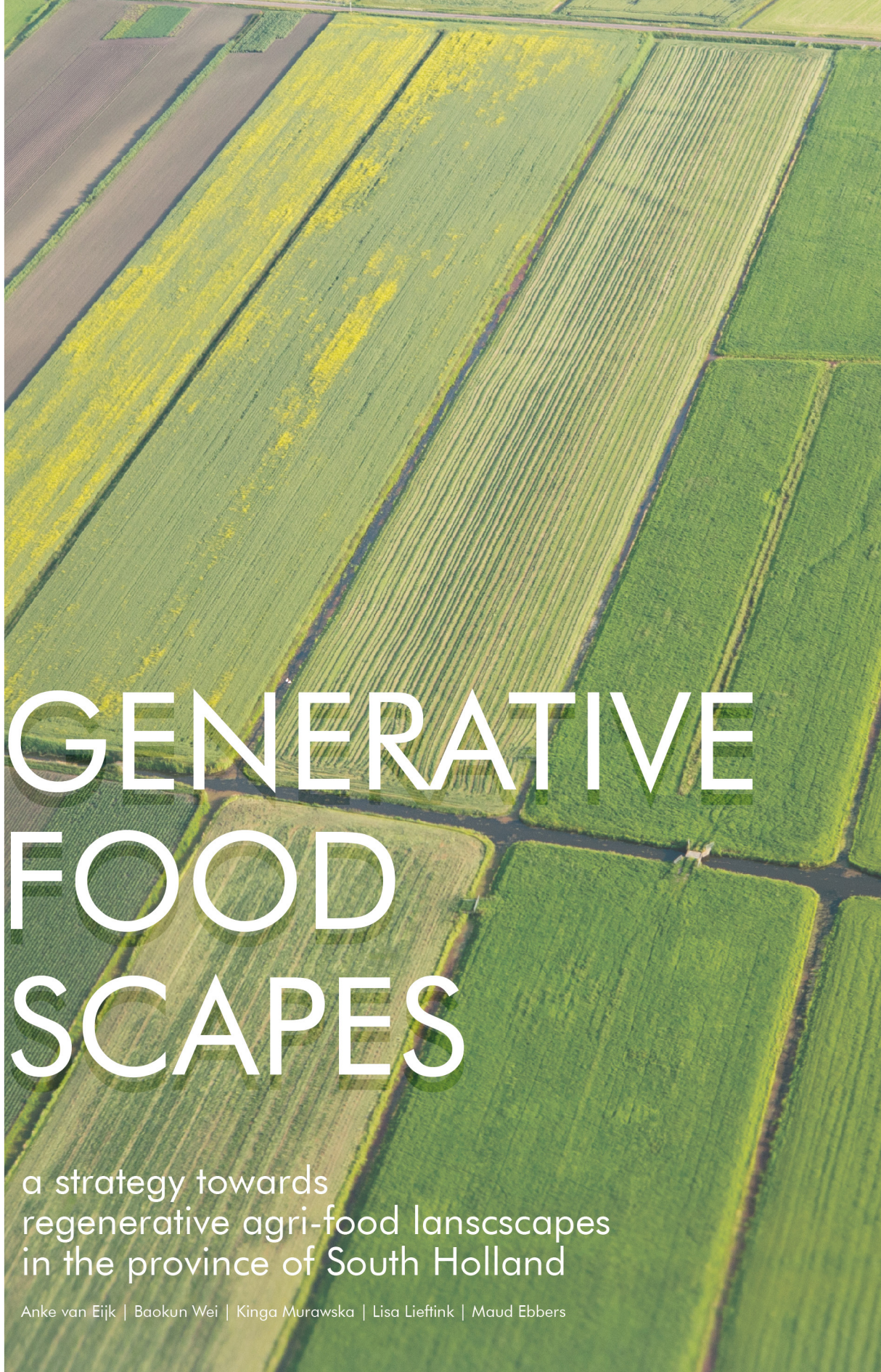

REGENERATIVE FOOD LANDSCAPES

a strategy towards regenerative agri-food lanscscapes in the province of South Holland

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ABSTRACT

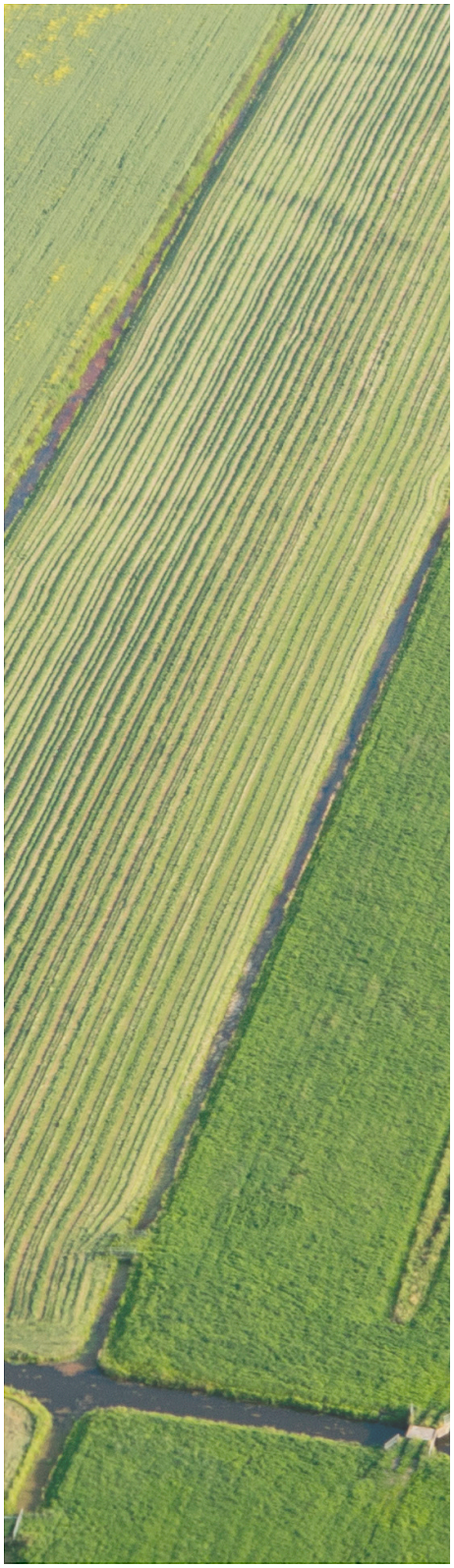
In the Netherlands landscape and (agri) culture have always influenced each other and there is an inherent relationship between them. Through innovations over time, the province of South-Holland developed profitable productive food-landscapes which provided an important contribution to the Dutch food production and export, making the Netherlands one of the leading food-exporters worldwide.

However, the profit-oriented character of the productive landscape no longer fits well with the changing societal values, as the current pattern is destructive to the environment and people feel disconnected from the food production and the landscape. Society today does not only value profit, but also increasingly cares about the environment and social justice. The productive systems are locked into a path of environmental destruction and do not focus on the values of society, which show increased awareness of the importance of a healthy, diverse, environmental-friendly and inclusive approach towards future developments.

To resolve this mismatch between landscape and culture, this project aims to transform the current economic-driven food productive landscapes towards regenerative food landscapes that match with the values and needs of society today. To do so, this project starts from the perspective of the landscape, uses transition theory as a theoretical base, takes into account social justice, and investigates the spatial implications of regenerative development.

The results are a vision that foresees regenerative landscapes for South Holland and a strategy with interventions to reach this vision by 2050. Both the vision and the strategy take into account the three different types of food landscapes of South Holland: agriculture on clay soil, livestock and dairy production on peat soil, and horticulture in a mixed peri-urban environment. The regenerative landscapes will not only mitigate the effects of previous destructions but reverse them by a cooperative relation between man and nature . The landscapes will revitalize the province to sustain modern values and to restore the inherent relation between landscape and culture.

Keywords:
Productive food landscapes, destructive land use, societal values, regenerative landscape development, spatial justice



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INTRODUCTION

INTRODUCTION

South Holland as a land of food

The province of South Holland is the most populous province of the Netherlands with over 3.7 million inhabitants on 3403 km^2 (CBS, 2020). Even so around 50% of the province is dedicated to food production. Hereby the province contributes much to making the Netherlands the second biggest food exporter in the world. The province is very prosperous and industrialized. Although there are many differences between residential, industrial and rural landscapes, much is cultivated and industrialized to be productive and profitable. This efficiency is good for the profit but not necessarily for the people and environment. There is still a lot of inequality in the region: this expresses itself in loneliness, stress, and unhealthy lifestyles. The global agriculture sectors have many negative environmental impacts, and while much of the produced goods are exported, the environmental impacts cause problems for the landscapes within the region.

The global industrialized economy is causing climate change and most of the province will experience the negative effects of that. As a world leader in the global economy, the province should become an example on how to reverse those negative effects.

The scope of this project are the food producing landscapes of the agricultural sector. Three main agri-food landscapes are defined: agriculture on the open clay soil, livestock and dairy production on peat soil, and horticulture in a mixed peri-urban environment. These areas have different typologies, uses and problems. Through the cultivation of land and technical innovations the Dutch became masters of agriculture. After World War II the agricultural landscapes were industrialized and crop yields increased. From this moment most Dutch citizens lost the relationship with their most productive landscape.

The Dutch agriculture sector is very efficient but the environmental impact on the landscape is critical and demands change.

A vision and a strategy were developed to shape that transition. This will be a transition towards regenerative landscapes. Regeneration takes a step further than sustainable development because it does not only mitigate but reverse the negative environmental effects. Furthermore the interaction between people and the landscape is a co-evolutionary one: this means that the regenerative landscapes will be used to fight inequality. The changed landscapes will remain productive for global export, but the balance with nature will be revitalised and the inherent relationship with the people will be re-established. Hereby setting the example for global development.

source: Google Earth

PROBLEM STATEMENT

Research question

How to transform the economic-driven productive food landscapes of South Holland into landscapes that match with the social and environmental values of society today?

In the Netherlands landscape and (agri)culture have always influenced each other and there is an inherent relationship between them (Koomen, Klijn & Nieuwenhuizen, 2005; Rijksdienst voor het cultureel erfgoed, 2016). The landscape represents the relation and interactions between nature and society (Primdahl, 2014). In early times, the landscape defined what the best places were to live, grow crops and start communities; the landscape influenced the culture. In the original delta landscape, the Dutch invented an innovative polder culture to create their own food landscapes. Later, after the hunger winter during World War II, the society never wanted hunger again and the farming landscapes were adjusted to be more productive; here the culture influenced the landscape (Planbureau voor de leefomgeving PBL, 2019; Rijksdienst voor het cultureel erfgoed, 2016).

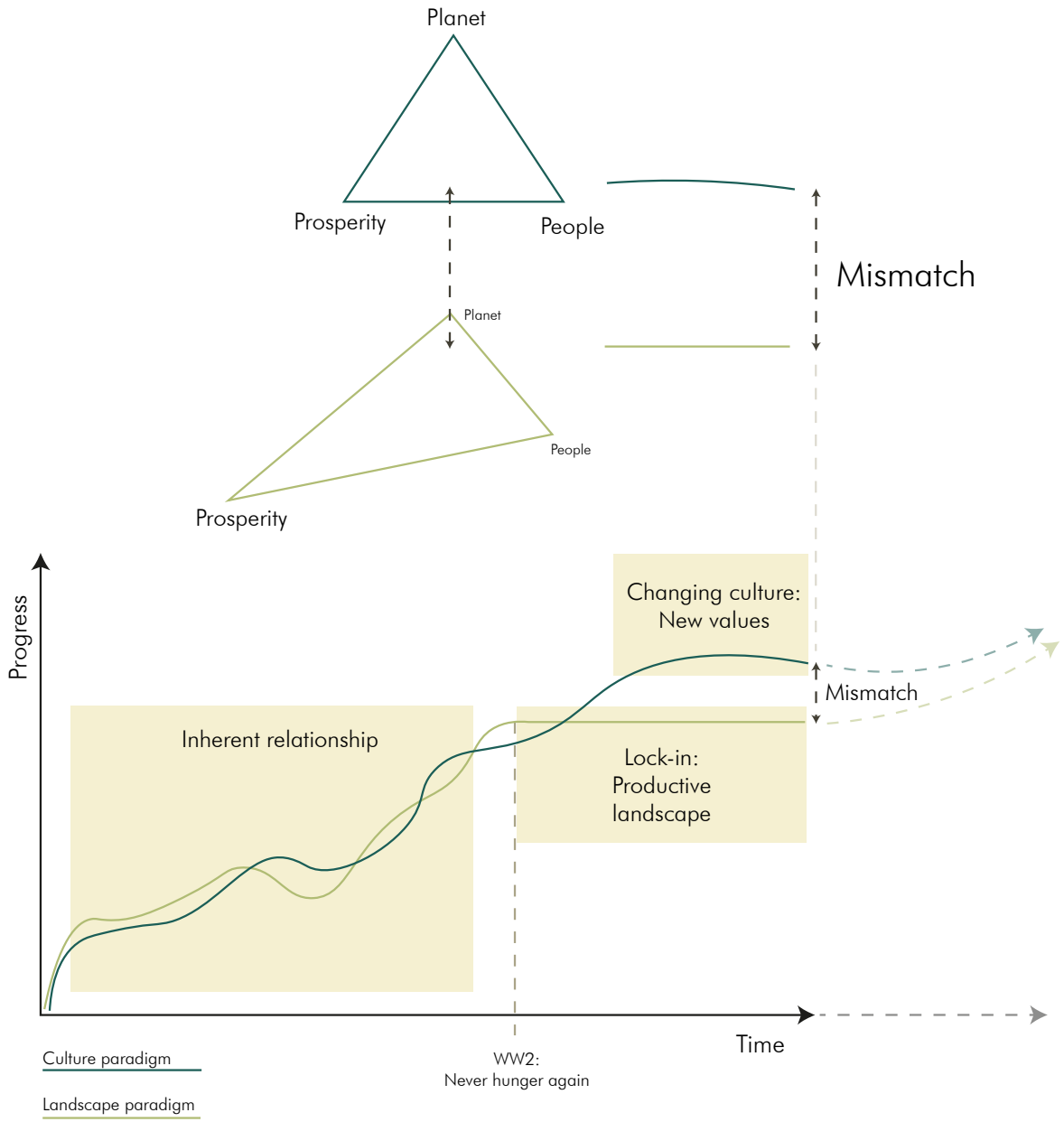
The province of South-Holland developed profitable productive food landscapes which provide an important contribution to the Dutch food production and export, making the Netherlands one of the leading food-exporters worldwide (Dolman, Jukema, & Rameakers, 2019).

However, these productive food landscapes are also the cause of a number of problems, which are becoming increasingly clear. Social problems such as the alienation of the citizen towards landscape and food production (Rijksdienst voor het Cultureel Erfgoed, 2017), and environmental issues such as biodiversity loss and greenhouse gas emissions (PBL, 2019).

Despite this, the dominant direction of the development of the Dutch farming is still fitting the post-war values of production for export and providing more than enough affordable food (PBL, 2019). It can be concluded that the current productive food landscapes are highly focused to be of economic value and that there is a lock-in of the current way of using the landscape; actors, institutions and technologies are adapted to, and facilitate, the current land use (Plambeck & Wijnakker, 2019).

In contrast, the societal values are changing due to more awareness of the problems. The society now attaches more importance to values as biodiversity, public health, cultural history, landscape, animal welfare and greenhouse gas reduction (PBL, 2019). Society today does not only value profit, but also increasingly cares about the environment and social justice; it would like the landscapes to fulfill values for people, planet and prosperity.

Because the society now wishes to add more values to the landscape, including environmental and social values, a mismatch exists between landscape and culture. The profit-oriented character of the productive food landscapes no longer fit well with the changing societal values, as the current pattern is destructive



to the environment and people feel disconnected from the food production and the landscape. The productive systems are locked into a path of environmental destruction and do not consider the values of society, which show increased awareness of the importance of a healthy, diverse, environmental-friendly and inclusive approach towards future developments.

To re-match the productive food landscapes with the new cultural values, and to manage the current and future environmental challenges, a shift is needed in the way these landscapes are used. This project aims to transform the current economic-driven food productive landscapes towards landscapes that match with the values and needs of society today.

The corresponding research question is: *How to transform the economic-driven productive food landscapes of South Holland into landscapes that match with the social and environmental values of society today?*

VISION STATEMENT

In 2050 South Holland will have regenerating agri-food landscapes. Regenerative development is about creating capacity and revitalizing for more capacity. The regenerative landscapes facilitate the co-evolution and cooperation between humans and nature to reverse the effects of climate change, overexploitation and ecosystem degradation.

The design values are based on that corporation: The environmental values revitalize the landscapes inner quality, the economic values focus on no longer exploiting the landscape, and the social values create healthy lifestyles and landscapes. The regenerative landscapes of South Holland remain productive for global export, but the balance with nature will be restored and the inherent relationship with consumers will be re-established. Hereby setting the example for global development.

The landscapes will be multifunctional, flourishing, and resilient. Healthy people interact with the landscape and work together to further evolve, themselves and the landscape. Each dominant landscape is regenerated in a different way to fit their needs and opportunities. The result is an adaptive and inclusive food system that contributes to both the health of the inhabitants as well as the health of the landscapes of South Holland.

In 2050 South Holland will have regenerating agri-food landscapes, which facilitate the co-evolution and cooperation between humans and nature to reverse the effects of climate change, overexploitation and ecosystem degradation. The result is an adaptive and inclusive food system that contributes to both the health of the inhabitants as well as the health of the landscapes of South Holland.

CONCEPTUAL FRAMEWORK

Which theories were used to answer the research question?

As shown in previous sections the project goal is to shape the transition from productive food landscapes towards more just and regenerative landscapes. In this chapter the conceptual foundation of this transition is explained. The foundation is based mainly on four theories: the landscape perspective, spatial justice, the transition theory, and regenerative development.

1. Landscape perspective

The landscape perspective is used as a starting point for the analysis of South Holland where we looked at specific conditions and characteristics. The proposed vision and strategy are mainly focused on the opportunities and future of the landscapes of the province and imply to change the culture by changing the landscapes.

Land itself is a finite resource (Amenta & van Timmeren, 2018; European Commission, 2020); it is not possible to extend the Earth or create new land and if treated in a bad way, land can also stop being a resource. However, it is possible and relevant to treat land as a renewable resource (Marin, 2018); if treated right, land can be used forever. Land is a special kind of resource, because it has presence and a fixed location (Li, 2014). As land is interpreted as a resource in itself, it can be seen as a common good: *'Commons are resources held in common'* (Rocco, 2020). Commons can be held by certain communities (Rocco, 2020), like farmland is held by farmers.

Landscape can be defined as a coherent whole, which is shaped by the interaction of humans and nature, that can be seen at a glance and distinguishes itself from adjacent parts (Pols et al., 2005). In contrast to land, landscapes are public goods (Lefebvre et al., 2015); they are non-excludable and non-rivalrous (Baldock, Hart and Scheele, 2011). Landscapes are free at the point of delivery, no one can be excluded from them and they don't decrease once you enjoy them (Rocco, 2020). The Dutch landscapes belong to everyone and are of public interest (PBL, 2019). It is clear that the health and quality, but also the viability of the landscapes is important for the whole society (Baldock, Hart and Scheele, 2011).

Farm landscapes can be considered public goods, even though the land itself is often private. While shaping the land for a private good (profitable food production), farming also provides the public goods of landscapes. The farming landscape can fulfill aesthetic, recreational and cultural values, but can also be necessary for other environmental public goods, such as water quality or biodiversity (Lefebvre et al., 2014).

As landscapes are considered public goods, and public goods should be fairly distributed, spatial justice is important to consider (Marcuse, 2009).

In the Netherlands, there is an inherent relationship between culture and landscape. As the landscapes developed to the present forms due to human interventions, the Dutch landscapes can be considered cultural landscapes (PBL, 2019; Pols et al., 2005). Human interventions, such as the polders, reclamations and urbanization, in combination with the soil, have played a big role in the development of the existing landscapes (PBL, 2019). Lemaire said about this relationship: "*In the landscape we are constantly confronted with ourselves, because for a large part the landscape is a sedimentation of our history*" (Lemaire, 2002 as quoted in Pols et al., 2005). In this way, landscapes are also part of the identity of places, as they are made up of historically grown patterns, structures and elements (PBL, 2019)). Because the landscapes change together with humans, they are dynamic (Pols et al., 2005). Moreover, an important part of the identity lies in the fact that the Dutch landscapes are always changing; change is part of the landscapes (Pols et al., 2005). Landscapes, as a reflection of culture, should be able to adapt with a changing culture. But, if the landscapes change too drastically, historic cultural layers could be lost (PBL, 2019). This is an important notion to take into account in the development of the strategy.

The Dutch landscapes are for a big part cultural farming landscapes, in which a strong relation exists between farming and landscape; landscapes provide opportunities and limitations for farming, and farming shapes and manages the landscapes (Koomen, Klijn & Nieuwenhuizen, 2005). Already in the past, the Dutch landscapes consisted mainly out of these production landscapes, which were (and still are) man-made and cultivated to produce food. (Pols et al.,). In this project these landscapes are called the productive food landscapes. Productive food landscapes are cultivated, used and maintained to produce as much food as possible. They are a result of a linear economic model where quick inputs are used to make them as profitable as possible, in disregard of waste streams and environmental impact.

As the landscapes changed over time, farming stayed the most important functional-economic carrier of the landscapes (PBL, 2019; Pols et al.,). After the Second World War, the landscapes changed drastically to prevent hunger in the future (PBL, 2019). Due to land consolidation, specialization, technical innovations, regional concentration and increases in the scale of farming, the food production was intensified. This made the Netherlands the second agricultural exporter in the world and until now the process of intensification continues (Bos, Smit and Schroder, 2013).

However, in the last few years the societal paradigm changed from profit-oriented, to sustainable oriented, for people, planet and prosperity. This influences the role of the landscape and farming, as they are now not only considered as food- and profit producers, but also as producers of environmental and social values (Bos, Smit and Schroder, 2013).
Farmers could for instance take care of sustainable food production, but also of soil- and water quality, biodiversity and the landscape (PBL, 2019).
"*The focus has shifted from the supply of agricultural commodities to the broader role of supporting the provision of a wide range of environmental and social public goods*" (Baldock, Hart and Scheele, 2011).

2. Spatial justice

In this project the concept of spatial justice is used to deal with the fair distribution of landscape qualities, the benefits and burdens of productive landscapes and the empowerment of silent stakeholders in planning. Spatial justice deals with the spatial aspects of social justice such as inequality, segregation or exclusion (Israel & Frenkel, 2017). Spatial justice has two main aspects: the distributive and procedural aspect (Marcuse, 2009).

This project deals with the procedural aspect of spatial justice by creating centers and networks where people can gather and participate. As the development of culture, and thus people, is inherently related with the development of landscape, it is important to include these people in decision making about these landscapes. Moreover, as landscape is considered a public good, it is in the interest and right of the society to have a say in what happens to the landscape.

The second aspect of spatial justice is distributive, but this distribution will be different for land and landscape. As land is considered a resource and a common good, landscape is considered a public good. Land is often private and the usefulness of land to humans usually depends on exclusion of other humans (Li, 2014). Furthermore the quality of land can be unequally distributed. It is not possible to distribute land but it is possible to give it a new purpose or regenerate it, which can improve the spatial justice for land.

Landscapes are public goods and should therefore be distributed fairly. This does not mean that farmers should share all their land, but that the landscapes fulfill values for the society, and that those values are distributed as fair as possible.

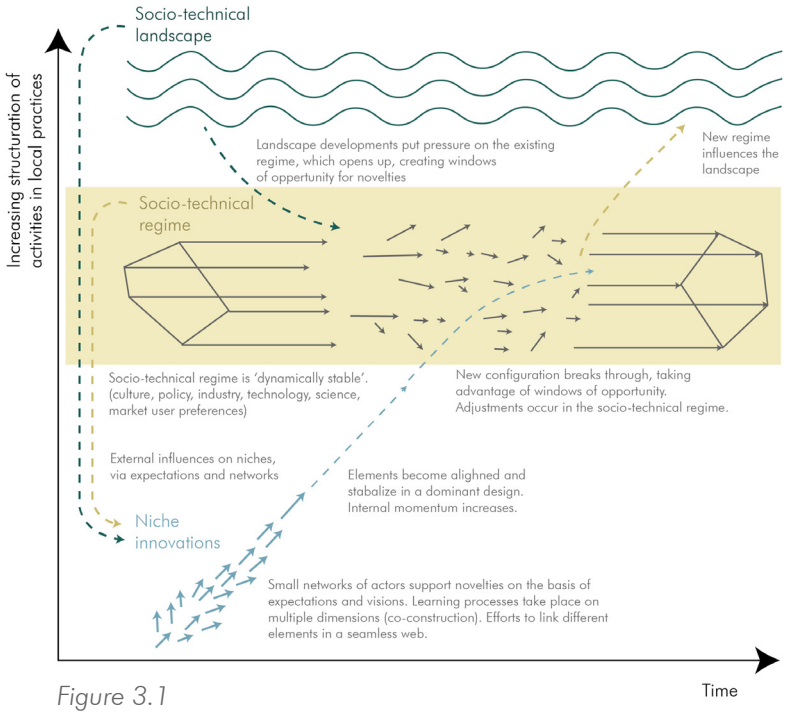


Figure 3.1

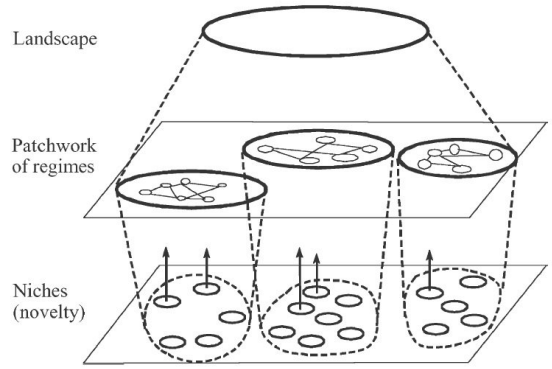


Figure 3.2

Figure 3.1:
Multi Level Perspective Model (Source: Food Hub, 2016)
Figure 3.2:
Multiple levels as a nested hierarchy (Source: Geels, 2002: 1261)

Landscapes should fulfill multiple values for society, from prosperity to social progress and environmental support. To ensure a fair distribution of the landscape it is important to make the landscape accessible for multiple uses and to distribute the effects of those uses fairly. To reach this, a transition is needed in the way the landscapes are used.

3. Transition theory

The transition theory is used to gain an understanding in the relation between developments of the landscape and the culture over time and in the current socio-technical regime of productive food landscapes. In addition, it has been used to shape the strategy.

The transition theory explains how transitions in socio-technical systems occur. A socio-technical system is a coherent complex of i.a. technologies, engineering practices, scientific knowledge, production processes, skills and procedures, and established user needs (Hoogma et al., 2005). Socio-technical transitions can be explained with the help of the Multi-level Perspective model (see Figure 3.1), which exists of three levels: The macro level of the socio-technical landscape, the meso level of the socio-technical regime and the micro level of the niche innovations (El Bilali, 2019; FoodHub, 2016; Geels, 2011).

The socio-technical landscape is the wider context for the interaction of actors and is shaped by i.a. paradigms, political developments, economic trends, cultural and societal values, and environmental problems. The landscape itself changes only slowly and influences niche and regime dynamics (El Bilali, 2019; Geels, 2011).

The socio-technical regime is the dominant system, the 'locus of established practices and associated rules' (El Bilali, 2019; Geels, 2011). It is a structure, consisting of a dynamic equilibrium of technologies, institutions and actors, that results in stability of the socio-technical system (El Bilali, 2019; FoodHub, 2016; Geels, 2011).

The niches are the places where radical innovation, and research and learning through experience, occur. The niche developments are protected from the mainstream market selection and therefore are able to deviate from the rules of the dominant regime (Geels, 2006; El Bilali, 2019). Examples are R&D laboratories, subsidised demonstration projects and start-ups (FoodHub, 2016; Geels, 2011).

The whole system can be seen as a nested hierarchy (see Figure 3.2): The regime is nested in the landscape and the niches are nested in the regime (Geels, 2006). In this, niches are the least

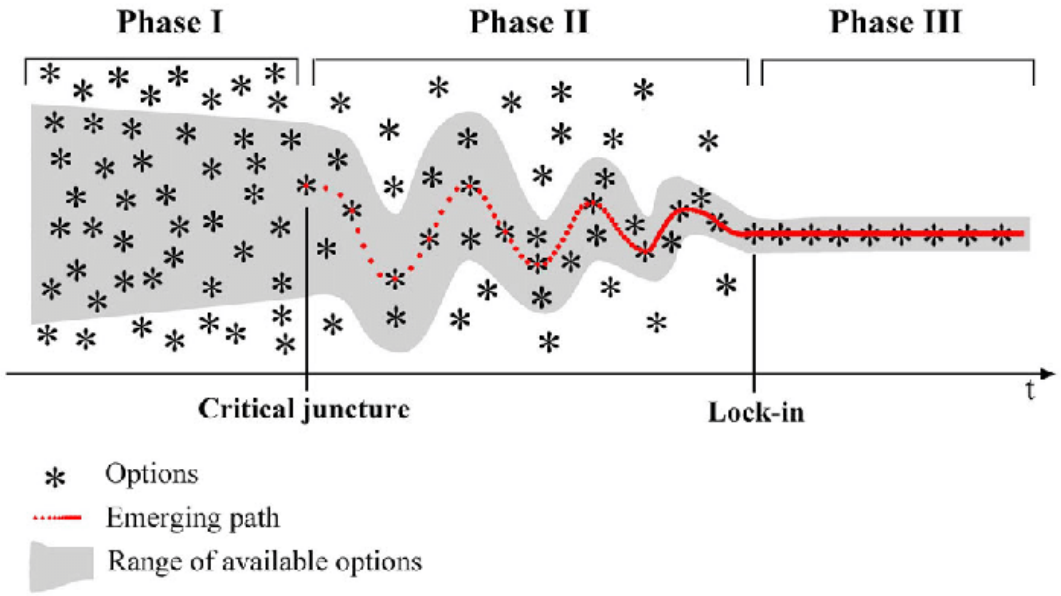


Figure 3.3: Phase III shows the lock-in (Source: Sydow et al., 2009: 692)

stable and landscapes are the most stable in terms of the amount of actors and degrees of alignment between the elements (Geels, 2011).

A transition is a shift from the current socio-technical regime to another (El Bilali, 2019). It is a process in which the society's culture, (institutional) structures and practices are changing fundamentally and irreversibly (Drift, 2020). These changes are the result of a co-evolution of developments at all the three levels of the socio-technical system (Drift, 2020; El Bilali, 2019). For a transition to happen, the current regime should be destabilised and a new regime should be able to emerge (Rocco, 2020). A regime can be destabilised by the landscape and niche levels. Changing trends and paradigms at the landscape level pressurize the regime to change. This creates opportunities for emerging niche developments, which fit better to the changed landscape than the current regime, to break through and form a new regime (El Bilali, 2019; FoodHub, 2016; Geels, 2011). This new regime will again influence the landscape; it generates new cultural and behavioural patterns (Rocco, 2020).

In reality, socio-technical regimes rarely transform or reconfigure (Bilali, 2019). The existing regime is stable because of many lock-in mechanisms (Geels, 2011); the regime is intertwined with institutional structures, infrastructures, and the expectations and skills of technology users (cultural attachment) (Kemp et al., 1998; Geels, 2006), see Figure 3.3. Changes are constricted to occur alongside established pathways of development and regimes tend to innovate only incrementally (Markard et al., 2012; Geels, 2011; Bilali, 2019).

The current food landscapes of South Holland are locked-in the socio-technical regime of the productive landscapes, as explained before. But there are signs of a possible transition: The socio-technical landscape is changing, because paradigms are moving towards more sustainable values, and niche developments can already be found in the form of initiatives and start-ups for new food systems and landscapes. Strengthening these changes in the landscape and niches will stimulate the transition towards a new regime.

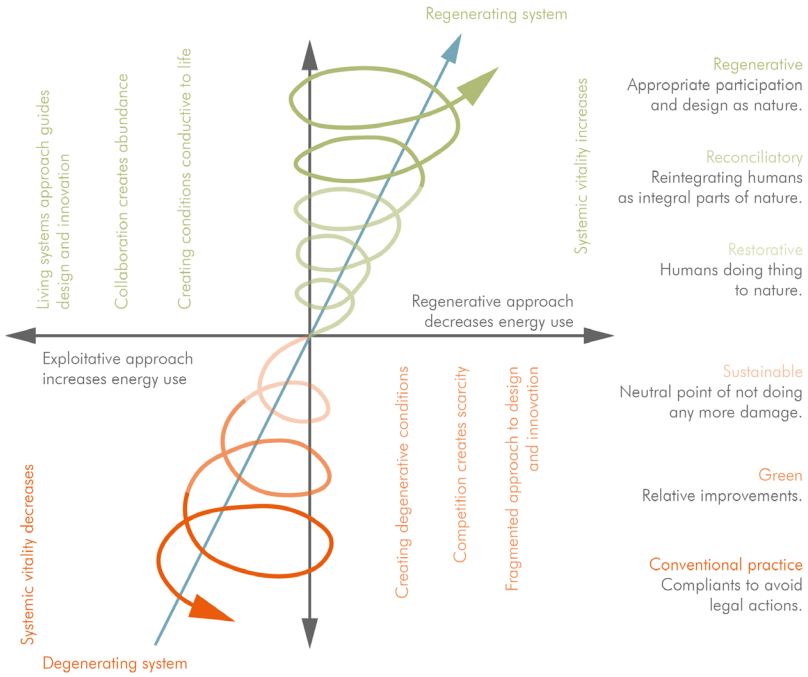


Figure 4.1

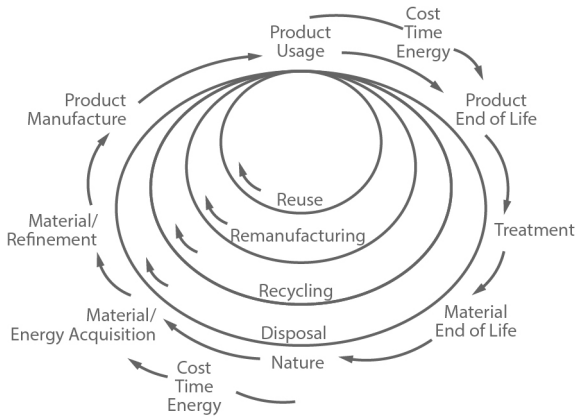


Figure 4.2

Figure 4.1:
The regenerative design framework (source: Wahl, 2019)
Figure 4.2:
Circular economy (source: Korhonen, Honkasalo & Seppala, 2018)

4. Regenerative landscapes

In this project the concept of regenerative development is used to create a vision where the negative effects of past use on landscapes are not only reversed but to give the landscapes the capacity to regenerate themselves. The current productive use of the agriculture landscapes in south Holland is depleting it's capacity and value. This projects' vision for regenerative landscapes focuses on restoring it's inherent resilience and health and goes further than sustainable development.

Sustainable development is the dominant paradigm nowadays (Mensah & Ricart Casadevall, 2019). It is development that does not compromise the needs of future generations and aims at a balance between achieving social progress (people), environmental equilibrium (planet) and economic growth (profit). These are referred to as the 3 pillars of sustainable development: economic, social and environmental sustainability (Mensah & Ricart Casadevall, 2019). Economic sustainability implies a system where natural resources (like materials, land, water and nutrients) are limited and need to be used and restored equitably. Social sustainability supports the capacity of current and future generations to establish healthy, safe and liveable communities. Environmental sustainability focuses on the capacity of ecosystems to maintain their natural processes, retain biodiversity and support human life. However, like us, there is a growing group of people that think just sustainable development is insufficient to restore the environmental equilibrium.

Along with these people, we turn to regenerative development as it offers more benefits in the form of capacity building and resilience: "Practices in sustainable or green design have focused primarily on minimizing damage to the environment and human health, and using resources more efficiently; in effect slowing down the degradation of earth's natural systems." (Mang & Bill, 2012); "Sustainable Development is a half-vast approach to vast problems. Its purpose, to make life on this planet sustainable, is a noble disguise for the maintenance of the status quo."(Gabel 2016); A sustainable system is one that goes to the neutral point of not doing any damage anymore and no further (Wahl, 2019).Regenerative approaches seek to design a co-evolution of human and natural systems in a way that generates mutual benefits and capacity for both. It tries to improve society's well being in a way that regenerates and builds the capacity of the support systems needed for future growth and therefore takes a step further than sustainable development as can be seen in figure 4.1 (Wahl, 2019; Gabel 2016; Mang & Reed, 2012).

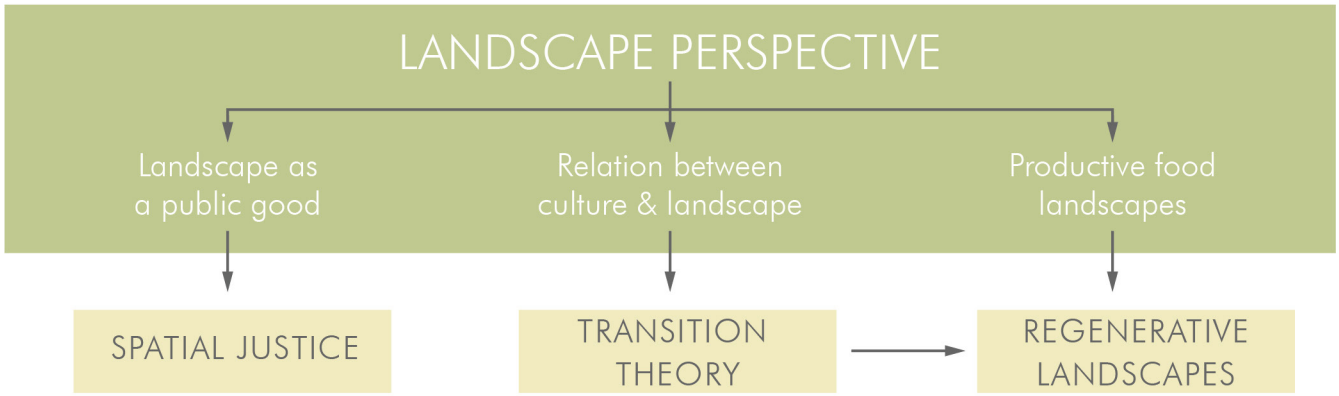


Figure 5.1

For this project Circular Economy and the revival of land, resources and nutrients play an important role in regeneration. The linear "source to sink" flows are destroying the earths' natural restoration system (Mang & Reed, 2012). The current model of Circular Economy focuses on prolonging the life cycle and value chain as long as possible by transforming the linear flow model into a circular one (Korhonen et al., Honkasalo, & Seppälä, 2018) . In figure 4.2 the smaller the circle the less resources and energy is needed to restore its value. Circular Economy is considered a condition for a sustainable society. However it will always cost energy and resources to recycle, only as long as the process can continue to replace its own materials and energy needed it can be considered a regenerative design (Mang & Reed, 2012).

Landscapes are the physical result of the interaction between man and nature, and are therefore the focus of this project. Because it is the co-evolution between man and nature that is vital in regenerative development. Regenerative development improves the health and vitality of both human and natural systems; it enhances the caring relation and commitment from stakeholders to a place (the landscape) that enables it to endure and evolve; it invests and produces surplus resources and energy to build the capacity of support systems needed for resilience and evolution (Mang & Reed, 2012). Regenerative landscapes have the capacity to restore itself.

5. Conclusion

Together, these concepts and theories form the conceptual framework used in this project (see Figure 5.1). The landscape perspective has put the focus on the notion of landscape as a public good, on the inherent relation of the development of culture and landscape, and on the current socio-technical regime of productive food landscapes.

The notion of the landscape as public good is strongly intertwined with spatial justice, as it is important to have a fair distribution of public goods, thus of the landscape (accessibility). This also fits with the idea that the landscape should fulfill values for everyone, not only the value of prosperity for the farmers. Although land itself can be private, the landscape should be able to function as a public good that fulfills values for people, planet and prosperity, and is distributed fairly. Because landscape is a public good, procedural spatial justice also matters. The communities are all 'owners' of the landscape and should be part of the landscape's development, that is connected to cultural development.

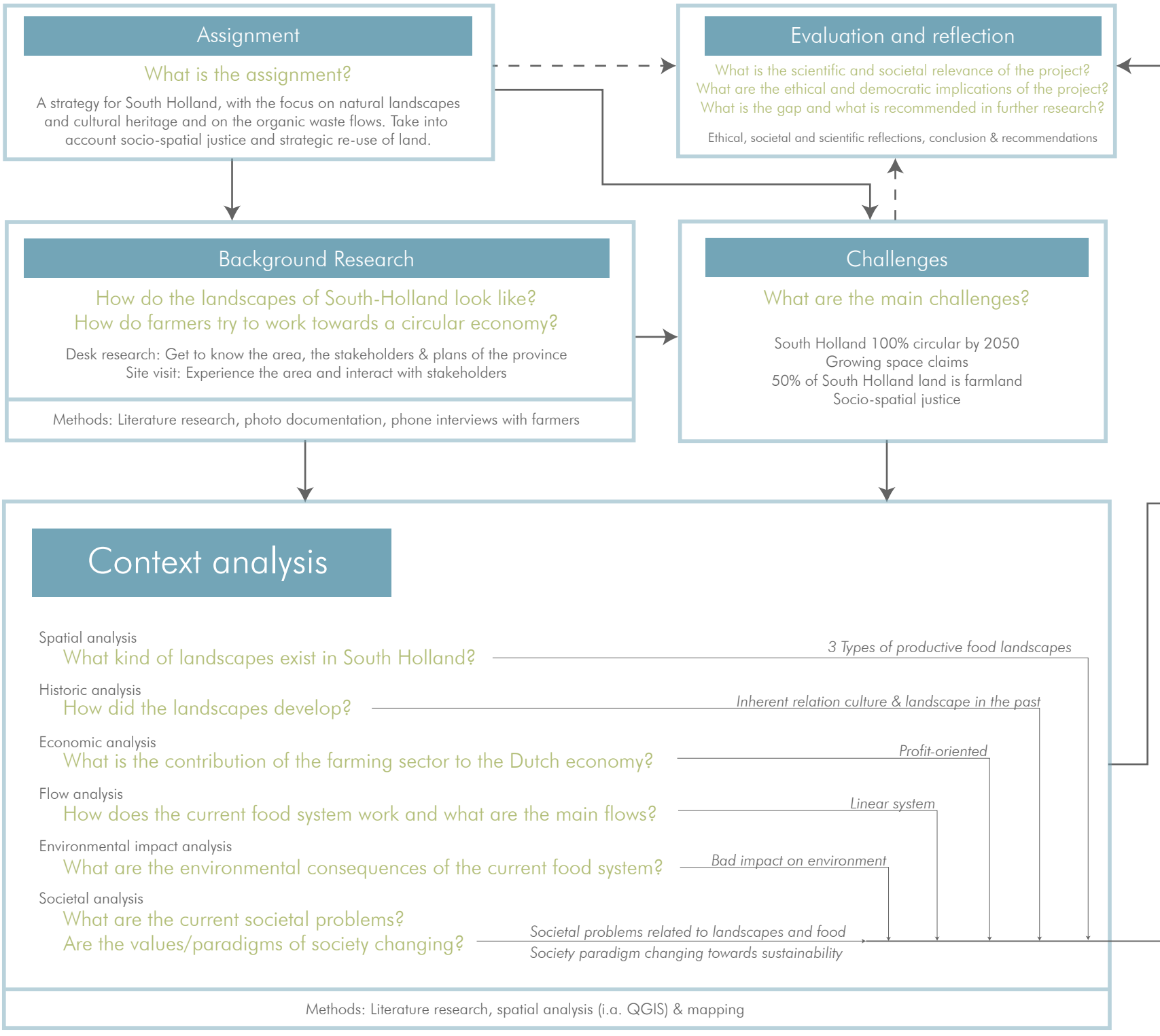
The inherent relation between the development of culture and landscape is also reflected in the transition theory. As the physical landscape can be seen as the socio-technical regime, and the culture can be seen as the socio-technical landscape, the transition theory shows how landscape and culture influence each other and develop together towards lock-ins and transitions.

Connected to the transition theory, it can be concluded that the current food landscapes are locked-in in the socio-technical regime of productive food landscapes. Following the transition theory, we want to shape a starting transition towards a regenerative system, paradigms are already changing and niche developments are evolving. Strengthening these changes in the landscape and niches will be one of the ways to shape the transition towards a new regime of regenerative landscapes.

The regenerative landscapes have the capacity to revitalisze their own support systems and are therefore extremely valuable as they are more resilient and have more capacity than the depleted traditional food landscapes.

The role of the strategy is to stimulate and guide this transition to ensure spatially fair distributions and processes, the prevention of the loss of historic cultural layers, and the development towards integrated regenerative landscapes.

METHODOLOGY FRAMEWORK



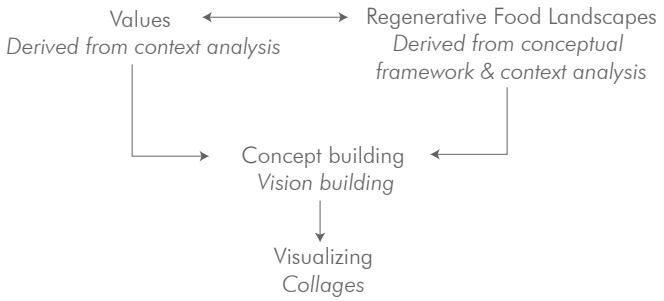
Strategy

How to guide and shape the transition from productive food landscapes towards Regenerative food landscapes?

Methods: Guiding principles, stakeholder analysis, circular flow analysis, mapping, research by design, visualizing

Vision

What is the future of the South Holland landscapes and how will they look like?



Methods: Values, concept building, ideal scenario, literature research, research by design, visualizing (collage)

Conceptual framework

Which theories can be used to answer the research question?

Methods: Literature research, concept building

Problem statement

Problem
=
Mismatch between the values that the productive food landscapes currently fulfill and the values that the society would like the landscapes to fulfill.

Research question

How to transform the economic-driven productive food landscapes of South Holland into landscapes that match with the social and environmental values of society today?

ANALYSIS

GOALS & CHALLENGES

What are the challenges for the province of South Holland? And what are the goals of it?

Circularity goal

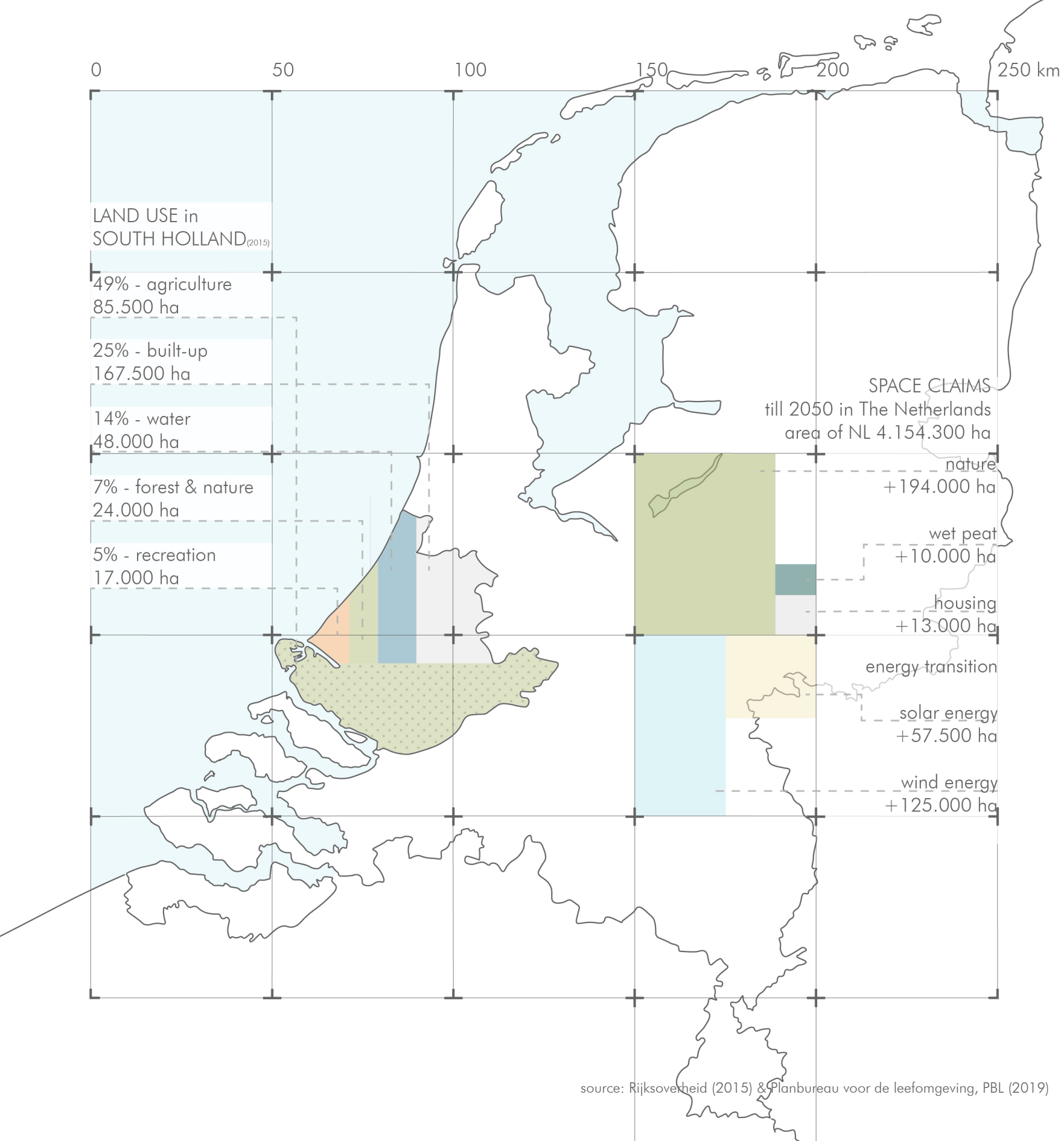
The province of South Holland set a goal to make its economy 100% circular by 2050 (Provincie Zuid-Holland, 2019). Circular economy is defined as 'a new economic model which supports societal development through fair distribution of resources, without exceeding the carrying capacity of the earth or affecting the functioning of the biosphere.' To reach this goal, the agri-food sector should become circular too. This makes closing the organic cycle one of the main goals of the province. The transition should focus on the whole chain, from production to consumption. The organic cycle can be closed by closing the nutrient cycles, by high-quality use of biomass and by the recycling of waste streams (Drift & Metabolic, 2019).

Space claims

An associated challenge is the challenge of the space claims in the Netherlands. Till 2050 the space claims will grow for housing, nature, climate adaptation and the energy transition. (Planbureau voor de Leefomgeving (PBL), 2019). The space claim for housing grows because the province needs to build around 230.000 new homes until 2030 (Ministerie van BZK, 2018). Space is also needed for nature development, as the Netherlands made international agreements to enhance and protect biodiversity. Due to climate change, periods of droughts are getting longer and peak water levels (of both sea and rivers) are getting higher. Therefore space is needed to store water and ensure safety. For the energy transition, space is needed for green energy production with wind turbines and ground bound solar panels (PBL, 2019).

Change in the way the food landscapes are used

At the same time, almost half of the land in South Holland is used for farming (Rijksoverheid, 2020). With the knowledge that the space claims are growing in the Netherlands, it is evident that the same applies to the province of South Holland. The space claims are growing, but almost all the land is already fulfilling a function. So it is inevitable that land should fulfill multiple functions in the future, and thus become multifunctional. And because half of all the land in South Holland is used for farming, the farming landscapes especially should change and fulfill multiple functions for society in the future. The question is how the province can rethink the way the land is used and how challenges can be turned into opportunities.



source: Rijksoverheid (2015) & Planbureau voor de leefomgeving, PBL (2019)

CURRENT STATUS

There are three dominant agri-food landscapes in South Holland. What is their current status?

The rural clay landscapes
in the south

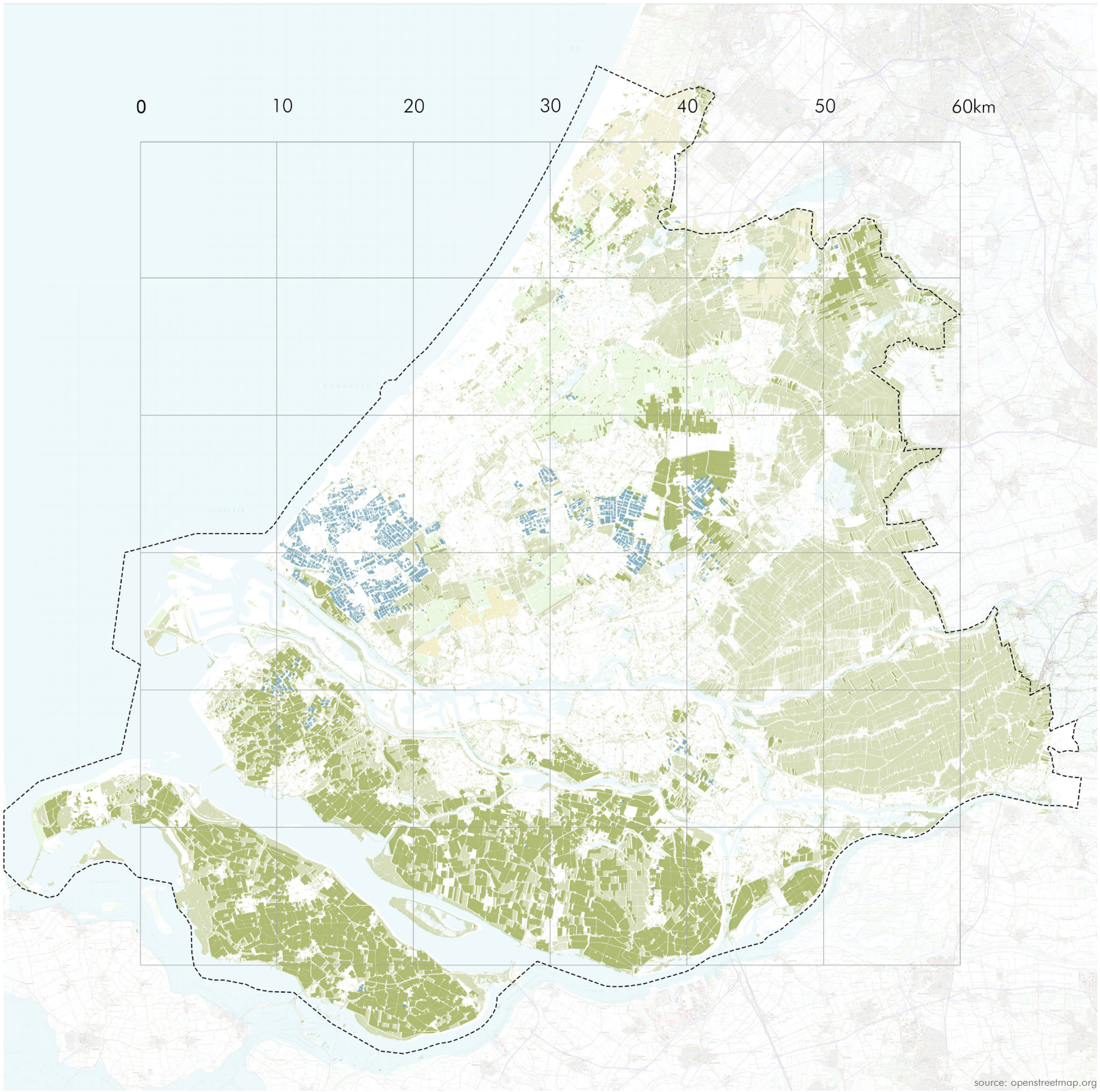
This area covers the (former) islands in the South of the province. These islands were shaped by the Rhine–Meuse–Scheldt delta and the sea. Once the area was protected for flooding by diking it, the area was safe and good to use for agriculture, as the sea clay soil is very fertile (Geologie van Nederland, n.d; Rensink,et al.2015). This landscape can be characterized by the large and seemingly endless agriculture plots with some small towns scattered around.

The rural peat landscapes
in the east

This area covers the lowest part of the Netherlands (AHN, 2020). This area consisted of peat wetlands, but in the middle ages it was reclaimed and cultivated for agriculture. Soon that was impossible due to subsidence (Plambeck & Wijnakker, 2019; Geologie van Nederland, n.d; Rensink,et al.2015). Now it is used for cattle (dairy and meat). It has little agricultural value and is difficult to urbanize because of the poor soil capacity (Plambeck & Wijnakker, 2019; RIVM 2015). It belongs to the green heart and has the typical Dutch polders with meadows, cows and windmills.

The peri-urban mixed landscapes
in the west

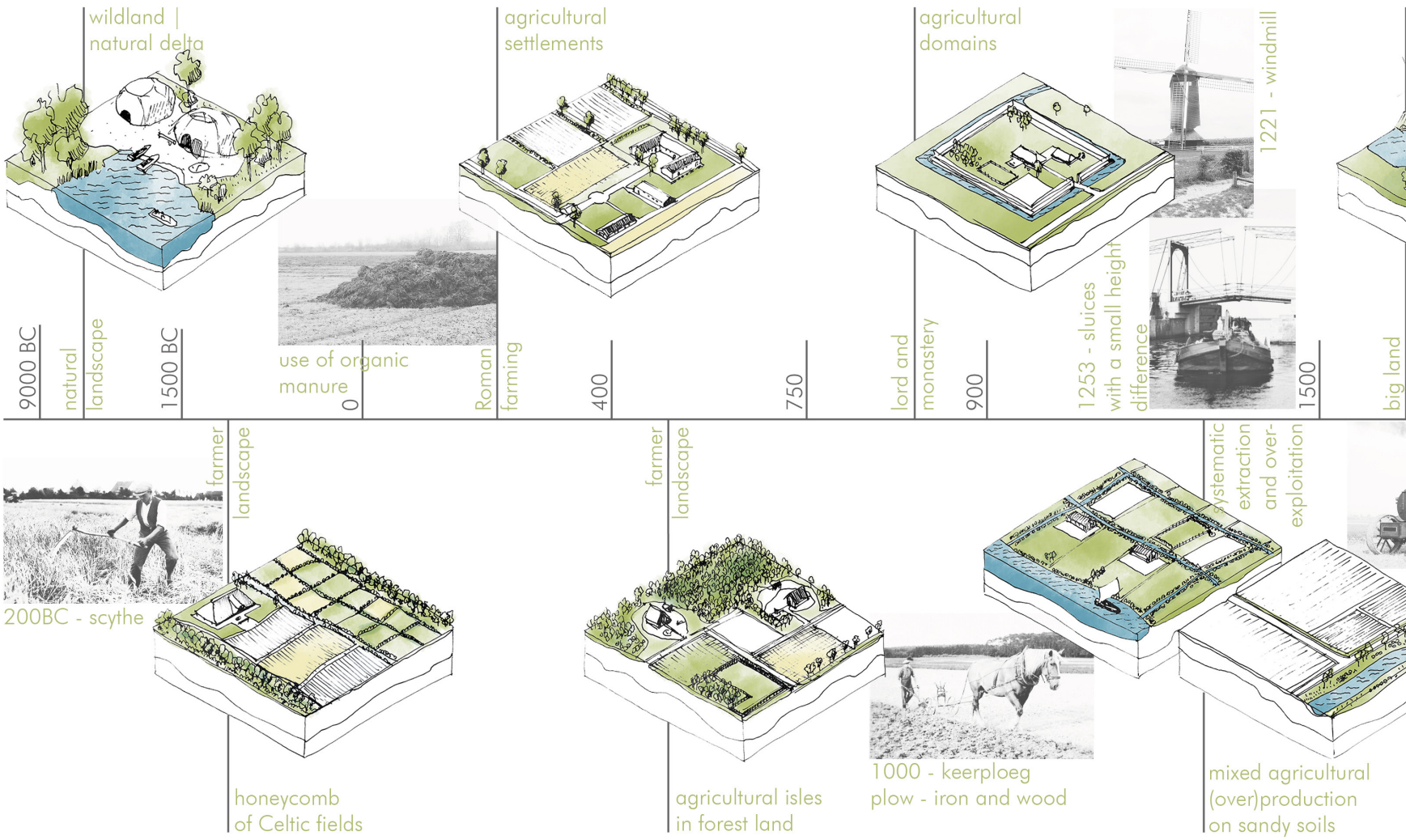
The west of the province is more urbanized and has several landscape-types: dunes, river clay, peat, sea-clay or combinations of these (Geologie van Nederland, n.d; Rensink,et al.2015). It has highly efficient and profitable horticulture clusters in Westland, Oostland, Boskoop and the Bollenstreek. This efficiency comes with large scale greenhouses in the peri-urban areas, cluttering and blocking the open landscape.



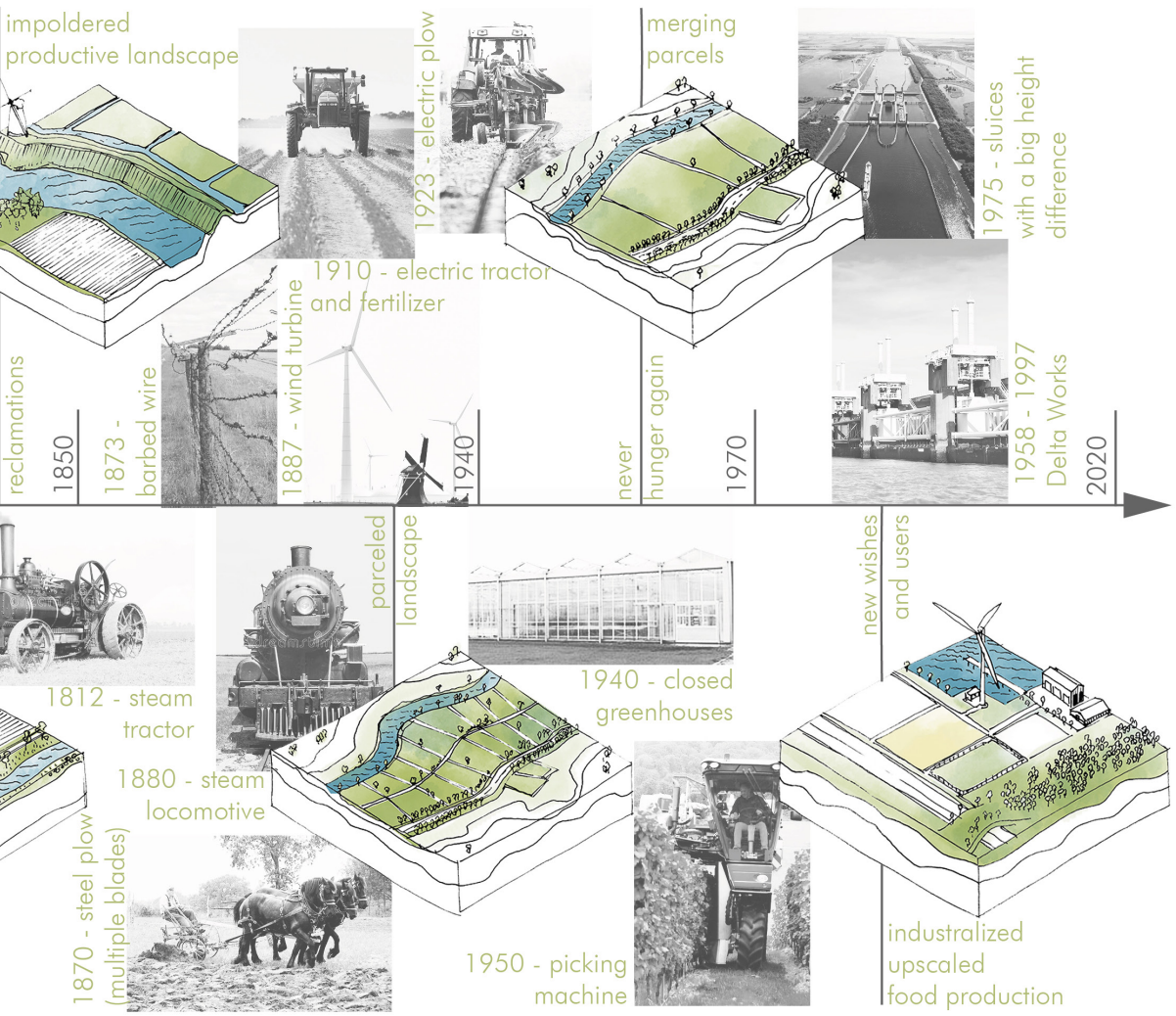
meadow (livestock) | on peat agriculture | on clay horticulture | on mixed soil open field (no agriculture function)

LANDSCAPE CHANGE + INNOVATIONS

How did agriculture influence the development of the Dutch landscape?
How did technological innovations throughout time change the landscape?



source: Man-Made Lowlands, C.P. van de Ven & 4 Tijdlijnen Nederlands Cultuurlandschap, Rijksdienst voor het Cultureel Erfgoed



During the Dutch history, agriculture played an important role in how the landscape was used. Most Dutch landscapes are cultivated. The methods for cultivation changed over time as new innovations made the process easier.

After the Romans left in 400 AD, the population size decreased and people went back to the primitive agriculture method of Celtic fields. These were scattered between the woods. In the middle ages, farmers worked for the nobility. The population was growing again and so did agriculture.

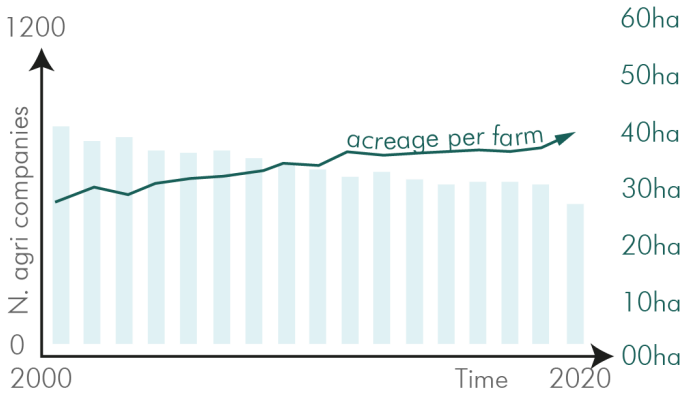
From the 11th century the wetlands in the west were systemically reclaimed, as the growing population was demanding more food. Farmers started to specialize and with the help of innovations such as the plow, crop yields increased. However this led to overexploitation, resulting in water problems in wetlands. These could be fixed with dykes and windmills, but history learned that that was not a lasting solution.

Later on wind turbines were used to drain former peat lakes (where peat was cut out for fuel). In the 19th century farms were privatized, resulting in many small parcels. After the hunger winter in the second World War the sentiment was to never be hungry again. This became the reigning paradigm: never hungry again. The whole agriculture sector was turned around to become super-efficient: plots were swapped to increase farm size; water management and infrastructure were improved and farms were modernized (Rijksdienst voor het cultureel erfgoed, 2016).

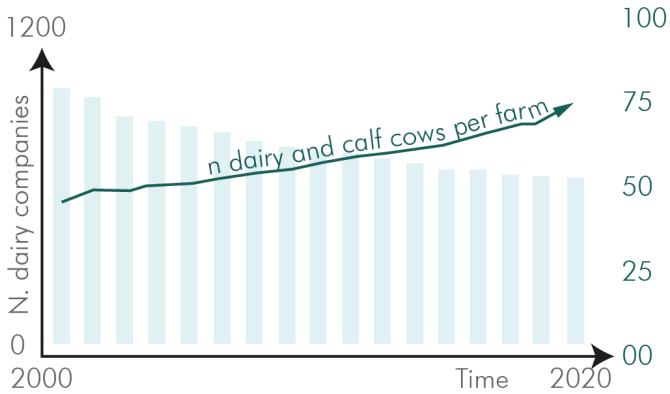
Many innovations were at the foundation of large developments: manure, plows, windmills, steam engines, fertilizer, tractors, picking machines and the greenhouses. Some evolved over time and some caused a revolution: windmills, the steam engine, and relatively recently the greenhouses.

POLICIES & POWER

Internationalization over time



Source: Dolman et al. (2017)



Source: Dolman et al. (2017)

Law and land ownership

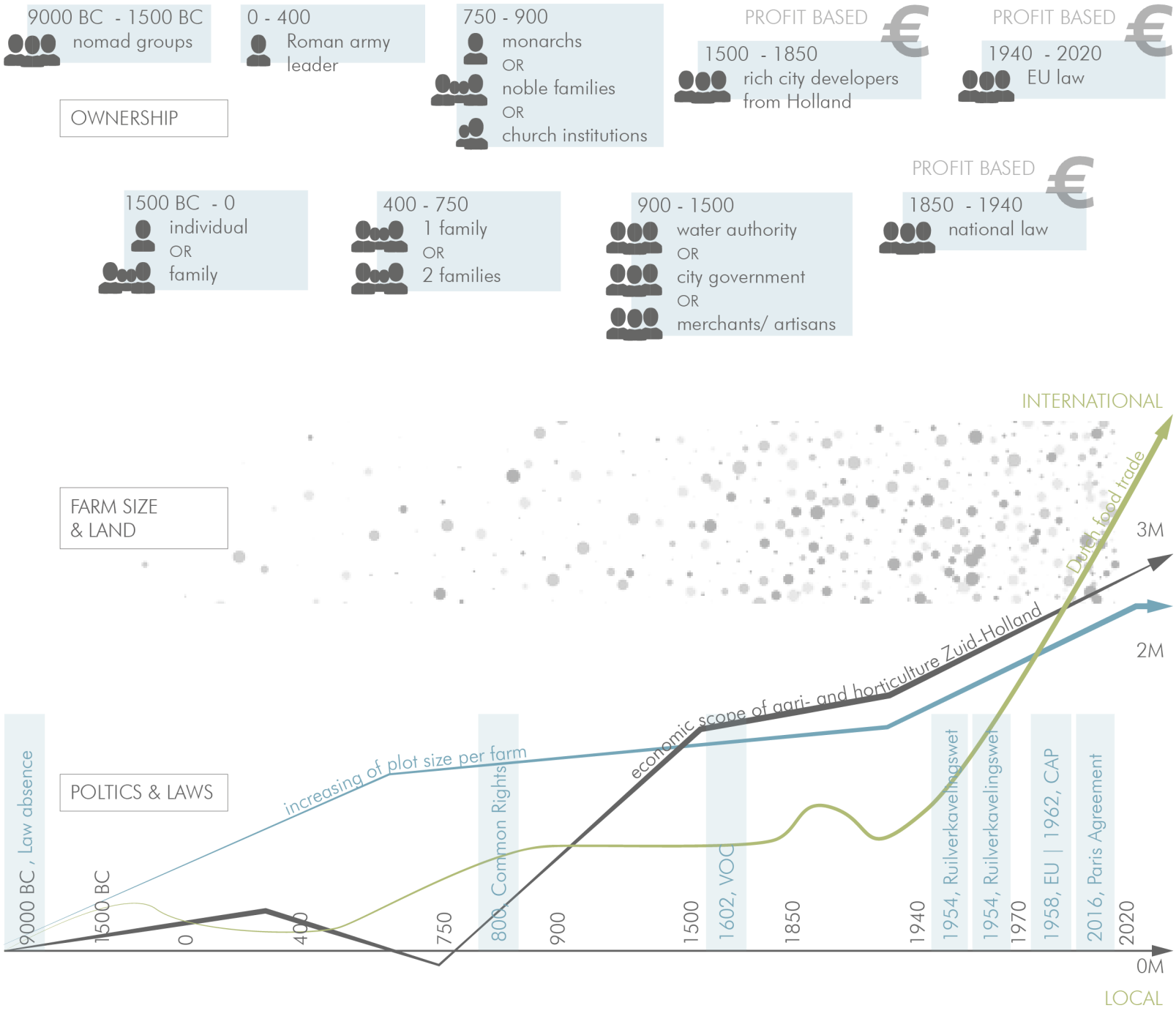
Until the second World War no fixed law for land ownership was there. Back in the days, army leaders owned plots and let the bourgeoisie work for them. In the VOC period, pieces were hijacked and later resold. After the second World War the land consolidation law made it possible for farmers to expand their land. Land consolidation is the redistribution of agricultural land or the exchange of plots of farmland, which creates larger, contiguous plots and allows the agricultural business to run more economically (Rijksdienst voor het cultureel erfgoed, 2016).

Produce as much as possible

When the economy started to grow and people could permit themselves bigger plots of land. Not only famers with ambition but also (private) investors started to invest more in land. The investor, the technical owner, was mostly not living close-by and hired landlords to do the work. They took care of the profit which, as being said it's after World War II, was only focussed on producing as much as achievable, no consequences taken into account (Rijksdienst voor het cultureel erfgoed, 2016).And still in current times, the farms are intensifying. This is visible in the graphs, as the amount of businesses are declining, but the scale is increasing. This means that plots get bigger per one agriculture farm, with a vast majority of livestock(CBS, 2020) .

From local to international

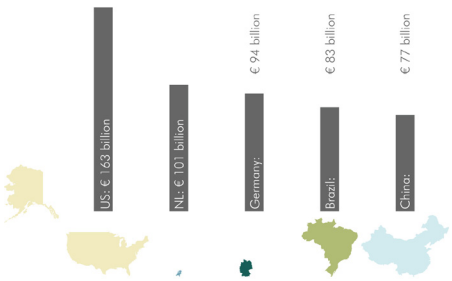
People never wanted hunger again, this is what brought us to the lock-in productive landscape. The will to be more productive, still applies. Through technologies, politics and upscaling of farms, the intensification is reached. Through the years, the high production levels have become important for the Dutch economy. Currently The Netherlands is the second biggest food exporter in the world. A change from local to international farming (Rijksdienst voor het cultureel erfgoed, 2016).



Source: European Commission (n.d.) & Province of South Holland (n.d.) & CBS (2014;2020) & Westlanders.nu (2016) & AgriFoodTech Platform (2018) & de Kort, et al. (2018) & Jukema, et al.(2020) & Wageningen University(2020)

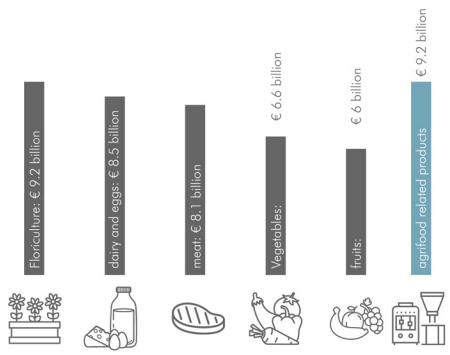
ECONOMY

What is the contribution of the farming sector in South Holland to the Dutch economy?



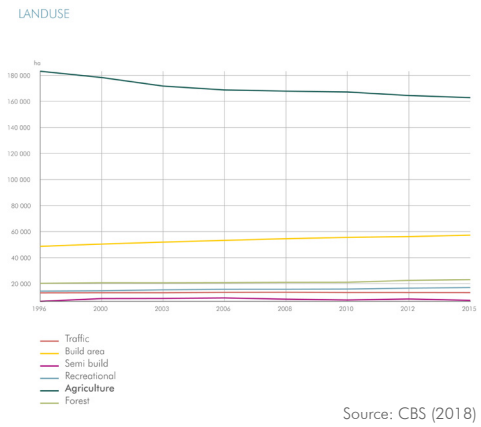
Data source: Dolman, Jukema, & Rameakers (2019)

Biggest food exporters in the world



Data source: Dolman, Jukema, & Rameakers (2019)

Economic production



Source: CBS (2018)

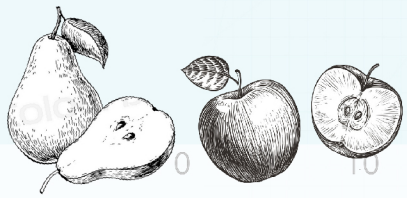
Change in land use over time

Most of the production in the Netherlands is used for export; in 2018 the country exported €90.3 billion of food products (Dolman, Jukema, & Rameakers, 2019). These products include: floricultural products with a value of €9.2 billion, dairy and eggs with a value of €8.5 billion, meat with a value of €8.1 billion, vegetables with a value of €6.6 billion and fruits with a value of €6.0 billion. The export of agrifood related products is growing, these include (high-tech) machinery. This has a value of €9.2 billion. Minus the costs, the complete food system of the Netherlands earns (added (added value): €45 billion. In 2018 the Netherlands was the 2nd agriculture exporter in the world (Dolman, Jukema, & Rameakers, 2019). In 2017 the agri-food sector was good for 7% of the GDP, this also includes the processing of imported goods and the trade of goods (Meulen, 2019). Of the Dutch GDP 18% is produced by South Holland (Manshanden & Koops, 2018). The agriculture sector is dependent on the global market: the Dutch export most of their products, use migrant workers from the EU for labor and are dependent on global transport systems (Trompiz, 2020).

The province of South Holland produced 6 tonnes of agricultural products with a value of €5.5 million in 2016. The sector is good for 103.170 jobs and 16.526 companies (Drift & Metabolic, 2018). In 2015 50% of the land was used for agriculture, this has been slowly decreasing in the last 20 years (CBS, 2019).
The focus of cattle breeding for dairy production and meat is in the rural peat area. The production of vegetables and fruits on open soil is focused in the south. The floricultural products and vegetables in greenhouses are produced in clusters, so-called greenports, throughout the peri-urban area.

NOS, 2020: "Export record for Dutch farming of € 94,5 billion in 2019"

In 2017 farming contributed to 7% of Dutch GDP



Fruit € 6,0 billion
6,6% of agri-export (2018)

Vegetables € 6,6 billion
7,3% of agri-export (2018)

Meat € 9,1 billion
8,9% of agri-export (2018)

Dairy & eggs € 8,5 billion
9,4% of agri-export (2018)

62% Grassland & green fedder

4% Horticulture - glasshouses

6% Horticulture - open soil

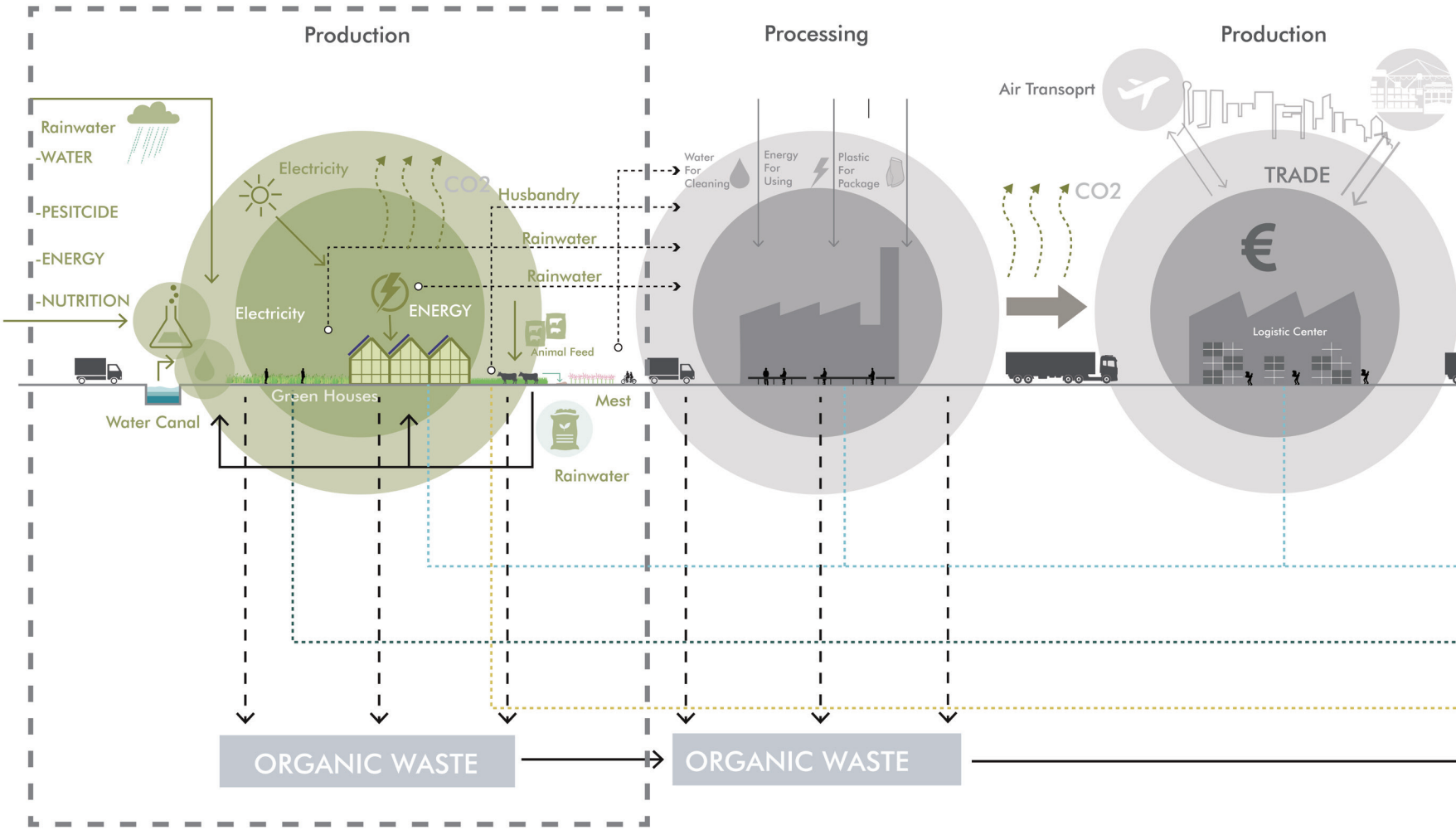
28% Agriculture

crops | Fruit trees | Grains | Livestock

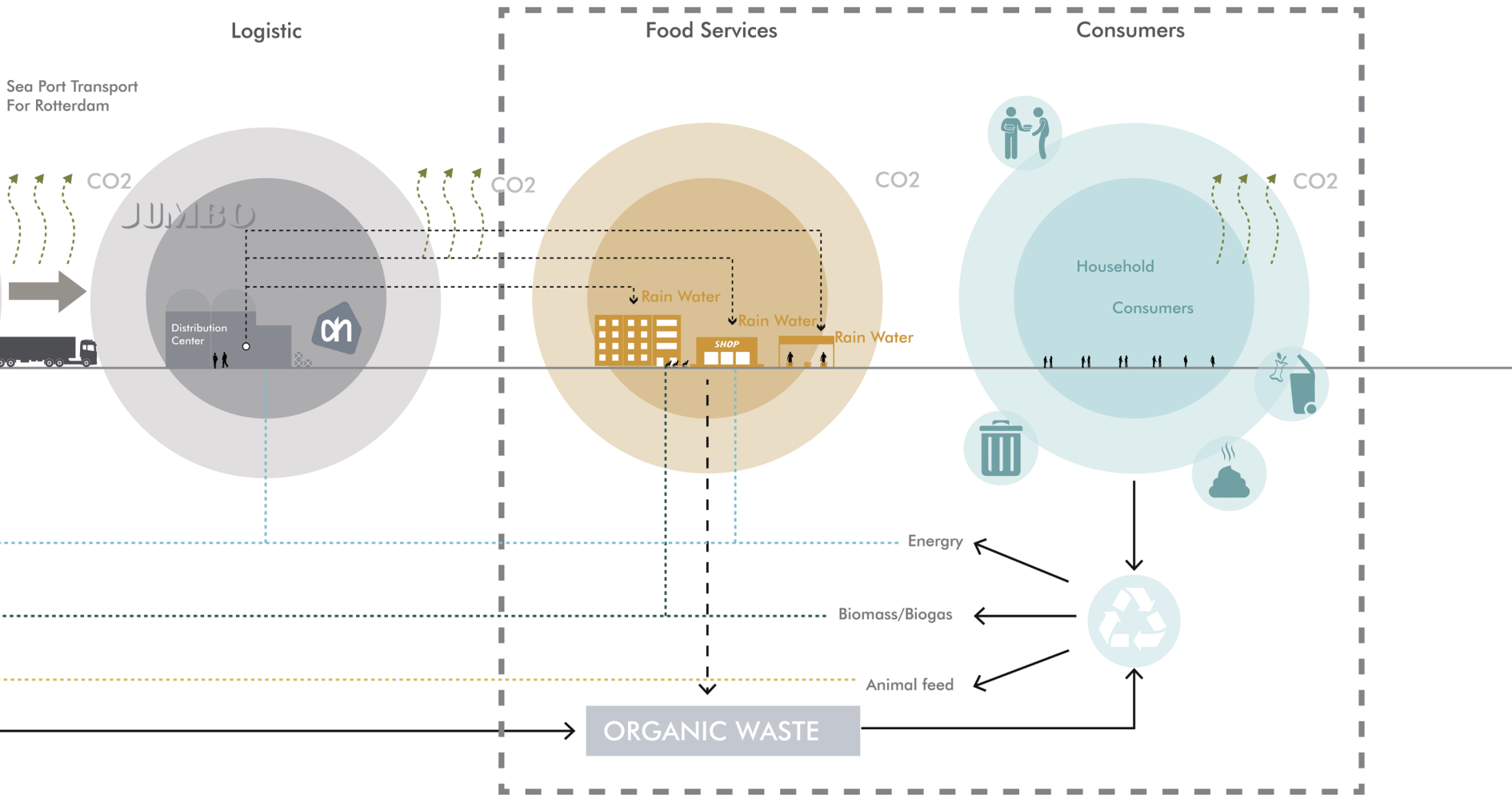
Clustering gradient:

Source: Dolman, et al. (2019) & NOS Nieuws (2020) & CBS(2016) & Province of South Holland (2019) & Ministerie van Economische Zaken (2020); LISA Database(2019)

LINEAR SYSTEM



The traditional agro chain is circular, the food after being grown and consumed becomes a waste that returns to the ecosystem (Mulder et al., 2017). However, the current food supply chain in the Netherlands is linear, which means that resources are not being reused and are being wasted. Except from the economic loss connected with the food waste, there is an extensive use of resources, such as water, energy or land, which are also being wasted if the food is not consumed or reused for different purposes. Except for use of resources, the agri-food sector pollutes air, water and soil, which because of that becomes less fertile and thus needs more fertilizers to be as productive as it was. The worldwide impact of agriculture on the environment accounts for 20%-30%, whereas in the Netherlands it is over 50% (Guinée et al., 2006).



Consumption of food causes environmental problems, however only 24% of them are visible. Therefore taking the right dietary decisions is difficult (Porcelijn, 2016). Worldwide around one-third of edible food, which is produced for humans, is being wasted. This equals 1.3 billion ton yearly (Gustavsson et al., 2011). In the Netherlands consumers throw away 8%-11% of the food they shop for, which accounts for at least 50 kilograms per person and 120 kilograms per household annually. It causes losses in the economy of the agro chain of approximately 2000 million Euro per annum. The waste is often not utilised. However some parts of waste flows are used for production of animal feed, biomass and compost (Thönissen, 2010).

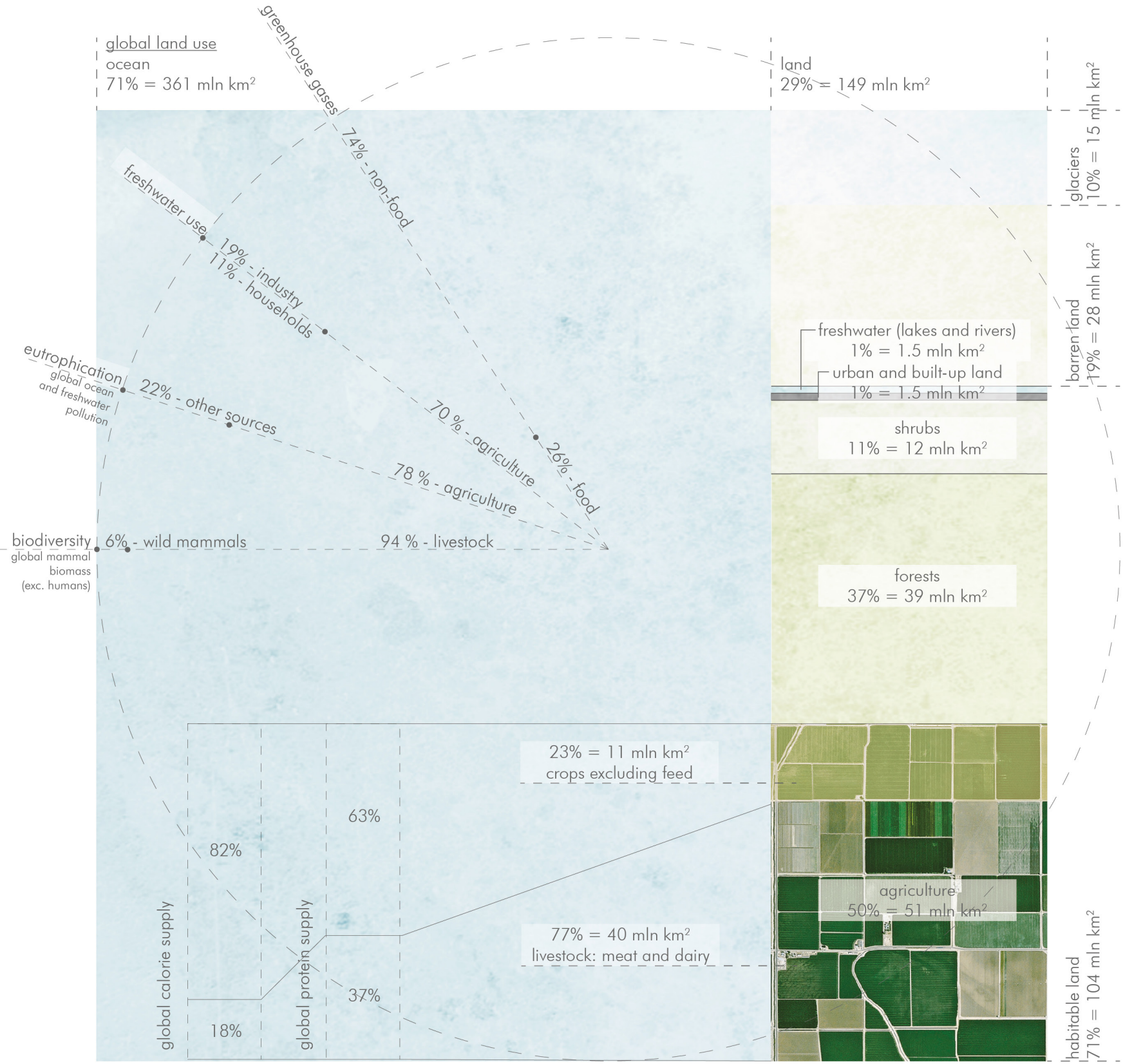
GLOBAL ENVIRONMENTAL ISSUES

How does food production impact the environment? How much land is used for agriculture? How does it relate to people's diet?

The United Nations defines water, energy and food as a key nexus of sustainable development. They are interrelated and the demand for these resources is currently increasing due to population growth, accelerated urbanisation as well as economic growth. In order to produce food there is a need for water and energy. The food supply chain consumes one-third of the global energy consumption. The amount of freshwater withdrawn for agriculture (including aquaculture, livestock and irrigation) is enormous; currently it accounts for 70% of yearly global water withdrawal (FAO, AQUASTAT). By the use of nutrient-rich pollutants, food production creates 78% of global eutrophication and one third of terrestrial acidification.

These processes can radically affect natural ecosystems, causing loss of biodiversity and reduction of ecological resilience (Bouwman et al., 2002).
Another environmental problem is caused by the emissions of greenhouse gases (GHG). Around three-fourth of them are related to energy, and thus in the fight against climate change the focus is on energy. But food production should also play a significant role in this fight, as it creates 26% of GHG emissions - 13.7 billion tons of CO2 equivalents. The biggest contributor of global emissions related to food production is livestock (31%), followed by crop production (27%) with 21% from crops for human food and 6% from crops for animal food (Poore, Nemecek, 2018).

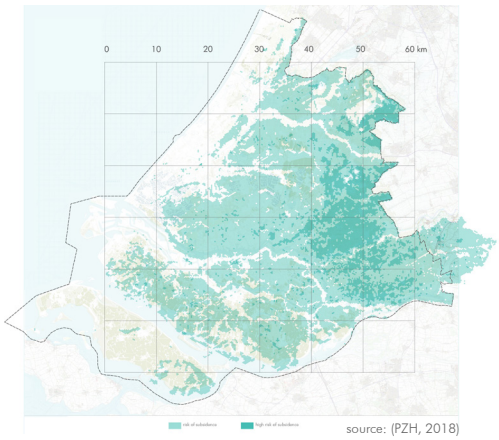
As shown in the diagram, half of habitable land - 51 mln square kilometres - is used for agriculture. Crop production (excluding crops for feed) uses only 23% of it at the same time providing 63% of global protein supply and 82% of global calorie supply. Livestock requires much more resources. In terms of land use, GHG emissions, eutrophying emissions, and freshwater withdrawals per one kilogram of food, a product that leads in most of aforementioned profiles of data is beef. Methane from cattle accounts for 22% of the greenhouse gas footprints of diets in European Union, another 22% is caused by manure management (Sandström et al., 2018).



data source: ourworldindata.org

REGIONAL ENVIRONMENTAL ISSUES

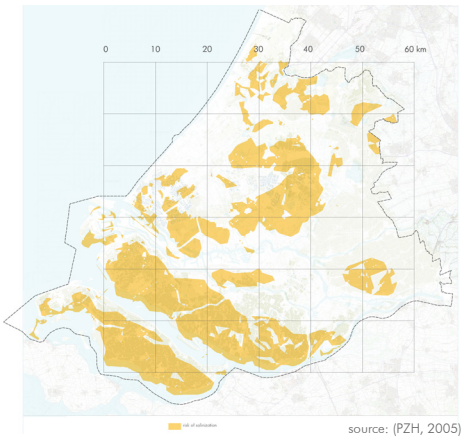
What are the environmental consequences of the current food system? What environmental problems threaten the current food system?



source: (PZH, 2018)

Subsidence and flood risk

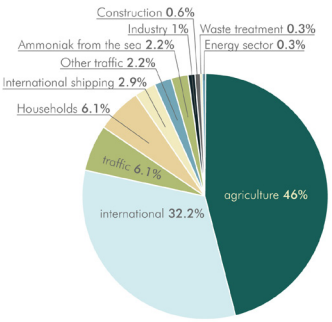
Flood risk of primary water defense is biggest in the rural peat area, if the secondary water defense breaks as well then the peri-urban area will have problems (Provincie Zuid Holland, 2019). The peat landscape is the most vulnerable for subsidence (Geologie van Nederland, n.d; PZH Directie Ruimte en Mobiliteit,2018). Peat grows in water rich areas and acts like a sponge. To enable grazing or building on peat, it needs to be drained of water. When the water is drained, the peat starts to subside. Then the peat oxidizes, which causes CO2 emissions (Plambeck & Wijnakker, 2019).



source: (PZH, 2005)

Salinization

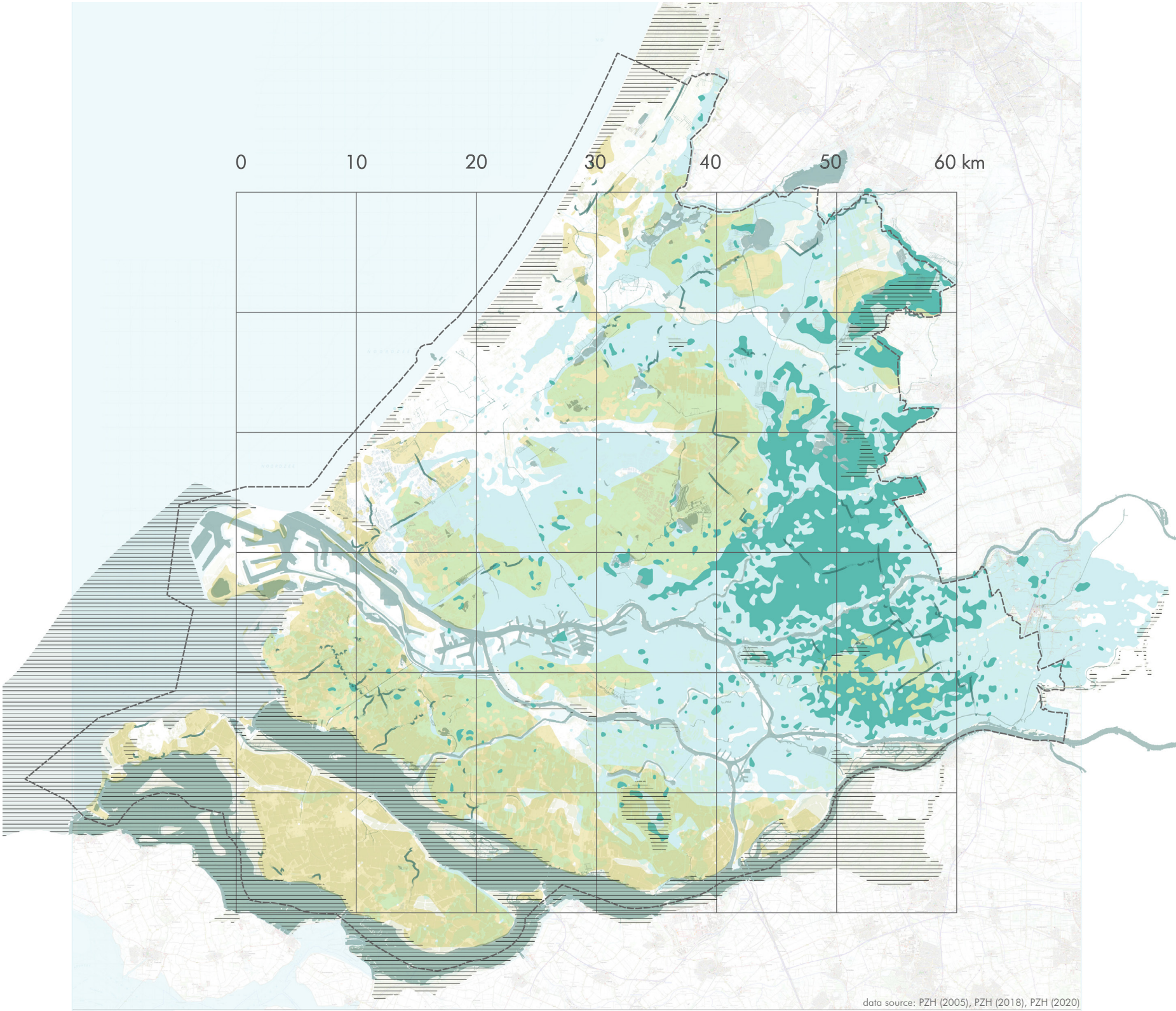
Another problem is salinization which is caused by seepage (Dutch: kwel) in shallow soil layers and seawater intrusion along the coast and into the open water connections. Salinization is damaging to a lot of crops growing on the sea clay in South Holland. The anticipated increase in sea level will increase the salt water pressure along the coast (Boer & Radersma, 2011). The dry summers, caused by climate change, increase the demand of fresh water. It is likely that the minimum fresh water flow required to combat salt intrusion will not be met in the future (Boer & Radersma, 2011).



data source: Remkes et al. (2019)

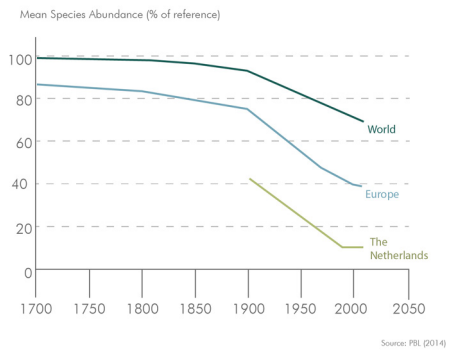
Nitrogen (water / soil / air)

Another environmental problem that is related to agriculture is the nitrogen pollution. In 2018 agriculture is calculated to contribute to this pollution for 49%, much more than other sectors (Remkes et al, 2019). Nitrogen is a key nutrient for plants but is also an insidious pollutant. Surplus wash-off causes eutrophication, nitrogen oxides and ammonia vapors from livestock manure can damage plants, acidify the soil and hinder plant growth (Stokstad, 2019). In most of the nature reserves (Natura 2000 and ecological connections), the nitrogen deposits are above the ecological risk thresholds, causing many plants to disappear. The high density of farming in the Netherlands is the main cause of the nitrogen emissions (Remkes et al, 2019; Stokstad, 2019).

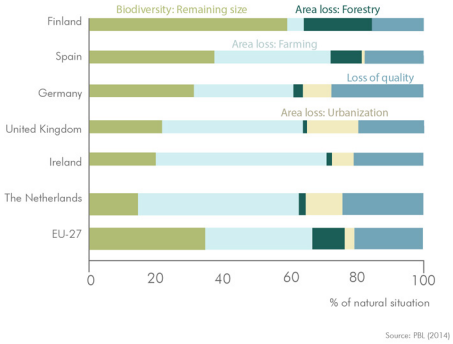

0
10
20
30
40
50
60 km
data source: PZH (2005), PZH (2018), PZH (2020)
Natura 2000
Water
Risk of salinization
Risk of subsidence
Ecological connections
High risk of subsidence

LACK OF BIODIVERSITY

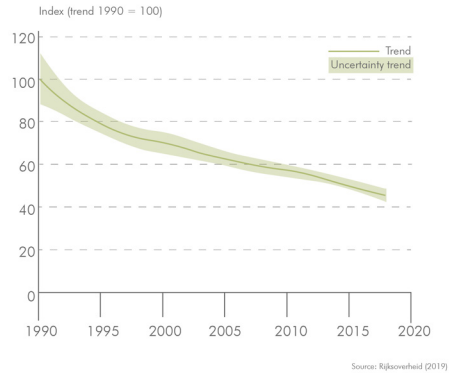
What are the main causes of biodiversity loss on Earth and in the Netherlands? What is the role of farming in these losses?



Biodiversity



Causes of biodiversity loss in Europe, 2010



Fauna in farmland area

Global biodiversity loss

As can be seen in the line graph, the loss of biodiversity on Earth is really critical. The five main causes of global biodiversity loss are habitat loss, high nutrient supplies, non-sustainable use of nature, invasive species and climate change (Planbureau voor de Leefomgeving (PBL), n.d.). This mainly has to do with the way the landscapes are used. Dutch consumption also contributes to the global biodiversity loss. Almost half of this loss is caused by food consumption (Rijksoverheid, 2015).

Dutch biodiversity loss

In the Netherlands the biodiversity loss is even more critical; the percentage of remaining population size is the lowest of Europe and less than 20%. And the main cause for this is farming. Due to the reclamation of nature for farmlands, the quantity of nature decreased. And due to the intensification and higher production, the quality of nature decreased. These quality losses are caused by the monocultural agricultural fields, eutrophication, acidification, the use of pesticides and desiccation (PBL, n.d.). The Natura 2000 areas are used to support biodiversity.

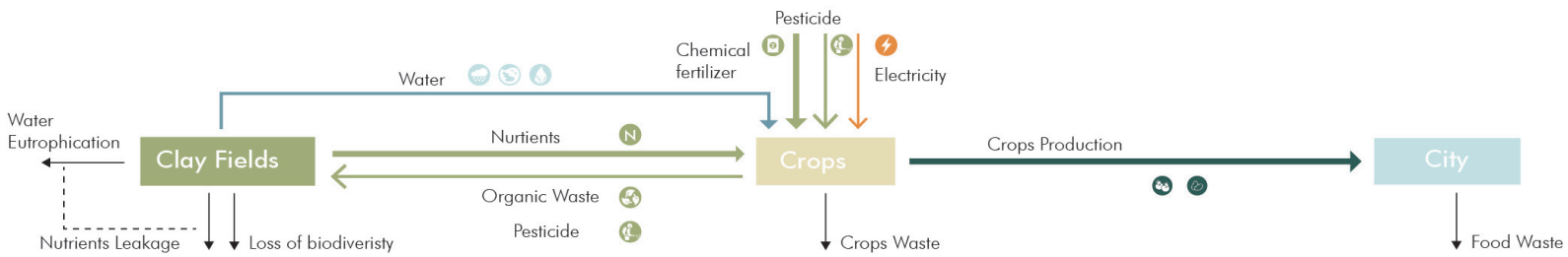
Biodiversity loss at the farmlands

The loss of biodiversity at Dutch farmlands has started since 1990, and unfortunately it is still ongoing. Especially the amount of birds and butterflies is decreasing. Due to the upscaling of the farmlands and the disappearance of small-scale extensive farms, edges are lost. These edges functioned as habitats; they provided shelter, place for nesting and a variety of food. This makes the fauna now even more disturbed by activities of the farmer, such as the mowing of the grass. (Rijksoverheid, 2015)


0
10
20
30
40
50
60 km
data source: Provincie Zuid Holland (2020)

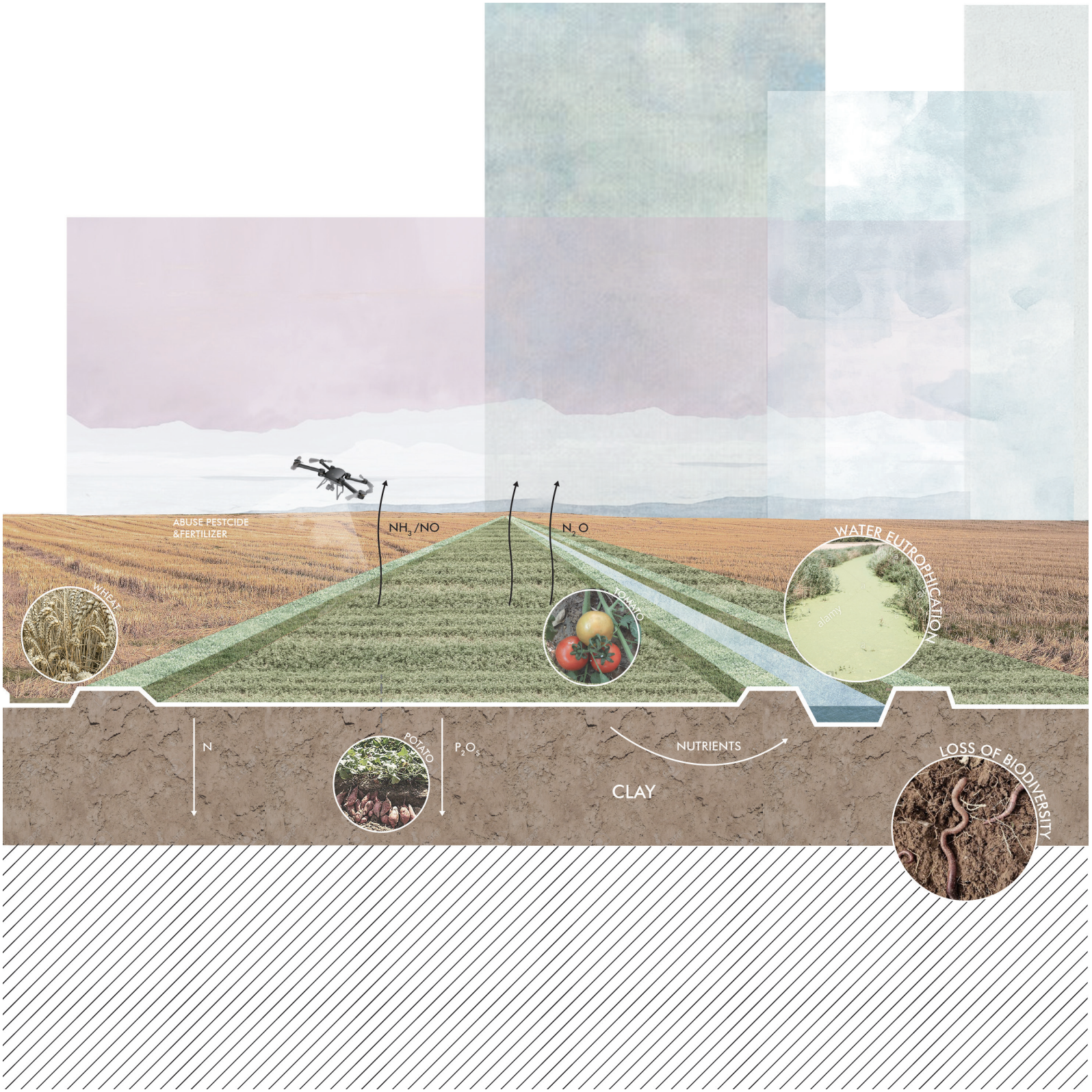
RURAL CLAY LANDSCAPE

How does the rural clay landscape function and what are the main problems caused by this landscape? What are the threats and opportunities of the rural clay landscape?



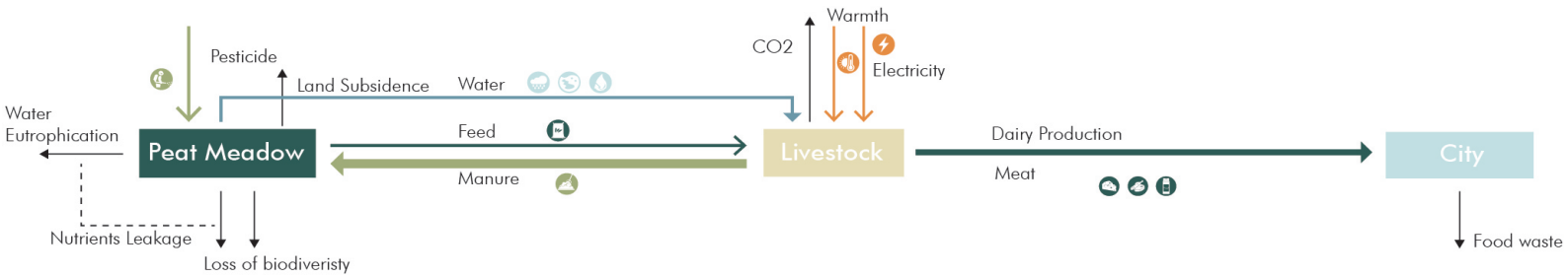
Rhine-Meuse-Scheldt, a vast delta, shaped this landscape and gave it the clay soil.. Benefiting from the frequent flooding, the soil is fertile and suitable for open agriculture (Studio Marco Vermeulen, 2015). The dominant production of the rural clay landscape are potatoes and sugar beets. Modern intensive agriculture has created enormous financial benefits for export. It also satisfies the demands of the increasing market, which makes prices affordable through mass production. However, the monocultural agricultural land causes a serious of environmental issues as well.

Firstly, the abuse of artificial fertilizer which contains nitrogen leads to the leakage of nutrients. Crops can not absorb all the nutrients from fertilizer . The result of this is that nutrients and salts remain in the ground water and then transfer into the surface water, causing water eutrophication (Drift & Metabolic, 2019). Another negative impact is the loss of biodiversity. In the agriculture sector, a large amount of pesticides are widely used (6,320 tonnes) . According to research (Drift&Metabolic, 2019), it shows that more than half of all pesticides in the Netherlands cause damage to people and other animals, including bees, insects, the soil and water. The toxic substances are accumulated locally. The biological food chain has been affected by this. In the long run, the local biodiversity has lost. Finally, Drift & Metabolic (2019) listed that the green waste in whole South Holland has produced 1,028,870 ton per year. With such a large amount of green waste, it is valuable to fully reuse the green waste and integrate it into the circular economy.

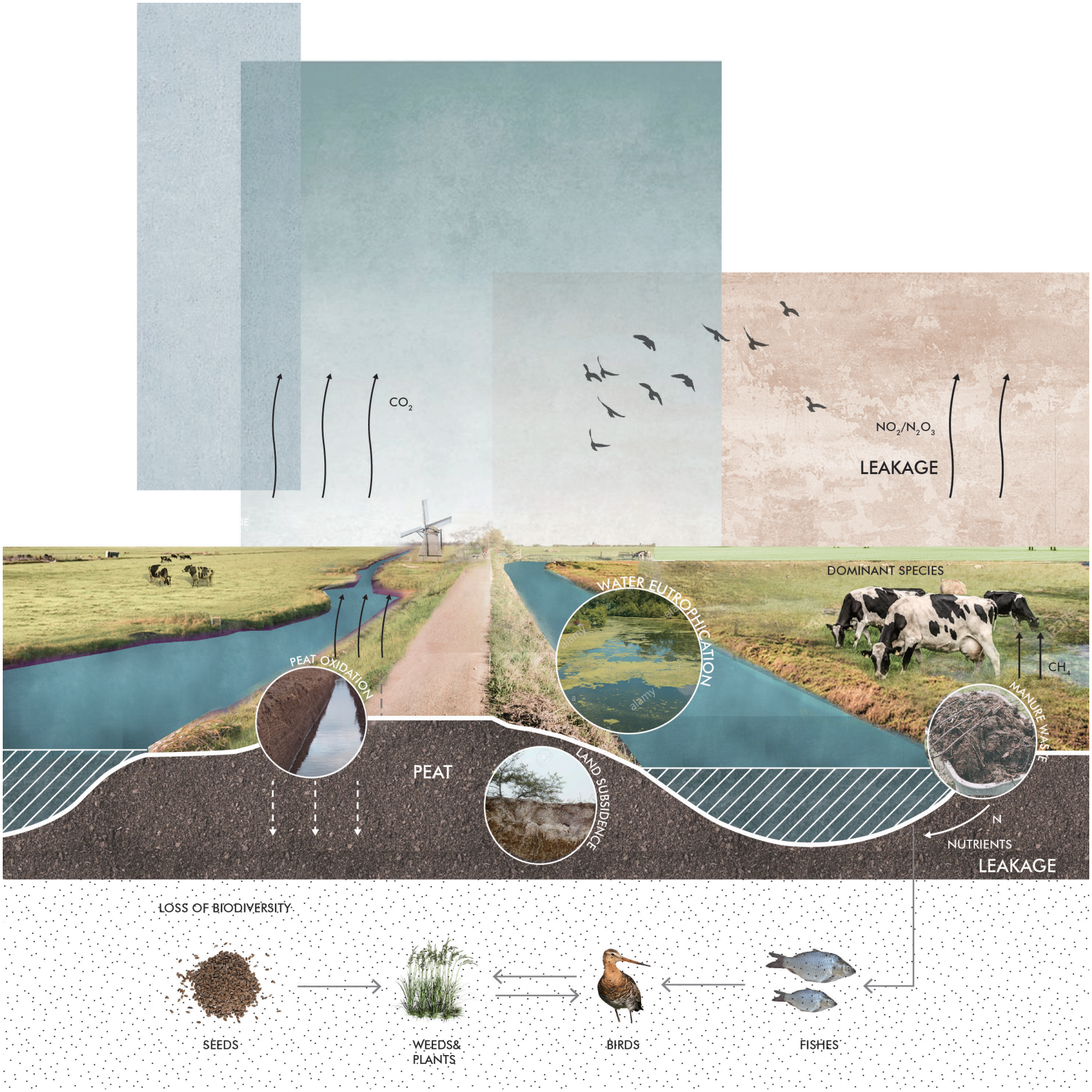

ABUSE PESTCIDE
&FERTILIZER
NH_3/NO
N_2O
WHEAT
TOMATO
WATER EUTROPHICATION
N
POTATO
P_2O_5
NUTRIENTS
CLAY
LOSS OF BIODIVERSITY

RURAL PEAT LANDSCAPE

How does the rural peat landscape function and what are the main problems caused by this landscape? What are the threats and opportunities of the rural peat landscape?

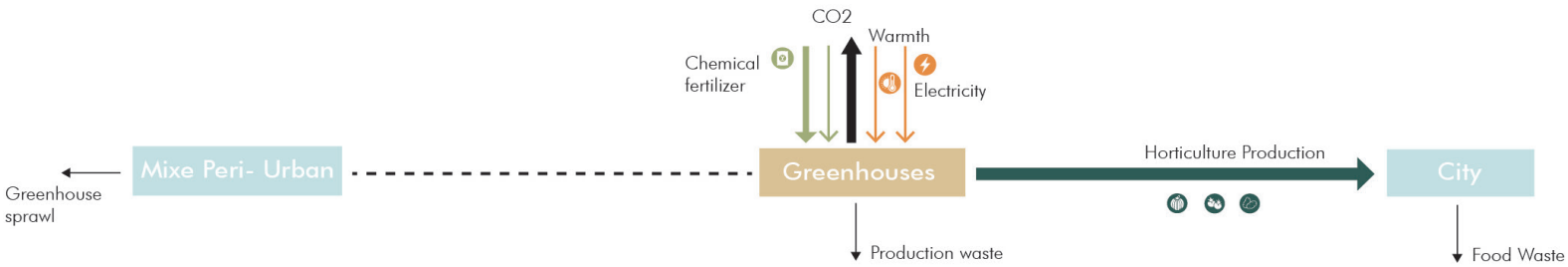


In terms of the location of the rural peat landscape in South Holland, it is located at the edge of the green heart. The main products of this productive landscape are milk, dairy products and meat. The outputs are significant components of Dutch people's daily diet. As mentioned before (Dolman, et al. 2019), they are also one of the main products for export. In order to make peat suitable for grazing, the groundwater level is kept low with drainage. The result of contact between peat and air is the oxidation process, which has created a large amount of CO2 emissions. In addition, the drainage is also the main reason for land subsidence (Drift & Metabolic, 2019). According to Drift & Metabolic (2019), the peat oxidation generates almost a megaton of CO2 per year. The Second issue of the rural peat landscape is the manure surplus. The data shows that 4,450 tons of nitrogen and 1,580 tons of phosphate in 2017 have been over supplied in South Holland(Drift & Metabolic, 2019). The scarce raw materials phosphate and nitrogen, produced by cow manure, are leaked into the ground and groundwater, only negatively threatening water quality and biodiversity. In terms of environmental issues, it has to point out that meadows have become the dominant species in the peat landscape and the weeds have been removed in order to support the intensive livestock farming. However, this measurement has affected the survival and multiply of wildlife and plants, causing loss of biodiversity (Vet,2017).

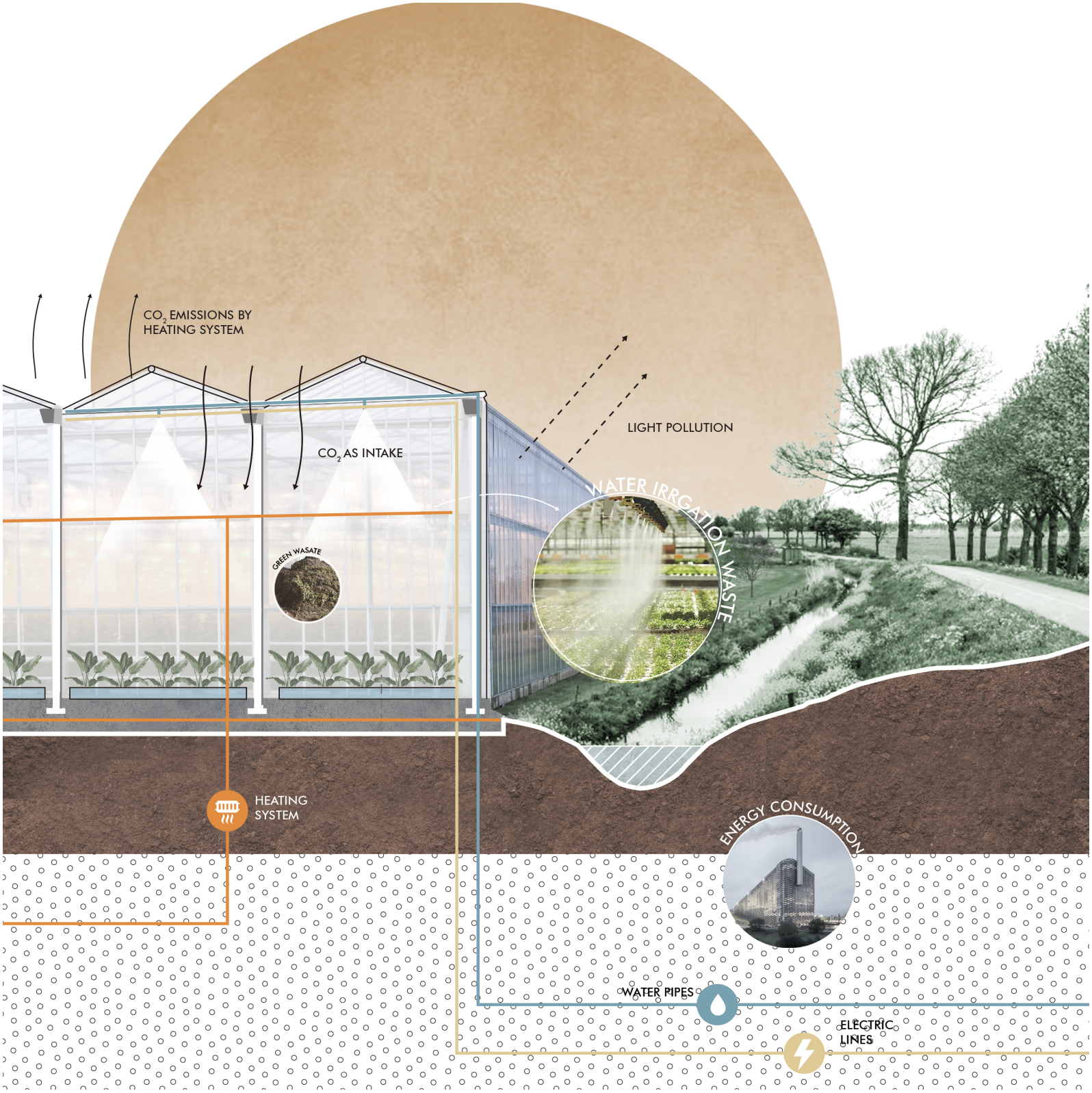

CO_2
NO_2/N_2O_3
LEAKAGE
DOMINANT SPECIES
WATER EUTROPHICATION
PEAT OXIDATION
CH_4
MANURE WASTE
PEAT
LAND SUBSIDENCE
N
NUTRIENTS
LEAKAGE
LOSS OF BIODIVERSITY
SEEDS
WEEDS& PLANTS
BIRDS
FISHES

PERI-URBAN MIXED LANDSCAPE

How does the peri-urban mixed landscape function and what are the main problems caused by this landscape? What are the threats and opportunities of the peri-urban mixed landscape?

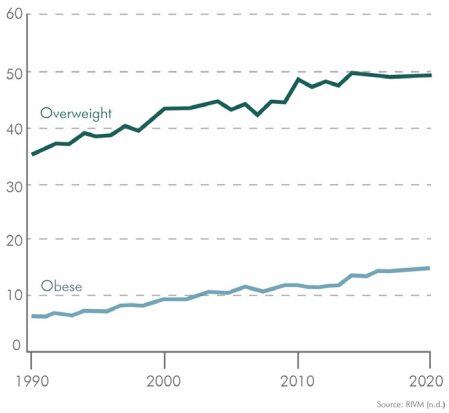


The peri-urban landscape denotes the area between the urban area and traditional productive landscape. The most representative productive landscape in the mixed peri-urban area are the areas containing green houses. In South Holland, the total area of greenhouses reach 4,672 hectares, occupying more than 50% of the national total. The greenhouse horticulture in the South Holland province is highly efficient. This is evident from the fact that the greenhouse horticulture can produce 18% of total agri-food production while it only takes up 3% of land (Drift & Metabolic, 2019). With the simulated ideal conditions, the sector could be viewed as the most productive one per square meter (Drift & Metabolic, 2019). It has the potential to become even more productive and efficient with the appearance of vertical urban farming. However, the greenhouse horticulture also has negative impacts on the environment. First of all, it is the main producer of CO2 emissions, because it consumes a large amount of raw materials and fossil fuels for energy use. The number shows that the emission of CO2 is considerable (3.5 megatons)(Drift & Metabolic, 2019). It states that 73% of the emissions have been produced by the burning of gas. It normally has three applications, including providing for heat demand, maintaining the CO2 concentration and electricity production. Secondly, the light pollution of green houses is another problem which needs to be taken into consideration due to the use of glass materials. Combining with the sprawl of green houses, the light pollution becomes even more serious.

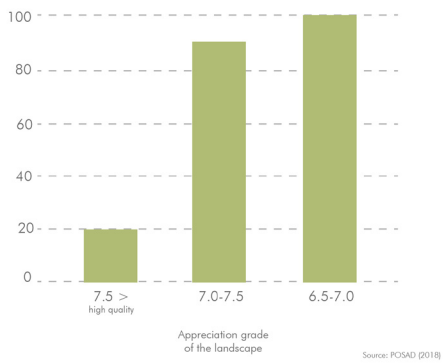

CO_2 EMISSIONS BY HEATING SYSTEM
CO_2 AS INTAKE
LIGHT POLLUTION
WATER IRRGATION WASTE
GREEN WASATE
HEATING SYSTEM
ENERGY CONSUMPTION
WATER PIPES
ELECTRIC LINES

SOCIETAL PROBLEMS

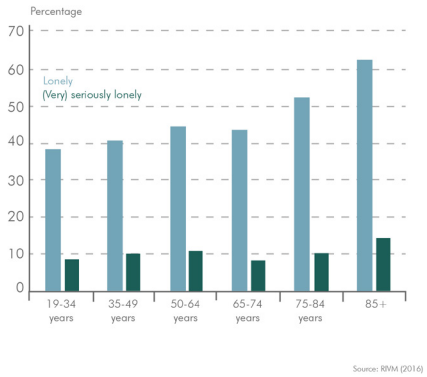
What kind of problems are emerging in the current society? How are these problems connected to the way the landscapes are used and food is produced?



Percentage of Dutch inhabitants (of 18 years and older) with overweight and abesity



Percentage of South Holland inhabitants who can reach a landscape within a 15 minute bike ride



Loneliness by age, 2016

Lost connection with food production

Being overweight is a growing societal problem. In 2018, 48.8% of the Dutch inhabitants were overweight and the expectation is that this percentage will grow to 62% in 2040 (POSAD, TNO, & Provincie Zuid Holland, 2018). The most important causes for being overweight are bad diets and not enough physical activity (Rijksinstituut voor Volksgezondheid en Milieu, n.d.). One of the causes of the bad diets is that people are losing the connection with food production and unprocessed food.

Lost connection with landscapes

Another societal problem is stress. City inhabitants are experiencing stress and a consequence is that 50% of Dutch inhabitants suffer from stress-related physical problems (POSAD et al., 2018). Experiencing high-quality landscapes and nature is proven to be stress-relieving (PBL, 2019; POSAD et al., 2018). The problem is that city inhabitants often do not have (close) access to high-quality landscapes. In South-Holland only 20% of city inhabitants can reach high-quality landscapes by bike within 15 minutes, and the landscapes are often inaccessible by public transport (POSAD et al., 2018).

Lost connection with each other

Loneliness is also growing. In 2018, 30% of the Dutch inhabitants felt moderately lonely, and it is expected that in 2040 even more people will be lonely. The most vulnerable groups for loneliness are elderly and people who live alone. With growing age, the social network reduces and the action radius shrinks. Because people are getting busier, the chances of losing the connection with each other, and especially with the elderly, are increasing (POSAD et al., 2018).

50% of Dutch people suffer from **stress**-related physical problems

In the city more stress is experienced. Escape from the nuisance is necessary. The large landscapes of the province could offer this escape.

48,8%
the percentage of **overweight** Dutch people (2017)

a **low socio-economic status** is an indicator for health backlogs

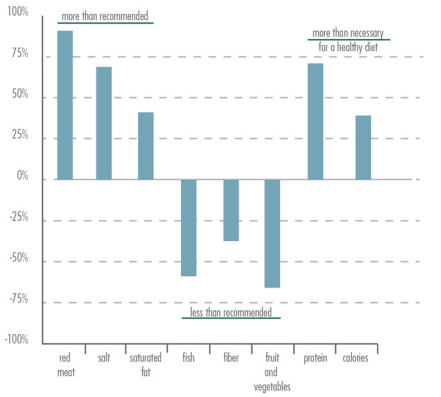
Only **20%** of city inhabitants can reach a high-quality landscape by bike within **15 minutes**

30% of Dutch people feel **lonely** regularly

Source: POSAD et al. (2018)

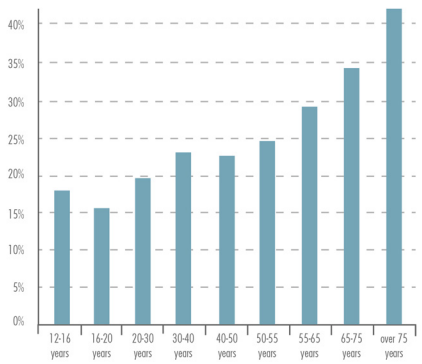
HEALTH & DIET

What does the Dutch society eat?
How does diet influence health?
Are the dietary patterns improving?



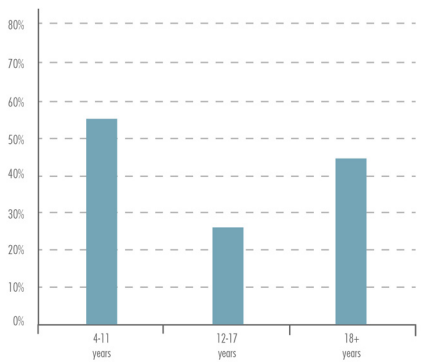
Source: PBL, 2012

Food consumption compared to guidelines 2007 - 2010



Source: POSAD, 2018

% of Dutch people eating enough fruit and vegetables



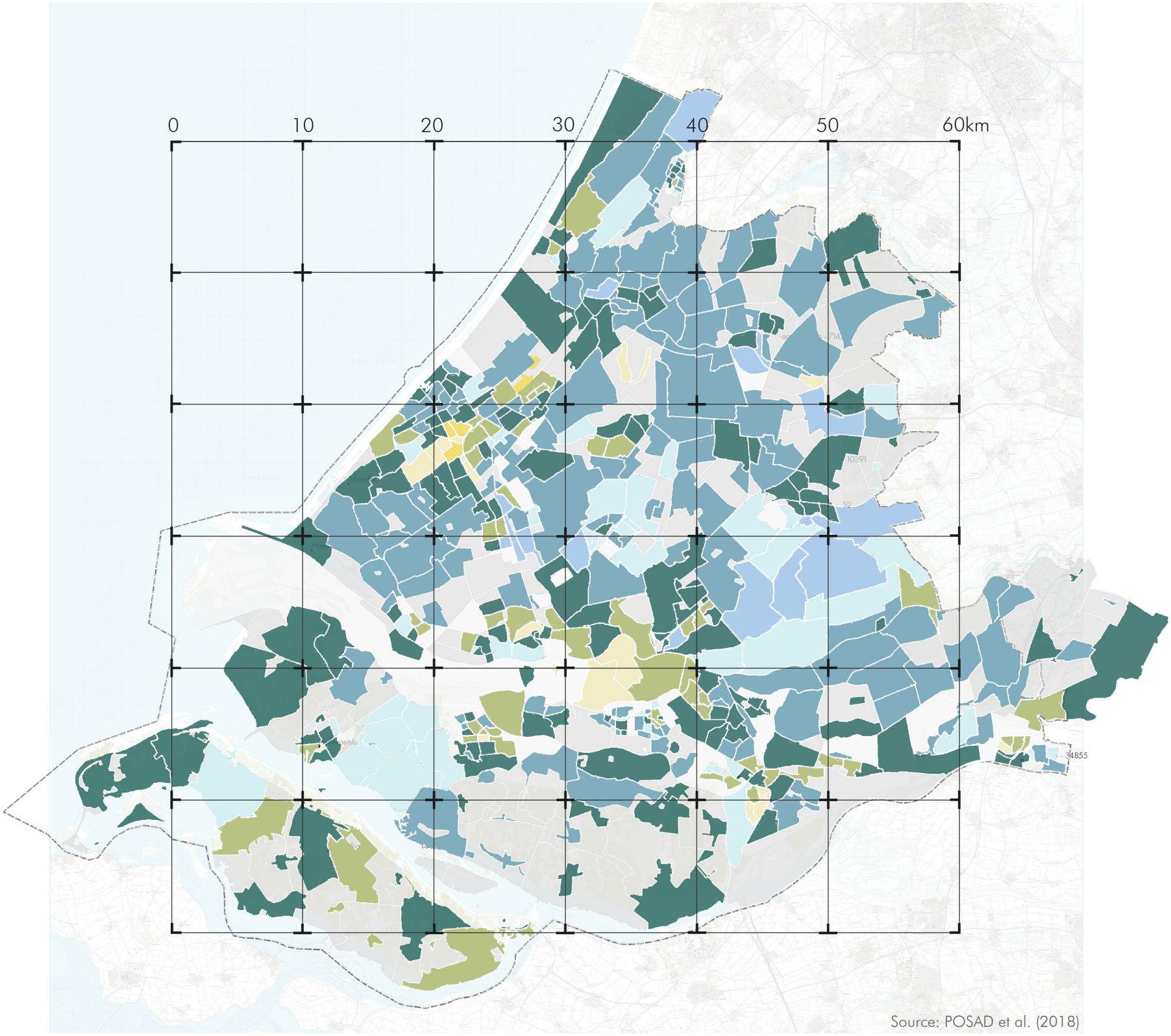
Source: POSAD, 2018

% of Dutch people with enough activity

In 2015 "The Dutch food-based dietary guidelines" were published. The goal of that publication was to inform the public that specific products and diets can prevent chronic diseases (Mozaffarian, Ludwig, 2010).
The researchers identified ten main chronic diseases related to diet. "The diseases are as follows: coronary heart disease (CHD), stroke, heart failure, type 2 diabetes, chronic obstructive pulmonary disease, breast cancer, colorectal cancer, lung cancer, dementia and depression." (Kromhout et al., 2016).

The main recommendation was to eat more plant-based products and reduce animal-based dietary patterns. Since the publication of the guidelines RIVM conducted a survey about food consumption. It shows that the dietary patterns in the Netherlands improved over years.
Nevertheless most Dutch people still do not meet the guidelines from 2015. Dutch people consume 120 grams of fruit daily (2012-2016), which is 8% more than in the years 2007-2010. However the recommended amount is 200 grams.

One of the guidelines was to eat less red meat, especially processed meat. The current trend is following the guideline. Dutch people consume 8% less meat per day than in the period 2007-2010 and 12% less dairy products in comparison to that period.
Reduction of meat consumption is beneficial not only to population health - lower risk of stroke, diabetes, colorectal and lung cancer - but also to the environment - lower GHG and eutrophying emissions.

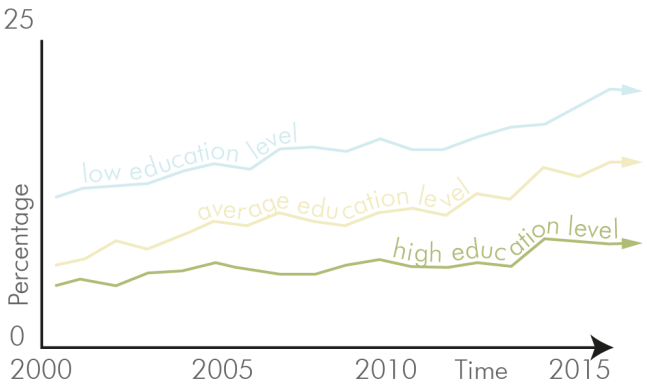


Health scoring by POSAD

41-50 51-60 61-70 71-80 81-90 91-100

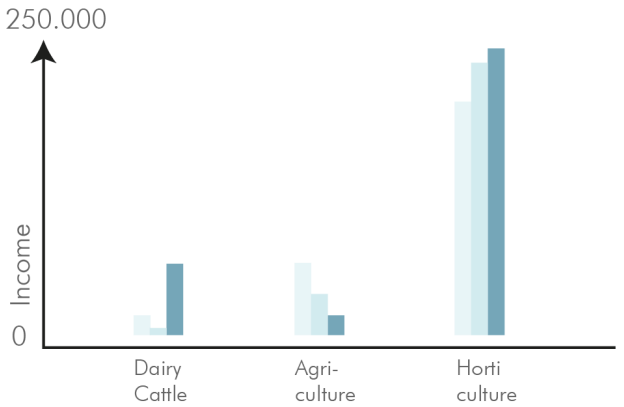
ISSUES OF SOCIO-SPATIAL JUSTICE

What causes social injustice in the province of South Holland?



Source: RIVM (n.d.)

Trend in obesity by educational level
25 years and older
1999-2017



source: Agrimatie (2018)

Income from agriculture business in animal and plant sectors
2015-2017

Social-economical status and health

People with a low socio-economic status are more likely to have health problems (POSAD et al., 2018; RIVM, 2020). They often live together in neighbourhoods with low quality housing and public spaces. These are areas where lots of fast food restaurants can be found and where there is a lack of sport- and play facilities (POSAD et al., 2018). Moreover, people with low education levels have less access to information and less ability to use new information, for instance about healthy diets (RIVM, 2020).

Accessibility to the landscape

Also the accessibility to the landscape is not fairly shared. As mentioned before, only 20% of city inhabitants in South Holland can reach a high quality landscape by bike in 15 minutes (POSAD et al., 2018). The percentage of people that really is able to reach these landscapes is probably even lower, as some people cannot ride bikes (elderly) or buy a bike (low incomes). This inequality is being enlarged by the fact that a lot of landscapes are inaccessible by public transport (POSAD et al., 2018).

Income of farmers

There is a large variation in incomes of farmers. This depends on the type of soil of the plots they own, on the products they produce, and the costs they make. Dairy farmers often have the lowest incomes, as their peat meadows can only be used for dairy and meat production, and the cows need a lot of space. The income of greenhouse farmers can be till 5 times higher, as they can produce a lot of crops on a small area (AgrifFoodTech Platform, 2018).

Source: POSAD et al. (2018)

REPRESENTATIVES FOR PUBLIC DISCOURSE

"We are the first generation that can end poverty, the last that can end climate change"

UN Secretary-General Ban Ki-moon, 2015

"Farming should become more sustainable and it will cost money", says Carola Schouten (Dutch Minister of Agriculture, Nature and Food Quality) to the national newspaper (NOS, 2020). She is aware of the Netherlands being the frontrunner in circular agriculture (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2017)) and tries to act on it. She is working hard to make the plans from the Netherlands for 2050 work. According to Wojciechowski (2018) 38% of the EU-budget is received by The Common Agricultural Policy. It will Cost the EU 30 cents a day per citizen to make agriculture more sustainable, to do this for the entire EU, it will be expensive (Wojciechowski, 2018).

A generation standing up in this is represented by Greta Thunberg, a 16-year old teenage girl who is making climate change negotiable on different world forums (BBC, 2019) . Even a 19-year-old anti-Greta has risen, so the younger generation is 'on speaking terms'. "We Are the First Generation that Can End Poverty, the Last that Can End Climate Change" (United Nations, 2015)

Frans Timmerman plays a big part in the European Green Deal and is giving humanity hope with the message that the European Union will be the first climate-neutral trading block in the world by 2030. This selection of quotes from society shows how the public opinion is changing. Besides prosperity, environmental and social sustainability are getting more and more important. The paradigm is shifting.

Carola Schouten,
Dutch Minister of Agriculture, Nature and Food Quality

#NL | #MINISTER | #SCHOUTEN

"Farming should become **MORE SUSTAINABLE** and it will **COST MONEY**"

"Landbouw moet duurzamer worden en dat kost meer geld"

REFERENCE nos, 2019 | REFERENCE Volkskrant, 2018

DUTCH LNV VISION, 2030

THE NETHERLANDS, FRONTRUNNER IN CIRCULAR AGRICULTURE

FRIDAYS FOR FUTURE, A MOVEMENT TO PROTEST AGAINST THE LACK OF ACTION ON THE CLIMATE CRISIS, 2018

A GENERATION STANDING UP

Greta Thunberg,
Swedish teenage activist

#TEENAGEACTIVIST | #GRETA | @WORLD ECONOMIC FORUM

"I want you to act **AS IF THE HOUSE IS ON FIRE**, because it is."

REFERENCE BBC on Greta Thunberg, 2018

Frans Timmermans,
Politician, as Executive Vice President-Designate of the European Commission from 2019

#EU | #PRESIDENT | #TIMMERMANS

"**1 BILLION EURO** for climate is just the start"

"1 biljoen euro voor klimaat is pas het begin."

REFERENCE RTLZ, 2020

GREEN DEAL, 2030

EUROPEAN UNION THE FIRST CLIMATE-NEUTRAL TRADING BLOCK IN THE WORLD.

Source: Ministerie van Landbouw, Natuur en Voedselkwaliteit (2017) & Smit (2018) & NOS Nieuws (2019) & RTL Z (2020) & European Commission (n.d.)

SUSTAINABLE (REGEN) INITIATIVES

Rural clay landscape
Blue city
Playground for circular companies

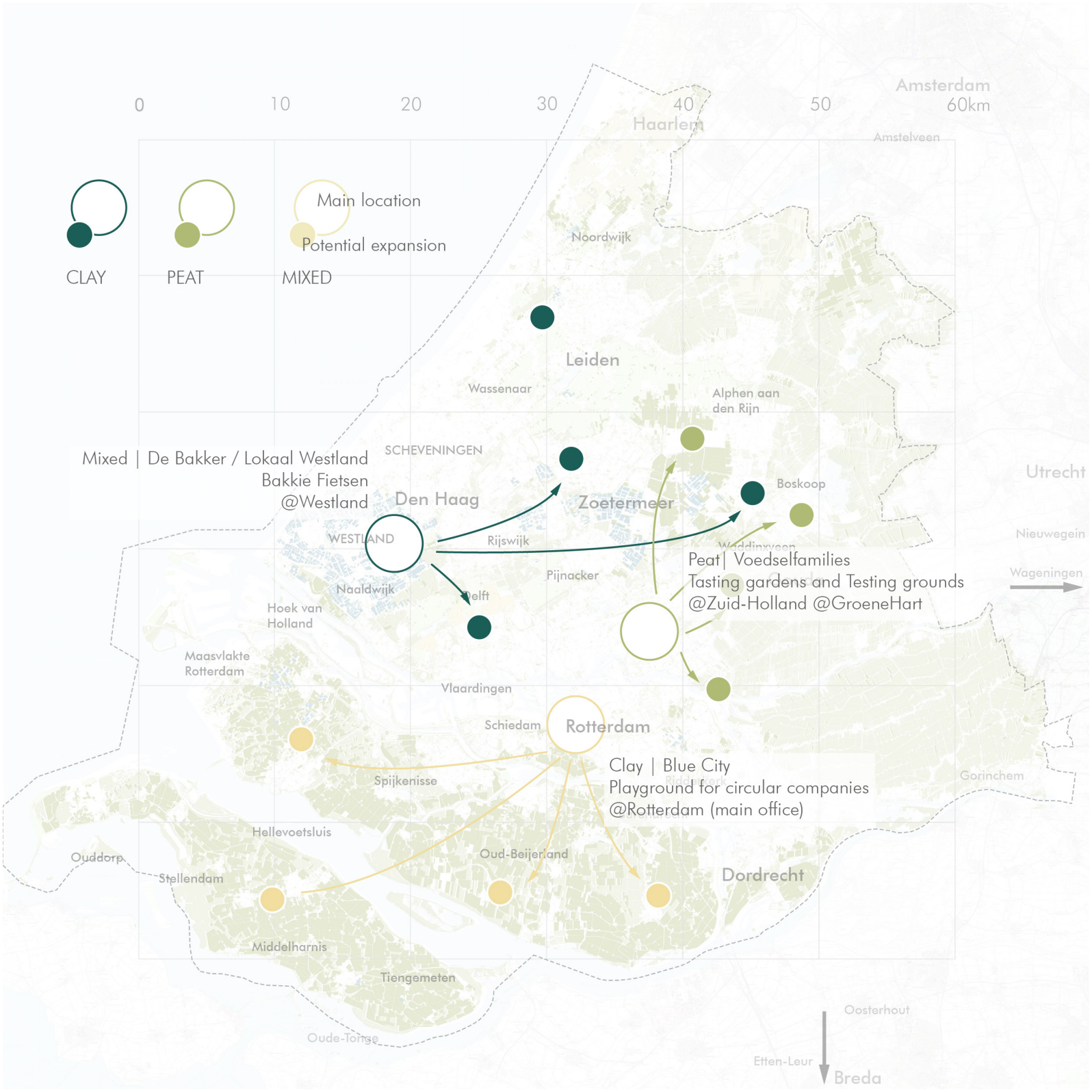
The Blue City has their main office in Rotterdam in the old building of the Tropicana swimming pool. The building is serving as a playground for circular companies in which start-ups determine new directions. Each morning you will get a portion of radical disruption with your coffee, surfing the new economy with start-ups, creating new waves and corporations catching the tide. They integrate what is working and skip what is not. In their vision waste doesn't exist and so they say together they realize a world in which waste is valuable. (blue city, ND)

Rural peat landscape
Voedselfamilies
Proeftuinen

Zuid-Holland Voedsel families is a renewal network, which wants to contribute locally to a sustainable, healthy and affordable food supply. For them this means: making food that makes you happy. They're organizing tasting gardens and harvesting lessons from the testing grounds in South Holland. The Voedselfamilies share knowledge and expand their network by a digital magazine, called "Making food that makes you happy". They consist of local pioneers, which they try to connect for increasing sustainable innovations. (Voedselfamilies, 2020)

Peri-urban mixed landscape
De Bakker / Lokaal Westland
Bakkie Fietsen

Bakkie Fietsen is an initiative in which they want to bring the consumer closer to the product. It is about cycling, visiting greenhouses of various horticultural companies and collecting fruit and vegetables in one day. After a tour of the greenhouse, you will know how the Westland vegetables, fruit, flowers and plants are grown and how bumble bees pollinate the tomatoes, for example. You know the rich history of Westland grape cultivation and the innovative technologies in horticulture. And last but not least, in front of your bicycle is a filled wooden box, your 'bakkie', with all the fresh from Westland soil. (De Bakker Westland, 2014)


0
10
20
30
40
50
Amsterdam
60km
Main location
Potential expansion
CLAY
PEAT
MIXED
Haarlem
Amstelveen
Noordwijk
Leiden
Wassenaar
Alphen aan den Rijn
Mixed | De Bakker / Lokaal Westland
Bakkie Fietsen
@Westland
SCHEVENINGEN
Den Haag
Zoetermeer
Boskoop
Utrecht
WESTLAND
Rijswijk
Nieuwegein
Pijnacker
Wageningen
Peat| Voedselfamilies
Tasting gardens and Testing grounds
@Zuid-Holland @GroeneHart
Naaldwijk
Delft
Hoek van Holland
Maasvlakte Rotterdam
Vlaardingen
Schiedam
Rotterdam
Clay | Blue City
Playground for circular companies
@Rotterdam (main office)
Spijkenisse
Gorinchem
Hellevoetsluis
Ouddorp
Oud-Beijerland
Stellendam
Dordrecht
Middelharnis
Tiengemeten
Oosterhout
Oude-Tonge
Etten-Leur
Breda

TIME FOR A SHIFT

What is the main conclusion of the analysis?

Conclusion from analysis

As explained before in the problem statement, and as can be concluded from the analysis, there is a mismatch between the culture and the landscape. The values of society are changing, but the productive food landscapes are not changing with it. The productive landscapes are largely focused on prosperity; a lot of money is being made in the sector, but the linear production system also causes environmental problems and the consumption habits cause social problems. In contrast, the society would like the landscapes to fulfill values for people, planet and prosperity; this is increasingly evident in politics and emerging initiatives. To solve the mismatch, a shift is needed in the way these food productive landscapes are used.

Perspective of transition theory

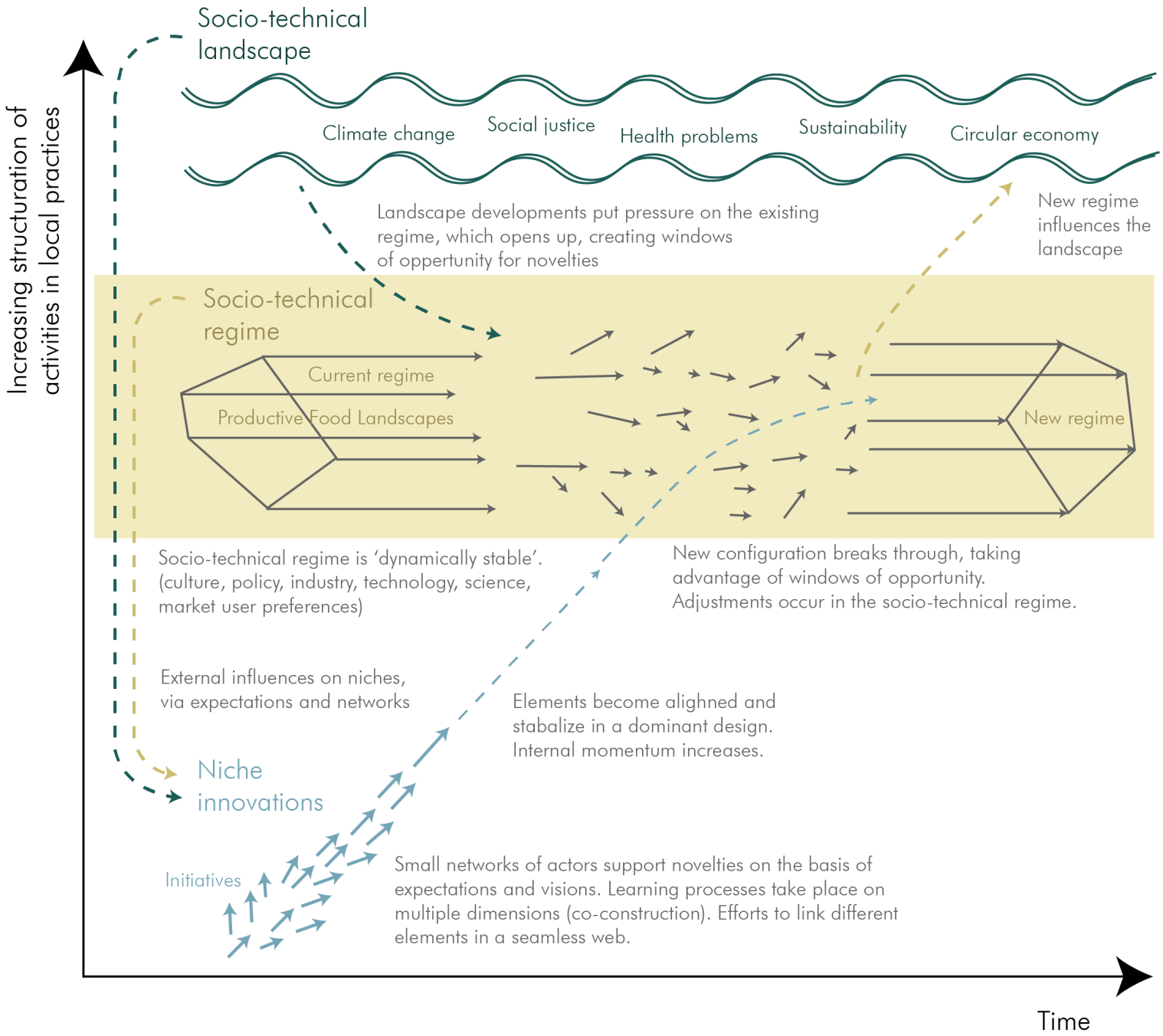
This can also be explained in the perspective of the transition theory[1]. The productive food landscapes are the current socio-technical regime. This regime is locked-in, as the actors, institutions, and technologies are being dependent on and supportive of these kinds of landscapes. After World War II this lock-in emerged, as the society never wanted hunger again after the hunger winter. It can be said that this 'culture shift' in the socio-technical landscape stimulated the socio-technical regime to change into highly productive food landscapes.

[1] For an introduction to the transition theory, see the conceptual framework

Time for a shift

However, the socio-technical system is showing some movements. The socio-technical landscape is changing, as the current paradigm is moving more and more towards sustainability. This is reflected by, for instance, the politics. In addition, the niche innovations are evolving, which is reflected by the large amount of sustainable initiatives. The socio-technical landscape and niche innovations are both pressurizing the socio-technical regime of the productive landscape; from both sides a regime shift is tried to be initiated. This makes the current time the right time to intervene. The strategy can make use of the support of the society and niche innovations, and is necessary to guide the transition in the right direction.

So, it is the right time for a shift, but a shift to what? What is the 'right direction'? What is the future of the South Holland landscapes?

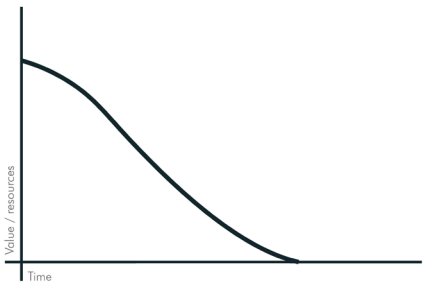


Source: FoodHub (n.d.)

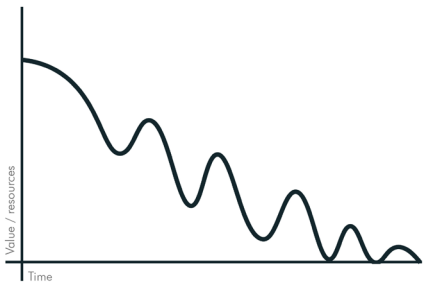
VISION

REGENERATIVE LANDSCAPE

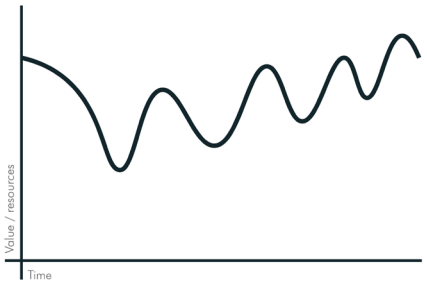
How did human activity over time influence ecosystems?
What does the landscape regeneration mean?
How can we change the way we treat resources?



Linear life cycle



Recycling - prolonging life cycle



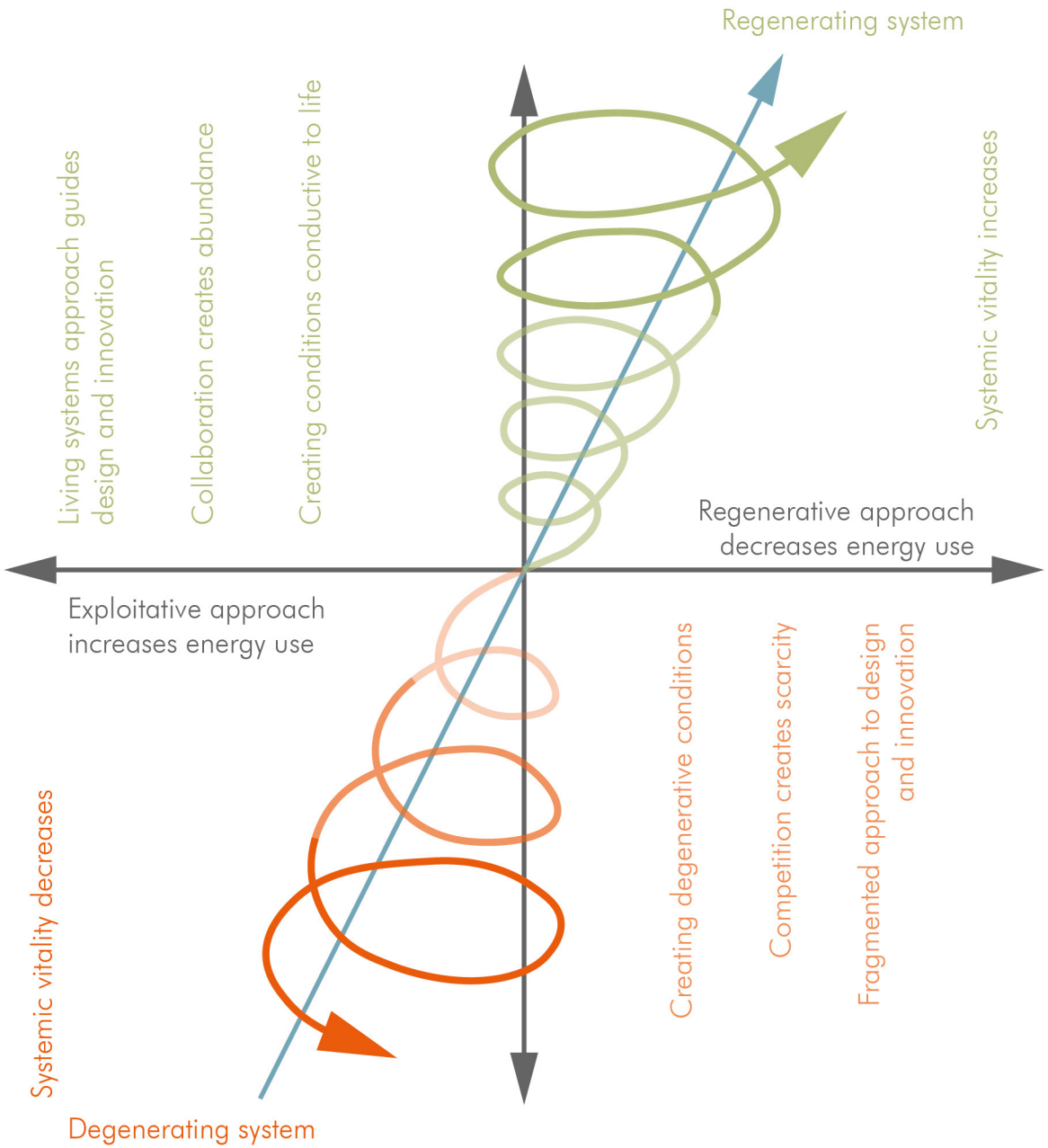
Regenerating life cycle

source of the graphs: by authors

It is known that because of the industrialisation of agriculture, prioritizing prosperity over the planet in the past centuries, people have caused serious damage to ecosystems. As mentioned in the environmental issues chapter the global demand of resources is rising and thus the availability of them is declining.
The current worldview about sustainability is not adequate, since the word itself does not indicate what we want to sustain. As Wahl (2006) writes "Design for sustainability is, ultimately, design for human and planetary health."

But there is a need to go beyond sustainability, to not only mitigate the negative effects of human activity, but to reverse them. The goal of regenerative cultures creation includes and transcends sustainability. The values of a regenerative human culture are health, adaptability and resilience (Wahl, 2017).
A change from a conventional degenerating system to a regenerating system requires different shifts, as shown in the diagram on the right side. Sustainability is presented as a "neutral point of not doing any more damage" (Reed, 2006).

Regenerative cultures consider future generations and their needs. Therefore they strive to create an abundance of resources by focusing on the regeneration and renewable limits of them (Everard, 2018). Hereby regenerative development does not limit growth, as that is often associated with sustainable development (Ekin 1993; Wahl, 2016).
Everard (2018), in the report "Regenerative Landscapes", identifies success factors to stimulate the shift towards regeneration of ecosystems and concludes that the shift is possible only when we consider ecology and activities of the society as interrelated parts of socio-ecological systems.



Regenerative
Appropriate participation and design as nature.

Reconciliatory
Reintegrating humans as integral parts of nature.

Restorative
Humans doing thing to nature.

Sustainable
Neutral point of not doing any more damage.

Green
Relative improvements.

Conventional practice
Compliants to avoid legal actions.

The regenerative design framework

source: Designing Regenerative Cultures, 2016, www.danielchristianwahl.com

VALUES

What are the values that lie in our vision?
How are they related to the aforementioned issues?
Why are they important?

Planet
Biodiversity

As shown in the analysis chapter, the loss of biodiversity in the Netherlands is critical. It is caused mainly by agriculture related to the reclamation of nature and intensive mono-cultural food production (PBL, 2014). However, biodiversity plays a crucial role in maintaining healthy ecosystems. It creates habitat for different species which are important for agriculture. Biodiversity influences resilience of the environment to disturbance caused for instance by climate change. It is also strongly linked with nutrition and food security providing a wide variety of products (FAO, 2019).

Planet
Climate adaptation

Substantial part of the Netherlands is located under sea level. A threat of flooding is embedded in the Dutch society. Over time more complex systems were introduced to protect the country from the harmful effects of climate change. The phenomenon of engineering the natural environment often leads to problems such as air and water pollution or ground subsidence. Nature-based systems are the solution to adapt to the changing climate and maintain resilience. They provide ways to purify water, clean soil and air and therefore lower vulnerability of different species (ASLA, 2018).

Prosperity
Circularity

With the current pattern of production and consumption, there is a risk of depleting the Earth's resources.
The Netherlands is well known for its efficient agricultural production. However the system could be improved by optimising biomass use, using waste as raw materials for different purposes. By closing the cycles, there is a possibility to reduce resources waste and therefore protect the environment and related to it humans' health.

Prosperity
Knowledge economy

Developing a knowledge economy gives a great potential to boost prosperity and at the same time diversify the national economy, therefore make it more resilient to economic crises.
Establishment of partnerships between government, industry and universities fosters development of new innovations. Knowledge economy does not require as many resources as for instance agriculture. However, it is profitable and valuable also for other nations which can progress faster thanks to help from developed countries.

People
Health

Dietary patterns are interrelated with use of resources such as water, energy and land, thus with environment and economy. However, diets have the strongest link with the health of society. In order to improve the status quo of people's health, there is a need to reduce the consumption of meat and replace it with plant-based protein sources which are at the same time more sustainable. Another factor which influences health is lifestyle, especially physical activity. It not only affects condition but also mental health, which affects overall quality of life.

People
Social justice

Existing inequalities within the society have far-reaching consequences. Rural areas with poorer access to education and culture as well as urban areas with limited access to nature have a strong impact on people's well-being. Gaps are also seen in the income, even within the agricultural society.
It is crucial for improvement of quality of life to provide just distribution of resources spatially and among different social groups.

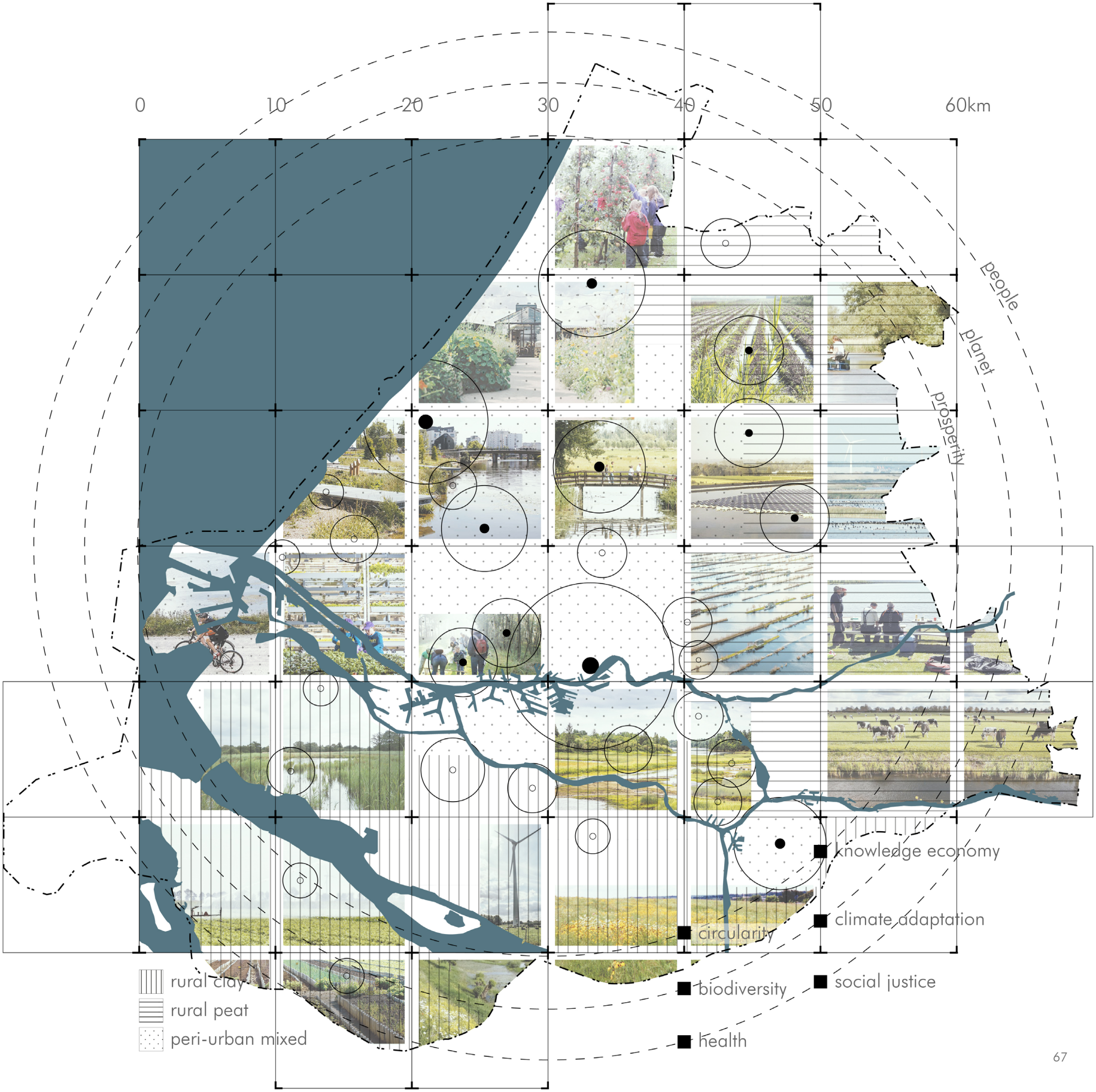
VISION STATEMENT

In 2050 South Holland will have regenerating agri-food landscapes, which facilitate the co-evolution and cooperation between humans and nature to reverse the effects of climate change, overexploitation and ecosystem degradation.
The result is an adaptive and inclusive food system that contributes to both the health of the inhabitants as well as the health of the landscapes of South Holland.

In order to change the current mono-functional productive landscapes, the vision aims to develop regenerative landscapes which could make the whole South Holland more adaptive, resilient, sustainable and healthy. The vision map shows what regenerative landscapes would look like in South Holland regarding the food, water and energy systems. It shows a combination of productive, attractive and diversified landscapes for South Holland.

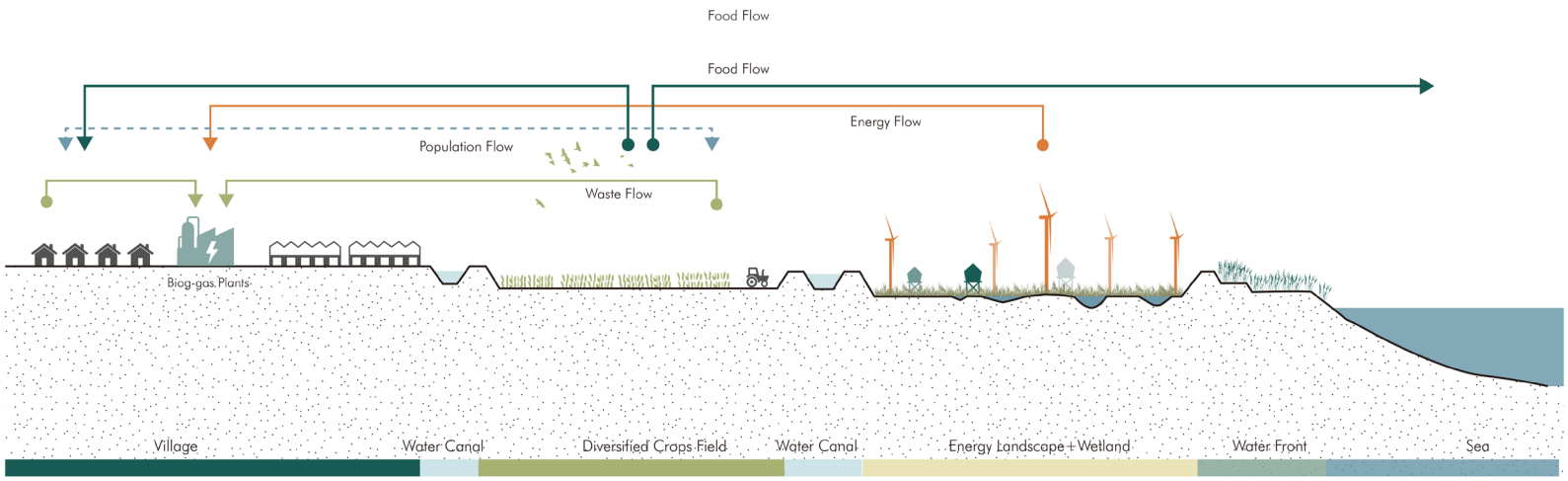
Regenerative landscapes are sourced by the place and it aims to manifest the potential that is created in the tension between local and regional qualities, opportunities and challenges (Wahl, 2019). Therefore the vision map shows three types of regenerative landscapes, which are Regenerative Circular Agriculture (rural-clay), Regenerative Peat Meadows (rural-peat) and Regenerative Social Landscapes (peri-urban-mixed).

Although the landscapes are still productive, they are now revitalised but no longer exploited. People will again care and cater the landscape and in return the landscapes cater people with food, energy and landscape quality to establish healthy lifestyles. People are interacting with the landscape and working together to further evolve themselves and the landscapes.


0
10
20
30
40
50
60km
people
planet
prosperity
knowledge economy
climate adaptation
circularity
social justice
biodiversity
health
rural clay
rural peat
peri-urban mixed

RURAL CLAY
→ REGENERATIVE CIRCULAR AGRICULTURE

"Regenerative practice is place-sourced. It is informed by the story of place and aims to manifest the potential that is created in the tension between local and regional opportunities and challenges." (Wahl, 2019)



In the rural clay…

The landscape remains a productive food landscape. However, it will be a diversified landscape where the natural capital is restored to enhance resilience and become climate adaptive. The efficient and diversified landscape gives space to new space claims for renewable public goods such as natural water storage, energy production and circular resource management.

Goal

First the natural capital has to be restored to enable it to deal with previous problems, future challenges and become resilient. Some space will be given back to nature and biodiversity is enhanced. Secondly there are opportunities for the agri-food sector to establish a circular and value creating network for their resources and knowledge. As a result the regenerative circular agriculture provides a diversified and most of all resilient landscape where farmers work together to restore the natural capital and establish a circular system .

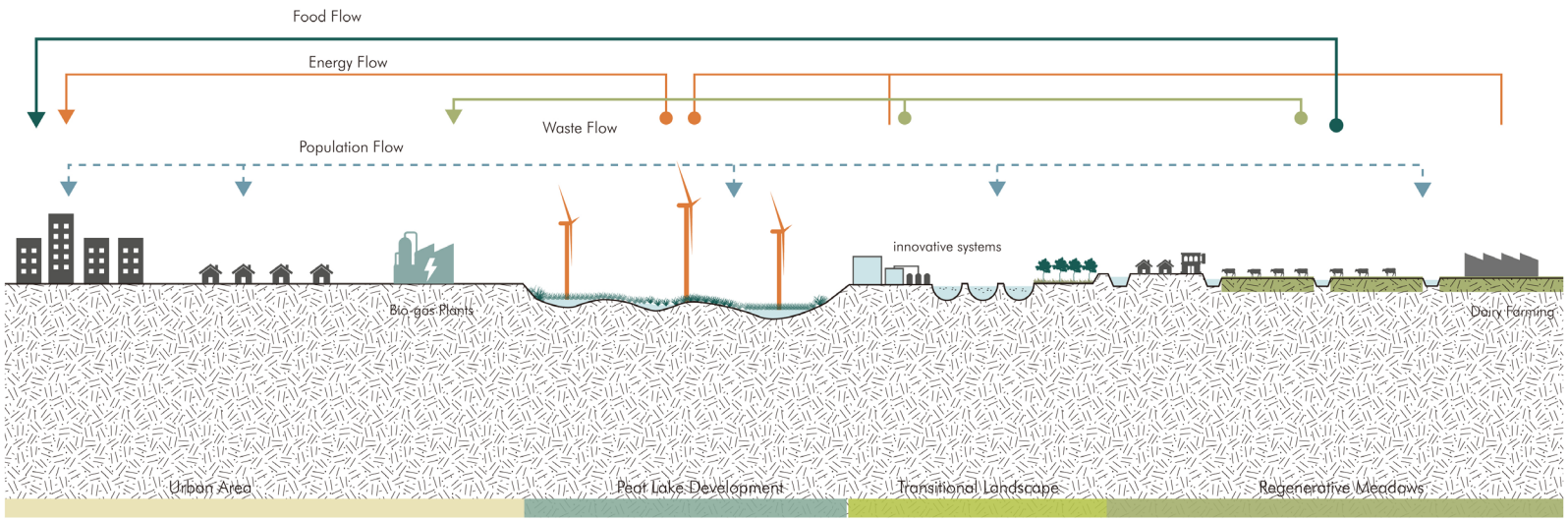
Regenerative technical system

For the Regenerative Circular Agriculture, the diversified crops and smart crops rotations will optimize the use of agriculture. At the waterfront, an energy wetland will give space for nature and will be a source of renewable energy. Farmers work together with biogas plant owners, initiatives and nature development to close the organic cycles.


Logistics

RURAL PEAT
→ REGENERATIVE PEAT MEADOWS

"Regenerative practice is place-sourced. It is informed by the story of place and aims to manifest the potential that is created in the tension between local and regional opportunities and challenges." (Wahl, 2019)



In the rural peat…

A large part will be given back to nature and water, to restore biodiversity and make the area more climate resilient. This restores the peat and stops the subsidence. A circular resource management network will extract nutrients and resources from organic waste flows. The nature parks will be opened for recreational and educational purposes about nature, food and healthy lifestyles. This will be a co-operation of the farmers and recreation sector.

Goal

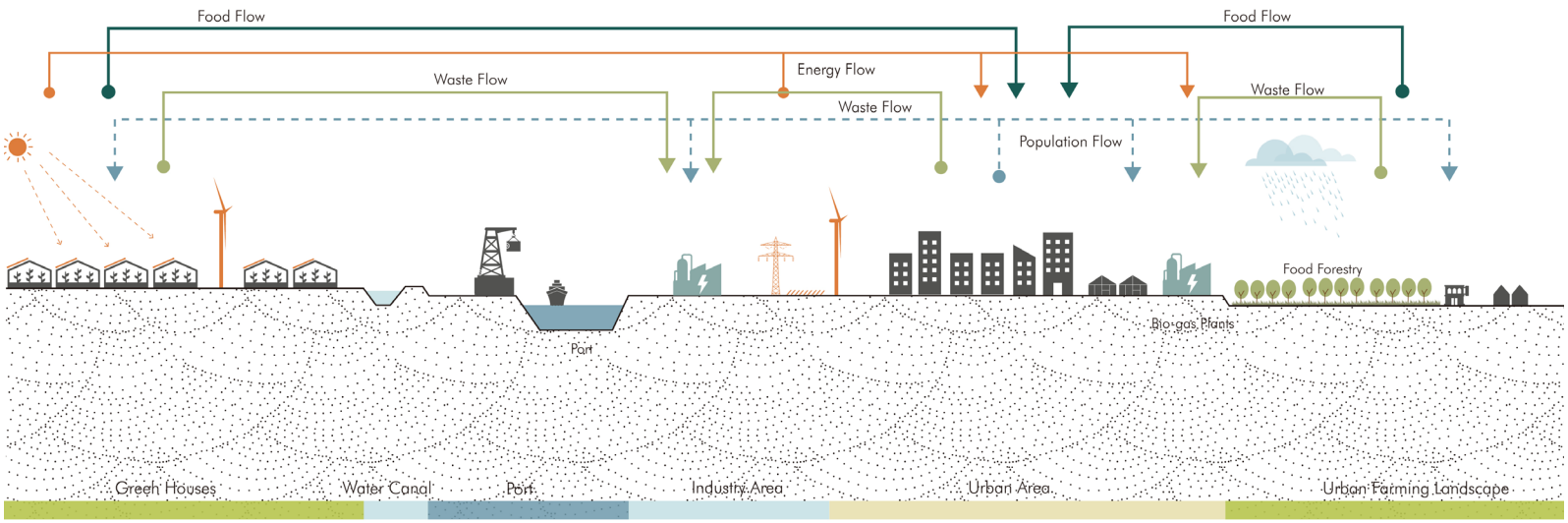
Part of the natural peat wetlands will be restored. In the transition zone between wet and dry new technologies for circular resource management will be introduced to restore natural capital and provide job opportunities. People are attracted by the natural landscapes and agro-tourism will develop. The combination of agriculture and leisure creates opportunities to teach people about food production and raise awareness about healthy food.

Regenerative technical system

For Regenerative Peat Meadows, the vision imagines raising the ground water level in peat meadows for reducing the CO2 emissions. Part of the meadow will be transferred into nature and transitional landscape for regenerative technologies such as the aquaponic system, natural water purification, and renewable energy production.

PERI-URBAN MIXED
→ REGENERATIVE SOCIAL LANDSCAPES

"Regenerative practice is place-sourced. It is informed by the story of place and aims to manifest the potential that is created in the tension between local and regional opportunities and challenges." (Wahl, 2019)



In the peri-urban mixed…

Citizens are reconnected to each other, the landscape and food production. Some green houses will be intensified by vertical farming. This means that more space can be used for nature and social activities. People gather and learn in community centers about food production and healthy diets. The social food bank and other initiatives will provide healthy food to the people. Initiatives, industry and farmers will work together to commercialize recycled products from organic waste.

Goal

First, the exchange of energy, nutrients and resources should be set up. In the regenerative social landscapes there are chances to develop commercial recycled products from local organic waste. Furthermore the citizens find a place where they can reconnect with nature and each other through local farming, art, recreation and other social activities. The regenerative social landscapes are multifunctional and layered to enhance the relation of citizens with the landscape.

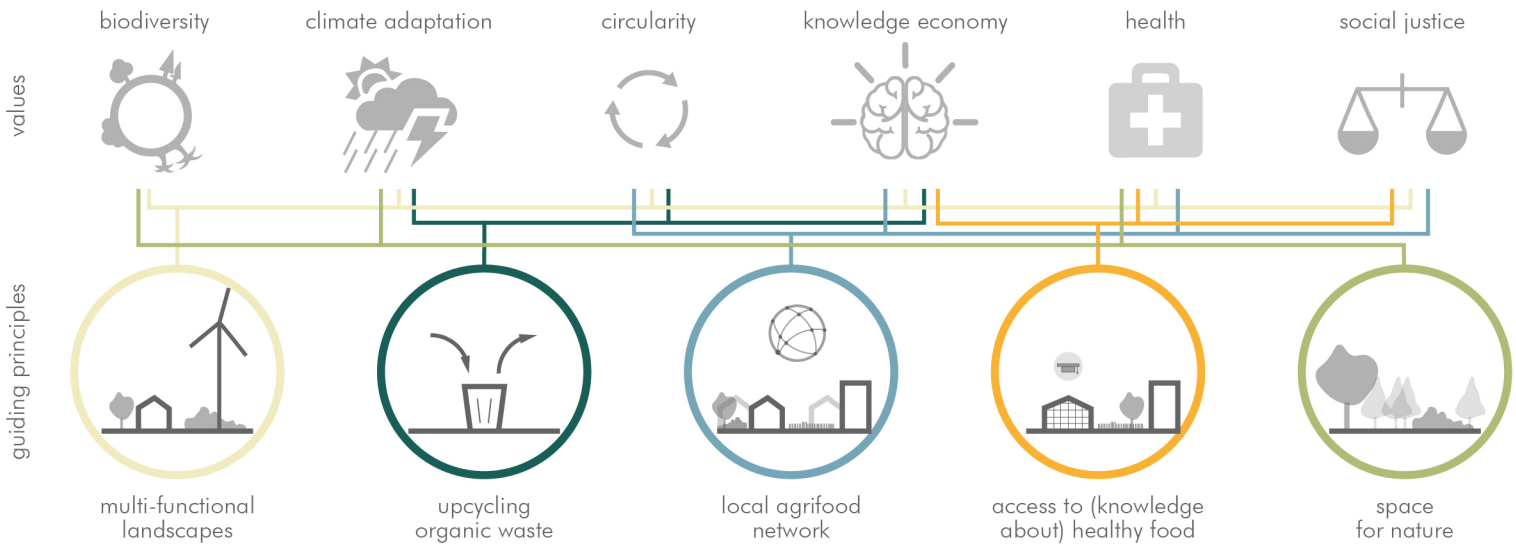
Regenerative technical system

For the Regenerative Social Landscapes, different initiatives will be combined with greenhouses and industry, creating chances for commercial production o f recycled products. A collaboration between the port of Rotterdam, the greenhouses and industry provides a circular network for nutrients and energy. In addition, social food banks and community centers will ensure access to healthy food and educate people about healthy lifestyles. The peri-urban landscape is developed into an integrated landscape where there is space for research, working, education and recreation alongside food production and forestry.

STRATEGY

STRATEGY PRINCIPLES

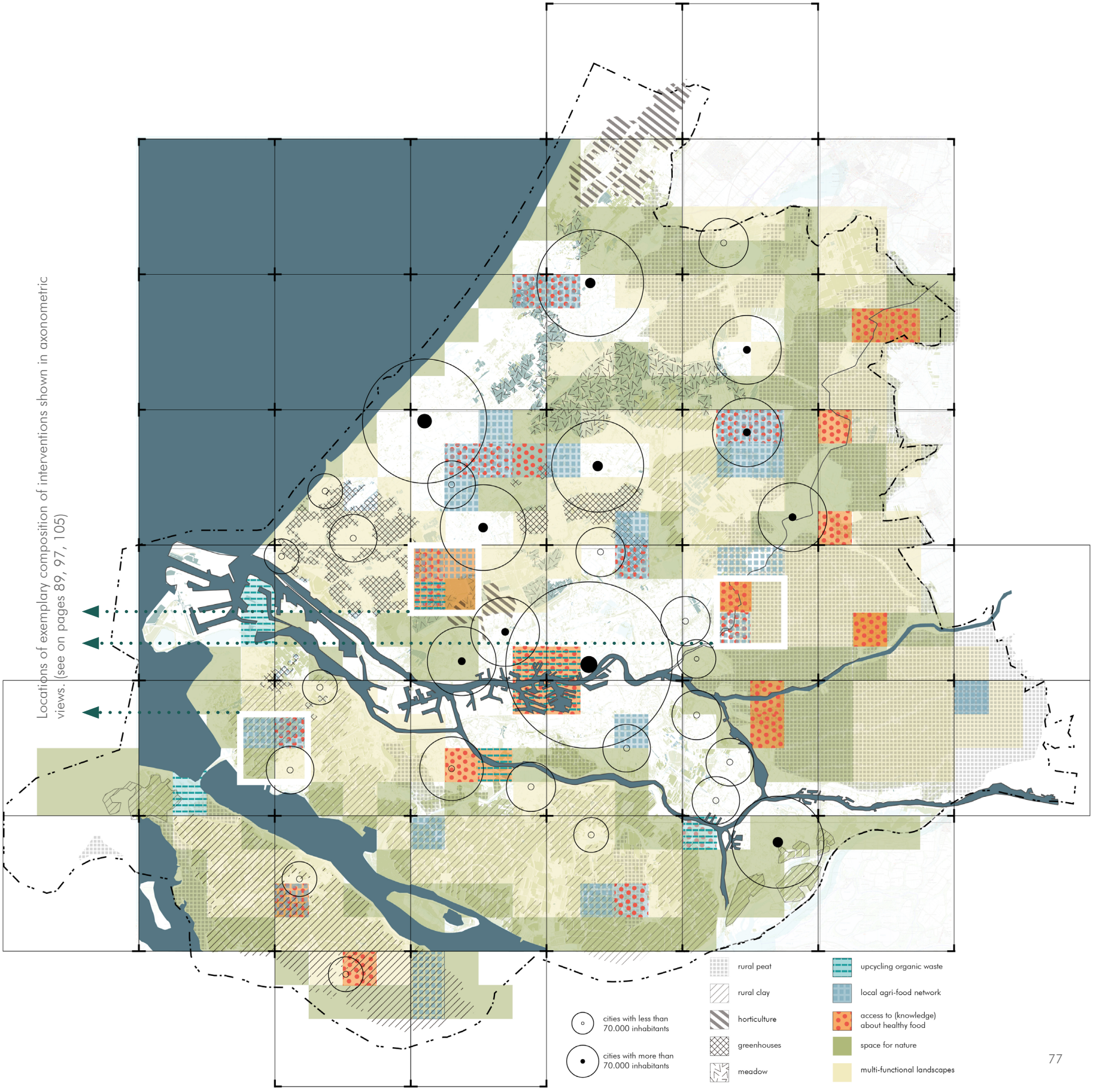
How to develop the vision?
How to reach the values of the vision?
What guiding principles should be used to do so?



Five main principles were defined in order to guide the strategy of regenerative landscapes. They relate to the aforementioned values of the vision. The strategy map shows where and in which combinations the guiding principles are applied.
The strategy principles are as follows:
Multi-functional landscapes give an opportunity to meet the new space claims for the Netherlands. By diversifying functions of different landscapes, their value rises not only in economical sense but first and foremost in cultural sense. It also protects the environment by making it more climate adaptive (Burrell, 2001).

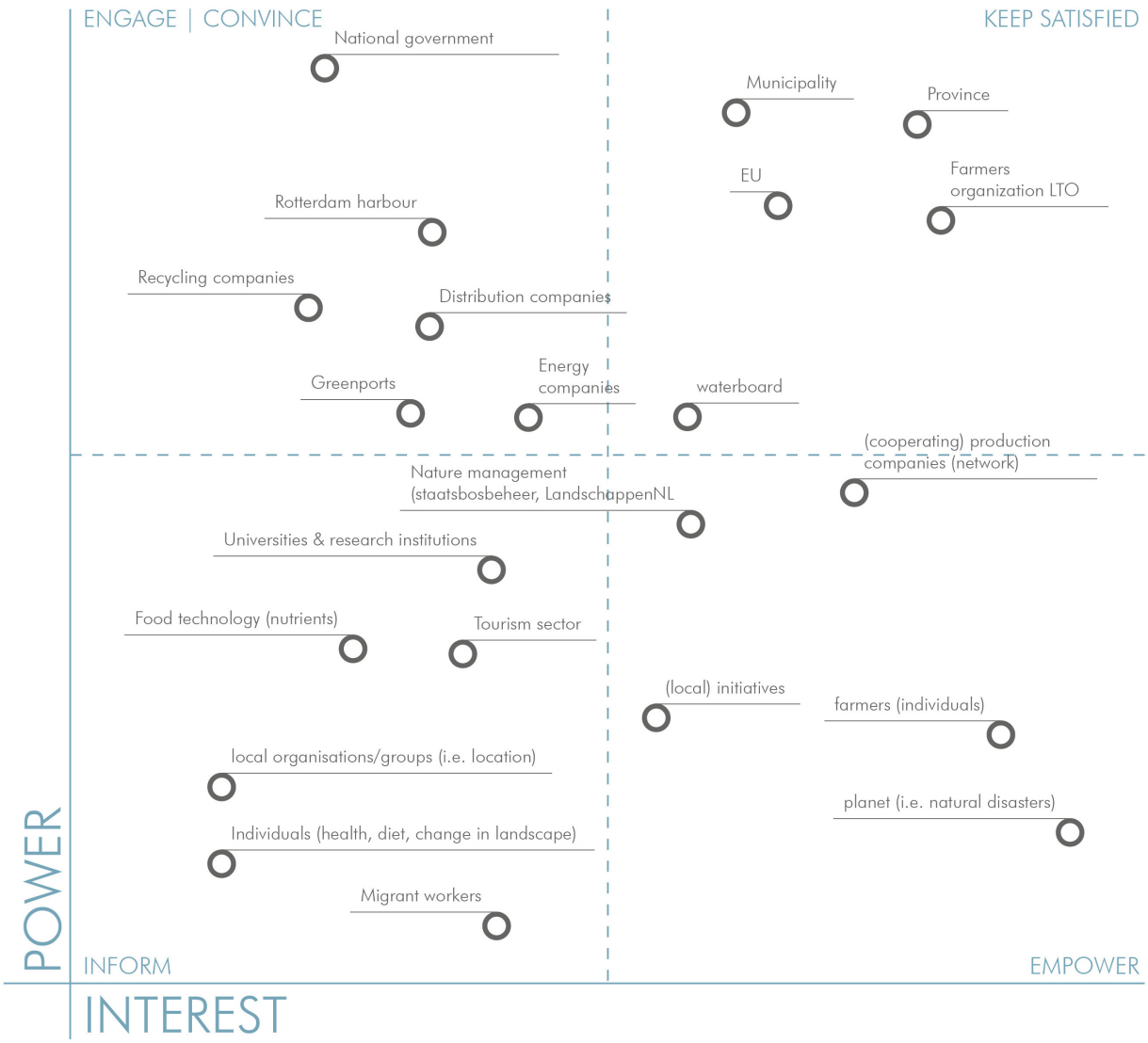
Up-cycling organic waste is strongly linked with circularity of resources. Closing loops in the food production chain saves money and environment by promoting reuse of not edible parts of plants and use of natural ways to fertilize the soil, which prevents soil degradation (Hepperly et al., 2009).
Local agrifood network
A purpose of this facility is to (re)connect local producers with each other and with the consumers, to strengthen individuals and to establish a system for a transfer of innovative ideas which would boost the sustainability of production.

Access to (knowledge about) healthy food plays a crucial role in shaping people's dietary patterns and awareness of the process of food production, which cultivates consumers' appreciation of farmers' work. As mentioned before diet is strongly linked to health and thus well-being (Tapsell et al., 2016).
Space for nature is needed mainly to create an environment resilient to climate change thanks to biodiversity. It also helps improve people's quality of life (Secretariat of the Convention on Biological Diversity, 2009).


Locations of exemplary composition of interventions shown in axonometric views. (see on pages 89, 97, 105)
cities with less than 70.000 inhabitants
cities with more than 70.000 inhabitants
rural peat
rural clay
horticulture
greenhouses
meadow
upcycling organic waste
local agri-food network
access to (knowledge) about healthy food
space for nature
multi-functional landscapes

STAKEHOLDER ANALYSIS

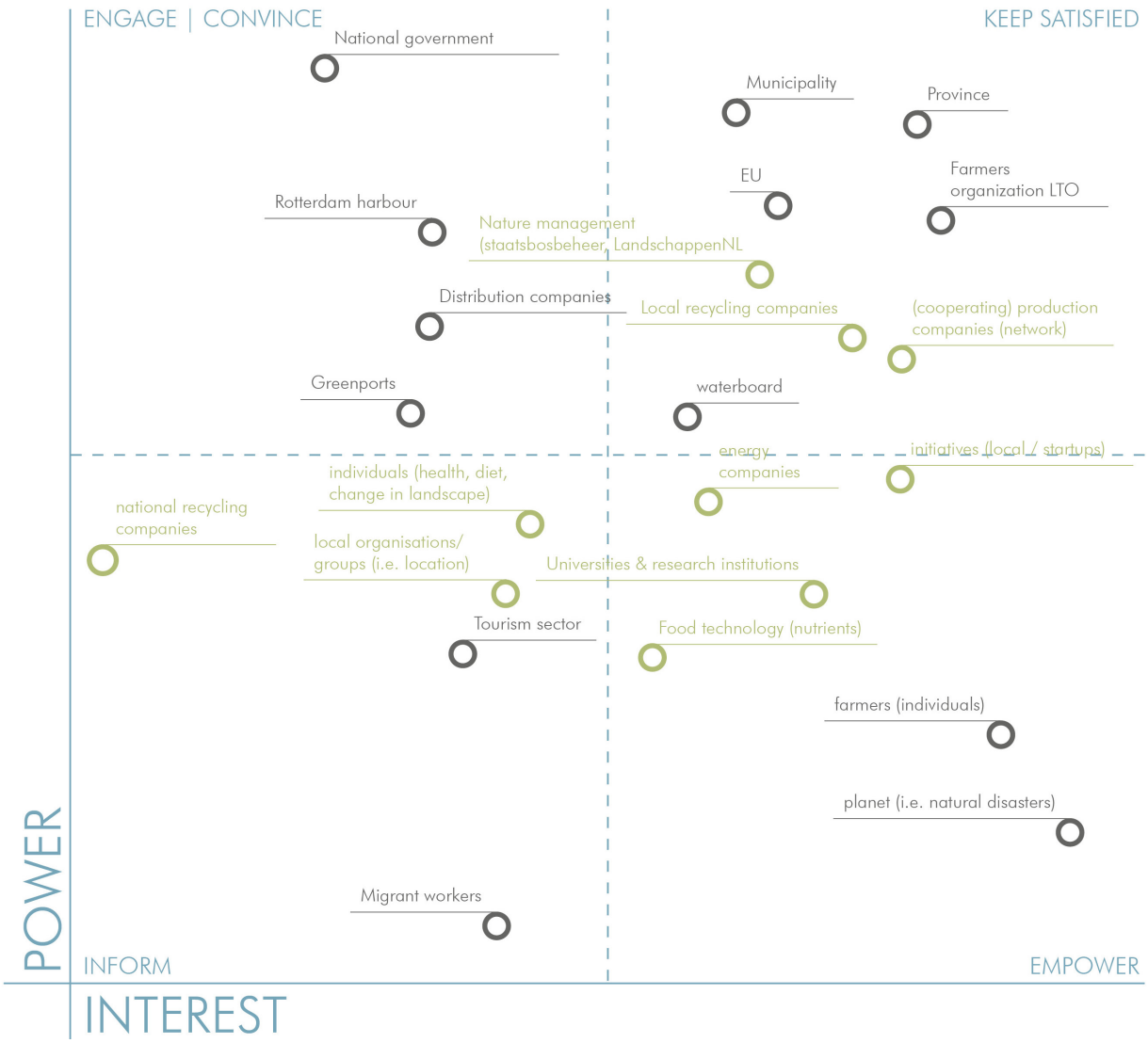
POWER INTEREST OF PRODUCTIVE LANDSCAPE



The interaction of people with the landscape is important. Therefore it is vital to know the interests and power of stakeholders and build a strategy for those that have or should have a close relation with the landscape. There are multiple stakeholders that will be reappearing in the strategy: nature management, the water board, initiatives, recycling- and energy companies, and the farmers. Next, there are supportive parties involved in the strategy. Some changes are necessary for the transition; this includes empowering, convincing and satisfying, activating and engaging stakeholders.

The first stakeholder is the individual. 'The individual' can be a farmer or a regular citizen, as it is necessary to restore the relation of individuals amongst each other and with the landscape. So they will again use and care for it. There are executive companies represented for recycling, energy and waste processing. They should contribute to circular organic resource management and renewable energy. This ought to be easier on a local scale, hence; local companies. The food technology sector, universities and research institutions are stimulated to research the methods to achieve that. The nature management organizations are empowered to own and develop new nature with farmers and local organization groups. The initiatives, cooperation networks and local organization groups are stimulated to create a network or hubs for participation, entrepreneurship and knowledge sharing.

POWER INTEREST OF REGENARTIVE LANDSCAPE



PARTICIPATION AROUND THE TABLE

For the regenerative landscapes cooperation is crucial. Hence, this round-the-table concept is developed for a participation process that includes individuals, initiatives and organizations. Local initiatives can be very impactful on a local scale, but struggle to build capacity on the bigger scale, can comply with regional policies or get noticed by institutions. This concept provides a podium and dialogue on multiple scales. As many people with conflicting interests are brought together at this table, respect is important. Only then consensus can be reached.

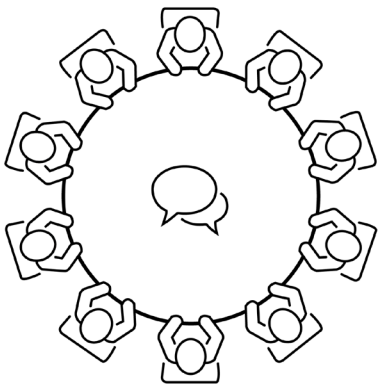


Table 1

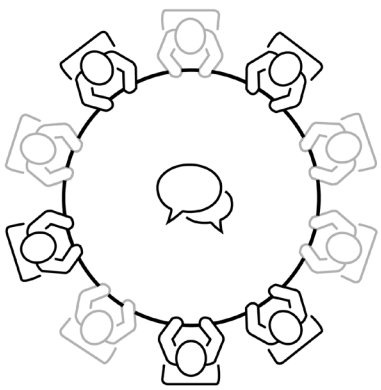


Table 2

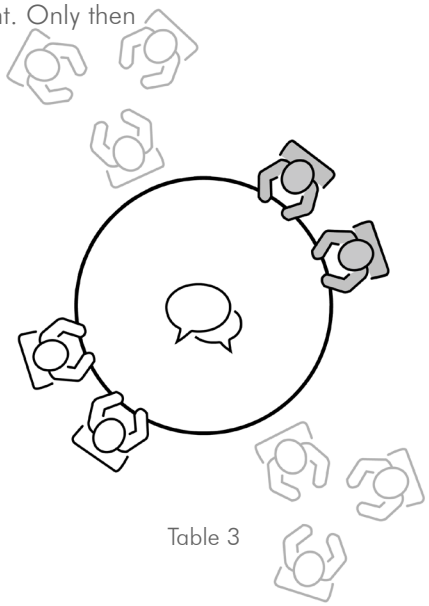


Table 3

The motto of participation:

1. For each table there is at least one person who is also present in a table on another scale.
2. Around the tables participants are open-minded, active in dialogue and constructive towards cooperation.
3. The table sessions are fair, constructive and action-oriented.

Table 1: Regional partners

This is the most formal table setting that is planned each month and organised for authorities of the province and companies. Representatives of the other tables are included to activate, discuss, present and inform about their sessions and so they can get back with the information to their table. This table can choose to support initiatives on a regional level.

Table 2: Landscape partners

This table setting is less formal and aims to bring institutions together with representatives of civil society and the landscape hubs each month. This will be organised for each landscape individually. Representatives of the other tables are included to activate, discuss, present and inform about their sessions and so they can get back with the information to their table. This table can choose to support initiatives on a landscape level.

Table 3: Free partners

The third table is one that can be called upon freely by anyone that sees an opportunity for a partnership. This meeting can be extremely informal as long as a representative of the round-the-table platform is represented and the idea is shared on an online platform so that other members can learn from it. This table can choose to support initiatives on a platform level. On several locations in the landscape is it possible to visit community centres/hubs by anyone who is interested and is open to talk about regenerative and durable development. The interesting conclusions of these talks can be sent to the online platform, just mentioned, engraved in the physical tables.

Table 4: Digital partners

Table four is the online platform already mentioned in table 3, this platform documents all the ideas and discussions of the other tables. Furthermore it acts as an online portfolio for all initiatives that are part of or develop the round-the-table concept.

https://www.zuid-holland.nl/feelfreetospeak/regenerativeroundthetable

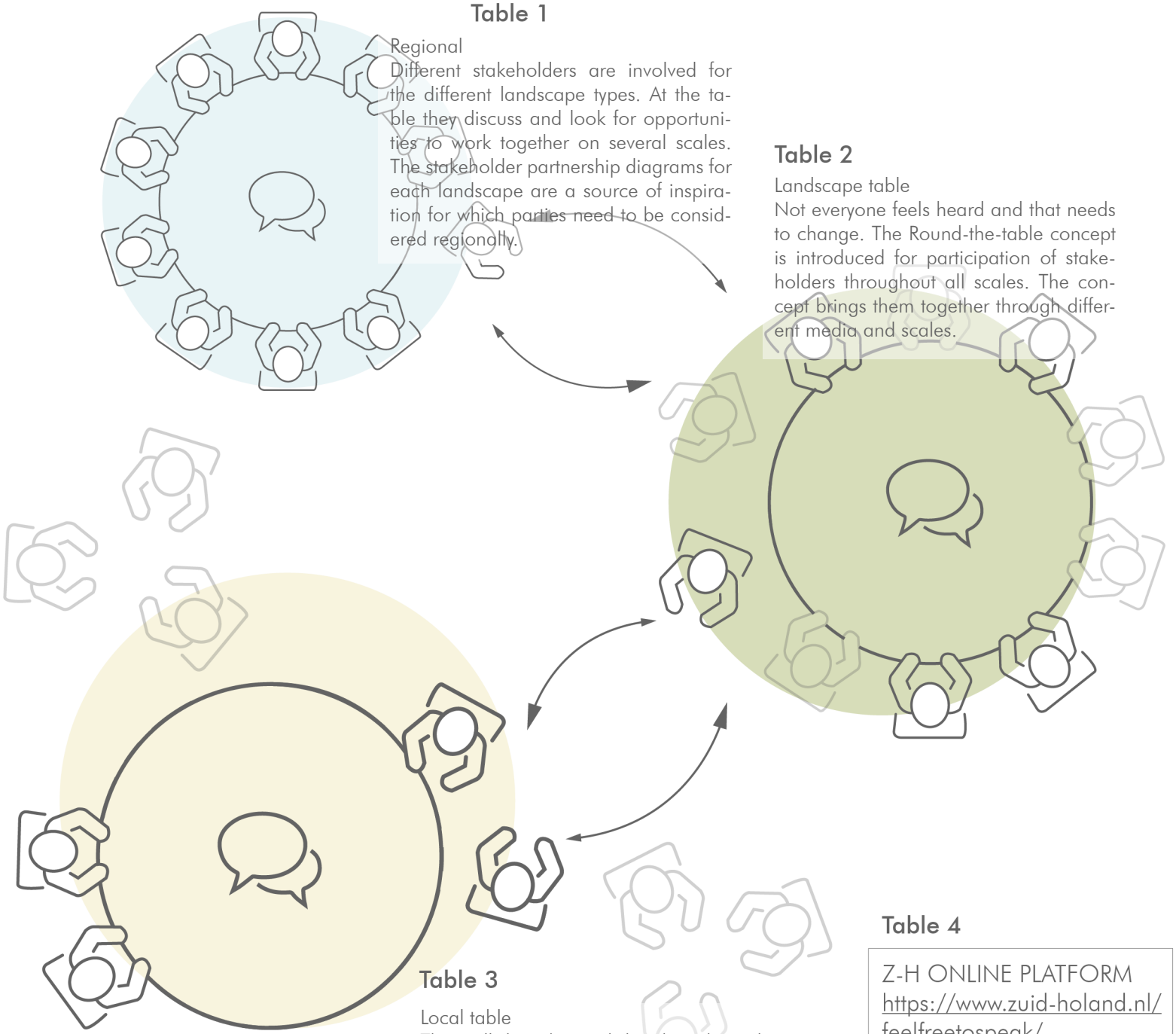


Table 1

Regional
Different stakeholders are involved for the different landscape types. At the table they discuss and look for opportunities to work together on several scales. The stakeholder partnership diagrams for each landscape are a source of inspiration for which parties need to be considered regionally.

Table 2

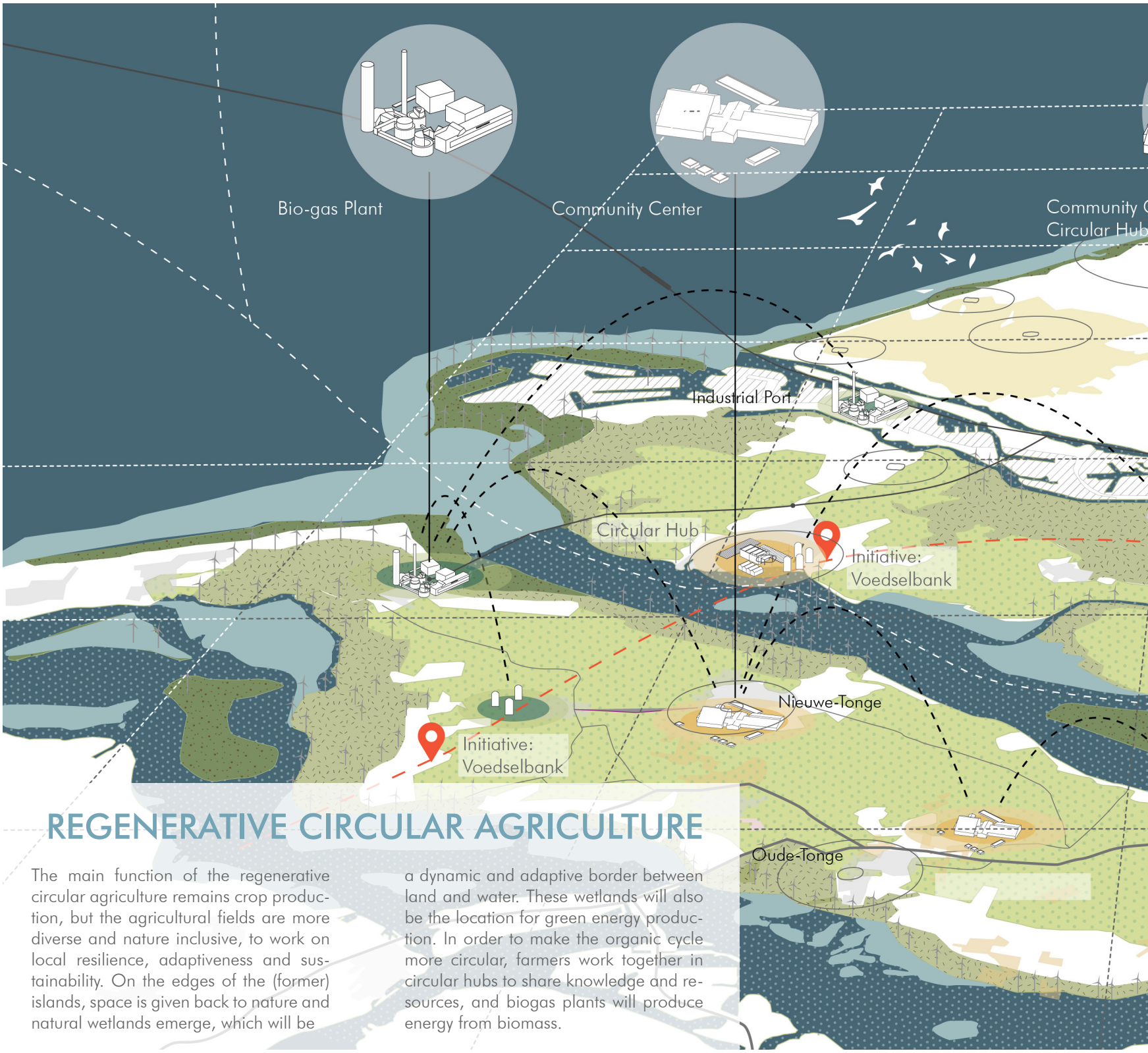
Landscape table
Not everyone feels heard and that needs to change. The Round-the-table concept is introduced for participation of stakeholders throughout all scales. The concept brings them together through different media and scales.

Table 3

Local table
This will be changed by the physical meeting of people, combined with an online platform.

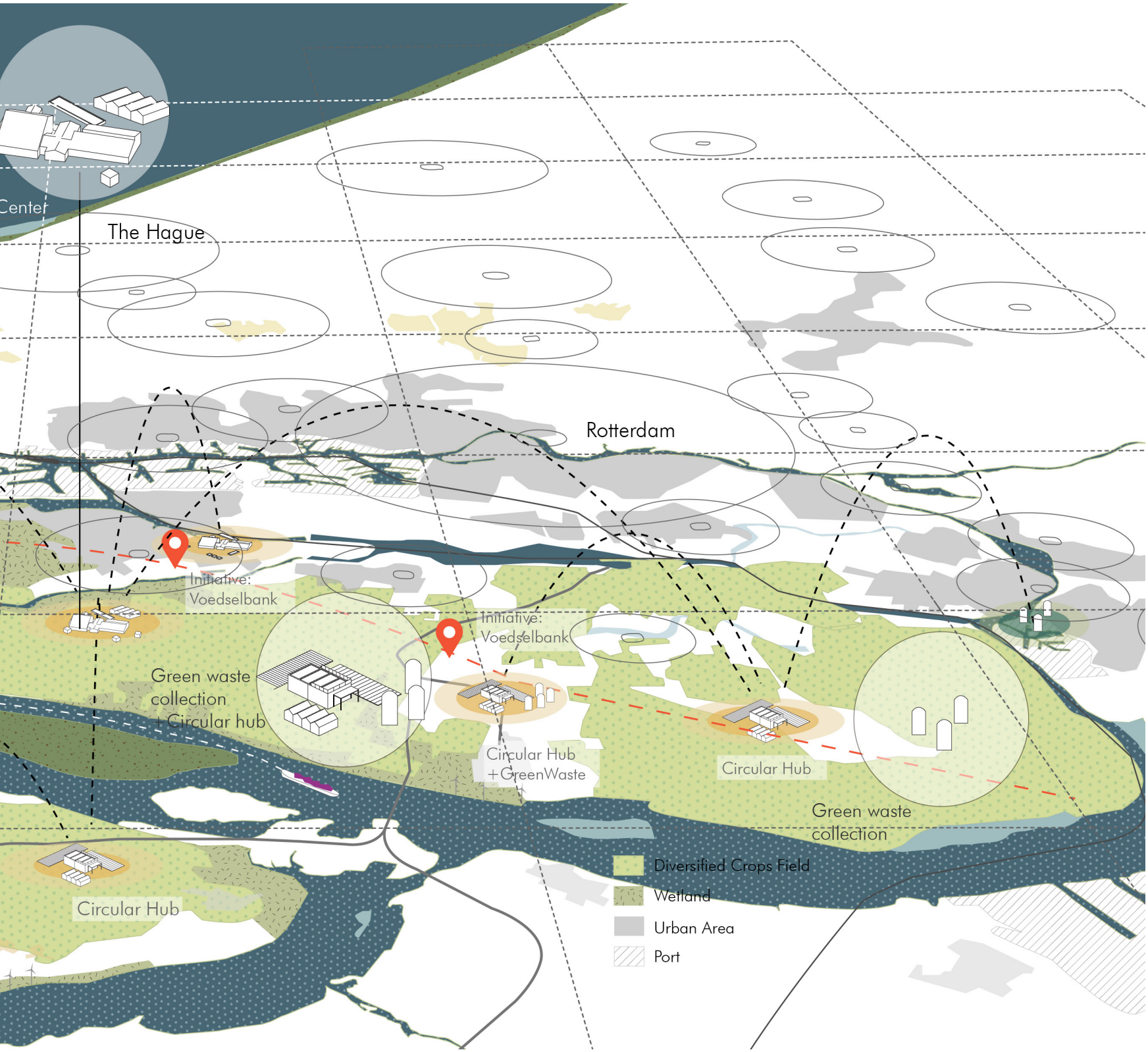
Table 4

Z-H ONLINE PLATFORM
https://www.zuid-holand.nl/feelfreetospeak/regenerativeroundthetable



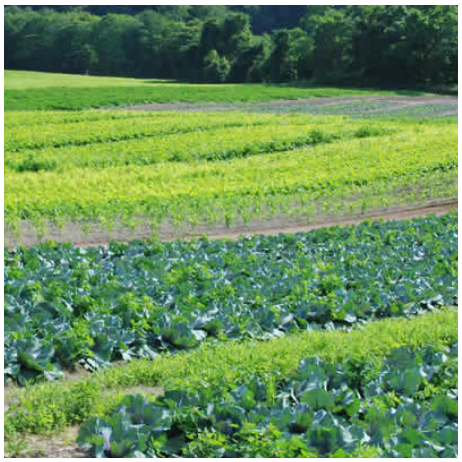
REGENERATIVE CIRCULAR AGRICULTURE

The main function of the regenerative circular agriculture remains crop production, but the agricultural fields are more diverse and nature inclusive, to work on local resilience, adaptiveness and sustainability. On the edges of the (former) islands, space is given back to nature and natural wetlands emerge, which will be a dynamic and adaptive border between land and water. These wetlands will also be the location for green energy production. In order to make the organic cycle more circular, farmers work together in circular hubs to share knowledge and resources, and biogas plants will produce energy from biomass.


Center
The Hague
Rotterdam
Initiative:
Voedselbank
Initiative:
Voedselbank
Green waste
collection
+Circular hub
Circular Hub
+GreenWaste
Circular Hub
Green waste
collection
Circular Hub
Diversified Crops Field
Wetland
Urban Area
Port

REGENERATIVE CIRCULAR AGRICULTURE FLOWS

How will resources and people flow through the new system?



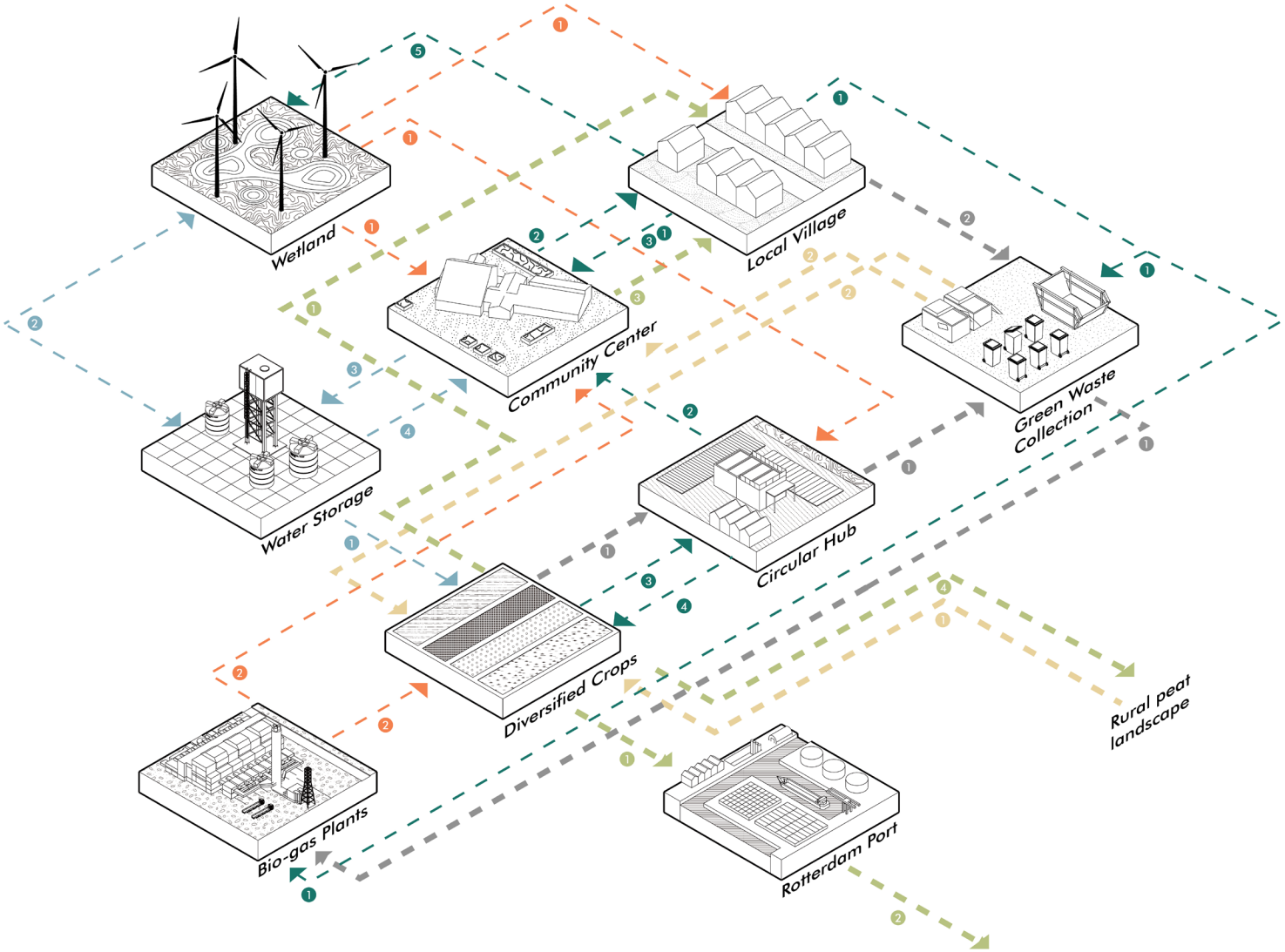
Food & organic waste flows

Crops will still be produced on the clay soils, but the fields (and so the products) will be more diversified. The crops will be distributed in the Netherlands and exported from the port of Rotterdam. A part of this production (or the waste products) will also be used as animal feed for the cows on the peat meadows. The community centers with local farming will be a second source for food production. Local inhabitants can grow their own food and bring it home. The organic waste that is produced by the cities and villages will be collected at local organic waste collection sites.

The organic waste from the farmers will first be collected in the circular hub, to see if it can be reused within the farmer community. What is not used in the circular hub is collected at the green waste collection. Here, a part of the waste will be compost that can be used for the farmers and local farming, and the rest will go to the biogas plant to be turned into energy. Extra organic fertilizer will come from the manure of the cows of the rural peat landscape.

Other flows

Energy will be generated by the wind turbines in the wetlands and by the biogas plants, and this energy is distributed locally. The wetlands will purify the water and will also contain areas for water storage, to provide enough fresh water to fight salinization during droughts. Recreational routing will make nature accessible for the local inhabitants. Farmers will gather in the circular hub to share knowledge about circularity and nature inclusive agriculture, and to share resources. Local inhabitants can gather in the community centers, where they will be educated about food production (by farmers) and healthy food. New job opportunities will arise in the community centers, waste recycling and biogas plants.



WASTE/resource

01.organic waste

02.household organic waste

WATER

01.water for cropsland against salinization

02.water purification of wetlands

03.rain water collection and storage

04.water for local farming

ENERGY

01.green energy production by wind tubines

02.energy from biogas plant

FERTILIZER

01.organic fertilizer from manure

02.organic fertilizer from organic waste

FOOD

01.crop production and distribution

02.food export from port

03.local farming production

04.animal feed

PEOPLE

01.new job opportunities

02.education

03.gathering locals/ gathering farmers

04.knowledges and resources

05.accessibility to natural landscapes

POLICY PACKAGES

Which policies are needed to develop regenerative circular agriculture landscapes?

Nature inclusive agriculture

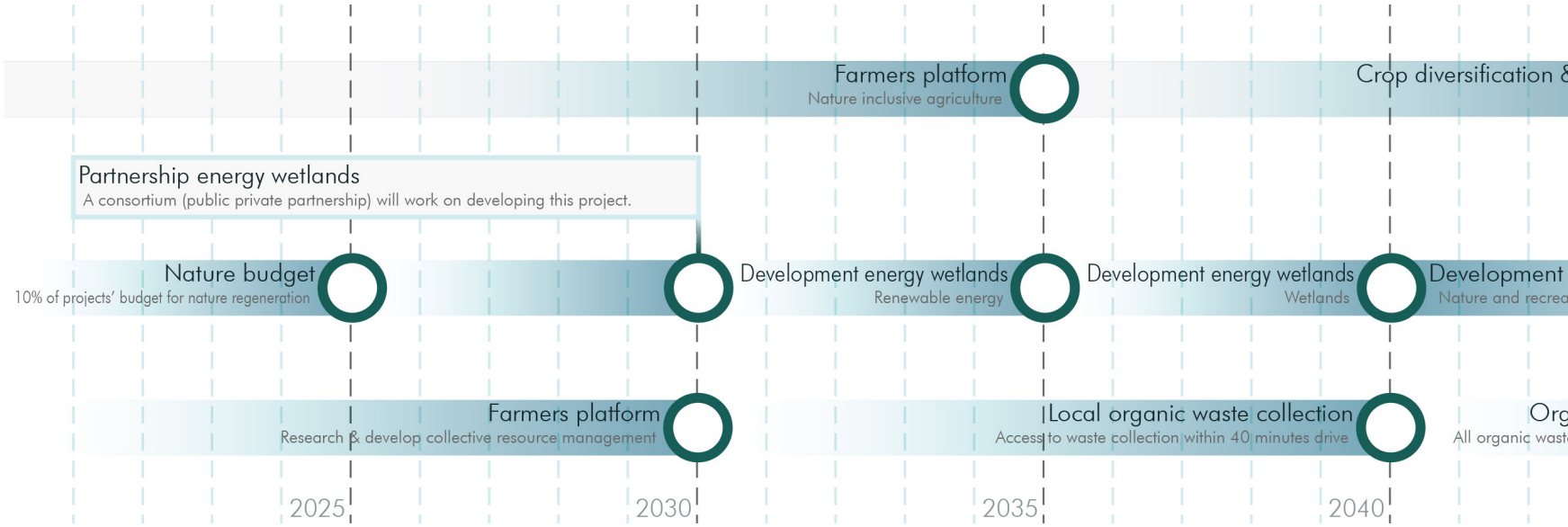
The goal of this package is to change the private monocultural agricultural fields into multicultural and biodiverse fields. A farmer platform is set up, where farmers, initiatives and researchers can gather to share knowledge about nature inclusive agriculture (LAFN). Biodiversity and climate resilience will be enhanced by crop rotations and space for nature at the plot borders (SFN, MFL). Nature inclusive agriculture will contribute to regenerative landscapes, as the soil will be healthier due to the crop rotations and biodiversity is enhanced.

Energy wetland development

The goal of this package is to combine nature, fresh water storage, green energy production and recreation. A partnership is formed to realize a combination of these functions (MFL). Biodiversity is enhanced by creating new habitats (SFN), water storage will provide climate resilience against droughts and salinization, and routings will make the wetlands accessible for recreation to enhance people's health. The energy wetlands will contribute to regeneration, as the natural wetlands are capable of restoring themselves and green energy is produced.

Organic waste resource networks

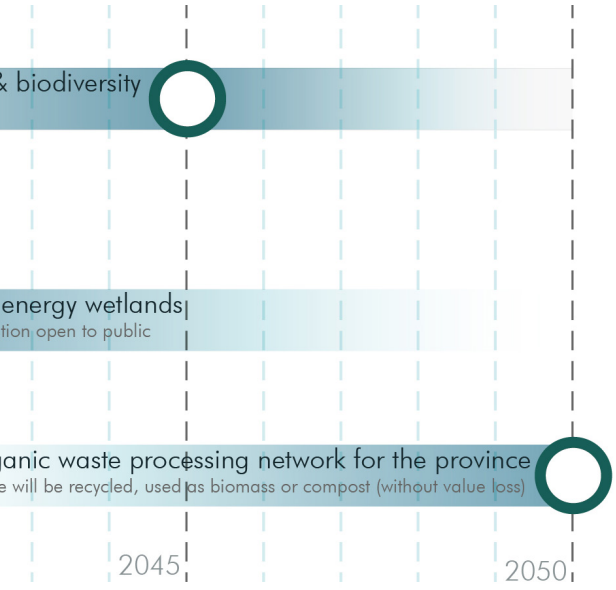
The goal of this package is to set up networks to improve circular resource management. Circular hubs are set up, where farmers can share knowledge and resources (LAFN). The organic waste cycle will be more circular, by collecting the waste locally. It can be processed for the use as compost or to make biogas (UOW). The organic waste resource networks will contribute to regenerative landscapes, as a circular system is needed to protect the landscapes from damage by emissions and to use waste as a resource.

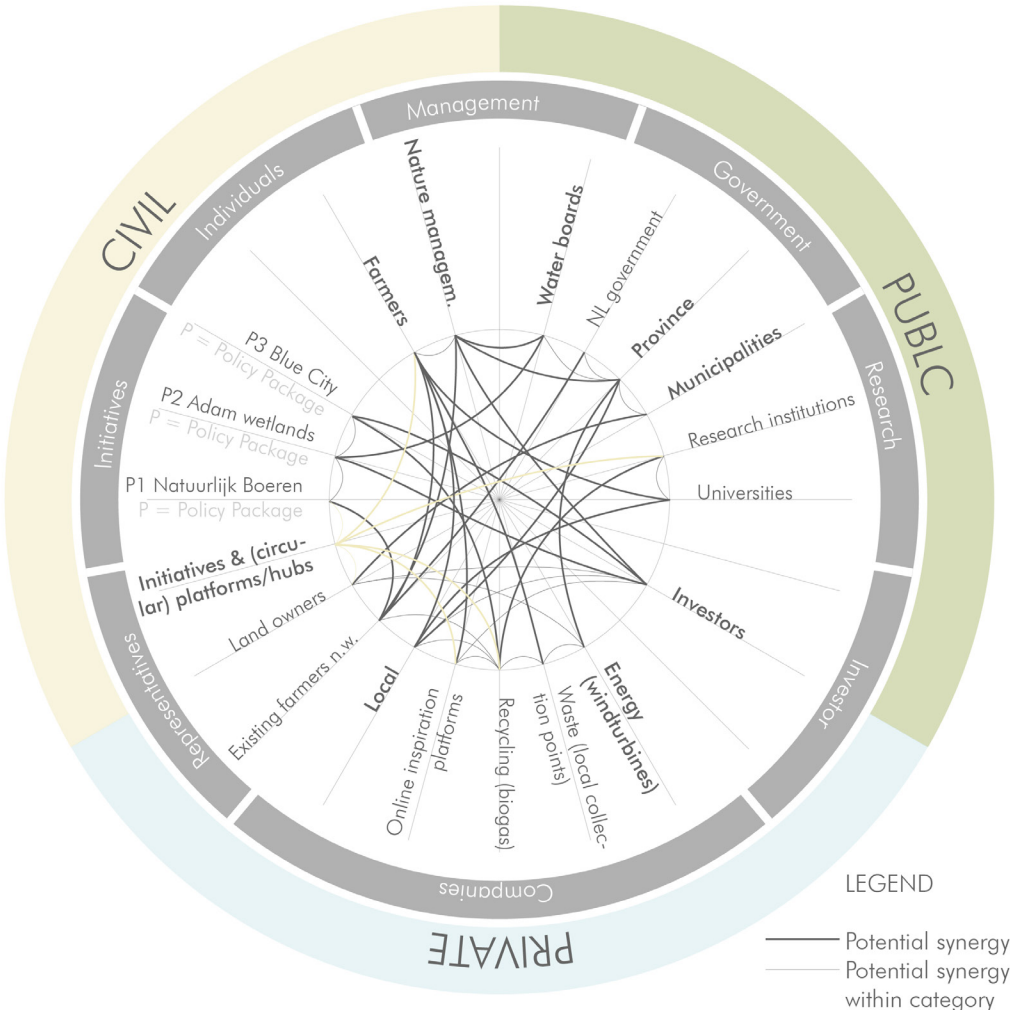


Legend

In the texts about the policy packages*:
Values in italic
Guiding principles in abbreviations
MFL = Multifunctional landscapes
UOW = Upcycling organic waste
LAFN = Local agri-food networks
AHF = Access to (knowledge about) healthy food
SFN = Space for nature

* In the appendix a table can be found in which all the links are made explicit between the problems, values, guiding principles, main interventions and policy packages





STAKEHOLDER SYNERGIES

What are the relations between local stakeholders? Which stakeholder synergies are successful?

The diagram shows the possible partnerships of these Regenerative Circular Agriculture. In beige it shows the main synergies, the collaboration between 'Initiatives & (circular) platforms/hubs' and the land owners, all (key potential) local initiatives, farmers, research institutions, recycling companies (biogas) and online inspiration platforms.

IIn CIVIL much is arranged among residents themselves, visible in many thin synergie lines within. Bonds between citizens should be made use of, also by PUBLIC and PRIVATE institutions. So citizen individuals or collectives can and will be supported by the region. Regional policies should support the (small) civil initiatives too, not only the bigger.

INITIATIVES

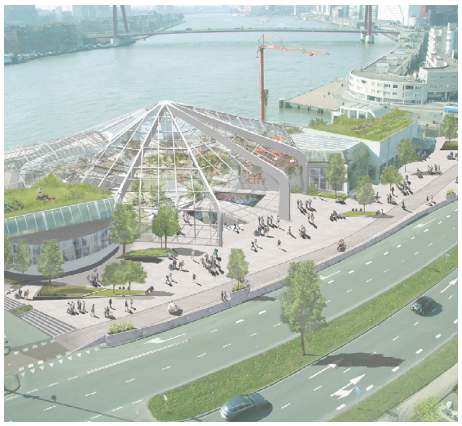
What initiatives could be introduced to reach the goals set for the regenerative circular agriculture landscapes?

Natuurinclusief Landbouwinitiatief
Exploration of the knowledge needs of farmers with regard to nature-inclusive agriculture,
Noord-Holland

Nature inclusive agriculture in which Natuurlijk Boeren! is fitting the concept of a change to multicultural, biodiverse agriculture fields seamlessly. This initiative is taking into account: biodiversity increase, balance between production and nature, nature-inclusive agriculture, collectives of farmers and crop rotation.

Amsterdam Wetlands
Wetlands energy transition,
biodiversity recovery, recreation and toursim
Amsterdam

In energy wetland development the Amsterdam Wetlands initiative seems inspiring for their: CO2-reduction and energy transition, vital circular agriculture, biodiversity recovery, the water agenda: supply, nuisance and quality and social challenge: designing a recreational grid for recreation and tourism. Amsterdam Wetlands is expecting the same as the policy package to combine nature, fresh water storage and green energy production.



Blue City
Playground for circular companies, start-ups;
waste is valuable
Rotterdam (main office)

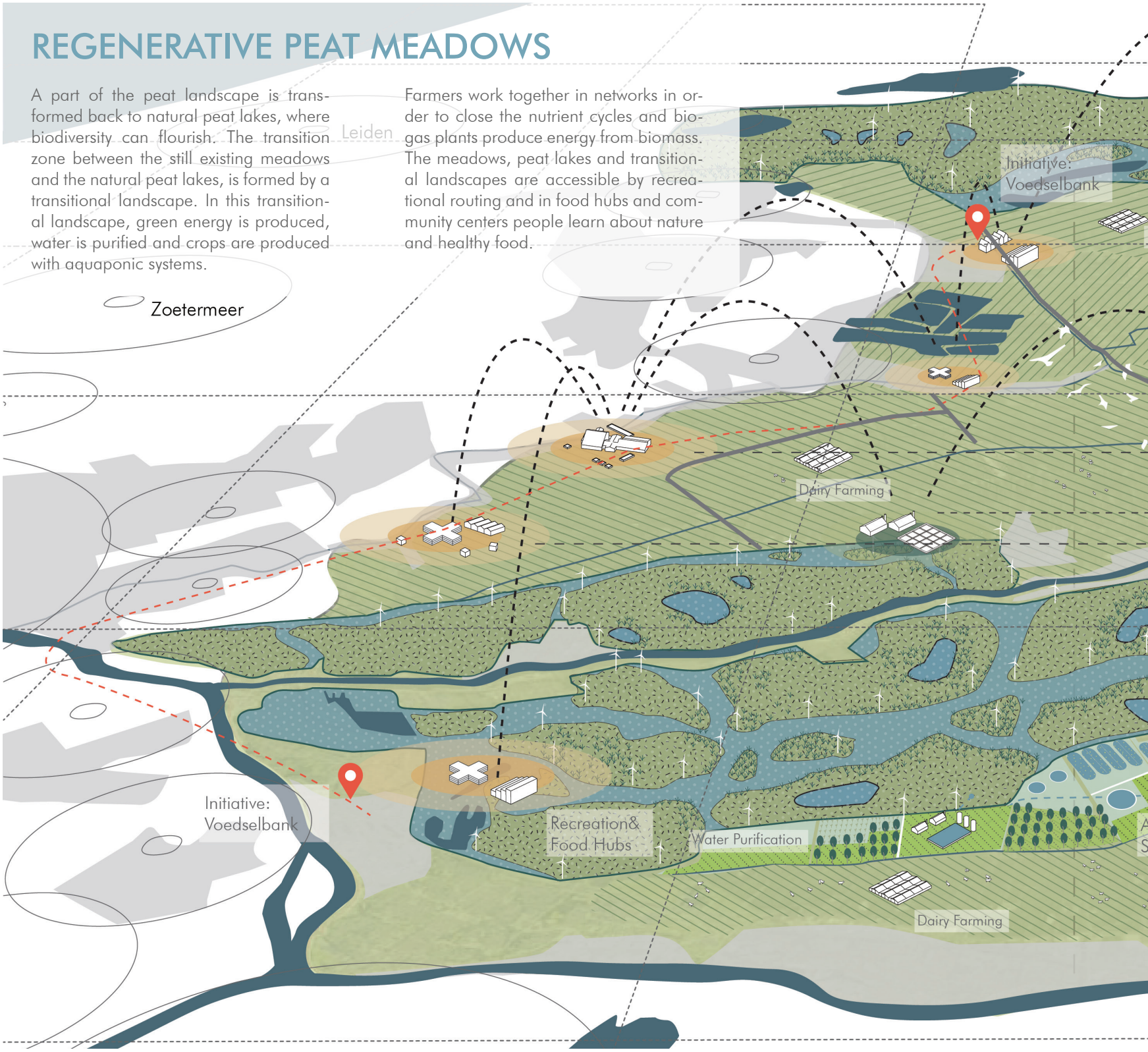
Blue City is the key initiative for the organic waste resource networks. This initiative serves as a playground for circular companies in which waste doesn't exist, waste is valuable (Blue City, 2020). Their statement is that you will get a portion of radical disruption with your morning coffee. Surfing the new economy, with start-ups creating new waves, corporates catch the tide. They integrate what's working, skip what's not. This practical approach is matching set up networks to improve circular resource management.

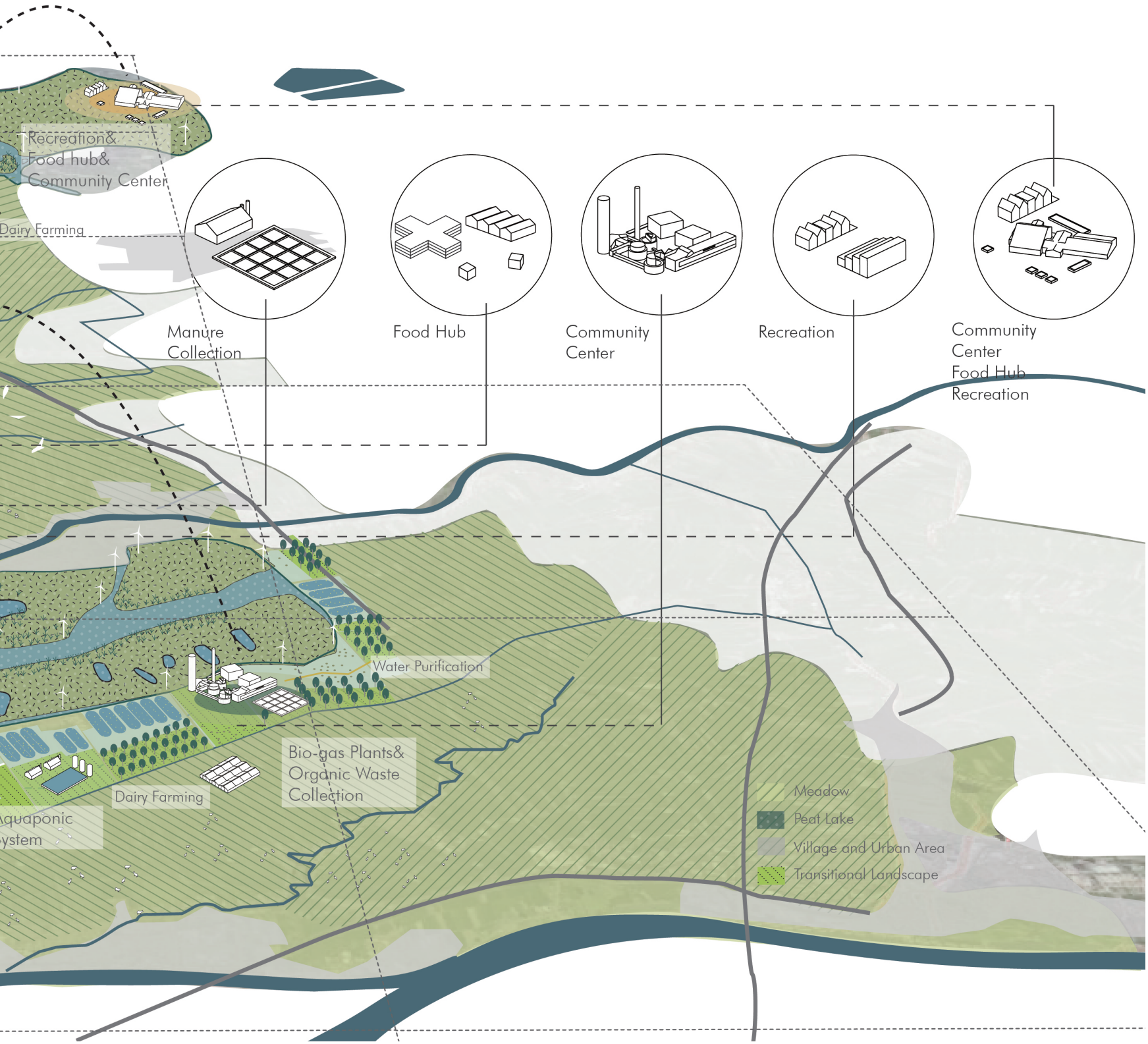

crops rotation
collectives
of farmers
start-ups
circularity hub
recreation
and tourism
crop diversification
biodiversity recovery
wetland
with renewable
energy production

REGENERATIVE PEAT MEADOWS

A part of the peat landscape is transformed back to natural peat lakes, where biodiversity can flourish. The transition zone between the still existing meadows and the natural peat lakes, is formed by a transitional landscape. In this transitional landscape, green energy is produced, water is purified and crops are produced with aquaponic systems.

Farmers work together in networks in order to close the nutrient cycles and biogas plants produce energy from biomass. The meadows, peat lakes and transitional landscapes are accessible by recreational routing and in food hubs and community centers people learn about nature and healthy food.




Recreation&
Food hub&
Community Center
Dairy Farming
Manure
Collection
Food Hub
Community
Center
Recreation
Community
Center
Food Hub
Recreation
Water Purification
Bio-gas Plants&
Organic Waste
Collection
Dairy Farming
Aquaponic
System
Meadow
Peat Lake
Village and Urban Area
Transitional Landscape

REGENERATIVE PEAT MEADOWS
FLOWS

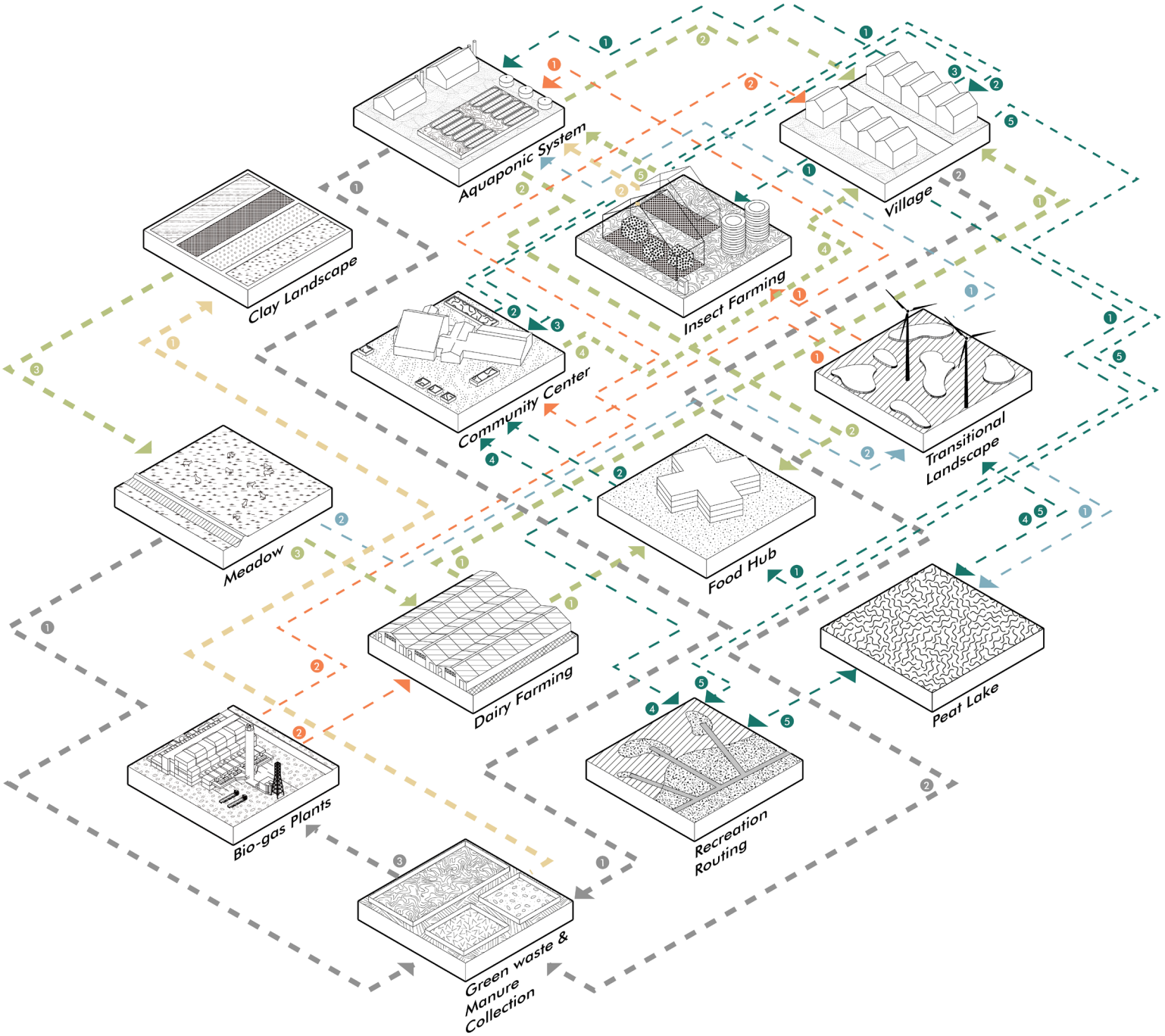
How will resources and people flow through the new system?

Food & organic waste flows

A part of the meadows will still be used for cow grazing. At the dairy farms, dairy is produced and afterwards distributed to the country, to export locations, and to the local food hubs. Extra animal feed for the cows is produced on the clay landscape. In the transitional wetlands, aquaponic systems are developed. In this system crops are grown in water and fish are held. The fish provide the nutrients for the plant growth and the plants filter the water for the fish. Insect farms will produce animal feed for the fish and extra organic fertilizer for the plants. The crops produced will again be distributed, also to the local food hubs. In the food hubs, cafes and restaurants work with local products and provide education about healthy food. Organic waste and manure will be collected in local green waste collection sites. Part of the manure is transferred to the clay landscape for the use as organic fertilizer. The remaining biomass will be used to generate energy in the biogas plant.

Other flows

Energy will be generated by wind turbines and floating solar panels in the transitional wetlands. This is also the location where a natural water purification system will be created. Polluted water from the meadows will be cleaned before it flows further towards the natural peat lakes. This water can also be used for the aquaponic systems. Farmers and local inhabitants can gather in the community centers. Farmers can work together to close the nutrient cycle and local inhabitants will be educated about healthy food and nature. Recreational routings will guarantee the accessibility of the landscapes from the villages and cities. New jobs will arise in the aquaponic systems, insect farming, food hubs, community centers and in waste processing.



WASTE

01.manure

02.green waste

03.biomass

WATER

01.purified water of the wetlands

02.water with nutrients /pollution

ENERGY

01.green energy produced by wind turbines and floating solar panels

02.energy from biogas plant

FERTILIZER

01.organic fertilizer

02.compost/ fertilizer

FOOD

01.dairy production

02.crop production

03.animal feed

04.local farming production

PEOPLE

01.new job opportunities

02.education

03.gathering farmers/ gathering locals

04.connection

05.accessibility

POLICY PACKAGES

Which policies are needed to develop regenerative peat meadow landscapes?

Peat lake development

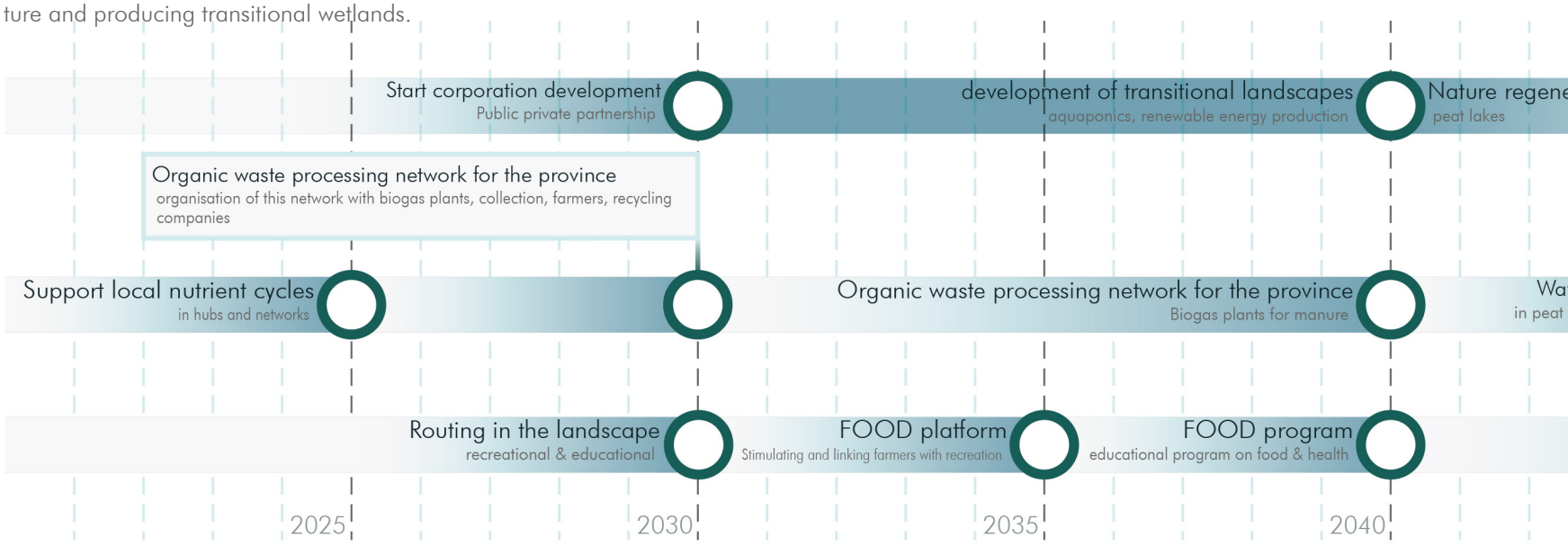
The goal of this package is to combine nature, water storage and alternative farming. A public-private partnership is formed to realize the combination of functions (MFL). Transitional wetlands are shaped, where green energy production and aquaponics are combined (MFL, SFN). The natural wetlands will enhance biodiversity and stop the peat oxidation and subsidence, which makes the area more climate adaptive (SFN). Farmers who lose their land are offered new opportunities in aquaponics and recreation (social justice). The contribution to regeneration will be through the adaptive nature and producing transitional wetlands.

Nutrient resource management

The goal of this package is to set up a more circular system for nutrients. Networks are set up in which farmers share their knowledge about nutrient management (LAFN). The organic cycle will be more circular, by sharing the resources (manure as organic fertilizer for agriculture) and producing biogas (UOW). Water is purified from nutrients in the transitional wetlands. Nutrient resource management will contribute to regenerative landscapes by protecting the landscapes from damage by nutrients and by using the waste as a resource.

Recreative food education

The goal of this package is to educate people about nature and food production. Educational routings and food programs are combined with recreation, to enhance the people's knowledge about healthy food (AHF, MFL). Later, community centers and food hubs will be the center points of food education. It will contribute to regenerative landscapes, as it reconnects people to the landscape. This will improve the health of the people and of the landscapes, as the people will value and cater the landscapes more.



Legend

In the texts about the policy packages*:
Values in italic
Guiding principles in abbreviations
MFL = Multifunctional landscapes
UOW = Upcycling organic waste
LAFN = Local agri-food networks
AHF = Access to (knowledge about) healthy food
SFN = Space for nature

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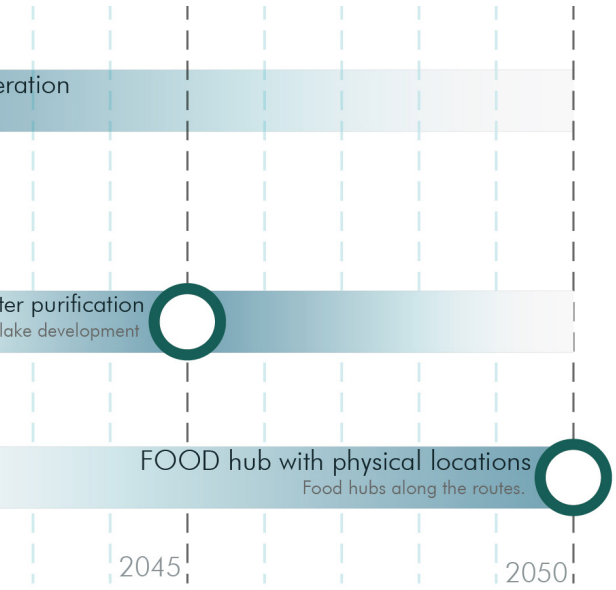
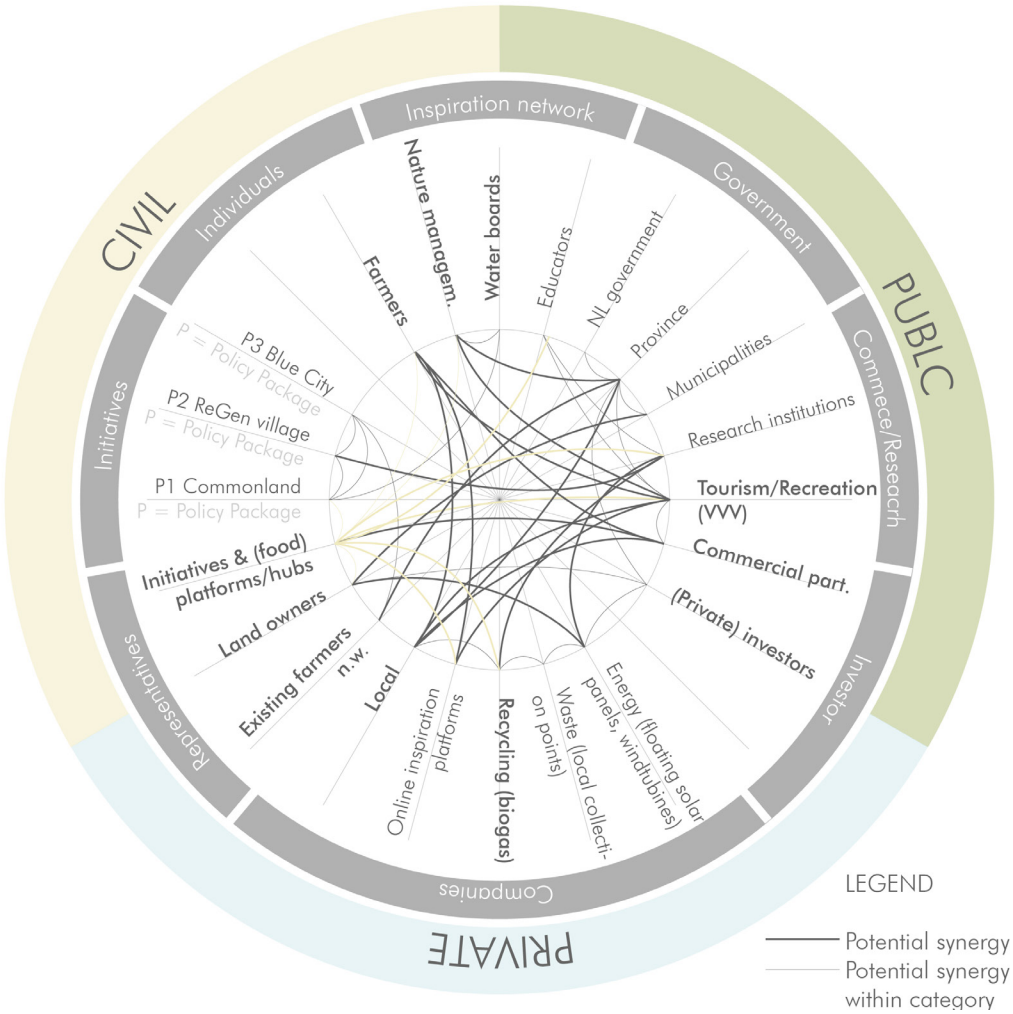




STAKEHOLDER SYNERGIES

What are the relations between local stakeholders? Which stakeholder synergies are successful?

The diagram shows the possible partnerships of these Regenerative Peat Meadows. In beige it shows the main synergies, the collaboration between 'Initiatives & (food) platforms/hubs' and the land owners, all (key potential) local initiatives, farmers, nature management, educators, research institutions, tourism/recreation, recycling companies (biogas) and online inspiration platforms.In CIVIL much is arranged among residents themselves, visible in many thin synergie lines within. Bonds between citizens should be made use of, also by PUBLIC and PRIVATE institutions. So citizen individuals or collectives can and will be supported by the region. Regional policies should support the (small) civil initiatives too, not only the bigger. Local companies, with great ideas, like Nederhoff Planten VOF feel unheard and come up with their own solutions for waste collection and recycling.

INITIATIVES

What initiatives could be introduced to reach the goals set for the regenerative peat meadow landscapes?

Commonland
Green deserts
World (online platform)

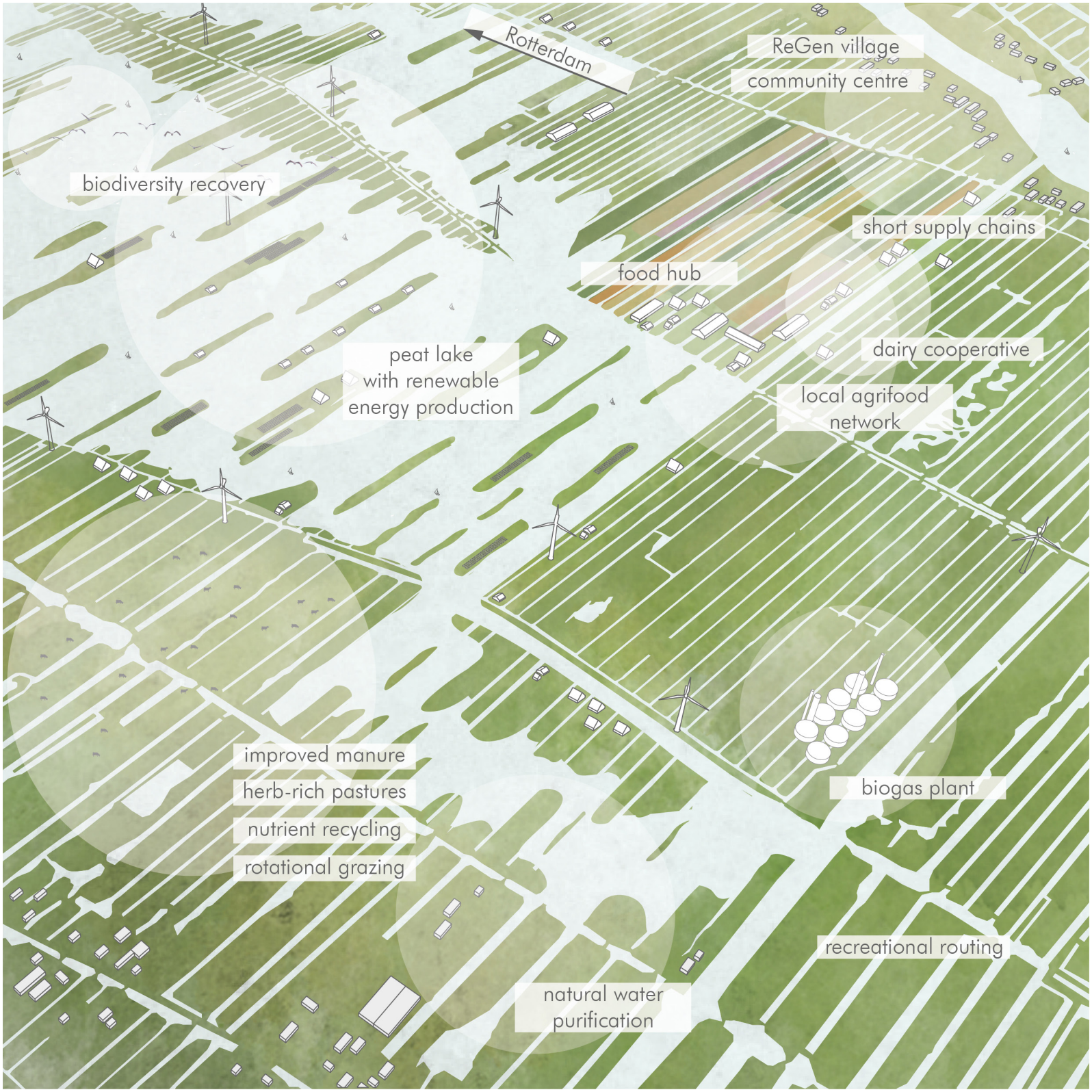
Peat lake development in which Wij. land agreeing with the, developed by Commonland's, 4Return filosophy, is fitting the concept of nature, water and biodiversity to battle peat oxidation and subsidence. Peat meadows, in which re-generating 'Green Deserts' is one of their specialties. Next to that they stand for: bi-odiversity increase, futureproof land-use practices. oxygen in water and waterlife increase, breeding place for regenerative practices. And, a holistic and practical framework that acts as the common lan-guage of global landscape restoration: inspiration, social capital, natural capital, financial capital (the 4 Returns).

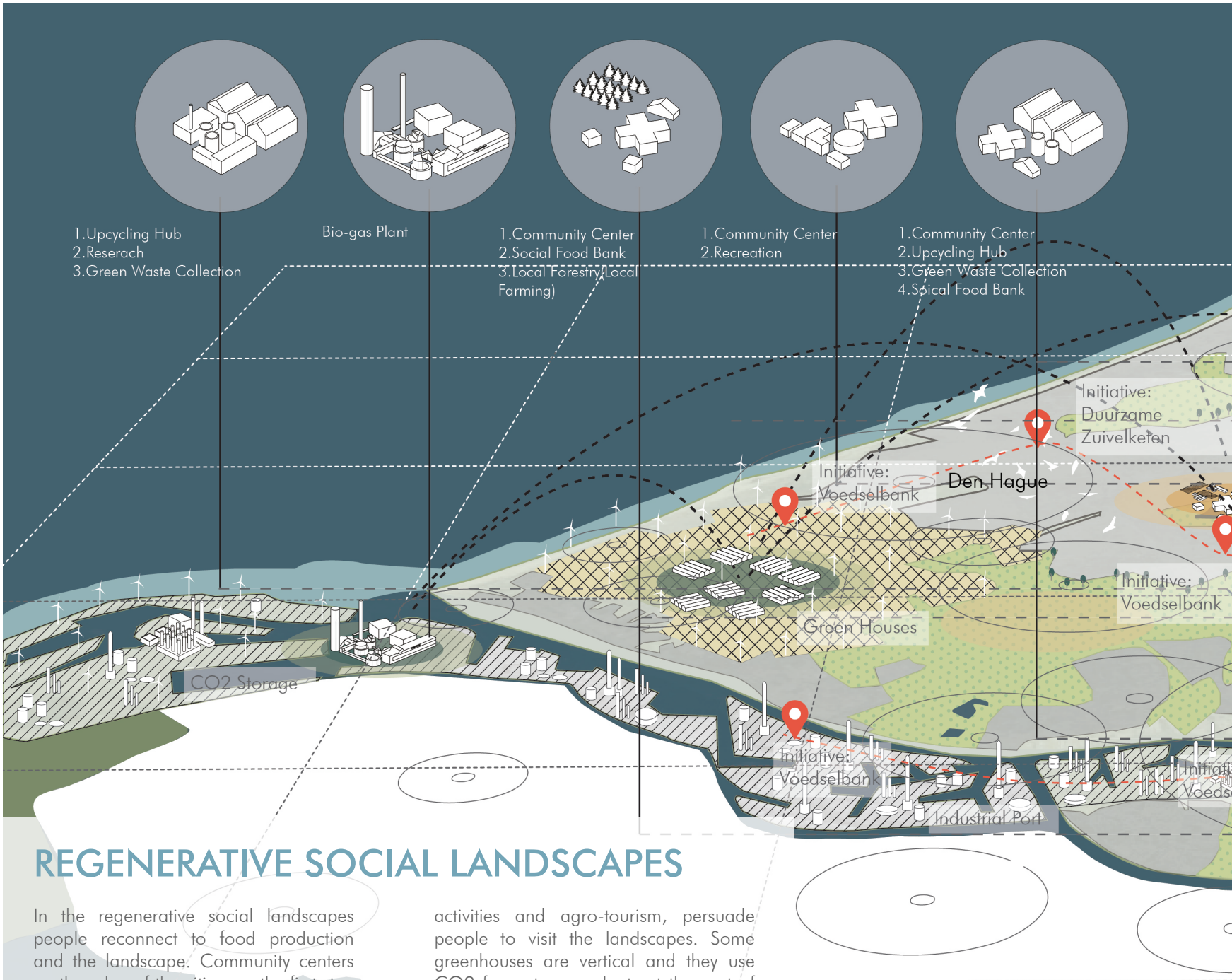
ReGen Villages
Self-sustaining village
Almere

Nutrient resource management is well-practiced in the ReGen Villages, even compared to food landscapes. As you can say a more circular system for nutrients, because they are energy neutral and self-sustaining villages in the field of food. Next to that they stand for: park-like appearance, biodiversity, integrated and resilient neighbourhoods that power and feed self-reliant families around the world, IoT-integrated (Internet of Things integrated) infrastructure enable thriving communities with surplus energy, water and organic food in the aggregate be-come asset classes and they will form partnerships with regional authorities, integrated neighbourhood designs incor-porate door-step agency and last but not least high-yield organic food production that feed diverse nutritional needs.

InnoPlant
Edible green in public space / feeding the city
Amsterdam

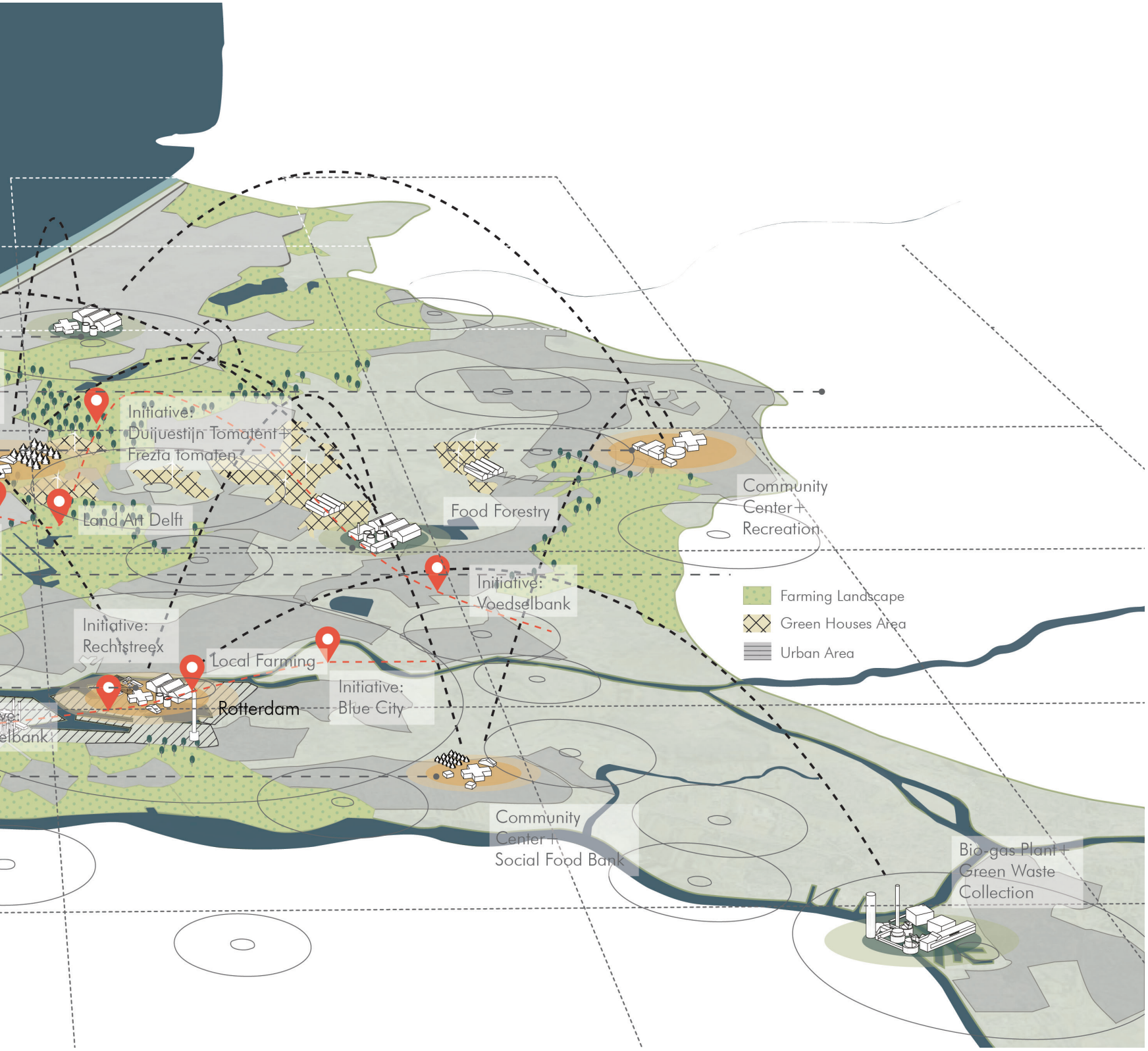
Recreative food education is the way to go by expanding the network and knowl-edge of the Zuid-Holland Voedselfam-ilies, getting familiar with their digital magazine "Making food that makes you happy". They educate people about na-ture and food production with their tasting gardens and harvesting lessons from the testing grounds. Next to that they stand for: a renewal (food) network, sustaina-ble, healthy and affordable food supply, local pioneers, sustainable innovations.


Rotterdam
ReGen village
community centre
biodiversity recovery
short supply chains
food hub
peat lake
with renewable
energy production
dairy cooperative
local agrifood
network
improved manure
herb-rich pastures
nutrient recycling
rotational grazing
biogas plant
recreational routing
natural water
purification



REGENERATIVE SOCIAL LANDSCAPES

In the regenerative social landscapes people reconnect to food production and the landscape. Community centers on the edge of the cities are the first step towards the landscapes. These centers are combined with local farming and/or food forests and educate the citizens about healthy diets. Parks and recreational routings, with interesting cultural activities and agro-tourism, persuade people to visit the landscapes. Some greenhouses are vertical and they use CO2 from storage plants at the port of Rotterdam. Upcycling hubs exist, where initiatives and researchers work together to create commercial products from organic waste.


Initiative:
Duijuestijn Tomaten+
Frezia tomaten
Land Art Delft
Food Forestry
Community
Center+
Recreation
Initiative:
Voedselbank
Farming Landscape
Green Houses Area
Urban Area
Initiative:
Rechtstreex
Local Farming
Rotterdam
Initiative:
Blue City
Community
Center+
Social Food Bank
Bio-gas Plant+
Green Waste
Collection

REGENERATIVE SOCIAL LANDSCAPES
FLOWS

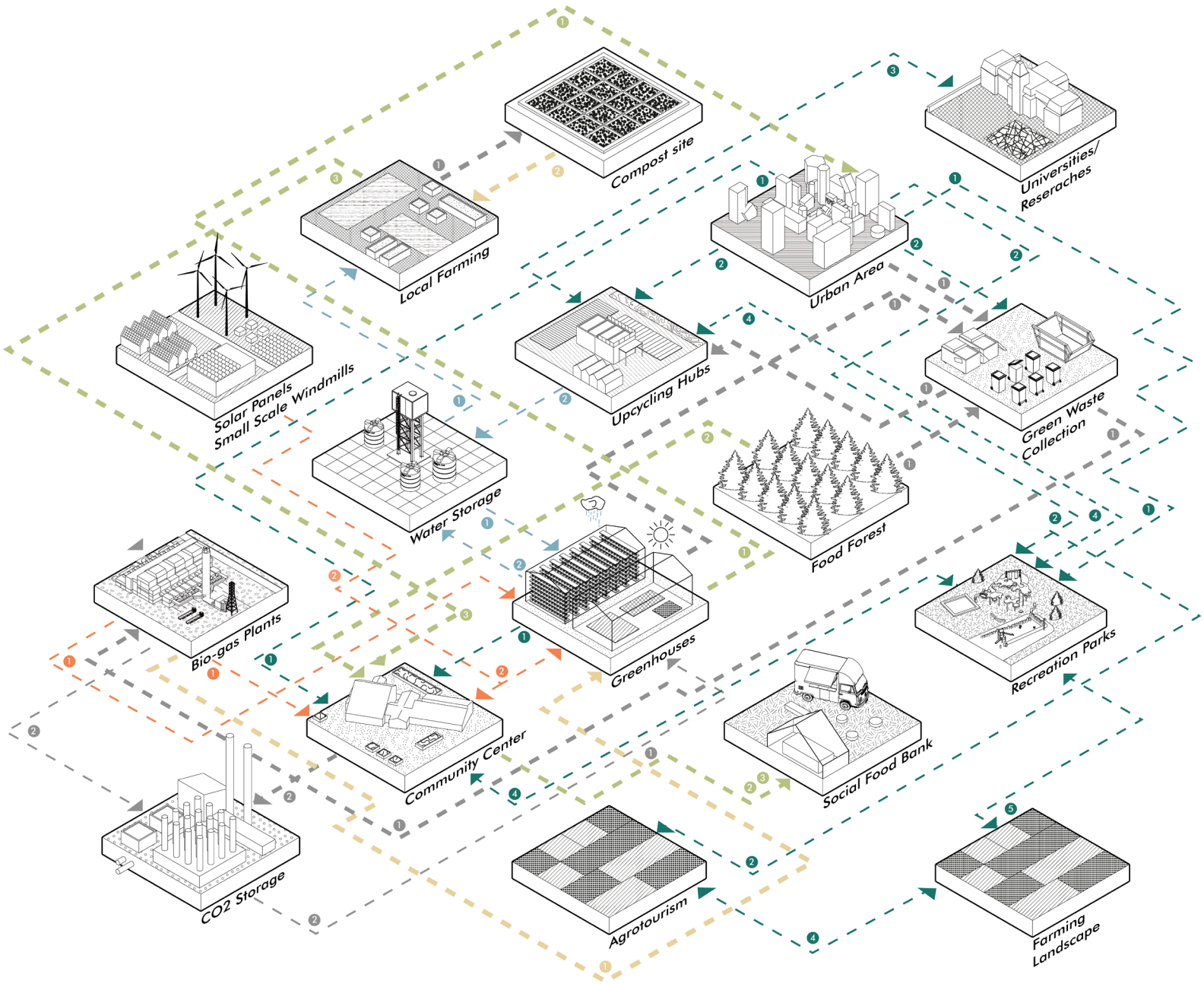
How will resources and people flow through the new system?

Food & organic waste flows

Crops and flowers will still be produced in the greenhouses and distributed in the country and for export. But two other food sources are added. Each community center will be connected to local farming and/or a food forest, where city inhabitants can learn about food production and grow their own food. This food will first be collected in the community centers, and a part will be gifted to social food banks to provide the poor with fresh fruit and vegetables. Organic waste from farmers and cities will be collected at local green waste collection sites. From here a part will be used in the upcycling hubs, to make (commercial) products. Here initiatives and researchers work together to find out the best production methods. The rest of the organic waste is used to produce energy in the biogas plant. The local farming will take care of its own organic waste, by making compost out of it, to use it as natural fertilizer.

Other flows

Energy will be generated by small scale wind turbines and solar panels, connected to the greenhouses and community centers. CO2 from the biogas plant and community centers will be stored to use it for the growth of crops in the greenhouses. Citizens gather in the community centers and will be educated about food production and healthy food, with the help of the local farming and food forests. Recreational parks will make the landscapes more accessible for citizens and agro-tourism will make the landscapes more interesting for visitors. New jobs are created in the community centers, upcycling hubs, recreation parks, waste recycling and processing, and agro-tourism.



WASTE/resources

01.organic waste

02.CO_2

WATER

01.water for greenhouses or local farming

02.rain water collection and storage

ENERGY

01.energy produced by biogas plant

02.energy produced by solar panels and small scale windmills

FERTILIZER

01.organic fertilizer

02.compost

FOOD

01.crops and flowers production

02.food from food forest

03.food from local farming

PEOPLE

01.gathering farmers/ gathering locals

02.job opportunities

03.knowledge exchange

04.connection

05.accessibility to landscape

POLICY PACKAGES

Which policies are needed to develop regenerative social landscapes?

Healthy community

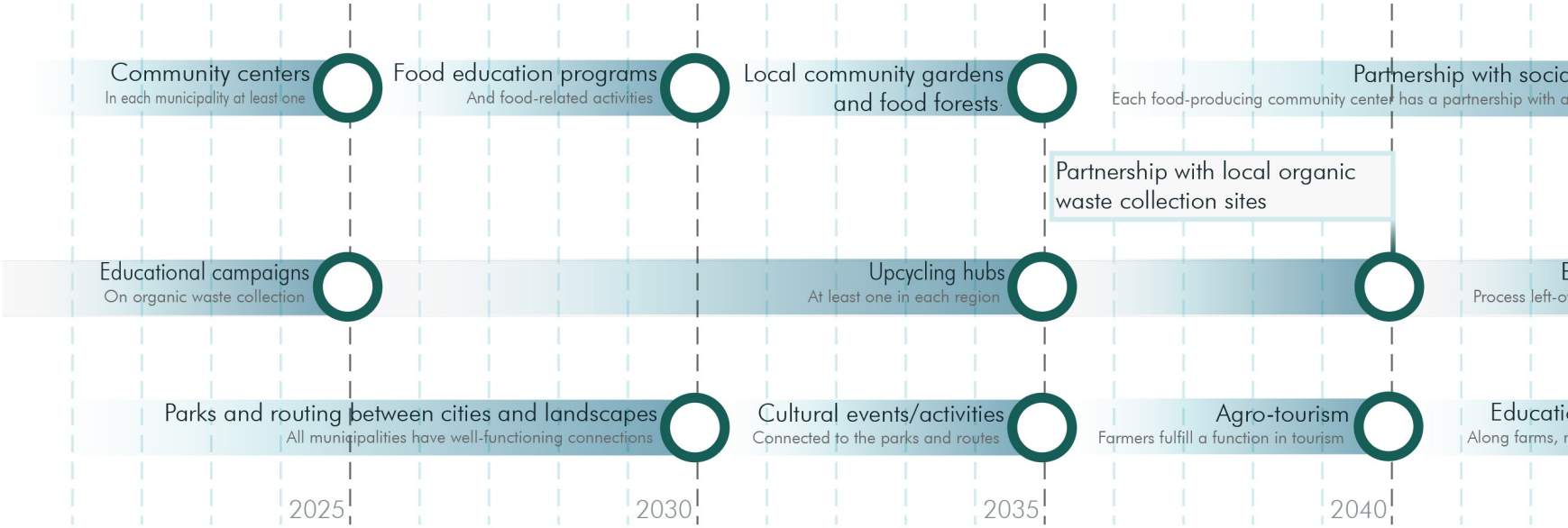
The goal of this package is to reconnect people to each other and to food production. In each municipality a community center with a local garden and food forest is created, where people will be educated about healthy food and food production (AHF). The community centers are open to everyone and will produce food for social food banks (social justice). This policy package will contribute to regenerative landscapes, as it regenerates the health of the people, who are part of these landscapes.

From waste to product

The goal of this package is to upcycle organic waste into new commercial products. An educational program learns people how and why to collect organic waste. This waste will be collected locally. Upcycling hubs will be set up, in which initiatives and researchers share knowledge and work together to upcycle the local organic waste into commercial products (LAFN, UOW). To make the cycle fully circular, leftover waste will be used to produce biogas. The contribution to regeneration will be by using waste as a resource for new products.

Peri-urban recreation

The goal of this package is to reconnect people to the landscapes. Parks and routings will be created to make the landscapes accessible for all (social justice). These parks and routings enhance biodiversity and climate adaptation by adding green and water storage (MFL, SFN). Cultural events and agro-tourism will attract people to visit the landscapes (MFL) and will be used to learn people about nature and healthy food (AHF). It contributes to regeneration, as it regenerates the health of the people and landscapes by connecting them.



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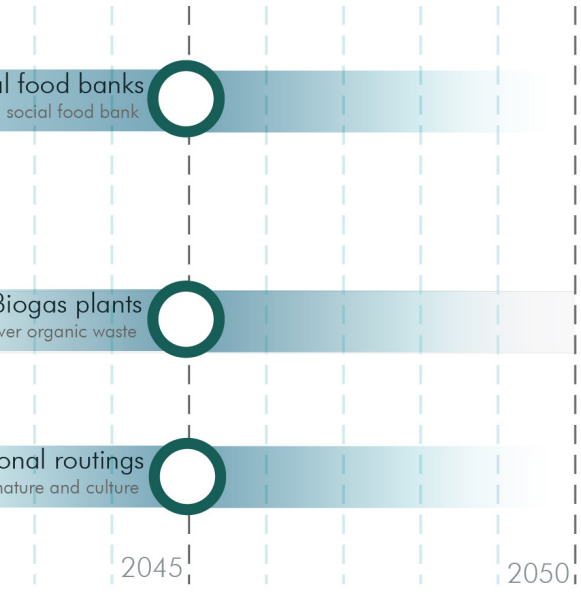

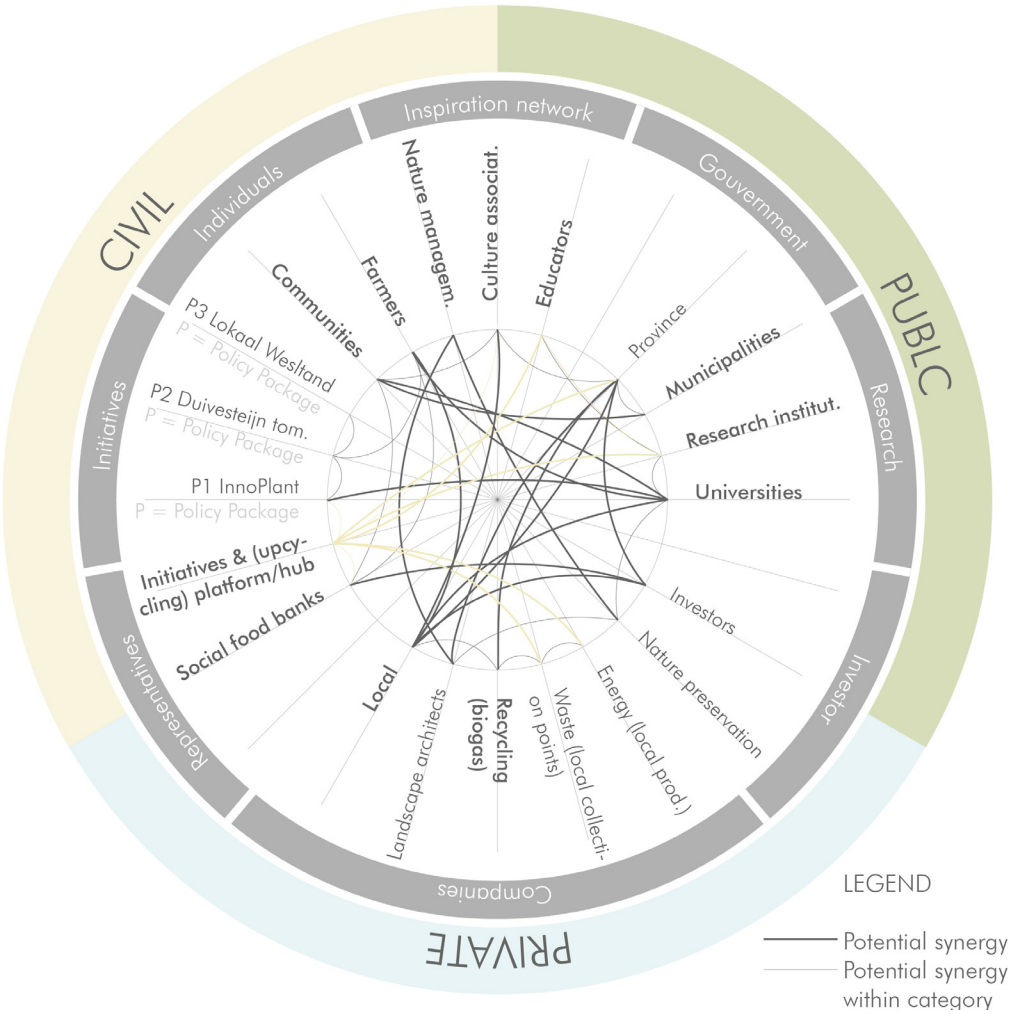

STAKEHOLDER SYNERGIES

What are the relations between local stakeholders? Which stakeholder synergies are successful?

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In CIVIL much is arranged among residents themselves, visible in many thin synergie lines within. Bonds between citizens should be made use of, also by PUBLIC and PRIVATE institutions. So citizen individuals or collectives can and will be supported by the region. Regional policies should support the (small) civil initiatives too, not only the bigger.

INITIATIVES

What initiatives could be introduced to reach the goals set for the regenerative social landscapes?

InnoPlant
Mobile food forests
Almere

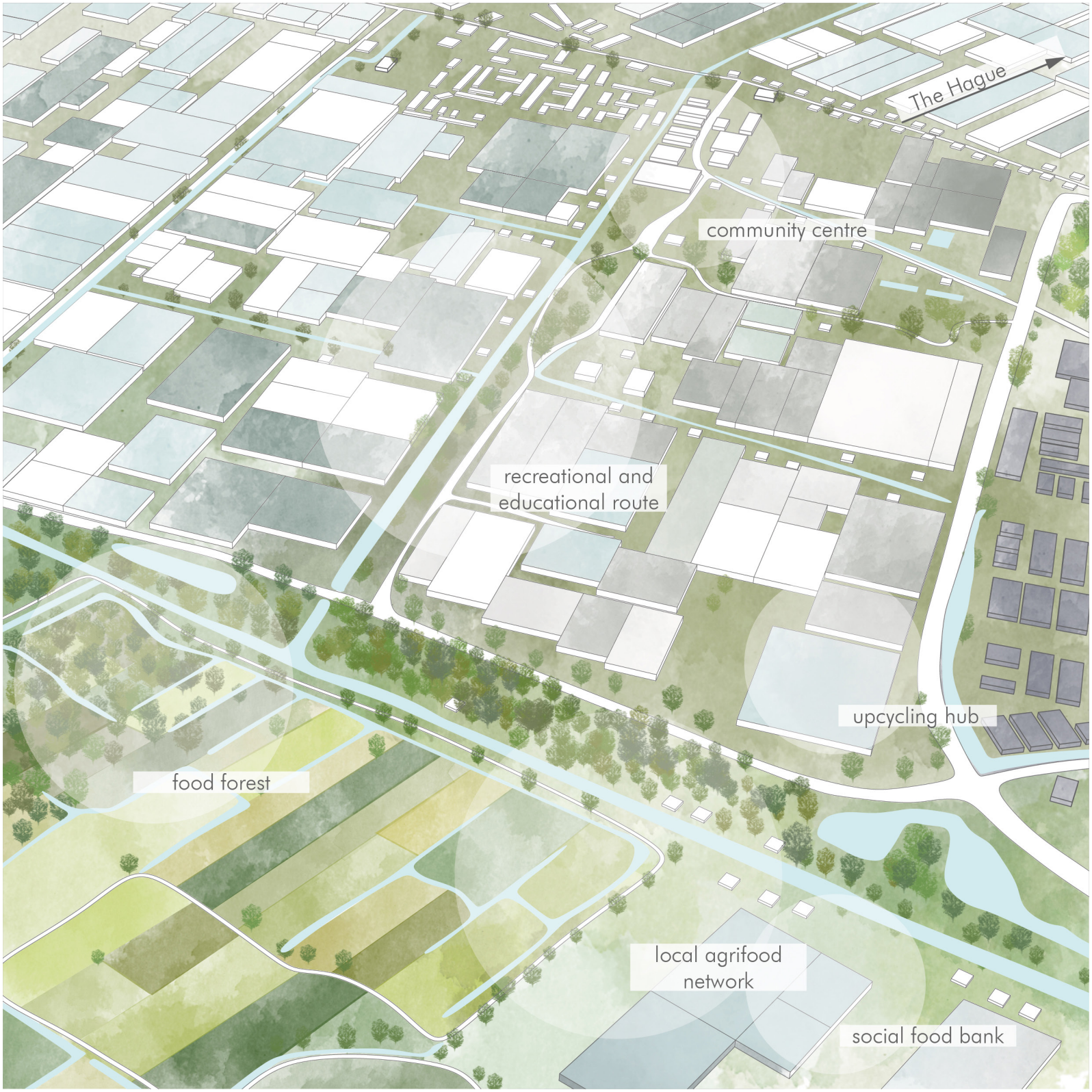
A healthy community like InnoPlant, the Mobile Food Forests are perfectly matching this meeting of recreation, tourism and food knowledge. These forests are also supporting the InnoPlant concept of Edible Green in Public Space, always available food and knowledge about the production of a nutrient. That concept stimulates picking and sharing (healthy) food and educates about the production process of nutrition. Greening and feeding the city by reconnecting people to each other and food production. An innovative way, in the middle of urban on expensive land with lots of polluted soil.

Duijvestijn Tomaten / Frezta Tomaten /
Groentegoed B.V. - first-, second-,
and third class tomato products
Pijnacker

From waste to product is the way to go by expanding the network and knowledge of Duijvestijn Tomaten. Duijvestijn Tomaten is a company driven by green practor Ted Duijvestijn, whom may call himself so, because he is “a figurehead, inspirator and engine, responsible for knowledge development and dissemination and practice-oriented research and professionalisation of teachers in MBO” (van Tatenhove, 2019). The company is upcycling waste to new commercial products in upcycling hubs. Duijvestijn is working at practice “Circular Greenhouse and Horticultural Innovation’ and tries to “make the world a bit healthier every day” (WUR, 2020). He takes care of the circular tomato chain and deals with cecond class flows, for pestos, tapenades (peppers, health line for meat substitutes, filet americain of vegetables) in collaboration with Frezta Tomaten.

Jeu de Boer
Events at knowledge hubs for production
Hazerswoude

Jeu de Boer is fitting the idea of peri-urban recreation and reconnecting people to the landscape. Jeu de Boer is hosting events at knowledge hubs to get closer with the production of nutrients, agrotourism: recreational routing along farmers and education.


The Hague
community centre
recreational and
educational route
upcycling hub
food forest
local agrifood
network
social food bank

CONCLUSION

CONCLUSION

This report introduced the concept of regenerative landscapes and how it can be established on a regional scale. The need for regenerative landscapes was based on the analysis of the productive food landscapes in South Holland. The food landscapes contribute to the Dutch food production and export, making the Netherlands one of the leading food-exporters worldwide. Nonetheless, they are also related to several problems. Firstly, there are social problems like the alienation between the citizens, the landscape and the food production. In addition, the environmental issues such as biodiversity loss and greenhouse gas emissions are mainly caused by the agriculture sector.

Still, the dominant development direction of the Dutch farming is fitting the post war values of mass production for export and providing more than enough affordable food. The productive food landscapes are highly focused to be of economic value and there is a lock-in of the current way of using the landscape. While the values and needs of society are changing, this lock-in hinders the spatial development.
This led to the following research question:
How to transform the economic-driven productive food landscapes of South Holland into landscapes that match with the social and environmental values of society today?

This project proposes a vision and strategy for so-called regenerative landscapes. These are future-proof transformations from the current food landscapes.

Regenerative landscapes facilitate the co-evolution between people and nature to reverse the negative effects of ecosystem degradation. The development of both society and the natural capital is important. This can only be achieved if people again care and cater the landscape, and in return the landscape shall cater the people.

To express the regenerative landscapes, the region is divided in three main landscapes: Regenerative Circular Agriculture (rural-clay), Regenerative Peat Meadows (rural-peat) and Regenerative Social Landscapes (peri-urban). For each of these landscapes a strategy is developed; a roadmap to bring stakeholders, initiatives and key projects together to achieve a regenerative future.

DISCUSSION AND RECOMMENDATIONS

This project shows the potential of regenerative landscapes. The integration of people with nature that is essential for regenerative development makes it more interesting than sustainable development, as many still feel that sustainable development is very limiting.

The Landscape perspective proved a good method for the problems this project dealt with, as it combines the working of nature, people and production. With a deeper understanding of the application of the landscape perspective in regional design it could have been more helpful. Furthermore this could have given the project a better grip on the implementation on the regional scale, as there are always local differences.

This project is an experiment with regenerative development. A theory, that to our best knowledge, has not been applied at this scale. Therefore we propose a strategy that is regenerative and based on theory, but which is not yet tested in practice. More research could be done on regenerative design at multiple scales, to make better decisions in the future.

For this project we focused on the production and to some extent the consumption parts of the food systems. This scope helped to set a focus on the physical landscape. However, we are very much aware that for circular resource management the logistics and transport sector are involved as well. We also feel that a lot can be gained for a circular economy by finding synergies between different cycles, instead of only focussing on one single cycle.

The initiatives are representative for change and play an important role in informal transitions. The quantity and quality of initiatives is very dynamic, small initiatives that have great impact on a local scale might not be on the radar of governing parties. As a result, it is a challenge to make an inventory that is conclusive and covers all of them. In this project we highlighted the relevance of the initiatives in transitions and created awareness that involving them might be more impactful than any governmental decision. Even more so in the Dutch context where entrepreneurship is part of the culture.

In conclusion, we see high potentials for the combination of the landscape perspective, the transition theory and regenerative development, to work towards a brighter future.

SCIENTIFIC RELEVANCE

In this project a body of theories is used. The landscape perspective was used to direct the project. The transition theory formed the guiding base of the strategy. Regenerative development gave the vision a narrative that involved the cooperation of people and landscapes, giving us a foothold in spatial justice from the landscape perspective as well. The combination of these theories was insightful, it formed the base for a theoretical yet practical approach for a socio-economic complex problem: the mismatch between changing cultural values and the conservative and exploitative use of food landscapes.

Within the project, we explored, explained and demonstrated the relevance of the regeneration of landscapes. This project is explorative; regenerative development has not been used on this scale before to the best of our knowledge.

It is felt that sustainable development is constrictive, and that it limits development too much (Wahl, 2019; Ekins 1993). Regenerative development gives landscapes the opportunity to revitalize and therefore development is continuous. Hereby making regenerative development, in this case applied as 'regenerative landscapes'. A much more attractive alternative as it does not limit the development of societies (Wahl, 2019; Ekins, 1993). This is especially important when the system is already very developed and environmental limits are near or crossed.

The transition theory is used as a mechanism of change. It helps to structure and guide a transition to a new future that may be visioned, but is hard to achieve due to the lock-in of the current system. The transition theory shows that it is possible that small initiatives can change a system if they are supported by the socio-technical landscape. For the contextual analysis a variety of tools were used to find evidence that support the need for change. This research looked into environmental as well as societal problems. These tools include extensive data analysis, spatial analysis and stakeholder analysis. This research forms the foundation of this project.

The body of theories and the contextual analysis supported this project. It supplied an interesting perspective and gave the tools to develop a strategy that we believe is very relevant in the field of sustainable development.

SOCIETAL RELEVANCE

The societal relevance of the project is closely related to the regeneration of landscapes; reversing the environmental impact of productive food landscapes and restoring the relation between people and the landscape. We believe that by creating productive but regenerative food landscapes we can set the example for sustainable agriculture and provide for healthy societies.

Climate action

The project takes steps towards a low carbon future by creating renewable energy wetlands, circular resource management and by restoring natural capital. By setting the example for sustainable agriculture, strengthening the resilience for climate change and building capacity for the natural systems this project adheres to the Paris agreement (United Nations for climate change, n.d.) and SDG 13 climate action (United Nations, 2020).

Furthermore the project focuses on the restoration and sustainable use of natural capital, this aligns with SDG 15 life on land (United Nations, 2020).

Sustainable agriculture

Instead of going local the vision is to stay a global player in food production. At the same time the ambition is to become sustainable. By doing so, the project is able to "ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality"(United Nations, 2020). This is part of SDG 2 Zero hunger. By creating nutrients and organic waste cycles the project adheres to SDG 12: responsible consumption and production (United Nations, 2020).

Healthy society

Regenerative landscapes focus on re-establishing a healthy relationship between people and nature. That relationship means that people care for nature (by reducing pollution and contamination) and in return people can use nature for healthy food production and social activities to improve healthy lifestyles. This goal adheres to the third SDG: good health and well-being (United Nations, 2020).

In the strategy we diversify the current monofunctional landscape. Secondly we develop new job opportunities in a fair process that includes and involves stakeholders. We incorporate sustainable innovations for industry and improve water quality for maritime life. Hereby we address SDG 7, 8, 9, 10, 11, 17 as well.

ETHICAL CONSIDERATION

Our project focuses on the regeneration of landscapes. As explained in the conceptual framework, we see landscapes as public goods, which fulfill values for everyone and are of public interest. Because of the inherent relation between culture and landscape, it is important to include communities in decisions about the landscapes. Therefore, this project also focused on participation and stakeholder involvement. In each landscape, hubs and community centers are set up, where people can gather, network and share knowledge. These hubs and centers are always the first steps in the development of the landscapes. It will strengthen the position of individuals in discussions about further development. These hubs and centers will be the locations where individuals can unite and where public-private partnerships are formed. In the end we foresee centers and hubs where public, private and civil actors interact and work together.

We also use the concept 'Round the tables' to ensure an inclusive process. In this concept, four 'tables' are used. The round-the-table sessions will be organized on multiple scales and levels of formality, providing a place to speak for a broad public. These tables will be open to each individual to share their opinion about a (planned) local development. At every table, at least one person should also be part of a table on a lower level, to ensure that all the tables work together and all important opinions are heard.

The last table is an online 'table'; a website where all the information discussed in the other three tables will be published and where each individual can share their opinion.

The vision of regenerative landscapes will, in the end, benefit all. If we make a transition towards landscapes that are diverse and regenerate themselves, food security, climate resilience and biodiversity will be ensured. With recreational routings and community centers in each municipality, we try to provide accessibility to the landscape and education about healthy food, for all. Benefits and burdens will not completely be distributed fairly, as the farmers should make more changes than the citizens.

But in the long term, it is inevitable for the farmers to not change their way of working, as the society values sustainability more and more. By empowering the farmers, bringing them together in hubs, and educating them, we help them to make this transition. The most disadvantaged group will be the farmers who lose their land to nature development. We think that the multifunctional landscapes will provide much more job opportunities than only farming, and that farmers could be offered new jobs in, for instance, nature preservation, agro-tourism, education or waste collection/processing.

We also address the most important silent stakeholder on earth: the environment itself. We are the first generation to notice climate change and likely the last to actually have a chance at reversing it. At a local scale we try to actually reverse it and on a global scale we hope to set an example on how to reverse climate change and regenerate landscapes while keeping the ability to produce food. The development of regenerative landscapes will also be beneficial for another silent stakeholder: the future generations. With the development, we can guarantee that future generations can still make use of the landscapes and provide for their own needs.

In the end, we tried to make this strategy as fair as possible by giving stakeholders the opportunity to participate on multiple levels/scales, by empowering stakeholders by bringing them together in bigger communities and networks, and by giving the disadvantaged new opportunities. The strategy will, in the end, benefit all, including the future generations and the planet.

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APPENDIX

CO(RONA)-WORKING

Group reflection

At the start of the period, Covid-19 was creating havoc in China. Students that went to China during the break had to go into quarantine for 2 weeks. That was the start of a surreal period that is at the moment of writing not going to end soon. A few weeks into the project, the first person in the Netherlands was tested positive, the virus had arrived. The number started to grow quickly and the day before the midterm presentation the Dutch prime minister announced in a press conference the first measures that would drastically impact the rest of this period: universities were ordered to go online and cancel physical education.

From that moment we started to work online as a group. This meant daily Skype meetings and a complete digital process, no more quick sketches and brainstorm sessions. In the meantime we were stalking the NOS liveblog and worrying about family. However this project went on and we adapted to the online meeting.
For many students the lockdown is limiting in freedom but not the end of the world. However the lockdown that many countries installed also meant closed borders, limited traffic and loss of work for a large part of the economy.
The Dutch agriculture is almost completely dependent on international trade and is hit hard by the limitations this crisis caused. Migrant workers cannot or do not want to leave their home country because of travel bans, there are driver shortages, shipping restrictions and grounded plains that hinder export (Trompiz, 2020). However, the consumer turns to the local market and many Dutch farmers grasp this opportunity. Initiatives are popping up around the country to support local business and they are willing to pay more to do this. As the corona crisis is now a global crisis it will definitely change perspectives, hopefully to a regenerative perspective (Rotman, 2020).

INDIVIDUAL REFLECTION

Anke van Eijk

In which way is the governance aspect embedded in the planning and design proposal of your group project?

When I used to think of regional visions, I used to think of lines on a map for infrastructure, dots for destinations or projects, hatches for areas that are important etc. To me landscape never seemed that relevant, it was just something to preserve or build on. This project changed that perspective. The planning history and culture of the Netherlands proves that landscape has always been intertwined with planning; the creation and cultivation of land, watermanagement, 'ruilverkaveling', 'het groene hart'. These are examples of how landscapes intervene with planning. This project was an eye-opener for me, in several dimensions.

There were several themes that were expected to be dealt with in the project: things like landscape perspective, spatial justice, circular economy, waste flows, stakeholders, strategies, sustainable development, the list seemed endless but most of extremely complex. For me, regenerative development as a theory was a useful method to bring all those concepts together. How Regenerative development works in practice is something we experimented with. Regeneration is a process and not an end goal. In the sense that all things could be regenerative or degenerative to something else, and regenerative landscapes are therefore always evolving. That is why stakeholders, participation and initiatives are so important. They enable a regenerative process and that is how governance is embedded in this strategy.

It is more important for regenerative landscapes that the people who interact with the landscape care about it and feel the same thing instead of the government enforcing them to do that. Buckminster Fuller (as cited in Bau, 2019) once said: "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete". As we already see a new system beginning to rise, the strategy is trying to accelerate and direct the transition to the new system that we shaped with the vision.

The use of participatory planning in the Netherlands is quite common these days, but that wasn't always the case. In the sense that the government used to be more pro-active in planning a couple of decades ago. I feel that the government should take a more pro-active attitude in regard of planning for sustainability, to accelerate the shift and support where it is needed. Conservatives are still hesitant to become sustainable and it is always helpful to stimulate them or give them incentive. They need to hear what is in it for them. I do think that regenerative landscapes and a restored capacity may do the trick.

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INDIVIDUAL REFLECTION

Baokun Wei

What is the relationship between research and design in your group project?

In conclusion of the whole project, I would like to say that I really enjoyed the process of cooperation with the four others. Even though we faced many difficulties during this special period, I still knew how to express myself and listened to others' thinking in the online group work. In addition, I've learned how to do regional planning(spatial planning) by following a complete research process.

Overall, the relationship between research and design is that design could be used as a tool to explore and develop our research, while research is more like guidelines to deepen, reflect, summarize and regulate our design to state a logical and clear storyline.
In order to clarify the design as the significant tool for research, I would like to use two examples during our group work. Firstly, at the beginning of the group work, we needed to decide our focus for organizing and developing our further research and then we faced obstacles. Originally, we wanted to use cows and diet as the cut point for our project but it did not work well. We changed to another route by focussing on specific landscapes and the relationships between landscapes and culture heritage because in that it is easier to elaborate what we have found with spatial maps and diagrams. The second example is about making the vision. During the vision making, the tutors always encouraged us to design several, even radical, scenarios about what will happen in South-Holland. Because our project is about regenerative landscape, by design we are able to demonstrate what a regenerative landscape is and how to realize it spatially in terms of different landscape types. Therefore, I consider the design a useful tool for starting research, it gives your further research a strong inspiration.
Research could motivate the development of design as well. For instance, we have found the mismatch and lock-in situation in values and the productive landscape. For deepening our project, we used the transition theory to discuss the formulation of the current lock-in situation and how to transfer, by using niche development, to influence the social-technical regimes. The inspiration for our design is that we also take the initiatives into consideration by combining and giving them strength with (new) hubs and initiatives that have been already developed. In addition, we have so many good ideas about different landscape types, but it seems some logic is missing when we just listed all ideas. To solve that, we have to do further research, described in recommendations, and finally determine to use a regenerative landscape to organize and regulate our ideas, which makes the whole story more coherent.
In summary, there is a strong link between research and design. I think it is different to separate the design and research in our project: it is difficult to express ideas concretely without design and it is superficial as a complicated and grant project without careful research.

INDIVIDUAL REFLECTION

Kinga Murawska

What is the role of a vision in the planning and design proposal of your group project and how has it influenced your development strategy?

„Visioning is more than painting an idealistic picture of the future – it is a process of evaluating present conditions, identifying problem areas, and bringing about a community wide consensus on how to overcome existing problems and manage change." (Sandler, 2000)

Our group's process of vision making followed the aforementioned steps. Starting with an in-depth research about the strengths and weaknesses of the region, we juxtaposed the data and were able to name probable, possible and desirable future scenarios for the region. The vision we proposed consists of a set of desirable and at the same time possible scenarios. Our vision is idealistic and imaginative, it challenged us and our design proposals. Thanks to defining six values in our vision statement, we were able to structure our work and have a reference point to which we compared all our ideas. It ensured that we stayed on the track.

„Visioning is more than painting an ideal We aimed for a clear, coherent and flexible vision that would inspire stakeholders. Although status quo of the region embraces complexity of needs and challenges, we strived to address and synthesize most of them while outlining a holistic vision for the future of South Holland.

Considering various perspectives in our envisioning process helped us propose an inclusive design that tackles societal, environmental and economic issues. Engaging different stakeholders in the process of reaching collective goals, makes the vision more attainable. Our development strategy connects the present with the desirable future. It consists of multi-scalar interventions and policies in order to deal with the complexity of the vision. We prioritized some ambitions and therefore could define a clear strategy with guiding principles that are related to the values in the vision.

We defined the principles and the recommendations for each type of landscape of South Holland to keep the strategy flexible and adaptable to the changes which can occur in the status quo, just like the corona crisis today.

I believe that our vision of regenerative landscapes is inspiring and can be promoted since it is motivated by a desire to improve the well-being of people and nature.

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INDIVIDUAL REFLECTION

Lisa Lieftink

What is the relationship between research and design in your group project?

I think there is a strong relationship between research and design in our project, as we tried to make all our decisions evidence-based. First of all, because we focused on the landscape perspective, it gave us new insights in how to perceive areas. Through research into soil types and landscape development, we defined three landscape types. These landscape types did not only differ by soil type, but also by characteristics and main problems. This affected the design, as we took into account these differences and treated all landscapes differently in the design of the vision and strategy. It was also interesting to see that this landscape perspective was quite a good starting point, even for an urbanized area as the province of South Holland. I realized, through the research, how much landscape and culture development are interrelated. And it is striking to see that areas within a landscape type show a lot of the same characteristics, not only natural ones, but also cultural ones.

Also our research into the transition theory influenced the design. We already did some research and concluded that there was a mismatch between the values which productive landscapes fulfilled and the values the society today expect them to fulfil. After the lectures about transitions, we realized that our observations fitted into the transition theory: There was a lock-in of the current socio-technical regime, what we called the productive food landscapes. This theory taught us that a transition could be initiated by niche developments and paradigm changes in the socio-technical landscape. It influenced our design immediately, as we now realized how important initiatives (niche developments) could be to make a transition happen. In our design, we wanted to strengthen the niche developments by offering initiatives locations (hubs) to work together and develop. They are also explicitly involved in the stakeholder participations and round the table conversations, as we think they can bring in knowledge and a strong drive for change.

So, we did know that a shift was needed in the way we use our landscapes. But a shift to what? To answer this question, we again did some research and came across the notion of regenerative development. It fitted a lot of our values as it implies for instance the collaboration between nature and people, and improvement of the health of both people and landscapes. People are seen as a part of the ecosystem and cannot be left out in developments in the landscape. This notion is reinforced by our historical research which showed an inherent relationship between the developments of people and landscape.

Through the whole process, we tried to make clear links between our research and design. Our values are derived from the main problems we found in the analysis, our guiding principles are based on the values and regenerative development, and our interventions and policies are based on the guiding principles. In the end, I would say that the research was leading our design, while we strived for evidence-based design.

Main inspiring lectures regarding this reflection:

- Towards a landscape-based regional design approach for urban development, by Steffen Nijhuis
- CE challenges PZH from transition perspective, by Roel van Raak
- Urban Metabolism & Designing for Synergies, by Nico Tillie
- Socio-technical systems, by Roberto Rocco

INDIVIDUAL REFLECTION

Maud Ebbers

In which way is the governance aspect embedded in the planning and design proposal of your group project?

All nature in the Netherlands is man-made. Unlikely but true I never really realized that, while living here all my life. The exposure to this (for us) discovery in the beginning of the planning- and design process got me thinking. If the above mentioned is true, the culture heritage is embedded in our landscape. Landscape and (agri)culture have always influenced each other and there is an inherent relationship between them (Koomen, Klijn & Nieuwenhuizen, 2005; Rijksdienst voor het cultureel erfgoed, 2016).

After the Second World War, the landscapes changed drastically to prevent hunger in the future (PBL, 2019). The profit-oriented character of the productive food landscapes no longer fits well with the changing societal values, as the current pattern is destructive to the environment and people feel disconnected from the food production and the landscape. Society now attaches more importance to values as biodiversity, public health, cultural history, landscape, animal welfare and greenhouse gas reduction (PBL, 2019). "We are the first generation to feel the effect of climate change and the last generation who can do something about it." (Obama, 2014). In the sixties they had their thinkers on "Our Common Future" in the Brundtland Report.

Now we have Greta's and anti-Greta's. Landscapes, as a reflection of culture, should be able to adapt with a changing culture. But, if the landscapes change too drastically, historic cultural layers could be lost (PBL, 2019). The socio-technical landscape is changing, because paradigms are moving towards more sustainable values, and niche developments can already be found as initiatives and start-ups for new food systems and landscapes. Strengthening these changes in landscape and niches will stimulate the transition towards a new regime. The stability and quality of channels between design practice and policy-making seem to be crucial for the performance of design in a situation of complex network governance (Balz & Zonneveld, 2014). Citizens can gather (knowledge), via (online) initiatives (platforms), and start to come up with these local scale communities and collaborations. For the regenerative landscapes cooperation is crucial, because the landscape represents the relation and interactions between nature and society (Primdahl, 2014). To persistently perceive territoriality as a malleable aspect in design processes has, however, been decisive in facilitating change (Balz & Zonneveld, 2014). The stability and quality of channels between design practice and policy-making seem to be crucial for the performance of design in a situation of complex network governance (Balz & Zonneveld, 2014). Local initiatives can be very impactful on a local scale, but struggle to build capacity on the bigger scale, can comply with regional policies or get noticed by institutions. This concept provides As many people with conflicting interests are brought together at this table, respect is important. The round table discussions have an informal independence to certain extent. So the downscaling of governance, a shared provincial governance with a (socio-technical) niche governance, is a perfect way to keep governance of the regenerative landscape participatory, but most of all resilient.

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VALUES AND PRINCIPLES IN POLICY PACKAGES

Landscape	Policy package	Problems	Values
Clay	*Nature inclusive agriculture*	Biodiversity loss Monofunctional All above	Biodiversity Biodiversity, climate adaptation All above + knowledge economy
	Energy wetland development	Biodiversity loss Salinization + heavy rains/droughts Monofunctionality	Biodiversity Climate adaptation All above + health + social justice
	Organic waste resource networks	Linear system/emissions Linear system/emissions	Circularity Knowledge economy
Peat	*Peat lake development*	Biodiversity loss, peat oxidation/subsidence Monofunctionality Farmers lose land/jobs to peat lakes/wetlands	Biodiversity, climate adaptation Biodiversity, circularity Social justice
	Nutrient resource management	Linear systems/emissions Linear systems/emissions	Circularity Knowledge economy
	Recreative food education	Unhealthy diets, not enough activity, loneliness Bad accessibility to landscapes, stress	Health, knowledge economy Health, social justice
Peri-urban	*Healthy community*	Unhealhy diets (especially with low socio-economic status), loneliness	Health, knowledge economy, social justice
	From waste to product	Linear system/emissions Linear system/emissions	Circularity, knowledge economy Circularity, knowledge economy
	Peri-urban recreation	Unhealthy diets, not enough activity, loneliness Bad accessibility to landscapes, stress Biodiversity loss, heavy rains/droughts	Health Social justice Biodiversity, climate adaptation

Guiding principles	Main interventions
Space for Nature	Nature at plot borders
Multifunctional landscapes	Crop rotations, nature at borders
Local agri-food networks	Sharing knowledge in at farmers platforms/circular hubs
Space for nature	Wetland development
Multifunctional landscapes, space for nature	Water storage at wetlands
Multifunctional landscapes	Green energy production & access to recreation at wetlands
Upcycling organic waste	Biogas plants, local organic waste collection and sharing resources in circular hub
Local agri-food networks	Network of farmers sharing knowledge in circular hub
Space for Nature	Peat lake development
Multifunctional landscapes, space for nature	Transitional wetlands with natural wate purification, green energy production and aquaponics
Multifunctional landscapes	New jobs in aquaponics, energy production, recreation (functions added)
Upcycling of organic waste	Biogas plants and sharing resources in the network, natural water purification in transitional wetlands
Local agri-food networks	Network of farmers sharing knowledge
Access to (knowledge about) healthy food	Community centers and food hubs with education about nature and food production/healthy diets
Multifunctional landscapes	Recreational routings from villages/cities towards landscapes
Access to (knowledge about) healthy food	Community centers with local community gardens/food forests and education about food production/healthy diets
Upcycling organic waste, local agri-food network	Upcycling hubs in which organic waste is upcycled into commercial products, biogas plants
Upcycling organic waste	Education about organic waste collection, local organic waste collection points
Access to (knowledge about) healthy food	Educational routings, agro-tourism and cultural events
Multifunctional landscapes	Recreational routings from villages/cities towards landscapes, cultural events and agro-tourism to attract people to landscape
Multifunctional landscapes, space for nature	Small scale nature development (routings/parks) with water storage

POLICY PACKAGES I Regenerative Agriculture Landscapes

1 Nature inclusive agriculture

Change to multicultural, biodiverse agriculture fields

How can we achieve more nature inclusive agriculture on private property?

By stimulating initiatives and R&D into nature inclusive agriculture

- From 2025 a farmers platform/network/hub will be organised that researches and experiments with nature inclusive agriculture (stimulating, shaping)

By creating farmers networks/platforms/hubs where farmers can participate and commit to the value of nature inclusive agriculture

- By 2035 the majority of the farmers are part of above mentioned network (capacity building)

By diversifying agricultural land with crop diversification and crop rotations, to avoid soil depletion by dominant species

- By 2040 only 70% of adjacent land on plots can be dedicated to the dominant crop (regulating)

By increasing biodiversity (wild flora) at plot borders

- By 2040 all private plots should dedicate at least 10% to enhance biodiversity (regulating) and higher percentages will be subsidized (stimulating)

Main actors/ stakeholders:

Farmers	with private land	for change in land-use
Municipalities	of areas concerned	for kick-off and subsidies
Initiatives	nature-inclusive-agriculture	for knowledge and value for change
Investors	EU, National Government	to stimulate with subsidies

POLICY PACKAGES I Regenerative Agriculture Landscapes

2 Energy wetland development

Combine nature, fresh water storage and green energy production

How can we integrally protect farmland from degenerating?

By ensuring that future (infrastructural) interventions include nature regeneration
By 2025 there will be a regulation that at least 10% of projects' budget goes to nature regeneration (shaping and regulating).
By setting up partnerships between landowners, energy companies, water boards, nature management, province, investors to develop integrated and multifunctional energy wetlands to stimulate efficient and multifunctional land use.
By 2030 a consortium (public private partnership) will work together on developing this project (regulating and capacity building).
By developing a sustainable energy network not dependent on fossil fuels.
By 2035 farmers use energy from local renewable energy production, this will be achieved by the windmills on the energy-wetlands (stimulating)
By developing collective wetlands to balance water needs
By 2040 freshwater wetlands will be developed as a key project for this strategy by the above-mentioned consortium (stimulating, shaping).

Main actors/ stakeholders:

Province	as a controlling authority	for bringing parties together
Energy companies	to manage and develop energy	for renewable (green) energy
Waterboards	to manage and develop wetlands	for freshwater storage
Nature management	to manage and develop nature	for nature and wetlands

POLICY PACKAGES I Regenerative Agriculture Landscapes

3 Organic waste resource networks

Set up networks to improve circular resource management

How can we stimulate efficient circular resource management among farmers?

By creating farmer networks/platforms/hubs where circular resource management can be stimulated, developed and monitored

- By 2030 there will be a farmers platform/network/hub that researches and experiments with collective circular resource management (stimulating, capacity building)

By organizing and stimulating waste collection on a local scale

- By 2040 all farmers will have access to waste collection within 40 minutes drive, this will be achieved by improving infrastructure or new local collection points (stimulating).

By organizing waste processing into biomass or compost on an inter-landscape scale

- By 2050 all organic waste will be recycled, used as biomass or composted (without losing value) (regulating).

Main actors/ stakeholders:

Farmers	in a platform/network/hub	for collective circular resource mnm.
Local companies recycling and waste		for stimulating (new) waste collection
Energy companies	biogas and biomass	for organic waste to biomass or comp.
Province		for coordination

POLICY PACKAGES I Regenerative Natural Peat landscapes

1 Peat lake development

Nature, water and biodiversity, multi-functional land use replace peat oxidation

How can we revitalize the peat polders?

By creating a good vision for multifunctional peat lake development that promotes it under farmers and ensure goodwill for suitable locations

- Start project 2025 by looking for locations and partners (shaping and capacity building)

By creating a corporation for the lake development.

- By 2030 a corporation will be formed to start with this project (stimulating, regulating) (sharing profits, contracting: make it interesting for private investors, let initiative partake; combining: know-how, land owners, investors, profit etc.) and planning (shaping)

By developing the energy wetlands (from 2035 -2050)

- By 2040 the transitional landscapes with aquaponics and renewable energy should be developed, so that the first profits can be earned (stimulating, regulating)
- From 2040 the nature / lake development should start, so the peat lakes can regenerate (stimulating, regulating)

Main actors/ stakeholders:

- Nature management	Staatsbosbeheer/waterboards	for development and management
- Land owners	such as farmers	for development of wetlands
- Private investors	pension/insurance funds	for investment in peat landscape
- Initiatives	aquaponics/floating solarPV	for knowledge and development

POLICY PACKAGES I Regenerative Natural Peat landscapes

2. Nutrient resource management

A more circular system for nutrients

How can we realise circular and regenerative nutrient resource systems?

By stimulating local nutrient cycles such as the aquaponics system

- By 2025 there will be a farmers platform/network/hub that stimulates and supports local nutrient cycles (stimulating / capacity building)

By Setting up a multilevel system for renewable organic waste treatment

- by 2030 a multilevel (local collection / distribution, regional processing) waste collection consortium is set up (regulating / capacity building)
- by 2040 biogas plants process local organic waste collected by the network above (regulating / stimulating)

By creating a natural water purification system in the transitional wetlands

- By 2045 part of the peat lake development functions as a water purification system (stimulating).

Main actors/ stakeholders:

Waterboard		for water purification
Local companies	waste/recycling	for organic waste system
Energy companies	biogas	for energy from biomass
Farmers		for participation in circular system

POLICY PACKAGES I Regenerative Natural Peat landscapes

3. Recreative food education:
Educate people about nature and food production

How can we educate people about nature and food production in a natural environment?
By creating recreational / educational routes in the natural landscape
- by 2030 these routes will be developed along existing and new nature landscapes (shaping/ stimulating).

By stimulating farmers to develop, change to or work together with local agro-tourism
- By 2035 a platform / network and budget will be developed to link farmers and the tourism industry (capacity building)

By setting up educational programs about nature and food production/consumption
- by 2040the platform will have set up their educational programs and promotions (stimulating)

By developing food hubs at the border of recreational and productive landscapes
- by 2050 the platform above will have physical locations within the landscape (regulating / stimulating)

Main actors/ stakeholders:

Nature management	Staatsbosbeheer/waterboards	for development routing
Farmers	agrotourism	
Educators	educational programming	for educational routes
Commercial parties	for food hub development	investment/businesses

POLICY PACKAGES I **Regenerative Social landscapes**

1 Healthy community

Reconnecting people to each other & food production

How can we stimulate healthy eating patterns and lifestyles?

By creating accessible community centers (in participation with communities) on the edge of cities/villages, where people can gather and build networks

- By 2025 all municipalities will have at least one community center on the city's edge, accessible from the whole city (capacity building, regulating)

By providing food-related activities and food education programs

- By 2030 all community centers provide food-related education programs (regulating)

By stimulating existing and new initiatives in the development of local community gardens and food forests

- By 2035 10% of the municipalities's budget of area development goes to the development of local community gardens and/or food forests (stimulating, regulating)

By stimulating the co-operation between food-producing community centers and social food banks (Voedselbank)

- By 2045 all community centers have a partnership with a social food bank (regulating)

Main actors/ stakeholders:

Communities		for community centers
Municipalities	of areas concerned	for kick-off and subsidies
Initiatives	local farming/forests	for knowledge and value for change
Educators	dieticians	for food-education

POLICY PACKAGES I **Regenerative Social landscapes**

2 From waste to product

Upcycling of waste to new commercial products

How can we build a system in which organic waste is up-cycled to commercial products?

By setting up educational campaigns on organic waste collection

- By 2025 each municipality should have finished the educational campaign (capacity building)

By creating upcycling hubs where the upcycling of organic waste into products is stimulated and further developed, in cooperation with initiatives, research and farmers

- By 2035 each region has an upcycling hub (stimulating, shaping)

By connecting local organic waste collection sites with upcycling hubs

- By 2040 all municipalities have local organic waste collection sites connected to upcycling hub (regulating, capacity building)

By stimulating green energy production

- By 2045 biogas plants process local organic waste that is not used for upcycling (stimulating, regulating).

Main actors/ stakeholders:

Municipalities	of areas concerned	for campaigns and information
Initiatives	upcycling organic waste	for knowledge and value for change
Waste recycling		for organic waste collection
Universities/research	upcycling organic waste	for developing upcycling methods

POLICY PACKAGES I **Regenerative Social landscapes**

3 Peri-urban recreation
Reconnecting people to the landscape

How can we reconnect people to the landscape?
By creating parks and routes to make the landscapes more accessible and interesting from the cities
- By 2030 all municipalities have well-functioning connections between city and landscape, that invites people to the landscapes (shaping, stimulating)

By stimulating cultural events and activities, and the placement of art in the landscape and along the routes
- By 2035 most cultural associations are connected to the parks and routing (stimulating, capacity building)

By stimulating farmers to develop, change to or work together with local agro-tourism
- By 2040 30% of the farmers fulfill a function in agro-tourism (stimulating)

By setting up educational routings along cultural associations, nature areas, farms and together with community centers.
- By 2045 the educational routings are developed and connected to the cultural associations, agro-tourism and landscapes (regulating).

Main actors/ stakeholders:

Municipalities	of areas concerned	for parks/routing & events
Nature management		for bigger scale routing / education
Cultural assoc.		for cultural activities
Farmers		for agro-tourism

INITIATIVES

id	name	(latitude, SN)	(longitude, EW)	Focus
1	The Food Hub	4.90718	52.377602	
2	Z-H Voedselfamilies			Province wide, Zuid-Holland
3	Duijvestijn tomaten + Frezta tomaten	4.41674	52.00881	Province wide, Zuid-Holland
4	Groentegoed B.V.	4.41674	52.00881	Province wide, Zuid-Holland
5	Mariahoeve- Logies dairy farm	4.60423	52.1675	Province wide, Zuid-Holland
6	Ruimte voor de Rivier			Zuid-Holland rivieren
7	Amazing Grazing			World wide
8	Dairy Campus			World wide
9	Duurzame Zuivelketen	4.32439	52.09005	
10	Innovatie Agenda Duurzame Landbouw Zuid-Holland			Province wide, Zuid-Holland
11	ReGen Villages			World wide & Almere
12	Wij.land (based on Commonland)	4.937914	52.278983	
13	Commonland			World wide
14	Duurzaam door	4.90125	52.37223	
15	TiFN			World wide
16	SAI Platform			World wide
17	InnoPlant (vision)			Nation wide
18	InnoPlant (& SIGN - Mobile Food Forest,) Amsterdam			Amsterdam
19	Innoplant - Edible Green in Public Space			Nation wide
20	Innoplant - Urban Greenhouse			Paris, France
21	Innoplant - Cultivation plan ReGen Villages			Almere
22	Innoplant - Nature-Inclusive Agriculture	5.761763	51.970859	
23	Brood en Spelen (vision)			Province wide, Noord-Brabant and Oost (Gelderland/Overijssel)
24	Brood en Spelen - Verborgen Landschap			Arnhem, Gelderland
25	Rechtstreex	4.433067	51.90839	Province wide, Zuid-Holland
26	Boerschappen	4.782664	51.597562	Province wide, Noord-Brabant
27	BlueCity	4.501502	51.919893	Rotterdam
28	Stichting Boerengroep Wageningen	5.675588	51.967535	Wageningen
29	RECREATIEBOERDERIJ JEU DE BOER	4.595432	52.115331	Alphen aan den Rijn
30	Land Art Delft	4.387247	51.980331	Delft
31	Voedselbank	4.447944	52.122031	Nation wide

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