the existing separation between key actors.

We must be creative in visualizing new scenarios - it is our responsibility as researchers and designers to fully harness the potential of this transformation. Furthermore, this transition calls for an unprecedented level of collaboration between diverse stakeholders, from local communities to global institutions, in order to align efforts and drive sustainable change across all levels of society.

The changes driven by the energy transition can serve as a powerful opportunity to improve the planet's current condition. They should be understood as a unique and real chance to rethink our relationship with the natural world and to define a new productive system that respects, and does not exceed, the limits of the planet we inhabit.

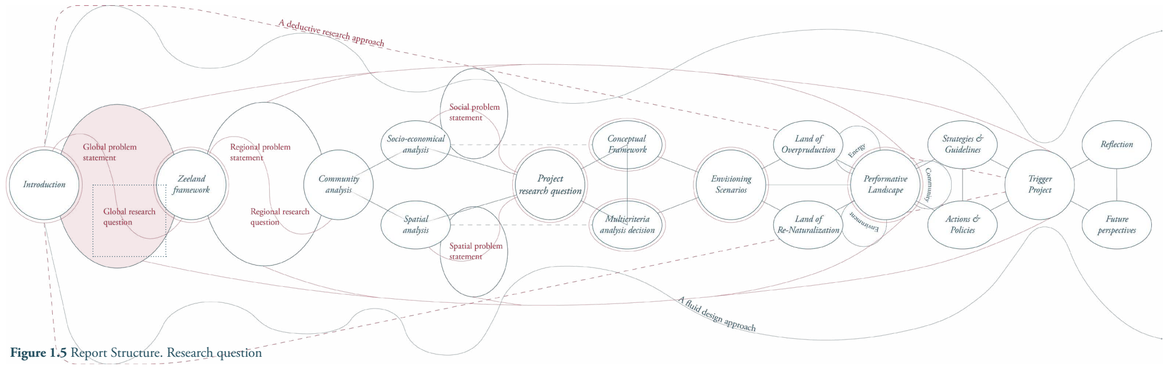


Figure 1.5 Report Structure. Research question

How can the energy transition empower local communities and simultaneously protect and enhance the region's landscape and environment?

Chapter 2

Zeeland

A province at the crossroads of climate & energy

Zeeland‘s Framework

A province at the crossroads of climate & energy

Driven by the desire to investigate the relationship between energy transition, local communities, and landscape, this research focuses on the Zeeland Delta Region.

Zeeland is a Dutch province located in the southwestern margin of the country, bordering Belgium to the south, the province of South Holland to the north, and North Brabant to the east. The territory is strongly characterized by the presence of water: the province consists of three different peninsulas crossed by parts of the delta and bordered to the west by the North Sea.

The imagery associated with the region stands in contrast to the nearby, yet vastly different, modern Randstad. It is shaped by water, wind, fields, and sun - by small agricultural villages and scattered medium-sized towns, by farmers and fishermen seemingly disconnected from the rush of modern society. Yet, paradoxically, the region lies within a network of major international port connections, being equidistant from the major ports of Antwerp, Rotterdam, and Ghent.

Zeeland is a region with a strong identity, deeply rooted in local traditions and communities. It is internationally renowned for its rich and complex landscape and for its long, windswept beaches. As a result, the tourism sector has been steadily growing and is gradually integrating into the region’s economy, which was traditionally based on agriculture and fishing. Alongside tourism, in recent decades Zeeland’s economy has seen significant development in the field of energy production, both renewable and non-renewable—particularly wind and nuclear energy - as well as the growth of major industrial infrastructures such as the North Sea Port and the port of Terneuzen.

Zeeland is therefore a region of great interest, combining exceptional features in all three fields of investigation: its strong and rooted identity, its rich and dynamic landscape, and its extensive and well-established energy infrastructure. This makes Zeeland an ideal context in which to explore how the energy transition can be harmonized with local social structures and the specific characteristics of place, offering valuable insights into how sustainable futures might be grounded in regional identities and landscapes

Figure 2.1 The Netherlands

The energy landscape of the Zierikzee coast

Figure 2.3

The industrial landscape of the port of Terneuzen

Figure 2.4

The tourist landscape of Westkapelle

Urban Fabric and Population

A province at the crossroads of climate & energy

The following section presents key data and insights on Zeeland's society, natural landscape, and energy systems. This information has been carefully selected to establish a comprehensive framework for understanding the complex socio-spatial dynamics that define the Delta region.

Zeeland is the least populated province in the Netherlands, with a total population of 391,124 and a population density of 220 inhabitants per square kilometer, ranking tenth out of the twelve Dutch provinces. Population growth over the past few decades has been relatively stagnant and modest, with a noticeable peak around the year 2020. However, no significant future increase is expected, due in part to the lack of large urban centers capable of attracting new residents. This demographic stability reinforces the region's rural character and influences long-term planning and development strategies.

Among the twelve municipalities of Zeeland, some remain closely tied to the region's historical rural traditions, while more urbanized areas are mainly concentrated on the Midden-Zeeland peninsula, particularly around Vlissingen and Middelburg—the provincial capital—as well as in Terneuzen, the province's most populous city.

Zeeland's municipalities and their populations:

- Hulst: 27,575 inhabitants
- Sluis: 23,166 inhabitants
- Terneuzen: 54,463 inhabitants
- Noord-Beveland: 7,581 inhabitants
- Schouwen-Duiveland: 34,065 inhabitants
- Tholen: 26,085 inhabitants
- Middelburg: 48,964 inhabitants
- Veere: 21,953 inhabitants
- Vlissingen: 44,358 inhabitants
- Borsele: 22,818 inhabitants
- Goes: 38,594 inhabitants
- Kapelle: 12,882 inhabitants
- Reimerswaal: 22,896 inhabitants

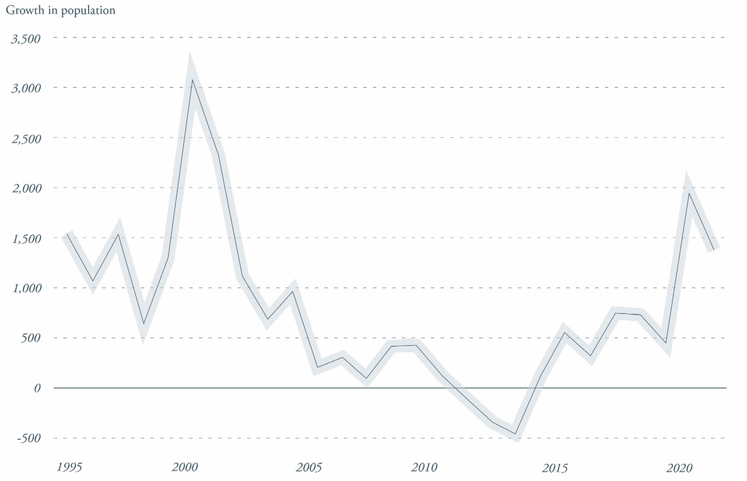


Figure 2.5 Population

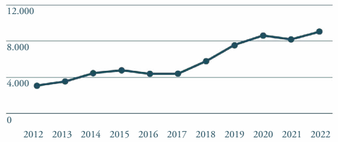
Figure 2.6 Urban areas

Energy Transition and Productive Sector

A province at the crossroads of climate & energy

The province of Zeeland holds a unique position within the national context due to its natural characteristics, which offer favorable conditions for the development of renewable energy. Zeeland is already actively engaged in the energy transition and is considered one of the key energy hubs of the Netherlands. The region features a diverse mix of energy sources, including large clusters of offshore wind and solar energy, the country's only operational nuclear power plant, and plans to develop the North Sea Port area into a major European hub for hydrogen production and distribution.

Total known renewable energy (2012-2022)



Energy consumption sectors (2012-2023)

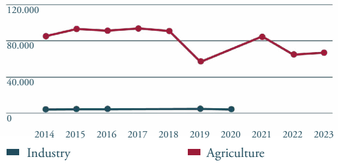


Figure 2.8

A significant number of national energy projects are being implemented in the region. These include plans for a second nuclear power plant, the development of a high-voltage electricity grid, and the construction of a hydrogen pipeline within the framework of the Delta-Rhine Corridor.

Due to its strategic border location with Belgium and its integration into European and global logistics networks, Zeeland also plays a crucial role in the national logistics system. Particularly important is the North Sea Port zone, located in the cities of Vlissingen and Terneuzen. This deep-sea port is part of the Hamburg - Le Havre industrial port range and is situated in the heart of Western Europe, along major European transport corridors: the North Sea-Rhine-Mediterranean and the North Sea-Baltic corridors. As such, the port serves as a key logistical node at both regional and international levels.

Known renewable electricity per capita (2022)

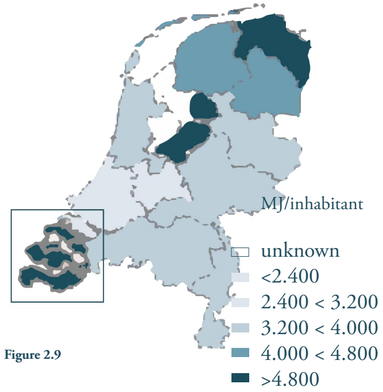


Figure 2.9

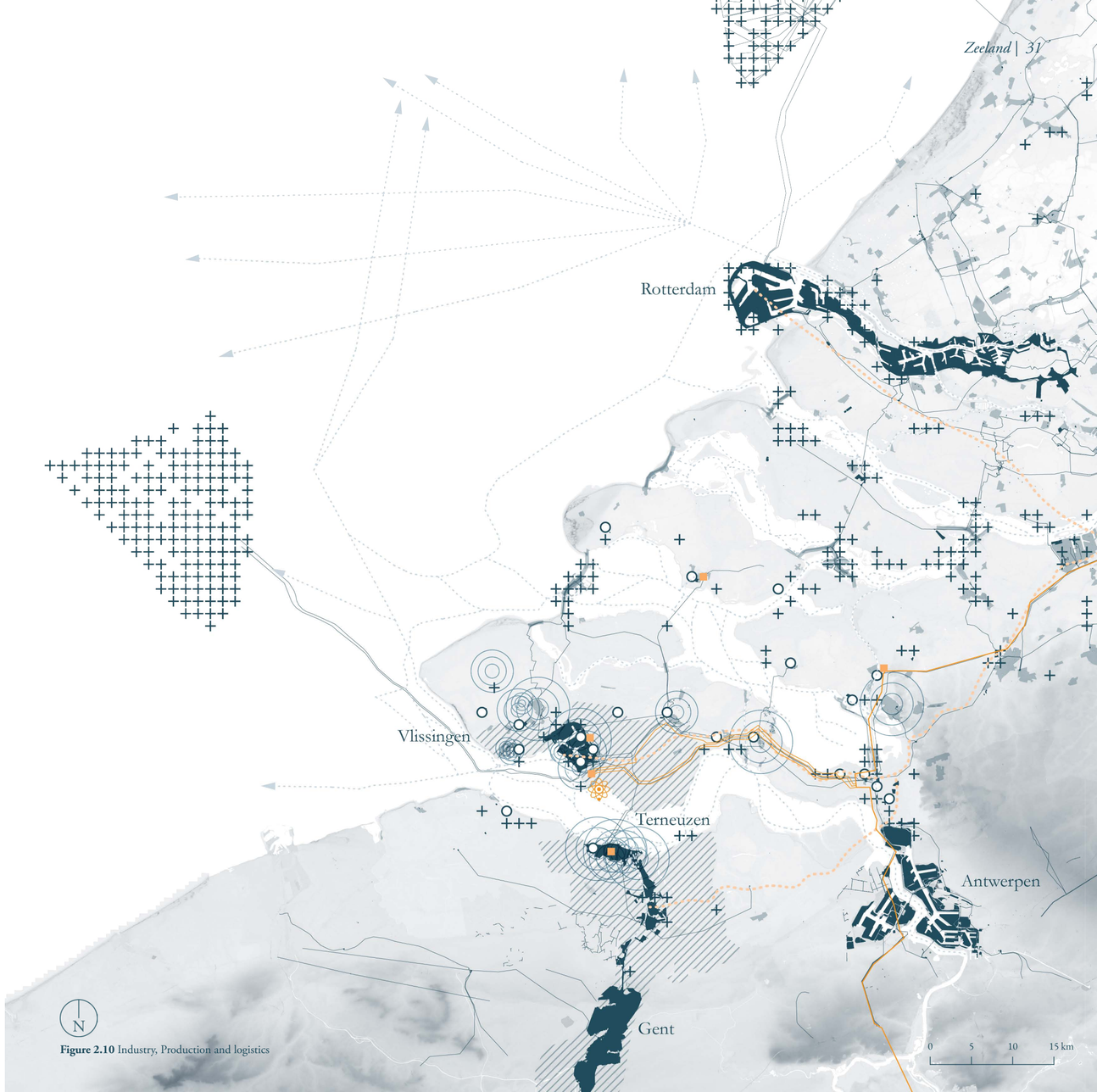


Figure 2.10 Industry, Production and logistics

A Land Between Water & Landscape

A province at the crossroads of climate & energy

From both a landscape and ecological perspective, Zeeland is a region of significant interest. The omnipresence of water is its most evident feature, shaping both its environmental balance and spatial composition. Zeeland's territory is inherently complex—a mosaic of land and water, sea and rivers, agricultural fields, dune systems, expansive beaches, and very few elevated areas. It is a dynamic landscape, shaped by the continuous interaction between human intervention and natural processes. As noted in the previous pages, the region does not exhibit a high concentration of built-up or densely populated areas, making it particularly relevant for investigation through the lens of energy transition.

This is further confirmed by provincial-scale GIS-based land use analysis: only 13% of the region is occupied by built environments, while over half consists of open agricultural land—spaces that are potentially of high interest for renewable energy production. Despite the dominance of agricultural land, it is important to note the presence of numerous natural areas and ecologically valuable elements. Scattered meadows, grasslands, and scrublands are widely embedded within the agricultural mosaic, while the most ecologically dense and diverse areas are concentrated along the coastline, where the characteristic dune landscape prevails.

The ecological importance of these coastal areas is underscored by their protection under the EU Habitats Directive and the designation of several Natura 2000 sites, especially across the Delta's coastal and riverine zones. One prime example is the Oosterschelde Delta, which is also a national park.

However, the region has a notably low tree density. Analysis of tree cover, based on a 1.5 km² grid, shows that trees are scarce outside coastal zones and urban areas. This indicates that Zeeland's open agricultural spaces may be relatively poor in biodiversity, with limited woodland and tree presence.

Landscape elements:
- Forest
- Meadow, heath, scrub
- Beach
- Water system
- Natural elements of quality

Protected areas
- National parks
- Natura 2000

Figure 2.11 Landscape in Zeeland

> Zeeland has always been an energy landscape—wind turbines, solar fields, they are just part of the view. My children grew up with this, they don't know anything else. For us this feels like home when we see this.'
>
> *// Holiday resort Oesterdam receptionist, Tholen*

Figure 2.12

A Territory that is changing into an Energy Landscape

Figure 2.13

Where Energy Production is an integrated part

A complex Hierarchy

Policies and Governance

There are several levels of regulations and programs that directly influence the area under consideration and determine the decisions made.

At the global level, initiatives such as the Sustainable Development Goals (SDGs) and the Paris Agreement set strategic directions and sustainable development goals for countries worldwide. These documents focus on tackling climate change, reducing greenhouse gas emissions, protecting ecosystems, and ensuring sustainable economic growth. They serve as a foundation for further legislative initiatives at international, European, and national levels.

These global objectives are considered at the European Union level and adapted into EU-wide strategies and directives, such as the European Green Deal, New Circular Economy Action Plan, CAP Strategic Plan (CSP), Renewable Energy Directive, and others. These programs define the principles and measures that EU member states must follow to achieve climate neutrality, improve energy efficiency, transition to renewable energy sources, and implement sustainable economic and agricultural practices.

EU member states then implement and refine these programs according to their national circumstances, developing their own strategies and regulations. In the Netherlands, key documents include Structural Vision for Infrastructure and Spatial Planning (SVIR) and the National Climate Agreement, which set out the country's key development directions, such as the transition to renewable energy, sustainable water management, and climate adaptation of territories. These policies are crucial for ensuring environmental, economic, and social sustainability.

At the regional level, provinces develop more detailed plans and strategies tailored to local conditions. For example, the Regional Energy Strategy (RES) translates national climate policies into regional action plans, defining which energy sources can be used in specific areas, how to reduce CO_2 emissions, and what measures need to be taken to ensure sustainable development.

Thus, there is an interconnected system of regulations, strategies, and programs that shape the framework for territorial development and decision-making.

In most cases, this process follows a top-down approach, where global and EU-wide initiatives are translated into national strategies and then adapted at the provincial and municipal levels. This means that decisions made at the local level must align with broader goals and commitments established on the international stage.

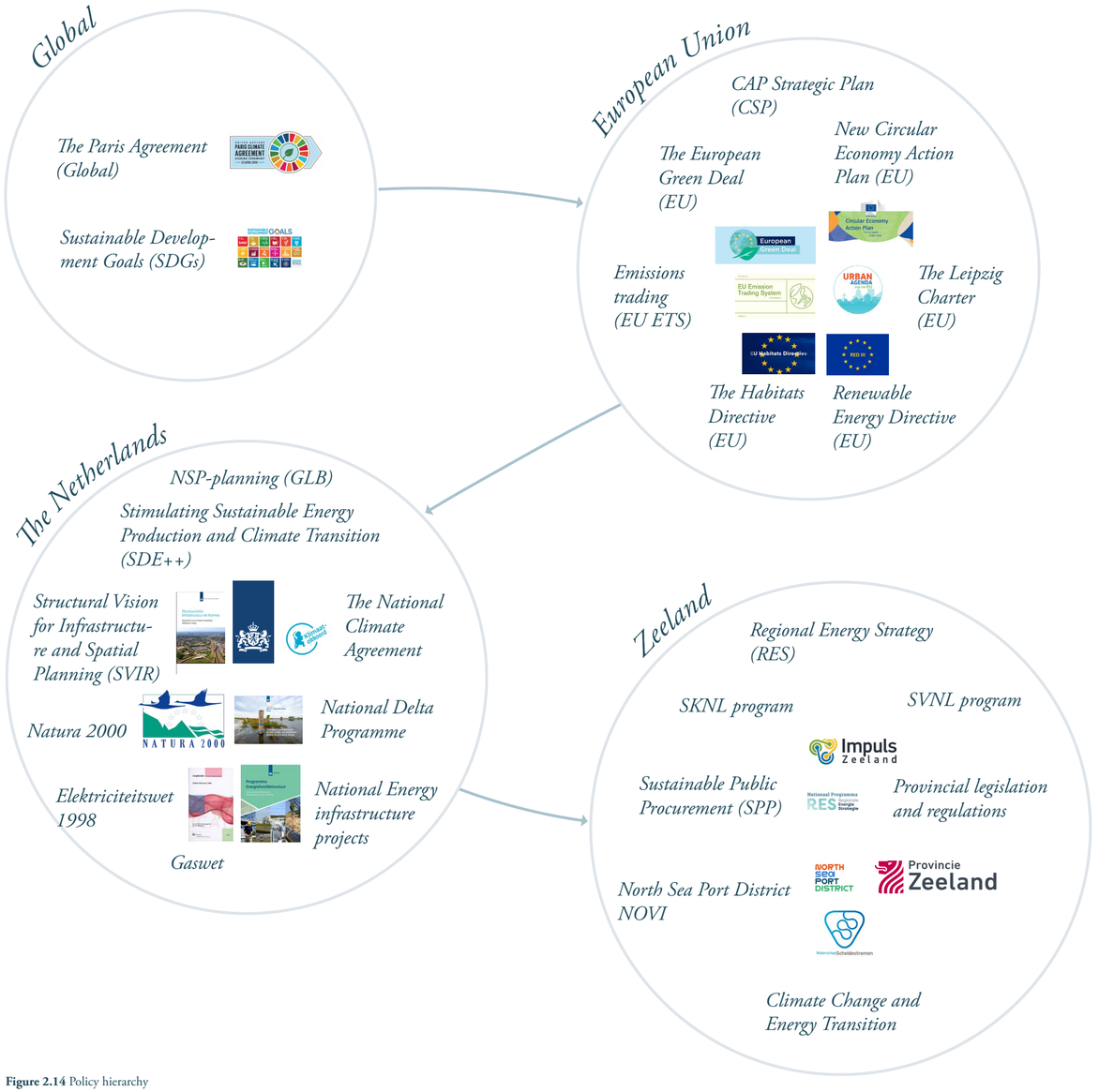


Figure 2.14 Policy hierarchy

Programmes and Regulations Aligned with Energy Transition

Policies and governace

Many global initiatives, such as The Paris Agreement and the Sustainable Development Goals (SDGs), are reflected in European Union policies, such as The European Green Deal. These policies are then adapted into national strategies in the Netherlands, forming the foundation for implementing climate and energy initiatives.

Energy Transition in the Netherlands.
Key programs supporting the energy transition include the Nationaal Programma Regionale Energiestrategieën (NP RES) and National Energy Infrastructure Projects, which establish Regional Energy Strategies (RES) for each region.

Key Objectives of the Regional Energy Strategies (RES) in Zeeland:

- Development of renewable energy sources (wind turbines, solar panels);
- Optimization of heating systems (phasing out natural gas);
- Modernization of energy infrastructure;
- Reduction of energy consumption;
- Engagement of local communities in energy projects;
- Achieving 35 TWh of sustainable onshore energy by 2030 (aligned with the National Climate Agreement).

Funding for these initiatives is provided through SDE++, which supports renewable energy development and CO_2 reduction projects. Resources are distributed via NP RES and allocated to specific regional projects. The implementation is overseen by provinces, municipalities, and local authorities.

Key Aspects of SDE++:

- Supports renewable energy projects (solar, wind, geothermal, biomass);
- Funds carbon capture and storage (CCS) technologies;
- Competitive bidding system: projects with the lowest cost per ton of CO_2 reduction receive funding first;
- Aims to decarbonize the economy and achieve climate neutrality by 2050.

The energy transition is closely linked to environmental policies, as reducing CO_2 emissions and shifting to sustainable energy sources directly contribute to climate adaptation. A key document in this field is The National Climate Agreement, which sets the goal of achieving climate neutrality by 2050.

Main Goals of The National Climate Agreement:

- Reduce CO_2 emissions by 49% by 2030 (compared to 1990 levels);
- Achieve climate neutrality by 2050;
- Expand renewable energy generation (wind, solar);
- Improve energy efficiency in industry, transportation, and buildings;
- Develop a circular economy, reducing waste and promoting sustainable resource use;
- Enhance carbon capture and storage (CCS) technologies to offset unavoidable emissions;
- Support regional energy strategies (RES) to implement national climate policies at the local level.

In conclusion, the energy transition in the Netherlands is a complex, multi-level process, where national strategies, regional initiatives, and local projects interact. It follows a top-down approach, starting from global climate agreements and translating into specific actions at the provincial level. Moreover, sustainable energy development is deeply connected to environmental policies, highlighting the importance of an integrated approach to achieving climate goals.

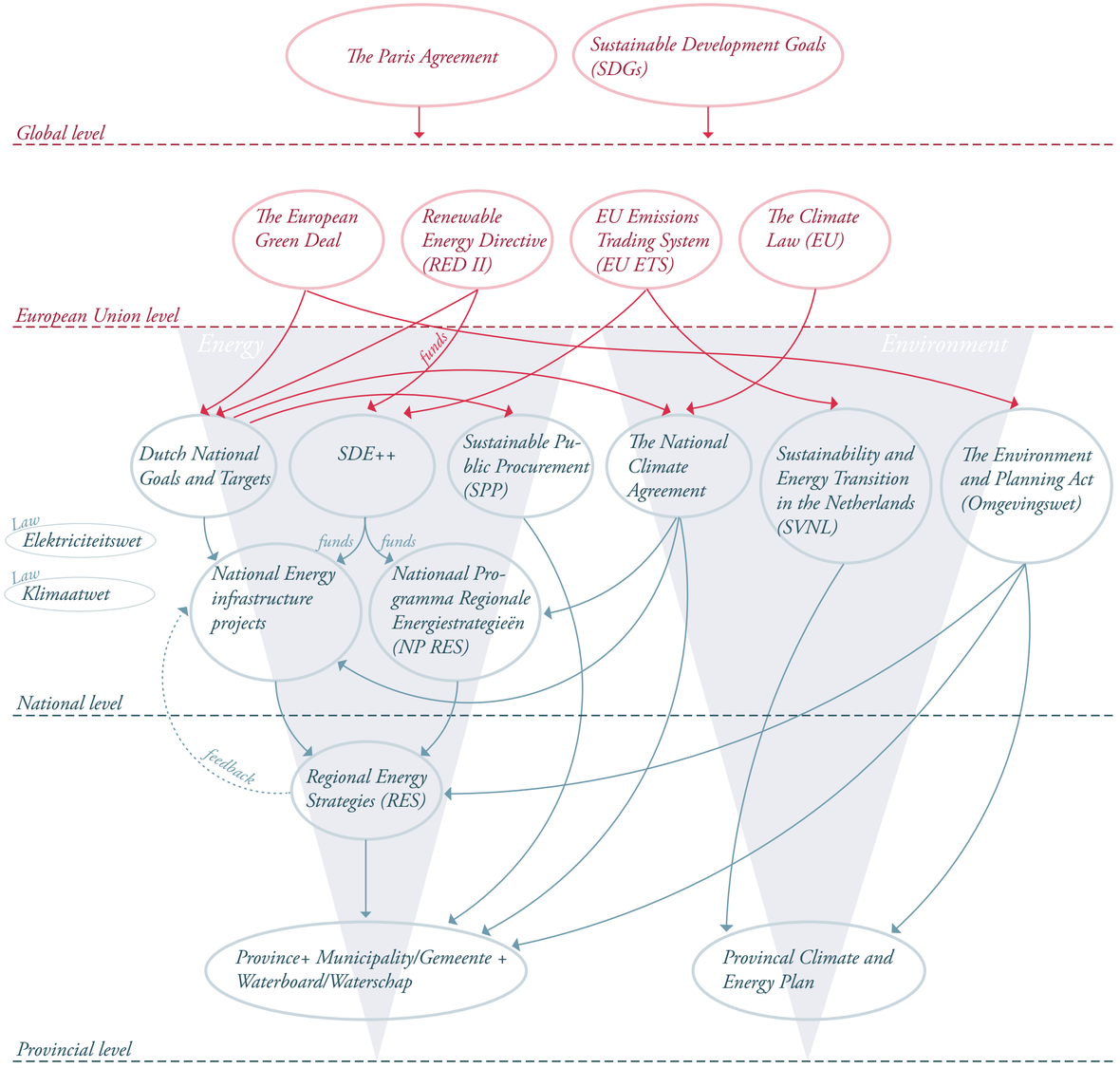


Figure 2.15 Programmes and Regulations Aligned with Energy Transition

Spatial Planning Analysis

Policies and governace

National Energy infrastructure projects

Figure 2.16

Key points;

- Development of Energy Infrastructure;
- Support for Energy Transition
- Ensuring Reliability and Sustainability;
- Coordination with Regional Energy Strategies (RES) and national climate goals;
- Optimization of Energy Distribution.

National Energy infrastructure projects

Figure 2.17

Energy projects in Zeeland:

- Construction of the hydrogen network in the Southwest Netherlands;
- The exploration of offshore wind energy landings;
- Expanding the high-voltage network, such as the 380 kV connection between Zeeland and Flanders.

Structural Vision for Infrastructure and Spatial Planning (SVIR)

Figure 2.20

This map outlines which areas and main networks are of national importance in relation to the formulated national objectives for competitiveness, accessibility and quality of life and safety, so that a coherent main spatial structure becomes visible. It is the concrete and geographically specified intermediate step for 2028 on the way to the ambitions for 2040.

Structural vision for infrastructure and space

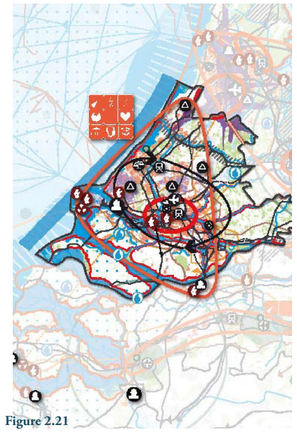


Figure 2.21

Tasks of national importance in this area are:

- Strengthening the primary flood defences and implementing the area-specific sub-programmes of the Delta Programme together with local and regional authorities;
- Making the main energy network robust and complete (380 kV);
- The establishment and protection of the (recalibrated) EHS, including the Natura 2000 areas.

National Delta Programme 2025

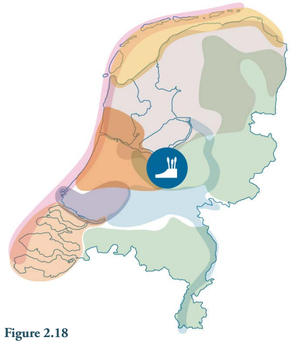


Figure 2.18

The water agendas are becoming increasingly interwoven with other spatial agendas, for example in the areas of housing construction, agriculture and nature.

Southwest Delta
Climate-resilient land use requires tailored approaches for each subarea for a connected delta with a mosaic of water and land uses.

National Delta Programme 2025

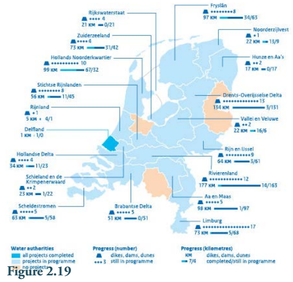


Figure 2.19

All primary dikes, dams and dunes and engineering structures must meet the standard stipulated by the Water Act so that the inhabitants of the Netherlands are protected against high water.

National Environmental Vision (NOVI)

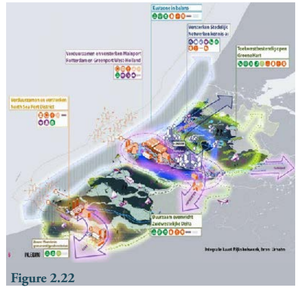


Figure 2.22

North Sea Port District was designated as a NOVI area in May 2021. For the rural area, it is being investigated which part of the rural area of Zeeland can be a frontrunner area within the framework of the National Rural Area Programme.

Een Ontdekkingsreis Naar Nieuw Zeeland

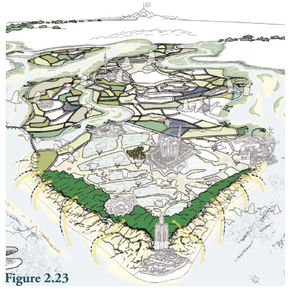


Figure 2.23

Plan for Zeeland to use system recovery as a strategy to deal with sea level rise and climate change. With the aim of developing a sustainable strategy for people and nature for the future.

*Legends can be found in the appendix

A multi-layered Spatial System

Policies and governace

Similarly to the analysis of different governance levels, the review of existing urban planning documents reveals a complex overlap of plans and strategies affecting the Dutch province of Zeeland.

The Dutch urban planning system is based on the collaboration of plans and visions across different scales. At the national level, the National Environmental Vision (NOVI) sets out broad ambitions guiding regional development until 2050:

- Sustainable economic growth potential for the Netherlands;
- Space for climate change and energy transition;
- Strong, liveable and climate-resilient cities and regions with sufficient space to live, work and move;
- Future-proof development of rural areas.

The most relevant project from this vision for Zeeland is The North Sea Port District. It is a Flemish-Dutch economic growth region in the heart of the EU with a strong international seaport, an important industrial cluster, a metropolitan and highly educated hinterland with unique nature.

Another crucial and highly relevant program for Zeeland is National Delta Programme.
The in Zeeland (Southwest Delta) focuses on climate adaptation and water management;

- Flood Risk Management – Strengthening coastal defenses and dunes.
- Freshwater Supply – Improving water availability for agriculture and residents.
- Climate Adaptation – Implementing strategies to cope with climate change.
- Ecosystem Restoration – Enhancing water quality and restoring tidal flows.
- Integrated Spatial Planning – Balancing economic, ecological, and recreational interests through coordinated regional plans.

From the Regional Energy Strategy (RES), we can see that many national projects are planned for implementation in Zeeland. There are several large projects running in the province of Zeeland:

- Construction of the hydrogen network in the Southwest Netherlands;
- The exploration of offshore wind energy landings;
- Expanding the high-voltage network, such as the 380 kV connection between Zeeland and Flanders;
- New construction of nuclear power plants.

This programs serves as a foundation for the structural plans of each municipality (gemeente). Particular attention is given to landscape protection, agricultural sustainability, renewable energy production (targeting 1,800 MW by 2030), and climate change adaptation.
In conclusion, it can be stated that a considerable number of nationally significant projects related to energy and the energy transition are planned for Zeeland. However, it is evident that the majority of these projects are focused on energy production for the entire country or for export, rather than addressing the needs of the local population. Furthermore, the modernization of the energy grid and infrastructure is noticeably delayed in relation to the current demand.

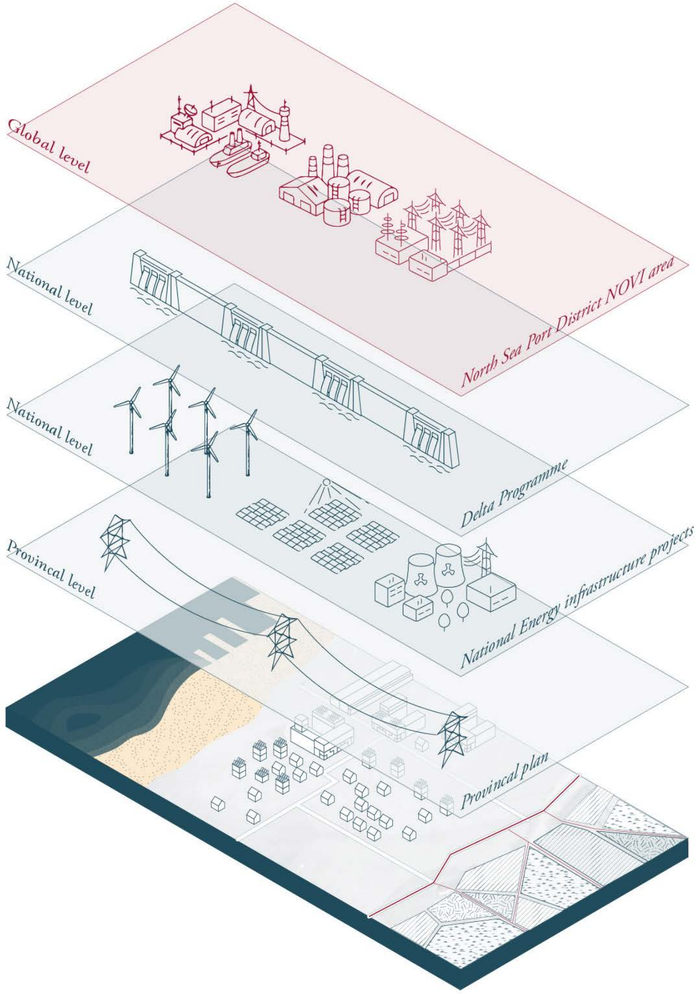


Figure 2.24 Spatial System layers graph

Productive Sectors and Land Use

A small community with a big potential

The main economic sectors in Zeeland are agriculture and food production, industry and logistics, tourism, fishing and aquaculture, making it a diverse and multifaceted province.

However, from a spatial perspective, it becomes clear that the largest portion of the province is occupied by agricultural land. At the same time, only about 3.5% of the workforce is employed in the agricultural sector, while it uses approximately 55% of the region's land.

This highlights a significant opportunity for transformation, as the energy transition requires open space and agricultural areas offer the greatest potential for implementing new sustainable solutions.

Therefore, farmers who own the land have every opportunity to become key players in shaping future energy transition solutions. Their involvement could play a pivotal role in driving the transition towards more sustainable and resilient systems.

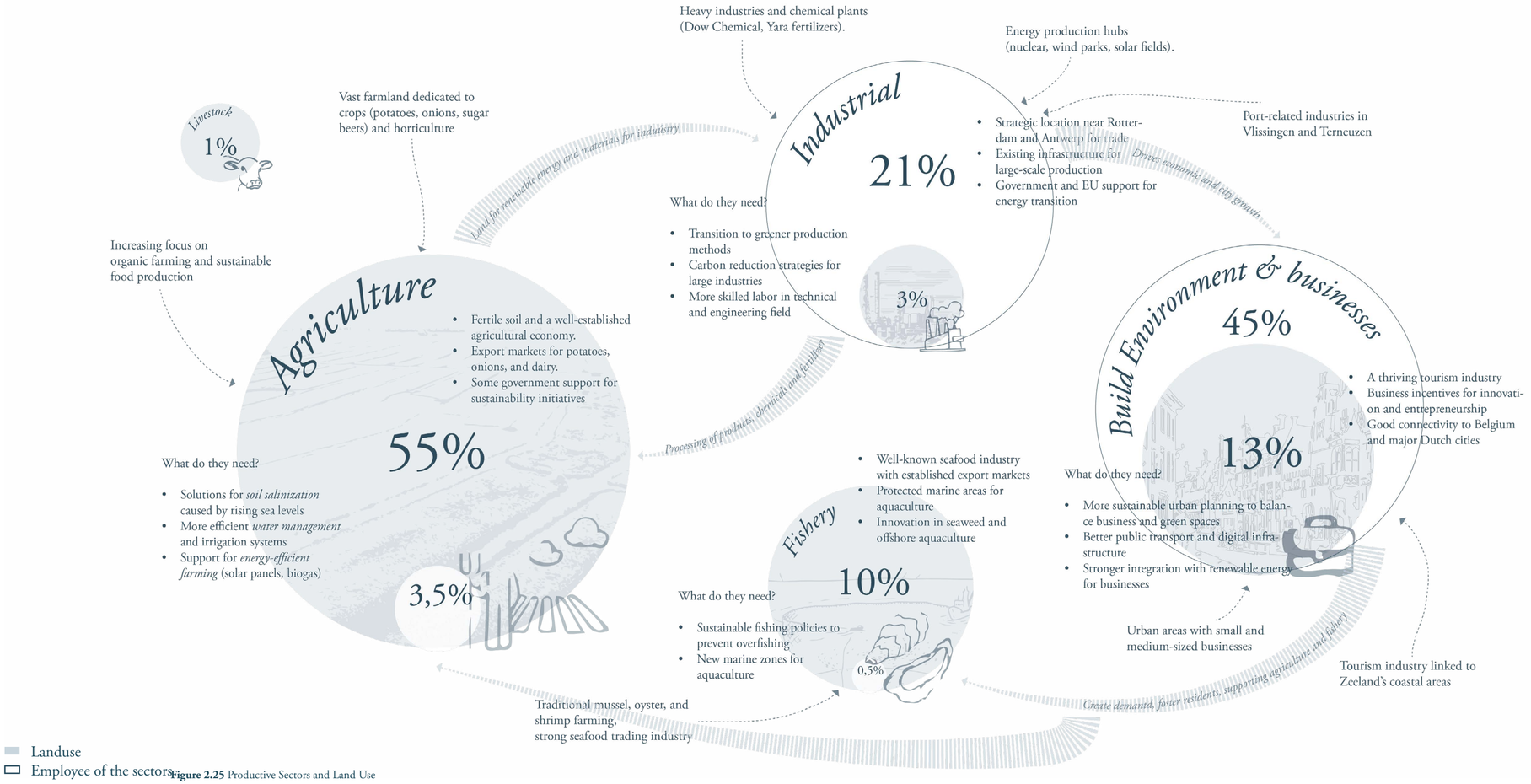


Figure 2.25 Productive Sectors and Land Use

A complex System orientated towards Export

Regional production flows

An analysis of energy flows in the province revealed a focuse on the development of industry and energy infrastructure. Most of these projects are aimed at the production and distribution of energy on a nationwide scale or for export to neighboring countries. The province actively producing energy, it is primarily focused on external markets. Farmers generate energy themselves and are almost self-sufficient.

The development of energy infrastructure is primarily concentrated in port and industrial areas. For local consumers, only the low-voltage network is currently available, covering only the largest cities
in the province.

A similar situation is observed in the agriculture sector. Large agribusinesses are focused on exporting products, while small farms often have no understanding of the final points of sale for their products.

Therefore, it can be concluded that, despite the region's high potential in energy and agricultural production, the current development strategy is primarily oriented towards the external market. This creates a challenge for integrating local consumers and producers into a system that can utilize regional resources for sustainable local development.

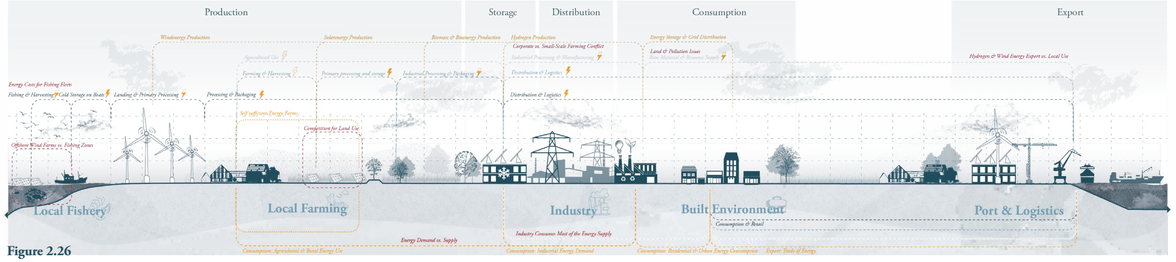


Figure 2.26

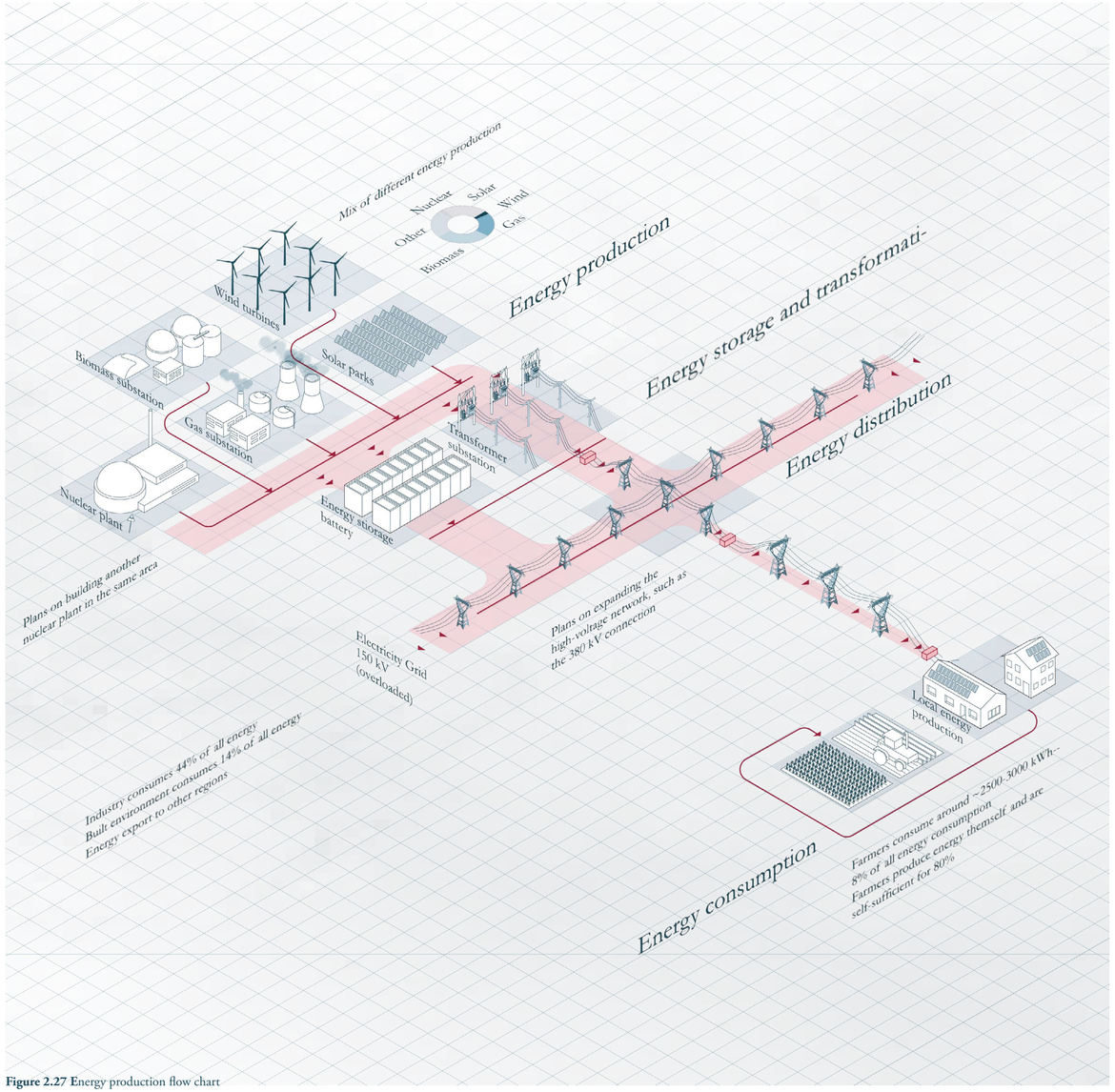


Figure 2.27 Energy production flow chart

A Region with Unique Conditions

Site-specific problem statement

Zeeland plays an important role in energy production and international logistics. It is a promising province in the context of the energy transition, with significant potential for generating renewable energy - particularly wind and solar power. Thanks to its strategic border location, Zeeland serves as a valuable and influential hub for logistics, exports, and international cooperation.

The province is characterized by a low population density and a large amount of available land. Much of this land is undeveloped and primarily used for agriculture.

However, this creates a certain imbalance. Industrial development is concentrated in specific clusters and largely driven by national projects, with a focus on large-scale industry and industrial zones. At the same time, farmers and agricultural communities remain largely excluded from these processes and are not integrated into the energy transition system. Outside industrial centers, even basic infrastructure often operates at or near capacity and struggles to meet the needs of local residents.

Therefore, despite having favorable conditions for advancing the energy transition, a significant portion of the land is not being used as efficiently as it could be. It is essential to address this gap, reconsider existing approaches, and explore ways to connect energy production and agricultural sectors to create synergies.

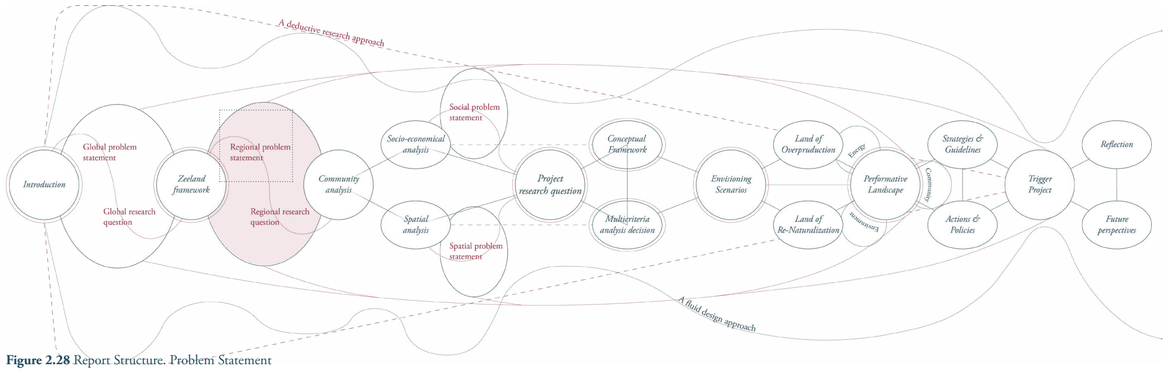


Figure 2.28 Report Structure. Problem Statement

Zeeland Delta Region holds significant potential for the energy transition thanks to its natural resources and conditions.

Majority of the territory is occupied by agricultural land, which could be used for renewable energy production.

Thus, the farming community has great potential to become key players in the region‘s energy transition.

However, this potential remains unrealized, by both planners and farmers.

Energy Production as an Opportunity

Site-specific Research Question

Are we using our available land efficiently enough, considering that land is a valuable and extremely limited resource in the Netherlands? How can we achieve a more rational and sustainable use of land resources?

In what ways can we ensure integration and symbiosis between energy production and agriculture? How can we leverage the advantages of the industrial and logistical clusters located within our province? How can infrastructure be made more accessible and beneficial for the agricultural sector?

How strong is the historical and functional connection between the land of this province and agriculture? How often have landscape transformations occurred in the past? What will happen to the identity of this place and the way it is perceived by local communities when we are faced with the need to develop new narratives and solutions within the framework of the energy transition? How will this affect the everyday lives and perceptions of the local population?

Can farming communities become the key actors capable of initiating a meaningful transformation of the current land-use model? How can they be placed at the center of this transition process? What steps must be taken to encourage their engagement, reveal new opportunities, inspire them, and actively involve them in shaping the future of their environment?

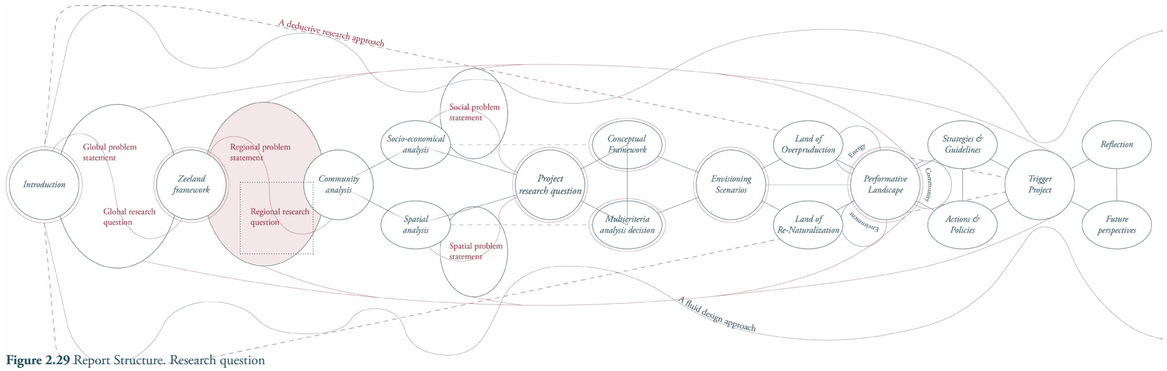


Figure 2.29 Report Structure. Research question

How can the energy transition in Zeeland help farmers fully utilize the potential of their land for renewable energy production, empowering them to play an active role in the process while respecting the unique character of the Delta landscape?

Chapter 3

Community Analysis

A socio-economic approach

Farmers adjusting to a dynamic Landscape

Historical evolution

Figure 3.1

Figure 3.2

Figure 3.3

Figure 3.4

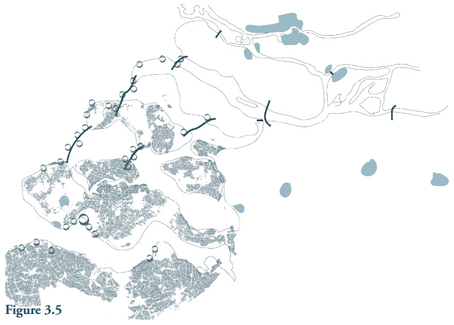


Figure 3.5

1815

Small-Scale Local Economy

Zeeland's rural communities were built around subsistence farming and small-scale fishing. Farmers cultivated modest plots, relying on local trade and seasonal rhythms. Life was intimately tied to the land, sea and its climate and seasons, with agriculture forming the backbone of community survival and a trigger for urbanization.

1953

North Sea Flood & Delta Plan

The imense North Sea Flood dramatically altered the region and its agricultural landscape. Farmlands were inundated, and many farming families were displaced. In the aftermath, the Delta Works infrastructure projects reshaped the landscape. Farmers not only lost land and therefore their exsistential base but also traditional knowledge systems tied to the former tidal environment.

1980

Completion of Delta Works & Port Expansion

With the completion of major water management infrastructure, Zeeland's agricultural sector saw both opportunity and challenge. Some farmers benefited from increased land security and flood protection, enabling modernized practices. Others, particularly those linked to fishing communities, faced restricted access to waterways and a loss of traditional livelihoods. A gap between farmers who could benefit from the aftermath and the ones who suffered from it was formed.

2000

Energy Transition Begins & Growing Tourism

Offshore wind farms emerge, reducing traditional fishing zones
Ports shift towards renewable energy logistics
Growth in tourism sector: resort housing & horeca (hotels/restaurants/cafés) expand
Local communities: Some farmers profit by leasing land for solar panels; others struggl, Tourism sector starts benefiting residents

2025

Corporate Expansion & Energy Conflicts

Today, Zeeland's farmers face growing pressures as large energy corporations acquire agricultural land for renewable infrastructure. This has led to visible tensions: some farmers benefit by participating in the energy transition, while others resist what they perceive as the industrialization of the rural landscape. At the same time, tourism and seasonal population shifts intensify challenges around land availability and housing. The initial gap between farmers, who were stable enough to adapt to changes and benefit from is and farmers who did not have the power to do so is now as big as never before.

Farmers: potential Players in the Energy Transition

Introduction of the community

Oysters, mussels, salt, and ice cream on the beach—these are some of the things that likely come to mind when thinking of Zeeland in the Netherlands. The province has always had perfect conditions for growing high-quality agricultural products, thanks to its fertile land, moist soil, and temperate maritime climate. Historically, this soil, reclaimed from the sea and protected from the water through centuries, has formed the foundation of Zeeland's agricultural success.

In 1800, two-thirds of the workforce was engaged in farming, and it formed the backbone of the province's economy and identity. Fast forward two centuries, and the agricultural sector still occupies 55% of Zeeland's landscape. The region is home to the largest agricultural farm in the area, covering 1,248 hectares (as of 2017), alongside many other farming enterprises. Over time, the farming community has diversified, expanding in terms of scale, product types, and sales channels. Yet, despite these changes, they continue to proudly identify as 'boeren' (farmers) on Zeeland soil.

The delicate balance between land and water has shaped Zeeland's farming practices for generations. Now, with the warming climate, farmers face mounting pressure from multiple directions: adapting to a changing conditions, meeting stricter regulations, securing support from society and responding to stagnated consumer demands. Despite the fact that nearly 80% of farms already adapted to being self-sufficient (leaving out greenhouses), many businesses are still struggling. The challenge is again how to sustain Zeeland's agricultural heritage.

Figure 3.6 Community collage

Revealing main Issues

Newspaper analysis

Als het aan deze Thoolse boeren ligt, komt er een gigantisch zonnepark op hun grond

Als zonnepark Welhoek bij Poortvliet er komt, wordt het een van de grootste zonneparken van Zeeland. Ruim 64 voetbalvelden aan zonnepanelen (45 hectare) is fors. Als het doorgaat, want het park past niet in het huidige gemeentelijke beleid en de verwachte stroomopbrengst van het nieuwe park zou via het stroomnet van nu niet eens afgevoerd kunnen worden.

Figure 3.7

Land & Energy Use

If it is up to these Thool farmers, a gigantic solar farm will be built on their land
Als het aan deze Thoolse boeren ligt, komt er een gigantisch zonnepark op hun grond (2023)

Farming has in some areas become less sufficient due to sinking soil and wet conditions. Agriculture land cannot capturing a lot of CO2, but a solar park could improve this. However, the municipality is not allowing the plan because of current rules. On top of that, the power grid doesn't have enough capacity to handle the electricity the park would produce.

Urgency & Relevance:
Policies are preventing farmers from converting their land to energy production. Additionally, it highlights the existing infrastructure problems in Zeeland, making it difficult for the area to rely more on renewable energy.

"Het park past niet in het huidige gemeentelijke beleid en de verwachte stroomopbrengst van het nieuwe park zou via het stroomnet van nu niet eens afgevoerd kunnen worden.
The park does not fit the current municipal policy and the expected power output of the new park would not even be able to be discharged through today's power grid.

Zeeuwse akkerbouwers slaan zoetwateroogst op in een bassin

ACHTERGROND AKKERBOUW JOB HIDDINK

De droogte en de beperkte waterbeschikbaarheid beinvloeden de bedrijfsvoering van Zeeuwse akkerbouwers in toenemende mate. Deze ondernemers werken hard aan innovatieve en duurzame oplossingen. Living Lab Schouwen-Duiveland organiseerde een excursie naar drie projecten waaraan boeren sinds 2024 deelnemen. Nieuwe Oogst stapte ook in de touringcar om de maatregelen te bekijken die de zoetwaterbeschikbaarheid vergroten.

Figure 3.8

Climate pressure

Farmers are building freshwater basins to deal with drought and salinization.
Zeeuwse akkerbouwers slaan zoetwateroogst op in een bassin – Nieuwe Oogst (2025)

This article showcases Zeeland farmers proactively building water basins to collect and store rainwater to deal with drought and soil salinization. As freshwater becomes more scarce and salty groundwater spreads, this infrastructure becomes a survival tool—especially in light of climate change.

Urgency & Relevance:
It illustrates the direct climate impact on agriculture and how farmers are left to finance their own resilience strategies, reflecting a lack of structural support. This connects with the „Climate Pressures" risk in your project and opens space to discuss hopes for community-led water management.

"Dat is een kostbare investering, maar zonder zoet water hebben we straks geen landbouw meer."
hat's an expensive investment, but without fresh water, we won't have agriculture in the future.

Boeren vinden steeds vaker aanvullende inkomstenbron

11-12-2020 00:00

Figure 3.9

Preservation & Adaptation

„Side Hustles to Survive: Farmers Reinventing the Countryside"
Boeren vinden steeds vaker aanvullende inkomstenbron – CBS (2020)

According to CBS, Dutch farmers are increasingly taking on secondary income sources—farm shops, solar panel hosting, agro-tourism—to stay financially viable as farming margins shrink.

Urgency & Relevance:
It ties into the economic pressure and uncertainty that farmers in Zeeland face. This reality drives farmers toward diversification and innovative survival models, which align perfectly with your performative landscape concept

"Ruim een kwart van de boerengezinnen haalt inkomsten uit andere bronnen dan landbouw."
Over a quarter of farming families earn income from sources other than agriculture.

Zeeland heeft 5 miljoen euro GLB-subsidie beschikbaar voor gebiedsplannen

NIEUWS ZEELAND REMKO EBBERS

Provincie Zeeland heeft 5 miljoen euro Europese subsidie beschikbaar voor gebiedsplannen die bijdragen aan de doelen voor klimaat, natuurlijke hulpbronnen en biodiversiteit. Dit wordt betaald vanuit de subsidieregeling 'Samenwerking integrale gebiedsontwikkeling Zeeland 2025'.

Figure 3.10

Policy & Participation

Money in the Air: Who Really Gets to Plan with EU Funds?"
Zeeland heeft 5 miljoen euro GLB-subsidie beschikbaar voor gebiedsplannen – Nieuwe Oogst (2025)

Zeeland receives €5 million in EU agricultural subsidies to support area-based development plans. The article implies that while funds are available, it remains unclear how or if local farmers can influence how that money is used.

Urgency & Relevance:
This represents the gap between available resources and participation—funds are present, but local actors are rarely part of the planning process. It illustrates the lack of procedural justice and could transition into community-led governance hopes.

"Voor het maken van deze gebiedsplannen is betrokkenheid van boeren essentieel."
Farmer involvement is essential in developing these area plans.

The Voice of the Farmers

Community interviews

Peter Cornelis

Type of farm: arable farmin weed, sugar beets & potatoes

Size: circ. S, with circ. 20 ha.

Other activities: tourist camping

Location: Cadzand, Zeeuws Vlaanderen

Background: Family business started in .....?

Their role: landowner & farmer

> De constante veranderingen steunen boeren op geen enkele manier. Het probleem is dat de overheid geen langetermijnvisie geeft.
>
> *These constant changes do not support farmers in any way. The problem is that the government does not give a long-term vision.*

Preservation & Adaptation

I am farming weed, potatoes and sugar beets in Zeeuws Vlaanderen. I have no idea about where my products are going, I sell to a distributer. My parents started a mini-camping 40 years ago to have a more stable income. Nowadays still costs are rising and farmers are not getting higher prices for our products. I do not see a future for my kids to take over the company because farming is not so profitable. Therefore I am now mainly investing in my camping because its is a stable investment.

Policy & Participation

For me, investing in the right machinery is crucial, as it represents one of the largest expenses. This decision also depends on the types of fertilizers and pesticides available. However, government regulations on these topics change every two to three years, creating uncertainty and leaving little room for long-term investments. These constant changes do not support farmers in any way. Farming is getting more and more expensive, but the market is not changing. The problem is that the government does not give a long-term vision.

Climate Pressures

Climate change is for sure noticeable. Extreme wheater like drought and heavy rain we increasingly see. Time of harvesting is already shifting and especially plants planted in spring have problems in the future, like my potatoes. I would be willing to start with different types of crops that can deal better with the climate change, but I cannot find lots of information yet. I'm also unsure whether it will sell on the market. Additionally, investing in new equipment comes with many uncertainties.

Land & Energy Use

I have solar panels that generate energy for both my camping and farming activities. However, when I produce a surplus, the grid cannot handle it. Zeeland urgently needs new energy infrastructure if it is to play a national role in energy production. Right now, I can't transfer my excess energy to those who might need it. We have an upcoming municipal meeting to discuss this issue. Small wind turbines, like EAZ windmills, are a great example of how farmers can generate their own energy.

Peter´s Concerns

- Unpredictable regulations
- Lacking high voltage grid
- Spring cultivation
- Rising costs for the agricultural production of goods
- Family business will not be taken over

Peter´s Hopes

- Mini camping as a stable investment
- Use of renewable energy
- Availability & education in new crop types that fit new climate circumstances

Sander Veldhorst

Type of farm: arable farming, food forest & vegetables

Size: M, with circ. 50 ha.

Other activities: selling products in local shop

Location: close to Middelburg, Walcheren

Background: Family business started in 1920

Their role: farmer & seller

> Groenten telen kost veel meer werk, energie en tijd, maar onze tarwe, levert tegenwoordig weinig op. Overstappen was onvermijdelijk.
>
> *Growing vegetables is much more labor-intensive and requires more energy and time, but arable farming—like our wheat—yields so little nowadays that switching was necessary.*

Sander´ Concerns

- Financially stability
- Land payoff costs
- Insufficient income for arable farming

Sander´ Hopes

- Community engagement
- Selling vegetables
- Cooperation with other farmers
- Sustainable practises of farming

Preservation & Adaptation

For the past five years, we have been running a pilot project where we sell vegetables from our food forest to local residents. A subscription model provides more income security. Our land is expensive, and repaying the loan is actually our biggest cost. Most of our customers come from Middelburg. Growing vegetables is much more labor-intensive and requires more energy and time, but arable farming—like our wheat—yields so little nowadays that switching was necessary.

Policy & Participation

The municipality didn't allow us to start a mini-campsite, so selling vegetables became our alternative extra income. EU regulations align with our methods, ensuring a truly sustainable agricultural system. We collaborate with a livestock farm to let our fields rest as grassland after intensive cultivation, keeping our soil healthy. Our vegetables are grown using organic methods, so you can trust that you're eating healthy and nutritious produce. However, we are just barely staying afloat.

Climate Pressures

Right now, we notice that the lack of frost in winter leads to increased weed growth, requiring extra soil management. Compared to the rest of the Netherlands, we are still doing relatively well—our harvests haven't often been ruined by heavy rainfall. However, if extreme weather becomes more frequent, it will pose a serious problem for our delicate, fast-perishing vegetables on which we now rely.

Land & Energy Use

We fully support the transition to sustainable agriculture. Our mechanical cooling system, once our biggest energy consumer, is now turned off. We generate our own energy with solar panels on the barn. Our arable crops, such as potatoes and wheat, are sold to cooperatives that handle distribution, while all other products go either to nearby livestock farmers or directly to the local community in Middelburg. We try to switch to totally local selling since distribution is not sustainable.

Andre Hoekman

Type of farm: cherries, pumpkin, red and black berries, calebas

Size: S, circ. 10 ha

Location: Noordwelle, Schouwen-Duiveland

Background: fourth generation since 1920

Their role: landowner, farmer, seller

> In Spanje doen ze er alles aan om je daar naartoe te lokken. In Nederland heb je het idee dat je als agrariër op de schopstoel zit.
>
> *In Spain, they do everything they can to lure you there. In the Netherlands, you have the idea that as a farmer you are on the chopping block.*

Preservation & Adaptation

The shift from auctioning to direct sales grew gradually. The short harvest period is key: tourists on the Walcheren coast buy cherries and plums during the season. After, we can still produce and sell. It's ideal to grow, harvest, and consume locally—that's most sustainable. Also, Zeeland has excellent conditions we should use. We've become such skilled farmers that we have a surplus. Ideally, farmers should relocate abroad to share knowledge and contribute where necessary.

Policy & Participation

Every spring, we anxiously wait to see if the minister will approve the use of crop protection products. I get that there are rules, but the paperwork is overwhelming. Pesticides, fertilizer regulations, safety rules – it's endless. Every hectare, every square centimeter has to be perfectly documented. It's a dreadful task. What started as one day a week grew to two, and now it's no longer enough. So, I decided to sell the business and start over in another country since the kids are not interested in taking over.

Climate Pressures

In the Netherlands, farmers don't yet feel the full impact of climate change. Zeeland's mild maritime climate remains stable, though heavier rainfall increases. For now, a good drainage system solves most issues. Dutch agriculture adapts by adjusting crop choices to climate shifts. Relocating to farm different products based on local suitability is another solution. Many cherry growers move to Belgium or switch crops. Some use protective tents, but in windy Zeeland, that's hardly an option.

Land & Energy Use

Rooftop panels on large barns are ideal, but seeing fields covered in panels feels like a waste of valuable soil. Unless the land becomes saline, it shouldn't be used for energy. With a growing global population, every grain of food matters. The wealthy West shouldn't cover fertile land with solar farms, especially since the current power grid struggles to handle excess energy. However, combining energy production with agriculture, like agrovoltaics, could be a promising solution.

Andre´s **Concerns**

- Overregulation in the Netherlands
- Uncertain future for Dutch farmers
- Grid capacity issues
- Loss of fertile land to energy production

Andre´s **Hopes**

- Continuing farming abroad
- Knowledge transfer
- Combining farming & energy production

Land & Energy Use

In Zeeland, many farmers have small wind turbines for generating the energy needed for the cooling down of potatoes. Als they have solar panels, but new ones are rarely placed on farmland. The government restricts solar on high-quality land, making permits hard to get for farmers. If you ask me where solar panels should go, put them in Brabant, where you can only grow grass. At the same time, the electrical infrastructure is inadequate, especially for additional production. Our factories struggle with power shortages while being pushed to switch to electricity

Policy & Participation

All our farmers receive subsidies from Brussels to grow environmentally friendly products. What is very important is that the farmers are doing what Brussels tells them to do. They all want to get subsidies, their plans depend on it. Farmers now struggle with regulations on disease control, as many effective sprays have been banned. As a result, they end up using more and more, which isn't ideal. This definitely has a negative impact on the water quality.

Climate Pressures

The most important thing is taking good care of your land and giving it rest. You can already see the difference between farmers who care for their land and those who focus only on profit— the first group tends to be more resilient. Last winter was extremely wet, and farmers without drainage systems or those growing heavy crops like potatoes had poor harvests. Maybe in 100 years, the land could be repurposed because the climate will no longer allow farming as we know it, but for now, no one seems to be thinking about that.

Preservation & Adaptation

To grow environmentally friendly products, farmers rely on Brussels. The market isn't supportive right now, and consumers aren't buying. It's visible in the media, but people aren't taking action. Some farmers have a good sense of timing when it comes to selling their products, and they can usually manage fine. However, larger farmers sometimes depend on just one type of crop. If it's grain right now, they're not making any money. They also have to pay the bank, and land prices are now very high.

Jan´s **Concerns**

- Dutch organic products are not selling, EU countries do
- Salt water, drought
- Excessive spraying
- Farmers dependency on Brussels
- Inadequate electrical infrastructure

Jan´s **Hopes**

- Repurposing land where conditions are bad for agriculture
- Diversification of production
- Brussels rules 'an sich' are a good case

Jan-Pieter Timmerman

Type of farm: Dehydrating company of forage products

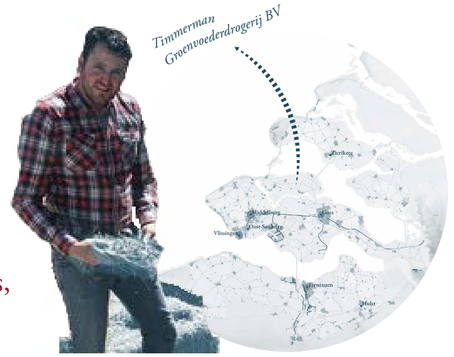
Size: 100 farmers are supplying

Location: Kortgene, Noord-Beveland

Background: family business since 1913

Their role: Sales

> Right now, the main issue everywhere is that the infrastructure is not in place yet. In Zeeland, it's difficult to get enough electricity for our factories. They expect us to switch everything to electric and move away from fossil fuels, but simply the electrical infrastructure cannot support it.



Regulations that effect Farmer Community

Agricultural regulations

Diving deeper into the regulations and funding concerning farmers, the top-down structure becomes quite apparent. Large programs originating from EU laws and agreements have a significant impact on regulations and laws in the Netherlands. This is not surprising, as the funding for Dutch programs often comes from the EU. Therefore, the Netherlands and all her programs is obliged to adhere to the agreements made.

The agricultural sector can be simplified into two branches: the protective and the restrictive branches. The protective branch aims to preserve and support valuable landscapes, for example, by designating areas such as Natura 2000, where extra attention must be given to maintaining quality. The restrictive branch set stringent limits on emissions and the use of pesticides, fertilizers, and other chemicals complying with environmental protection standards. Both regulations force farmers to adopt sustainable practices, which can limit common farming techniques. Water, as a collective good, is managed through its own independent system. Strict regulations set by the Waterboards establish rules for irrigation and the protection of waterways. This system is carefully managed and has a significant impact on all programs related to agriculture.

The subsidies farmers receive come from the EU, and the national or regional government distributes these funds based on the criteria outlined in the plan. Farmers apply for funding at the regional level, such as in the province of Zeeland. For instance, the NSP (National Strategic Plan), which is essentially another name for the CAP (Common Agricultural Policy) program of the EU is a very common program.

Over the past decade, agricultural regulations have changed multiple times, requiring farmers to continuously adapt to new requirements. These frequent changes create uncertainty, making long-term planning, investment decisions, and financial stability more challenging. They also lead to increased costs, both for compliance and operational adjustments. For agricultural bussinesses operating in the international market, this means a competitive disadvantage compared to relative to foreign competitors that face less stringent or no rules at all regarding the environment. Studies such as The Impact of the Common Agricultural Policy on EU Farmers (European Court of Auditors, 2020) highlight the significant impact of this ongoing regulatory evolution on farmers‘ ability to sustain their operations. The most significant cost category remains material assets, accounting for 45% of total expenses, including costs related to land, buildings and machinery, depreciation and rents paid. Due to tightened EU regulations costs for fuels, seeds, seedlings, and plant protection products have increased, especially in recent years.

Changes in Regulations

2013 - Publication of Regulation GLB
2014 - Nitrogen and phosphate use standards
2014 - New GLB 2015- new GLB
2017 - Fertiliser act
2020 - Water & nitrates
2023 - Eco activities GLB
2025- eco activities GLB

Development of average costs per arable farm

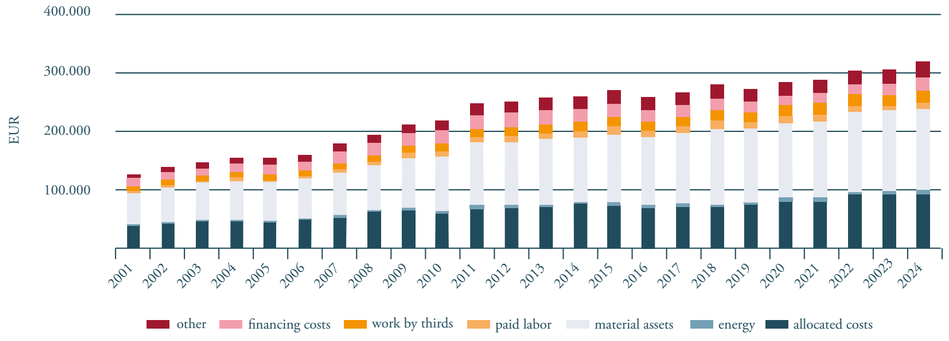


Figure 3.15

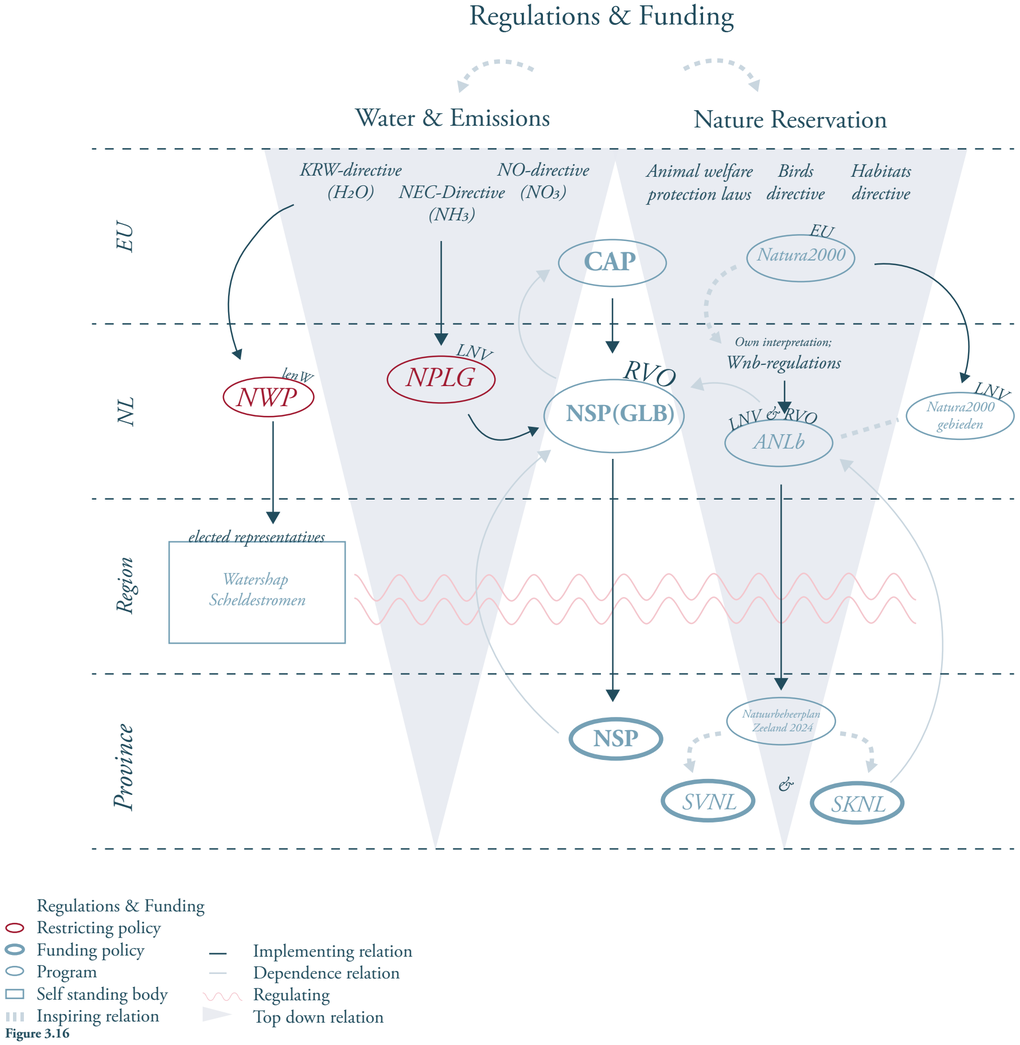


Figure 3.16

Community Developement

Trends

To gain a clearer understanding of the agricultural community in Zeeland, some key figures offer valuable insight. The agricultural sector is already ahead in the energy transition compared to other sectors. Many farmers are self-sufficient in their energy use, primarily through the installation of solar panels on barn roofs or wind turbines. In fact, the agricultural sector is responsible for almost 50% of the energy production in the Netherlands, while it only consumes 6% of that energy. The sector is thus a major producer of renewable energy.* While the agricultural sector is a large energy producer, it remains a small consumer. Despite this, few farmers currently benefit from being responsible for such a high level of energy production. Local communities are often not well connected, which leads consumers to work with large energy companies rather than tapping into the potential of surrounding farms.

Another noticeable trend is the change in the profile of farmers. Over the past decades, the number of farmers with more than 50 hectares of land has significantly increased in Zeeland. Many farmers have been encouraged by the government to expand their operations, aiming at increasing efficiency and lowering production costs. From the government, this was often seen as necessary to produce cheaper food to remain competitive in the global market. Larger farms, with more land and capital, are now economically more stable than smaller farms, allowing them to more easily make the necessary investments to meet regulatory requirements. One drawback is the fact that big farmers often are now dealing with monocultures that are far from the sustainable agriculture ideal. Small farmers, on the other hand, often rely on EU subsidies and tend to specialize, as their farming practices alone are not economically viable with the market of today. Starting a completely new farm business is almost impossible since the cost of land has risen significantly, and interest rates are relatively high. In this way, large companies often manage to stay afloat, while smaller farmers are increasingly forced to quit, partly due to the difficulty of finding successors. The younger generation is less inclined to take over the family farm, especially when the financial challenges and uncertainties are so high. This creates a growing divide between the large-scale, industrialized farms and smaller, family-run operations that are struggling to survive.

This leads to another trend that is particularly visible over the past 10-15 years. For smaller farmers, alternatives to traditional farming have become more financially attractive leading in the rise of secondary activities. Adding a campsite, food forest, or local shop alongside a small farm has become increasingly popular, especially in the more tourist-driven areas of Zeeland.

Looking ahead, sustainable agricultural practices will become more crucial with each passing day. Additionally, producing energy could emerge as a more significant income source for smaller farmers. In the future, larger farms may struggle to compete against medium-sized ones, and there will likely be a resurgence of opportunities for small farmers in highly localized areas. This shift could reshape the agricultural landscape, providing room for smaller-scale, sustainable farming practices once again.

**= However, it's important to note that the exact figures can vary depending on the source, and for this report, the highest estimate has been used.*

National Energy **Consumption** *in the NL*
6% for agriculture

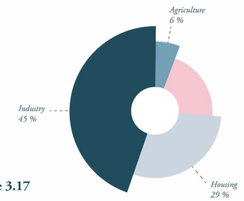


Figure 3.17

- Large industry
- Mobility
- House holds
- Agriculture

National Energy **Production** *in the NL*
50% *generated by* **agriculture**

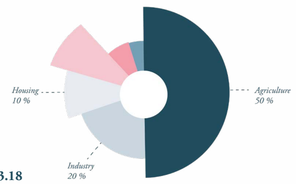


Figure 3.18

- Agriculture
- Municipalities & government
- Large industry
- Housing

Energy supply in the agricultural excl. greenhouses **80% is self sustainable**

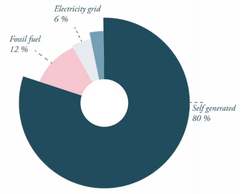


Figure 3.19

- Self generated
- Fossil fuel
- Electricity grid
- Geothermal

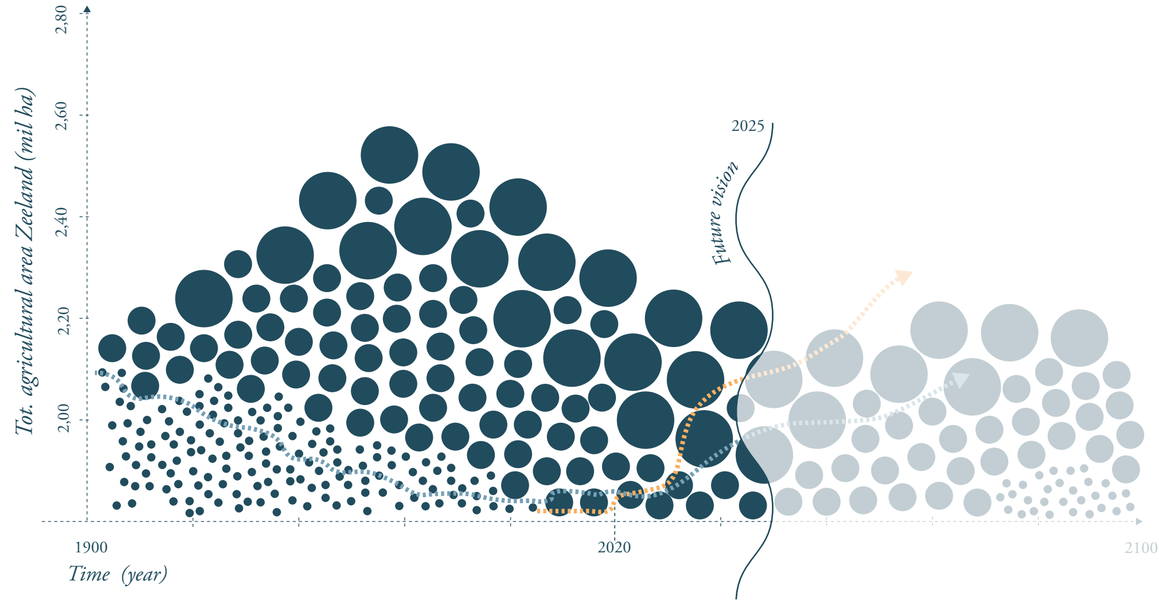


Figure 3.20 Changes in the farmer-to-land area ratio

- Composition of farms over the years
- Depiction of the future
- Direct selling at consumer
- Production of energy
- Farmer > 50 ha
- Small farmer < 50 ha
- Very small farmer < 5 ha

Farmers' Concerns about the Future

Community Concerns

Summarizing the outcomes of the community interviews as well as the research into affecting trends, a complex picture of challenges faced by the community of Zeeland's farmers emerges. Economic pressure stands out as the most urgent concern. Farmers are struggling to remain profitable due to increasing regulations, high investment demands, and a stagnant market that makes it difficult to shift toward alternative production models. While the risk of crop failure due to climate change is not yet critical, it is becoming more apparent. At the same time, the lack of a robust energy infrastructure, combined with strict regulations and local policy restrictions, means that renewable energy production is not yet a viable option for most farmers.

These concerns can be clustered into four main concern fields: Land & Energy Use, Governance, Climate & Environment, and Economic Pressure & Agriculture. These categories emerged from early media analysis and were then refined through direct engagement with the community. Many concerns intersect across categories, but these four themes help structure the broader system of issues and highlight where action and support are most urgently needed.

Land & Energy Use
This field includes concerns around land competition, spatial conflicts with large energy developers, and the loss of familiar landscapes. Farmers feel increasing pressure as agricultural land is converted for energy purposes, often without their involvement.

Governance
Farmers express frustration about top-down decision-making, lack of transparency, and confusing or shifting regulations. Many feel sidelined in important processes and increasingly dependent on external subsidies to survive.

Climate & Environment
Though still emerging, environmental stressors like soil salinization, biodiversity loss, and changing weather patterns are becoming harder to ignore. These developments threaten long-term productivity and sustainability.

Economic Pressure & Agriculture
This field includes concerns about poor market conditions, growing debt, lack of succession in farming families, and rising competition with corporate actors. Farmers face mounting difficulties balancing tradition with survival.

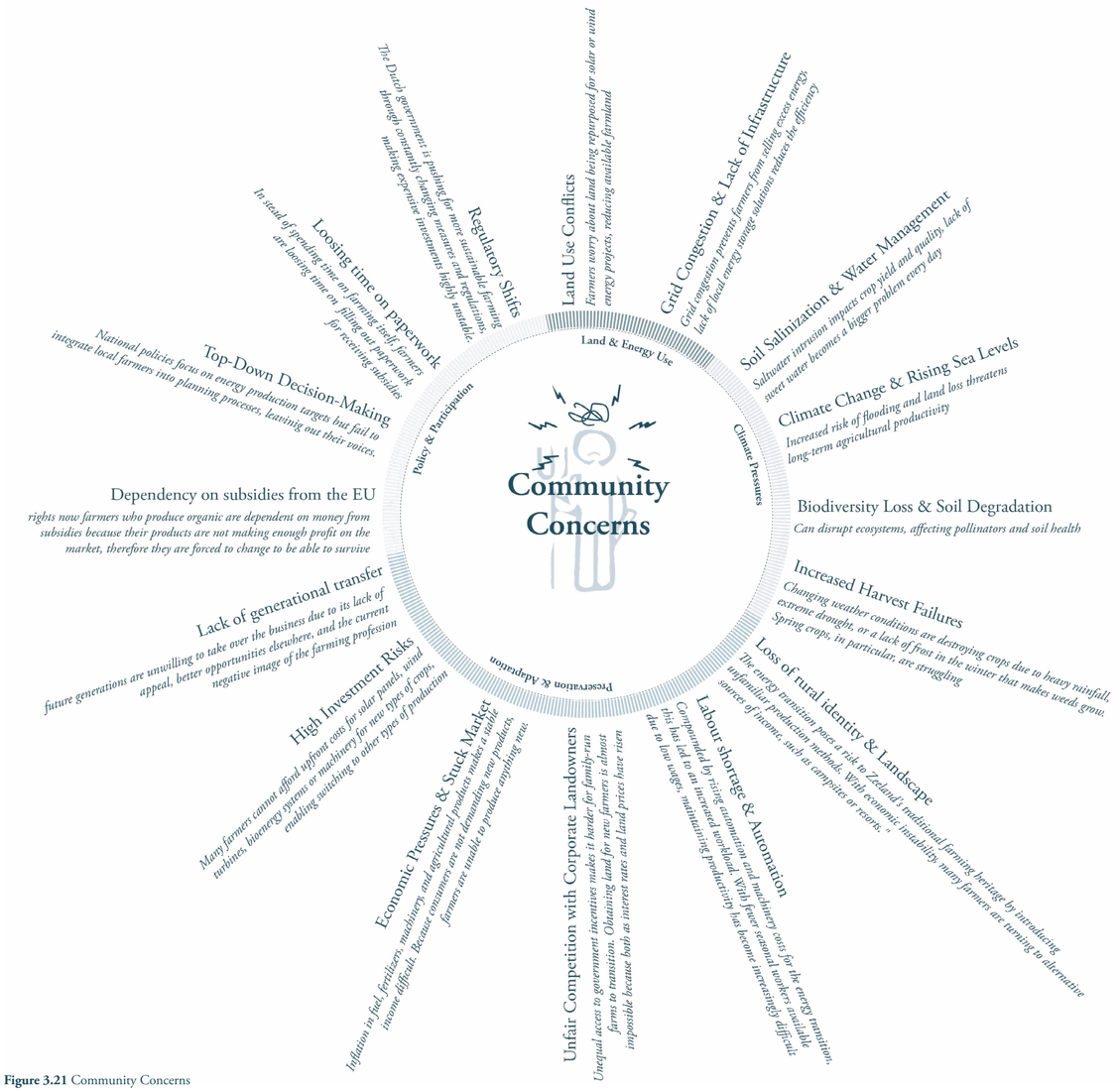


Figure 3.21 Community Concerns

Farmers' Hopes about the Future

Community Hopes

While the community expressed a wide range of concerns, the interviews and trend analysis also revealed a strong set of hopes for the future. These aspirations are deeply connected to the same themes that define today's struggles. By reinterpreting the problem fields as solution fields, we can shift the perspective - from challenge to potential. This transition is at the core of our spatial vision, which is designed to directly respond to the lived realities and future desires of the region's residents.

From Land & Energy Use to Integrated Energy
Where currently tensions around land competition and top-down energy development revolved, a hope for multifunction and a community-oriented energy system emerges. Integrated Energy reflects a future where agriculture and renewables can coexist, creating spatial synergies instead of spatial conflicts.

From Climate & Environment to Resilient Adaptation
Environmental challenges such as rising sea levels, soil degradation, and water scarcity have sparked a desire for adaptive, nature-based solutions. Resilient Adaptation focuses on strengthening the land's ability to cope with climate impacts, while protecting the ecosystems and rural livelihoods it supports.

From Economic Pressure & Agriculture to Diverse Agriculture
Rather than continuing a cycle of monocultures, market dependency, and generational decline, Diverse Agriculture envisions a system that is sustainable, flexible, and locally embedded. This includes support for small-scale farmers, alternative income models, and stronger food sovereignty within the region.

From top-down Governance to Engaged Community
What was once a field marked by exclusion, confusion, and lack of transparency should become a space for participation, co-creation, and agency. Engaged Community speaks to the hope for more inclusive decision-making processes, better communication between governments and residents, and support for bottom-up initiatives.

These four solution fields provide a structure for designing spatial strategies that are not only responsive, but visionary. They connect the region's challenges with its potential—and most importantly, they offer a roadmap toward a future that is truly shaped with and for the community of Zeeland.

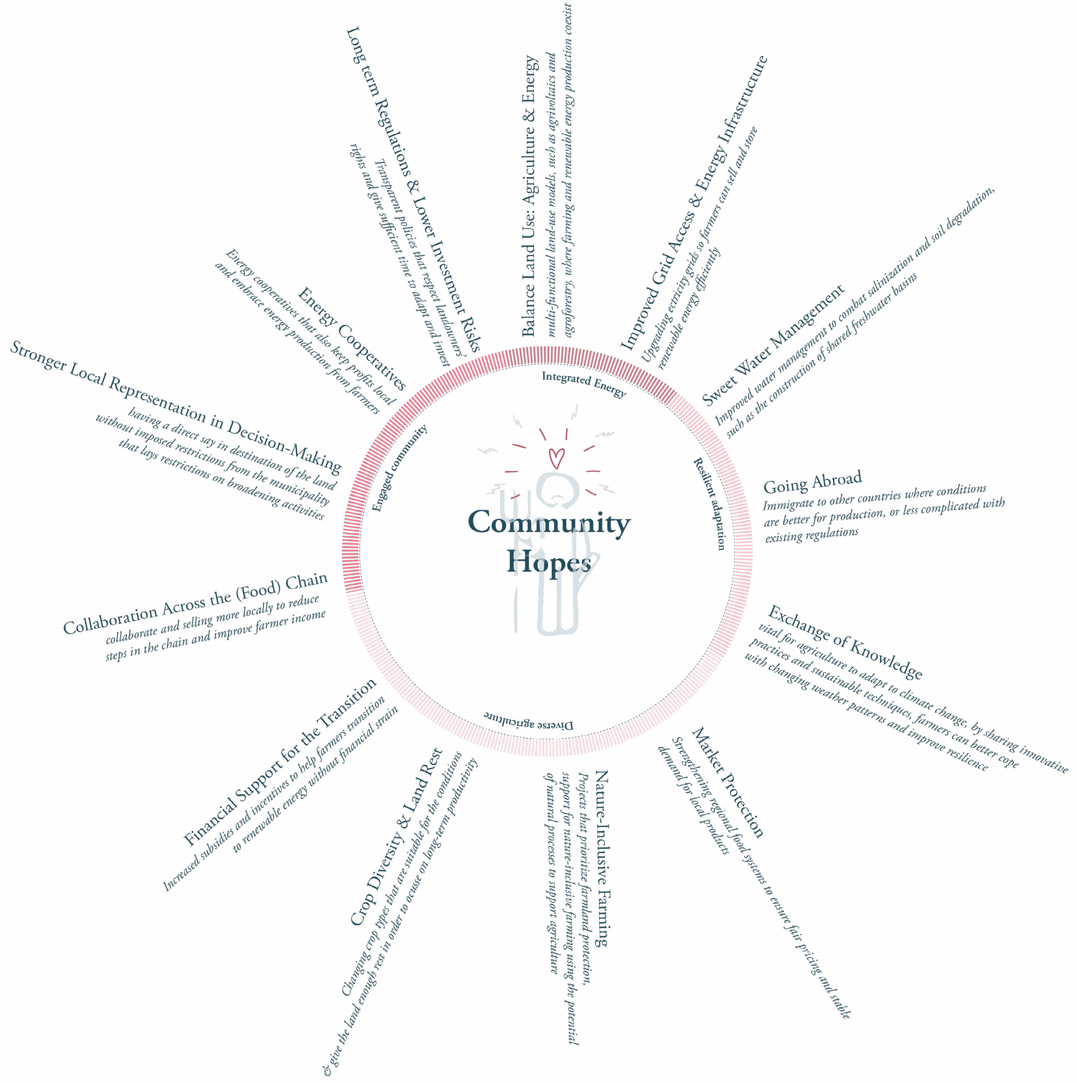


Figure 3.22 Community hopes

Community Analysis Take-aways

Key findings for the project

Selling Energy to the Grid

Starting January 1, 2027, net metering will be abolished, meaning farmers can no longer offset self-generated electricity against consumption. To ensure financial stability, farmers should be able to sell surplus renewable energy at a fixed, fair price. Government-installed energy storage systems will manage excess power, ensuring efficient distribution without burdening farmers, helping stabilize the energy system.

Right now, the main issue everywhere is that the infrastructure is not in place yet. In Zeeland, it's difficult to get enough electricity for our factories. They expect us to switch everything to electric and move away from fossil fuels, but simply the electrical infrastructure cannot support it.
- Jan Pieter Timmermans

Support for Organic Transition

„To support the transition to sustainable organic farming, organic production should not rely solely on EU subsidies but must achieve fair profitability in the market. A temporary consumer subsidy for organic products is proposed to ensure affordability during the initial years of production. This will support the shift towards agricultural practices that maintain soil health and long-term sustainability. The subsidy will gradually phase out as organic farming becomes more competitive, fostering a self-sustaining and resilient agricultural sector.“

All our farmers receive subsidies from Brussels to grow environmentally friendly products. What is very important is that the farmers are doing what Brussels tells them to do. They all want to get subsidies, their plans depend on it.
- Jan Pieter Timmermans

Education and Awareness

„Make farmers that own land that will be flooded or badly influenced by salt already aware now. Educate in other possibilities for using their lands sustainable. Also inform and help farmers in filling out the forms of the EU that they know need to fill out every year. Create an app to easily track the amount of fertiliser, sprays and other duties. “

I would be willing to start with different types of crops that can deal better with the climate change, but I cannot find lots of information yet. I'm also unsure whether it will sell on the market. Additionally, investing in new equipment comes with many uncertainties.
- Peter Cornelis

Regulatory Stability Period

„To ensure stability and allow sufficient adaptation time, any significant changes in agricultural regulations should have a minimum implementation period of five years. This will provide farmers with the necessary certainty to make informed investment decisions and adjust their operations accordingly. Exceptions may apply in cases of urgent environmental or public health concerns.“

Yes I would like to work outside but I want to get rid of the Dutch rules. I am not the only farmer who thinks this way but well I did take the step to put my farm up for sale.
- Andre Hoekman

Mapping Actors

Stakeholder Analysis

	Stakeholders	Interests	Conflict of Interests	Problem Perception	Attitude towards Vision	Power Resources	Collaboration Potential	Spatial Footprint	Temporal Influence
Agricultural actors	Export-Oriented Farmers	Profit from export markets, maintain production levels	Resistance to land-sharing with energy/nature projects	Climate change, soil degradation, market volatility	+1	**Mixed:** Land ownership, Strong export networks, Agricultural lobby (e.g., LTO), Access to EU subsidies (CAP)	Medium	Rural, large-scale farms	Long-Term
	Local/Regenerative Farmers	Sustainable production, food sovereignty, land stewardship	Limited financial power vs. dominant agri-business	Loss of land, lack of support, policy inconsistency	+2	**Informal:** Local community trust, Knowledge of sustainable practices, Participation in local food networks, Advocacy in grassroots movements	High	Rural, scattered small plots	Long-Term
	Agri-input & Distribution Companies	Expand market for agricultural inputs, maintain supply chains	Dependency on intensive farming, ecological externalities	Unstable supply chains, regulation pressure	0	**Formal economic influence:** Financial capital, Control over supply chains, Pricing power in agri-markets, Lobbying through agri-industrial groups	Medium	Distributed, tied to agri-zones	Mid-Term
Energy actors	Big Energy Companies	Maximize energy production and efficiency across landscape	Spatial conflict with agriculture and biodiversity	Policy uncertainty, local opposition to land use	-1	**Financial, industrial, and political power:** Investment capital, Technological expertise, Access to national energy markets, Political influence via national lobbying	Medium	Across Zeeland & industrial zones	Long-Term
	Small-Scale Energy Producers	Promote decentralized, community-based renewable energy	Limited scalability, faces regulation barriers	Lack of infrastructure support, limited visibility	+2	**Informal, decentralized networks:** Grassroots mobilization, Local investment and energy cooperatives, Innovation (e.g., biogas, solar)	High	Scattered, decentralized	Mid-Term
Government & Institutions	Municipalities in Zeeland	Good governance, spatial planning, serving residents	Competing priorities between voters and regional goals	Difficult coordination, slow policy instruments	+1	**Formal (governance/legal):** Local planning authority, Access to EU/regional development funds, Ability to set spatial strategies	High	Zeeland-wide	Mid-Term
	Province Zeeland / National Government	Regional development, economic and energy leadership	Balancing growth with environmental and social impacts	Pressure to deliver energy & economy while protecting land	+1	**Strong institutional power:** Policy and regulatory power, Budgetary authority (infrastructure, energy), Coordination role in cross-border projects	High	Regional/National	Long-Term
	Water Board (Waterschap Scheldestromen)	Water safety, freshwater availability, dike and flood protection, climate adaptation, agricultural water management	Conflicts over water allocation (e.g., irrigation vs. ecological flows), potential tension with urban/energy developments	Sea level rise, salinization, extreme weather events, infrastructure aging	+1	**Legal authority, hydrological infrastructure control:** Flood and drought risk management, Taxation power, Role in spatial planning and climate adaptation strategy	High	Zeeland-wide (delta water systems, coastlines, and polders)	Long-Term
	Knowledge Institutes	Research, advising policy, innovation in agri-energy	Difficulty influencing fast political/economic shifts	Slow uptake of research, need for systemic change	+2	**Knowledge-based, institutional:** Research credibility, Data and scenario modeling, Access to innovation funding (e.g., Horizon Europe)	High	Institutes across NL	Long-Term
Local society	Local Residents	Affordable energy, healthy living, local economy	Low political power, often excluded from key decisions	Rising costs, energy transition burden	+1	**Civic/social power:** Voting power, Participatory influence in planning processes, Community advocacy	High	Urban, peri-urban	Mid-Term
	Tourism Sector	Stable tourism experience and landscape preservation	Seasonal economy, spatial tension with agriculture	Loss of landscape quality, climate risks	+1	**Sectoral economic influence:** Economic leverage in rural economies, Influence over local perception of land use, Lobbying through tourism associations	Medium	Coastal and rural leisure zones	Short/Mid-Term
Market forces	Certification Bodies (e.g. Vera, SKAL)	Ensure standards and traceability in sustainable food	Greenwashing concerns, consumer trust issues	Enforcement challenges, complexity in certification systems	+1	**Normative/standard-setting authority:** egulatory gatekeeping, Consumer trust, Influence over agri-market access	Medium	Scattered, international	Md-Term
	Seed Companies	Control and expand seed market, IP rights	Market consolidation and farmer dependency	Changing regulations, resistance from smallholders	0	**Corporate power via IP and global reach:** Control over IP (patents), R&D capabilities, Market dominance in crop varieties	Low	Global reach	Long-Term
	Cross-border Partners (Belgium)	Harmonize policy, cross-border energy and agriculture	Complex legal frameworks, bureaucracy	Uncertainty due to policy and project coordination	+1	Diplomatic/governance influence: Bi-national policy leverage, Access to EU coordination frameworks, Influence in transport/energy corridors	Medium	Cross-border (BE/NL)	Long-Term
	North Sea Port / Logistics Sector	Grow as energy/agri-logistics hub	Competes for land, drives up costs	Land scarcity, growing opposition	0	Institutional + market influence: Infrastructure ownership, Strategic control over trade routes, Economic importance to regional employment	Medium	North Sea Port, corridors	Long-Term

Power-Interest

Stakeholder Analysis

The transformation of Zeeland's delta is not just about water, climate, or agriculture alone - it's a deep systemic shift that touches energy, biodiversity, spatial justice, economic continuity, and cultural identity. From export-driven agribusinesses to local farming communities, this complex system involves a wide constellation of actors with different resources, timelines, and motivations. In this context, every stakeholder, plays a role in influencing different futures. Their positions are shaped not just by interest or intent, but by what they can influence, what they must protect, and what they are willing to let go.

On one side, we find a **Transition Cluster**, a synergy of local/regenerative farmers, municipalities, and knowledge institutes, that leads much of the bottom-up momentum for place-based, circular, and ecologically sensitive strategies. When joined by small-scale energy producers, active resident groups, and the water board, this cluster becomes a strong advocate for resilience, diversity, and public value in land use. These actors are motivated and future-oriented, but often lack institutional power or access to critical infrastructure.

On the other end, **Top-Down Regulators** such as the national and provincial governments, energy corporations, and the North Sea Port hold formal authority over spatial planning, economic development, and infrastructure. Their influence is vast, from setting subsidies and regulatory frameworks to overseeing energy transition corridors and hydrogen infrastructure.

As these clusters interact, conflict zones emerge. Spatial collisions are frequent, for example, where industrial-scale wind farms or port expansion projects encroach upon land needed for food production, tourism, or nature restoration. Ecological tensions complicate the picture further, balancing water safety, soil fertility, freshwater access, and biodiversity protection against pressure for intensification.

And yet, amid these tensions lies one of the region's most urgent and promising opportunities: fostering cooperation between large-scale export-oriented farmers and small-scale regenerative farmers. These two groups are often positioned in opposition, representing different markets, values, and practices. But beneath the surface, they share an increasing number of constraints: vulnerability to changing regulations, exposure to market volatility, and dependence on a land and water system under growing stress. While their methods and priorities differ, their long-term viability is tied to the same delta.

This shared ground offers a critical leverage point. Zeeland's future won't be secured by choosing between large-scale or small-scale farming, but by fostering hybrid, cooperative models where both can thrive. This includes flexible certification, shared infrastructure, and co-use of land for both food and energy. Rather than competing for resources and policy space, farmers can align around joint goals - like ecosystem-based subsidies or resilient supply chains.

Cooperation is no longer optional - it's essential. By shifting from fragmentation to collaboration, Zeeland can realize a spatial vision that balances production and protection, economy and ecology.

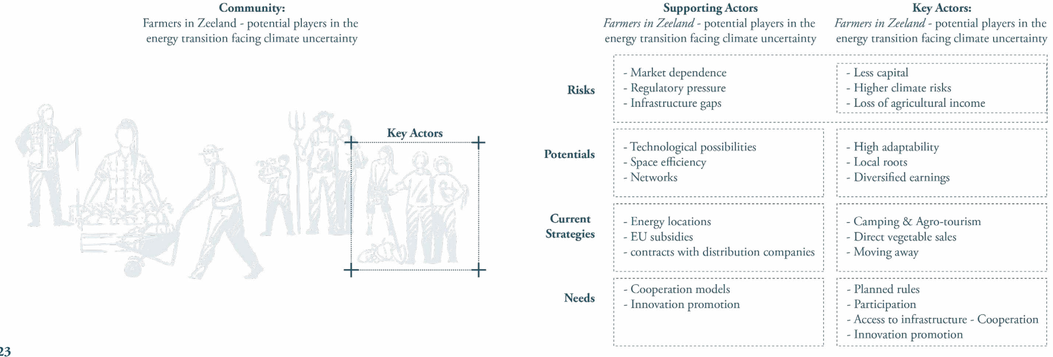


Figure 3.23

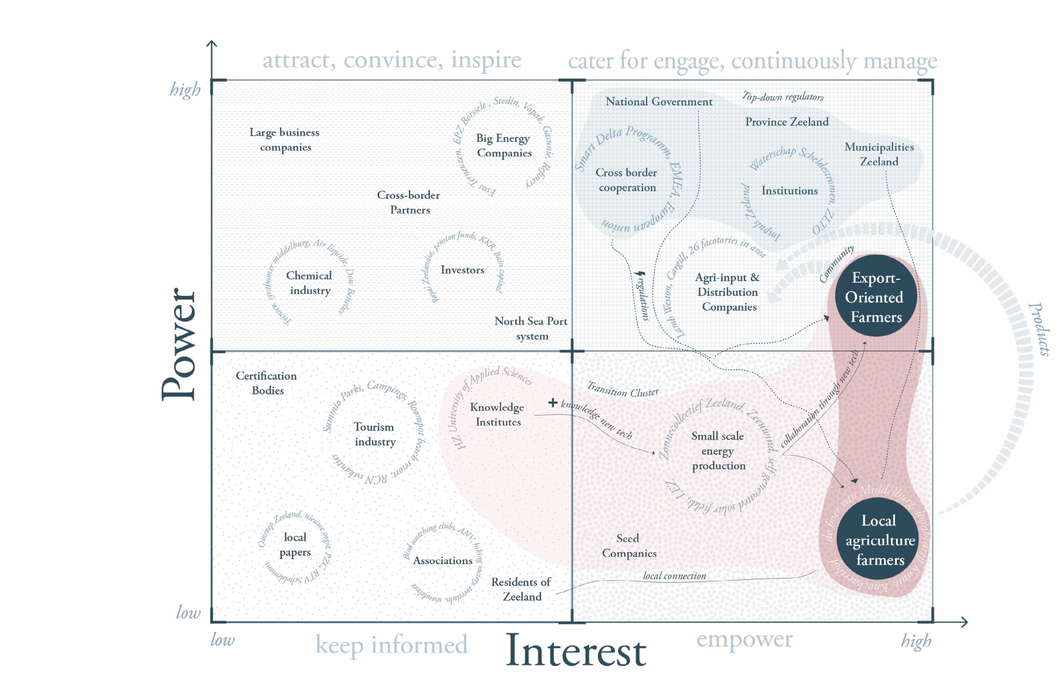


Figure 3.24 Power-Interest Analysis

A Community in Transition

Socio-economic problem statement

Within this community, small-scale, local farmers emerge as key actors. Deeply connected to the land and their neighbors, and often more agile in decision-making, they are uniquely positioned to adapt and experiment with new practices. From agro-tourism and ecological restoration to small-scale energy initiatives, these farmers already explore alternatives. Yet this adaptability comes with risks: small farmers are often financially fragile, with fewer buffers and less capacity to absorb regulatory or environmental shocks. Crucially, they are also more unempowered, lacking access to policy processes, institutional support, and future-proof investment structures.

Out of necessity, many have already begun transforming their practices – turning farmland into seasonal camping areas, selling direct-to-consumer products, or exploring hybrid models that blend agriculture, tourism, and energy. Their vulnerability makes change urgent. Their rootedness makes change possible.

Meanwhile, larger farms remain essential actors in this landscape. They benefit from greater financial stability and access to subsidies, networks, and infrastructure, allowing for investment in large-scale innovation. Still, they face growing challenges of their own – from water scarcity to shifting policy demands and climate-related disruption. Their resilience depends on more than technology or scale. It depends on collaboration.

To meet the challenges ahead, we must foster alliances across farming scales. Larger farms can support smaller ones through shared infrastructure, logistics, and political leverage. Smaller farms contribute flexibility, local knowledge, and trusted community ties. Together, they can co-create models of land use and energy production that are both ecologically and socially sustainable.

This shared resilience can take shape through cooperative networks, community-driven energy landscapes, and spatial strategies that reflect both vulnerability and opportunity. The goal is not only to endure the transition but to shape it—together.

By aligning strengths and addressing imbalances, Zeeland's farming community can become a driver of transformation, leading the way toward a more just, adaptive, and future-ready Delta.land-use models, and pilot integrated energy systems that reflect both ecological realities and social needs. From shared solar fields and bio-waste projects to local food-energy-water systems, their collaboration can create resilient, multifunctional landscapes that benefit entire regions.

This is not only about surviving change - it's about shaping it. By working together, these diverse farmers can actively lead Zeeland's energy transition towards a more adaptive, just, and future-proof Delta.

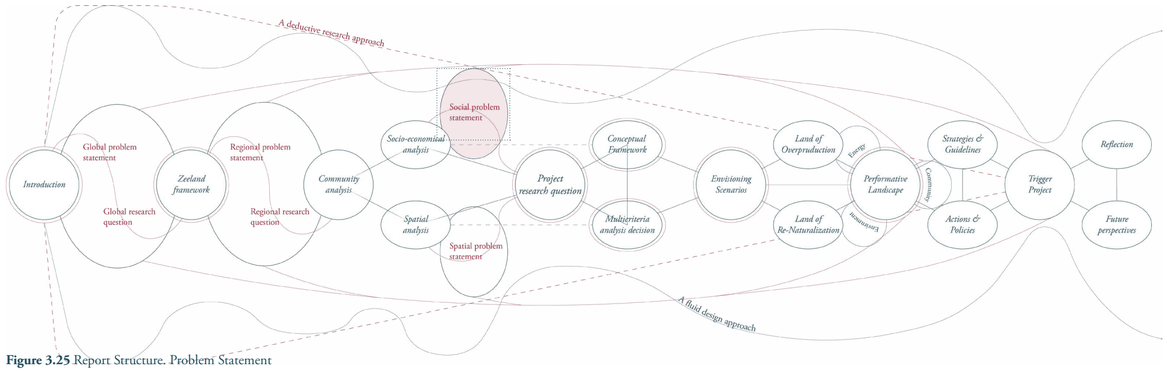


Figure 3.25 Report Structure. Problem Statement

Agriculture is deeply rooted in Zeeland's identity.

For generations, farmers have successfully adapted to the changing conditions of the Delta.

However, the farming community is now facing significant uncertainties, including shifting regulations and rising costs, leading to critical financial instability.

While being pressured to adapt, the energy transition remains an unviable alternative, hindered by a lack of support and top-down imposed changes.

Chapter 4

Community Analysis

A spatial approach

Mapping: The **Exsisting Structures**

A categorization of the agricultural fields

The following pages present an analysis of the farming community in Zeeland, with particular attention to the condition of the land they cultivate and benefit from. The aim is to understand its current state, the risks associated with the environmental crisis, and the opportunities linked to the ongoing energy transition.

The map on the right-hand page offers a general overview of the status quo of agricultural fields in Zeeland. It categorizes the various plots of land by linking data on field size, energy consumption, and the types of agricultural products grown. Overlaid is a layer showing the density and distribution of small-scale farmers across the region.

The complexity of Zeeland's agricultural landscape is immediately apparent: a mosaic of fields of varying sizes and types that cover the majority of the province. This is a model of modern, export-oriented agriculture—both nationally and internationally—clearly reflected in the presence of numerous large fields (over 15 hectares).

Smaller plots are mostly concentrated either around urban centers or in areas where the presence of water makes large-scale agriculture unfeasible. These fields are more closely linked to local consumption and tend to employ more traditional farming methods.

Certain areas, such as the agricultural belt north of Middelburg and Vlissingen, stand out for their specific characteristics: low energy consumption, smaller field sizes, and a likely connection to a peri-urban agricultural model linked to the surrounding tourism economy.

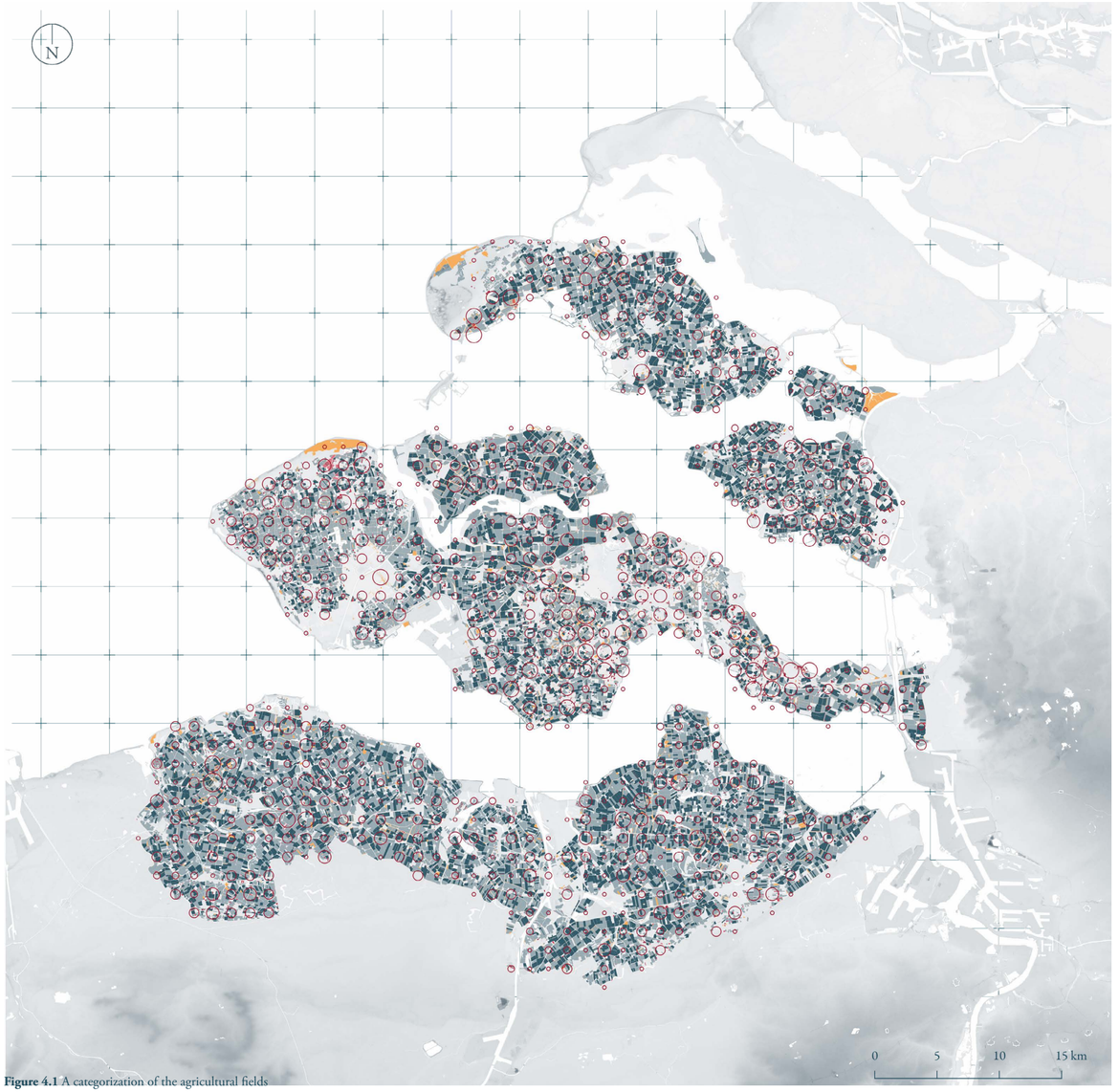


Figure 4.1 A categorization of the agricultural fields

A Diverisfied Production

Agricultural fields in Zeeland

Zeeland's agricultural landscape reveals a highly structured and specialized system dominated by a small number of crop types. A significant share of farmland is allocated to high-input monocultures, particularly potatoes, cereals, and grasslands, with comparatively little spatial variation across the region. This pattern reflects a model of export-oriented, conventional agriculture, optimized for yield and scale but increasingly misaligned with future climate and ecological realities.

Despite regional differences in field size and land use the overall diversity of crop types remains limited. The majority of crops grown today are resource-intensive, highly dependent on stable weather conditions, and poorly suited to rising salinity, irregular rainfall, or long dry periods. Potatoes alone make up a substantial proportion of total agricultural output, yet they rank low in both salt and water tolerance, and have moderate-to-high energy demands for both cultivation and distribution.

As shown in the chart pecies with adaptive value under saline or flood-prone conditions, such as salt-tolerant vegetables or wetland biomass crops, are largely absent from the current system.

This imbalance leaves Zeeland's agricultural structure exposed to systemic risk. The region's strong dependence on a narrow crop base increases vulnerability to both climate disruptions and market shocks, while also limiting the landscape's potential to contribute to broader energy and biodiversity targets.

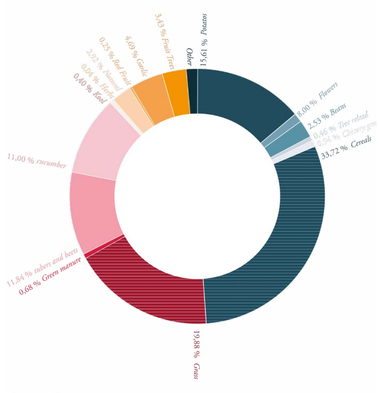


Figure 4.3

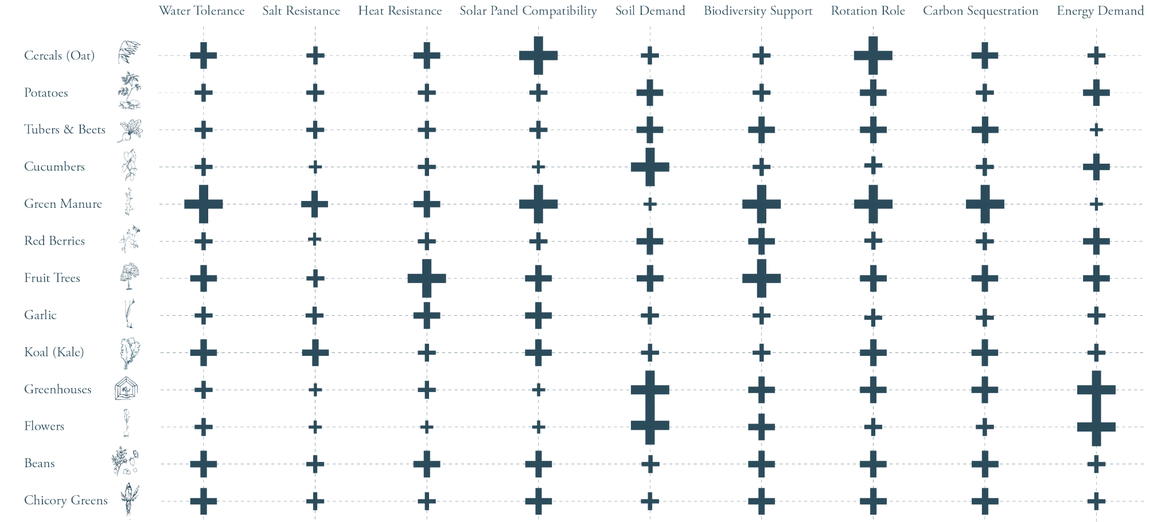


Figure 4.2

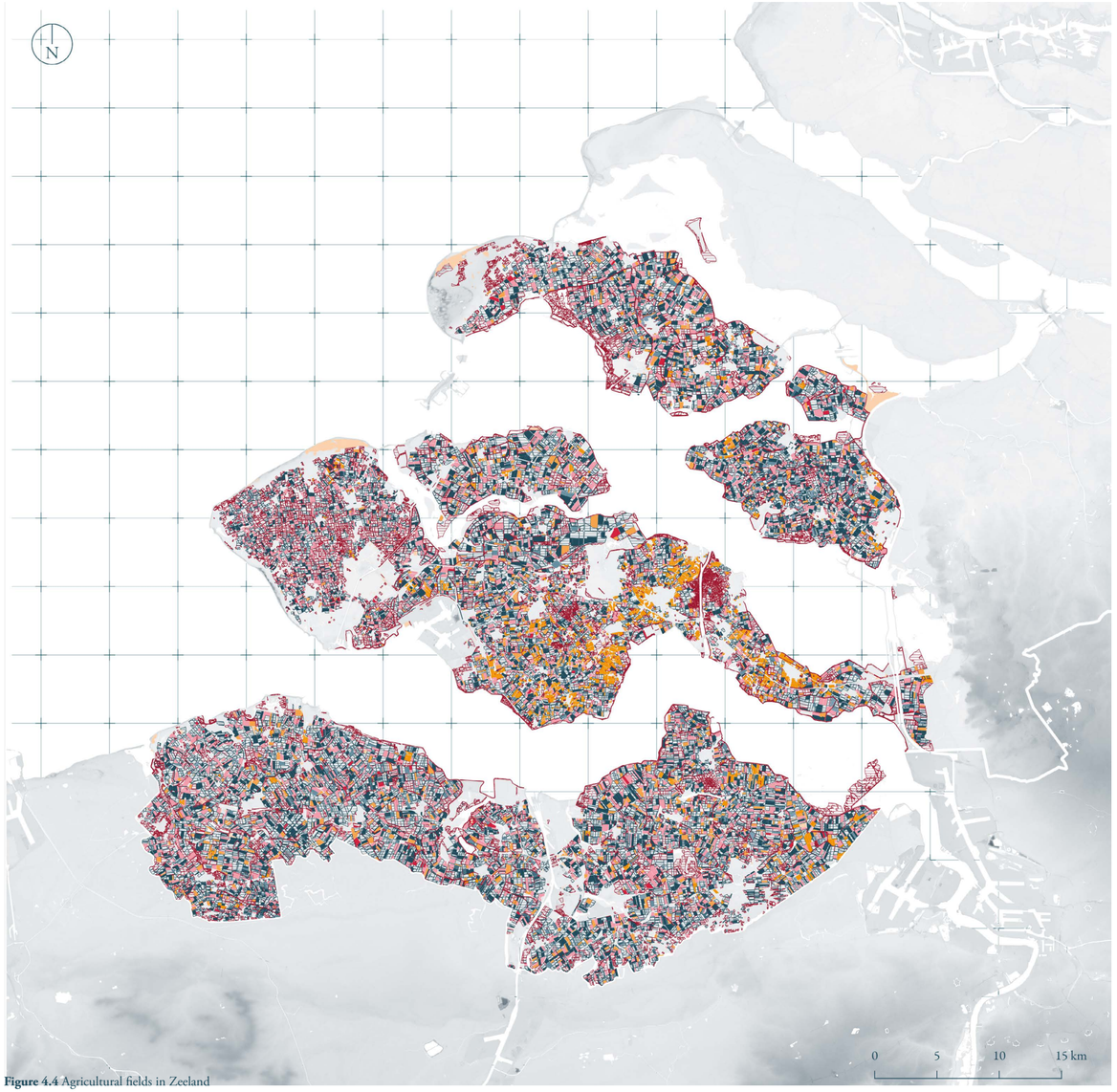


Figure 4.4 Agricultural fields in Zeeland

A Landscape with Uncertainty

Mapping the future risks

Continuing the analysis, the following section presents data concerning the potential future impacts of the environmental crisis, with a particular focus on the risks related to flooding and the salinization of agricultural soils. The diagram on the right combines projections of both processes and organizes them through a categorization of the different agricultural areas within the region.

From this preliminary data integration process, it is interesting to observe how clusters of high-risk areas emerge at the provincial scale, appearing in an orderly distribution across the territory. Areas classified as „high risk“ are those where both flooding and salinization risks are present at a high intensity. While salinization is a more widespread process, flooding tends to affect specific zones—particularly with return periods of 50 to 75 years—expanding to broader areas when considering 100-year or longer scenarios.
High-risk zones are often found along the coastline or in riverine regions, such as the areas surrounding Terneuzen and Borsele. However, some inland areas also fall into this category, including the surroundings of Zierikzee and the agricultural belt north of Middelburg and Vlissingen, previously mentioned in the analysis.

It is also worth noting that areas dominated by large, industrialized agricultural fields tend to be less exposed to these environmental risks. In contrast, zones shaped by more traditional farming systems—typically smaller in scale and more locally rooted—appear more vulnerable to the impacts of future climate and environmental stressors. This contrast highlights a potentially critical imbalance between agricultural models and environmental resilience across the region.

Figure 4.5

Figure 4.6

Figure 4.7

Change of flooding in 2050
1/30 years
1/100 years
1/1000 years

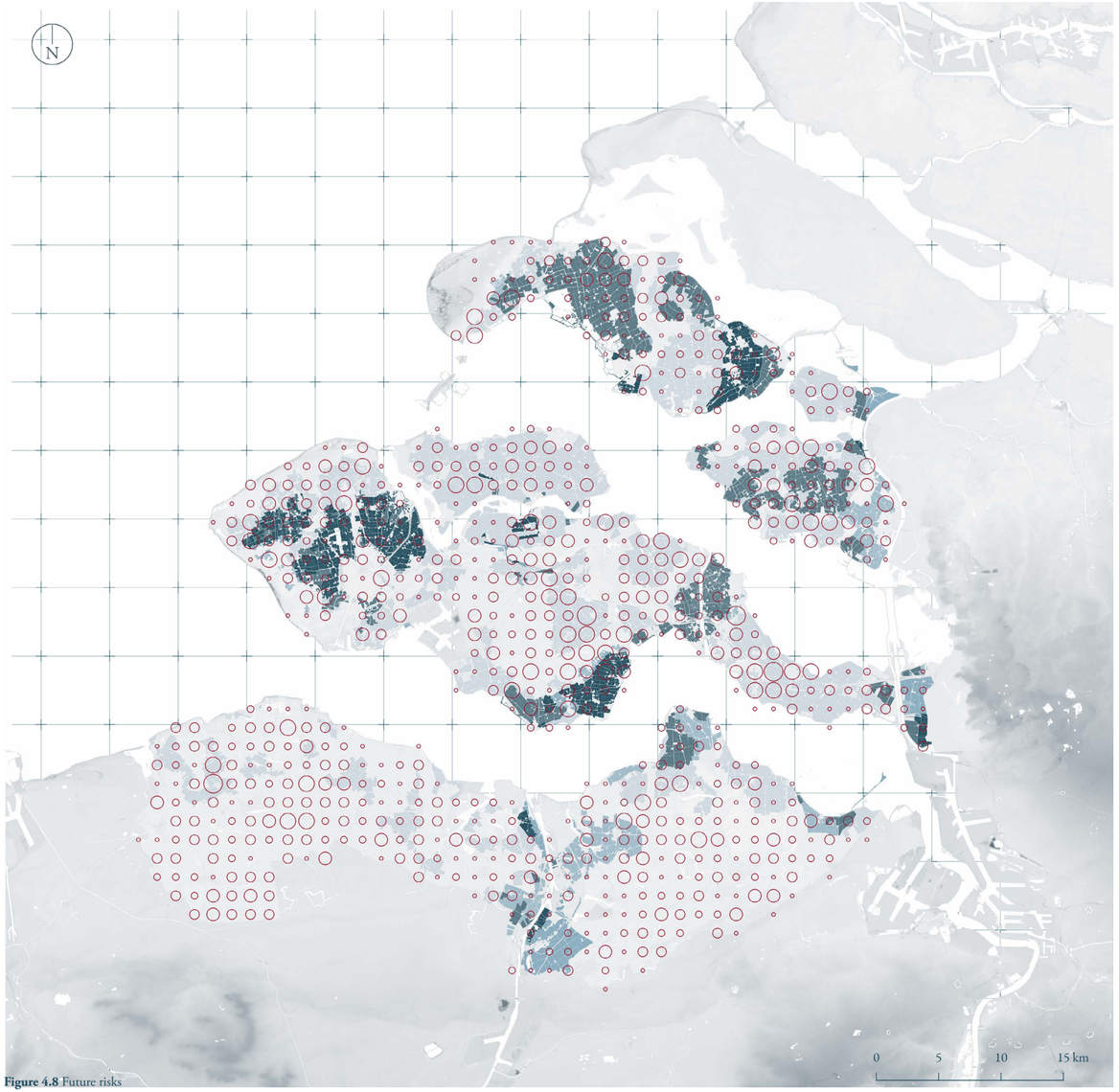


Figure 4.8 Future risks

A Landscape with Opportunities

Mapping energy production potential

In order to spatially connect the theme of renewable energy production with the territory of Zeeland, the following page presents a map that combines data on the potential for both wind and solar energy production. Even at a first glance, it is clear that renewable energy production represents a major opportunity for the future development of the Zeeland region.

The data layers for wind and solar potential are overlaid, making it possible to observe how the areas with the highest potential are mainly concentrated along the western parts of the peninsulas. These zones benefit from specific environmental and geographic conditions that make them particularly suitable for energy production.

Solar potential is closely linked to the presence of agricultural land. The fields with the highest solar potential are located in the flat plains surrounding the cities of Middelburg, Vlissingen, and Zierikzee. Conversely, the more inland parts of the region tend to have lower solar energy potential, likely due to differences in land use and exposure.
Wind energy, on the other hand, shows greater potential along the coastal areas and the edges of the delta. Here, the strong and consistent winds coming from the North Sea can be effectively harnessed. In contrast, the southern part of the region, near the border with Belgium, presents more challenges for wind energy production due to less favorable wind conditions.

This spatial distribution of renewable energy potential offers valuable insights for regional planning strategies, helping to identify priority areas for future energy infrastructure and sustainable development.

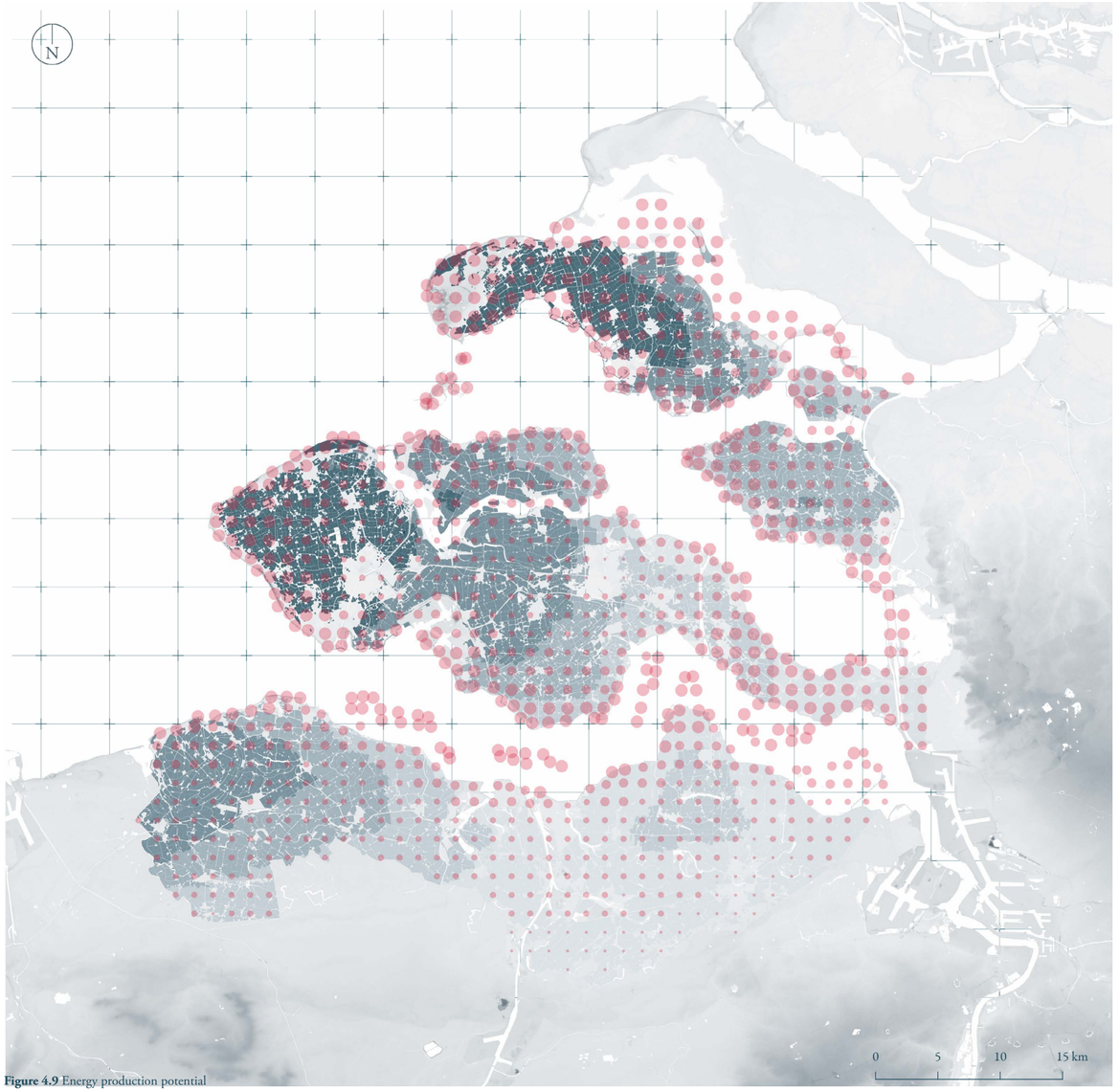


Figure 4.9 Energy production potential

A landscape with Challenges and Potentials

Defining clusters of intervention

Thanks to a process of overlaying the various layers from the spatial analysis, it was possible to identify several agricultural clusters of particular interest—both in terms of risks and potential. These nine macro-areas present risk conditions related to the impacts of the climate crisis, which could make agricultural production increasingly difficult or even impossible in the future. They combine negative characteristics in terms of both flooding and soil salinization.

These are the areas where action is most urgently needed, where the most vulnerable segments of the community live and work, and where a long-term strategy is essential to face future uncertainty.

At the same time, however, these areas also hold strong potential for the intensification of renewable and sustainable energy production. This could represent a valuable counterbalance to the decline of agricultural activity, offering opportunities for integration and coexistence between energy and food production systems.

On the following pages, the data related to these specific agricultural areas are presented in more detail. Each cluster shows distinct characteristics in terms of risk, potential, and landscape structure, and therefore requires particular attention and deeper investigation in order to lay the foundation for effective planning and design interventions.

Interestingly, the risk clusters are aligned along an axis that cuts transversely across the region—except for the two clusters located between Middelburg and the coast.

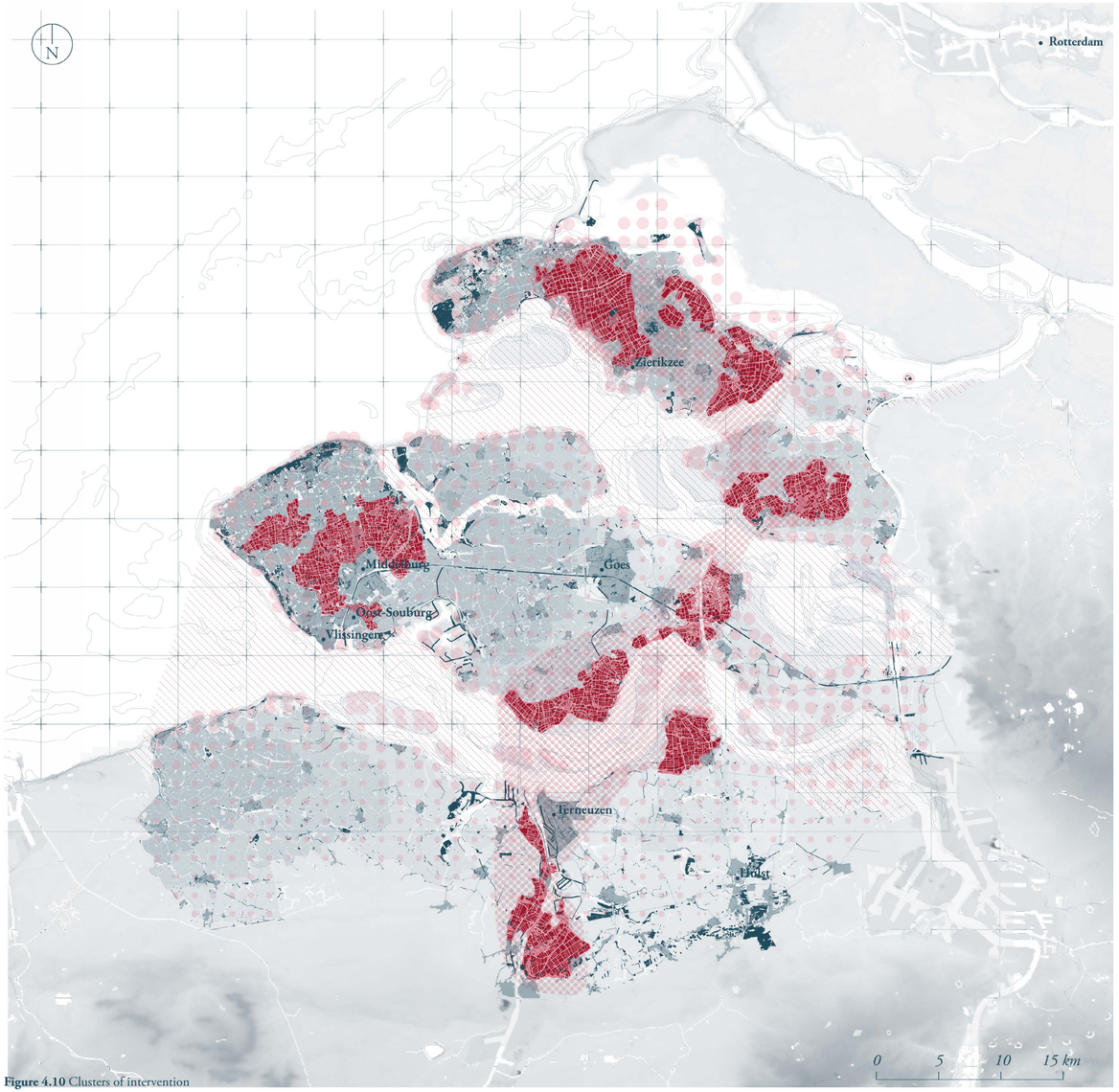


Figure 4.10 Clusters of intervention

Combinging Data

Clusters analysis

n order to establish a comprehensive and accurate objective foundation for the planning and design strategy phases, spatial data concerning the different agricultural clusters at risk were systematically extracted through a detailed GIS-based analysis. This process aimed to gather and assess critical spatial information that would form the backbone of the subsequent design work. The various data points, summarized in the table below and presented through a simplified index ranging from 1 to 5, highlight key characteristics that are essential for understanding the underlying conditions and potential of the agricultural areas in question:

The current condition of these agricultural plots:
- Field size
- Soil quality
- Proximity to industrial areas
- Proximity to urban areas
- Proximity to protected natural areas

Future risks related to climate change:
- Salinization
- Flood risk

Potential for transition:
- Solar potential
- Wind potential

In an effort to establish the most objective foundation possible, and following the Multi-Criteria Decision Analysis (MCDA) model, all data were normalized on a scale from 1 to 5. Their combination forms the scientific basis upon which the following design chapters are built, highlighting the potential predisposition of each area to future development scenarios.

	Exsisting Structures						*Risks*		*Potential*	
Cluster	Field Size	Soil Quality	Proximity to Industry	Proximity to a City	Proximity to Natura	Energydemand	Salinization	Flood risk	Solar Potential	Wind Potential
1	1,55	1,36	2,30	5,00	1,50	2,13	4,95	4,28	4,95	1,27
2	1,55	1,06	1,00	2,20	2,00	2,09	4,98	4,28	5,00	4,39
3	1,89	2,62	1,50	1,50	3,50	1,98	2,81	3,59	1,16	4,48
4	1,56	1,54	2,50	2,10	3,50	2,42	4,24	4,44	2,22	3,79
5	1,37	1,18	2,70	3,80	5,00	2,12	4,99	3,60	1,81	1,26
6	2,07	2,69	5	4,20	2,00	1,95	1,62	4,44	1,00	1,00
7	1,64	1,95	1	3,60	3,80	2,26	4,82	3,52	2,96	3,46
8	1,70	2,13	1,4	3,20	4,60	2,31	5	4,44	3,16	1,84
9	1,72	2,71	1,9	4,30	4,20	2,11	5	3,65	4,98	4,19

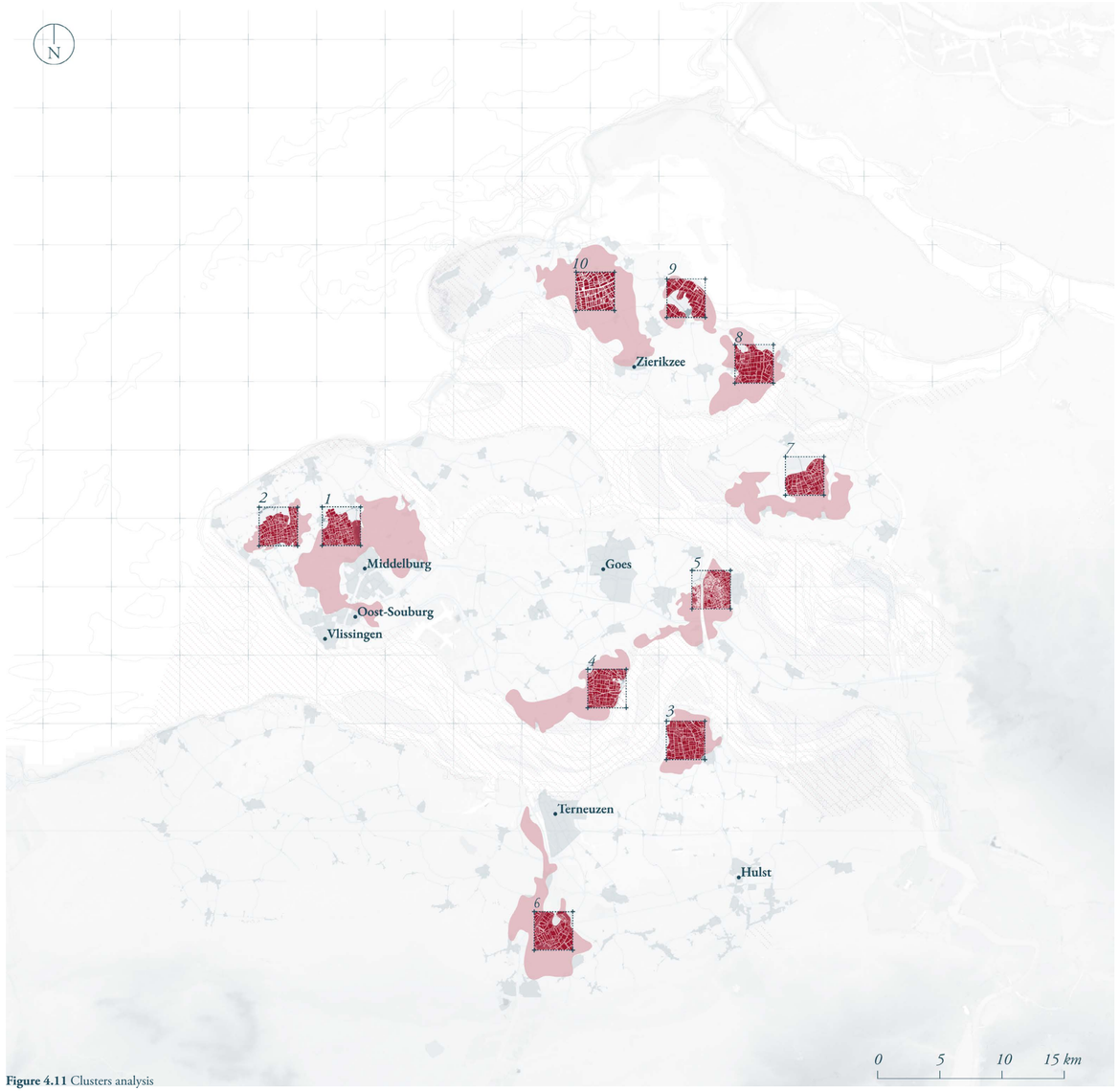


Figure 4.11 Clusters analysis

A Small-scale Analysis

Clusters' ID

In the following pages, in order to conclude the chapter on the spatial analysis of the community and agricultural landscape of Zeeland, the data extracted from the GIS-based analysis for each cluster are carefully presented. These are combined with more general information related to the types of crops present and the size of the agricultural plots. The outcome is an intensity map for each agricultural cluster, which, along with its name, territorial mugshot, and general data, aims to provide a comprehensive and detailed overview of the agricultural communities at risk and their surrounding territories.

For each area, the map offers a detailed, close-up view of the complexity of each agricultural field, highlighting the various crops, sizes, and organizational structures in place. The agricultural landscape of Zeeland is a rich and intricate mosaic, with highly diverse areas that differ significantly from one another. It may include regions with extensive farming practices, such as cluster number 08, with fields between Oosterland and Bruinisse, characterized by large fields focused on the production of tubers, cereals, and onions. On the other hand, there are areas with more natural characteristics and traditional farming models, such as cluster number 05, the Yerseke Moo Agro Reserve, which features small to medium-sized fields and a strong presence of water elements.

The compass located below provides a detailed overview of the spatial data mentioned earlier, organized for each cluster. By examining this and overlaying the different resulting shapes, one can observe how, from a technical standpoint, the various clusters exhibit distinct characteristics. These differences are especially noticeable in terms of climate risk, which is a key factor that influenced their selection.

Through the analysis of the identity maps for the different clusters, it becomes possible to extract essential qualitative and quantitative data about the most significant agricultural areas, the communities that inhabit them, and the potential futures for their agricultural practices. Every single piece of data is critical and invaluable, serving as a foundation for the design phase, which seeks to address emerging challenges while simultaneously capitalizing on the untapped potential of the communities and the agricultural landscape.

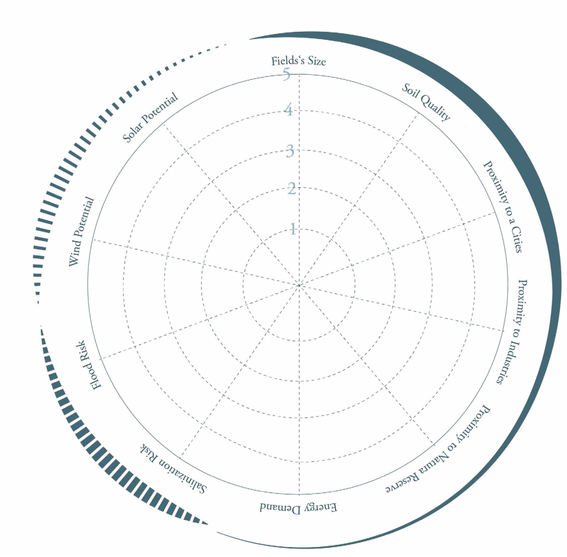


Figure 4.12 Matrix base

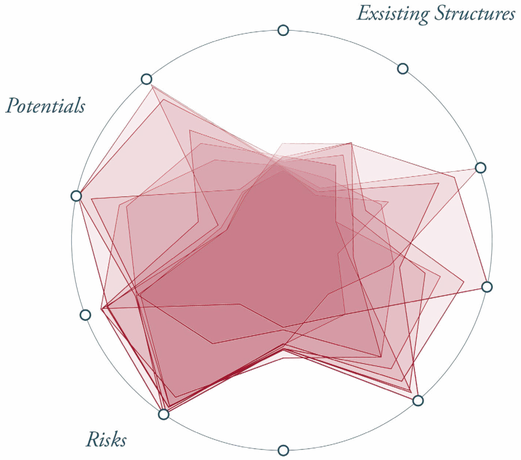


Figure 4.13 Attributes of each cluster

01. The Agricultural Belt of Middelburg

Fields Size
S 8% - M 54% - L 38%
Main productions
Grass 42% - Cereals 29% - Tubers 20%
Other relevant productions
< 4%

Figure 4.14

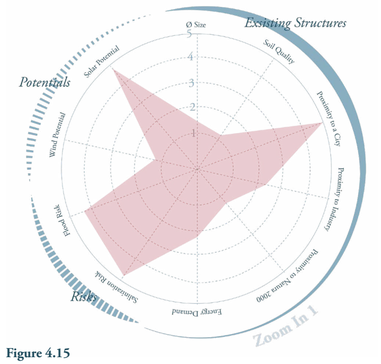


Figure 4.15

02. Fields Between Grijpskerke and Westkapelle

Fields Size
S 8% - M 68% - L 24%
Main productions
Grass 48% - Cereals 27% - Tubers 17%
Other relevant productions
Beens 3%

Figure 4.16

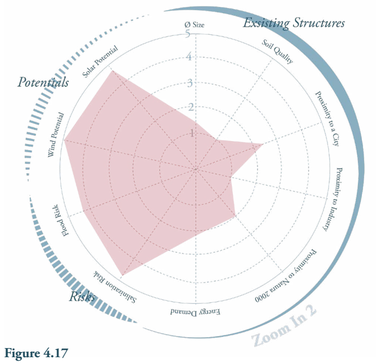


Figure 4.17

03. The Ossenisse Plain

Fields Size
S 5% - M 43% - L 52%
Main productions
Cereals 36% - Tubers 33% - Grass 15%
Other relevant productions
Onion family 6% -Beens 5%

Figure 4.18

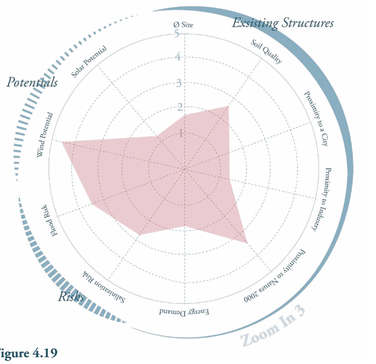


Figure 4.19

04. The Borssele Agricultural Coast

Fields Size
S 7% - M 49% - L 44%
Main productions
Cereals 29% - Fruits 25% - Tubers 24%
Other relevant productions
Grass 9% - Onion family 4%

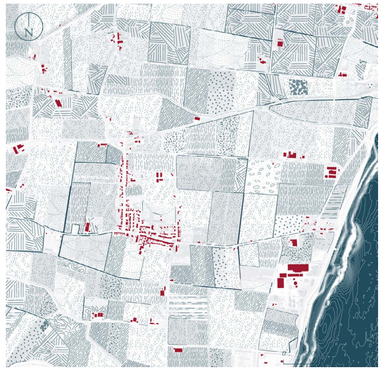


Figure 4.20

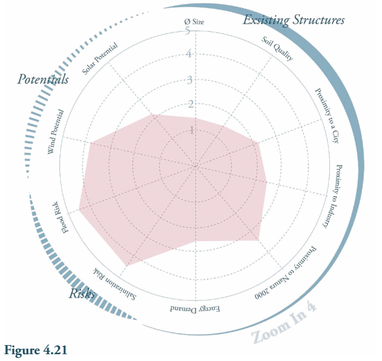


Figure 4.21

05. Yerseke Moo Agro Reserve

Fields Size
S 16% - M 48% - L 37%
Main productions
Grass 45% - Cereals 26% - Tubers 12%
Other relevant productions
Fruits 6% - Onion family 4%

Figure 4.22

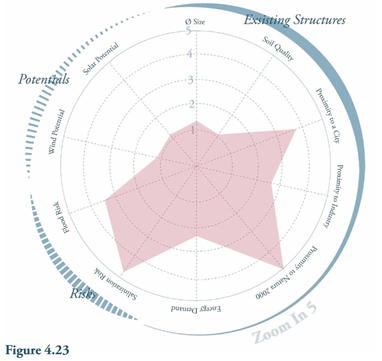


Figure 4.23

06. The Agro-Industrial Landscape of Terneuzen

Fields Size
S 4% - M 30% - L 67%
Main productions
Cereals 42% - Tubers 28% - Grass 15%
Other relevant productions
Onion family 6% -Beens 4%

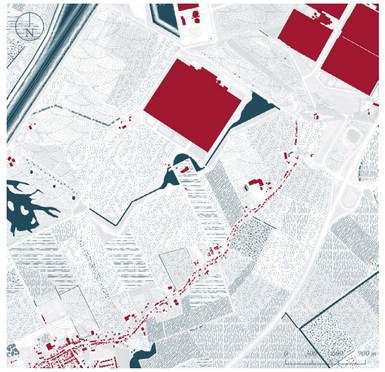


Figure 4.24

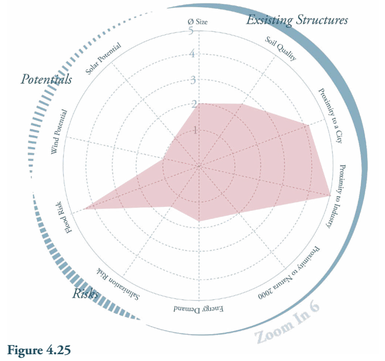


Figure 4.25

07. Poortvliet Plain

Fields Size
S 7% - M 52% - L 41%
Main productions
Tubers 35% - Cereals 27% - Grass 17% *Other relevant productions*
Flowers 7%

Figure 4.26

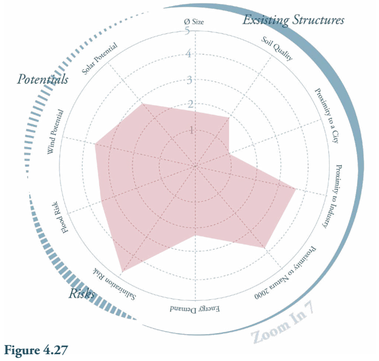


Figure 4.27

08. Fields Between Oosterland and Bruinisse

Fields Size
S 5% - M 31% - L 64%
Main productions
Tubers 33% - Cereals 27% - Grass 13%
Other relevant productions
Onion family 8% -Beens 4%

Figure 4.28

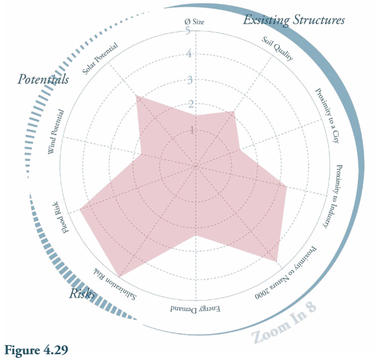


Figure 4.29

9. Agricultural area north of Zierikzee

Fields Size
S 6% - M 34% - L 60%
Main productions
Cereals 39% - Tubers 31% - Grass 17% *Other relevant productions*
Onion family 4%

Figure 4.30

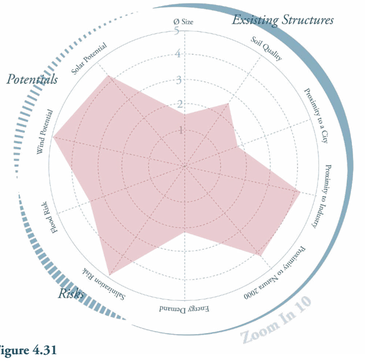


Figure 4.31

Mapping the Farmer Community

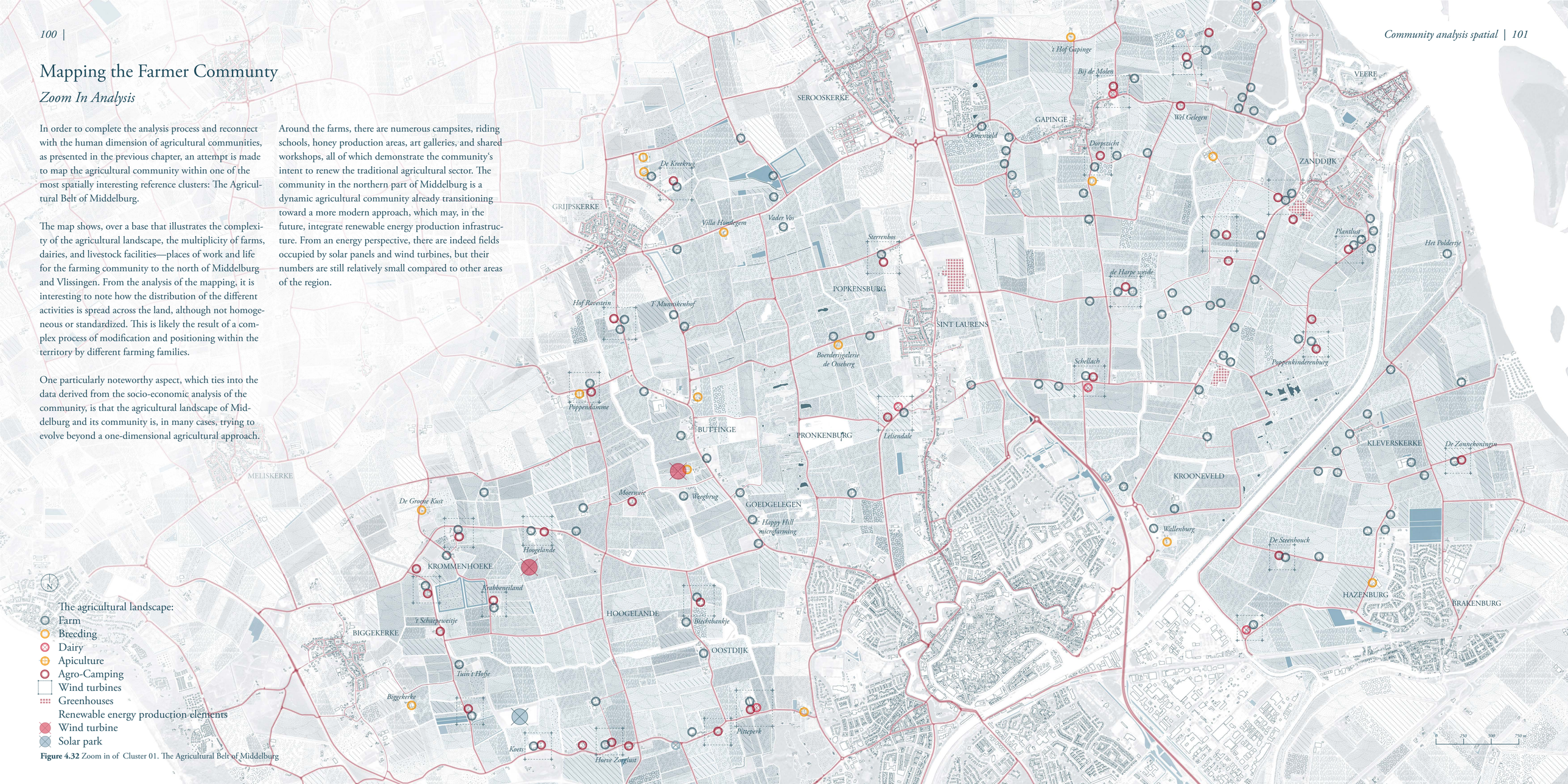
Zoom In Analysis

In order to complete the analysis process and reconnect with the human dimension of agricultural communities, as presented in the previous chapter, an attempt is made to map the agricultural community within one of the most spatially interesting reference clusters: The Agricultural Belt of Middelburg.

The map shows, over a base that illustrates the complexity of the agricultural landscape, the multiplicity of farms, dairies, and livestock facilities—places of work and life for the farming community to the north of Middelburg and Vlissingen. From the analysis of the mapping, it is interesting to note how the distribution of the different activities is spread across the land, although not homogeneous or standardized. This is likely the result of a complex process of modification and positioning within the territory by different farming families.

One particularly noteworthy aspect, which ties into the data derived from the socio-economic analysis of the community, is that the agricultural landscape of Middelburg and its community is, in many cases, trying to evolve beyond a one-dimensional agricultural approach.

Around the farms, there are numerous campsites, riding schools, honey production areas, art galleries, and shared workshops, all of which demonstrate the community's intent to renew the traditional agricultural sector. The community in the northern part of Middelburg is a dynamic agricultural community already transitioning toward a more modern approach, which may, in the future, integrate renewable energy production infrastructure. From an energy perspective, there are indeed fields occupied by solar panels and wind turbines, but their numbers are still relatively small compared to other areas of the region.



The agricultural landscape:
- Farm
- Breeding
- Dairy
- Apiculture
- Agro-Camping
- Wind turbines
- Greenhouses

Renewable energy production elements
- Wind turbine
- Solar park

Figure 4.32 Zoom in of Cluster 01. The Agricultural Belt of Middelburg

Landscapes in Transition

Spatial problem statement

After the spacial analysis Zeeland shows to be a land dominated by the production of agricultural goods. Especially arable farming with bigger crop types like potato, suger beets and grain are taking up most of the land. At the same time, Zeeland is having a huge potential for generating renewable energy—mainly wind and solar—due to its strong coastal winds and high solar exposure.

However, this dual identity is becoming increasingly strained. In several areas, agricultural production is deminishing due to rising salinization and an increased risk of flooding, both driven by climate change. As the soil becomes less fertile and reliable harvests harder to secure, the long-term viability of traditional farming practices is put into question. This not only affects food production, but also the economic foundations and cultural fabric of local communities.

In response to these risks, a data-driven approach was used to identify nine agricultural clusters across Zeeland. Each cluster was analyzed based on soil conditions, water risk, crop type, and spatial characteristics. This allowed for a deeper understanding of where agriculture may remain sustainable - and where it may not. In areas identified as vulnerable, the potential for alternative land uses such as renewable energy integration or renaturalisation has been assessed.

This challenge demands careful spatial strategies that balance food security, energy transition, and landscape identity. By recognizing that not all agricultural areas can or should be preserved in their current form, and by identifying where multifunctional land use can offer a resilient path forward, Zeeland can pioneer a transition that is both climate-smart and community-centered.

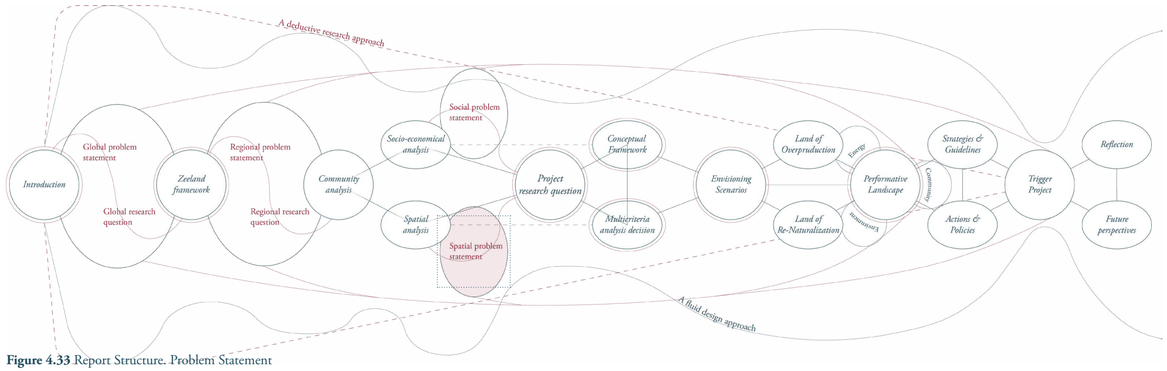


Figure 4.33 Report Structure. Problem Statement

Zeeland is a land of production.

Where the agricultural landscape is essential to farmers‘ existence, providing profit and stability.

However, certain areas with great potential for the energy transition are now at high risk due to climate change. In these vulnerable clusters, agricultural production may become unsustainable, unprofitable, or even unfeasible.

Exploring renewable energy as an integrated transition could offer new opportunities for these at-risk areas, ensuring long-term resilience and economic stability.

Chapter 5

Concept

A new framework for integrated land use

An Ambition for the Future

Project research question

Agriculture is deeply embedded in the identity of Zeeland. For generations, farmers have adapted to the changing conditions of the Delta, maintaining productive landscapes and supporting local economies. However, today's farming community faces mounting uncertainties: shifting regulations, increasing production costs, and diminishing financial security are placing serious strain on their ability to continue. At the same time, the ongoing energy transition presents a parallel challenge. While the shift to renewables offers theoretical potential, it remains an unviable alternative for many—hindered by top-down policies, infrastructural gaps, and a lack of local support.

Spatially, Zeeland is a land shaped by production. Large areas are dominated by arable farming, with crops such as potatoes, sugar beets, and grains forming the economic backbone of rural regions. Yet, climate change is starting to undermine the future of this agricultural landscape. Salinization and flood risk are rendering certain areas less viable for traditional food production, particularly in locations that also happen to hold high potential for renewable energy generation. In these vulnerable clusters, the future of farming - and with it, the resilience of local communities - is increasingly uncertain.

It is precisely at this intersection of socio-economic pressure and spatial transformation that our project research question emerges.
From this intersection of socio-economic pressure and spatial vulnerability, several key questions emerge:
How can we respond to climate risks both spatially and socially?
How can rural areas be adapted to new environmental and climatic conditions?
How can we effectively address sea level rise, salinization, drought, and land degradation?
What alternative scenarios can we offer to farmers to ensure they remain connected to the land?
How can energy production be meaningfully integrated into the rural landscape while maintaining ecological balance?
How much space must be returned to nature to safeguard biodiversity and ensure ecosystem functioning?
How can we balance the three key objectives: nature conservation, food security, and the energy transition?

These questions guide our central project research question which our vision revolves around. It is the lens through which we explore the potential of renewable energy as an integrated transition - not as a replacement for agriculture, but as a strategic opportunity to support at-risk areas, strengthen rural economies, and reimagine the relationship between humans, land, and nature in the Delta region.

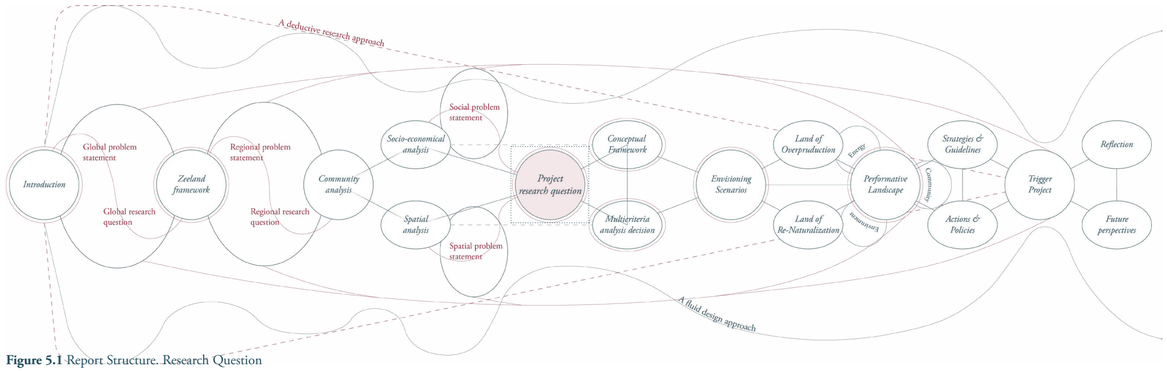


Figure 5.1 Report Structure. Research Question

Is it possible to create a vision for Zeeland's Delta Region in which, through Energy Transition, farmers are empowered to actively shape a productive landscape that integrates renewable energy production, sustainable food systems and landscape preservation, while ensuring long-term climate resilience, economic stability, and the integrity of the Delta's unique character?

An Integrated Approach

Conceptual layers

Every design project is guided by a set of underlying ideas that shape its direction and decisions. A conceptual framework shows the approach taken during a project and explains the main ideas and relationships behind it. In our case, the framework illustrates the concept of the performative landscape as it developed through our design process. For this project, the framework is built around three interconnected diagrams, each of which is explained in more detail below. Overall the framework serves as the foundation for guiding design decisions, framing the project's approach to community engagement, and shaping the long-term sustainability of the farming community.

An integrated Approach
The first diagram highlights our integrated design approach, which balances the needs of both people and planet. By distinguishing between the biosphere (natural systems) and the anthroposphere (human systems), we acknowledge that what benefits ecological health does not always equally benefit human needs - and vice versa. In our project, we aim to find the most suitable solution for both, based on the specific qualities and characteristics of each part of the landscape.

A scenario-based Approach
The second diagram illustrates the method we used to explore different spatial and social development scenarios for Zeeland's rural future. At its core, this diagram is based on the Venn diagram method, which is used to visualize relationships, overlaps, and distinctions between three central components: agriculture, energy production, and renaturalization. Each of these components plays a vital role in shaping the future landscape, and each scenario reflects a different configuration of their interaction.
The three overlapping circles represent three distinct conceptual scenarios, each emphasizing a different guiding logic:

• A market-oriented approach, where economic efficiency and energy production dominate;
• A nature-oriented approach, prioritizing ecological balance, biodiversity, and climate resilience;
•A community-oriented approach, focusing on local agency, inclusive decision-making, and the social fabric of rural life.

All three scenarios acknowledge the energy transition as an inevitable force, a foundational premise emphasized in our course framework. Rather than proposing a single ideal future, we developed these divergent scenarios to intentionally stretch assumptions and expose trade-offs. By pushing the scenarios toward their extremes, we are better able to examine the spatial, ecological, and social consequences of each pathway—highlighting potential synergies and tensions that may emerge.
The overlapping structure of the diagram emphasizes that no future scenario exists in isolation. All three contain elements of agriculture, energy, and nature—but in different proportions, priorities, and forms of integration. This method allowed us to visualize not only the contrasts between pathways, but also their common ground, helping to identify leverage points for hybrid or balanced solutions.
Ultimately, this diagram serves as both an analytical tool and a design compass—guiding us in the development of a performative landscape that can support climate resilience, economic transformation, and community empowerment in Zeeland's Delta Region.

A multiscalar Approach
The third diagram is based on the understanding that any adjustments will affect multiple scales. It illustrates the multiscalar approach in which the farmer operates, symbolizing the entire production chain. This includes actors interacting with other stakeholders, as well as bodies of power that impose regulations, which cascade through all levels. Our community is situated at the smallest scale, where bottom-up approaches can emerge, while EU regulations are represented at the largest scale. This gap will be further explored in later chapters. In the project we categorize each action according to its corresponding scale and examine the influence of the performative landscape on the broader production system, aligning with the principles of our conceptual framework.

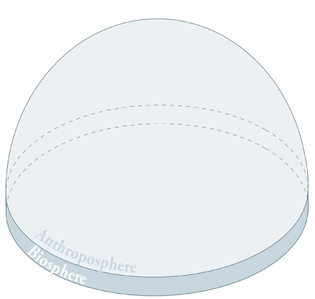


Figure 5.2

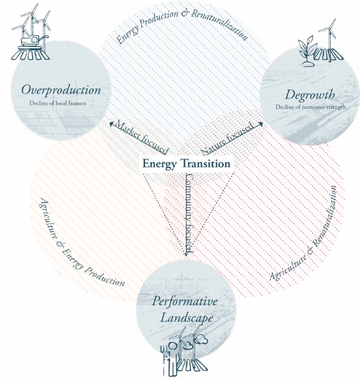


Figure 5.3

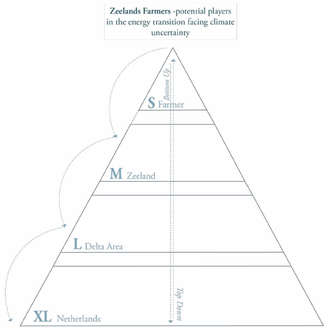


Figure 5.4

Embrace Complexity

Conceptual framework

Together, these three diagrams form the foundation of our conceptual framework, each contributing a distinct lens through which we examine the energy transition in Zeeland. While each diagram functions independently, highlighting integrated design, scenario thinking, and multiscalar logic, it is in their interplay that the full potential of this framework emerges. Their combination enables us to engage with the energy transition not as a linear shift, but as a complex transformation that affects and is affected by spatial, ecological, social, and political systems.

At its core, the **integrated design approach** positions the landscape between the biosphere and the anthroposphere - between natural systems and human structures. It reminds us that successful solutions cannot favor one over the other, but must actively seek a balance. It also serves as a call to resist "going with the flow"- to move beyond reactive spatial planning and instead engage critically with both natural processes and societal structures. Only by designing with respect for both can we build landscapes that are not only productive but also resilient and just.

Integrating the **scenario-based approach** together with the design approach, expands this ethical baseline into a tool for imagination and inquiry. Using a Venn-diagram logic, it explores the interactions between agriculture, energy production, and renaturalization - three land uses that increasingly compete for space. The three conceptual futures (market-oriented, nature-oriented, and community-oriented) are not meant as fixed endpoints, but as provocations. By stretching the scenarios to their extremes, we are able to test what the land can sustain, what the community can absorb, and where frictions might arise. It opens space for negotiation and hybrid solutions, while always returning to the performative capacity of the landscape.

Shifting the model into a spatial concept, the third and final component, the **multiscalar approach**, reminds us that energy transition is never limited to one geographic or political layer. It is not something that simply „happens ", it cascades across scales, from international climate targets to regional planning zones, down to individual farms and households. This approach brings structure to our understanding of power, influence, and implementation. It ensures that our vision is not only rooted in the local but is also aligned with broader frameworks, recognizing that every actor—from EU policymakers to smallholders—is part of the system shaping Zeeland's future.

Embracing this level of complexity is a necessity. The energy transition is not a singular technical shift; it is a spatial, ecological, political, and cultural transformation. To approach it with integrity and ambition means recognizing that no single discipline, scale, or solution can address the challenges ahead in isolation. Instead, we must design with an integrated systems perspective, one that acknowledges the interconnected layers of influence, dependency, and opportunity.

This means designing in a way that carefully considers:

The ecological boundaries of the land
Not all land is equal in its capacity to produce energy, food, or ecosystem services. Climate change has introduced new risks which limit agricultural viability in certain areas. At the same time, opportunities for renewable energy must be assessed in light of biodiversity, water management, and long-term environmental health. Designing within planetary boundaries requires us to map and respect the land's regenerative limits, rather than simply optimizing it for short-term output.

The social dynamics of the communities who live and work on it
Farmers are not just land users; they are knowledge holders, stewards of cultural identity, and critical actors in shaping transition pathways. Any intervention in the landscape must be rooted in local realities, in the hopes, fears, and capacities of the people who depend on it. This includes generational transitions, community agency, and participation in decision-making processes. Social equity and spatial justice must be central to energy transition planning, not afterthoughts.

The multi-level governance systems that frame what is possible
The energy transition is guided by international climate targets, EU directives, national legislation, regional spatial plans, and local municipal policies—all of which intersect and sometimes contradict. These governance structures define both opportunity and limitation. Successful strategies must bridge top-down frameworks and bottom-up needs, ensuring that transitions are not only compliant but also co-owned and context-sensitive. Understanding power dynamics across scales is vital to implementing change that lasts.

In sum, this complexity is not a burden to be avoided - it is the condition of meaningful transformation. A conceptual framework that embraces it equips us to act with clarity, responsibility, and imagination in the face of uncertainty. Only through this multi-dimensional lens can we shape a performative landscape that works for a just energy transition in Zeelands Delta region.

Through the concept of the Performative Landscape, we, as urban designers, strive to ethically balance the empowerment of farmers with the needs of the planet. By addressing the interconnected needs of the economy, people, and the environment, our approach promotes long-term sustainability for the farming community.

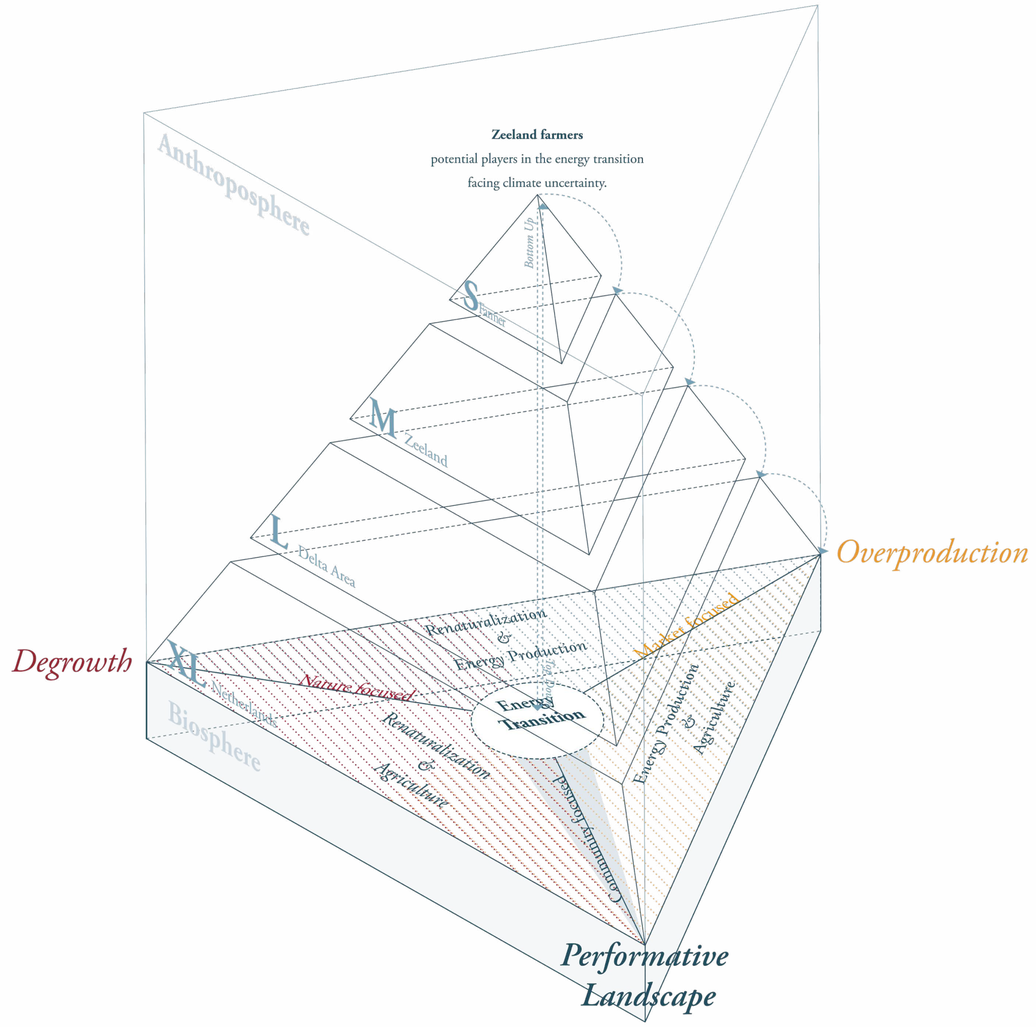


Figure 5.5

A Process of Qualitative and Quantitative Integration

Design methodology

Before fully engaging in the Regional Design phase, it is essential to provide a premise regarding the methodology that has guided the planning and design process of the team.The attempt to envision a future on a regional scale for the agricultural landscape of Zeeland, a landscape that is characterized by significant risks related to the environmental crisis as well as opportunities linked to the production of sustainable energy, is deeply rooted in a comprehensive process of spatial and socio-economic analysis, which has been detaily showed in the previous chapters.

The effort to integrate both qualitative and quantitative approaches, which was evident during the research phase, is equally present and influential during the design phase. The collection of data related to the health, risks, and criticalities of the agricultural territory provides the theoretical and objective foundation for the decisions made during the design phase. This foundation is particularly important for the construction and selection of a catalog of actions designed to address the care and development of the socio-territorial fabric.

This set of objective spatial data - processed through a conceptual model of multicriteria analysis - is interpreted through the lens of the conceptual framework outlined in the previous pages. It is also the product of careful listening to the needs and desires of the local community, as well as a set of values and goals shared by all members of the research and design team. This forms the theoretical basis upon which we attempt to answer the design research question.

The project's objectives and methods emerge from the combination of these two elements: a qualitative and a quantitative approach, which together lay the foundation for the development of three distinct design scenarios.

The scenarios, each distinct yet interconnected, represent parallel attempts to respond to the research question, focusing on different values and priorities. These scenarios are built on the recognition of the urgency of proposing an ambitious and forward-thinking vision for the future of local communities, while acknowledging the necessity of addressing the uncertainty of the future, both in terms of environmental challenges and socio-political dynamics. Building on this preliminary envisioning scenario phase, the focus shifted toward the full development of one of these scenarios: "Performative Landscape." This scenario is elaborated through the definition of specific guidelines, which contain targeted actions and policies for each of the nine agricultural clusters at risk. These actions aim to respond to the particular criticalities identified during the analysis phase, which are then reflected in the territorial identity cards of each cluster.

Finally, in order to effectively communicate the directions and strategies within the vision, a comprehensive plan was developed for the Middelburg Agricultural Belt, one of the nine rural clusters identified. This zoom-in, treated as a pilot project within the vision, aims to demonstrate not only the feasibility of the proposed strategies but also their potential impact, both socially and territorially, in the long term.

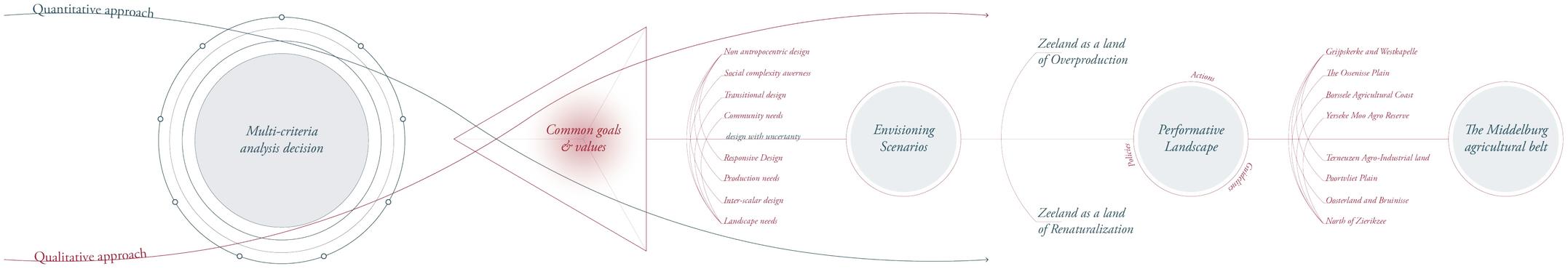


Figure 5.6 Design Methodology

Chapter 6

Vision

Future perspectives: the Performative Landscape as a new paradigm

What if ... *Zeeland would turn into a land of Overproduction*

Scenario 1

2075. The world, society, and politics have taken a decisive turn to the right. Nationalism dominates Europe, which is now on the verge of collapsing as a union and political institution. The market has become the only remaining institution, and economic logic prevails at the expense of environmentalism and socially-oriented approaches. Expansion, growth, and intensification are the mantras of modern politics, guiding planning activities driven by an engineering mindset and a distinctly anthropocentric vision.

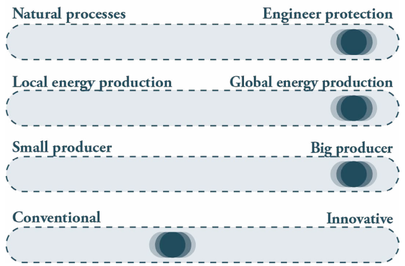
In this scenario, the Delta region has become the symbol of the new era. A massive system of artificial dikes protects the coasts from rising sea levels. At the same time, a new wave of polderisation has created additional stretches of land reclaimed from the water, designated for urban expansion, industrial agriculture, and logistics development. Land has become infrastructure, a surface to optimize, adapt, and fill.

The logistics sector has experienced exponential growth: the expansion of ports marks the coastline, which has been redesigned for maximum efficiency. Natura2000 areas and natural reserves have been progressively reduced or absorbed by new infrastructural developments.

All forms of renewable energy are exploited to their fullest potential. Huge offshore wind farms dot the marine horizon, while floating solar platforms extend across artificial basins. The new dike hosts hybrid facilities that combine energy production and water management. A new-generation nuclear power plant is welcomed as a symbol of safety and technological progress.

However, the energy transition has left little room for small players: traditional farming communities are now on the verge of extinction. The agricultural landscape has been radically transformed. Large agricultural corporations dominate the sector, oriented toward export and production efficiency. Farming practices are increasingly industrialized, with widespread monoculture, extreme mechanization of fields, and large-scale adoption of vertical farming in former suburban areas. .
Rural communities are dissolving. The diasproa from the countryside by younger generations has given way to a highly standardized landscape, where resources are fully exploited and the presence of unwanted flora and fauna is minimised.

Impact on the community



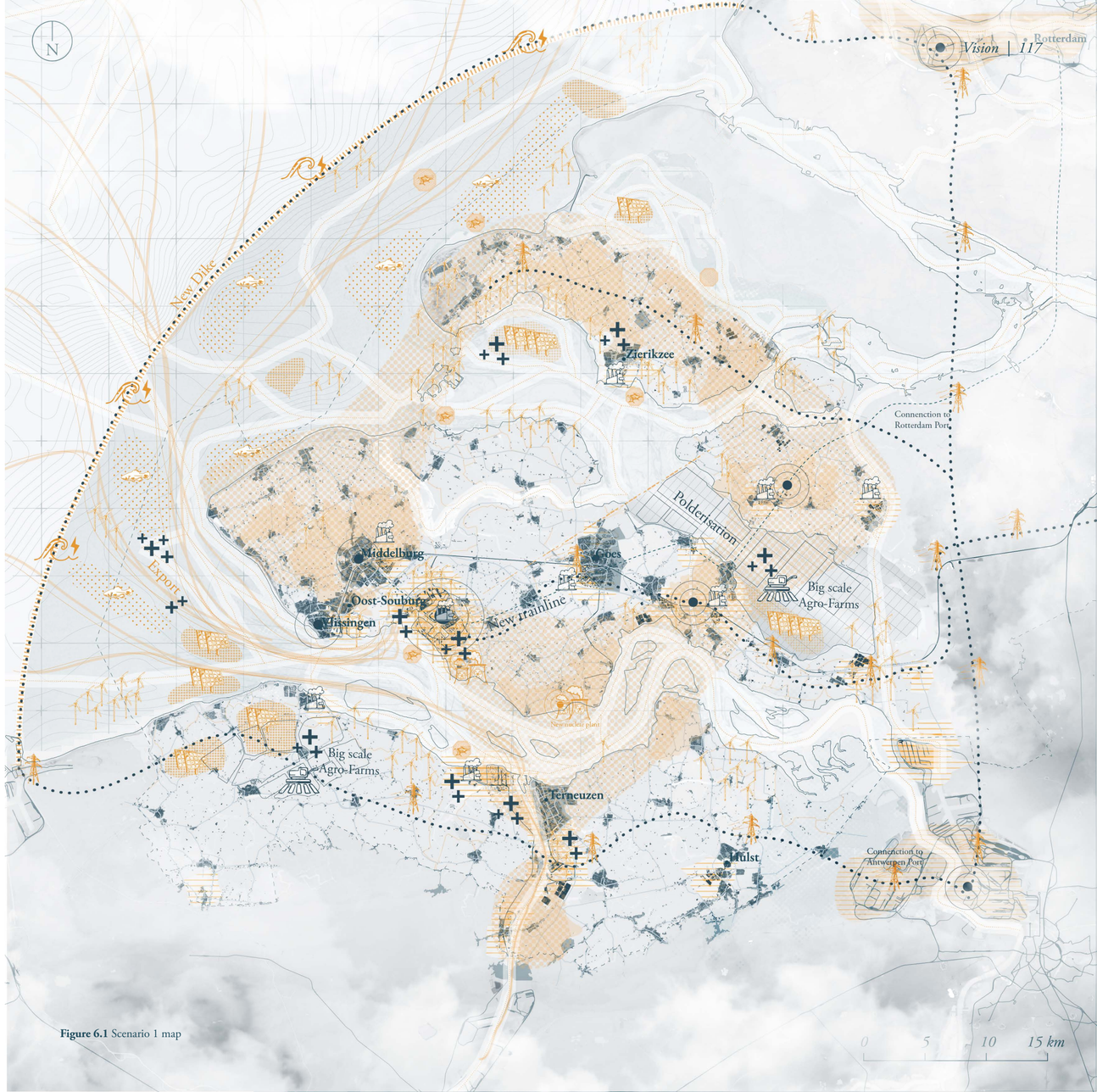


Figure 6.1 Scenario 1 map

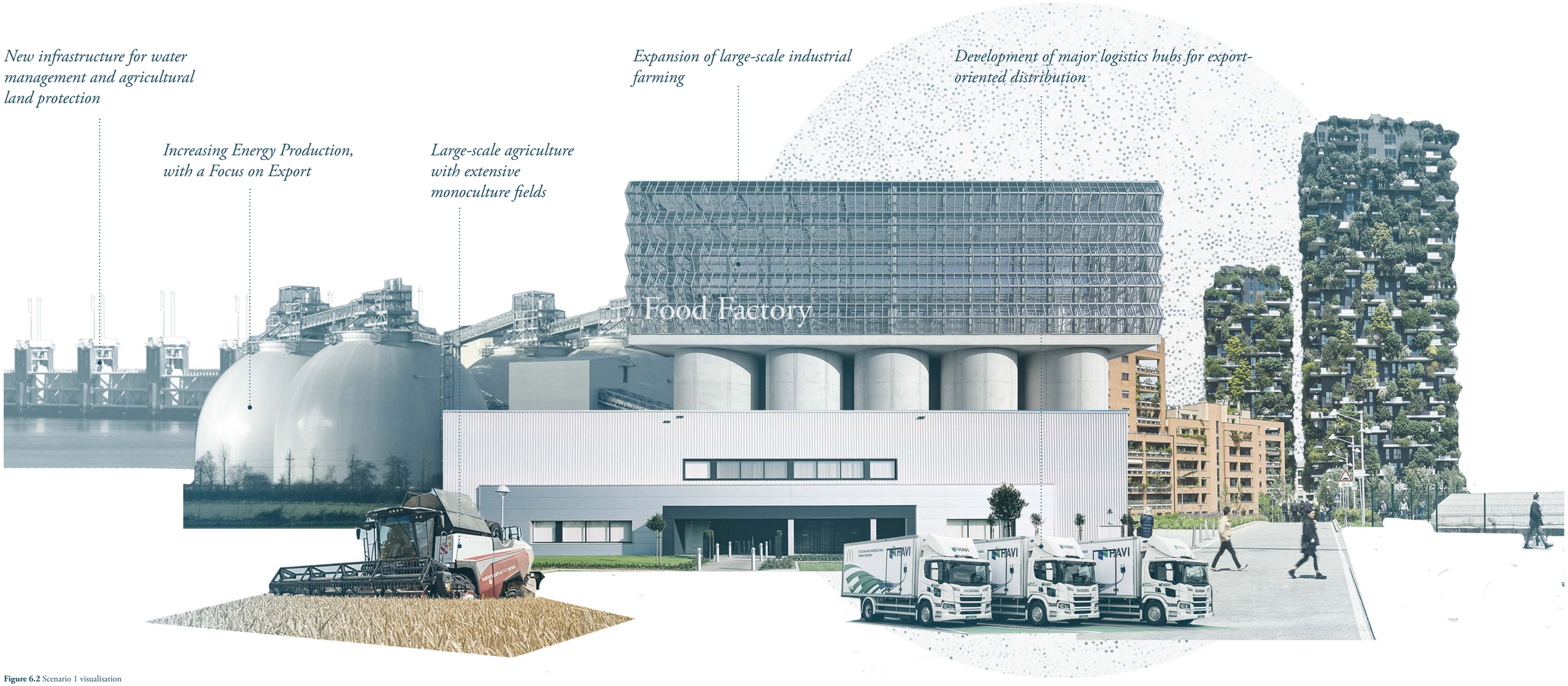


Figure 6.2 Scenario 1 visualisation

What if ... *Zeelands production would face Degrowth*

Scenario 2

2075. The victory of the Green Party in the national elections of 2028, followed by their consolidated success in subsequent European elections, allowed the Netherlands to fully honor its commitments under the Paris Agreement. A growing concern for the planet's well-being—fueled by the dramatic flooding in Zeeland in 2026—spread throughout the country. The Netherlands decisively reinforced its commitment to the European Green Deal and the Sustainable Development Goals (SDGs), setting even more ambitious targets and positioning itself as a laboratory for the practical application of a "smart and happy" degrowth model on a national scale.

Serge Latouche was appointed special advisor for the development of the new Dutch National Spatial Strategy (NOVI), built on the principles of degrowth and the ecological restoration of large portions of land back to nature. This new territorial model is not only ideological but also economically feseable, supported by an integrated system that combines renewable energy production, local agriculture, and regenerative tourism. In this context, the Zeeland Delta area emerged as a pilot region, becoming a true laboratory for experimenting with a new balance between humans, nature, and landscape.

Existing infrastructure in the province has been progressively downscaled or decommissioned, while vast areas once dedicated to agriculture have been reopened to the sea and to natural hydrological processes.

Agriculture has shifted in both function and scale, now primarily serving the needs of local residents. The total agricultural land area has decreased, while new crop types adapted to changing conditions—such as salt-resistant plants and algae—are being tested.

Renewable energy sources have been fully integrated into natural processes. Flooded or partially submerged areas are now used for offshore wind turbines and floating solar panels, which provide financial compensation to small farmers who have lost their land.

Urbanization has come to a halt, communities are restructured around closed, sustainable production cycles. The landscape is an active partner in the generation of ecological services. Zeeland is a living landscape, where agricultural production coexists harmoniously with nature and its rhythms, at the expenses of the market.

Impact on the community

Natural processes — **Engineer protection**

Local energy production — **Global energy production**

Small producer — **Big producer**

Conventional — **Innovative**

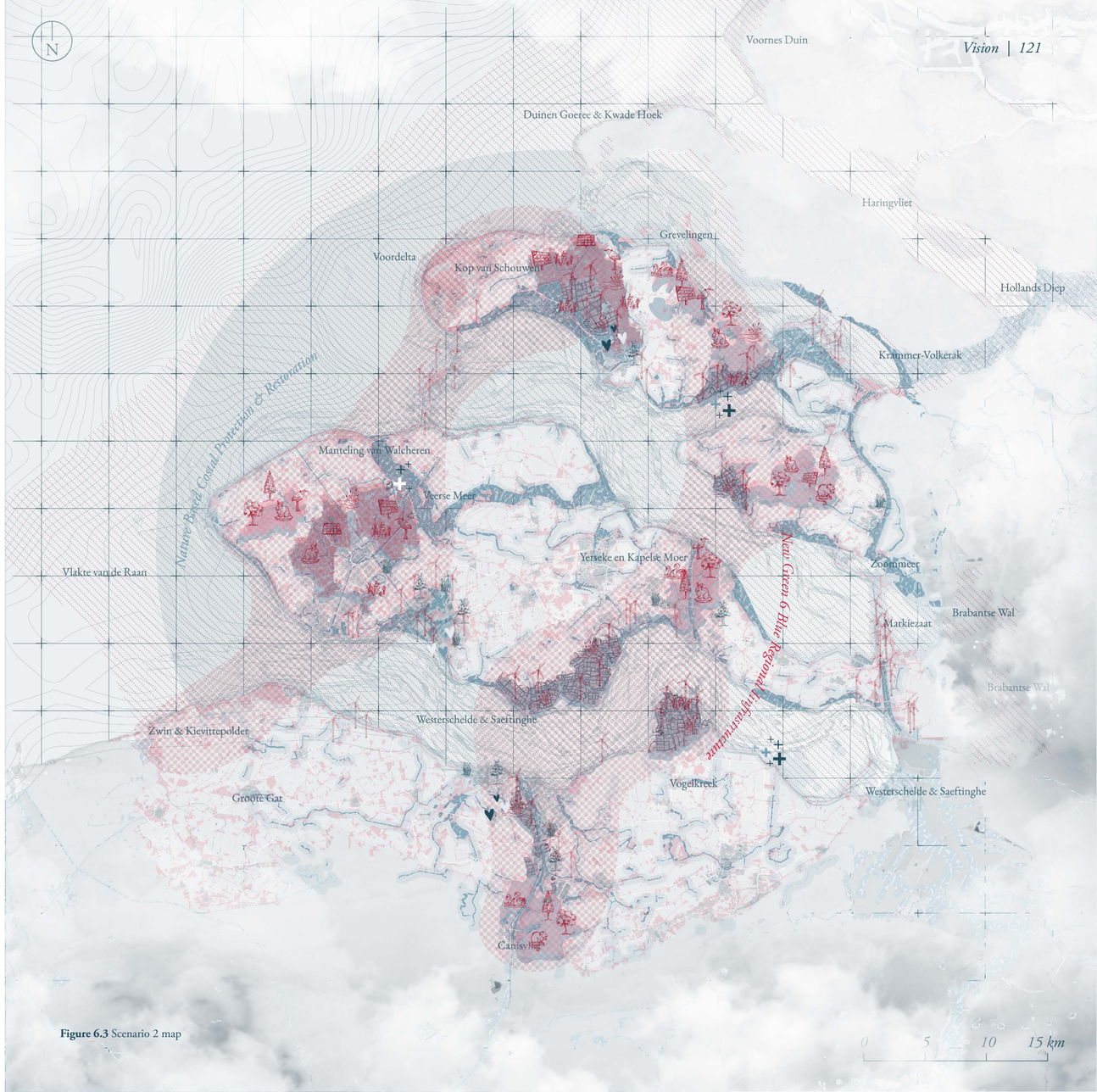


Figure 6.3 Scenario 2 map

Repoldering and Ecosystem Restoration, Nature-Based Water Retention

Implementation of Sustainable and Resilient Food Production Methods

Circilar Local Energy Production and Consumption

Figure 6.4 Scenario 2 visualisation

Four Guidelines to shape the Future

Project guidelines

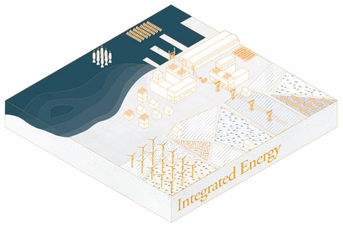


Figure 6.10

Integrated Energy

Ambition: Zeeland, as a key national energy hub, based on the synergies between local energy communities and big producers, maximizing the potentials of the delta region and landscape in order to provide alternative ways for production.

Zeeland should fully utilize its significant natural advantages to maximize the production of sustainable electricity. This requires a reconsideration of the current energy distribution system, with a strong focus on serving and supporting local consumers.
Particular attention should be paid to the development and scaling of energy infrastructure within the province, as well as the creation of new connections between urban, industrial, and rural areas.
This would enable a more balanced and efficient allocation of resources. It is important to introduce innovative forms of energy production. One of the key challenges is to develop solutions for integrating energy infrastructure into agricultural land.

Figure 6.11

Resilient Adaption

Ambition: Building landscapes and systems that enhance water management, biodiversity, and climate resilience for the Delta region.

Emphasizes the importance of addressing the consequences of climate change as a top priority. It is essential to allocate more space for water — by creating buffer reservoirs, restoring wetlands, and implementing other natural water systems that enhance water management.
Particular attention should be given to the renaturalization of areas that are no longer suitable for agriculture. This includes the reclamation of polluted and degraded lands, and the restoration of natural biodiversity and landscape variety.
This approach not only helps to mitigate climate-related risks but also significantly improves the overall quality and resilience of the landscape, supporting more balanced and sustainable regional development.

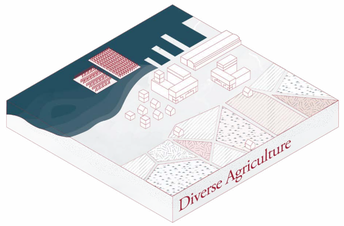


Figure 6.12

Diverse Agriculture

Ambition: A climate-resilient, economically thriving, and ecologically rich agricultural landscape, where regenerative practices, renewable energy, and innovation empower farmers to produce diverse, high-quality food while enhancing soil health, biodiversity, and water security.

The need to rethink traditional agricultural practices.
It encourages the introduction of greater diversity in farming strategies, including the cultivation of new, resilient crop varieties — for example, salt-tolerant plants.
The approach promotes a shift toward smart and sustainable local production and consumption, grounded in the principles of a circular economy. It also supports the integration of various energy production methods into the agricultural sector, such as the development of biofuels.
Together, these strategies aim to make agriculture more adaptable and resilient in the face of ongoing environmental changes.

Figure 6.13

Engaged Community

Ambition: A resilient and empowered Zeeland where farmers, residents, and local stakeholders actively shape the region's future through bottom-up participation, shared ownership, and collaborative decision-making—ensuring a just and inclusive energy and agricultural transition that strengthens local identity and prosperity.

The importance of focusing on our local community. It encourages the promotion and support of local cooperatives, as well as the shared use of infrastructure and equipment.
The creation of common infrastructure for energy storage and distribution should be prioritized. Additionally, initiatives based on a bottom-up approach should be nurtured and supported. Connecting representatives of local communities with local authorities, municipalities, and other stakeholders for mutual cooperation is essential. Educational and awareness programs should be developed in collaboration with local universities to support and expand the local knowledge base.

A comprehensive Inventory

Catalogue of actions

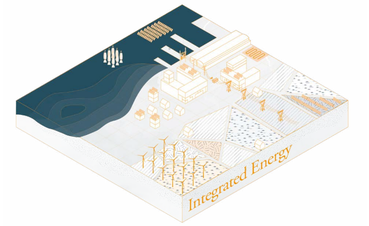


Figure 6.10

Integrated Energy

e01 - Agro-energy symbiosis
e02 - Decentralised energy grids
e03 - Expanding Zeeland's hydrogen hub
e04 - Tidal and wave Energy
e05 - Energy-positive Ports
e06 - Circular bioenergy
e07 - Integrated heat networks
e08 - Floating solar panels
e09 - Scaling wind power
e10 - Electrified mobility corridors
e11 - Adaptive energy infrastructures

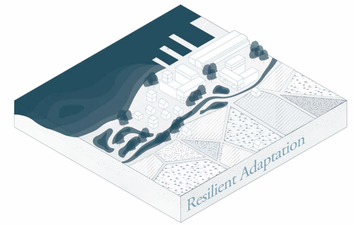


Figure 6.11

Resilient Adaption

r01 - Water buffer
r02 - Wetlands
r03 - Underground water storage:
r04 - Controlled polders
r05 - Nature-based dike reinforcement
r06 - Floating living spaces
r07 - Biodiverse planting
r08 - Planting of seagrass meadows
r09 - Agroforestry
r10 - Creation of salt marshes and tidal flats
r11 - Oyster and mussel reef cultivation
r12 - Strengthening coastal ecosystem

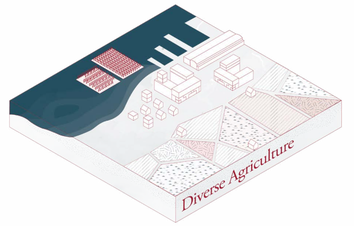


Figure 6.12

Diverse Agriculture

a01 - Agroecological Farming
a02 - Regenerative soil management
a03 - Circular farming
a04 - Freshwater retention systems
a05 - Km 0 food network
a06 - Salt tolerant agriculture
a07 -Algae-based biofuel production
a08 - Agrovoltaics
a09 - Small-scale wind
a10 - Smart drainage systems
a11 - Floating solar farms
a12 - Tidal farming
a13 - Salt marshes
a14 - Made in Zeeland

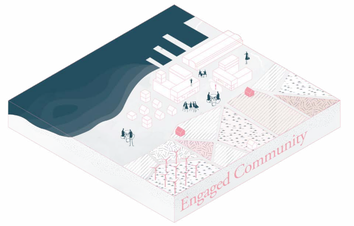


Figure 6.13

Engaged Community

c01 - Community-led cooperatives
c02 - Agri-food & energy hubs
c03 - Co-biogas and bioenergy
c04 - Community storage
c05 - Participatory land use planning
c06 - Government support
c07 - Digital partecipation
c08 - Educational & training programs
c09 - Rural dialogues
c10 - Retail & restaurant partnerships

Integrated Energy

Catalogue of actions

Ambition: Zeeland, as a key national energy hub, based on the synergies between local energy communities and big producers, maximizing the potentials of the delta region and landscape in order to provide alternative ways for production.

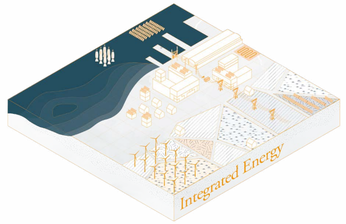


Figure 6.18

e1: Agro-Energy Symbiosis

S M L XL P

Integrate solar panels and wind turbines on farmlands to enable dual-use agricultural and energy production systems.

Timeframe	+ + + + +
Energy	+ + + · ·
Renaturalization	+ + + + +
Agriculture	· · · · ·
Community Impact	+ + + · ·

e2: Decentralised Energy Grids

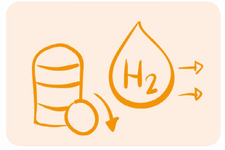
S M L XL P

Develop local smart grids and energy storage solutions to enhance self-sufficiency and reduce dependency on centralised networks.

Timeframe	· · + + +
Energy	+ + + + +
Renaturalization	· · · · ·
Agriculture	+ + · · ·
Community Impact	+ + + + +

e3: Expanding Hydrogen Hub

S M L XL P



Boost green hydrogen production, storage capacity, and cross-border energy exchange to solidify Zeeland's role as a key hydrogen hub.

Timeframe	+ + · · ·
Energy	+ + + + ·
Renaturalization	+ · · · ·
Agriculture	+ · · · ·
Community Impact	· · · + +

e4: Tidal and wave Energy

S M L XL P

Utilise Zeeland's delta to deploy tidal and wave energy converters for continuous renewable power generation.

Timeframe	+ · · · ·
Energy	+ + + + +
Renaturalization	+ + · · ·
Agriculture	· · · · ·
Community Impact	· · · · +

e5: Energy-positive Ports

S M L XL P

Transform ports into energy hubs by integrating offshore wind farms, hydrogen production, and smart logistics electrification.

Timeframe	+ + + · ·
Energy	+ + + + +
Renaturalization	· · · · ·
Agriculture	· · · · ·
Community Impact	· · · + +

e6: Circular bioenergy

S M L XL P

Convert agricultural waste and biomass into biofuels and biogas, closing regional energy and material loops. Expand bioenergy with biofuels, biogas, and algae-based solutions.

Timeframe	+ · · · ·
Energy	+ + + + +
Renaturalization	+ + + · ·
Agriculture	+ · · · ·
Community Impact	+ · · · ·

e7: Integrated heat Networks

S M L XL P

Harness residual heat from industries and data centers for district heating, cutting fossil fuel use and heating costs.

Timeframe	+ · · · ·
Energy	+ + + + ·
Renaturalization	+ + · · ·
Agriculture	· · · · ·
Community Impact	+ + · · ·

e8: Floating solar panels

S M L XL P

Combine floating solar farms with restored wetlands and aquaculture to optimise space, enhance food production and generate renewable energy.

Timeframe	+ + + · ·
Energy	+ + + + ·
Renaturalization	+ + + + ·
Agriculture	· · · · ·
Community Impact	+ · · · ·

e9: Scaling wind power

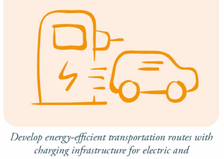
S M L XL P

More coastal wind farms & better energy storage.

Timeframe	+ · · · ·
Energy	+ + + + +
Renaturalization	+ · · · ·
Agriculture	· · · · ·
Community Impact	· · · · ·

e10: E-Mobility corridors

S M L XL P



Develop energy-efficient transportation routes with charging infrastructure for electric and hydrogen-powered vehicles.

Timeframe	+ + · · ·
Energy	+ + + + +
Renaturalization	· · · · ·
Agriculture	+ + · · ·
Community Impact	· · · + +

e11: Adaptive energy infrastructures

S M L XL P

Design energy infrastructure that coexists with ecological restoration, tourism and water management in Zeeland's delta.

Timeframe	+ · · · ·
Energy	+ + + + ·
Renaturalization	+ + + + ·
Agriculture	+ + · · ·
Community Impact	+ + + + +

Integrated Energy

Catalogue of actions

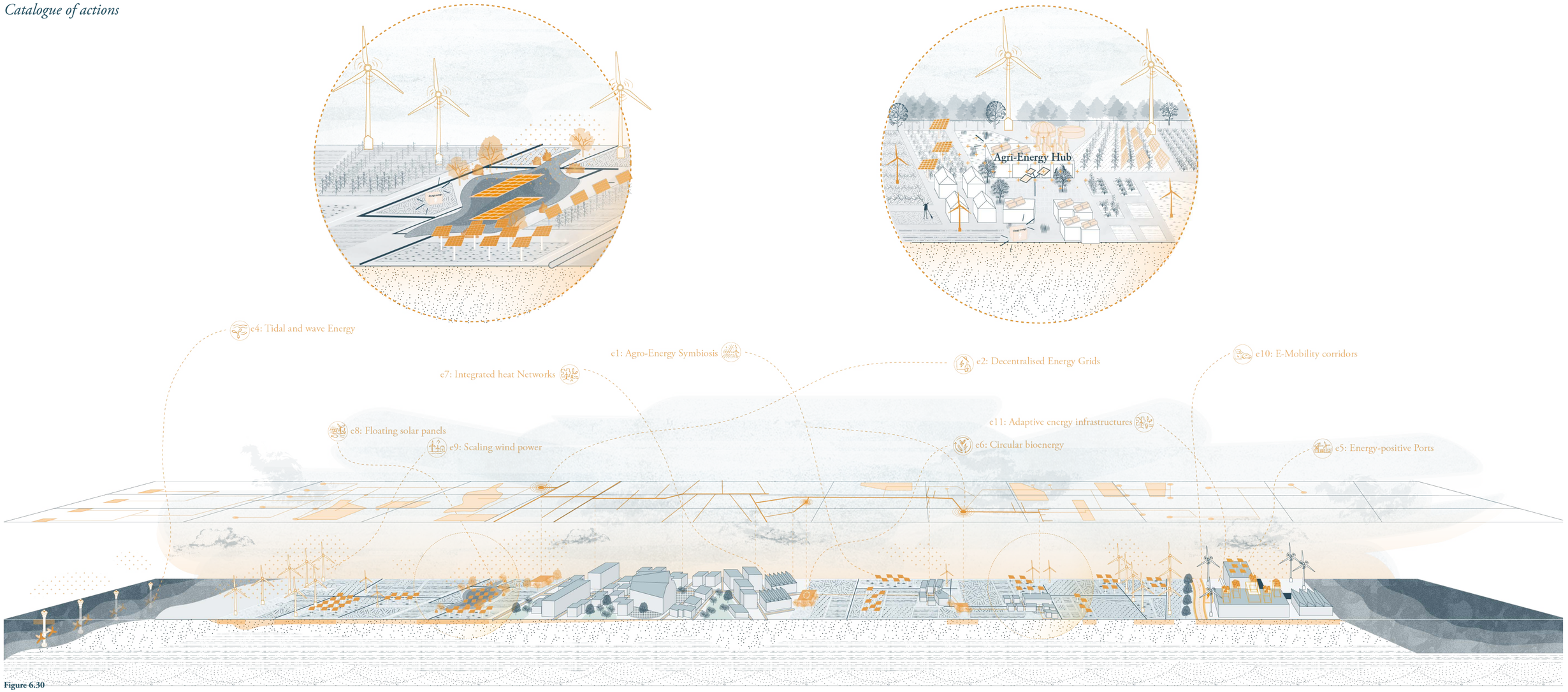


Figure 6.30

Resilient Adaptation

Catalogue of actions

Building landscapes and systems that enhance water management, biodiversity, and climate resilience for the Delta region.

Figure 6.31

r1: Water buffer

S M L XL P

Create retention ponds to store rainwater, reduce flooding, absorb excess water near farmland, and prevent salt intrusion while replenishing groundwater.

Timeframe	+ + · · ·
Energy	· · · · ·
Renaturalization	+ + + + ·
Agriculture	+ + · · ·
Community Impact	+ + + + ·

r2: Wetlands

S M L XL P

Creation of new wetlands, to collect the water in case of flooding, water filtration, salinity control and improve biodiversity.

Timeframe	+ + + + ·
Energy	+ + + + +
Renaturalization	· · · · ·
Agriculture	+ + · · ·
Community Impact	+ + + + +

r3: Underground water storage

S M L XL P

Utilize aquifers and underground reservoirs to store excess rainwater for drought periods and prevent saltwater intrusion.

Timeframe	+ + + · ·
Energy	· · · · ·
Renaturalization	· · · · ·
Agriculture	+ + + + +
Community Impact	+ + + + +

r4: Controlled polders

S M L XL P

In order to manage flooding and enhance natural habitats at agricultural fields.

Timeframe	+ + + · ·
Energy	· · · · ·
Renaturalization	+ + + · ·
Agriculture	+ + + + +
Community Impact	+ + + + ·

r5: Natural dike reinforcement

S M L XL P

Upgrade and reinforce dike systems using nature-based solutions, such as hybrid dikes with tidal marshes, to enhance specific areas we want to protect agianst flooding.

Timeframe	+ + + + ·
Energy	· · · · ·
Renaturalization	+ + + + ·
Agriculture	+ + + + +
Community Impact	+ + + + ·

r6: Floating living spaces:

S M L XL P

Homes, farms, and public spaces to adapt to rising water levels and ensure long-term resilience.

Timeframe	+ + + + +
Energy	· · · · ·
Renaturalization	+ + + + +
Agriculture	+ + + · ·
Community Impact	+ + + + +

r7: Biodiverse planting

S M L XL P

Introduce salt-resistant crops and wetlands to combat, preserve trees and plant drought-resistant species to contribute to resilience, improve soil quality, prevent erosion and regulate water balance.

Timeframe	+ + + · ·
Energy	· · · · ·
Renaturalization	+ + + + +
Agriculture	+ + + + +
Community Impact	+ + + + ·

r8: Planting of seagrass meadows

S M L XL P

Planting of seagrass meadows: to stabilize seabeds and decrease wave strength and protect the coastline.

Timeframe	+ + + · ·
Energy	· · · · ·
Renaturalization	+ + + + +
Agriculture	+ + + · ·
Community Impact	+ + + + ·

r9: Agroforestry

S M L XL P

In order to create wind and water barriers that reduce soil erosion and enhance biodiversity

Timeframe	+ + + · ·
Energy	· · · · ·
Renaturalization	+ + + + +
Agriculture	+ + · · ·
Community Impact	+ + + · ·

r10: Salt marshes and tidal flats

S M L XL P

Creation of salt marshes and tidal flats: to reduce storm surge impact, rewilding also degradeted farmland.

Timeframe	+ + + + ·
Energy	· · · · ·
Renaturalization	+ + + + ·
Agriculture	+ · · · ·
Community Impact	+ · · · ·

r11: Reef cultivation

S M L XL P

Oyster and mussel reef cultivation: to form natural breakwaters that reduce erosion and improve water quality.

Timeframe	+ + + + ·
Energy	+ · · · ·
Renaturalization	+ + + + +
Agriculture	+ · · · ·
Community Impact	+ + + + ·

r12: Strengthening coastal ecosystem

S M L XL P

Expand and restore dune systems, wetlands to naturally protect against storm surges and rising sea levels.

Timeframe	+ + + + +
Energy	· · · · ·
Renaturalization	+ + + + +
Agriculture	+ + + + ·
Community Impact	+ + + + ·

Resilient Adaptation

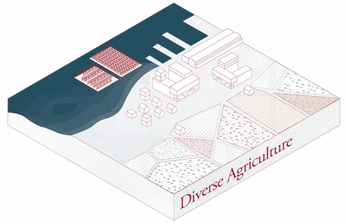
Catalogue of actions

Figure 6.44

Diverse Agriculture

Catalogue of actions

Ambition: A climate-resilient, economically thriving, and ecologically rich agricultural landscape, where regenerative practices, renewable energy, and innovation empower farmers to produce diverse, high-quality food while enhancing soil health, biodiversity, and water security.



a1: Agroecological Farming

S M L XL P

Adopt nature-based farming methods that enhance ecosystem restoration, biodiversity, and resilience against climate change impacts.

Timeframe	+ + + + ·
Energy	+ + · · ·
Renaturalization	+ + + + +
Agriculture	+ + + + +
Community Impact	+ + + · ·

a2: Regenerative soil management

S M L XL P

Use cover crops, crop rotation and minimal tillage to restore soil fertility, enhance carbon sequestration and prevent erosion.

Timeframe	+ + + · ·
Energy	+ + · · ·
Renaturalization	+ + + · ·
Agriculture	+ + + + +
Community Impact	+ + · · ·

a3: Circular farming

S M L XL P

Minimize waste by reusing agricultural bioproducts for composting, animal feed and bioenergy production, closing resource loops.

Timeframe	+ · · · ·
Energy	+ + · · ·
Renaturalization	+ · · · ·
Agriculture	+ + + + +
Community Impact	+ + · · ·

a4: Freshwater retention systems

S M L XL P

Implement innovative water storage and irrigation techniques to secure freshwater availability for crops and livestock.

Timeframe	+ + + + ·
Energy	+ · · · ·
Renaturalization	+ · · · ·
Agriculture	+ + + + +
Community Impact	+ + + · ·

a5: Km Zero food network

S M L XL P

Promote short supply chains, regional, seasonal food markets and farm-to-table initiatives to strengthen local food sovereignty and organic goods.

Timeframe	+ · · · ·
Energy	+ · · · ·
Renaturalization	+ + + · ·
Agriculture	+ · · · ·
Community Impact	+ + + + +

a6: Salt-tolerant agriculture

S M L XL P

Introduction of salt-resistant crops such as potatoes, sugar beets, quinoa, samphire and seaweed. Use bacteria and fungi to enhance plant tolerance to salinity.

Timeframe	+ + · · ·
Energy	+ + · · ·
Renaturalization	+ + · · ·
Agriculture	+ + + + +
Community Impact	+ + + · ·

a7: Algae-based biofuel production

S M L XL P

Cultivating algae in saline water for biofuel and high-value biochemical products

Timeframe	+ + + · ·
Energy	+ + + + +
Renaturalization	+ · · · ·
Agriculture	+ + + + ·
Community Impact	+ + · · ·

a8: Agrivoltaic

S M L XL P

Installing solar panels above crops to generate energy while reducing soil evaporation.

Timeframe	+ + + · ·
Energy	+ + + + +
Renaturalization	+ · · · ·
Agriculture	+ + + + +
Community Impact	+ + + · ·

a9: Small-scale wind turbines

S M L XL P

Small-scale wind turbines integrated into farms for local energy production.

Timeframe	+ + · · ·
Energy	+ + + + +
Renaturalization	· · · · ·
Agriculture	+ + + · ·
Community Impact	+ + + · ·

a10: Smart drainage systems

S M L XL P

Implementation of smart drainage systems to manage water quality and levels based on climate conditions.

Timeframe	+ + + + ·
Energy	· · · · ·
Renaturalization	+ + + · ·
Agriculture	+ + + · ·
Community Impact	+ + · · ·

a11: Floating solar farms

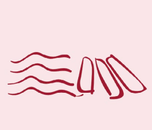
S M L XL P

Floating solar farms on water reservoirs: placing solar panels on water bodies near farms to optimize space and reduce evaporation.

Timeframe	+ + + + ·
Energy	+ + + + +
Renaturalization	+ + + + +
Agriculture	+ · · · ·
Community Impact	+ + + · ·

a12: Tidal farming

S M L XL P



Converting flood-prone areas into sustainable aquaculture zones (mussels, oysters, seaweed).

Timeframe	+ + · · ·
Energy	+ · · · ·
Renaturalization	· · · · ·
Agriculture	+ + + + +
Community Impact	+ + + · ·

a13: Salt marshes

S M L XL P

Conversion of degraded farmland into salt marshes to enhance biodiversity and reduce coastal erosion.

Timeframe	+ + + · ·
Energy	+ · · · ·
Renaturalization	+ + + + +
Agriculture	· · · · ·
Community Impact	+ + · · ·

a14: Made in Zeeland

S M L XL P

Balance price of organic agricultural products on a national level and subsidy farmers that transit to an organic and salt-resilient production.

Timeframe	+ · · · ·
Energy	· · · · ·
Renaturalization	· · · · ·
Agriculture	+ + + + +
Community Impact	+ + + + +

Diverse Agriculture

Catalogue of actions

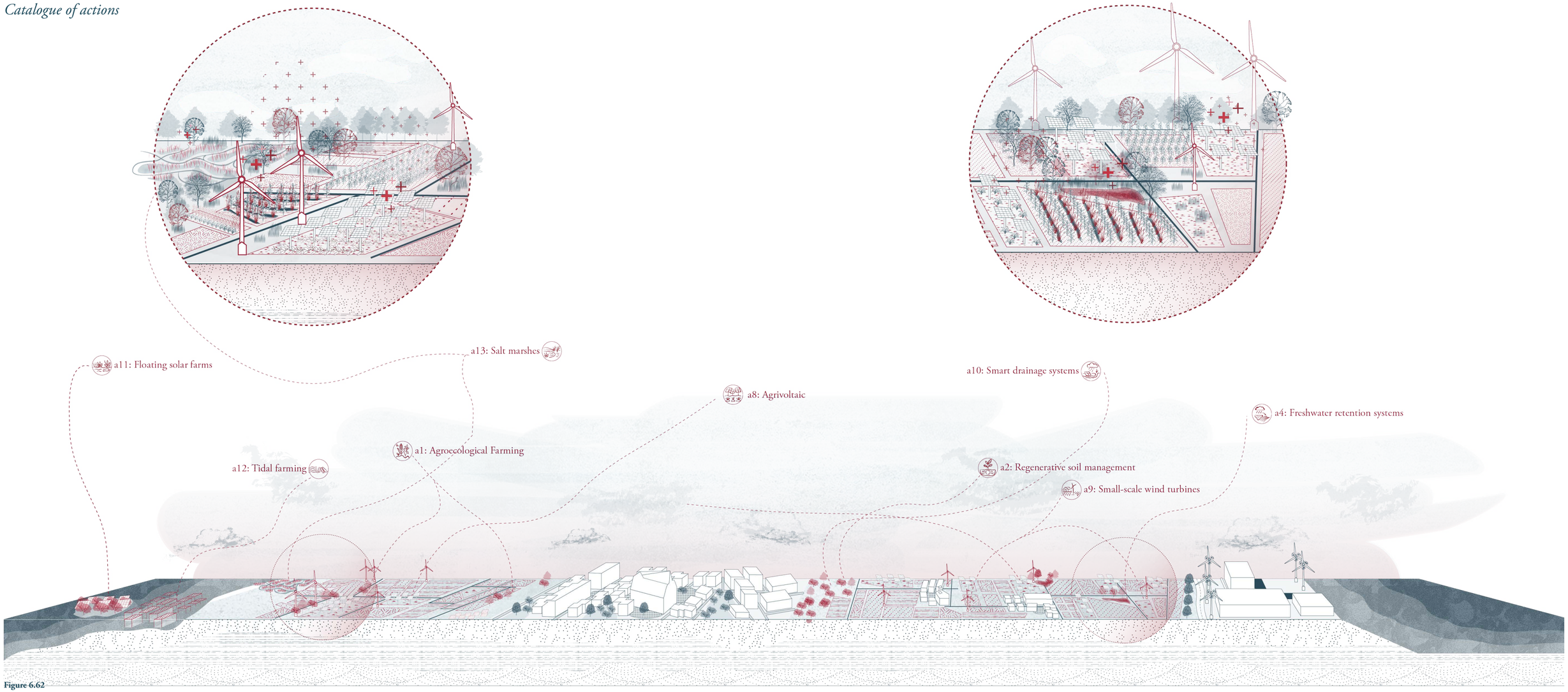


Figure 6.62

Engaged Community

Catalogue of actions

Ambition: A resilient and empowered Zeeland where farmers, residents, and local stakeholders actively shape the region's future through bottom-up participation, shared ownership, and collaborative decision-making—ensuring a just and inclusive energy and agricultural transition that strengthens local identity and prosperity.

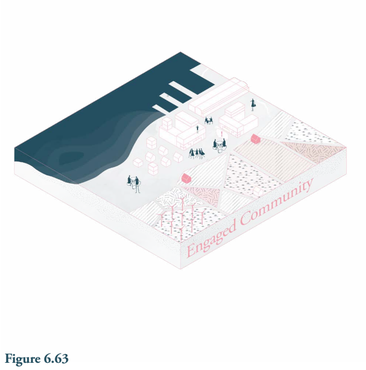


Figure 6.63

c1: Community-led cooperatives

S M L XL P

Enable local farmers and residents to co-own renewable energy projects through cooperatives, ensuring fair benefit sharing and local reinvestment allowing farmers to share costs, equipment, and profits.

Timeframe	+	·	·	·	·
Energy	+	+	+	·	·
Renaturalization	·	·	·	·	·
Agriculture	+	+	+	·	·
Community Impact	+	+	+	+	+

c2: Agri-food & Energy hubs

S M L XL P

Top-down regional hubs and competence centers where farmers, innovators, and citizens collaborate on sustainable food production, energy generation, and knowledge exchange.

Timeframe	+	·	·	·	·
Energy	+	+	+	+	+
Renaturalization	·	·	·	·	·
Agriculture	+	+	·	·	·
Community Impact	+	+	+	+	+

c3: Co-Biogas and Bioenergy

S M L XL P

Activating farmers to work together in order to convert agricultural waste into energy, making farms self-sufficient while providing natural fertilizers.

Timeframe	+	·	·	·	·
Energy	+	+	+	+	·
Renaturalization	+	·	·	·	·
Agriculture	+	+	+	·	·
Community Impact	+	+	+	·	·

c4: Community storage

S M L XL P

Develop community-based energy storage to allow farmers to store excess renewable energy and sell it when demand is high.

Timeframe	+	+	·	·	·
Energy	+	+	+	+	+
Renaturalization	·	·	·	·	·
Agriculture	+	·	·	·	·
Community Impact	+	+	+	+	+

c5: Participatory land use planning

S M L XL P

Integrate bottom-up decision-making where communities actively contribute to spatial planning, balancing agriculture, energy, and nature.

Timeframe	+	+	+	·	·
Energy	+	+	·	·	·
Renaturalization	+	+	·	·	·
Agriculture	+	+	·	·	·
Community Impact	+	+	+	+	+

c6: Government support

S M L XL P

Develop an easier process to access funding, subsidies and tax benefits for community-driven energy and agricultural transition projects.

Timeframe	+	+	·	·	·
Energy	+	+	·	·	·
Renaturalization	·	·	·	·	·
Agriculture	+	+	+	+	·
Community Impact	+	+	+	+	+

c7: Digital participation

S M L XL P

Usage of digital tools to work with farmers and include their opinion and needs in key projects.

Timeframe	+	+	·	·	·
Energy	·	·	·	·	·
Renaturalization	+	·	·	·	·
Agriculture	+	+	+	+	·
Community Impact	+	+	+	+	+

c8: Educational & training programs

S M L XL P

Offer accessible workshops, apprenticeships, and digital tools to empower farmers with the skills needed for sustainable farming and energy production.

Timeframe	+	·	·	·	·
Energy	+	+	+	+	·
Renaturalization	+	·	·	·	·
Agriculture	+	+	+	+	+
Community Impact	+	+	+	+	+

c9: Rural dialogues

S M L XL P

Organise structured, ongoing discussions where local communities can influence policies on energy, food and climate adaptation.

Timeframe	+	·	·	·	·
Energy	+	+	+	·	·
Renaturalization	+	+	+	·	·
Agriculture	+	+	+	+	·
Community Impact	+	+	+	+	+

c10: Retail & restaurant partnerships

S M L XL P

Direct farm-to-market connections with supermarkets, schools and farm-to-table programs, strengthening the local circular economy.

Timeframe	+	·	·	·	·
Energy	·	·	·	·	·
Renaturalization	·	·	·	·	·
Agriculture	+	+	+	+	·
Community Impact	+	+	+	+	+

Engaged Community

Catalogue of actions

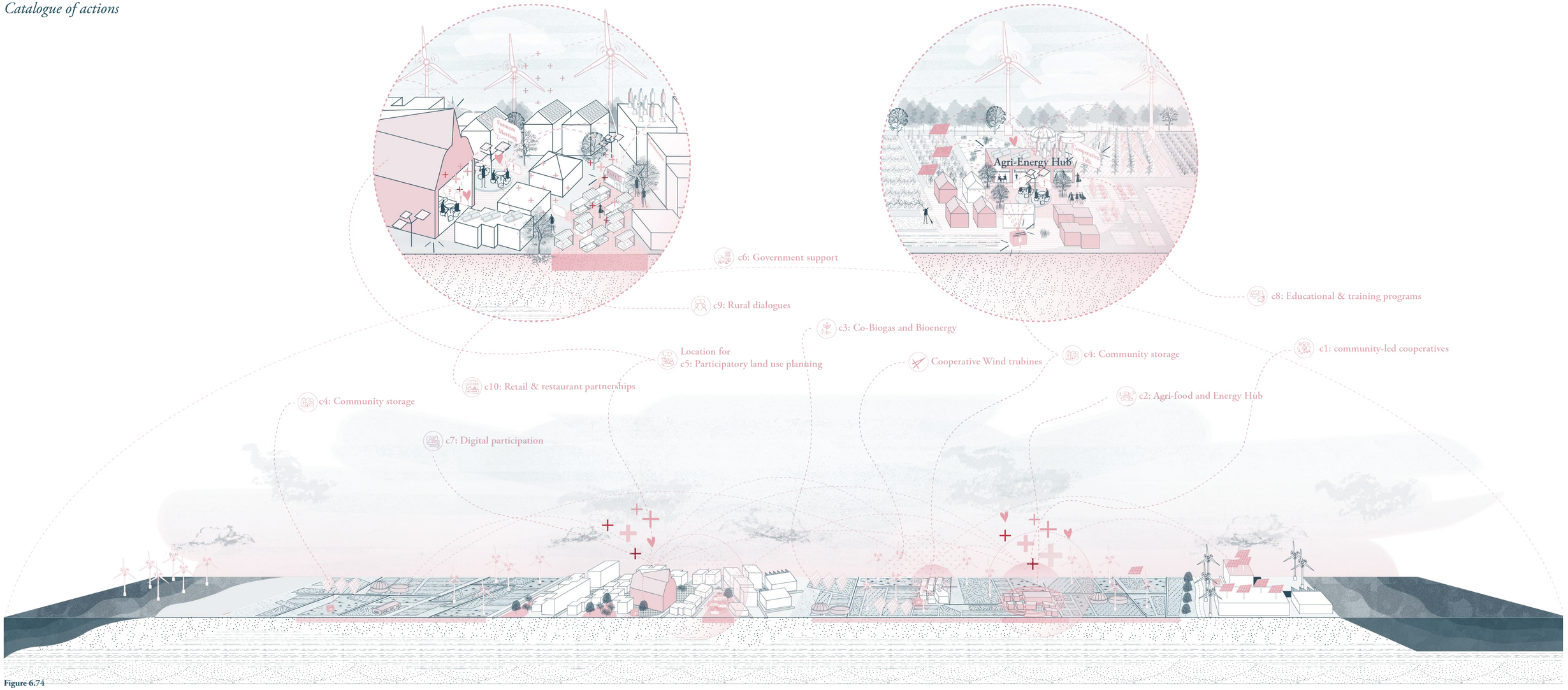


Figure 6.74

What if... *Zeeland's Delta Transformed into a* ***Performative Landscape?***

Action map

The integrated application of the full set of actions outlined in the catalog presented in the previous pages lays the foundation for the development of the third and final scenario: Performative Landscape. The design actions, categorized and organized according to the four specific guidelines, are assessed based on their content and their impact on the farming community, the environment, the renewable energy production system, and their ease of implementation.

The decision to apply these actions within the Performative Landscape vision is based on the information derived from the matrix resulting from the spatial analysis of the agricultural landscape. It aims to balance the shortcomings highlighted in the identity card of each rural cluster by addressing critical issues and leveraging territorial or energy-related potentials.

The result is a complex plan in which each agricultural cluster is assigned a set of design actions, selected with the goal of reactivating the agricultural landscape. These actions aim to provide farming communities with the tools to cooperate in energy production and to adapt carefully to the needs of the Delta landscape.

One or more targeted actions are therefore proposed for each cluster, tailored to the specific characteristics that emerged during the analysis phase. Taken together, these actions form a strategy for the socio-economic and territorial development of each territorial unit over the next 50 years, addressing each one in its specific context and complexity.

The specific characteristics of each area guide the planning process, resulting in a complex and renewed productive landscape. For example, the agricultural area north of Zierikzee becomes a laboratory for experimenting with partnership models between large and small producers. Its potential for solar energy production is harnessed through the implementation of extensive agri-voltaic sectors integrated into the mosaic of fields.

Meanwhile, the plain near Ossenisse becomes the focus of coastal area renaturalization, the implementation of nature-based coastal protection systems, the experimentation with permaculture techniques for high-quality agricultural production, and the installation of new wind turbines co-owned by the farmers who have given up part of their land.

Figure 6.75

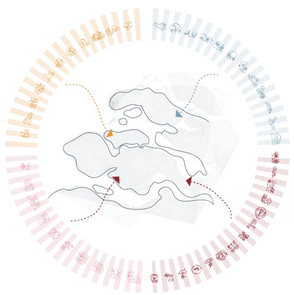


Figure 6.76

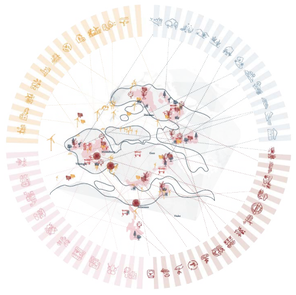


Figure 6.77

- Integrated Energy
- Diverse Agriculture
- Resilient Adaptation
- Shared community infrastructure
- Special areas for community engagement and tourism

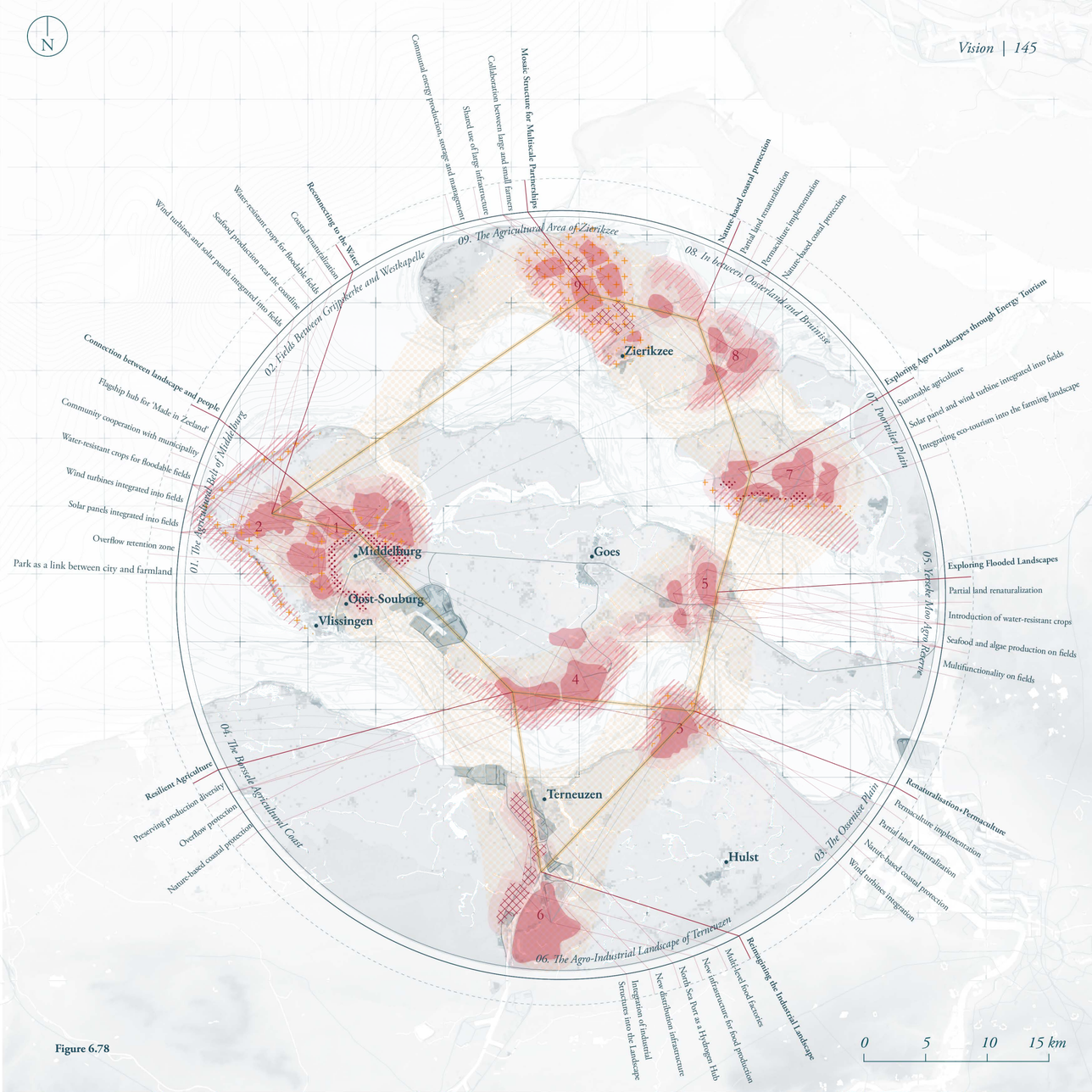


Figure 6.78

Vision 2075: A new Paradigm

Performative Landscape

2075. At the conclusion of the fifty-year timeframe of the second edition of the Performative Landscape vision, it is time to analyze the results of a long-term plan and approach that has strongly shaped the spatial, environmental, and planning policies of the Zeeland province over recent decades.

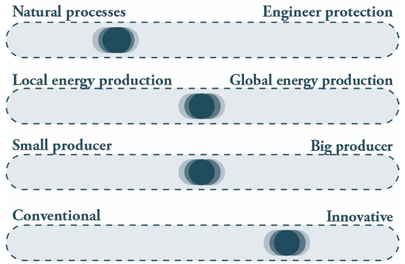
With the opening of a new phase of public review and participation by farming communities, there is a noticeable increase in interest and requests for involvement from several rural communities that were not included in the actions set out in the earlier editions of the plan.

The interventions carried out in the first nine selected agricultural clusters are now well-established, and their success is widely recognized and admired across institutional, academic, and civic spheres. The Zeeland administration is highly satisfied with the proposed model, which has managed to balance the needs of local farming communities with the necessary process of adapting to natural systems, using sustainable energy production as a key tool to revive a sector that many had already considered compromised by 2025. What was once a critical challenge has been transformed into an opportunity for innovation and resilience.

The model, now fully integrated with other planning tools and regional strategies, has contributed significantly to achieving environmental protection and global emissions reduction goals. The agro-energy communities represent an outstanding example of social cooperation, technological integration, and decentralized energy production, propelling Zeeland's economy toward the international export of renewable energy, thanks to its achievement of energy self-sufficiency and long-term sustainability.

Agricultural production in Zeeland has become an area of excellence, with its diverse, high-quality products in demand throughout the country and increasingly beyond its borders. The local economy is now grounded in principles of circularity, innovation, and environmental care, and has successfully halted the depopulation of rural areas. These territories are once again vibrant and inhabited—not only by farmers, but also by a rich biodiversity, urban residents seeking closer ties to the land, and visitors drawn by the renewed identity of Zeeland's rural landscape.

Impact on the community



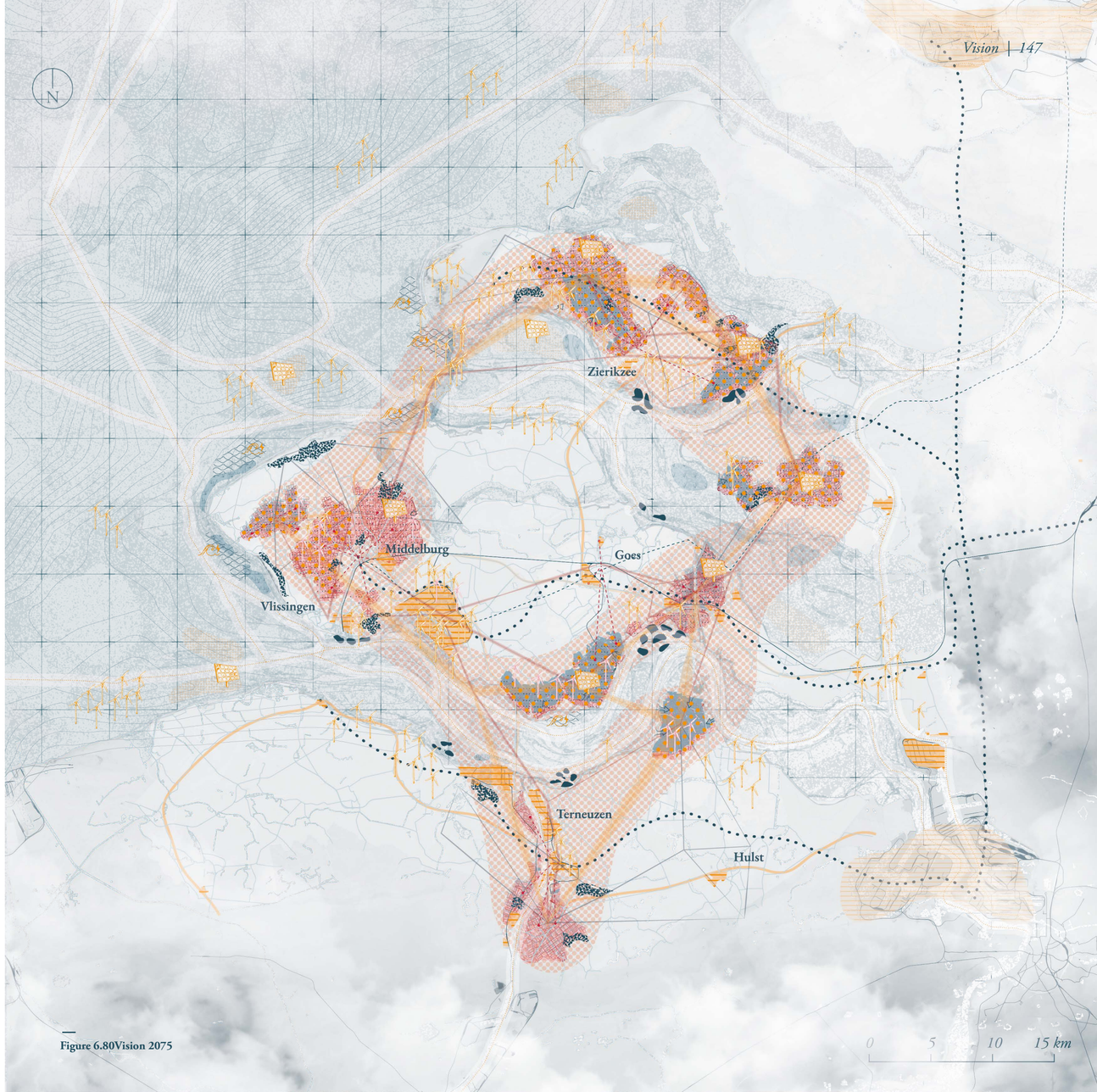


Figure 6.80Vision 2075

The four Layers of Intervention

Performative Landscape

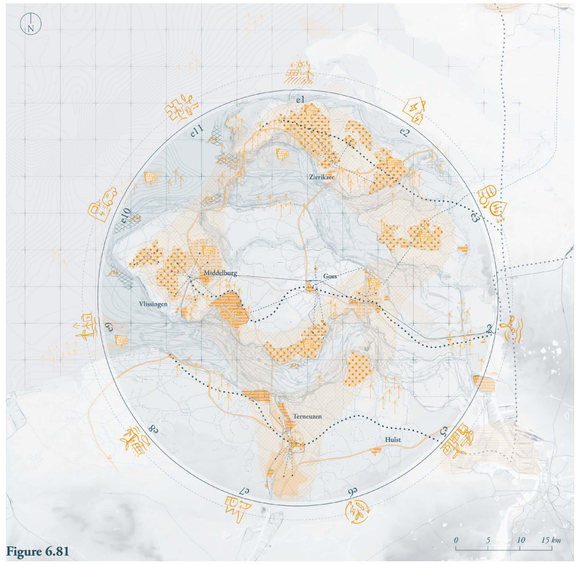


Figure 6.81

Integrated Energy

In the clusters, the most intensive production of renewable energy is concentrated. New connections have been established between the clusters through the development of new energy infrastructure. The existing network has been expanded and upgraded. All clusters are covered by a unified system for energy storage and distribution. Additionally, new types of energy production are being introduced, such as tidal energy.

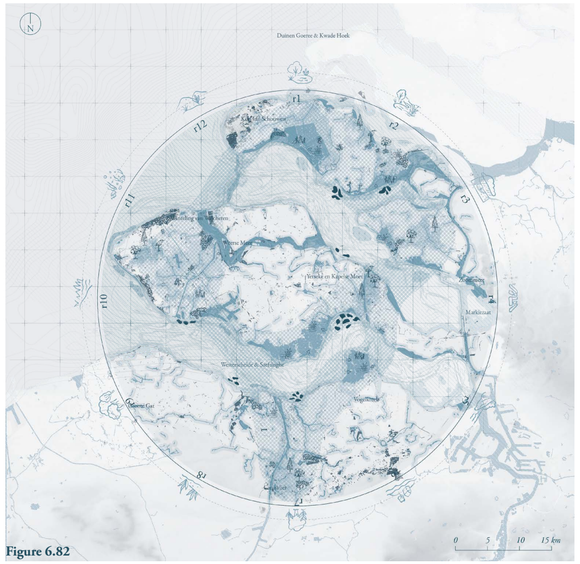


Figure 6.82

Resilient Adaption

More space has been allocated for water. Buffer zones, wetlands, and ponds have been introduced to improve water management. Biodiversity is supported through the planting of salt-tolerant species. Degraded agricultural lands are being renaturalized, with efforts focused on soil restoration and reforestation. Nature-based solutions are applied to reinforce the coastline.

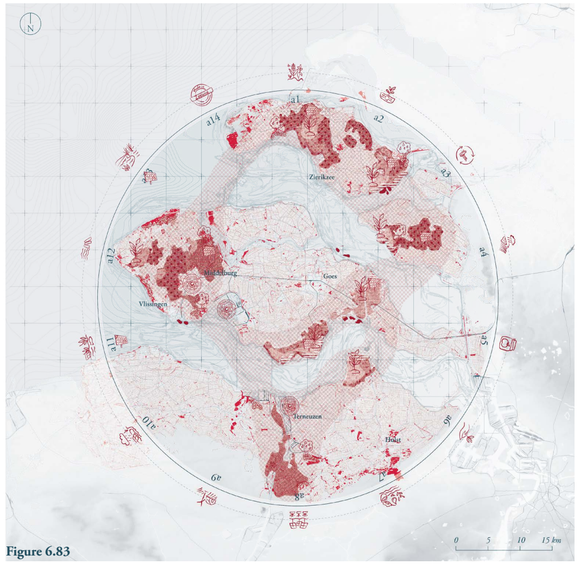


Figure 6.83

Diverse Agriculture

Implementation of new sustainable solutions on agricultural land, including the introduction of resilient crop types and plant species, such as salt-tolerant varieties. Promoting principles of smart and sustainable local production and consumption. Integrated energy solutions are introduced into agricultural areas, including the production of biofuels.

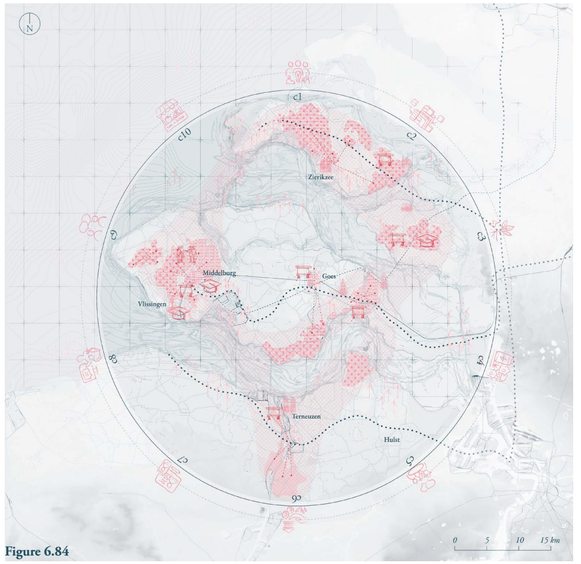


Figure 6.84

Engaged Community

Enhance community engagement within the proposed clusters by fostering the creation of local cooperatives. Promote the shared use of infrastructure and machinery, and establish collective systems for energy storage and distribution. Develop a network of informational and educational hubs for the local community - spaces for meetings, knowledge exchange, and collaboration.

*Legends can be found in the appendix

A Selection of best Practices

Overlapping scenarios

First Scenario - Overproduction

This scenario involves maximizing all possible types of production, including both energy production and agricultural output, by fully utilizing the potential of the area in question. In this scenario, we focus on meeting market demands at all costs, while ignoring the needs of the planet and the environment. The desires and needs of local communities are also overlooked. As a result, we lose our specific farming community, as intensive production leads to the loss of agricultural land.

Second Scenario - Degrowth

This scenario focuses on the maximum possible renaturalization of land, dedicating a large part of the area to the restoration of ecosystems, water bodies, and the biosphere, as well as soil restoration. The main emphasis is on the needs of the planet and ecosystems. Consumption is minimized, and production becomes more localized. However, this scenario is unlikely to meet the interests of society and the economy, as it involves significant losses of agricultural land, making it unrealistic for both local residents and the state. In this scenario, we also lose our specific farming community, as agricultural fields are significantly reduced.

Third Scenario - Performative Landscape

This scenario combines the positive solutions and practices from the first two scenarios while removing the controversial and extreme measures. Areas at high risk of flooding or salinization are subject to renaturalization, while valuable agricultural lands are preserved. For regions with significant renewable energy potential, the installation of wind turbines and solar panels is proposed. The infrastructure for energy production is integrated into open agricultural spaces, allowing for the most efficient use of land. In this scenario, a balance is achieved: nature is given more space, the farming community is preserved and supported.

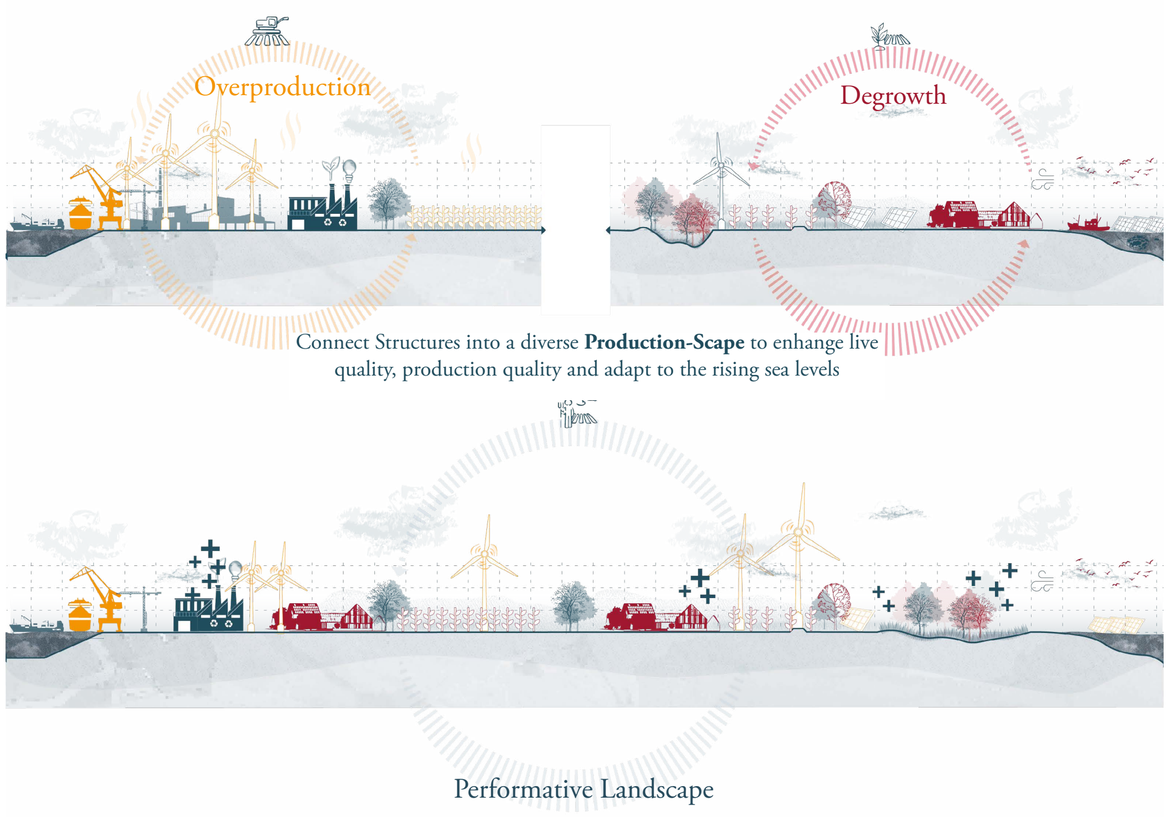


Figure 6.5 Scenario 3 explanation

Performative Landscape Timeline

A long-term vision

Performative Landscape is a complex project that aims to propose a new paradigm for the landscape and agricultural communities of Zeeland, offering an open, long-term, if not very long-term, vision.
For this vision, understood as a planning document and urban regulation, one can imagine a detailed evolution over the next 50 to 75 years. It is important to emphasize, as a premise, that the projects outlined are not fixed and standardized, but flexible and ready to adapt depending on the results of the participation and co-design processes.

Performative Landscape has the significant characteristic of being a long-term plan, a tool capable of providing a clear and stable legislative and urban framework for the agricultural community, seeking to counteract the negative practice of frequent and continuous legislative changes currently in place. Its application is imagined within a 5-year window designed for co-designing the final plan with the communities, with a minimum duration of 20 years, up until 2050, when the drafting of the second version of the plan will begin.

The three different editions of the plans envisioned for the next 75 years are linked to an ongoing process of listening and empowering the agricultural community, which takes place in different phases and with varying levels of intensity (e.g., Knowledge, engagement, etc.). Each edition is associated with a phase for the evolution and activation of Performative Landscape, along with relevant flagship or key projects, which serve as pilot projects and drivers to mobilize the activation of the entire socio-territorial fabric.

Alongside the design actions on the agricultural clusters, interventions in the legislative and/or energy sectors are developed in parallel. These serve as supplementary projects and allow for a broader and more comprehensive approach to the interests of various stakeholders.

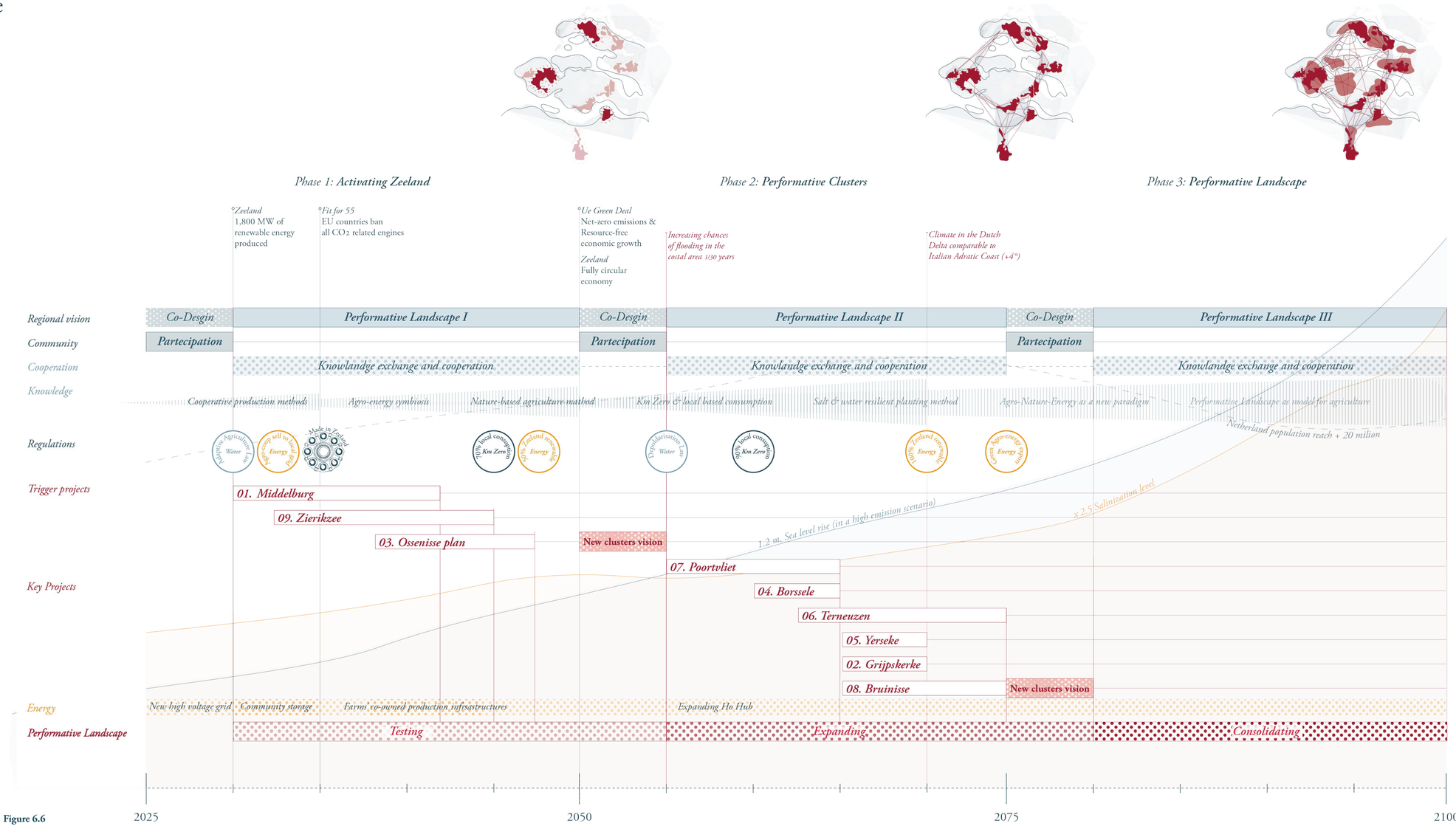


Figure 6.6

Implementation in Policies and Governance

Policy framework

Performative Landscape aspires to function as a comprehensive urban planning framework for the development of Zeeland's agricultural territory. It is conceived as a plan that can be elaborated upon, adopted, and adapted in the future by local authorities.

The proposal combines a traditionally top-down planning approach with the principles of listening, inclusion, and participation of local communities. It results from an integrated approach which, if properly developed, could become a vital tool for territorial development in Zeeland.

To ensure its proper implementation and long-term feasibility, the plan aligns itself with key spatial governance instruments, both from a political-legislative and urban planning perspective. Reflecting its ecological and innovative ambition, the plan clearly supports the majority of the Sustainable Development Goals (SDGs), as well as the principles set out in the European Green Deal.

At the national level, the plan is also consistent with Dutch energy and land management policies, including the objectives and targets of the Klimaatwet. It respects the goals for sustainable energy production and the ambitions related to water management and climate change adaptation.

At the regional scale, the plan aligns with Zeeland's Regional Energy Strategy (RES), particularly with the ambition to produce 1800 MW by 2030, and reinforces the longer-term goals for 2050.

From a planning perspective, the plan is positioned in line with the existing regional spatial vision of Zeeland and fits within the hierarchy of spatial planning instruments. It incorporates and integrates the directions set by both the National Spatial Strategy (NOVI) and the regional vision, with a particular focus on the future of the regional agricultural landscape.

This vision, developed through a complex and participatory process, is intended to serve as a guiding framework to which individual municipal plans should align, adapting their forecasts and strategies accordingly. At the same time, it is also a tool that any planner or local citizen can adopt to propose forward-thinking policies in land governance, climate adaptation, and renewable energy production.

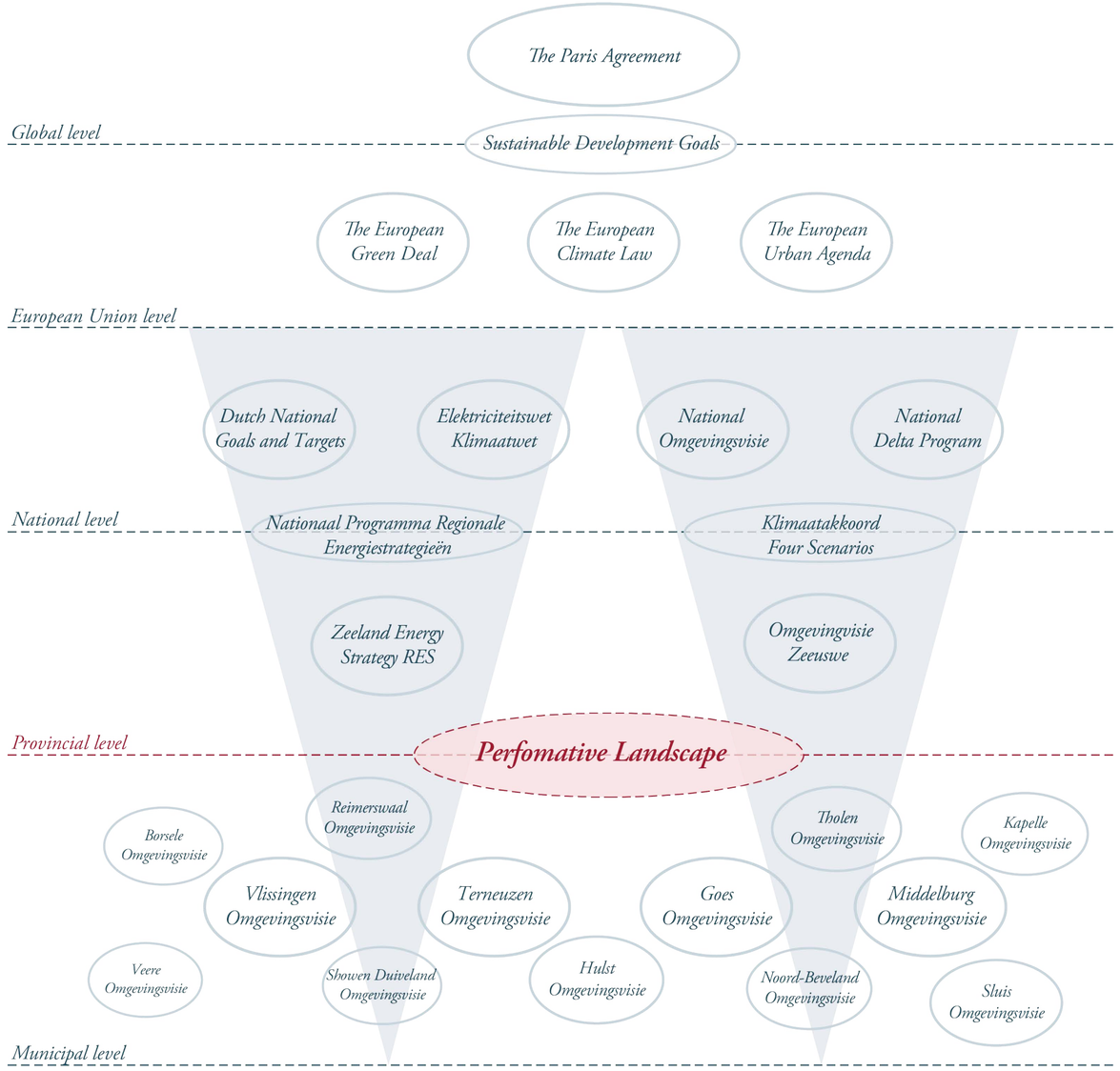


Figure 6.9

A Vision based on the the Community‘s Needs

Participation strategy

The Performative Landscape vision is not only a spatial-strategic model, but also a social negoti-ation process that is inconceivable without the active participation of the local population and relevant stakeholders. For this reason, a comprehensive participatory process structured in se-veral phases will be initiated in the first five years of the twenty-year vision. The aim is to shape the trans-formation not by ignoring the people, but together with them - based on their know-ledge, their needs and the reality of their lives.

Phase 1: Local knowledge as a key resource

In the first phase, the focus is on collecting, correcting and supplementing input data that will serve as the basis for the subsequent multi-criteria analysis and cluster profiling. While existing geographic and structural data is often incomplete or outdated, local residents and stakeholders have valuable everyday knowledge about landscape use, path networks, water dynamics and social interdependencies. This knowledge is systematically col-lected in workshops with key people and integrated into the digital mapping.
This creates a more precise picture of the landscape needs, marked needs and community needs of the indivi-dual clusters. The aim is a corrected, classified route net-work that not only depicts functional but also perceived spaces - and thus provides the actual basis for subsequent spatial decisions.

Phase 2: Design with the community

Based on the cluster profiles developed, the dialog on the specific options for action begins in phase 2. This is where farmers in particular come into focus as central actors: targeted participation formats - digital and analog - give them the opportunity to give their assessment of the proposed action cards.
Using tools such as an interactive online app, they can indicate which measures appear feasible for them, such as the willingness to grow salt-tolerant crops or integrate agrivoltaics. In a second step, details such as the neces-sary machinery, expertise, area or desired government support are clarified together.
This approach enables a transparent, cooperative trans-formation in which farms are not forced to make short-term adjustments, but can act as co-creators of their own future. Participation creates space for trust, promotes planning security and strengthens the local ability to act in the face of global challenges such as climate change and the energy transition.

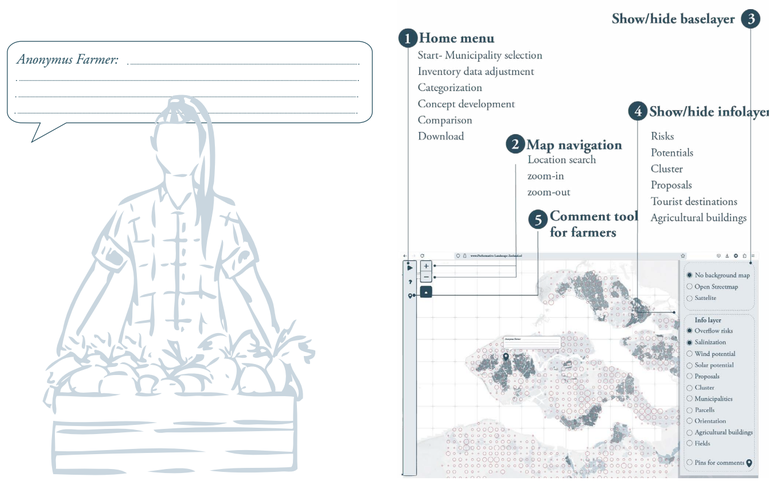


Figure 6.7

Figure 6.8 Participation

From Flows to Circles

Renewed regional flows

Zeeland's delta is undergoing a structural reconfiguration of its metabolic flows. Energy, food, materials, and labor now move through increasingly complex, overlapping systems that challenge conventional sectoral and spatial divisions. The interdependencies between production, storage, distribution, and consumption are no longer linear, but shaped by dynamic structures. This shift marks a transition from static, sector-bound economies toward multifunctional landscapes.

Production no longer occurs in isolated zones. Energy is harvested across agricultural land, rooftops, and coastlines; food is processed and consumed increasingly closer to its point of origin.

Storage and distribution are key elements in how Zeeland's food and energy systems operate, but their role is changing. In the past, large-scale production often required extensive storage: cold rooms for perishable goods, or energy buffers to manage fluctuations. But with the shift toward seasonal harvesting, climate-adapted crops, and local consumption patterns, the need for long-term storage is gradually being reduced.

New farming approaches embrace what the land and season naturally offer, which leads to shorter supply chains and more direct links between producers and consumers. This doesn't just simplify logistics, it also reduces energy demand for storage and cooling, especially in food systems.

As a result, the focus moves away from building more storage and toward developing smarter, more flexible distribution networks. These systems prioritize regional flows, real-time coordination, and direct delivery. The goal is not to store more, but to move better: aligning production and consumption through timing, geography, and collaboration.

Agro-energy systems, combined land uses, and co-located infrastructure challenge the legacy of mono-functional zoning. Where formerly production, processing, and distribution occurred in discrete steps and zones, they are now increasingly co-located, blurred, or circular. Organic waste is revalorized into biogas; residual heat is redirected to nearby facilities; harvested crops support not only food chains but bio-based energy or material production.

The emerging Performative Landscape thus operates not through static land-use categories but through evolving flow relations. Its effectiveness depends on the ability to choreograph these flows - across ownership structures, temporalities, and value systems - into shared and resilient spatial futures.

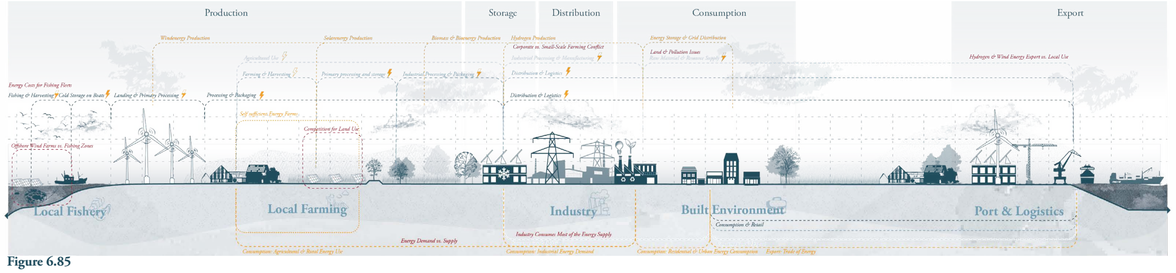


Figure 6.85

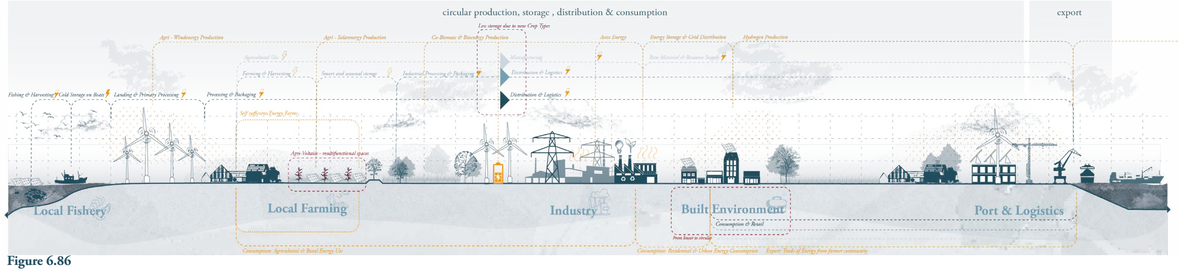


Figure 6.86

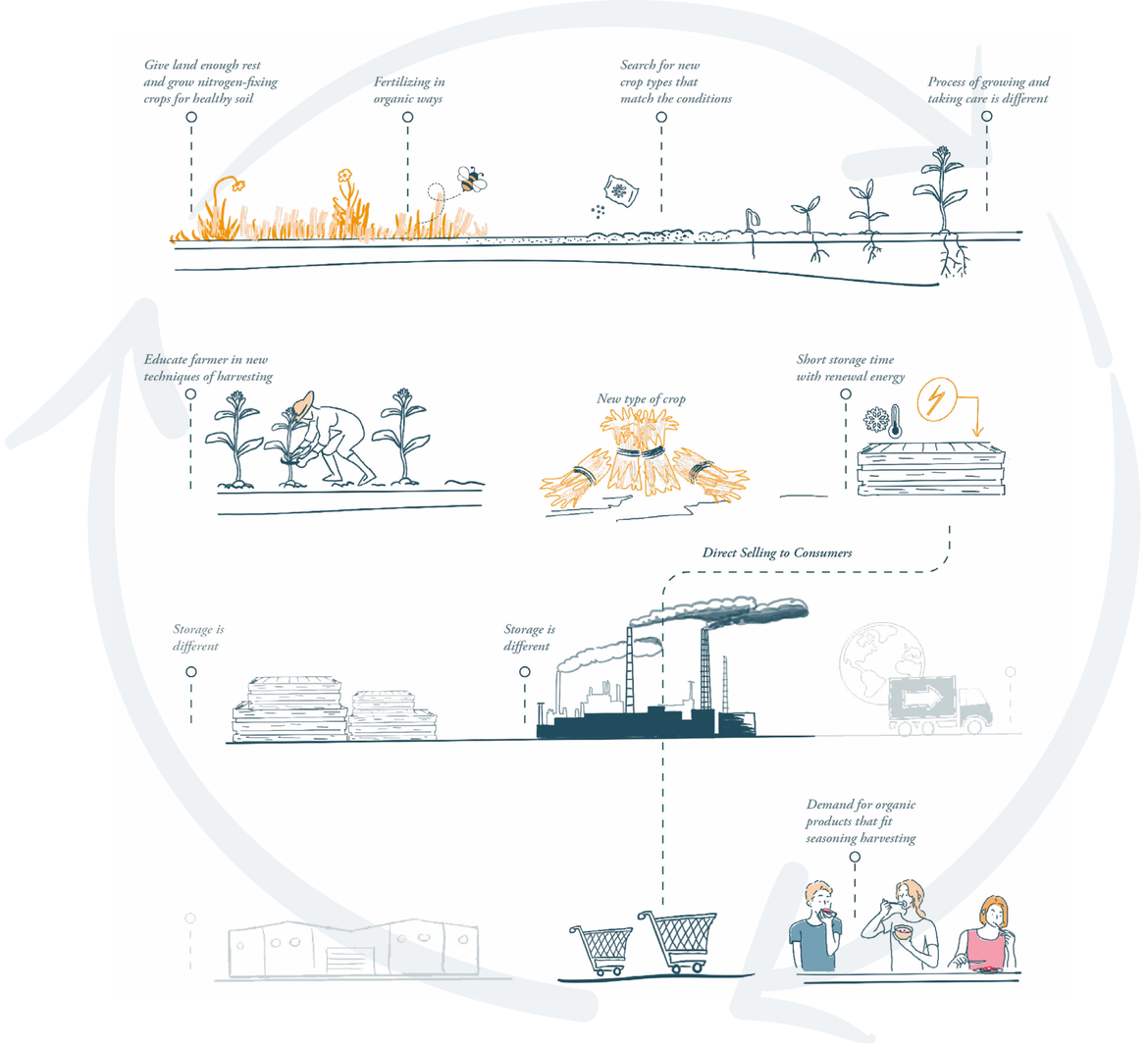
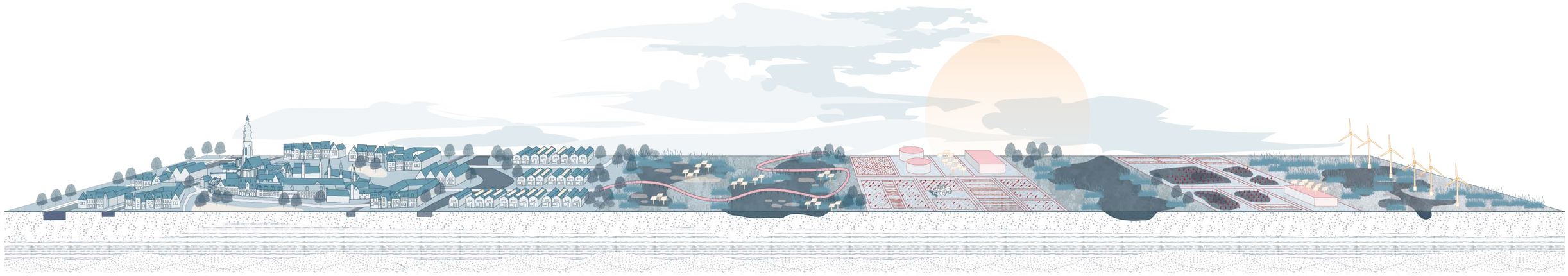


Figure 6.86



Performative Landscape

A new framework of agriculture that combines renewable energy and local food production with landscape preservation. It maximizes productivity while ensuring the health of the environment and local communities, especially local farmers.

Figure 6.88

Chapter 7

Case-study: Middleburg

From vision to practice: testing the Performative Landscape

Performative Middelburg

Strategic vision

The Middelburg site was selected as an exemplary case study and trigger project in order to place the appropriate action cards in a specific spatial context. This location is particularly suitable for prototypical implementation, as a large number of measures from the four central fields of action - Integrated Energy, Resilient Adaptation, Diverse Agriculture and Engaged Community - are applied here in a spatially concentrated manner.
Middelburg is therefore the first cluster to be transformed - a space in which the Performative Landscape can be experienced as a new model for the development of the Zeeland landscape. Due to its location close to Zeeland's largest city and its diverse landscape and infrastructure, Middelburg offers ideal conditions for implementation as a test and learning space. The findings from this pilot project serve as a blueprint for scaling up to other clusters within the Delta region - and beyond in the long term.

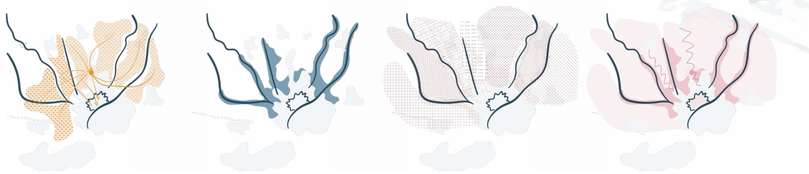
The city is characterized by a functional interweaving of urban, agricultural and landscape structures. The planned Performative Park acts as a spatial interface between the urban center of Middelburg, the surrounding agricultural land and the water landscape of the delta. In this hybrid space, residents, political actors, farmers, local initiatives and tourists come together - connected by the central elements of energy, agricultural and climate transformation.

The case study is highly relevant for the transformation of Zeeland towards a resilient, productive and inclusive cultural landscape that combines regional identity, nature-based experience and local value creation.
In the area of integrated energy, measures such as floating solar and agri-photovoltaics enable multifunctional use of the landscape in which energy generation is directly linked to agricultural production. Energy-positive infrastructures such as the Community Hub make local supply visible and tangible.

The Resilient Adaptation category is covered by nature-based solutions such as Constructed Wetlands and Controlled Polders. They increase the landscape's ability to adapt to climate risks and at the same time create valuable ecological and social open spaces.

Sustainable forms of production such as salt-resistant crops and agrovoltaics are being introduced in the Diverse Agriculture Zone. They strengthen agricultural resilience and promote synergies between production, energy and the environment.

The Engaged Community area focuses on participatory processes, educational landscapes and social infrastructure. The Community Hub and Agri-Food & Energy Hubs connect people with place, production and nature - creating a new, collective identity.



Integrated Energy *Resilient Adaptation* *Diverse Agriculture* *Engaged Community*

Figure 7.1 Guidelines scheme

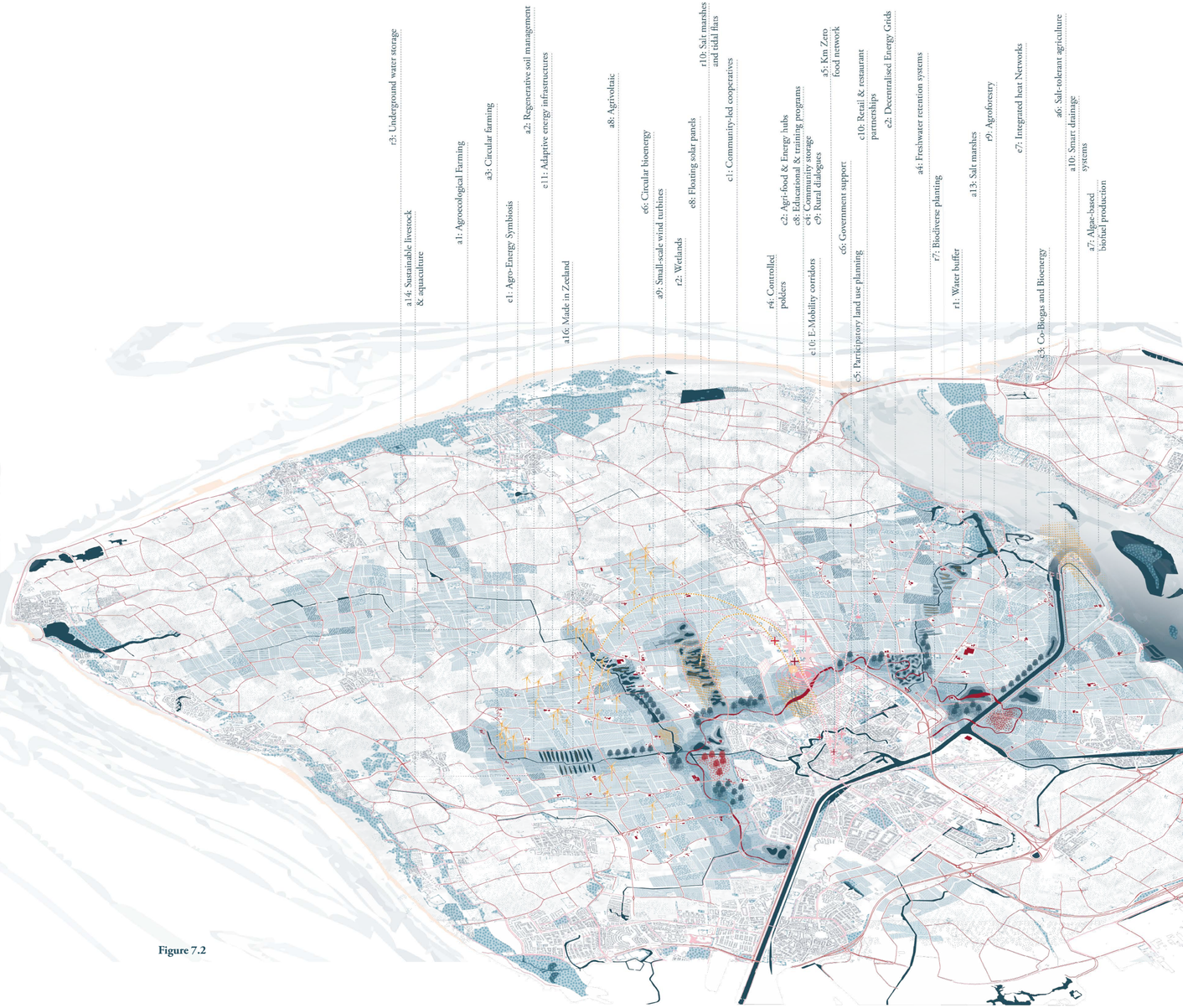
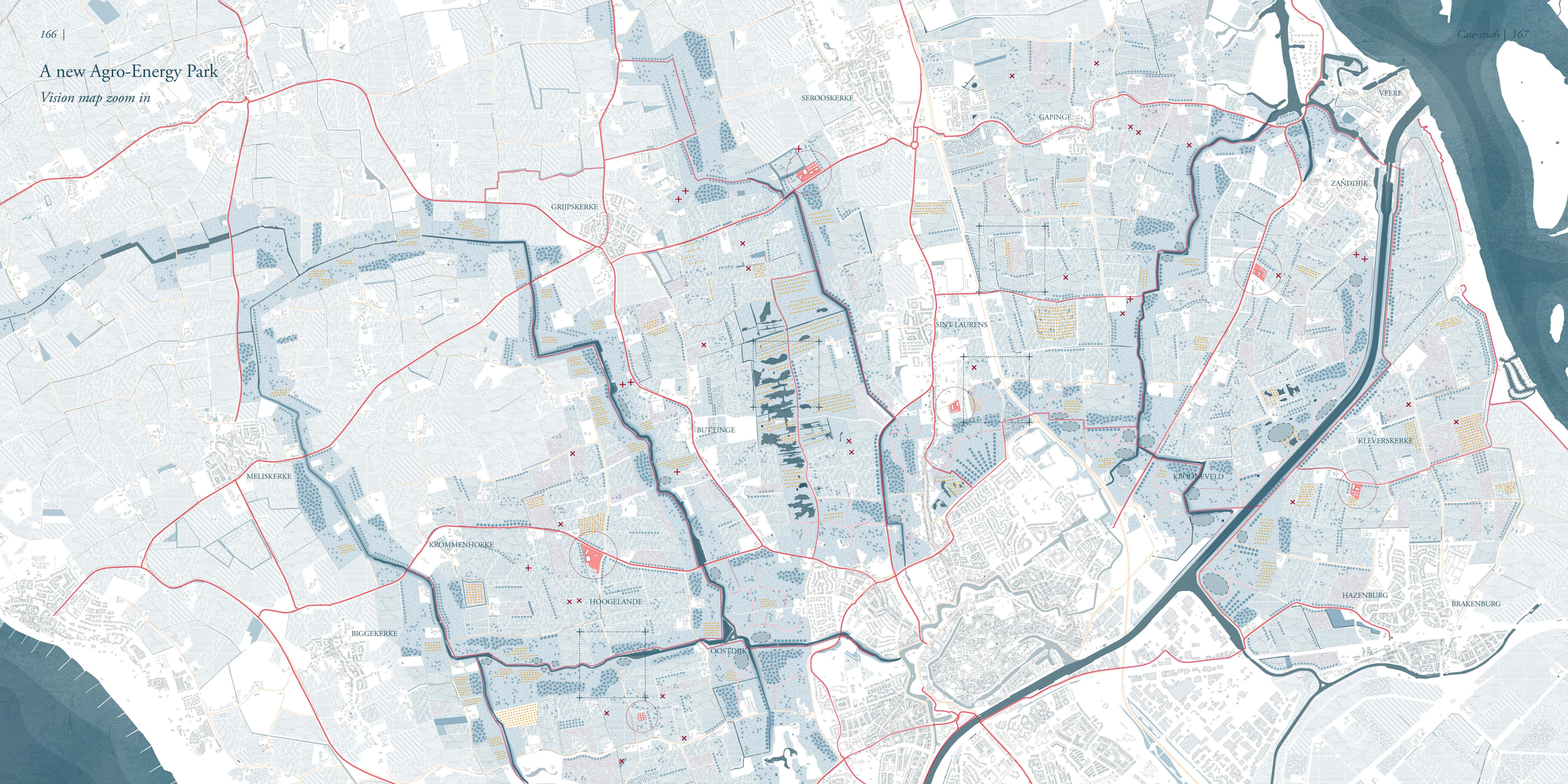


Figure 7.2

A new Agro-Energy Park

Vision map zoom in



4 Layers of Intervention

Vision Map

Figure 7.4

A landscape infrastructure for water management

The transformation of the Middelburg cluster into the first active example of a Performative Landscape is marked by a key intervention in water management and hydraulic risk mitigation.
The design of the new landscape begins with the implementation of renaturalization measures along the main rivers and canals that cross the area. A buffer zone surrounds and forms the foundation of the Blue Rays, becoming more prominent around the city's edge.
Here, newly designed retention basins, intended to store excess water and prevent the risk of looping, are integrated into the agricultural park. These basins serve as water storage systems during the summer months and act as drivers of biodiversity throughout the year.

Figure 7.5

A new productive energy landscape

The transformation of the Middelburg cluster is an energy project. Of a transition not only towards renewable energy, but also from a traditional agricultural production model to an integrated system of symbiosis between agriculture and energy.
Within the renaturalized areas, nine solar energy infrastructures and several wind turbines are strategically located. Across the agricultural landscape, regenerative agrivoltaics is introduced, where low-quality farmland is converted into solar parks, while productive farmland is dotted with small to medium-scale community wind turbines.
Community hubs act as catalysts for cooperative energy production, incorporating innovative community storage systems and enabling direct energy sales to the residents of Middelburg.

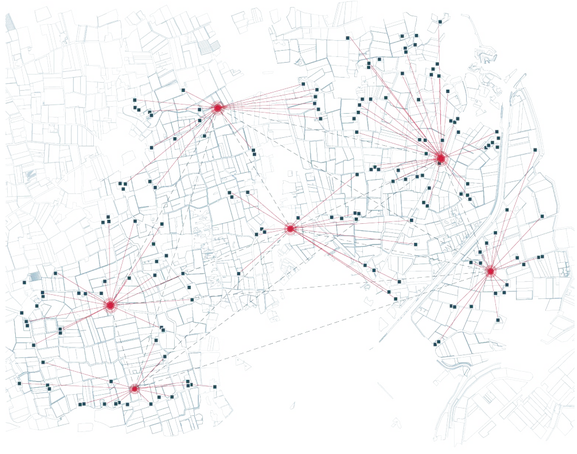


Figure 7.6

A collaborative project

The transformation of the Middelburg cluster is fundamentally a community project, aimed at building a cooperative network of agricultural producers, energy providers, and citizens. It takes shape across the territory with the goal of empowering local farming communities and positioning them as active players in the energy and landscape transition.
The presence of the community hubs -Farm 2.0- serves as both a social catalyst and a structuring element within Middelburg's fabric. These hubs provide spaces for gathering, knowledge exchange, cooperation, commerce, and community-based storage of both energy and agricultural products.
Farms 2.0 act as the core of the different agricultural zones, becoming key tools to activate the territory and engage local communities in a regenerative and sustainable future.

Figure 7.7

A new agricultural park for Middelburg

he transformation of the Middelburg cluster is a public space project. The creation of a large agricultural park that revitalizes and enhances a high-quality yet currently undervalued landscape, returning it to the citizens.
The project is rooted in the renaturalization of the Blue Rays and the green belt surrounding the urban edges. Within this framework, alongside energy infrastructures, there are also spaces for sports, leisure, and wetlands of significant landscape value.
In parallel with the park, a new network of slow mobility paths is developed across the agricultural territory. These paths allow people to access key areas at a relaxed pace, fostering both enjoyment of the landscape and stronger connections within the community. The regeneration of the agricultural landscape becomes a driving force for the development of a new territorial identityo that responds to the needs of both residents and visitors.

Winter: a Sponge and Productive Landscape

A seasonal project

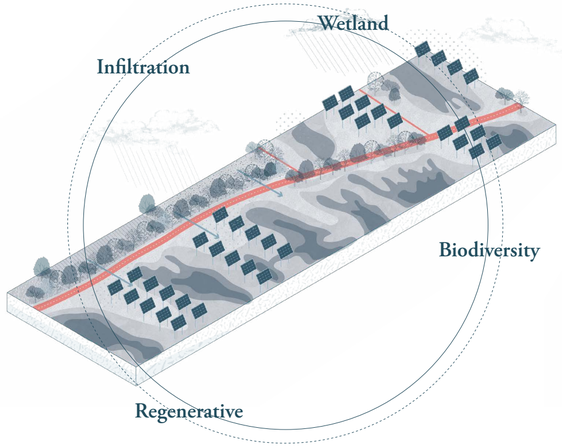


Figure 7.8

01. Restored energetic wetlands

The wetlands collect excess water from the agricultural landscape. Solar energy production is low, but biodiversity levels are high. Human presence is limited to workers and sports enthusiasts.

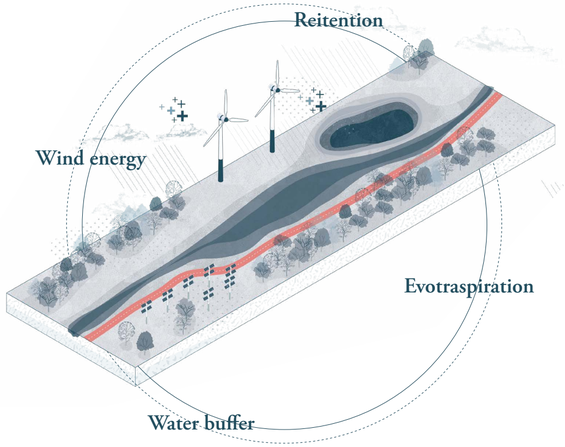


Figure 7.10

02. The Blue Rays

The rewilded riverbed hosts a wet and rich ecosystem. The retention basin is full and protects against flooding caused by heavy rainfall. The woodland areas help manage the rainfall, while the turbines operate at full capacity.

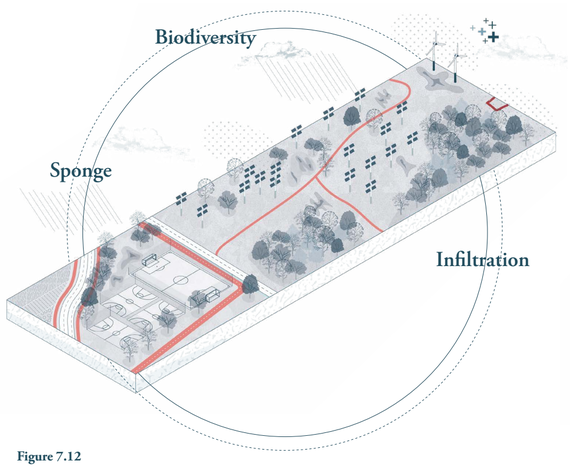


Figure 7.12

03. The agro-energetic park

The new green belt in Middelburg hosts sports areas that are active year-round, while the park areas have limited foot traffic. The natural areas promote infiltration, as do the rain gardens. The wind turbines harness the power of the wind.

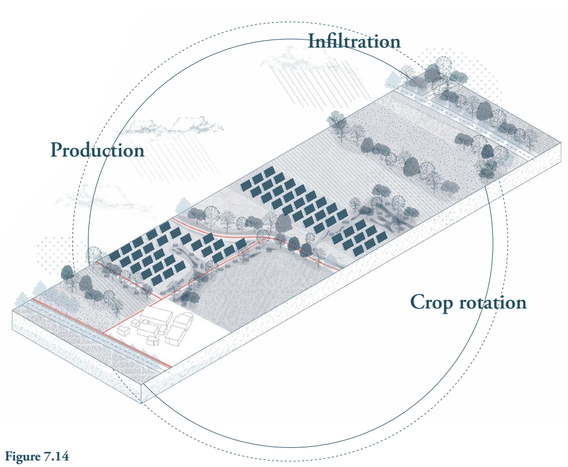


Figure 7.14

04. New productive landscape

The agricultural landscape hosts various new functions, with linear natural systems helping to collect rainwater. Beneath the solar panels, useful productions for biomass and animal feed are developed.

Summer: an Attractive and Productive Landscape

A seasonal project

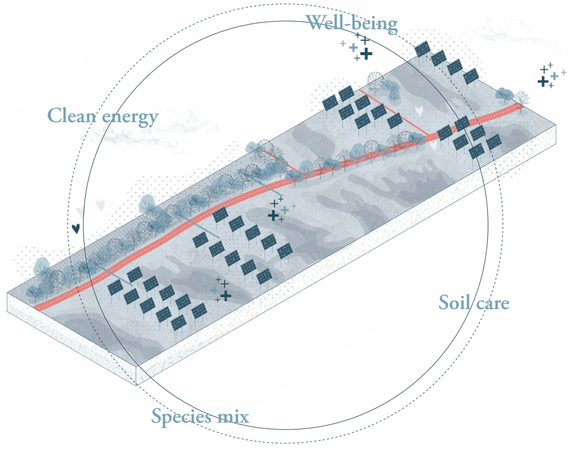


Figure 7.16

01. Restored energetic wetlands

The wetlands return water to the fields, solar energy production is maximized, and biodiversity levels remain high. The area becomes a popular destination for citizens for walking, picnics, and outdoor activities.

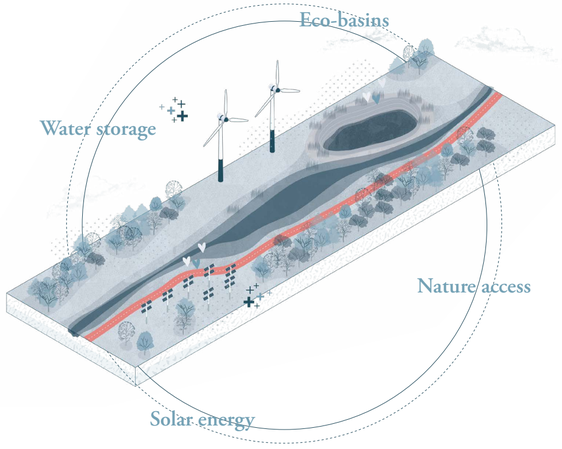


Figure 7.18

02. The Blue Rays

The blue zones are rich in biodiversity, the retention basin now returns water for agricultural production while simultaneously providing a thriving environment for flora and fauna. The tree cover and park areas attract tourists and local residents, while the photovoltaic systems optimize energy production.

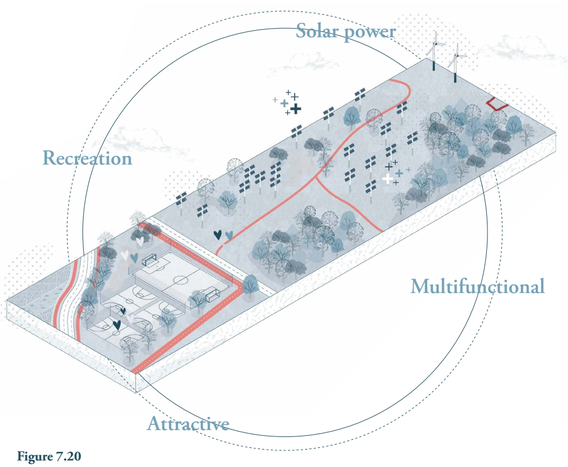


Figure 7.20

03. The agro-energetic park

The park is extremely popular with local communities for sports, events, and personal enjoyment. The connections open up the agricultural landscape to both people and wildlife, while the solar panels harness the power of the sun.

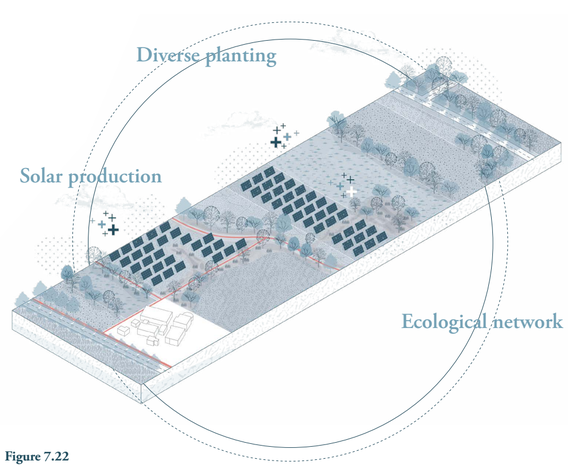


Figure 7.22

04. New productive landscape

The new agricultural fields optimize production, as do the fields that follow seasonal patterns. The linear natural systems are now dry and provide an ideal environment for walking and outdoor activities.

An Environmentally positive Branding Strategy

Made in Zeeland

Label to give farmers certainty for the future

Roquefort, Champagne, Parma Ham, and Parmigiano Reggiano – these are all famous products, made possible through formal Geographical Indication (GI) status. Once a product obtains GI status, its name becomes legally protected, meaning only producers from the specific region can use that name for the product. This provides economic stability and gives a boost to agricultural production in a given area, something Zeeland farmers having a pressing need for this. However, getting GI status is not easy; the product must go through a rigorous selection process. Only if the methods are approved, the product is officially registered at the European level and can be marketed as a premium product.

To achieve GI protection, products need to have unique characteristics, traditional production methods, and a clear connection to the region. These methods are in core not sustainable since they are not adapting to the characteristics of the area. Certainly in a area like Zeeland, with its changing conditions of the Delta, a certain brand should be find in a more sensitive approach to the environment. Recognizing the need for sustainable agricultural methods that align with the region's shifting landscape, the idea of creating a new type of label emerged.

A Zeeland specific label

The brand of MADE IN ZEELAND includes three main pillars:

- **Quality**; first off al again the product itself should be tasty, healthy and in general be a quality product.
- **Sustainable**; the production should be organic produced by only using renewal energy, or the production of renewal energy itself.
- **Local sensitive**; is the base for any type of production in which the changing conditions of the Delta should be central

In this way the production will be contributing to the regional identity and can be profitable and sustainable for coming generations van zowel de boeren als alle andere gebruikers van het landschap.

The brand will boost the local economy, providing farmers with more stability and certainty in their income, profitability, and investment decisions. By focusing on local sensitivity, the type of production will automaticly suit its conditions allowing major adjustments to occur naturally in the process. Giving the boost and the sensitive approach, farmers will be less reliance on EU subsidies. This allows them to regain control over their decisions, thereby empowering them and rekindling their entrepreneurial spirit.

A Blueprint for Adaptive Farming

Once new production methods prove to be effective, the knowledge can be shared with other deltas around the world that will also face significant changes. This exchange of knowledge will not only strengthen global agricultural practices but also foster international cooperation in tackling climate change. This would position Zeeland as a leader in the future of agriculture, offering products that not only meet high-quality standards but also provide solutions to global challenges.

> We've become such skilled farmers that we have a surplus. Ideally, farmers should relocate abroad to share knowledge and contribute where necessary. - Andre Hoekman

Zilt & Zicht

A new brand that gives stability & support for the local farmer community in Zeeland, embracing sensitive types of prodcution that adapt to the changing conditions of the Delta landscape.

Farm 2.0 as a Community Center of the Future

Agri-energy hubs

Farm 2.0 is a new way of using old or new agricultural buildings. It acts as a multifunctional hub within the Performative Landscape, with spatial possibilities for the players in this landscape. As an Agri-Energy Hub, it brings together central groups from agriculture, energy production, research, politics and civil society in one place. It will thus become a new competence center in rural areas, where not only production takes place, but also sharing, learning, negotiation and joint development.

Based on the Action Card C2: Agri-Energy Hubs, Farm 2.0 creates a platform in which local knowledge from farmers is combined with technological innovation and systemic thinking from research institutions and companies.

The physical infrastructure enables exchange, proximity and direct collaboration: community members, energy companies, universities, municipalities, water associations and nature stakeholders can regularly exchange ideas here – whether in workshops, showrooms, test fields or in day-to-day operations.

The aim is to co-creatively develop solutions for the major challenges facing rural areas: from energy self-sufficiency and climate-resilient agriculture to social and economic participation. The farm thus becomes a living demonstration space for transformation, in which knowledge is not only transferred but also jointly generated.

By being located in the Delta, the Farm 2.0 also becomes a place where global transformations – for example in dealing with water, energy or food – become locally visible, negotiable and shapeable. Its presence in the territory bridges the gap between innovation and tradition, fostering resilience in vulnerable landscapes.

Farms 2.0 become a tool for territorial stewardship and monitoring, supporting adaptation to climate change processes. At the same time, they operate as catalysts for community engagement and cooperation, reactivating the agricultural and social fabric of the Middelburg landscape, opening new paths for collective sustainability.

Farm 2.0: A Tool to Activate the Territory

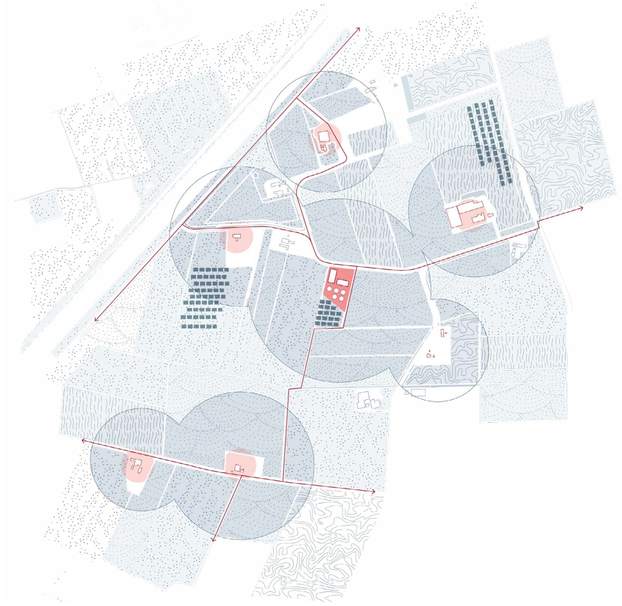


Figure 7.25

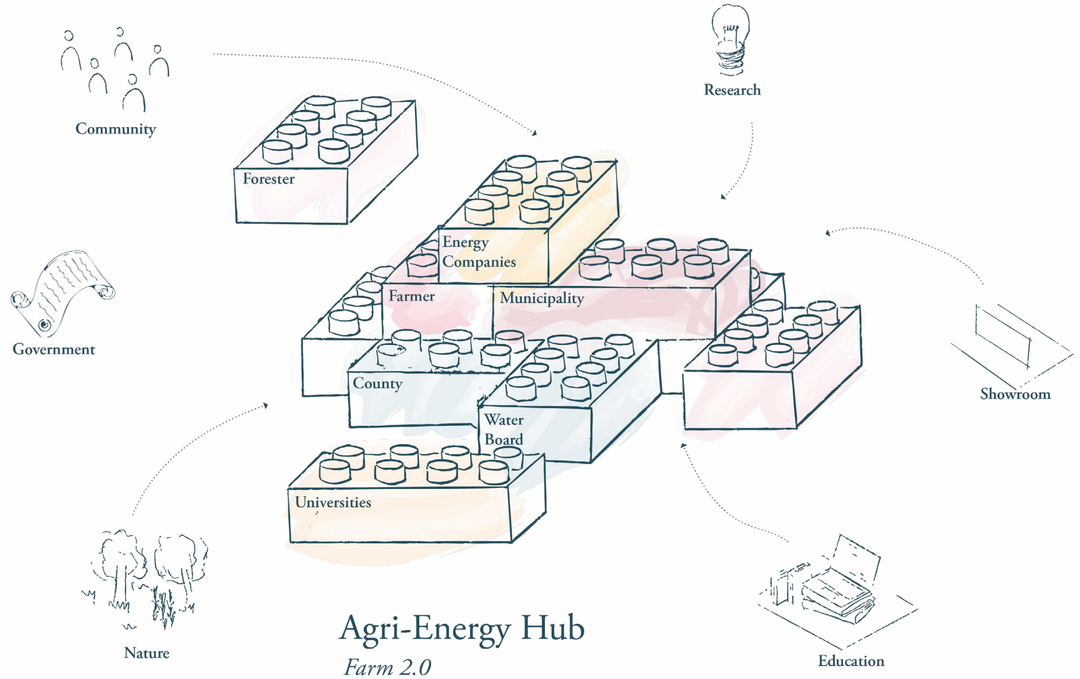


Figure 7.26

Figure 7.27 | Visualisation

Figure 7.28 Visualisation

Chapter 8

Future Perspective & Reflection

From Conflict to Collaboration

From trigger project to Regional Transformation

Performative Landscape as a framework for targeted interventions

The Middelburg cluster represented the first step in the implementation of the Performative Landscape - a trigger project in which the developed Action Cards were applied and tested for the first time. Here, the various fields of action - energy, agriculture, adaptation and community - were brought together and spatially interwoven. It was the place where the new concept became tangible for the first time.

Middelburg functions here as a prototype for a scalable transformation model: in the following years, the concepts will be transferred in an adapted form to other clusters in the Zeeland region - in each case adapted to their specific risks, potentials, trends and landscape conditions. With the help of participatory processes, the appropriate action cards are selected individually for each location and anchored locally.

This development shows: The Action Cards have a high degree of spatial transferability and flexibility in terms of content. Their combination can vary depending on requirements and context - but the basic principles remain constant: creating synergies, promoting multifunctionality, building resilience.

In this way, each cluster that is implemented is another building block towards a large-scale, landscape-based transformation. Once this process is complete, the whole of Zeeland will redefine itself as a coherent Performative Landscape - a space in which sustainable energy production, local food production and landscape preservation are mutually dependent and mutually reinforcing.

„A new framework where agriculture combines with renewable energy and local food production with landscape preservation. It maximizes productivity while ensuring the health of the environment and local communities - especially local farmers.“

Zeeland is thus becoming a sustainable model area that shows how regional identity, ecological resilience and economic viability can go hand in hand - from locally tested solutions to globally relevant role models.

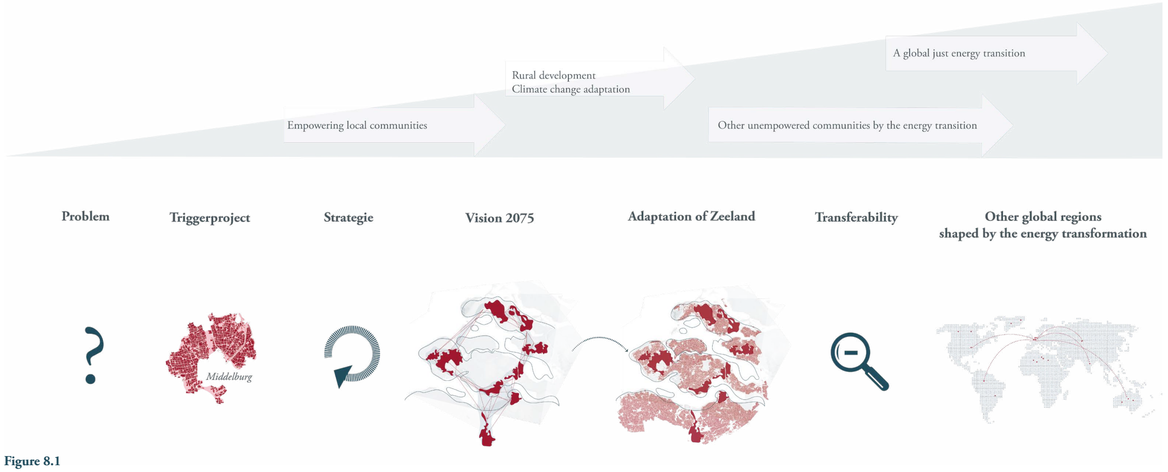


Figure 8.1

01. The Agricultural Belt of Middelburg

Figure 8.3

02. Fields Between Grijpskerke and Westkapelle

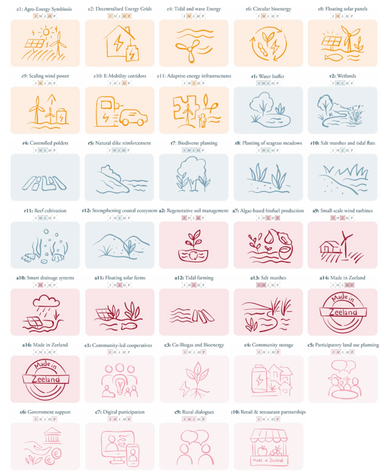


Figure 8.5

03. The Ossenisse Plain

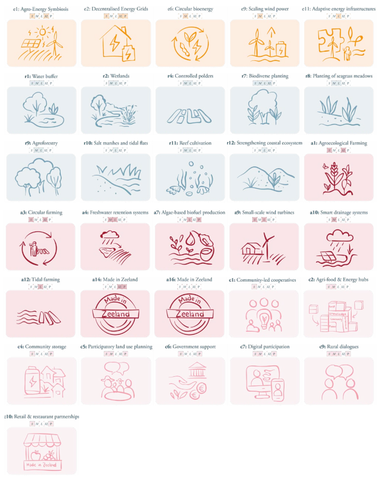


Figure 8.7

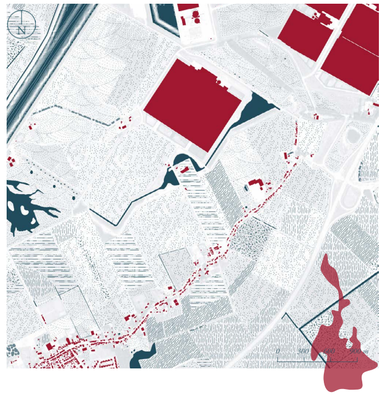
04. The Borssele Agricultural Coast

Figure 8.9

05. Yerseke Moo Agro Reserve

Figure 8.11

06. The Agro-Industrial Landscape of Terneuzen



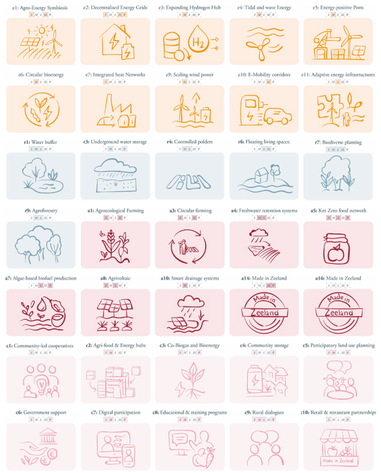


Figure 8.13

07. Poortvliet Plain

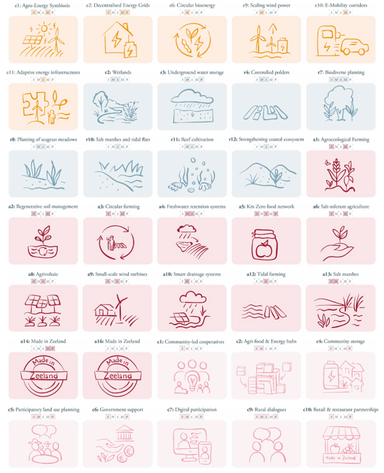


Figure 8.15

08. The Fields Between Oosterland and Bruinisse

Figure 8.17

9. The Agricultural Area in the north of Zierikzee

Figure 8.19

Individual Relfections

Anastasia Stolyarova
6161723

The topic of energy is particularly close to me. My family works in this field, and I already have some knowledge about it. That's why I was especially interested in exploring, through this course, what the energy transition might mean from an urbanistic perspective. Energy is a global and deeply significant issue. Our everyday life is completely dependent on electricity consumption. However, it is not always clear how to address this topic within the field of urban planning. This is why the research question developed by our group felt very personal and aligned with my own interests: How exactly might the landscape of a given region change in the process of transitioning to renewable energy? What would this look like spatially? And how would these changes manifest across different scales - from local to regional?

I often find energy projects disappointing - they start with ambition but end in simplistic solutions like solar panels on roofs. I really wanted our proposal to offer something substantial and exciting - not just in terms of infrastructure, but also in improving the quality of the built environment. My goal was for this project to enhance not only the region's energy system but also to enrich the space, bring it to life, and introduce new uses and meanings.

We began by choosing a site that felt both unique and inspiring. A great deal of attention was devoted to thoroughly analyzing the area, understanding its characteristics, and identifying its existing conditions and challenges. Finding a community to work with proved to be difficult. The farmers initially did not fully align with our narrative, and there was some uncertainty about whether it was the right fit. The region itself is quite complex: on one hand, it is strategically important and developing, but on the other hand, development is uneven, with many gaps. Farmers in the area have largely been left out of national programs - they are pressured to adapt through regulation and restrictions, forced to either change how they produce or sell their land. At the same time, it's hard to classify land-owning farmers - in a country like the Netherlands, where land is so scarce - as a marginalized group in need of urgent protection. We tried to resolve this contradiction throughout the entire project, and I believe that we managed to find an approach. We avoided solving their problems for them, but instead aimed to provide alternative pathways and inspiration for transformation. To me, this balance is crucial - we tried to respect the community's rights to their future while also encouraging them to take responsibility for changes that can bring broader societal benefit.

At first glance, our project might not seem radical. But a closer look at the final vision reveals a profound transformation of the current system. These changes are designed to unfold gradually - a conscious choice. We aimed to show that even conservative communities, often bound by tradition, can change when offered real alternatives and long-term perspectives.
This quarter's topic was incredibly valuable for me. I often struggle to narrow my focus - but this course helped me strengthen that skill and work more precisely with a single theme. I also found it fascinating to explore planning systems and policies in the Netherlands and compare them with those of my home country. Such comparisons are always insightful - they reveal global patterns and show how different planning cultures address similar challenges.

Nynke Krabbenborg
5276497

Connecting a small-scale community with a top-down movement like the energy transition proved to be a challenging task. Gaining a true understanding of the area and uncovering issues and potentials of the community was a challenge substantial enough to fill more than ten weeks. It wasn't until halfway through the project that we were able to clearly formulate a problem statement grounded in the local context and presenting the needs of the chosen community.

Looking back, we kept returning to the community's story to search for the underlying narrative of our work. I had to learn patience—to slow down, discuss details, and resist the urge to push forward too quickly. Working in a highly international group with no native English speakers, communication was sometimes a challenge. This made me more aware of my own working culture, habits, and shortcomings. As the only Dutch team member, I naturally took on a specific responsibility: I knew the area, spoke the language, and was able to connect with the community more directly. I embraced this role and often acted as the group's "fact-checker," making sure our proposals were grounded in local knowledge and accurately reflected the Dutch context.

Once we had arranged interviews, it became surprisingly rewarding to connect with the people we had studied from a distance. When our earlier research assumptions were confirmed by real-world concerns, it gave us a strong motivational boost. The recognition and enthusiasm from the farmers we spoke really encouraged me to integrate their expressed needs and concerns into our design.

Normally, I wait a long time before I start designing—I prefer to build a solid foundation first, supported by clear arguments. In contrast, my groupmates were more intuitive in their approach and started sketching from the beginning. I learned from this difference: early design can also help clarify a direction and narrative. By testing our ideas with the community through three different scenarios just before the mid-term presentation, the impact of our design on our community became much more visible and concrete allowing us to, at the end, make a more integrated vision at the end.

Ultimately, this project taught me that regional design is systemic and inherently relational. It requires both grounded, community-based research and the ability to zoom out and rethink across multiple layers simultaneously. As an urban designer, you never design for just one group—you need to understand the broader system, but also empathize deeply with a small group to fully grasp the impact of your decisions. Aligning our group around one shared story took time and attention, but once it clicked, it was incredibly satisfying to see everyone truly stand behind the same vision.

Pietro Bernardini
6316506

Complexity is the key word to describe the past quarter. Not intended as a mere synonym for difficulty, but rather in the sense described by Edgar Morin, the French sociologist and philosopher: a way of thinking "that aims to overcome confusion, complication, and the difficulty of thinking, with the help of an organizing thought: one that separates and connects."

This complexity permeated the themes we explored and the various project scales we worked across. It emerged in the intrinsic relationship between renewable energy production, landscape, and the local communities living within it. It was also present in the dynamic and ever-changing nature of the Zeeland Delta territory – a region as fragile as it is fascinating to spatially analyze and interpret.
I also encountered complexity within the region's social fabric, particularly in the role and structure of its agricultural communities, which are deeply rooted in the socio-territorial context. Likewise, in the almost ethnographic approach we took to understand their needs, hopes, and concerns, with the aim of meaningfully integrating them into the project.
There was also complexity in working for the first time in an international team – navigating thoughts in Italian, definitions in English, German terms, Cyrillic layers, and attribute tables in Dutch.
It was precisely the awareness of this complexity – and the willingness to embrace it – that guided my approach to both the regional design process and group work. A journey I faced with enthusiasm and curiosity, appreciating its multi-scalar dimension from both spatial and social perspectives.

I believe the evolution of our group work over the past two months, as well as the final deliverable, represents a strong and meaningful attempt to respond to the challenges set by the course and the design brief. It is the result of ongoing and careful dialogue, a continuous process of mutual adjustment between a deductive research approach – rooted in my personal interest in the relationship between energy and landscape – and a fluid design process that moves across different scales: region, village, and city.
Encouraged by continuous feedback and reviews, we strived to combine qualitative and quantitative approaches, adopting a holistic perspective capable of accurately portraying the region, its communities, and their connection to energy production.
The planning and design phases stem directly from this approach, and I believe they successfully communicate, through a range of graphic outputs, a coherent and meaningful vision for Zeeland's future. While time constraints inevitably limited the depth of our investigation, I am nonetheless extremely satisfied with the level of complexity we managed to reach.

I believe – and hope – I've grown both as a designer and as a planner during this quarter. Despite some predictable moments of uncertainty, the ambitious expectations in terms of both content and form truly challenged and motivated me. Likewise, working in a team made up of such different personalities from vastly different backgrounds was a crucial factor in my personal growth.

After a second quarter in which my motivation and interest had wavered, I was happy to engage in a project like this – one that, at least on paper, felt closer to my comfort zone due to my academic and professional background. However, integrating topics that were only partially familiar to me, such as the energy transition, and confronting the required level of complexity, became a real source of motivation, leaving me eager and curious for what lies ahead in my academic journey.

Sarah Mae Tönsmann
6251544

"First life, then spaces, then buildings – the other way around never works." (Jan Gehl, 2010) is a quote I first encountered during my bachelor's, and I always believed my design approach followed that logic - starting with the people. However, this quarter truly revealed how essential it is to deeply understand communities, stakeholders, power relations, policies, and socio-economic structures when working on a regional scale. My prior design experiences, both academic and professional, never extended beyond the scale of a neighborhood or city. This was the most complex project I've ever worked on, and it taught me that when designing at such a large scale, deep, layered research is not optional - it's essential. Only by unpacking the complexity of the context can a truly grounded and meaningful vision emerge. Working on a vision for a whole region made me aware of the magnitude of impact such plans can have - not only on the anthroposphere but also on the biosphere.

My initial interest was the landscape and how large-scale visions influence its identity, ecology, and use. I view landscape not just as a space for nature preservation, but as a system that can both support and benefit people - without being dominated by man-made structures. The theme of energy transition aligned seamlessly with this inquiry, as it directly alters territories and spatial dynamics. Through the SDS lectures, Capita Selecta series, and workshops, I understood the importance of integrating detailed community research - something that took time to fully develop. I believe that with more time, we could have deepened this aspect further through surveys, extended site visits, or even participatory events. Including more voices would have enriched the vision even further.

Still, I believe our final proposal resonates strongly with the community in Zeeland. Starting from broad community analysis, then zooming into spatial and then back to community socio-economic structures, laid a solid foundation for a sustainable vision - one that integrates social, ecological, and economic aspects. Our shared group interest in landscape, community, and energy transition allowed us to create a vision that introduces a new model of working with landscape: rather than exploiting it, we propose a performative landscape that preserves, produces, and profits - benefiting both humans and ecosystems. This shift was deeply influenced by the lectures and research methods we engaged with, and it aligns with larger goals like the SDGs and the Paris Agreement.

Reflection on my Personal Development and Skills
This quarter challenged me to rethink my design approach, especially with the interscalar lens. I moved beyond just designing through analysis and began researching through community. The step-by-step process from analysis to concept and design across scales helped me expand on what I learned in previous quarters. Tools like Atlas.ti and new QGIS methods boosted my confidence and prepared me well for my graduation project. Most importantly, I discovered a strong interest in working on large-scale, systemic design approaches. This experience showed me how vision-making at this scale can be grounded in research, inclusivity, and sustainability—and how powerful it is when design becomes not just reactive, but performative and transformative.

Group Reflection

Group process

In the first few weeks of the project, our group struggled to fully grasp the scope of the course. Without realizing it at first we had chosen a location that was highly relevant to the objectives due to the presence of a large top-down energy infrastructure and a small community owning the land. Initially, we were very spatially oriented with the 'performative landscape' framework but were hesitant to really engage with the community. While reviewing regional visions and reports, we found that many approaches were vague and lacked clear steps for implementation. This made us realize that we had to develop a concrete approach ourselves.

Through coaching and workshops, we were again pushed to delve deeper into understanding the community. What exactly was the need of the community we found by having 4 interviews with Zeeland farmers. Just before the mid-term, using three different scenarios, we gained a clearer perspective on how regional design had an impact on our community. From this point on, the system and all stakeholders surrounding the farmers just started to pop up and enabled us to make initial suggestions for policy changes. After a final reformulation of the problem statement in week 9, we arrived at a more precise definition of the community's narrative and our interpretation of the 'performative landscape'.

Spacial design and its underlaying ethics

Looking back on the project, we aimed to create a vision where the farming community is empowered through its participation in the energy transition. The project's narrative is grounded in a realistic approach, where we rethink the entrepreneurship of our community, a core part of their identity and pride. By introducing the concept of the performative landscape, we as urban designers try to balance the farmers' empowerment with the needs of the planet. We sometimes did not fully choose to follow every wish of the community, but instead weighed them against long-term goals. By doing so, we strengthen our community where it can truly thrive, while addressing the needs of the planet.

Each piece of land has its unique characteristics, leading to different outcomes for its optimal use. When the landscape is optimized for producing goods, it ensures an economically sustainable future for our community. This approach responds to the needs of the economy, people, and the planet, aiming for a balanced solution where all three are considered.

Chapter 9

Appendix

Sources and bibliography

Bibliography

Literature

Belgian Geo Portal. (2025). Geo Portal. Belgian Geo Portal. https://publish.geo.be/geonetwork/srv/eng/catalog.search#/home

Bijzondere plannen voor de prijsvraag Energielandschap van de Toekomst bekendgemaakt - Architectuur Lokaal. (z.d.). Architectuur Lokaal. https://arch-lokaal.nl/bijzondere-plannen-voor-de-prijsvraag-energielandschap-van-de-toekomst-bekendgemaakt/

BN de Stem. (2023, november 30). Als het aan deze Thoolse boeren ligt, komt er een gigantisch zonnepark op hun grond. BN de Stem. https://www.bndestem.nl/thoolse-boeren-zonnepark

Boerderijwinkel met fruit, groente en streekproducten - De Zoete Kers. (2021, 14 juli). De Zoete Kers. https://www.dezoetekers.nl/

CBS. (2020, oktober 15). Boeren vinden steeds vaker aanvullende inkomstenbron. https://www.cbs.nl/boeren-aanvullende-inkomstenbron

Copernicus. (2025). Corine land cover. Copernicus. https://land.copernicus.eu/en/products/corine-land-cover

De Boer van Middelburg. (2023, 9 februari). De Boer van Middelburg. https://deboervanmiddelburg.nl/

Dekking, A. (2022, 23 maart). Brochure over de rol van boeren en tuinders in de energietransitie - Energie & Landbouw. Energie & Landbouw. https://www.ppsenergielandbouw.nl/brochure-over-de-rol-van-boeren-en-tuinders-in-de-energietransitie/?utm_source

De Knockaerthof familie minicamping Knokkertweg Cadzand. (2024, 5 januari). De Knockaerthof Mini Camping. https://deknockaerthof.nl/

Dellar, M., Geerling, G., Kok, K., Van Bodegom, P. M., Van Der Schrier, G., Schrama, M., & Boelee, E. (2024). Future land use maps for the Netherlands based on the Dutch One Health Shared Socio-economic Pathways. Scientific Data, 11(1). https://doi.org/10.1038/s41597-024-04059-5

Eo Wijersstichting. (2023, 2 oktober). Een ontdekkingsreis naar nieuw Zeeland — Eo Wijersstichting. https://eowijers.nl/finalisten/een-ontdekkingsreis-naar-nieuw-zeeland/

Felixx. (z.d.). NBS Catalogue. Felixx. https://www.felixx.nl/projects/nbs-catalogue.html

Geofabrick. (2025). Open Street Map. Geofabrick. https://download.geofabrik.de

González, A. D., Frostell, B., & Carlsson-Kanyama, A. (2011). Protein efficiency per unit energy and per unit greenhouse gas emissions: Potential contribution of diet choices to clima te change mitigation. Food Policy, 36(5). https://doi.org/10.1016/j.foodpol.2011.07.003Kaandorp, V. (2024, 7 augustus). Zoet water voor Zeeuwse akkers. Deltares. https://www.deltares.nl/verhalen/zoet-water-voor-zeeuwse-akkers

Kadaster. (2022). Bodemgebruik Nederland 2022 (versie 1.0). Nationaal GeoRegister. https://www.nationaalgeoregister.nl/metadata/bodemgebruik-nederland-2022

Klimaateffectatlas. (2025). Kaartviewer - Klimaateffectatlas. Klimaateffectatlas. https://www.klimaateffectatlas.nl/kaartviewer

Kros, H., et al. (2024). Region oriented and integrated approach to reduce emissions of nutrients and greenhouse gases from agriculture in the Netherlands. Science of the Total Environment, 909(168501). https://doi.org/10.1016/j.scitotenv.2023.168501

Ministerie van Economische Zaken en Klimaat. (2023). Klimaatnota 2023.

Ministerie van Economische Zaken en Klimaat, & Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2024, maart). Programma energiehoofdstructuur: Ruimte voor een klimaatneutraal energiesysteem van nationaal belang.

Ministerie van Infrastructuur en Waterstaat. (2024a, september 2). Ontwerpkracht voor een klimaatbestendige toekomst. Rijnmond-Drechtsteden en Zuidwestelijke Delta | Deltanieuws. https://magazines.deltaprogramma.nl/deltanieuws/2023/01/ontwerpkracht-voor-een-klimaatbestendige-toekomst#:~:text=Zo%20zet%20Waterstad%202100%20in,de%20identiteit%20van%20het%20gebied

Minister van Klimaat en Groene Groei. (2024). Beantwoording kamervragen over Nederlandse uitbreiding van ETS2 (DGKE-K / 86937003).

Ministerie van Infrastructuur en Waterstaat. (2024, 16 september). Zoetwater. Drie Thema's Deltaprogramma. https://www.deltaprogramma.nl/themas/zoetwater

Ministry of Infrastructure and Water Management, Ministry of Agriculture, Nature and Food Quality, Ministry of Economic Affairs and Climate Policy, & Ministry of the Interior and Kingdom Relations. (2022, March). Annex to the National Water Programme 2022-2027: North Sea Programme 2022-2027.

Ministerie van Landbouw, Natuur en Voedselkwaliteit. (2023). The Netherlands national strategic plan CAP 2023-2027.

Nationaal GeoRegister. (2025). Nationaal GeoRegister. Nationaal GeoRegister. https://www.nationaalgeoregister.nl/geonet-work/srv/dut/catalog.search#/home

Nieuwe Oogst. (2025, januari 12). Zeeuwse akkerbouwers slaan zoetwateroogst op in een bassin.

Nieuwe Oogst. https://www.nieuweoogst.nl/zeeuwse-akkerbouwers-slaan-zoetwateroogst-op

Nieuwe Oogst. (2025, februari 5). Zeeland heeft 5 miljoen euro GLB-subsidie beschikbaar voor gebiedsplannen. Nieuwe Oogst. https://www.nieuweoogst.nl/zeeland-heeft-5-miljoen-euro-glb-subsidie-beschikbaar

PDOK. (2025). PDOK GeoViewer. PDOK. https://www.pdok.nl/geo-voorzieningen/pdok-geoviewer

PDOK. (2025). Topografische Tijdreizen. PDOK. https://www.pdok.nl/geo-voorzieningen/topografische-tijdreizen

PosadMaxwan. (2023). Designing for vital soil: Handbook. PosadMaxwan. https://posad-maxwan.ams3.cdn.digitaloceanspaces.com/uploads/posadmaxwan-handbook-designing-for-vital-soil-2023-6489b.pdf

PPS Energie & Landbouw Factsheet: Potentie duurzame energieproductie van de landbouw. PPS Energie & Landbouw. https://www.ppsenergielandbouw.nl/publicaties_post/factsheet-potentie-duurzame-energieproductie-van-de-landbouw/

Provincie Zeeland. (2021). Zeeuws Deltaplan Zoet Water.

Provincie Zeeland. (2023, August 24). Zeeuwse omgevingsvisie Middelburg. Provinciaal Blad, Nr. 10050.

Provincie Zeeland. (2024). Regionale Energiestrategie; Plan van Aanpak. https://www.zeeland.nl/digitaal-archief/ZLD2024-1401

Provincie Zeeland. (2024). Open Data Portaal Zeeland. Provincie Zeeland. https://data.zeeland.nl

Provincie Zeeland. (2024). Strategische visie waterbeheer Zeeland 2050.

Rijksoverheid. (2024). Programma Energiehoofdstructuur: Ruimte voor een klimaatneutraal energiesysteem van nationaal belang. Ministerie van Economische Zaken en Klimaat; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. https://www.rijksoverheid.nl/documenten/rapporten/2024/03/04/programma-energiehoofdstructuur

Rijksoverheid. (2021). Plan van Aanpak North Sea Port District (NOVI-gebied). Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. https://www.zeeland.nl/sites/default/files/digitaalarchief/IB21_63019b1b.pdf

Ruimtevolk, Posad, H+N+S, FABRICations, Studio Marco Vermeulen, & NRG Lab. (2018). Ruimtelijke Verkenning Energie en Klimaat. Ministeries van Economische Zaken en Klimaat (EZK), Infrastructuur en Waterstaat (I&W), en Binnenlandse Zaken en Koninkrijksrelaties (BZK). https://www.klimaatakkoord.nl/documenten/publicaties/2018/02/21/ruimtelijke-verkenning-energie-en-klimaat Klimaatakkoord+1Klimaatakkoord+1

Scheldestromen. Home. Scheldestromen. Geraadpleegd op 09 april 2025, van https://scheldestromen.nl/

Sietsema, F.-J. (Regisseur). (2024, maart 15). De boer is boos [Televisie-uitzending]. Omroep Zeeland. https://www.omroepzeeland.nl/tv/aflevering/de-boer-is-boos/370307042

Systeemstudie energie infrastructuur Zeeland 2020-2030-2050 Van der Niet, S., Rooijers, F., Van der Veen, R et al. (2020). CE Delft, Royal HaskoningDHV. https://www.cedelft.eu/publicaties/systeemstudie-energie-infrastructuur-zeeland-2020-2030-2050

Timmerman. (2024, 9 augustus). Timmerman. https://www.drogerijtimmerman.nl/

Water News Europe. (2024, 29 november). Holistic Water Management in Agriculture: Tackling Salinization and Water Scarcity in Dutch Farmlands. Water News Europe. https://www.waternewseurope.com/holistic-water-management-in-agriculture-tackling-salinization-and-water-scarcity-in-dutch-farmlands/

Wageningen University & Research. (z.j.). Regionale landbouwcijfers in beeld: Regio Zuid, periode 1997-2007. Wageningen University & Research. https://edepot.wur.nl/5912

WEC. (2019). These Dutch tomatoes can teach the world about sustainable agriculture. World Economic Forum. Geraadpleegd op 14 maart 2025, van https://www.weforum.org/agenda/2019/04/these-dutch-tomatoes-can-teach-the-world-about-sustainable-agriculture/

ZEELANDIA: Ontwerp design report. (2023). Studio Hartzema, Feddes/Olthof, & Witteveen en Bos. https://studiohartzema.com/app/uploads/2023/10/240605_RDD-Booklet-IABR-2-Team-zeelandia-new-1.pdf

Zeeuws Archief. (z.d.). Zeeuws archief. https://www.zeeuwsarchief.nl/

Zhang, Z., & Balakrishnan, S. (2021). Multi-criteria decision analysis. In International Encyclopedia of Transportation

Bibliography

Maps & Images

All maps created by the authors were produced using the following data sources:
Geofabrick. (2025). Open Street Map. Geofabrick. https://download.geofabrik.de
Kadaster. (2022). Bodemgebruik Nederland 2022 (versie 1.0). Nationaal GeoRegister. https://www.nationaalgeoregister.nl/metadata/bodemgebruik-nederland-2022
Klimaateffectatlas. (2025). Kaartviewer - Klimaateffectatlas. Klimaateffectatlas. https://www.klimaateffectatlas.nl/kaartviewer
Nationaal GeoRegister. (2025). Nationaal GeoRegister. Nationaal GeoRegister. https://www.nationaalgeoregister.nl/geonet-work/srv/dut/catalog.search#/home
PDOK. (2025). PDOK GeoViewer. PDOK. https://www.pdok.nl/geo-voorzieningen/pdok-geoviewer
PDOK. (2025). Topografische Tijdreizen. PDOK. https://www.pdok.nl/geo-voorzieningen/topografische-tijdreizen
Provincie Zeeland. (2024). Open Data Portaal Zeeland. Provincie Zeeland. https://data.zeeland.nl

Figure 0.1 Methodology : Created by the authors
Figure 1.1 Energy production map
Created by the authors
Source: Sijmons, D. (2014). Spatial footprint in hectares for the electricity demand of 1 million homes.
International Energy Agency (IEA). (2019). Global energy statistics. Retrieved from https://www.iea.org
Figure 1.2 Renewable Energy production map
Created by the authors
Source: Sijmons, D. (2014). Spatial footprint in hectares for the electricity demand of 1 million homes.
International Energy Agency (IEA). (2019). Global energy statistics. Retrieved from https://www.iea.org
Figure 1.3 Energy production omparative analysis graph
Created by the authors
Source: Sijmons, D. (2014). Spatial footprint in hectares for the electricity demand of 1 million homes.
International Energy Agency (IEA). (2019). Global energy statistics. Retrieved from https://www.iea.org
Figure 1.4 Report Structure. Problem Statement
Created by the authors
Figure 1.5 Report Structure. Research question
Created by the authors
Figure 2.1 The Netherlands Map
Created by the authors
Figure 2.2
Source: https://stock.adobe.com/nl/
Figure 2.3
Source: https://stock.adobe.com/nl/
Figure 2.4
Source: https://stock.adobe.com/nl/
Figure 2.5 Population
Created by the authors
Figure 2.6 Urban areas
Created by the authors
Figure 2.7
Source: Klimaatmonitor. (n.d.). Energieverbruik dashboard [Data dashboard]. Rijkswaterstaat. Retrieved April 9, 2025, from https://klimaatmonitor.databank.nl/Dashboard/dashboard/energieverbruik-2?regioncode=10&regionlevel=provincie
Figure 2.8
Source: Klimaatmonitor. (n.d.). Energieverbruik dashboard [Data dashboard]. Rijkswaterstaat. Retrieved April 9, 2025, from https://klimaatmonitor.databank.nl/Dashboard/dashboard/energieverbruik-2?regioncode=10&regionlevel=provincie
Figure 2.9
Source: Klimaatmonitor. (n.d.). Energieverbruik dashboard [Data dashboard]. Rijkswaterstaat. Retrieved April 9, 2025, from https://klimaatmonitor.databank.nl/Dashboard/dashboard/energieverbruik-2?regioncode=10&regionlevel=provincie
Figure 2.10 Industry, Production and logistics
Created by the authors
Figure 2.11
Created by the authors
Figure 2.12
Created by the authors
Figure 2.13
Created by the authors
Figure 2.14 Policy hierarchy
Created by the authors
Figure 2.15 Programmes and Regulations Aligned with Energy Transition
Created by the authors
Source: Regionale Energiestrategie (2021). Regional Energy Strategy. Retrieved from https://www.regionale-energiestrategie.nl/english/default.aspx;
Rijksdienst voor Ondernemend Nederland (RVO). (n.d.). SDE++ subsidie (Stimulering Duurzame Energieproductie en Klimaattransitie). Retrieved from https://www.rvo.nl/subsidies-financiering/sde;
Klimaatakkoord. (2019, June 28). National Climate Agreement – The Netherlands. Retrieved from https://www.klimaatakkoord.nl/documenten/publicaties/2019/06/28/national-climate-agreement-the-netherlands
Figure 2.16
Source: Rijksoverheid. (2024, March 4). Programma energie. Retrieved from https://www.rijksoverheid.nl/documenten/rapporten/2024/03/04/programma-energie
Figure 2.17
Source: Energieprojecten Nederland. (n.d.). Energieprojecten Nederland. Retrieved from https://www.energieprojectennederland.nl/energieprojecten-neder
Figure 2.18
Source: Delta Programma. (n.d.). Delta Programma. Retrieved from https://english.deltaprogramma.nl/
Figure 2.19
Source: Delta Programma. (n.d.). Delta Programma. Retrieved from https://english.deltaprogramma.nl/
Figure 2.20
Source: Rijksoverheid. (2012, March 13). Structuurvisie infrastructuur en ruimte. Retrieved from https://www.rijksoverheid.nl/documenten/rapporten/2012/03/13/structuurvisie-infrastructuur-en-ruimte
Figure 2.21
Source: Officiële Bekendmakingen. (2023). Prb 2023-10050. Retrieved from https://zoek.officielebekendmakingen.nl/prb-2023-10050.html
Figure 2.22
Source: Officiële Bekendmakingen. (2023). Prb 2023-10050. Retrieved from https://zoek.officielebekendmakingen.nl/prb-2023-10050.html
Figure 2.23
Source: RO&AD architecten. (n.d.). Ontdekkingsreis naar Nieuw-Zeeland. Retrieved from https://www.ro-ad.org/projecten/ontdekkingsreis-naar-nieuw-zeeland/
Figure 2.24 Spatial System layers graph
Created by the authors
Source: Kalinin, I. (n.d.). Icons by Kalinin Ilya. Retrieved from https://thenounproject.com/browse/creator/kalinin.ilya/icons/?p=1;
The Noun Project. (n.d.). Solar panels. Retrieved from https://thenounproject.com/icon/solar-panels-5174703/;
The Noun Project. (n.d.). Water dam. Retrieved from https://thenounproject.com/icon/water-dam-6530979/;
Figure 2.25 Productive Sectors and Land Use
Created by the authors
Source: CBS. (2020, October 15). Boeren vinden steeds vaker aanvullende inkomstenbron. Retrieved from https://www.cbs.nl/boeren-aanvullende-inkomstenbron
Figure 2.26
Created by the authors
Figure 2.27 Energy production flow chart
Created by the authors
Source: Regionale Energiestrategie (2021). Regional Energy Strategy. Retrieved from https://www.regionale-energiestrategie.nl/english/default.aspx
Figure 2.28 Report Structure. Problem Statement
Created by the authors
Figure 2.29 Report Structure. Research question
Created by the authors
Figure 3.1
Created by the authors
Figure 3.2
Created by the authors
Figure 3.3
Created by the authors
Figure 3.4
Created by the authors
Figure 3.5
Created by the authors
Figure 3.6 Community collage
Source: SF Gate. (2010, November 25). Farmers' Thanksgiving tables showcase fresh bounty. Retrieved from https://www.sfgate.com/food/article/Farmers-Thanksgiving-tables-showcase-fresh-bounty-2298150.php;
Pinterest. (n.d.). Pin by user on Pinterest. Retrieved from https://in.pinterest.com/pin/497014508897589252/;
Pinterest. (n.d.). Pin by user on Pinterest. Retrieved from https://ru.pinterest.com/pin/298785756534121183/;
Les Zed. (2022, November). Middelburg, Zeeland, Pays-Bas. Retrieved from https://www.leszed.com/2022/11/middelburg-zelande-pays-bas/;
Wind-n-More. (n.d.). Wind-n-More. Retrieved from https://wind-n-more.com/;
Pinterest. (n.d.). Pin by user on Pinterest. Retrieved from https://mx.pinterest.com/pin/23784704275770000/;
RM Auctions. (n.d.). A Chinese rose Imari provinces shaving bowl with the arms of Zeeland, Kangxi, Yongzheng. Retrieved from https://www.rm-auctions.com/en/asian-arts-i--ii/12011-a-chinese-rose-imari-provinces-shaving-bowl-with-the-arms-of-zeeland-kangxi-yongzheng
Figure 3.7
Source: BN de Stem. (2023, november 30). Als het aan deze Thoolse boeren ligt, komt er een gigantisch zonnepark op hun grond. BN de Stem. https://www.bndestem.nl/thoolse-boeren-zonnepark
Figure 3.8
Source: Nieuwe Oogst. (2025, januari 12). Zeeuwse akkerbouwers slaan zoetwateroogst op in een bassin. Nieuwe Oogst. https://www.nieuweoogst.nl/zeeuwse-akkerbouwers-slaan-zoetwateroogst-op
Figure 3.9
Source: CBS. (2020, oktober 15). Boeren vinden steeds vaker aanvullende inkomstenbron. https://www.cbs.nl/boeren-aanvullende-inkomstenbron
Figure 3.10
Source: Nieuwe Oogst. (2025, februari 5). Zeeland heeft 5 miljoen euro GLB-subsidie beschikbaar voor gebiedsplannen. Nieuwe Oogst. https://www.nieuweoogst.nl/zeeland-heeft-5-miljoen-euro-glb-subsidie-beschikbaar
Figure 3.11
Created by the authors
Figure 3.12
Created by the authors
Figure 3.13
Created by the authors
Figure 3.14
Created by the authors
Figure 3.15
Source: Agrimatie. (n.d.). [Title of the document]. Retrieved from https://agrimatie.nl/publicatiePage.aspx?subpubID=2291&sectorID=2233&themaID=2272&indicatorID=2052;
PBL Netherlands Environmental Assessment Agency. (n.d.). [Title of the document]. Retrieved from https://www.pbl.nl/uploads/default/downloads/500091002.pdf;
Agrimatie. (n.d.). [Title of the document]. Retrieved from https://agrimatie.nl/binternet.aspx?ID=4&bedrijfstype=11
Figure 3.16
Created by the authors
Figure 3.17
Figure 3.18
Figure 3.19
Source: Centraal Bureau voor de Statistiek. (2025, 28 maart). Landbouw; gewassen, dieren en grondgebru

Vision Map: Integrated Energy & Resilient Adaption

Legends

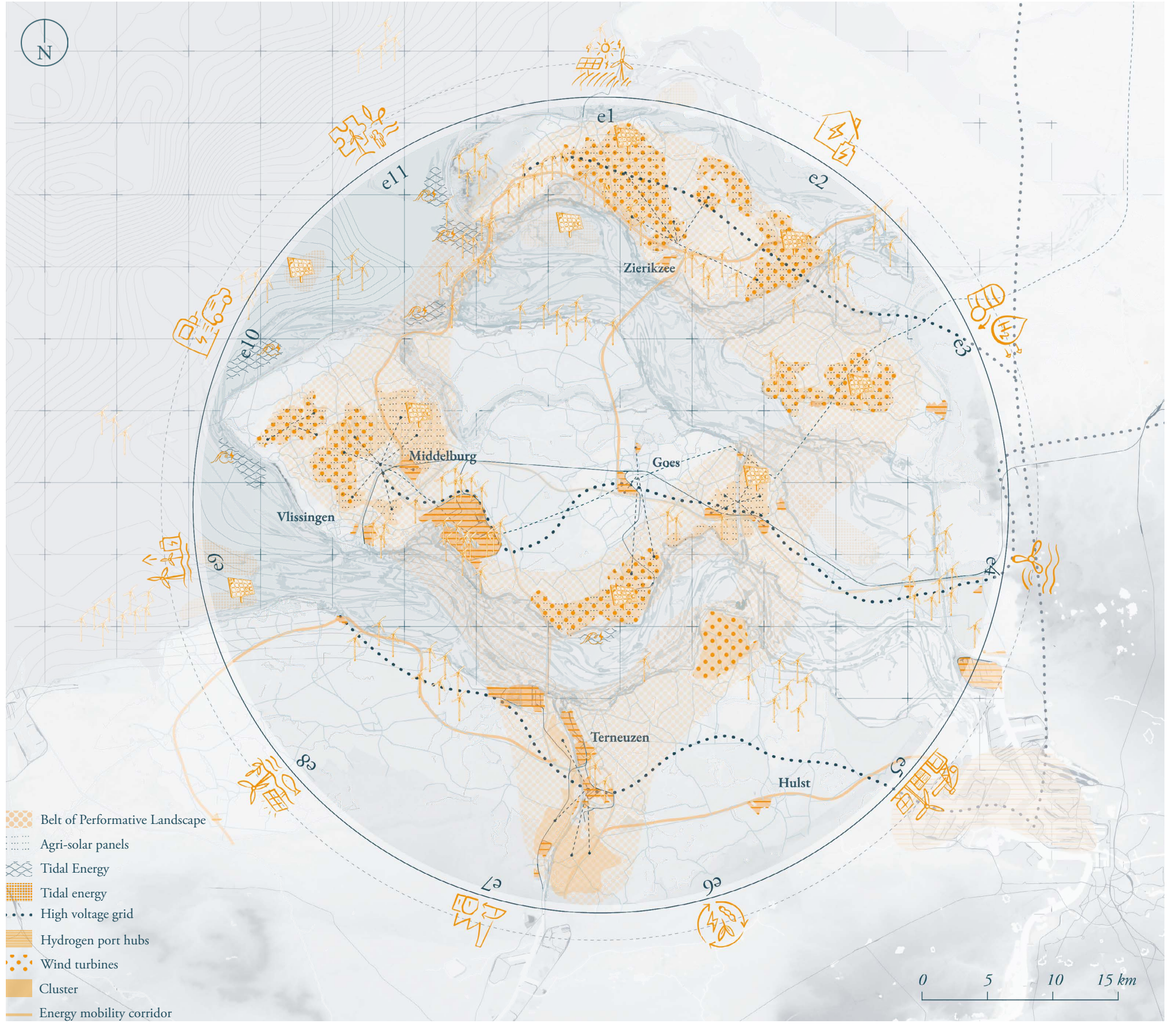


Figure 6.81

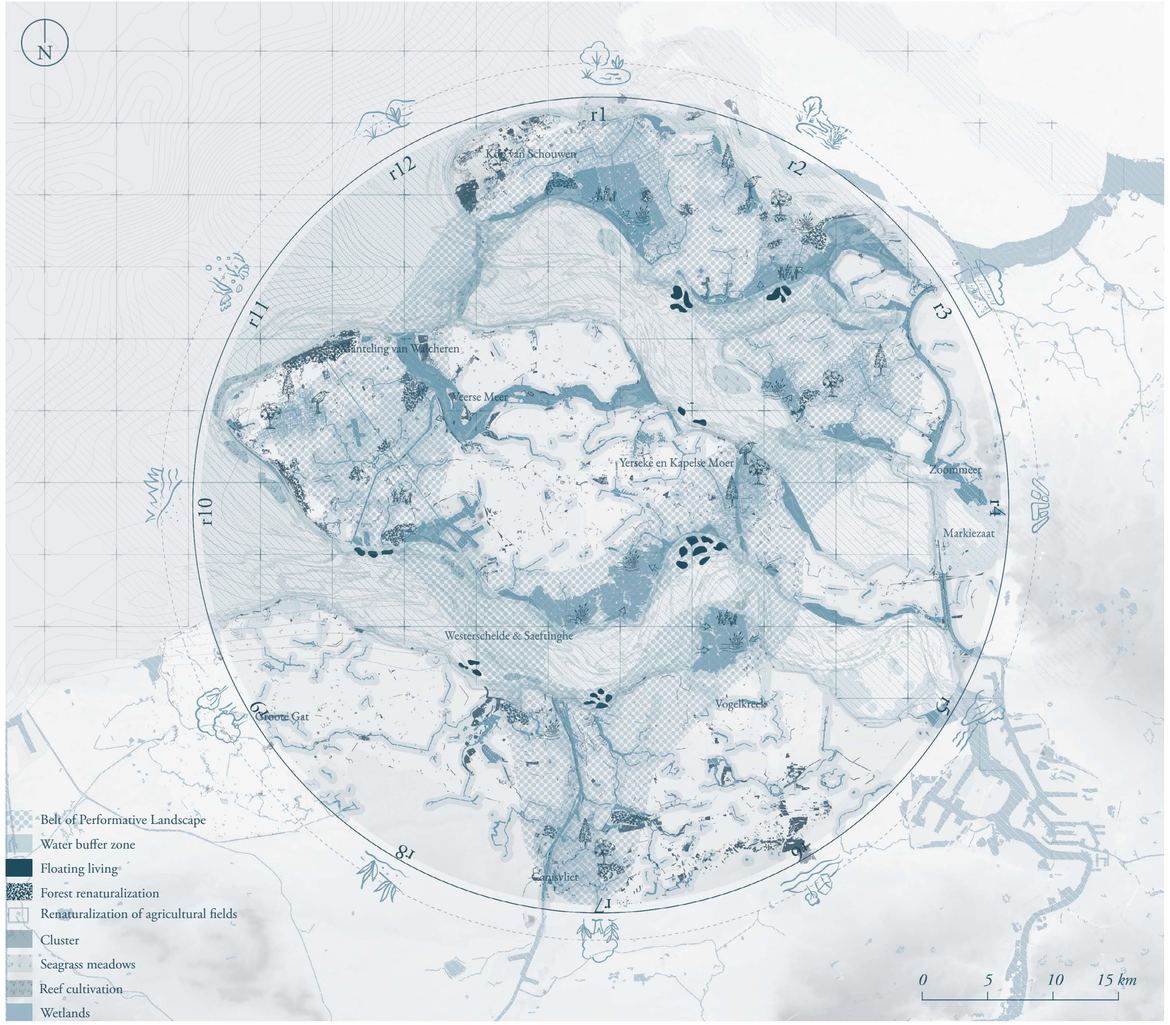


Figure 6.82

Vision Map: Diverse Agriculture & Engaged Community

Legends

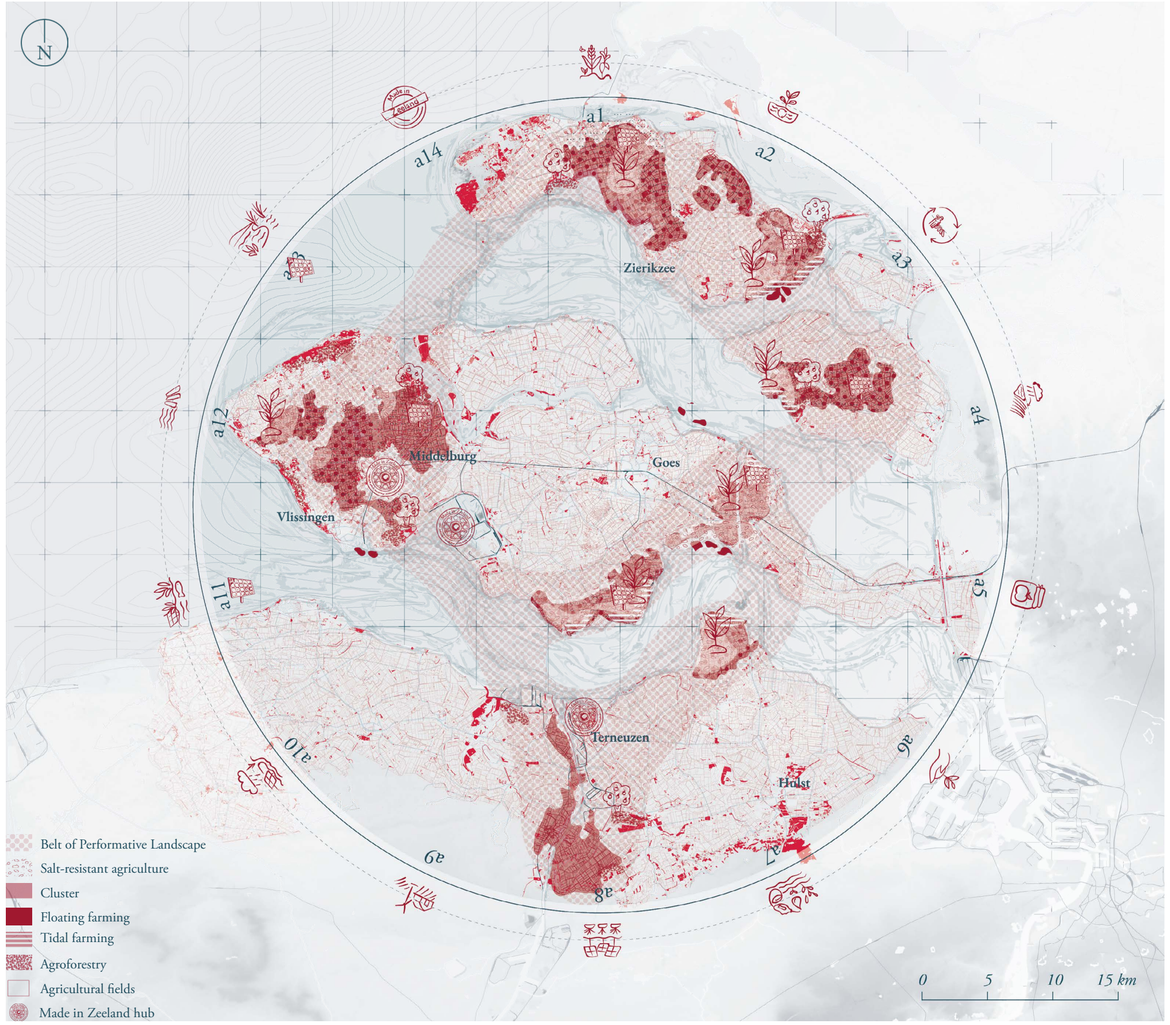


Figure 6.83

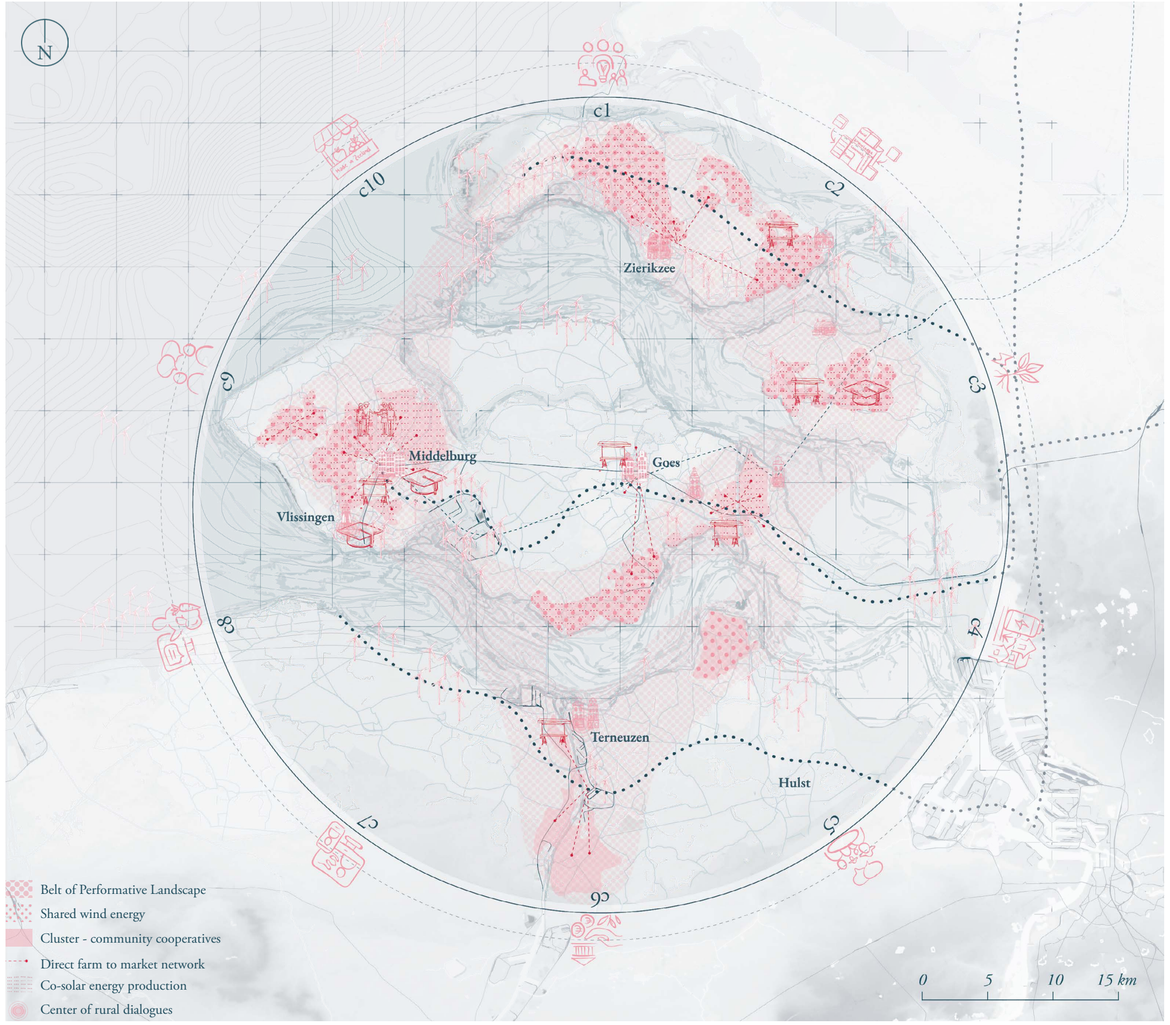


Figure 6.84

Spatial Planning Analysis

Legends

National Energy infrastructure projects

Figure 2.16
Source: Rijksoverheid. (2024, March 4). Programma energie. Retrieved from https://www.rijksoverheid.nl/documenten/rapporten/2024/03/04/programma-energie

National Energy infrastructure projects

Figure 2.17
Source: Energieprojecten Nederland. (n.d.). Energieprojecten Nederland. Retrieved from https://www.energieprojectennederland.nl/energieprojecten-neder

National Delta Programme 2025

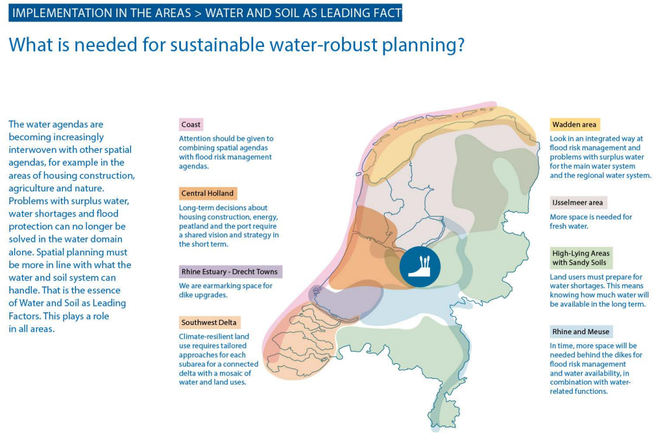


Figure 2.18
Source: Delta Programma. (n.d.). Delta Programma. Retrieved from https://english.deltaprogramma.nl/

National Delta Programme 2025

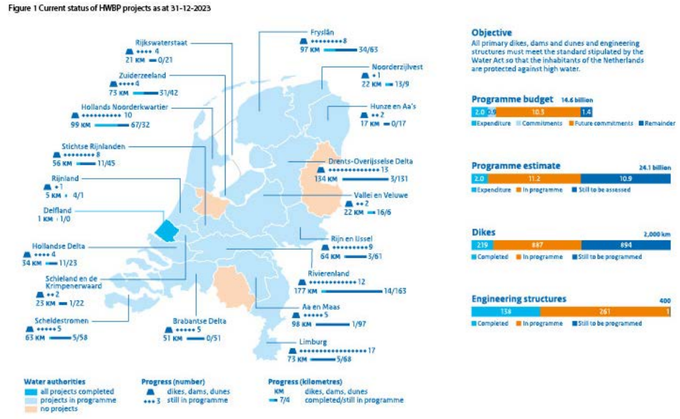
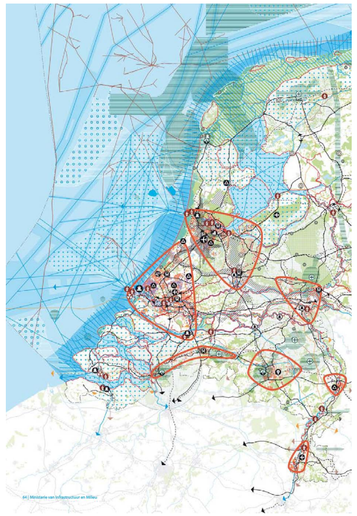


Figure 2.19
Source: Delta Programma. (n.d.). Delta Programma. Retrieved from https://english.deltaprogramma.nl/

Structural Vision for Infrastructure and Spatial Planning (SVIR)



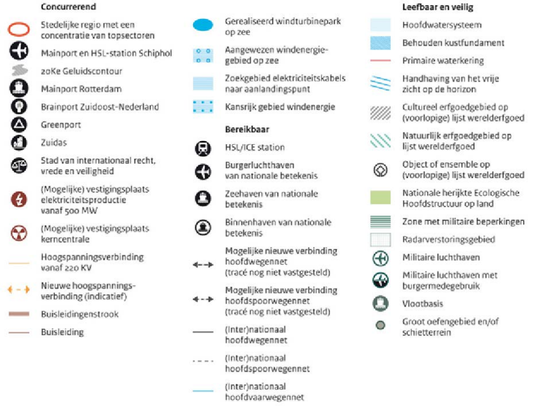


Figure 2.20
Source: Rijksoverheid. (2012, March 13). Structuurvisie infrastructuur en ruimte. Retrieved from https://www.rijksoverheid.nl/documenten/rapporten/2012/03/13/structuurvisie-infrastructuur-en-ruimte

Structural vision for infrastructure and space

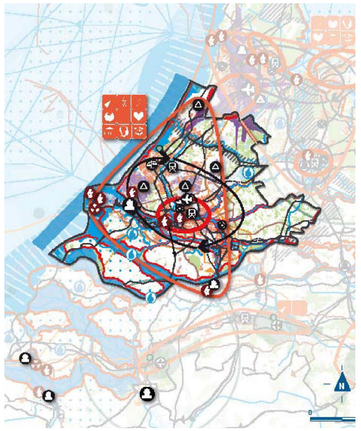


Figure 2.21
Source: Officiële Bekendmakingen. (2023). Prb 2023-10050. Retrieved from https://zoek.officielebekendmakingen.nl/prb-2023-10050.html

National Environmental Vision (NOVI)

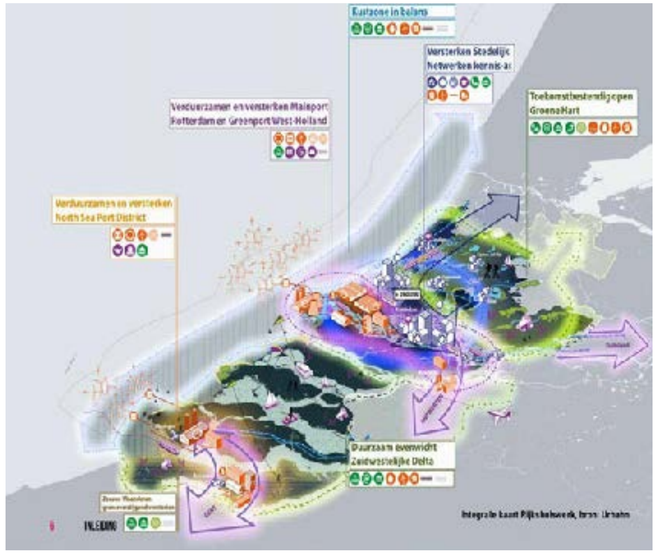


Figure 2.22
Source: Officiële Bekendmakingen. (2023). Prb 2023-10050. Retrieved from https://zoek.officielebekendmakingen.nl/prb-2023-10050.html

Een Ontdekkingsreis Naar Nieuw Zeeland

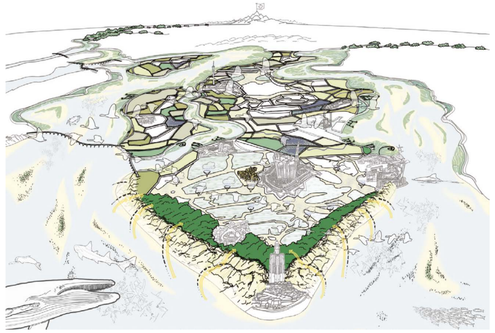


Figure 2.23
Source: RO&AD architecten. (n.d.). Ontdekkingsreis naar Nieuw-Zeeland. Retrieved from https://www.ro-ad.org/projecten/ontdekkingsreis-naar-nieuw-zeeland/