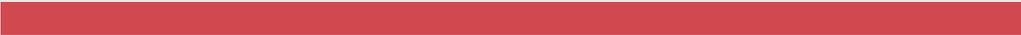


PATCHING UP



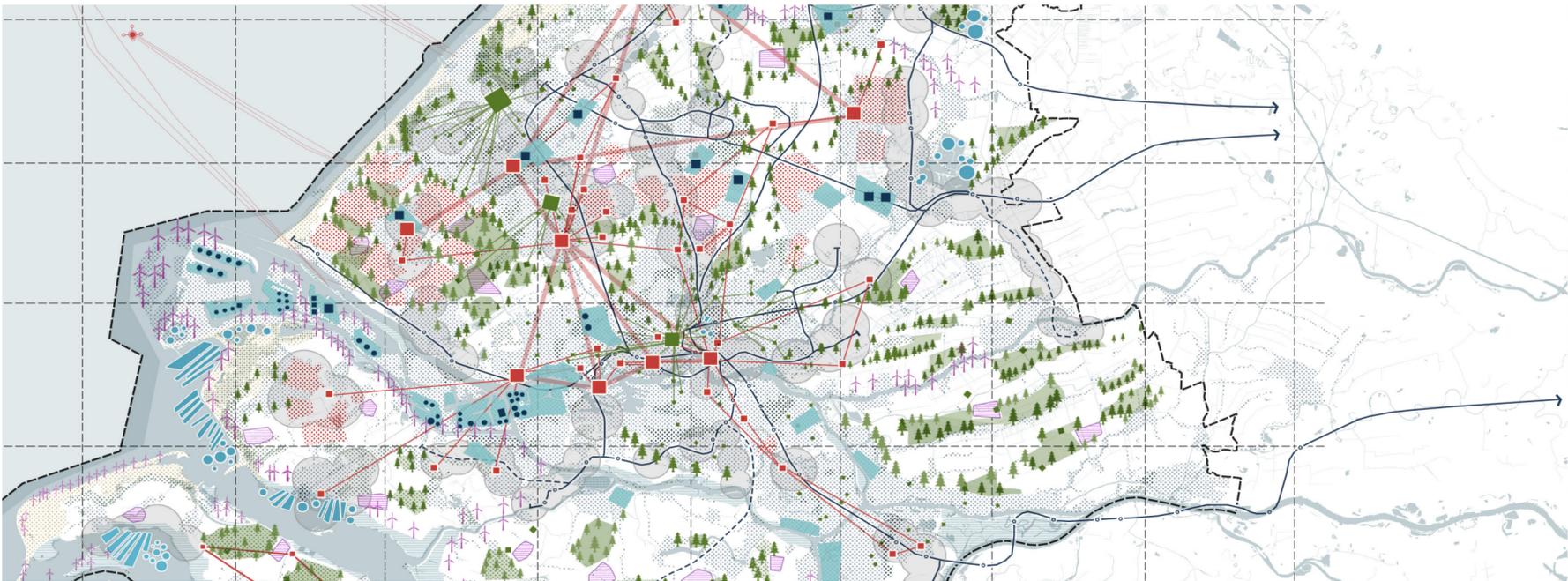
A strategy to integrate drosscapes
to achieve a circular organic sector
in South Holland.



AR2U086 R and D Studio:
Spatial Strategies for the Global
Metropolis (2019/20 Q3)

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ABSTRACT

In the Netherlands, the organic sector is one of the key pillars of the economy. Currently, the country holds the role of the second biggest exporter of food globally, having 94.5 billion in value of goods exported in 2019. In South-Holland itself the organic sector contributes to the regions' budget by 16%. Most of the production is happening in large greenhouse clusters known as the Greenport. However, the organic sector produces a considerably huge amount of waste and pollution. It also forms drosscapes in outdated lands of infrastructure. Drosscapes and the organic patch system of the landscape are two individual systems that do not work in synergy with each other. They both create different kinds of waste (environmental, social, economic and solid), not contributing to circular sustainability. Therefore, the main question is how they can be combined with the organic sector, improving the performance of the agro-industry and reducing waste. The project answers this question by looking at the sector through a strong sustainability concept which includes the key values such as the circular and knowledge-based economy and a wide range of participants. The strategy of the region is based on four main principles. First, the goal is to bring drosscapes back into the organic system. Second, the sector has to be combined locally. Third, potential stakeholders and R&D companies have to be involved more widely and from different fields. Finally, spatial diversity has to be improved in order to make the organic sector in South-Holland circular. The strategy is based on scenario planning. The detailing of the strategy focuses on diverse system clusters of production making relations between local and compact. Additionally, the small scale examples are based on knowledge and innovative technologies, being considered a potential export product, contributing to the food geopolitics, but most important - to South Holland's sustainability. Patch structure in the concept is used as a method, in which clusters are able to close smaller loops of production before they become connected to the regional circular system. As a result, the main sector of the export would become knowledge of farming and adaptation to climate change in the region. The strategy can be applied in different scales and locations while reaching circular economy by implementing local drosscapes into a system. Policy makers can make the best use of drosscapes in a practical way by applying the strong sustainable concept and similar strategy in their region.

Keywords: Drosscape, organic sector, circular economy, South holland, Regional design

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1. INTRODUCTION

1.1 TOPIC

In the Netherlands, the organic sector is one of the key pillars of the economy. Currently, the country holds the role of the second biggest exporter of food globally, having €94.5 billion in value of goods exported in 2019 (Government of the Netherlands, 2020). „Patching up. A strategy to integrate drosscapes to achieve a circular organic sector in South Holland.“ is a project talking about food production in one of the key producer regions not only in Europe but also in the World. South Holland is a bustling province in the Netherlands, known for its pioneering solutions applied in everyday life. One could say that it's a 'window of a shop' - a display or a gate, through which ships enter Europe. South Holland has a role to play. It needs to impress, inspire and encourage. Whatever can be observed here, will leave the impression for later. That's why it's so important to build a strong, sustainable image of the province. We don't want this image to be ruined by flaws of the organic sector which produces a considerably huge amount of waste and pollution. The project investigates how to introduce a circular economy model using South Holland's potential, hidden in remaining values of the province. We consider drosscapes one of them. We will explore their assets, temporalities, and resilience in order to build upon it a convincing strategy for South Holland, 2050.

1.2 ACADEMIC RELEVANCE

This project has ambitions to become an active tool in discussions around the transition of South Holland towards circularity. It's relevant both in an academic and municipal environment. Our strategy is formulated upon the research based on reliable and widely acknowledged sources. We analyzed current tendencies, consumption behaviors, and looked into challenges drawn by the experts. The overall picture that we gained was enriched by our own subjective observations. The project serves as a starting point for more detailed development, especially, that it brings fresh ideas on such topics as drosscapes – a theme still being new and unexplored in literature.

1.3 DYNAMIC TEAM

We are a team of four international students from the Netherlands, China, Lithuania, and Poland. Due to the diversity of our group, we were able to share experiences gained in our homeland. All of the four countries have different planning and governance traditions that inevitably shaped us - and so did the prior academic education, completed in our countries of origin. Thanks to distinct methods of teaching, each of us was able to bring to the table different qualities and skills. Interestingly, we also have a different professional background – only one of the team members finished the urbanism-related course, while others graduated from architecture. We tried to complement each other's knowledge, teach each other new skills. In the whole complexity of this project, we managed to find our small interests that we could individually develop and later contribute to the bigger picture. Below, our profiles and ambitions explain what we tried to explore within the cooperation:

Kevin Hollander – architect. Bachelor in Architecture completed at TU The main interests in the project were: Building with Nature, stakeholder engagement, integral design.

Ning Cai - planner. Bachelor in Urban and Rural Planning. The main interests in the project were: Spatial requirements of circular economy, landscape transition, and strategy design.

Paulius Kliučininkas - architect. Bachelor in Architecture. The main interests in the project were: food industry interaction with the water, spatial and social justice; quality of food production; large scale regional planning.

Elżbieta Zdebel architect. Bachelor in Architecture completed at the Cracow University of Technology. The main interests in the project were: food geopolitics; spatial, social and economic injustice; academic writing.

2

FRAMEWORK

2.1 CONTEXT AND PROBLEM FIELD

South Holland, the subject of this report, due to its national and international importance is being rooted in a few different contexts - not always have they convergent interests, though. One of the key sectors present in the province is the organic one - it contributes to the regions' budget by 16% (Staat van Zuid Holland, 2013). Most of the production happens in large greenhouse clusters known as the Greenport, but not only. Nearly half of the province's area is meant for agriculture (Waar Staat je Provincie, n.d.). Such a spatially extensive organic sector produces a considerable amount of waste and pollution. In outdated lands of infrastructure, it also forms several drosscapes - formations we will later have a closer look at.

South Holland's main problem is, that the drosscapes and the organic patch system are two individual systems that do not work in synergy with each other and both create different kinds of waste (environmental, social, economic and solid) and are therefore not contributing to strong circular sustainability.

The environmental, social and economic contexts all affect the undertaken efforts towards circularity.

To understand how the province manages to align with all of them at the same time, it is crucial to guide ourselves between different scales. But before we explore this topic later on, it is necessary to understand South Holland's several obligations - naturally, the most important one is this towards the country. But the province also belongs to the Metropolitan Region called Randstad, or another one, less formal, called Eurodelta. On a bigger scale, South Holland needs to align its strategy with the European Union policy. In the end, there is also a global context, being no less important than the prior one.

2.2 THEORETICAL AND CONCEPTUAL FRAMEWORK

The project "Patching Up" is developed based on a number of theories or concepts. Therefore, this is a chapter introducing theories, documents or authors which are acknowledged in the project. Moreover, many concepts like drosscapes, patch systems and ecological succession are interrelated and synthesized in the regional plan.

- Global food industry

When in 2017 Frank Viviano wrote a broad article for National Geographic, giving it a very triggering title "This Tiny Country Feeds The World" (Viviano, 2017), millions of readers confronted themselves with knowledge, which for many perhaps was never an interest. This publication raised awareness about something bigger than just global trade of goods - that food may also be a political tool and that there is an entire field of science dedicated to food geopolitics. Currently, the Netherlands is the 2nd biggest exporter of agricultural products in the world. Trade, food and technology sectors in 2018 together brought to the budget 99 billion euros, which stated for 58% of the trade market in the country ("The Dutch Agri Food Tech Sector", 2019). Although the economy strongly relies on the food sector, current circumstances also bring threads and questions. Indeed, they show a very risky distribution of power. According to the AgriFoodTech Platform (2019), 8,7% of the Dutch labor force is located in the food industry. Considering environmental threats, just to name flood risk or climate hazards, it is much bravery to put so much on one card. As long as the Netherlands will pioneer in the global food export, the country can be relatively safe, but shifts in food geopolitics, in the long run, may complicate its comfortable situation. This is due to the fact that, although the Dutch sector produces a significant amount of goods, for now, it is also in need of importing half of its demands.

To maintain stability on the global market, countries, to a certain level, need to observe their alliances' policy. This means that a country like the Netherlands cannot really be a single-player, having no concern about the European Union. Rather, the country needs to align its export/import policy so it is never aimed against the European interest. There are many European and worldwide units monitoring the overall distribution of goods. There are, for instance, two important indexes, often being used when describing the global food sector in a cross-section. One is called the Global Food Security Index, the other one the Food Sustainability Index. The prior ranks every country based on affordability, availability, quality, safety, natural resources and resilience of the sector. The Netherlands, together with Germany, Canada, and the United States, just to name a few, belong to the group of countries with the best performance. Importantly, this ranking points out the challenges for the Global South. At this point, this is a strategic aspect for the Netherlands as the country trades with partners from the group of moderate and poor performance.

The latter ranking, the Food Sustainability Index, looks into countries' production practices - their commitment to sustainability, food loss, water and waste management, and nutritional value of food. This index, run by the Barilla Center for Food & Nutrition Foundation, provides knowledge about the global challenges in the food sector. It is of great importance also from a political point of view to understand why food stability plays a key role in political stability. Countries such as Yemen or Somalia can prove that poverty starts in a place where governments become corrupted and helpless.

It is believed („The Emerging Geopolitics of Food", 2013), that the food sector should stay comparatively in both public and private hands. As already mentioned, food can become a strong political tool to impose pressure on other countries. Food nationalism is one of these phenomena, which should definitely be avoided, no matter how beneficial for a country. It is by definition a situation, when "the state is playing a more pronounced role in the support, ownership and management of businesses and strategic industries, such as agriculture and mining" („The Emerging Geopolitics of Food", 2013). The source further says: "The Dutch government should distance itself from resource nationalism and aggressive overseas policies to secure food and raw materials, which sometimes hurt the local economy or local food security." The private partnership may assure the food sector and keep the government away from unnecessary political decisions. On the other hand, though, it is also purely profit-oriented, which means that during times of scarcity, it is less likely to consider people's interest in the first turn. Thus, the government is there to play the role of mediator, having all the necessary tools to decrease the prices when needed.

In the geopolitical discussion, it is important to realize how particular countries may contribute to global stability. Some countries of the global South rely on exporting goods but at the same time, they may also struggle with effective, sustainable production. Countries like the Netherlands are in a very privileged position being able to build a strong and stable policy. They are able to trade goods for the sake of a better deal or quality. But there are also countries on the map, for whom the overriding idea is to feed a country and whose demands are not high. While looking for long-term partnerships, it is naturally important to look at what a partnering country has to offer in return. The Netherlands needs to (and already does) acknowledge the value of trading knowledge itself. This way, the countries of the best food performance may build a better future for those, who tackle daily demands, hunger, poverty, and are moreover involved in a huge ecological crisis.

- The organic sector

One of the main objectives of this project is the adoption of organic production to a circular economy. Therefore, there is a high necessity to define what includes the organic sector in this specific context. At a glance, the organic sector could be described as an economic sector based on the production of agricultural goods (for e.g. food (livestock, grains, poultry, etc.), flowers, seeds).

This sector is usually called the agricultural sector. Yet, the organics encompass more aspects related to processes like flows of organic materials or waste and recycling systems.

The European Union suggests the extensive term for the organic farming sector. According to the union regulations "organic farming rules cover agricultural products, including aquaculture and yeast. They encompass every stage of the production process, from seeds to the final processed food." This term can be illustrated by the main examples of the sector:

- seeds and propagating material such as cuttings, rhizome etc. from which plants or crops are grown;
- living products or products which do not need further processing;
- feed;
- products with multiple ingredients or processed agricultural products for use as food.

Likewise the legislation, the project excludes hunting of wild animals and wild fishing. Yet, many strategic projects are related to aquaculture (EU, 2008).

The rules of the organic sector and farming will become even stricter, yet related to natural ecosystems and eco-farming. The closest EU changes are expected from 1 January 2021. The main aims of the legislation are fair competition of farmers while maintaining consumer trust (EU, 2020). Due to the reclamation the decisions of the plan have to be stricter and visionary. These are the exemplary aspects from the new regulations:

- production rules will be simplified through the phasing out of a number of exceptions and opt-outs;
- the control system will be strengthened thanks to tighter precautionary measures and robust checks along the entire supply chain;
- producers in third countries will have to comply with the same set of rules as those producing in the EU;
- organic rules will cover a wider list of products (e.g. salt, cork, beeswax, maté, vine leaves, palm hearts) and will have additional production rules (e.g. deer, rabbits and poultry);

- certification will be easier for small farmers thanks to a new system of group certification;
- there will be a more uniform approach to reducing the risk of accidental contamination from pesticides;
- exemptions for production in demarcated beds in greenhouses will be phased out.

Because of many limitations, the organic sector was not related to many spatial subjects or values. These aspects are essential in planning processes nowadays. Despite many formal definitions of the term, the project team had to define what organic sector introduces. The full meaning of the organic sector is defined by four main categories:

- Processes
- Materials
- Features
- Infrastructure

The process in the organic sector is more emphasized throughout flows, biobased energy and development of drosscapes (look drosscapes paragraph). Environmental materials include water, soil and air. Features are more related to values like spatial justice or ethics of the sector. Finally, infrastructure encompasses physical subjects like port, greenhouses or network of roads.

Currently, the organic sector legislation is poorly related to spatial plans or visions. Yet, there is a growing urgency to include the sector into circular economy decisions. Therefore, the meaning of the organic sector should be extended.

- Strong sustainability

Within the project, the concept of strong sustainability has been applied to achieve sustainable development. A more commonly known concept of sustainability can be seen in Figure 1. In this figure it is shown that to achieve sustainable development, a proposal, or design, must consider 'Nature', 'Society', and 'Economy' in equal measure, which is based on the work 'Our Common Future' by (Brundtland, 1987). At the same time, this concept suggests that it is possible for human capital, economy and society, to substitute natural capital, nature. This has attracted a lot of criticism over time. Since the resources we have and are given are limited by what we are given on this planet. It could be considered wrong to say that human capital can substitute natural capital when we're talking about sustainable development.

This criticism has led to the development of the concept of strong sustainability. Strong sustainability suggests that while human and natural capital are complementary, they can not be exchanged for one another (Neumayer, 1999). A quick example is sunlight, which is an important natural capital and is difficult right now for humans to replicate. The concept of strong sustainability can be seen in Figure 2. The first circle, nature, makes it possible for societies to develop in a certain way, which makes certain types of economies possible. Sustainable development using the concept of strong sustainability therefore places more importance on direct ecological development over economical or societal gain, which in theory could still happen later, if the natural conditions are appropriate.



Figure 1. Weak sustainability from Socio-Ecosystemic Sustainability by Morandín-Ahuerma, 2019.



Figure 2. Strong sustainability from Socio-Ecosystemic Sustainability by Morandín-Ahuerma, 2019.

The proposal follows the line of sustainable development through strong sustainability. For it agrees that the resources of Earth are limited and should, therefore, be used in its most optimal way. The UN Sustainable Development Goals were placed in the three circles of strong sustainability as a way of determining which goals are of higher importance and which have a leading voice in the design as can be seen in Figure 3. The design seeks to create certain environmental conditions, which in turn make it possible for society and the economy to develop in a sustainable way.



Figure 3. United Nation Sustainable Development Goals through the concept of strong sustainability. Own imagery, 2020.

- Drosscape

In the country of a vast, equal open landscape constructed from a repeatable set of patches, there is a considerable amount of non-productive land added to it, emphasizing, even more, the size of open space. Not always non-productive land must have a negative connotation, though. It can as well work as a buffer zone or may accommodate greenery – and although it does not bring monetary profit, it can serve a utilitarian function. However, there are certain types of lands that are considered wasted, meaning, that they waste their value or potential. Alan Berger (2006), the Professor of Landscape Architecture and Urban Design at Massachusetts Institute of Technology, in his book "Drosscape: Wasting Land in Urban America" first introduced the term of drosscape, saying: "The waste landscape emerges out of two primary processes: first, from rapid horizontal urbanization (urban "sprawl"), and second, from the leaving behind of land and detritus after economic and production regimes have ended. From its deindustrializing inner core to its sprawling periphery to the transitional landscapes in between, the city is the manifestation of industrial processes that naturally produce waste."

To recap his words, there is a spatial recognition of urbanization waste byproducts: associated with sprawl, industrial leftovers and lands in-between. He later differentiates them further into dwelling, transition, infrastructure, obsolescence, exchange, and contamination waste landscapes. Berger sees drosscapes as one of the main challenges for designers in the XXI century. What he also strongly points out in the essay is that wastelands are not fossils from the past (as mistakenly considered by some urbanists and architects), thus they are not static. It is important to think of them as lands in transition. Their current state of non-productiveness should not be viewed in Past Simple, but rather in Present Continuous, meaning that there is always a phase of waste and it's a natural process that repeats every now and then in turns. To further quote Berger (2006): "I argue that planned and unplanned horizontal conditions around vertical urban centers are intrinsically neither bad nor good, but instead natural results of industrial growth, results that require new conceptualization and considered attention, and that these must be in hand before potential solutions to any problem discovered can be effectively addressed or devised".

Hence, once drosscape today, may not be one tomorrow, and the opposite. Knowing the mechanisms that drive urbanization, it is possible to predict future wastelands due to a common tendency. It is pivotal to accept that wastelands are an important element, but not necessarily a mistake in planning, and they will continue to occur, so planning needs to be flexible and adaptive. Design should not strive towards defined and complete patches that will not wish to change with the time, as it is also acknowledged, that urbanization as a phenomenon is a continuous process, and never a complete piece.

In our approach, drosscape by its given definition is a starting point for further exploration. Whilst wasteland is often attempted by a word potential, we found it interesting to look closer at potentials per se. Thus, we extended the definition of drosscapes by questioning scapes – are they only land formations? Can we talk about human scapes as well? If yes, can we consider drosscapes as the wasted potential of human scapes in a context of social injustice? And how about semi-productive patches that have greater potential than their current use? Poetic boredom of landscapes may always be justified, but can as well open doors for transformation.

While mapping drosscapes in places of intervention, we tried to view them through the prism of three pillars of sustainability – environmental, economic and social. Our discovery was broader than Alan Berger's definition which did not fulfill our research demands. We decided to include a full spectrum of lands that lack diversity, whose monofunctional face was so apparent, that it was not able to bring importance, nor meaning to the table anymore. We believe that in the age of bio scarcity, it is about justifying every spatial and functional decision. If precious land is being taken from nature and given certain functions, these functions need to be meaningful. They may either be profit-oriented or may serve non-material purposes, but it is important to make sure that land is a vital part of a discussion. As long as a semi-productive patch can be replaced, transformed into something of a broader vision without affecting the bigger system, we assume that its prior function was not crucial, irreplaceable.

So when we talk about higher productivity, we do not necessarily mean profit-oriented incentives, nor spatial efficiency. We like to question and confront undertaken efforts to examine reasons behind keeping the current state of the land, whether it would mean taking or returning it to nature.

- LAND TRANSITION

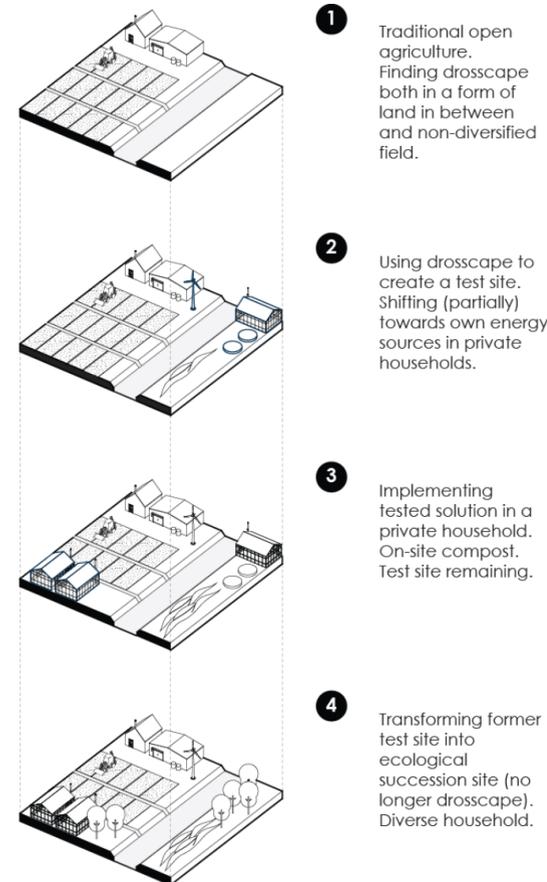
Drosscapes are inevitably associated with transition. Quoting after Ellen Banzhaf et al. (2017): "We define urban transformations as fundamental, multi-dimensional changes in urban land-use patterns, population developments, infrastructures, governance regimes as well as established values, norms and behaviors. A central focus is on land use and its changes to supply ecosystem services as a key driver for quality of life." In theory, the constant circulation and dynamic processes prevent decay from happening. However, sometimes the resting phase of land shifts from regeneration towards abandonment. In urban areas, land consumption and the value that follows it, is higher than in rural areas, thus the demand for monitoring natural processes of transition is higher and more strict. What shapes consumption is "residents' socio-economic status which in turn influences residents' behaviors and thus urban land use" (Ellen Banzhaf et al., 2017) but, on the other hand, also the amount of power given to stakeholders (Van den Dool et al., 2015, p. 218). Naturally, such power is tightly connected to land ownership, thus it often generates conflicts. In the face of growth and shrinkage of the cities, it is crucial to wisely locate interests in space. In this sense, it is hard to fully control the transition of drosscapes in rural and peri-urban areas, where the pressure is lower. Also, the underlying patches view drosscapes through different scales and there is no unified way, nor a common time relation to measuring them.

An important question that occurs in the context of transition, and which was already discussed in the drosscape paragraph, is giving meaning to the land. There is a thin line between regeneration (resting) of the land and its waste. There is also a need for understanding that processes of reusing drosscapes do not necessarily mean building-up, but often also demolition. Having understood the whole complexity of wasteland typologies and stakeholders communicating hypothetical interest in intervention, is it possible to shape the strategy in a top-down way? How to integrate the drosscapes into a consistent patch system of South Holland, to optimize the use and efficiency of the land? How to carry out a transition that requires the involvement of private actors?

To answer these questions, we proposed a model of testing-observation-implementation, as we realize constraints that follow enhancing private stakeholders to invest in transformation. By doing so, we engage the knowledge sector, both public and private, to create a P-P partnership. To reveal the concept behind it, Stephen H. Linder (1999) writes:

"the hallmark of partnership is cooperation - not competition; the disciplining mechanism is not customer exit or thin profit margins, but a joint venture that spreads financial risks between public and private sectors. Joint-venture arrangements actually stabilize volatile markets and work to mitigate competitive pressures, not exploit them". In the following model, the governmental body needs to compromise towards entrepreneurship, whilst the private sector has to wider acknowledge public interest.

The public-private partnership in our scenario may use drosscapes as their field of experimentation to test different models of agriculture and innovation as well as different models of partnership as such. The ongoing processes of transition would be open to the public and are supposed to serve as an enhancement for further development in the private sector. One of the flaws of such a model is its long-term application, but on the other hand, it helps to better adjust the process to individual needs to avoid failed or overpriced investment. Figure 4 illustrates an example of a process of transition over time.



- LANDSCAPE PATCH SYSTEM

The current structure of the landscape of the region became the starting point in this project. Observations revealed separated, disconnected or segregated functional fields of landscape in South Holland. This feature of landscape is usually described as a patch mosaic model (Forman, 1995). Under this theoretical model "a landscape is represented as a collection of discrete patches. Major discontinuities in underlying environmental variation are depicted as discrete boundaries between patches." (McGarigal, 2005). Although this term is usually used in a science of geography for natural habitats and ecologies, it was adopted to the production-agricultural and urban landscapes in this project.

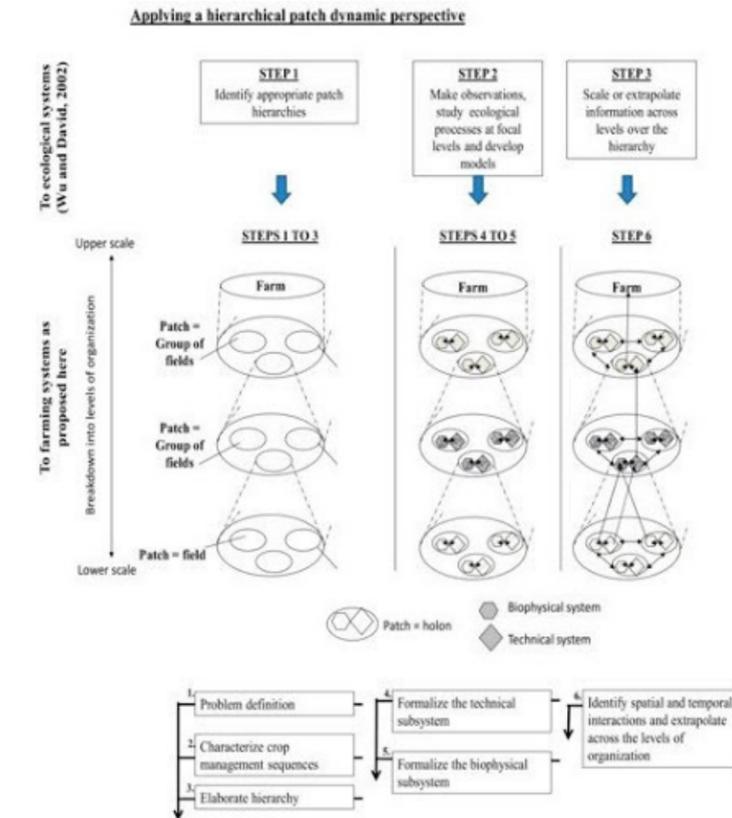


Figure 5. Hierarchical Patch Dynamics Perspective in Farming System Design. (Merot, 2019)

The term "patch" is used as an identification of the main functional environments in the region: the port, urban, greenhouses, open-air fields of production and water environments. These environments and functions are closely related to each other, although the patch system envisions a separated and static concept of space. The patch dynamics theory reveals the interrelations and patches as a natural process. Ecological succession is one of the theories widely used in this regional plan (see the ecological succession paragraph). Patch dynamics is closely related to a timeframe which is the key factor in the development of the organic sector and ecological development (Wu, 2019). As a result, the timeline of projects and schemes of drosscape interventions over time depicts the development of patches. Moreover, the cycle economy is one of the driving forces of interconnected patches and patched landscapes. Different organic environments and functions become better functioning and less wasting when they are interconnected and using each other's leftovers or produced material. The concept can also be adopted in different scales. The example model shows the one farm patching system of fields.

- ECOLOGICAL SUCCESSION

The importance of strong sustainability within the project has also led to the development of ecological succession within the project. This is in line with the concept of 'Building with Nature' in which the design tries to accept and adapt to the natural systems that are active, or will be active within South Holland.

The concept of 'Building with Nature' seeks to understand the natural system, tries to turn from a static to a dynamic approach, and find a way to live with uncertainty (De Vriend & Van Koningsveld, 2012). The adaptation of drosscapes into these places of ecological succession can be defined as places where time becomes an important part of the design. Figure 6 shows an example of how this process, where time becomes part of the design, could take place. On the one hand, it allows for the natural process of decay over time, on the other hand, it allows for societies and economies to adapt to this process and form new industries and knowledge over time.

- CIRCULAR ECONOMY

The first roots of the circular economy appeared in 80's. The pioneer of this concept is Walter R. Stahel who developed the theory throughout several articles organisations or books. The article called "The Product Life Factor" and the report "The Limits to Certainty" became groundbreaking 30 years ago. The authors opposed to the point of view in EU policies that old products should be disposed instead of repairing them. Furthermore, they highlighted the finite of raw materials which limits the economic growth.

One of the main strategies in the modern circular economy concept is "closing loops". Flow of materials model encompass the reuse of materials which are always limited. The architecture professor Stahel started developing approach of several stages in material flows. They can be separated into four main categories in exact hierarchy: Reuse, Remanufacturing, Recycling and Disposal.

The essence of this strategy is elimination of materials itself. The industry has to adopt the reuse of goods or service-life. In other words, the industrial production becomes non-material subjects and reuse of materials that are already in use. Furthermore, services have to become as goods that needs to be sold, according to Stahel. It should be the most efficient industrial strategy in practice according to the theory.

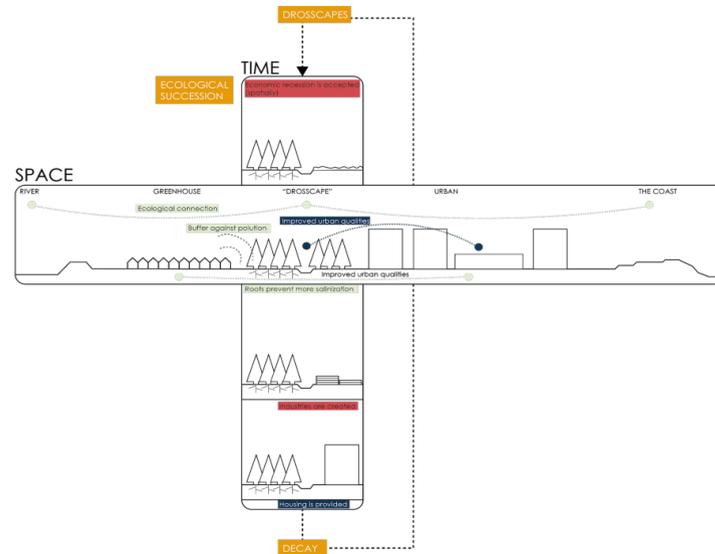


Figure 6. Space and Time in relation to Drosscapes. Illustrated by authors

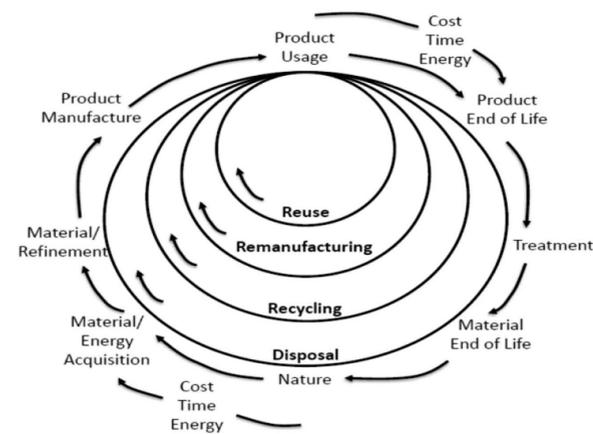


Figure 7. Flows of materials in the cycles of product usage. (Korhonen, 2018)

The essence of this strategy is elimination of materials itself. The industry has to adopt the reuse of goods or service-life. In other words, the industrial production becomes non-material subjects and reuse of materials that are already in use. Furthermore, services have to become as goods that needs to be sold, according to Stahel. It should be the most efficient industrial strategy in practice according to the theory. The other important aspect of this circular concept is limits of growth. The infamous book "The Limits to Growth" first time ever presented the correlation between economic development and resources of the earth. This point of view was envisioned in the circular economy concept.

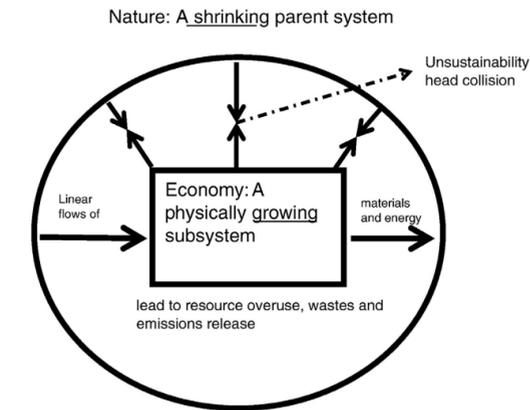


Figure 8. Growing economy and shrinking limits of raw materials leads to limits of growth (Korhonen, 2018)

Growing population, economy and their increasing industrial production are the key trends in the current historical period. However, the resources that were in the planet before, are going to an end. The strong sustainability concept was chosen as a supporting concept in this project which developed the environment as a limiting aspect for the rest. (see the Strong sustainability paragraph). This situation calls for another production strategy.

The economy in this concept has to be advocated and trends of growing or production has to be taken into account. There is no secret that such a vision in practice has to be beneficial. There are several trends that support effectivity of circular economy. One of the main advocates is EU. The union has counted that such an economical transitions can create 600 billion euros annual economic gains. It would result in 1000 billions US Dollars benefit for the entire world (Korhonen, 2018). That is the reason why such countries like China, Japan, UK or The Netherlands include the new economy into policies. As a result, the circular economy has become more practical than theoretical concept.

The process of "closing loops" has another economic, environmental and social benefits. It reduces energy and raw material cost; value in resources is used several times; costs that arise from environmental legislations are reduced; there appear new employment opportunities; increase the sense of community by sharing materials; user groups share the functions and services instead of physical products. There appear the benefits in output of materials as well. The wastes are reduced; value leaks and losses are reduced; new markets are found; new responsible business attract investment. The list can be developed further. Just one's need to keep in mind that circular industries make their profits from sufficiency, such as waste prevention.

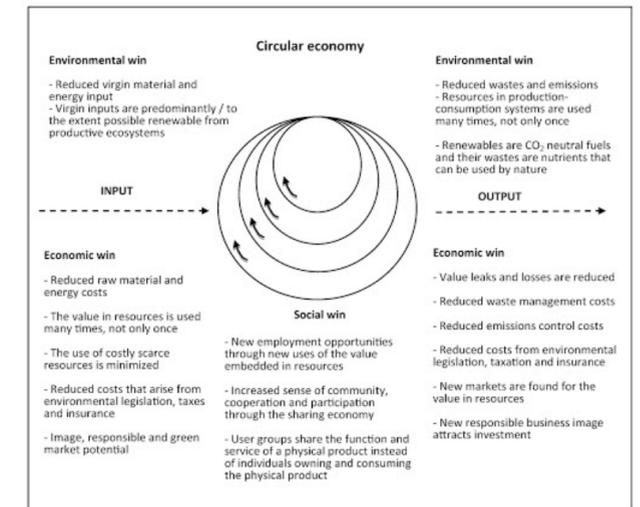
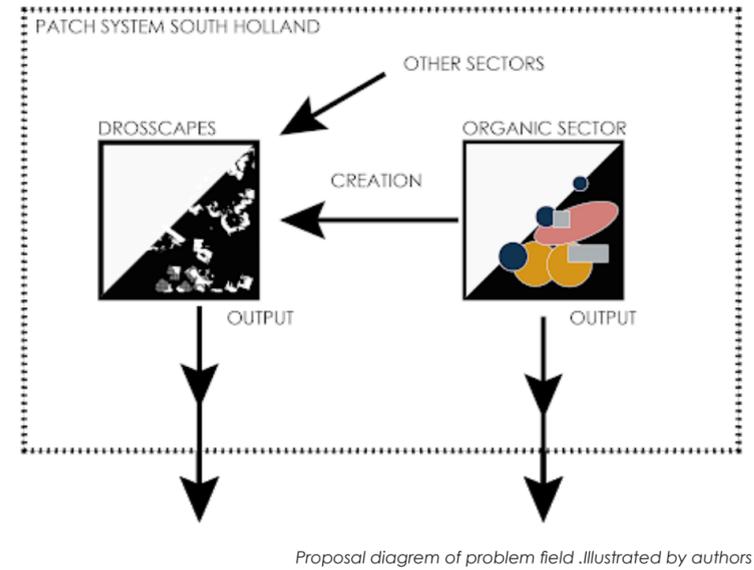


Figure 9. Benefits of circularity in all processes of manufacturing. (Korhonen, 2018)

Economic thinking is the main catalyst for changes. This system would not work without appropriate system thinking. There are three main industrial economies: linear, circular and service. The last one requires the most energy for creating the system because it is based on solutions and processes rather than typical industrial production in a factory. System thinking also helps to connect the flows, identify locations of different materials or invent the chains of repairing or remanufacturing. Most of the discussed decisions are based on schemes of flows which are results of the system thinking.

The region of South Holland is one of the examples all over the world in the process of moving towards circular economy. Yet, a lot needs to be done further. Rotterdam municipality has recently published its own strategy towards circular city and the port called Urban Metabolism. The process has already started. Dordrecht is becoming the center of food innovations with a number of R&D centers. EU officially accepted strategic regulations towards circular cities and regions. Finally, the scientific development if this concept is far away from the practical envisioning. As a result, universities and scientists have a lot of power to push the concept one or another way.

2.3 RESEARCH QUESTION



How can the **drosscapes** of South Holland be used in the waterfront, open-land farming, greenhouse farming industries, and urban areas to **close loops** and improve the overall **sustainability** of the **organic sector**?

3

INVESTIGATION

3.1 GLOBAL CONTEXT

3.1.1 IMPORT

Despite the fact, that the Netherlands is the second largest exporter of food products globally, having brought to the national budget 94.5 billion euro in 2019, it also heavily relies on imports that cost the country 64.1 billion euro the same year (EuropeanSeed, 2020). In the report called "The Emerging Geopolitics of Food"(2013), formulating challenges of the Dutch food sector, the authors elaborate: "From a strategic point of view it can be argued that it is important to maintain a domestic food production capacity in order to ensure food security. In that case, it is worthwhile to consider sustaining a diverse range of agro-food industries." The current balance of power between import and export is a result of a few factors. First, the Netherlands would not be entirely able to cultivate raw materials on a sufficient scale. The size of a country and its geographical conditions make it easier to cultivate food that grows vertically rather than horizontally – the latter demands vast open areas and is usually associated with crops or soybean – all of which indeed are being imported. It wouldn't be true to say that the country shifted from open agriculture towards greenhouses, as the majority of agricultural land still remains open. The cultivation, though, needs to be well chosen and reasonable, and the intentions measured. On the other hand, one of the consequences of having an open market is that countries not only import essential goods that cannot be grown in a homeland but also these that are of a better price or quality. The open market allows traders to be selective and always consider profitability, even if it comes with the cost of unsustainable shipping and irrationally widespread network.

Whereas trade balance with Germany and other countries of the European Union is positive, the global one remains negative ("The Dutch Agri Food Tech Sector", 2019). The latter one is especially crucial for the overall import cross-section, considering type of goods being imported. Currently, the main commodity groups of import are („The Emerging Geopolitics of Food", 2013):

- Fruits, nuts and spices – competitive, integrated chains of supply. Good back sourcing in the EU (apart from exotic fruits and spices).
- Coffee, tea and cocoa – few producer regions, strong market concentration. No back sourcing from the EU.
- Margarine, fats, and oils - several producer regions, land use constraints. Fair EU back sourcing.
- Nitrogen, phosphorus, and potassium - Few producer regions, strong market concentration. Limited EU back sourcing.
- Coarse grains and soybean - strong market concentration, land use constraints. EU supply insufficient to meet EU demand.

As the European Union cannot back source several commodities, it is important to carefully arrange deals with supplying countries, considering their food security. If the market is highly concentrated, though, there is not much space to stimulate it. Sometimes relations between the food security index and exclusiveness of a certain production region may be inverse, just to name India as an example of a country with moderate security performance (Global Food Security Index, n.d.) but strong market concentration for spices, rice, coffee or tea. The challenge, however, is not to decrease trade with countries of a poor and moderate security index (as proven above - it is almost impossible if the market is concentrated), but rather create a partnership, in which the developing countries could benefit in a long term, by improving their production processes.

FOOD SECURITY INDEX

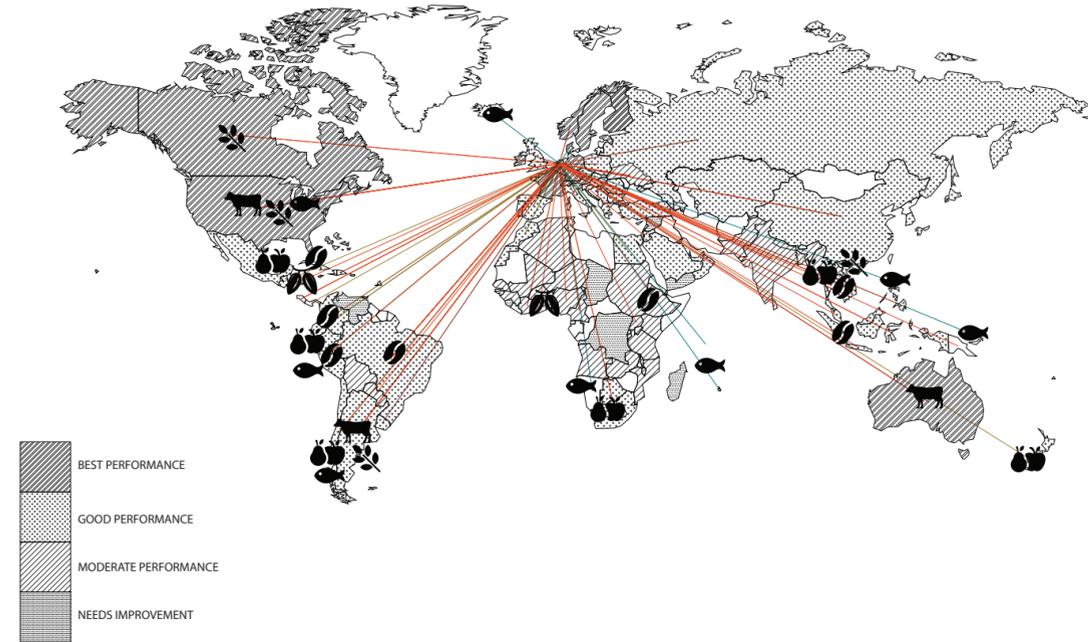
MODERATE PERFORMANCE

- ALGERIA (export)
- ANGOLA (export)
- BANGLADESH (export)
- CAMEROON (import)**
- COTE D'IVOIRE (export / import)**
- ETHIOPIA (import)**
- GUINEA (export)
- INDIA (import)
- NIGERIA (import / export)**
- PAKISTAN (export)
- PARAGUAY (import)**
- SENEGAL (export)
- UGANDA (import)**
- UKRAINE (import)**

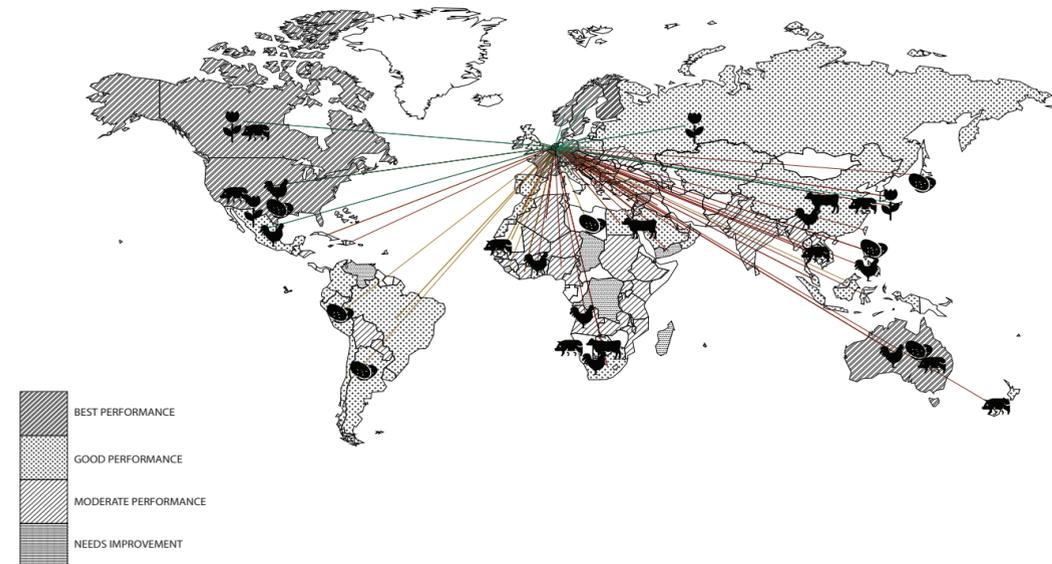
MODERATE PERFORMANCE



IMPORT



EXPORT



There are three types of risks that follow intensive import („The Emerging Geopolitics of Food”, 2013):

- Economic
- Environmental
- Political

The economic risk and increasing prices that follow it, would, in the most extreme scenario, lead to the prohibition of trade. To maintain the flow of import/export, one of the ways is to allow negotiations between suppliers and buyers to negotiate prices. The other solution assumes turning towards resources secured by the EU for its partnering countries.

The environmental risks, on the other hand, look at the broad ecological context across the globe, seeing threads in land abandonment, air and water pollution, biodiversity loss and overall degradation leading to spatial and social injustice. Current nutrition tendencies are highly unsustainable and many of the choices could be avoided by raising consciousness about the source and production chain of a certain commodity. For example, the increasing consumption of meat leads to extensive production of animal feed, just to name soybean. The latter demands a vast amount of space, which often leads to deforestation or local droughts. However, such a local environmental crisis usually does not affect the majority of importing countries, and on the other hand – the countries of production calculate monetary profit over ethics, accepting the risks and ignoring them.

To finish, the political risks, quoting after the source („The Emerging Geopolitics of Food”, 2013), “relate to effects on the security of supply of importing countries as a result of decisions taken at the political level of commodity exporting countries.” One of the main geopolitical threats noticed by the authors is the so-called resource nationalism, described as an interest-driven consideration of a food chain, being limited only to one country's needs, despite global dependencies and obligations. This means that the government may use its power both to create a global political pressure, but also to prioritize its own country's interest at any cost. Another threat is a shift towards exporting processed materials rather than raw ones – an issue affecting countries with developed processing sector. The key risk, though, concerns political instability, escalation of conflicts and broken chains of supply, affecting both importing and exporting countries.

To deal with the underlying risks, it is necessary to make decisions that concern safety and integrated strategies, even if they partially affect national interests for the sake of global order and responsibility.

3.1.2 EXPORT

The negative balance of the global trade, already mentioned in the import section, emphasizes the Dutch export being mostly rooted in Europe, with the highest export value between Germany, Belgium and the United Kingdom (Government of the Netherlands, 2018). According to the data from 2018 (“The Dutch Agri Food Tech Sector”, 2019), 25% of the entire traded commodity goes to Germany, 52% to the rest of the European countries, and only 23% outside Europe. Such a policy is built upon the EU membership and food security obligations that follow it. To be able to meet the demand of both the Dutch market and the EU, the Dutch approach lays in maximized cultivation under the glass roofs. According to National Geography (Viviano, 2017), the Dutch greenhouses occupy the area of 36 square miles, which is the size of Manhattan. In fact, flowers and vegetables contribute to the list of the most valuable goods, along with materials and technologies, dairy, eggs, and meat.

Although the food sector is still competitive across the globe, the flower industry is way more concentrated (“Quick facts and figures about the Dutch Horticulture industry”, n.d.). The Dutch floriculture stands for 44% of the entire global trade – a number that makes the country a single leader in the race. The sector relies on trading live trees, bulbs, cut flowers (77% of all the flowers circulating) and roots, but also nutritional products. Moreover, the Dutch industry contributes to the development of new plant varieties, annually introducing new modifications to the market.

Another strong export commodity is fresh vegetables. Since 2000, the country started to implement an idea of producing “twice as much food using half as many resources” (Viviano, 2017). As a result, the Netherlands is leading effective cultivation per square meter of tomatoes, chilies and green peppers, cucumbers, pears, carrots, potatoes, and onions. This does not mean the highest total export number of these goods, but a ratio considering the surface of growth versus harvest capacity. Such excellent performance wouldn't be possible if not the development of technologies and vertical farming.

Therefore, the Netherlands is considered one of the most innovative agriculture suppliers. What the country already does is it exports knowledge to the countries of the Global South. Being home to a renowned research institution, the Wageningen University, it leads several projects across the globe. Some of the undergoing ones are (Viviano, 2017):

- managing transition zones between farm and forest (Latin America)
- sustainable and competitive market for vegetables, to meet the rising demand of a growing middle class (Ghana)
- studying the results of the spread of waterborne pathogens due to frequent flooding (Bangladesh)
- better access to artificial insemination of dairy to improve food security (Kenya)
- improving seed-tuber quality in potato cultivation (Ethiopia)
- rail transportation safety between the Netherlands and China
- development of natural rubber from the roots of dandelions (Kazakhstan)
- innovative rice cultivation (India)
- working with private and public sectors to optimize sustainable business models (Indonesia)

Currently, there is still a demand for intensive export within and outside the European Union. However, such a state cannot be taken for granted considering all the efforts being made to improve production quality in the countries of moderate and poor security performance. This means that one of the future challenges on the global food market may be shifts in production and import demands in particular countries. The Dutch economy needs to be smart and be able to flexibly adjust to new scenarios. The possible decrease of export cannot result in a cut back in the economy, thus another source of income needs to be prepared on the side.

3.1.3 TRENDS THAT CALL FOR THE CHANGE

According to TiFN (n.d.), a public-private partnership for multi- and interdisciplinary research in food and nutrition, there are three global trends emerging from international research: healthy nutrition, sustainable food systems, and consumer engagement. Such an approach to future challenges is rooted in behaviorism and analyses of consumption patterns. The center reckons the following goals for the food industry to tackle:

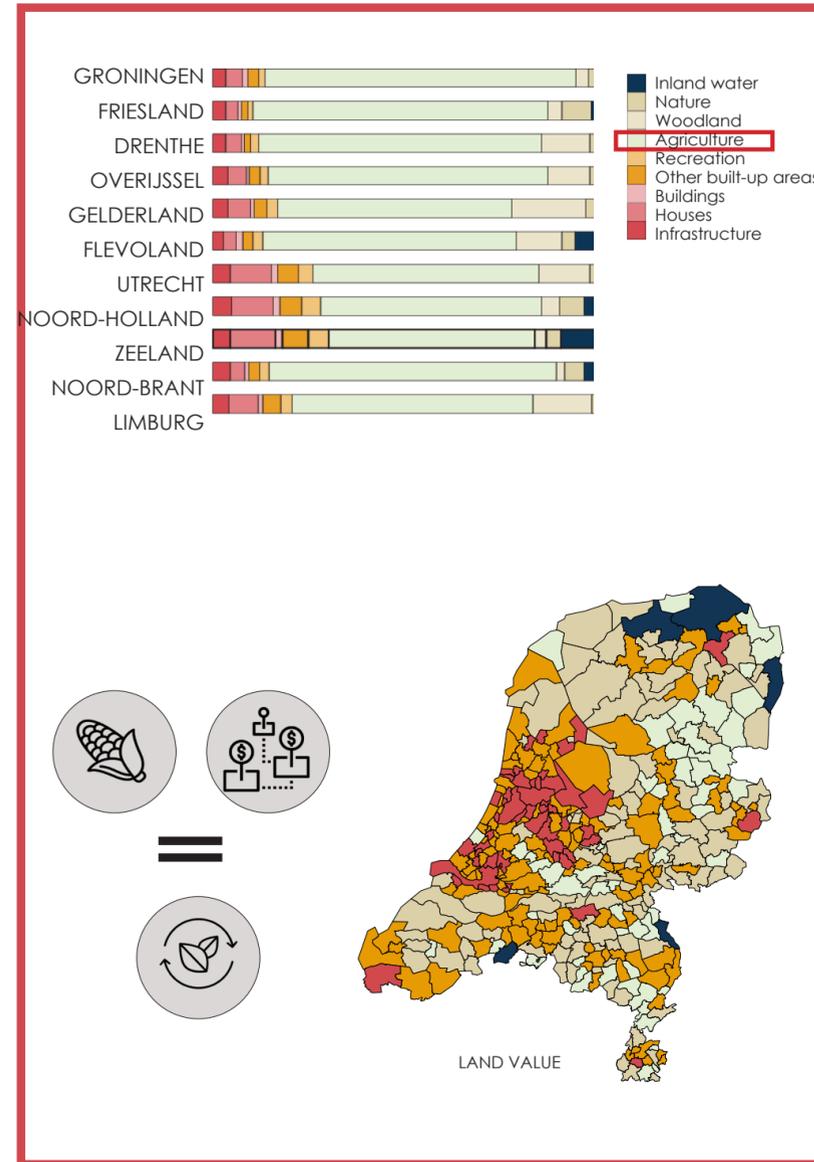
- shift in consumer behavior towards healthy and sustainable diets
- nutritional impact on specific health aspects
- nutrient balance and attractive food
- effective personalized nutrition
- regenerative farming business models
- mild processing and optimal use of biomass
- minimizing food waste
- integrated measurement and modeling of nutrition, health, and sustainability

TiFN is one of many other knowledge-based institutions, located in the so-called Food Valley. The network gathers 8,000 scientists and 1500 food agri companies (Foodvalley, n.d.). The sector is already prepared for a change in the balance of powers. One of the goals is to import less raw materials and diversify the Dutch production. The other aims towards the increased export beyond the European borders. As societies across the globe become wealthier, their expectations are also rising. On the one hand, the production sector needs to be flexible and carefully observe rising and changing demands. On the other, though, such an approach is touching a behavioral issue of consumer engagement. It could be questioned whether society should consume more just because they can. Until recently, the apparent sign of getting wealthier was always associated with increasing meat consumption. In fact, this prediction is still being valid. According to “The Emerging Geopolitics of Food” (2013), “As more and more people enter the middle class, demand for meat and dairy products will increase. (...) Globally, the Organisation for Economic Co-operation and Development (OECD)-FAO Outlook of 2012 estimates that the world will have 2.3 billion additional mouths to feed by 2050. This rise in demand will require 60% more animal feed, 1 billion more tonnes of cereals, and 200 million more tonnes of meat”. The global food sector, instead of working to meet this demand, should seek ways to reverse this tendency.

Countries of poor and moderate performance struggle with effective agriculture, which is underinvested and non-sustainable. However, such countries need to maintain trade to be able to stabilize their economy. If the Netherlands wanted to develop a more self-sufficient model of agriculture in their own country, it would probably mean more varied domestic production. It is, therefore, worth considering, how the country can still play a key role on the global market. One of the possibilities is to export technology, but more importantly – it could trade knowledge, solutions, experience, models of development or governance.

3.2 THE NETHERLANDS

3.2.1 National trends



The Dutch food sector coexists with other crucial ones, just to name chemical industry, energy, high-tech, life sciences health, logistics and water management (Holland, n.d.). It may seem that agriculture plays an important role in contributing to the national GDP, but numbers can be surprising. The Dutch GDP, according to data from 2017 (Index Mundi, 2017), consists of services (70.2%), industry (17.9%) and agriculture (1.6%). However, the food sector as such cannot entirely be placed within the agricultural frame. Its complexity lies between agricultural services and industry as well. According to "Food Economic Report 2019 of the Netherlands" (van der Meulen & Berkhout, 2020), in 2017 it participated with 7.9% to the GDP. Another statistic enhances this balance of power ("The Dutch Agri Food Tech Sector", 2019) - in 2018, 8.7% of the Dutch labor force worked in the agri-food sector. This is an impressive number, but it also makes the sector vulnerable. Any shift in powers or even natural disasters may tremendously affect the industry.

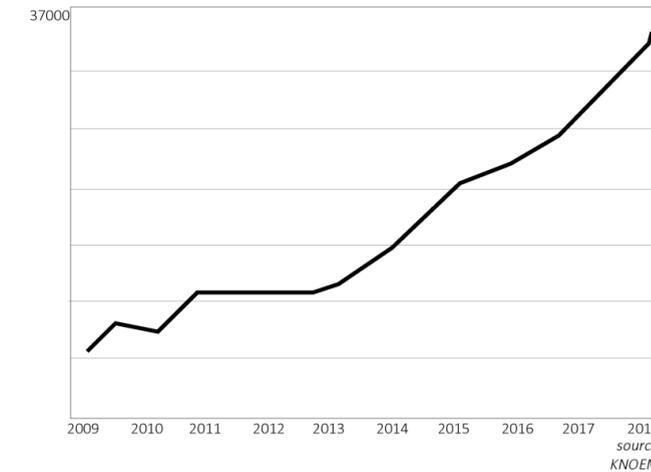
Agriculture is also interesting spatially. Whereas the service sector, usually associated with urban areas, is less space demanding, the agricultural one, associated mostly with rural and open fields, occupies the majority of land - 1.82 million ha ("Food Economic Report 2019 of the Netherlands", 2020). In the same time it is known for its efficient cultivation per square meter. This allows an early hypothesis concerning more compact land use in the future with not a big harm for the economy.

Interestingly, land use analyses may tell a lot about the Dutch approach as a nation. The country is known for its equal and just consideration of matters, people, development, etc. It would be too idealistic to say that it works as good in practice as it sounds in theory, but by looking at a bigger picture, this approach is certainly true. Each province in the Netherlands possesses a considerable amount of agricultural land, but its size may vary. Whilst in Drenthe it stands for 70.4%, in South Holland, it is only 48.1% (Waar Staat je Provincie, n.d.). There is another tendency which says that the bigger the amount of agricultural land in a province, the lower its value. Surprisingly, the western part of the country (including the province of South Holland), giving away nearly half of its space to food production, is having relatively cheap lands (57,800 euros / ha), compared to provinces of the south, with agricultural land values reaching 70,500 euros / ha ("The Dutch Agri Food Tech Sector", 2019). This tendency may be unexpected especially due to close proximity to the Port of Rotterdam, Food Valley and highly extensive and innovative production.

In our strategy, the land investigation across the country is reasonable due to spatial, economic and social justice. As South Holland is the subject of the project, it is important to formulate a proposal, which would not stand in contrast to the national policy. There is already some injustice seen when comparing land value, job opportunities and migration between the provinces (Rijksoverheid, n.d.). It is rhetorical to ask, whether agricultural lands in the northern part offer the same opportunities as South Holland. However, current spatial capabilities may allow for the increasing attractiveness of undeveloped regions by implementing South Holland's model. The analyses already proved that the Netherlands can accommodate more intense agriculture occupying smaller surfaces. For the country, compact food production would mean freeing valuable land for ecological succession, just to name reforestation amongst many other actions. This is an important factor that must be taken into consideration. Compared to other European countries, the Netherlands suffers from a scarcity of forests and natural reservoirs - in a cross-section, the numbers vary between 4.8% and 22.4% (6.6% for South Holland) of total land use in provinces (Waar Staat je Provincie, n.d.). To provide a safer environment, one of the challenges will be to restore nature and minimize the negative effect of agriculture.

THE GROWING NEED FOR ARGRI-FOOD

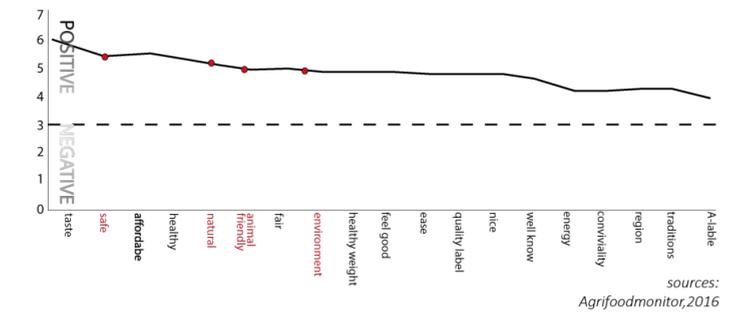
ZUID-HOLLAND POPULATION



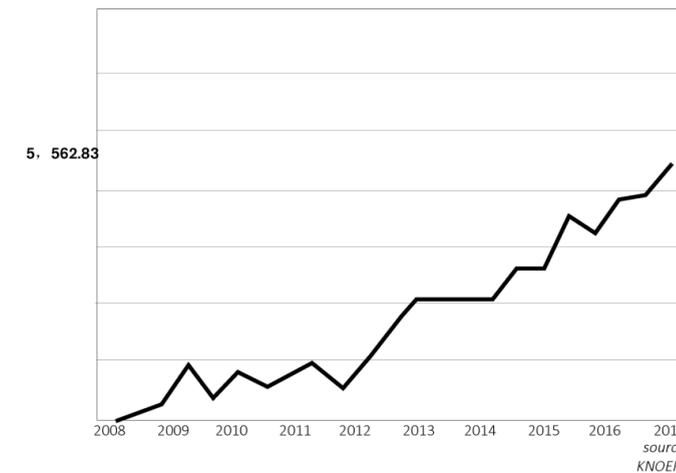
3,681,044

The growing population, especially the increasing proportion of the middle class lead to increasing demand for nutrients needed for food production. 4.5 million tonnes of food in the chain, 1.3 million tonnes of food is needed to feed the 1.6 million households in the province. + As there will be 70,300 more households before 2050.

IMPORTANCE OF VALUE IN MAKING FOOD CHOICE



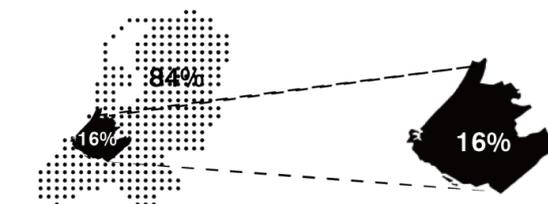
ZUID-HOLLAND AGRICULTURAL OUTPUT



5,662.83 MILLIONS OF EURO

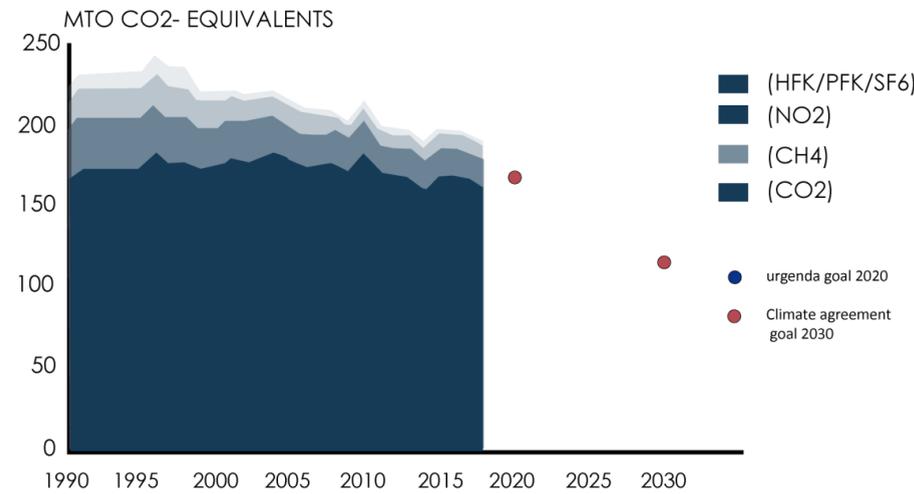
In 2017, agricultural output for Zuid-Holland was 5,562.83 millions of euro. Agricultural output of Zuid-Holland increased from 4,280.21 millions of euro in 1998 to 5,562.83 millions of euro in 2017 growing at an average annual rate of 1.44%

16% OUTPUT OF AGRICULTURE IN SH



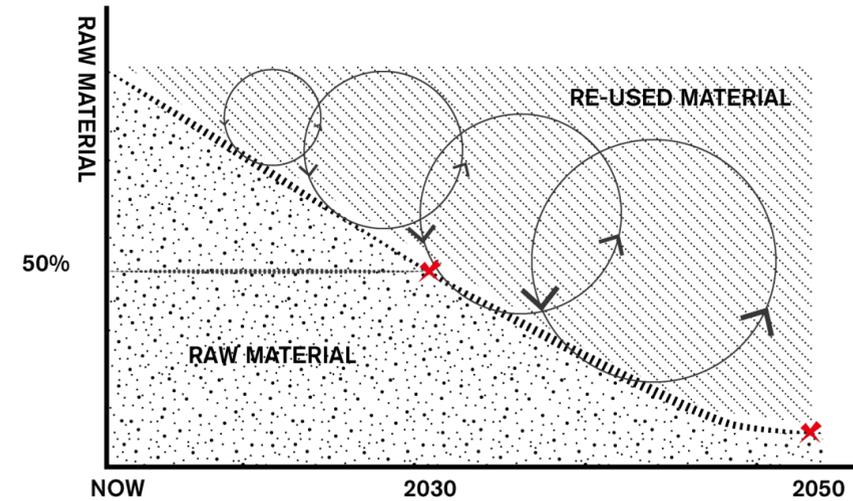
3.3 THE SOUTH HOLLAND CONTEXT

CHALLENGE & AMBITIONS FOR DECREASING THE WASTE



Reference: <https://staatvan.zuid-holland.nl/>
Illustrated by authors

In the NSL, the number of road kilometers is calculated each year with the future limit value for nitrogen dioxide being exceeded. This mileage decreases every year. This concerns the sum of provincial, state and municipal roads. In 2017, this number decreased to 1.5 km. The health effect of air pollution is expressed in the number of people exposed to concentrations of nitrogen dioxide above the limit value. This number has fallen sharply in recent years. The target of no exposed people in 2015 has almost been achieved. These are calculated numbers that are surrounded with some uncertainty. There are no more exceedances for fine dust. Since last year, the number of concentrations exposed to concentrations has also been given slightly below the limit value.



Ambitions: The ambition of the government is to 2030 together with social partners (between) to achieve target of 50% less use of primary raw materials (mineral, fossil and metals). Raw materials are used efficiently in 2050 and re-used without harmful emissions to the environment

Limits of South Holland

South Holland, according to the European Commission (2019), in 2017 participated in the country's GDP with 21.4% GDP. That means that 1/5 of the country's Gross Domestic Product per capita relies on the province. Such a dynamic economy demands new job opportunities, spatial configuration, housing, etc. Opportunities for any other province, for South Holland mean constraints. Because of the attractiveness, many people migrate to the region for work. The province tries to offer variety but has limited space to accommodate diversified landscapes and qualities. Thus, several patches are competing with each other, having sometimes contrary interests. Urban areas overlap with peri-urban and rural ones, but the latter are highly productive. If the rural patches commonly would be associated with idyllic, peaceful lands, in South Holland are an incubator of dynamic production, processing, and shipping. What they are not, is a plausible environment to enjoy nature. The production came with the cost of almost no forests or protected nature. Currently, the province works on renaturalization of several spots, but such actions are reactive, not proactive, and they already mean negotiations with stakeholders, as the land is precisely planned and facilitated.

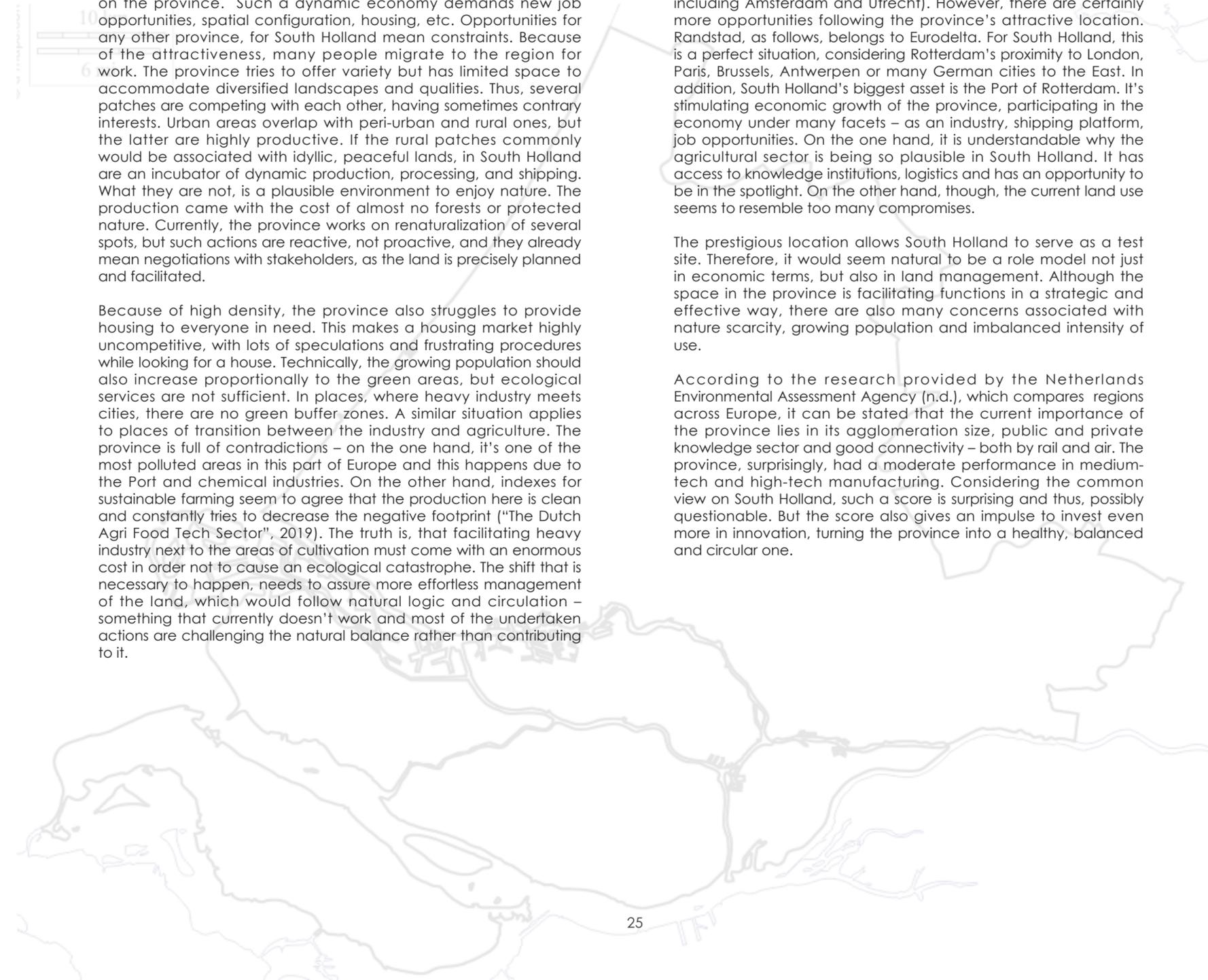
Because of high density, the province also struggles to provide housing to everyone in need. This makes a housing market highly uncompetitive, with lots of speculations and frustrating procedures while looking for a house. Technically, the growing population should also increase proportionally to the green areas, but ecological services are not sufficient. In places, where heavy industry meets cities, there are no green buffer zones. A similar situation applies to places of transition between the industry and agriculture. The province is full of contradictions – on the one hand, it's one of the most polluted areas in this part of Europe and this happens due to the Port and chemical industries. On the other hand, indexes for sustainable farming seem to agree that the production here is clean and constantly tries to decrease the negative footprint ("The Dutch Agri Food Tech Sector", 2019). The truth is, that facilitating heavy industry next to the areas of cultivation must come with an enormous cost in order not to cause an ecological catastrophe. The shift that is necessary to happen, needs to assure more effortless management of the land, which would follow natural logic and circulation – something that currently doesn't work and most of the undertaken actions are challenging the natural balance rather than contributing to it.

Potential of South Holland amongst other regions

South Holland is located in the heart of the Netherlands. The Hague-Rotterdam Metropolitan Area belongs to the bigger organism called Randstad (economic metropolitan region including Amsterdam and Utrecht). However, there are certainly more opportunities following the province's attractive location. Randstad, as follows, belongs to Eurodelta. For South Holland, this is a perfect situation, considering Rotterdam's proximity to London, Paris, Brussels, Antwerpen or many German cities to the East. In addition, South Holland's biggest asset is the Port of Rotterdam. It's stimulating economic growth of the province, participating in the economy under many facets – as an industry, shipping platform, job opportunities. On the one hand, it is understandable why the agricultural sector is being so plausible in South Holland. It has access to knowledge institutions, logistics and has an opportunity to be in the spotlight. On the other hand, though, the current land use seems to resemble too many compromises.

The prestigious location allows South Holland to serve as a test site. Therefore, it would seem natural to be a role model not just in economic terms, but also in land management. Although the space in the province is facilitating functions in a strategic and effective way, there are also many concerns associated with nature scarcity, growing population and imbalanced intensity of use.

According to the research provided by the Netherlands Environmental Assessment Agency (n.d.), which compares regions across Europe, it can be stated that the current importance of the province lies in its agglomeration size, public and private knowledge sector and good connectivity – both by rail and air. The province, surprisingly, had a moderate performance in medium-tech and high-tech manufacturing. Considering the common view on South Holland, such a score is surprising and thus, possibly questionable. But the score also gives an impulse to invest even more in innovation, turning the province into a healthy, balanced and circular one.



3.3.1 PATCHES AND INFRASTRUCTURE

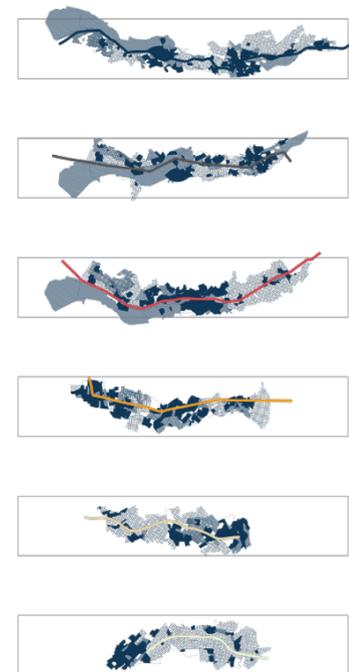
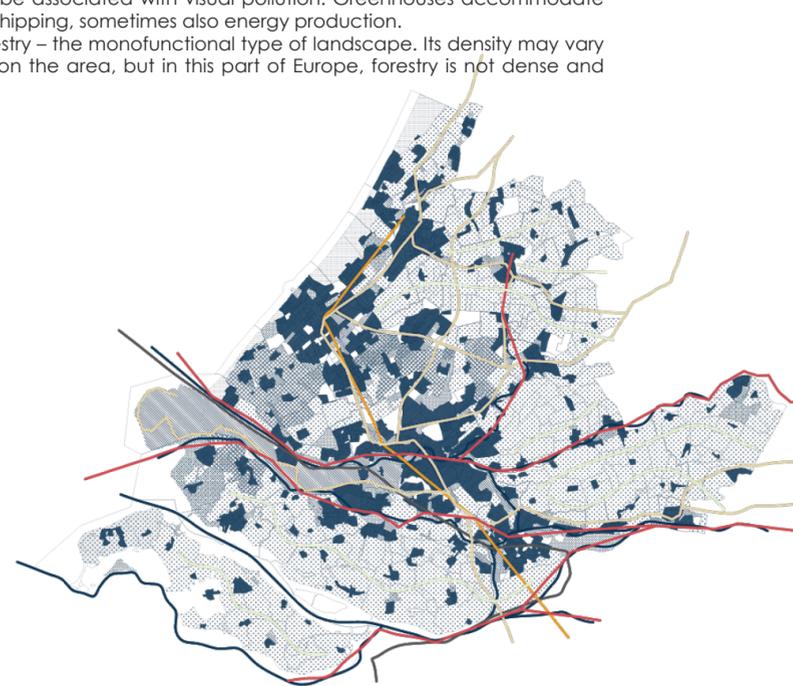
South Holland is structured based on repeatable patches, or in other words – particular landscapes accommodating certain typical functions. Such a description, of course, is a simplification that can only be introduced on a macro scale. Some of these patches may seem to be quite monofunctional and equal, whereas others diversified. They are characterized by different densities, demographics, and flows, but their dominating features can draw a simplified profile. Based on such assumptions, it is possible to recognize the following patches:

- Industry – its landscape is dynamic, vertical and associated with visual pollution. In most of the cases, it's located on the riverbanks, but also inside the cities or on their outskirts. Industrial patches are home to such organic functions as energy production, waste processing, shipping or storage.
- Urban Area – the most diversified landscape, spread both vertically and horizontally. It's highly dynamic and accommodates functions concerning living, working, leisure and production. Urban areas are privileged in terms of accessibility to the food sector, as most of the supporting functions are located there. They include storage, processing, manufacturing, distribution, and consumption, but also waste management. They have a high potential for circularity that can be run within the frames of these areas.
- Agriculture – rural, equal landscape, associated with open fields, low density, and statics. Agriculture is home to the cultivation of plants and animals, their processing and storage on-site, but also shipping. While the majority of processes take place in the cities, the rural areas are missing some facilities on-site that would contribute to the local circularity. Such spatial injustice leads to resource losses during transportation – question that both applies to energy supply or agricultural goods.
- Greenhouses – the rural and peri-urban landscape of the dense built environment. These patches are monotonous and monofunctional and can as well be associated with visual pollution. Greenhouses accommodate cultivation, shipping, sometimes also energy production.
- Forestry – the monofunctional type of landscape. Its density may vary depending on the area, but in this part of Europe, forestry is not dense and widespread.

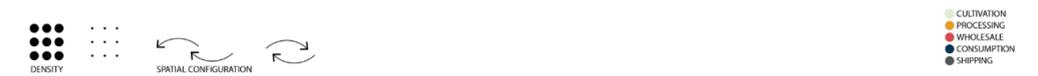
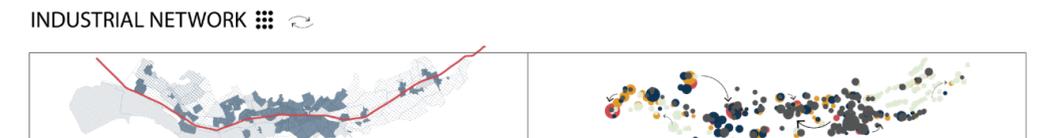
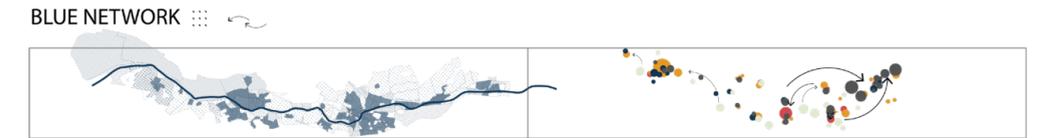
- Nature – both urban and rural, horizontally organized landscape associated with ecological services. Most of the time it's static, but some areas may introduce certain dynamics linked to energy production or water management.

On a meso scale, these main patches overlap each other, creating places of transition and interaction. Urban landscape, while meeting agriculture, usually reflects in peri-urban areas. In this case, we could talk about the blurred transition. Sometimes, though, the edge is sharp as it happens between the industry and urban areas. This is certainly South Holland's spatial limitation.

What sews together the following patches, are the corridors of infrastructure, in other words – networks. Not always infrastructure connects landscapes; sometimes it may also cause spatial and functional disconnections. In such a dynamic region, there is a whole variety of networks. Few, particularly interesting and important, can be outlined:



b.Functions around infrastrucural corridors



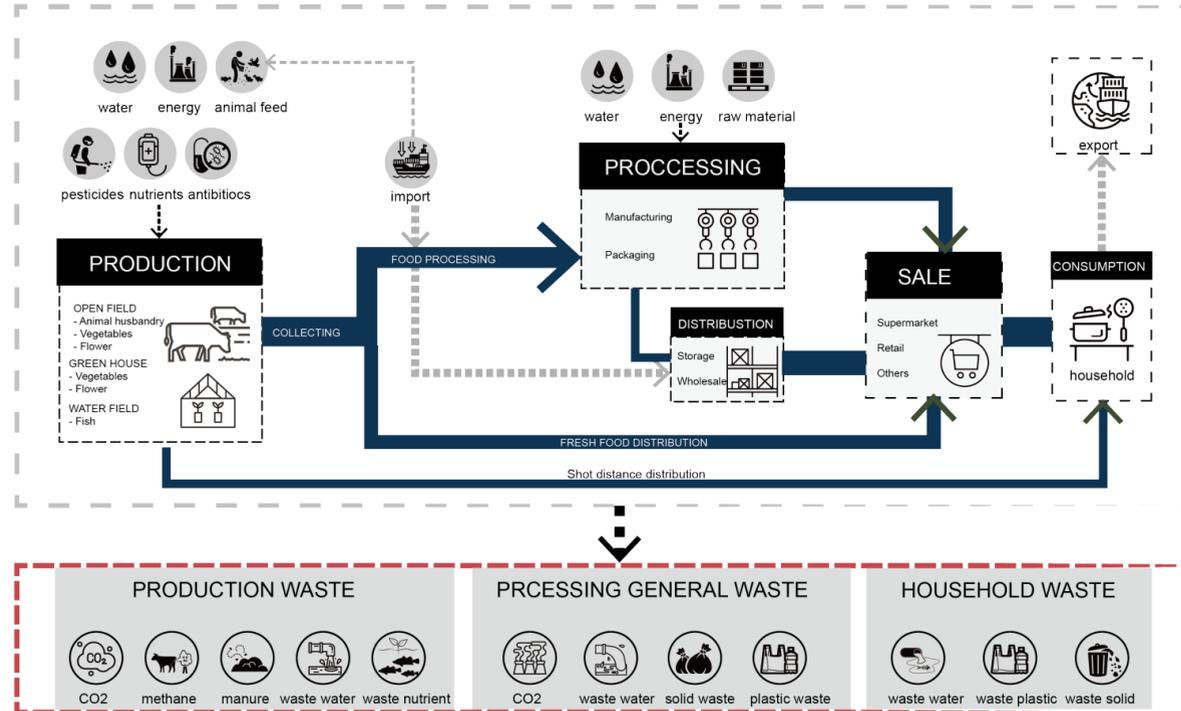
3. 3 INVESTIGATION SOUTH HOLLAND REGION

3.3.2 GENERAL ORGANIC SECTOR

FROM LINEAR TO CIRCULAR

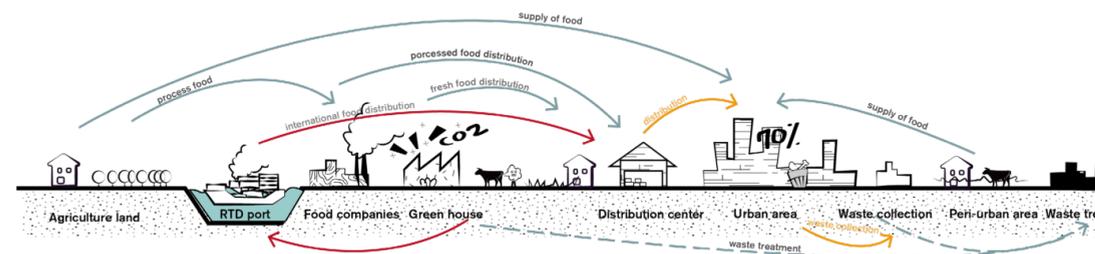
THE SYSTEM IS WASTEFUL

According to the Food and Agriculture Organization of the United Nations (FAO), roughly one third of the food produced in the world for human consumption every year — approximately 1.3 billion tonnes — gets lost or wasted. Furthermore, growing populations and rapid urbanisation in emerging economies could lead to a significant rise in organic waste generation and its associated negative impacts. Indeed, by 2025 emerging economies are expected to generate 70% of global waste. At present, 60% of this total is organic, the primary generators of methane, and 80% of collected waste is disposed of in open dumps or sub-standard landfills.



NUTRIENT FLOWS ARE DISRUPTED

The food system is overwhelmingly linear – it does not cycle nutrients effectively. Modern agricultural practices, such as excessive tillage and the use of heavy machinery, accelerate erosion and water runoff, carrying nutrients out of the soil and into water systems.



Reference: Illustrated by authors

FROM LINEAR TO CIRCULAR

The circular organic sector has three main objectives

1. Provide a diagnosis of current organic sector

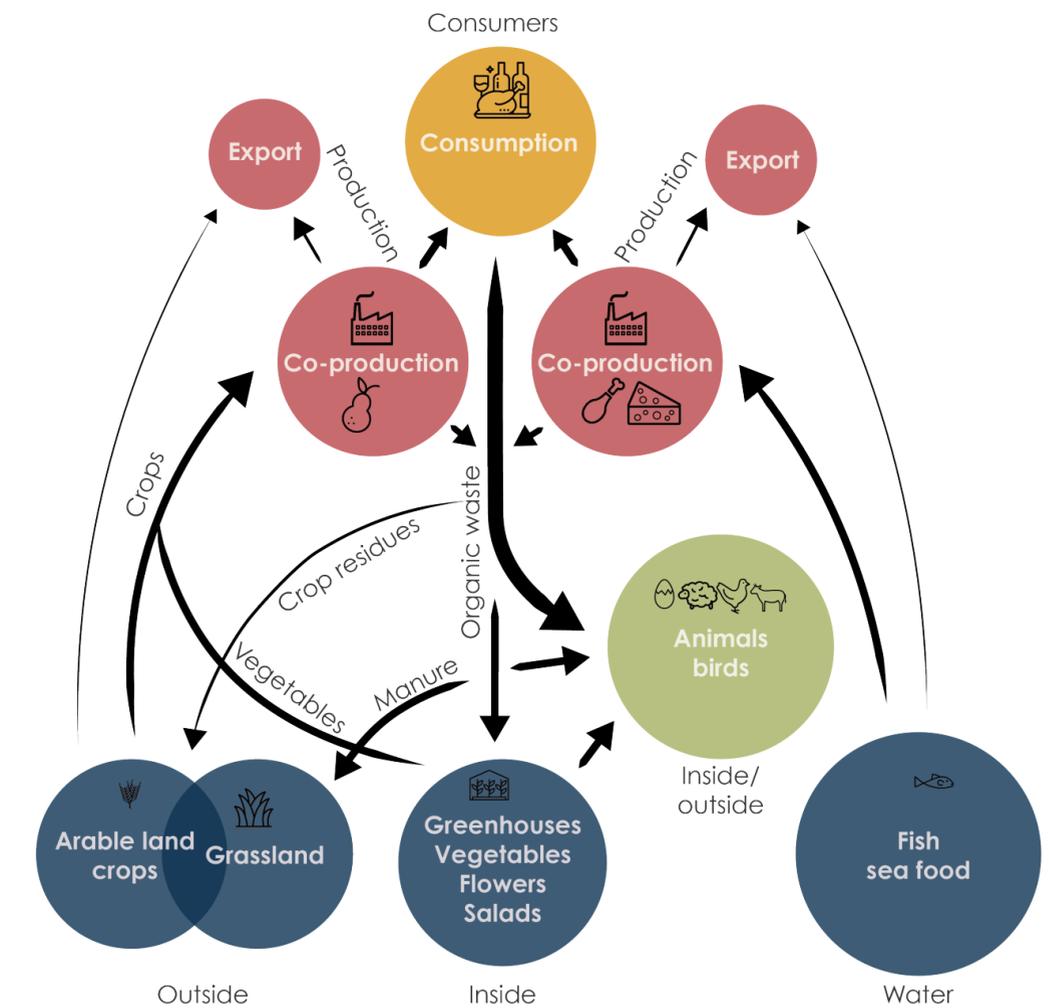
This will be achieved through examining the environmental social and economic issues embedded in today's organic sector. The research will aim to provide a new synthesis of the challenges of the current linear food system, including projection of the risk in the landscape as usual pathway.

2. Create the design for a restorative and regenerative system

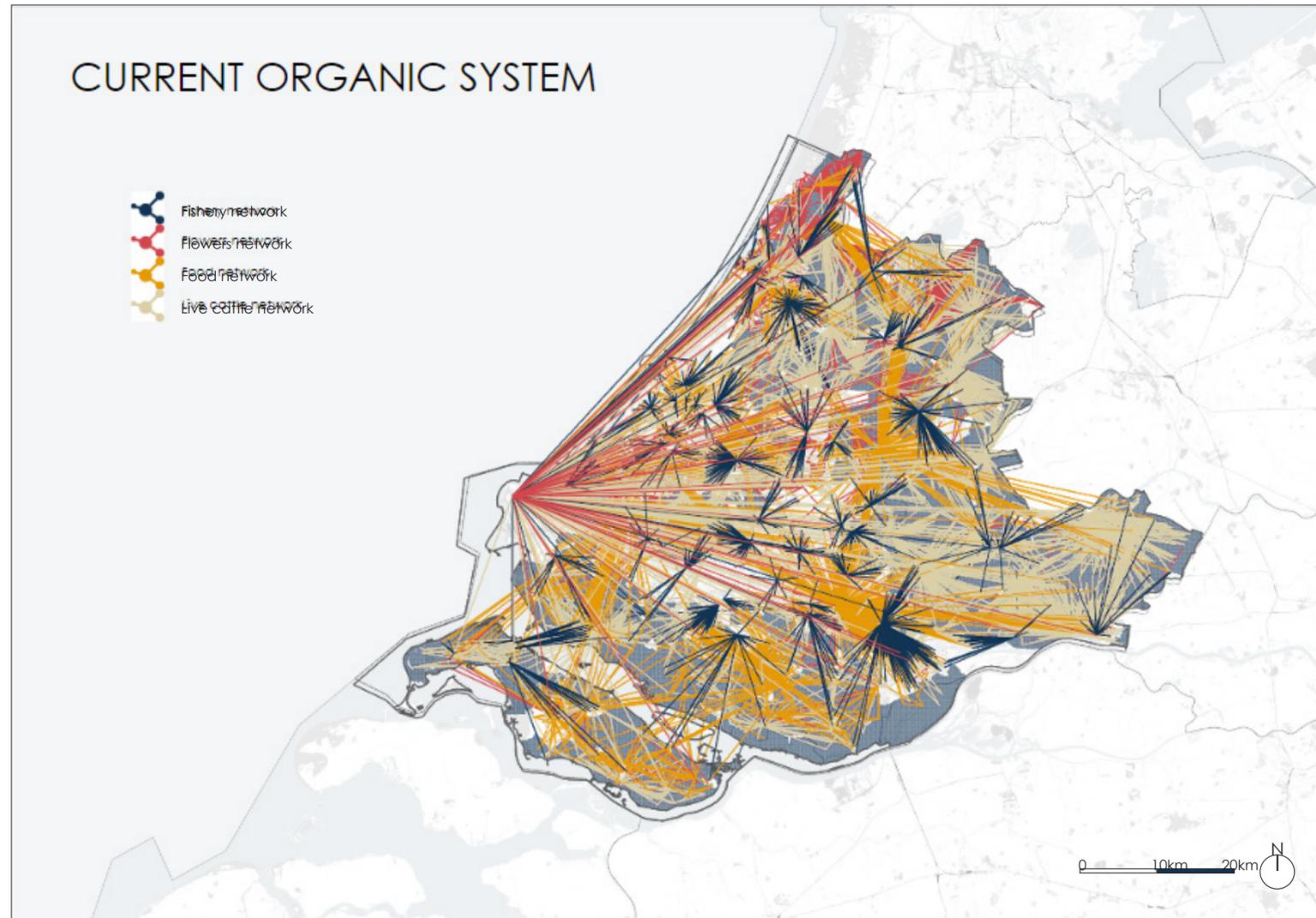
By adapting policy options, innovation scaling and public-private collaboration. This will be underpinned by analyses of both economic conditions required to achieve the change and the opportunities arising from them.

3. Start implementing change through the consortium of key actors

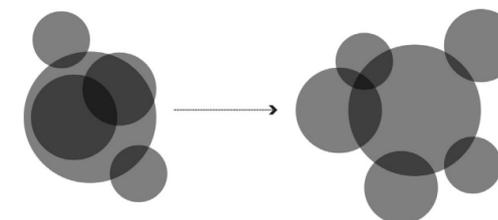
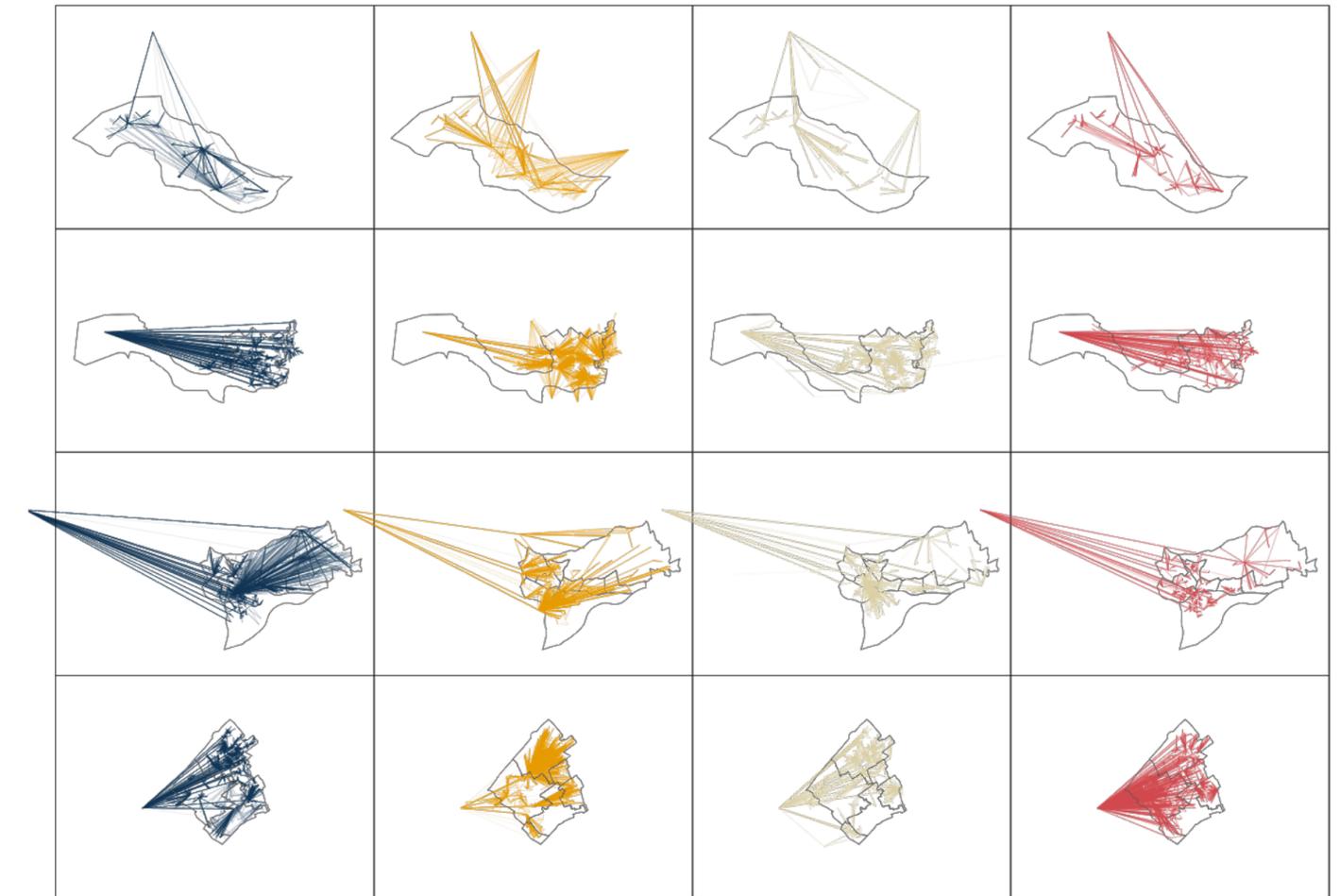
Who will be assembled not only to participate in the analysis and review of the report, but also to actively in phase and mobilise the subsequent initiatives and prototypes.



FLOWS MAP IN THE REGION

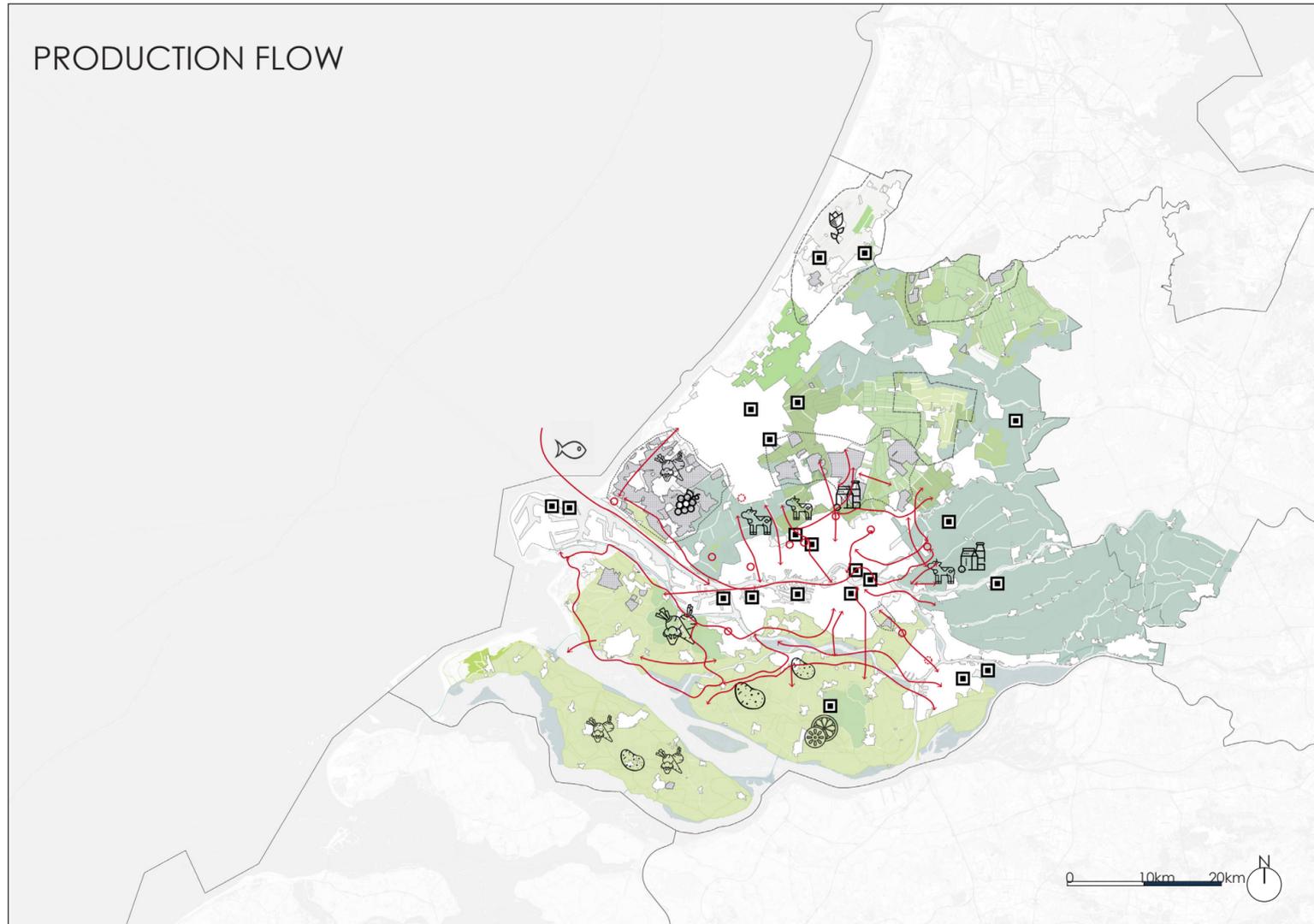


EXISTING FLOWS



Although South Holland consists of repeatable configuration of patches, many of them still belong only to the general organic system. This is due to the fact that the distribution of facilities for certain stages of production is not always fair. Urban areas are generally hubs for production and waste processing, but they cannot facilitate cultivation etc. Some flows, depending on location, are very space consuming and demand long distances. Moreover, power, gas, organic and waste water management are also not fairly distributed. The overall situation leads to very spread network, where urban areas seem to be more privileged, but rural have higher future potential for circularity. The goal would be to fill the gaps with missing facilities to be able to create local loops, which then will be connected to a bigger, provincial one.

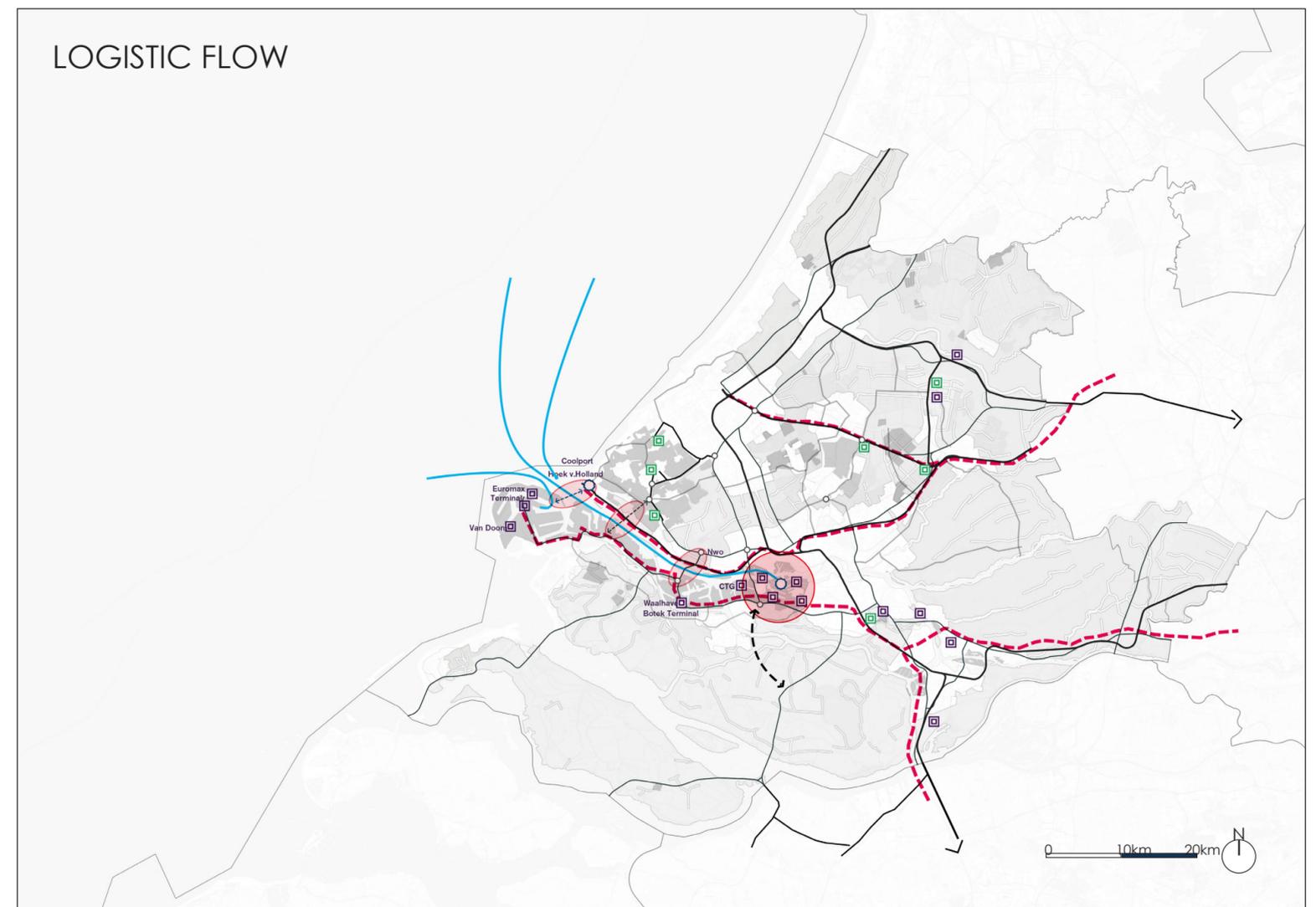
FLOWS MAP IN THE REGION



There are 4.6 million tonnes of products from this chain. Approximately 1.3 million tonnes of food is needed to feed the 1.6million households in the province. 48% of the local agriculture land is used for producing animal feed, and rest of the cattle feed is imported.

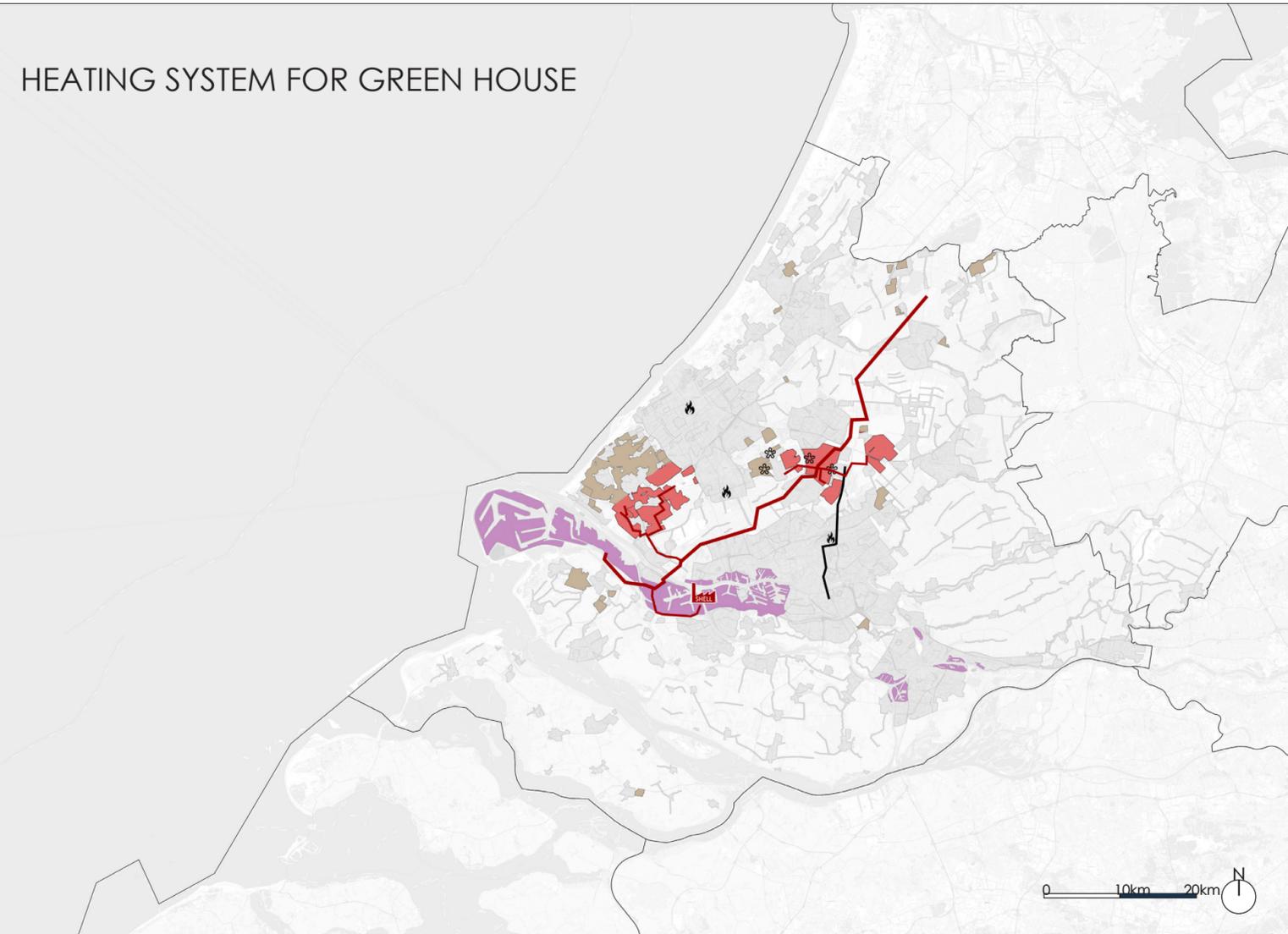
Reference :van der Schans, J. W., Vader, J., Ruijs, M. N. A., van Bergen, J., Kolpa, E., Aaftink, R., ... & Boddeke, J. (2016). Ruimtelijke verdien capaciteiten Greenport Westland-Oostland. Van Bergen Kolpa Architecten.
illustrated by authors

- open land for agriculture
- Green house
- Logistic center
- Logistic flow



Reference :PZH_2019_Omgevingsvisie_Zuid-Holland_Concept
illustrated by authors

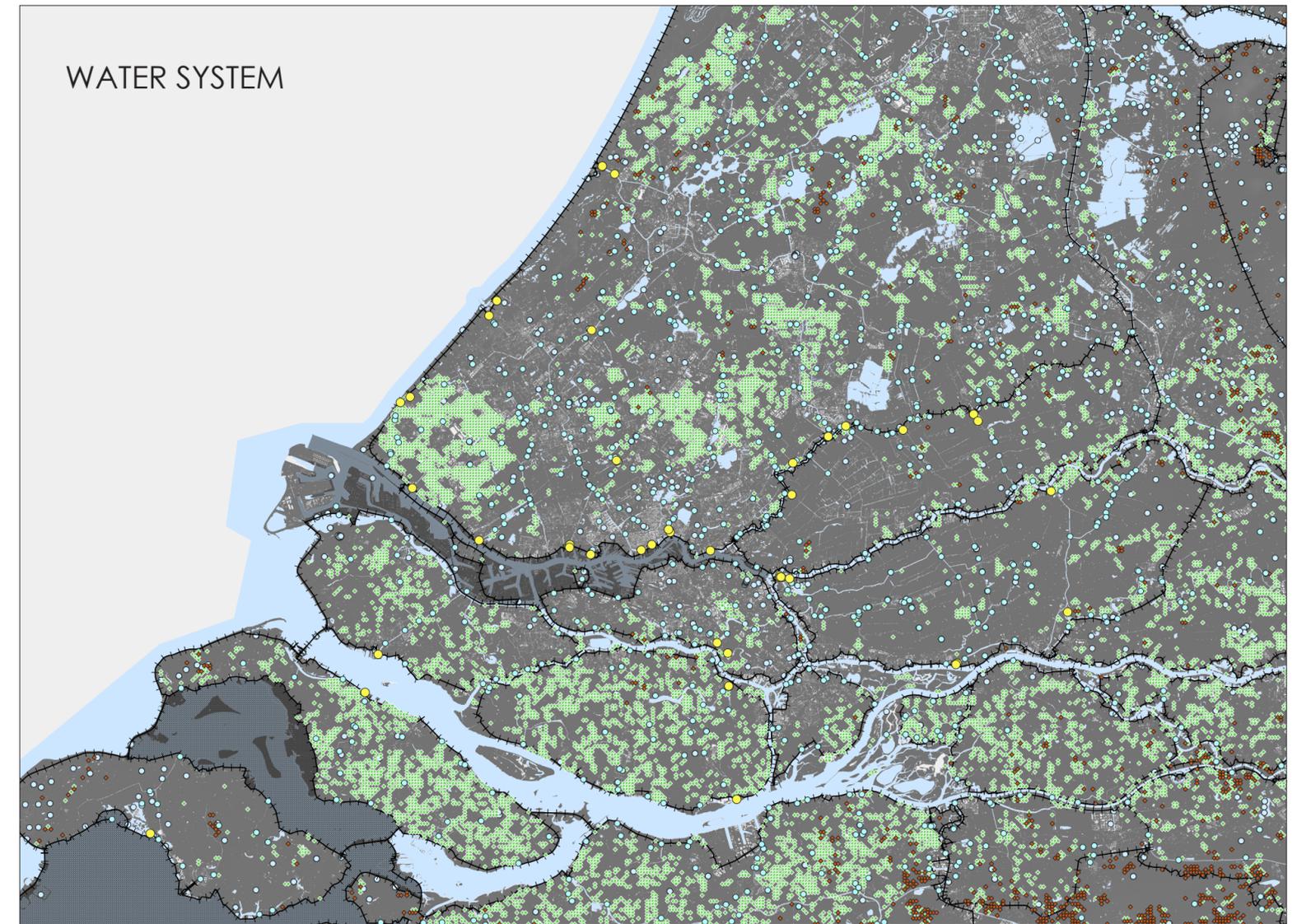
FLOWS MAP IN THE REGION



The 48 petahoules of natural gas consumed by green horticulture in South Holland area equivalent to the gas consumption of more than 1.2 million households. Green house horticulture emits 73% of the direct emissions in South Holland agriculture through the burning gas.

Reference :van der Schans, J. W., Vader, J., Ruijs, M. N. A., van Bergen, J., Kolpa, E., Aaftink, R., ... & Boddeke, J. (2016). Ruimtelijke verdien capaciteiten Greenport Westland-Oostland. Van Bergen Kolpa Architecten. illustrated by authors

- Green house horticulture
- Industry CO2 provider
- CO2 Discharges
- District heating

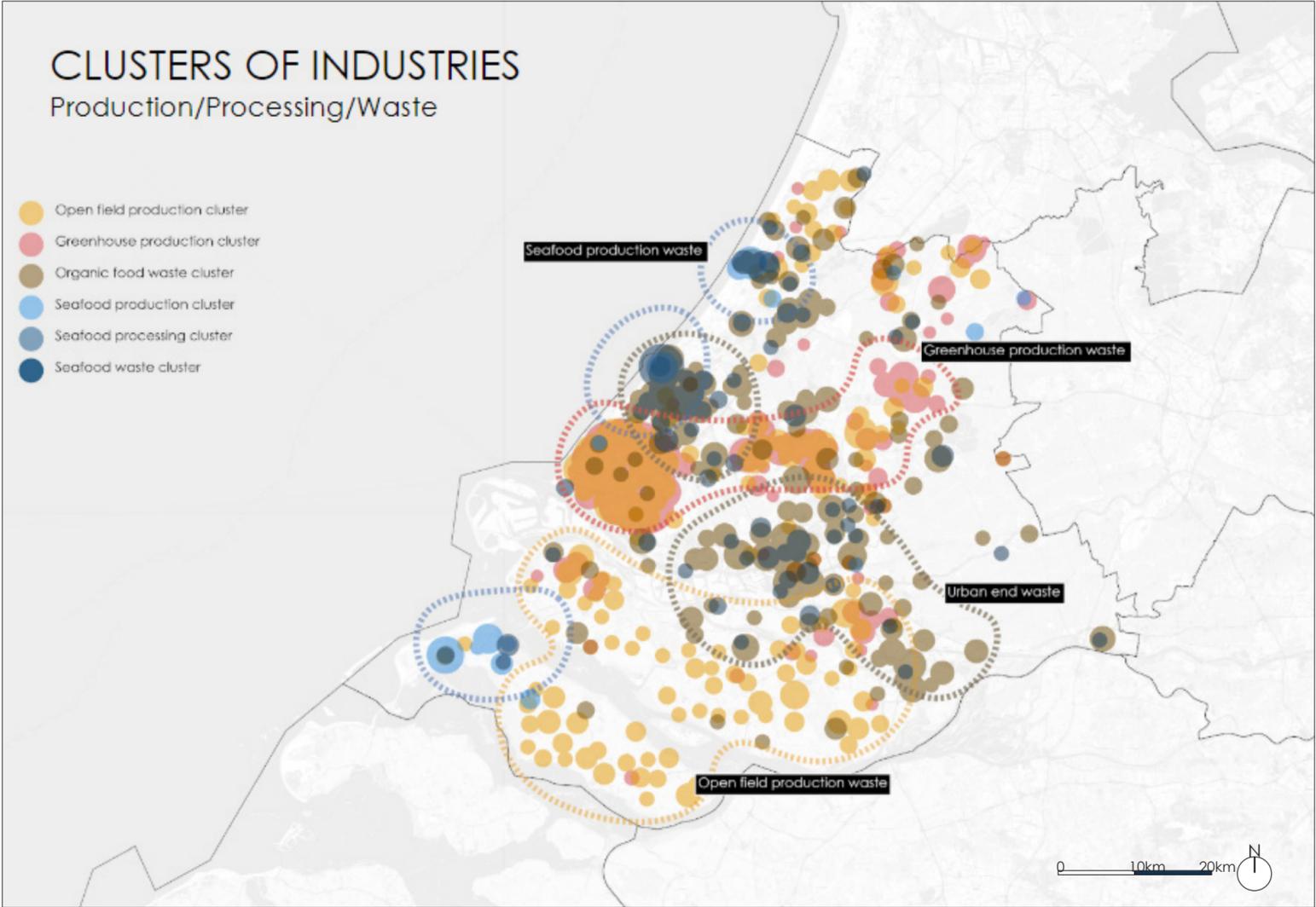


The water system of South Holland, showing where water is pumped and where which types of water is being utilised.

Reference : based on data from Deltares. Illustrated by authors

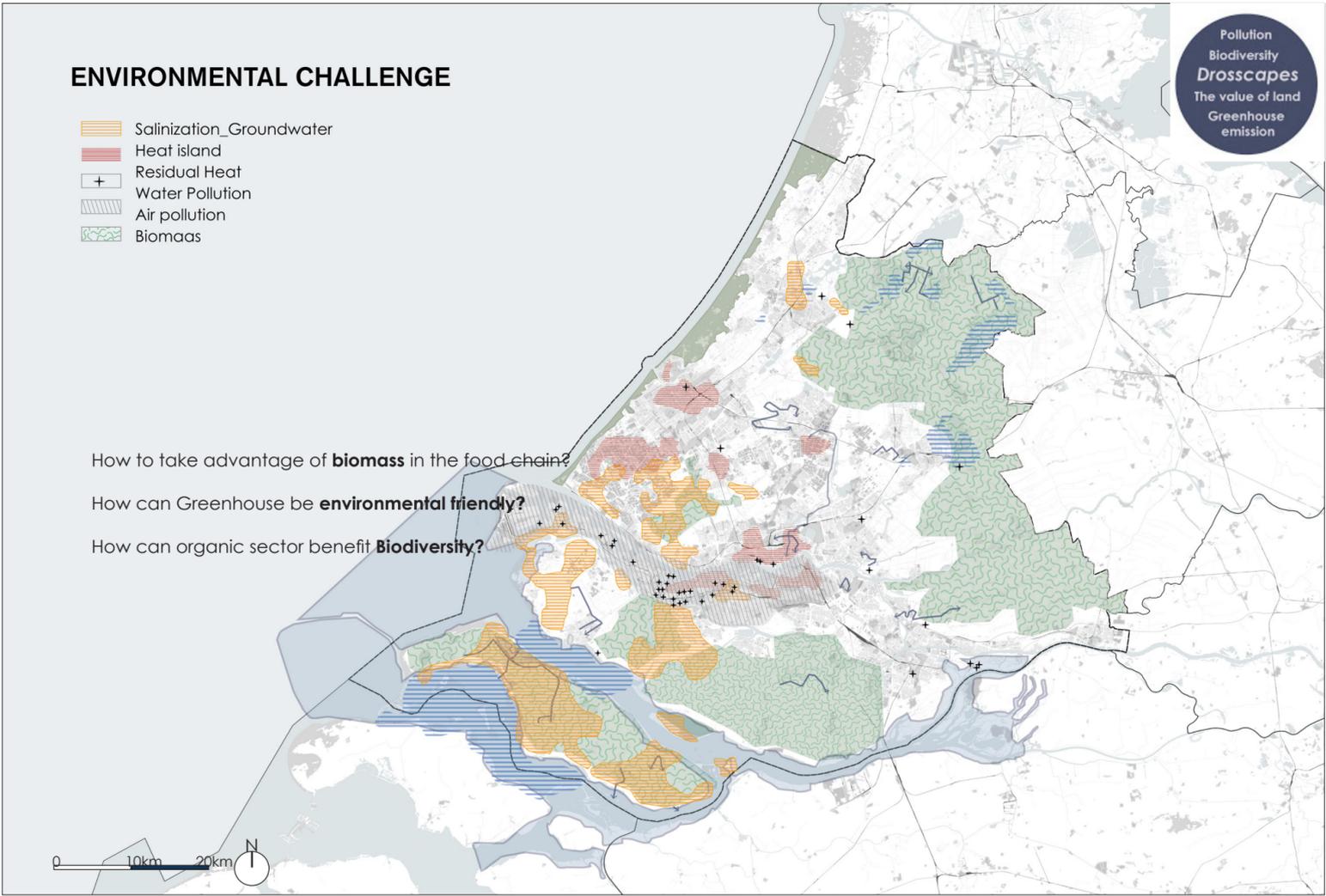
- Primary pumps
- Secondary pumps
- Ground water
- Surfacewater
- Salination
- Salt water

CLUSTERS OF FOOD INDUSTRIES



Reference: data from LISA
illustrated by authors

IMPACTS & CHALLENGES

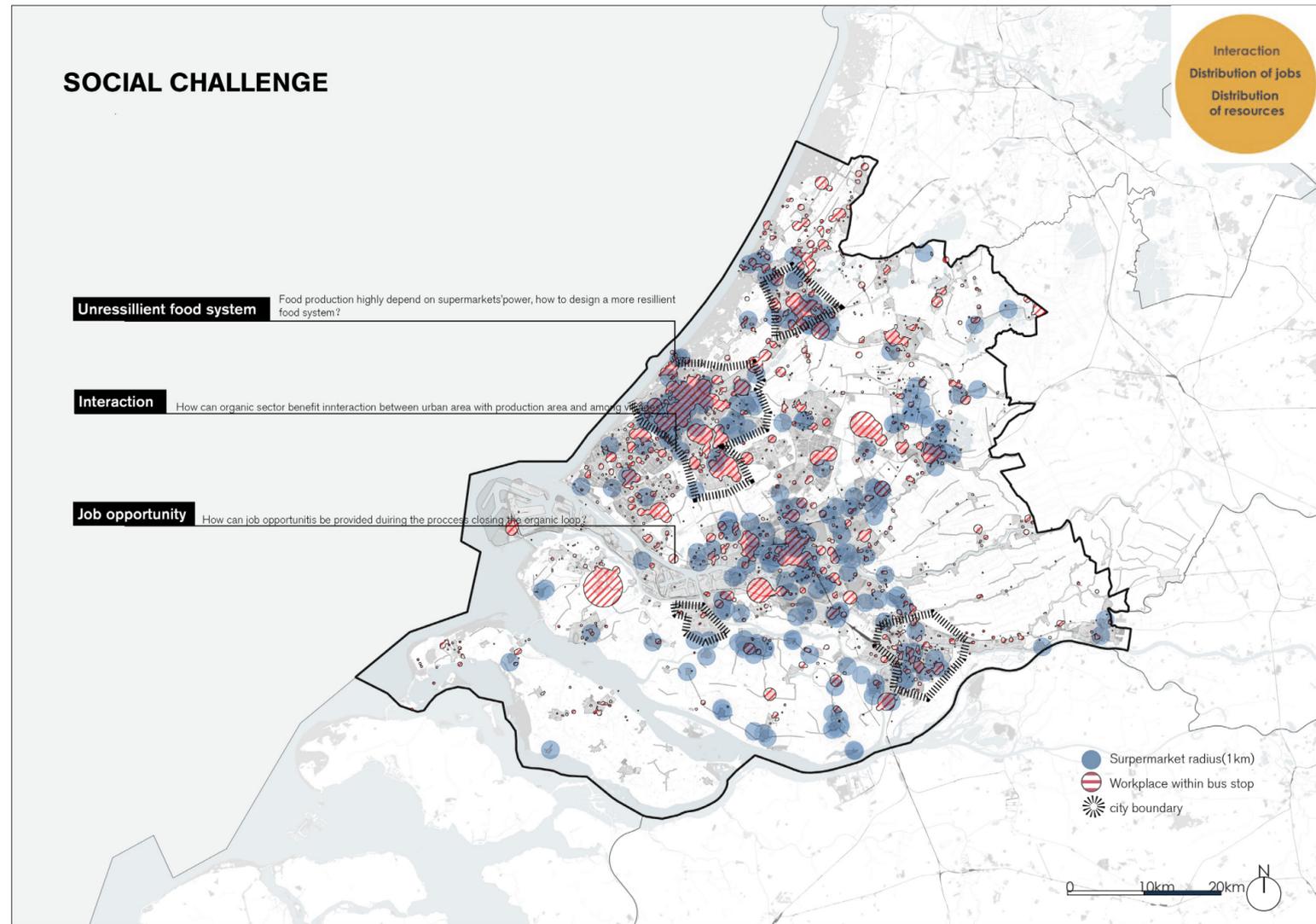


Reference: data from EDU GIS
illustrated by authors

THE SYSTEM CONTRIBUTES TO ENVIRONMENTAL DEGRADATION

Industrialised farming practices and long distance transport have negative environmental externalities across the value chain (FAO). Many agricultural industries would be unprofitable if such externalities were priced in. These externalities include: land degradation, salinization, biomass waste, fertiliser run-off from agricultural land.

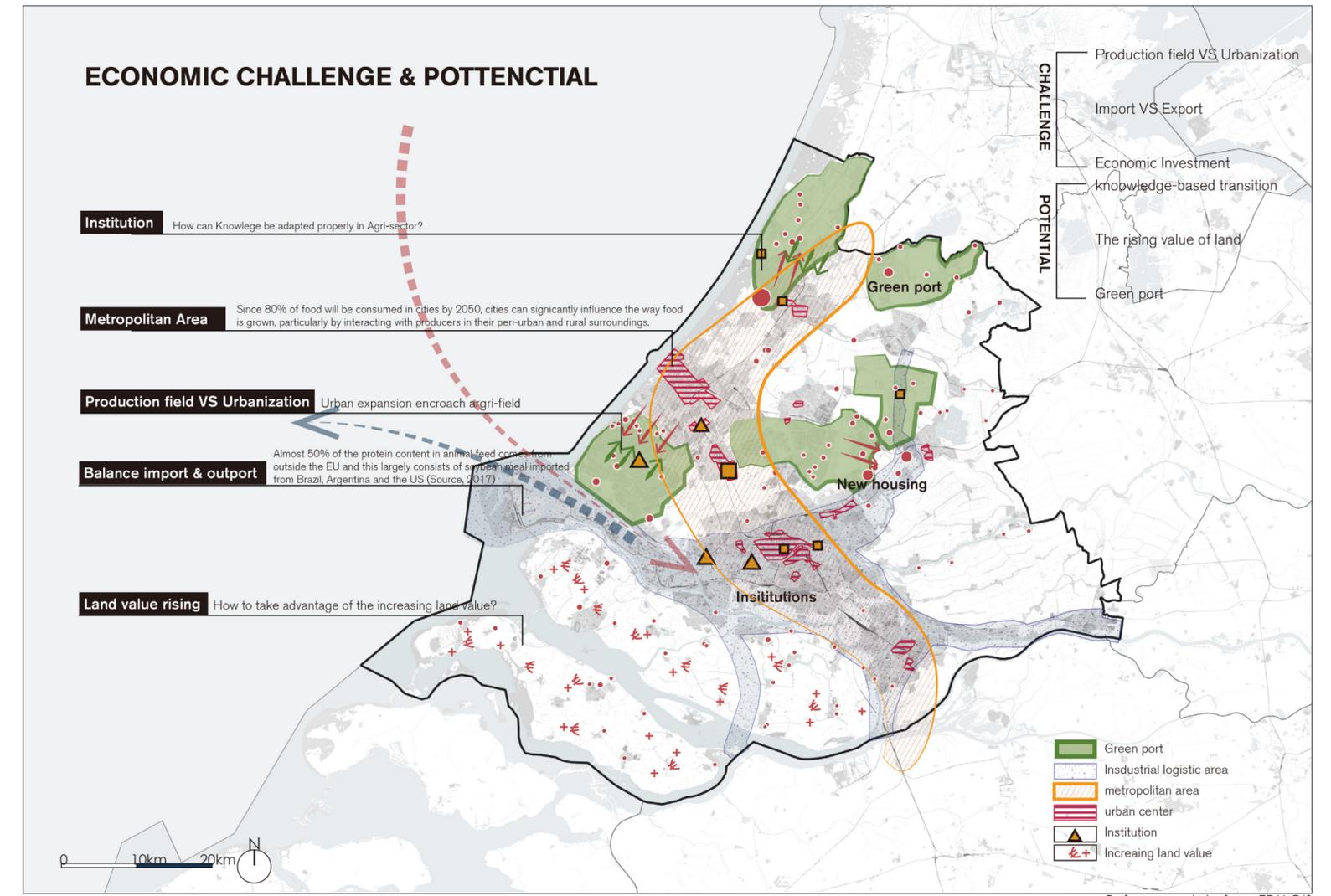
IMPACTS & CHALLENGES



SOCIAL CHALLENGE IN FOOD CHAIN

This topic refers to justice in food chain. By applying flow questions we have a more clear vision about what we want to achieve contributing a justice food chain.
 -Food production highly depend on supermarkets power, how to design a more resilient food system?
 -How can organic sector benefit interaction between urban area with production area?
 -How can more job opportunities be provided during the process of closing the loop?

IMPACTS & CHALLENGES

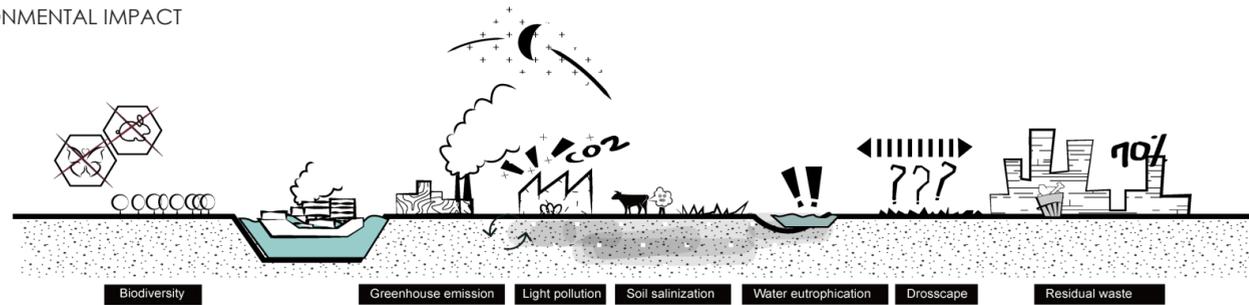


ECONOMIC CHALLENGE IN FOOD CHAIN

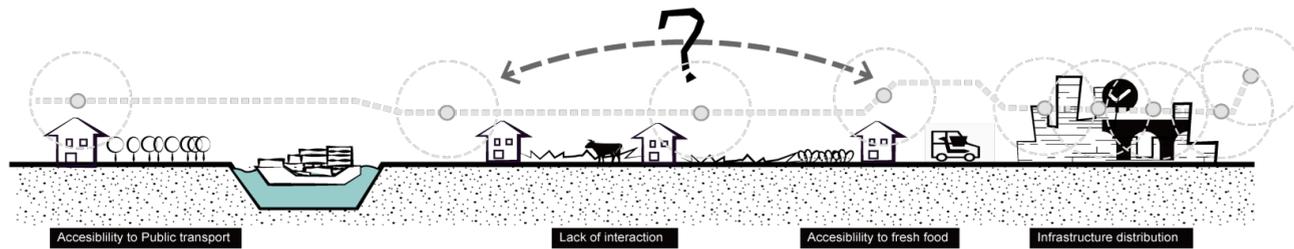
This topic mainly focus on the economic potential which reflected on spatial environment.

IMPACTS & CHALLENGES SECTION

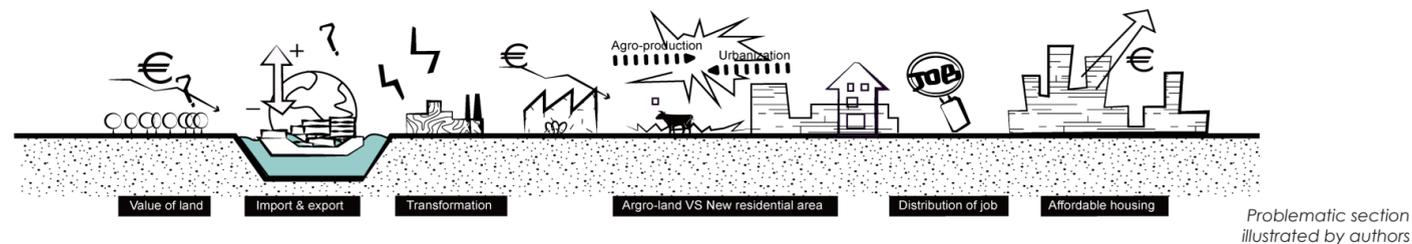
ENVIRONMENTAL IMPACT



SOCIAL JUSTICE



ECONOMICAL CHALLENGE

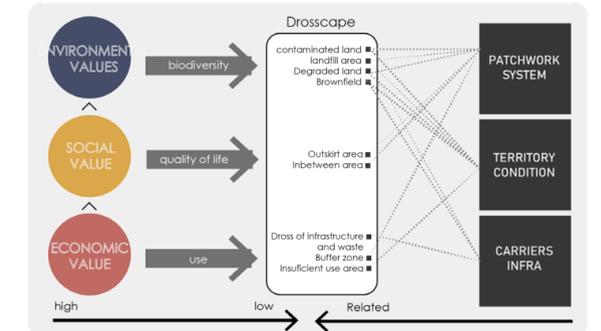


Looking at it through the scope of strong sustainability, the organic sector comes with its own set of challenges. (From an environmental perspective; there are pollution, biodiversity challenges)
 We asked how can the greenhouses be environmentally friendly? How can the organic sector benefit biodiversity? from the perspective of environmental challenges
 (Some socially challenges such as the distribution of jobs arise.)
 How can organic sector provide more job opportunities and get more people involved in the food chain? from the perspective of social challenges
 (And then the economic challenges, related to for example urban growth.)
 How can we deal with the expansion of the built environment within this region? from the perspective of economic challenges

3. 3 INVESTIGATION SOUTH HOLLAND REGION

3.3.3 DROSSCAPE

In our approach, drosscape by its given definition is a starting point for further exploration. Whilst wasteland is often attempted by a word potential, we found it interesting to look closer at potentials per se. Thus, we extended the definition of drosscapes by questioning scapes – are they only land formations? Can we talk about human scapes as well? If yes, can we consider drosscapes as the wasted potential of human scapes in a context of social injustice? And how about semi-productive patches that have greater potential than their current use? Poetic boredom of landscapes may always be justified, but can as well open doors for transformation.



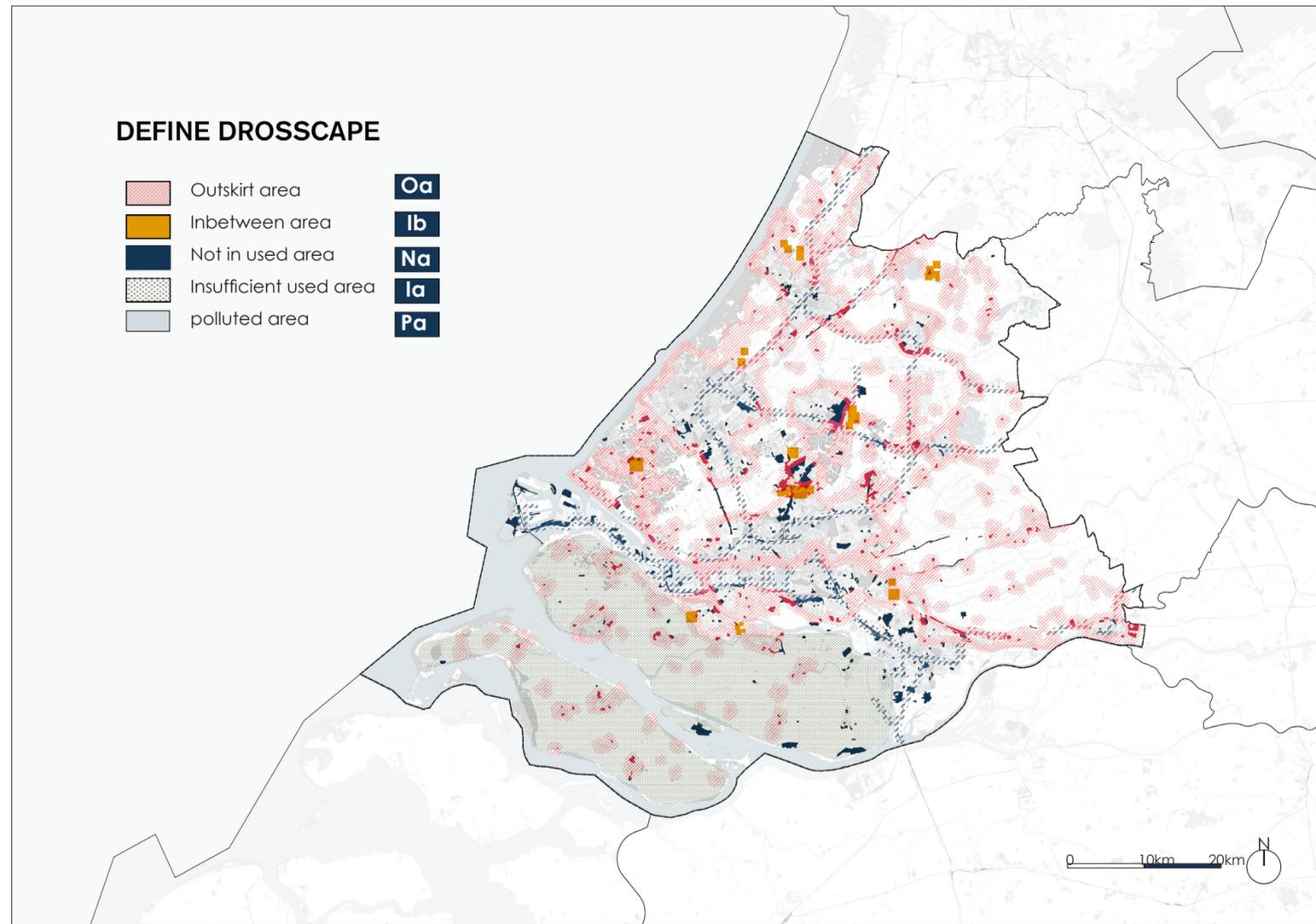
The current linear state of drosscape, characterized by strong sustainable concept environmental > social > economic

Illustrated by authors



Pictures from google map

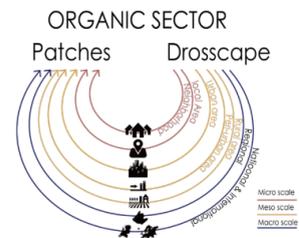
3. 3 INVESTIGATION SOUTH HOLLAND REGION



Analytical description, map of drosscape. Illustrated by authors

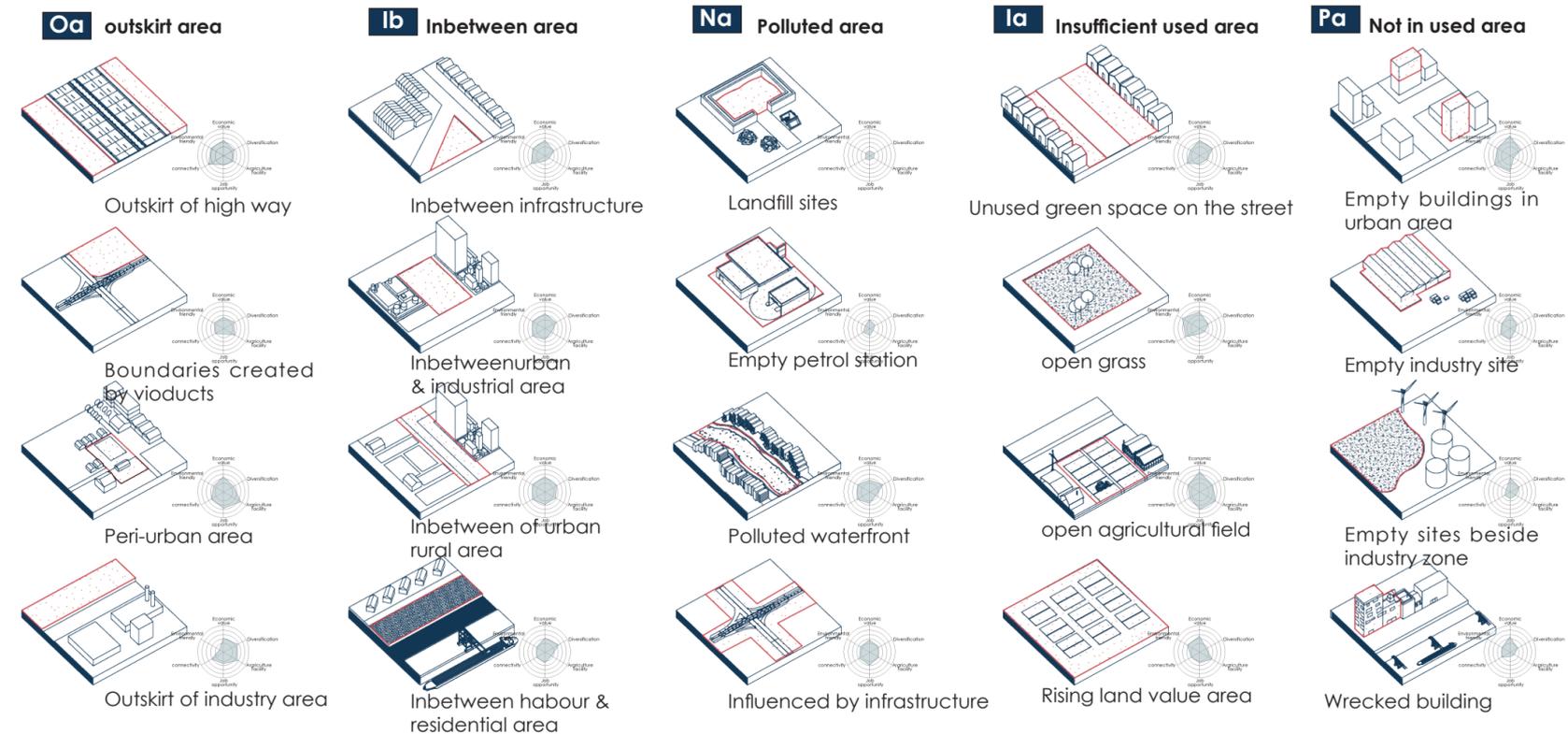
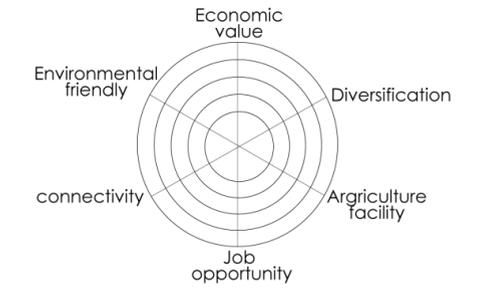
Drosscapes, in this project, are waste geographies/abused land on the peripheries of cities and beyond/landscape patches including the following: outskirts, not in used area, polluted areas, in between areas and insufficiently used areas.

South Holland has several of these types of landscapes and for our project they provide as the playground for new interventions.



3. 3 INVESTIGATION SOUTH HOLLAND REGION

To get a better understanding of these drosscapes, here are the types we defined. Each with their own assesment based on: Economic value, diversification, agriculture facility, job opportunity, connectivity, and environmental friendliness. Currently, most of values are very low in these spaces.



Typology of drosscape Illustrated by authors

4 FOCUS FIELD

4.5 MAIN STAKEHOLDER IN THE REGION

START IMPLEMENTING CHANGE THROUGH THE KEY ACTORS FROM ACROSS THE VALUE CHAIN

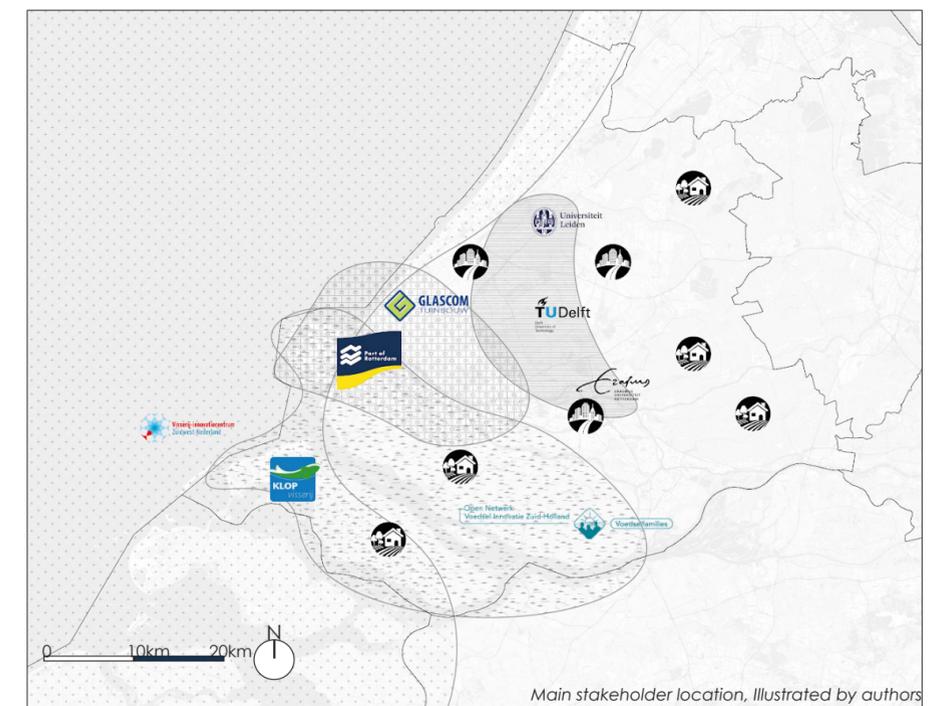
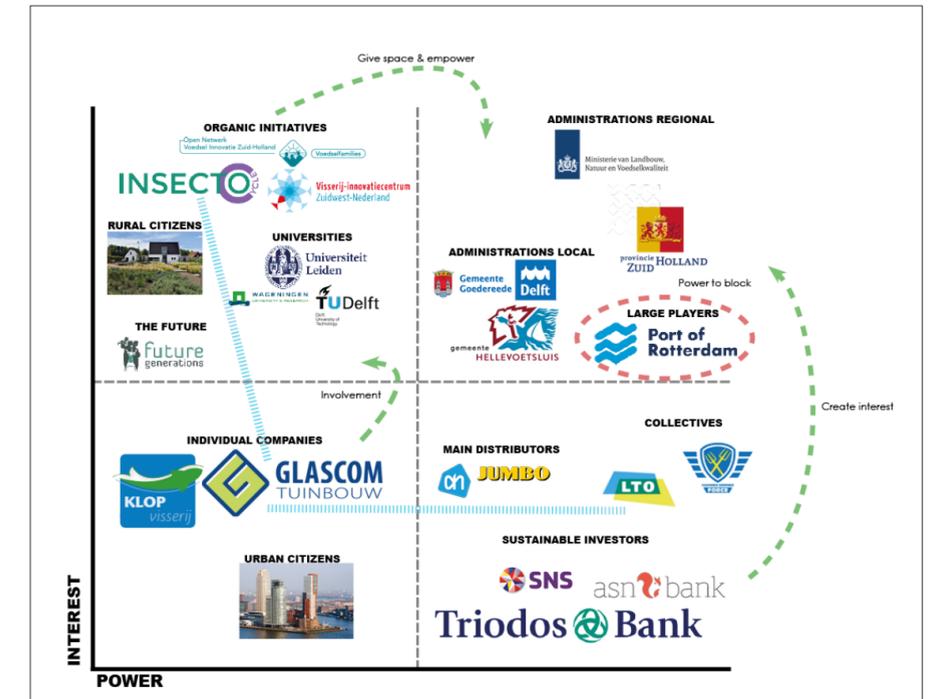
The study will aim to understand the potential of larger scale collaborations across producers,retailers and the major commercial actors invoveld in food preparation. It will also aim to understand the potential of emerging innovations to disrupt current linear system and enable a circular one.

Important actors in the organic sector will be studied, including the **major food retailers, and commercial food preparers and food producers.** These actors will be particular interest to the study, as together they play a major role in sourcing food and bringing it into cities.

Other members of the consortium will include corporate or small scale business of the following types:

- Producers
- Distributors/Wholesalers
- Retailers
- Processors
- Innovators/entrepreneurs
- Major caterers such as hospitals, other institutions, and event organisers.
- Utilities
- Waste processors

Consideration of challenges led to the swot analysis where appeared the main consolidations of challenges. The strongest and most promising features are related to natural soil, wind and water features together with the potential of successful port and knowledge institutions. Promising yet making us worry subjects are based on linear economy and growing disbalance between industries and rural citizens. Negative aspects that could participate positively in the regional development are results of patched and segregated landscape in industrial, rural and urban areas. In addition, the amount of land is a limiting but giving knowledge opportunities. Finally, the most destructive problems are evident in increasing import on the cost of the biodiversity of local landscape and resource.



4.1 PROBLEM STATEMENT

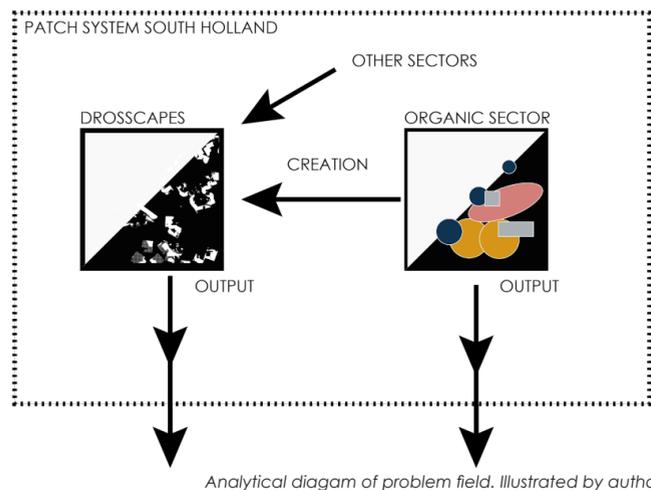
Combined map (patches+flows+drosscapes)

Finally, all the previous observations and discoveries come into a filter where the main challenges, responsibilities and potential can be identified. Therefore, the overall map signalyses the key features and problems in the province

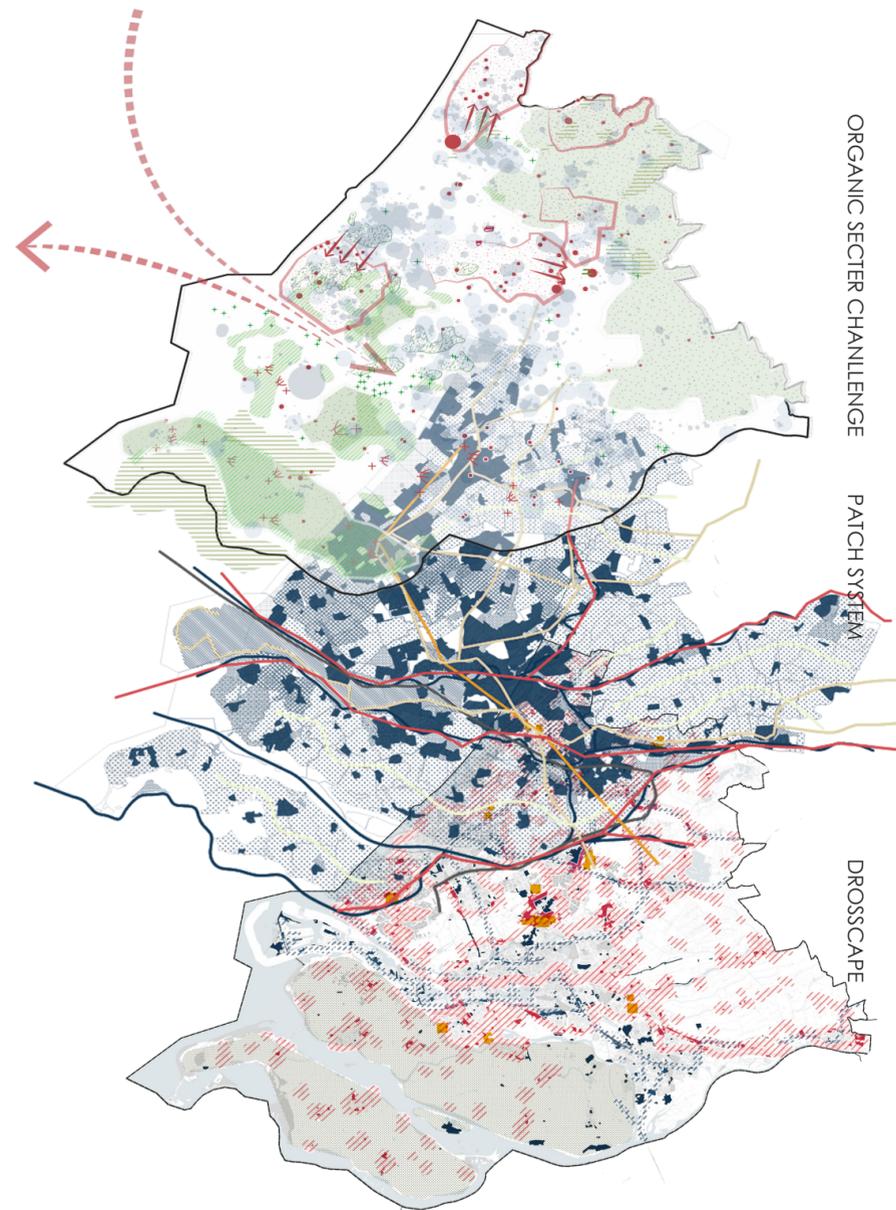
1. South Holland has a number of challenges including environmental pollution, social segregation and economic imbalance
2. The province consists of patches which are evident in repetitive, monofunctional landscapes
3. The patches and other industries generate a system of drosscapes
4. There is a physical structure of drosscapes which meets the organic system but these two systems don't work in synergy

THE PROBLEM STATEMENT

Drosscapes and the organic patch system are two individual systems which do not work in synergy with each other and both create different kinds of waste and are therefore not contributing to strong circular sustainability.

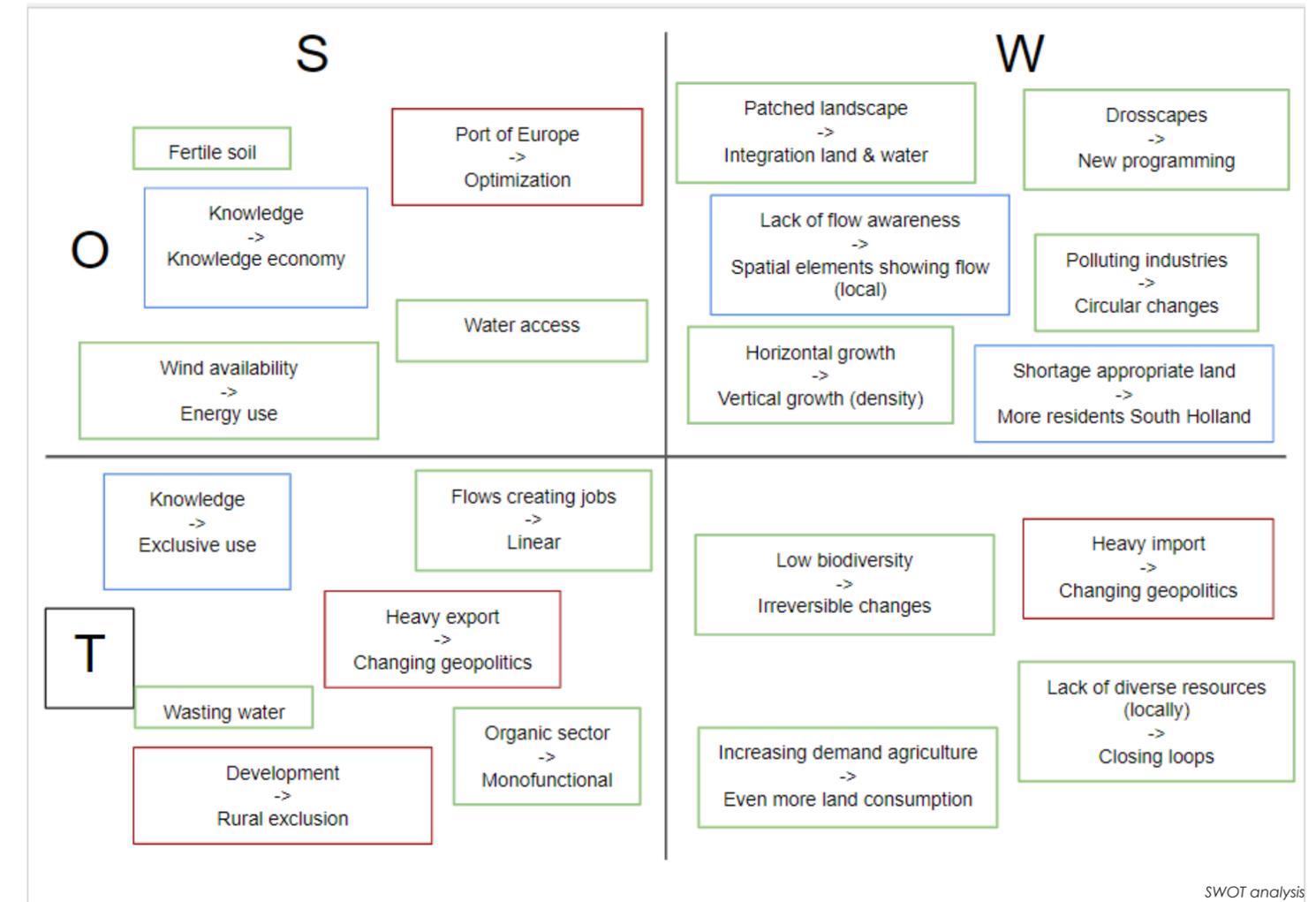


Analytical diagram of problem field. Illustrated by authors



Three layers of problem field
Illustrated by authors.

4.3 SWOT ANALYSIS



SWOT analysis
Illustrated by authors

Consideration of challenges led to the swot analysis where appeared the main consolidations of challenges. The strongest and most promising features are related to natural soil, wind and water features together with the potential of successful port and knowledge institutions. Promising yet making us worry subjects are based on linear economy and growing disbalance between industries and rural citizens. Negative aspects that could participate positively in the regional development are results of patched and segregated landscape in industrial, rural and urban areas. In addition, the amount of land is a limiting but giving knowledge opportunities. Finally, the most destructive problems are evident in increasing import on the cost of the biodiversity of local landscape and resource.

4.4 POTENTIAL ANALYSIS

There is a lot of wasted space in South Holland, which has a potential to contribute to circularity of materials.

-Knowledge institution are the pillars of innovation in this region. Close communication between universities, R&D centers and farmers would rise the region to another level

-The port has a potential to become a face of an alternative economy. All the new interventions will affect the port and it's production.

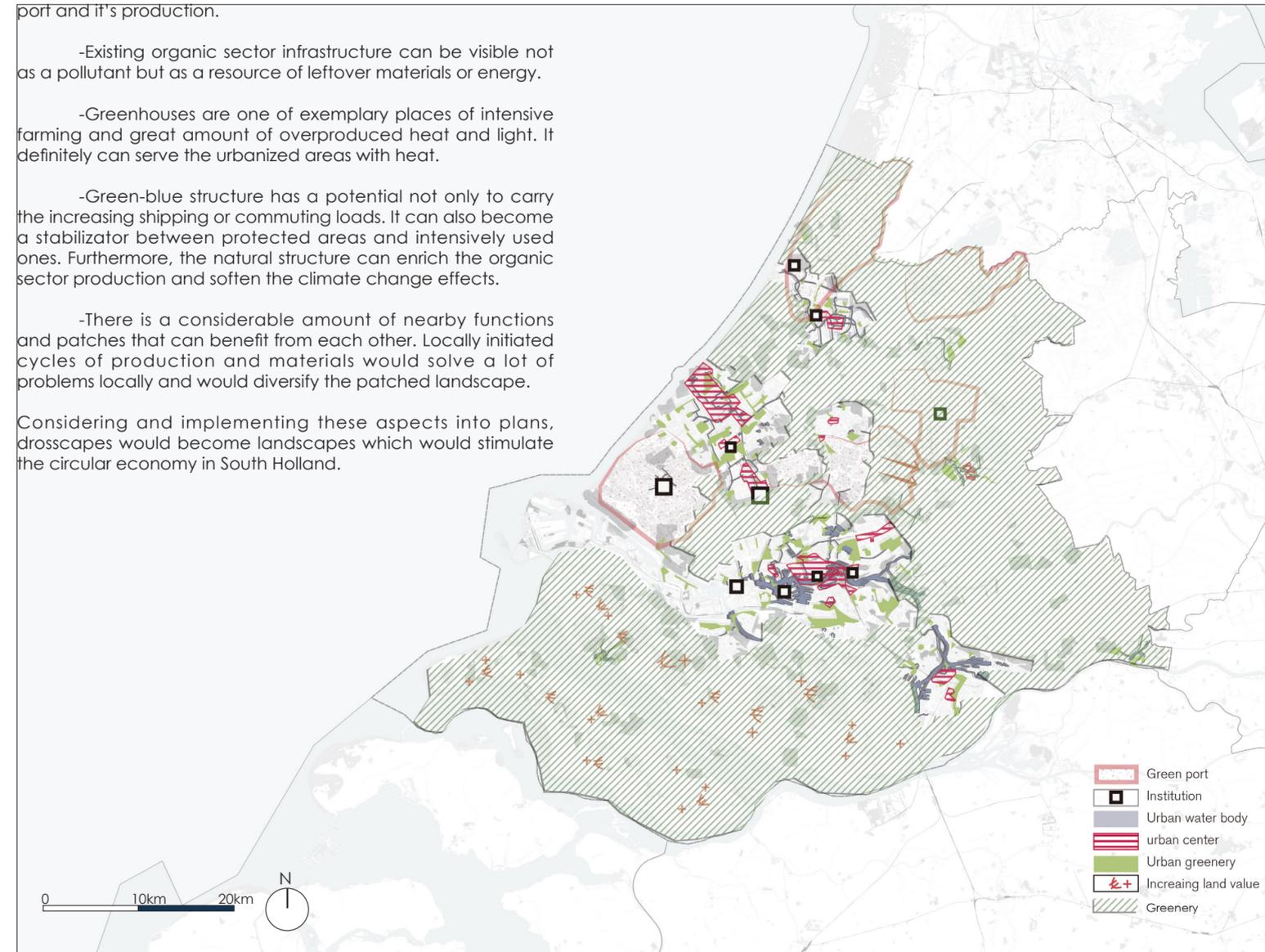
-Existing organic sector infrastructure can be visible not as a pollutant but as a resource of leftover materials or energy.

-Greenhouses are one of exemplary places of intensive farming and great amount of overproduced heat and light. It definitely can serve the urbanized areas with heat.

-Green-blue structure has a potential not only to carry the increasing shipping or commuting loads. It can also become a stabilizator between protected areas and intensively used ones. Furthermore, the natural structure can enrich the organic sector production and soften the climate change effects.

-There is a considerable amount of nearby functions and patches that can benefit from each other. Locally initiated cycles of production and materials would solve a lot of problems locally and would diversify the patched landscape.

Considering and implementing these aspects into plans, drosscapes would become landscapes which would stimulate the circular economy in South Holland.



5

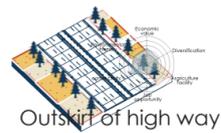
VISION DEVELOPMENT

6.1 TRANSFORMATION OF DROSSCAPE

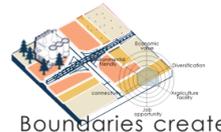
To get a better understanding of these drosscapes, here are the types we defined. Each with their own assesment based on: Economic value, diversification, agriculture facility, job opportunity, connectivity, and environmental friendliness. Currently, most of values are very low in these spaces.



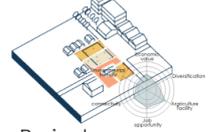
Oa outskirts area



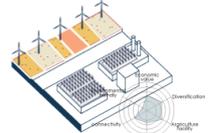
Outskirt of high way



Boundaries created by viaducts

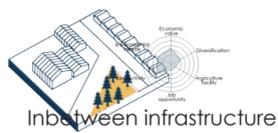


Peri-urban area

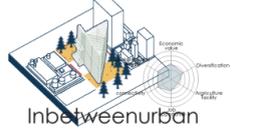


Outskirt of industry area

Ib Inbetween area



Inbetween infrastructure



Inbetween urban & industrial area



Inbetween of urban rural area

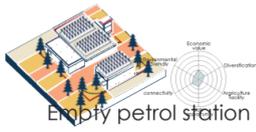


Inbetween harbour & residential area

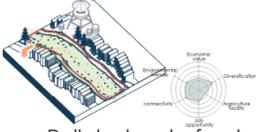
Na Polluted area



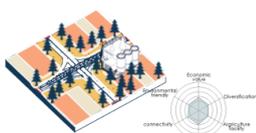
Landfill sites



Empty petrol station



Polluted waterfront

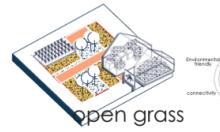


Influenced by infrastructure

Ia Insufficient used area



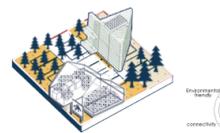
Unused green space on the street



open grass



open agricultural field



Rising land value area

Pa Not in used area



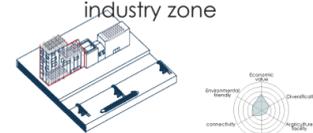
Empty buildings in urban area



Empty industry site



Empty sites beside industry zone



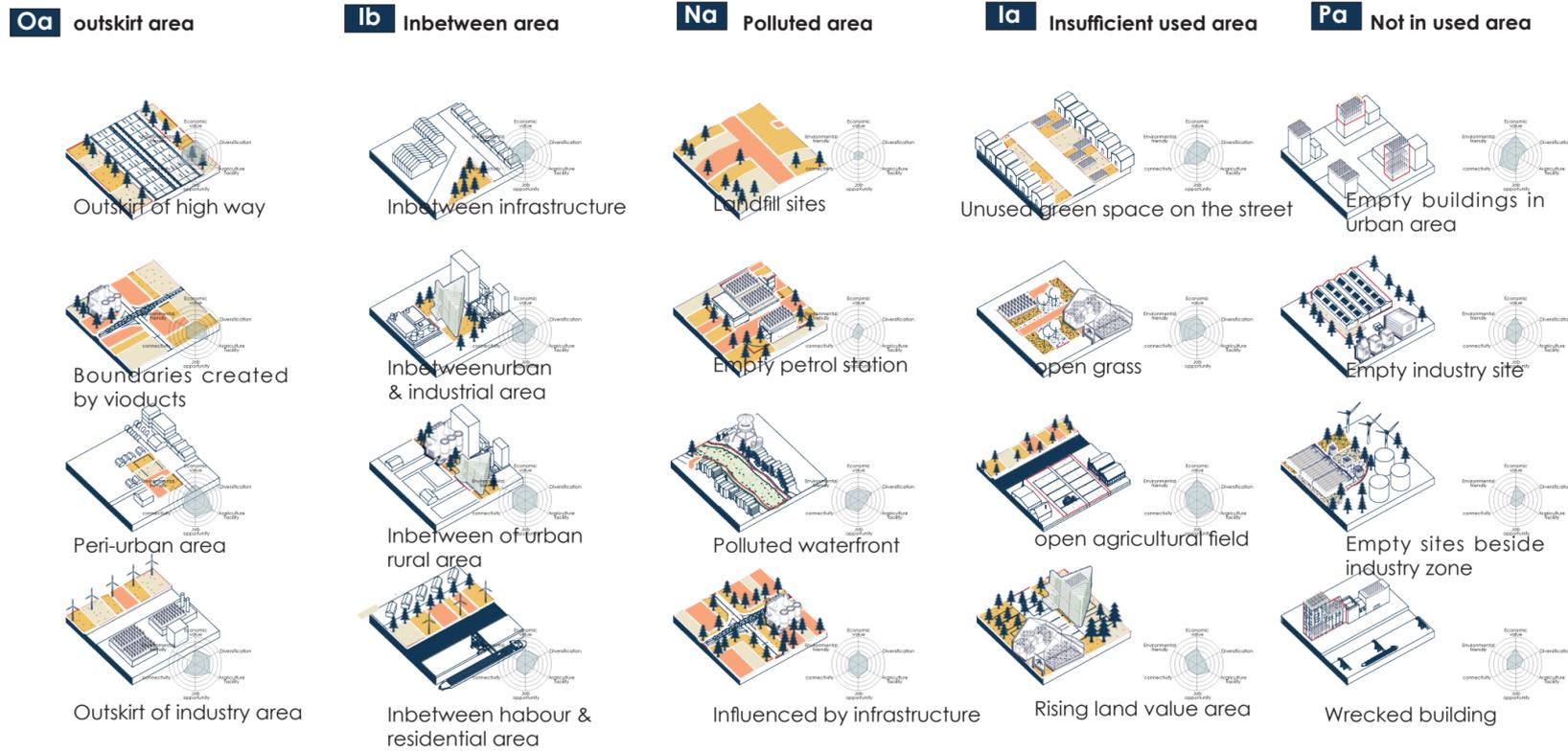
Wrecked building

6.1 Vision statement

The research question helped develop the following vision statement for South Holland, which is visualised in vision map.

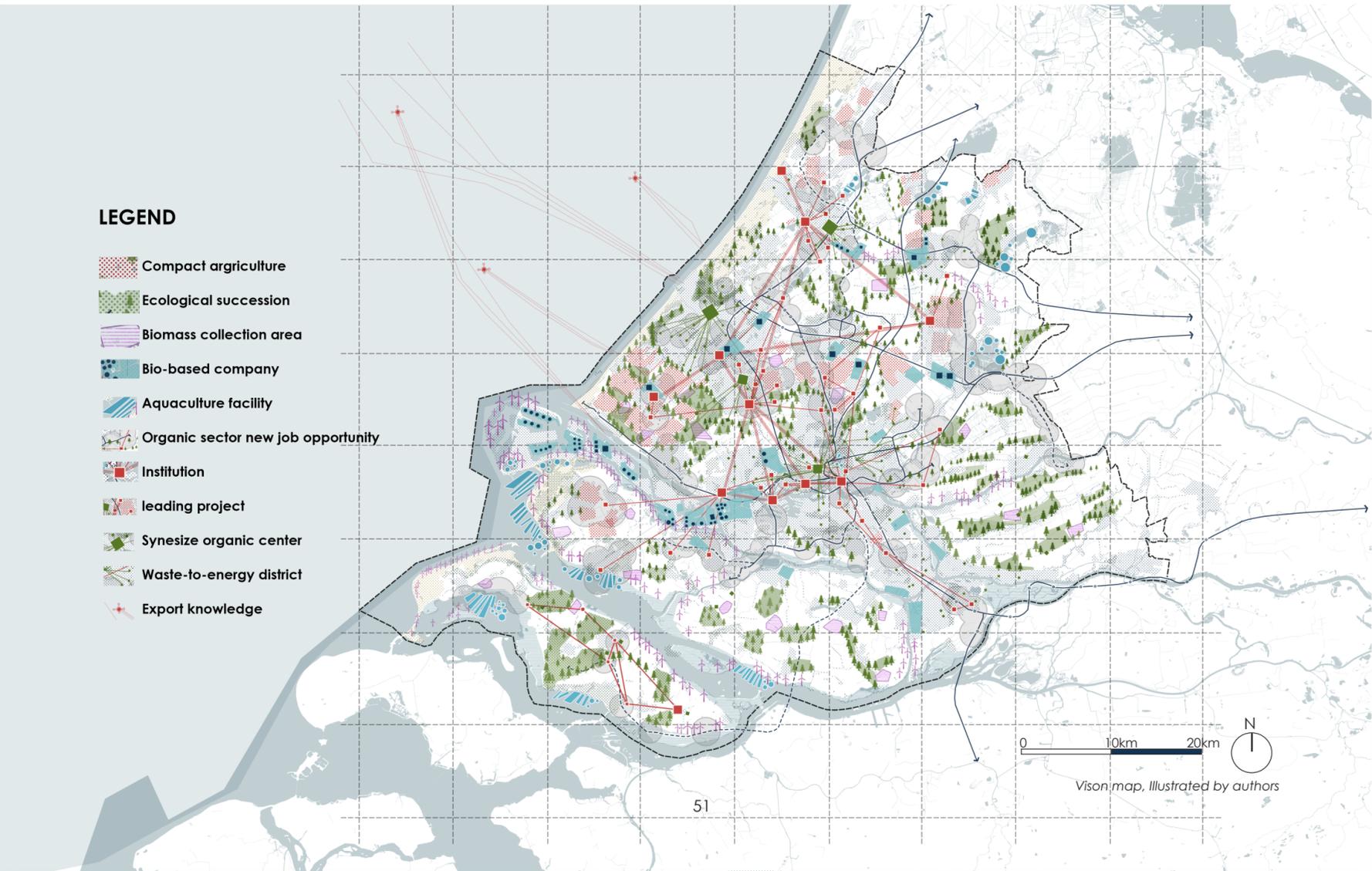
In 2050, South Holland will have a circular economy in which linear organic processes will be reshaped into locally closed flows by introducing drosscapes as part of the organic cycle.

As mentioned in chapter 3, the organic sector is structured in a linear way. At the same time drosscapes are a wasted potential in South Holland. As can be seen in the figure on the page 16, the two systems have their own processes and produce their own waste. Therefore, the believe is that these two separate systems have potential to work together and synergize each with other, as a way to make the organic section circular and sustainable within space and time, as can be seen on the figure on the page 46. In this way the new "drosscapes" could function as buffer zones, where excess products or waste from certain local organic processes are used, to develop something new. For example, the process of the greenhouse industry within South Holland produces a lot of greenhouse gasses which are currently unused. Combined with the fact that trees can store these gasses (Ellison, David, et al, 2017). There is the possibility to change drosscapes in this scenario into places of tree production. Thereby using the output of the greenhouse industry, as input for the now new forestry. At the same time these changes of drosscapes will be able to sustain new types of industries related to the new produce produced, such as forestry in the previous example, which could eventually lead to urbanization using wood instead of the more commonly used concrete. This as a vision could have all sorts of different ways of being worked out. There is an important factor of locality tied to this vision. Each type of industry and drosscape has its own potential and factors that could contribute to choose a specific type of intervention.



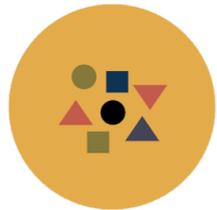
LEGEND

- Compact agriculture
- Ecological succession
- Biomass collection area
- Bio-based company
- Aquaculture facility
- Organic sector new job opportunity
- Institution
- leading project
- Synesize organic center
- Waste-to-energy district
- Export knowledge



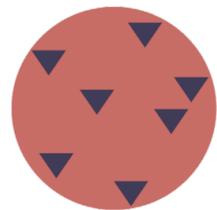
6.2 SPATIAL PRINCIPLES

Having the vision statement as goal to work towards, a set of principles were developed that will be able to help guide the design when zooming into a specific part of South Holland as can be seen in figure below. These principles are based on the concept of strong sustainability, and therefore as mentioned earlier place more emphasis on the environment, and less on the social and economic aspect. The principles are as follow:



POLYFUNCTIONAL

Interventions should seek to make a specific area more polyfunctional. On the one hand this stimulates a diversity of activities, and different activities could synergize with different functions, whereas this would be more difficult if it was a monofunctional area.



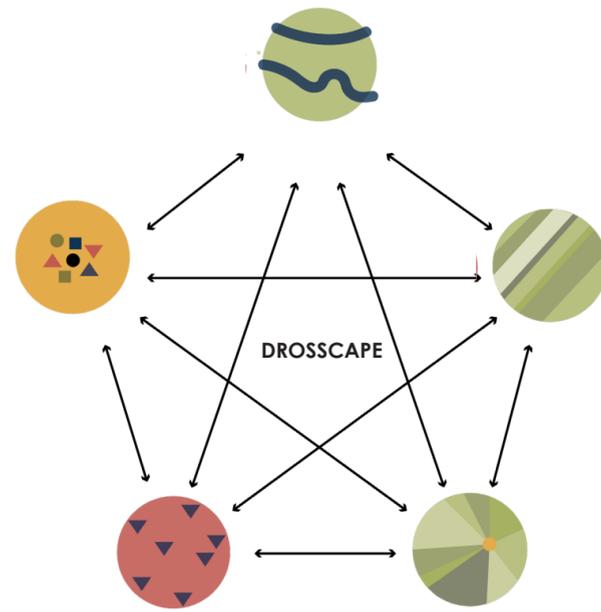
WIDE RANGE PARTICIPANTS

Intervention should always take as many (potential) stakeholders in mind as possible, doing this makes the intervention sustainable and resilient on the long term for the proposition might face less resistance or be less susceptible to future failures if all stakeholders are properly considered.



INTEGRATING BLUE & GREEN STRUCTURE

Interventions should seek to integrate larger ecological structures in- and outside the region. This is a mean to make the system more resilient and able to make use of the resources that are provided by nature.



Principle network diagram, illustrated by authors



COMPACT

Interventions should seek to concentrate and intensify industries. There are a lot of activities within South Holland could be upscaled in an experimental way and thereby making more effective use of the space it currently has.



BIODIVERSITY

Interventions should seek to make an area more biodiverse. This principle is related to the principle of integrating blue & green structure in the sense that it seeks to make the organic sector more resilient to sudden changes. At the same time, it opens up the possibility for new types of industry.

6.3 PRINCIPLE & STRATEGY NETWORK



Integrating blue & green structure



Polyfunctional



Biodiverse



Compact



Wide range participants/stakeholders

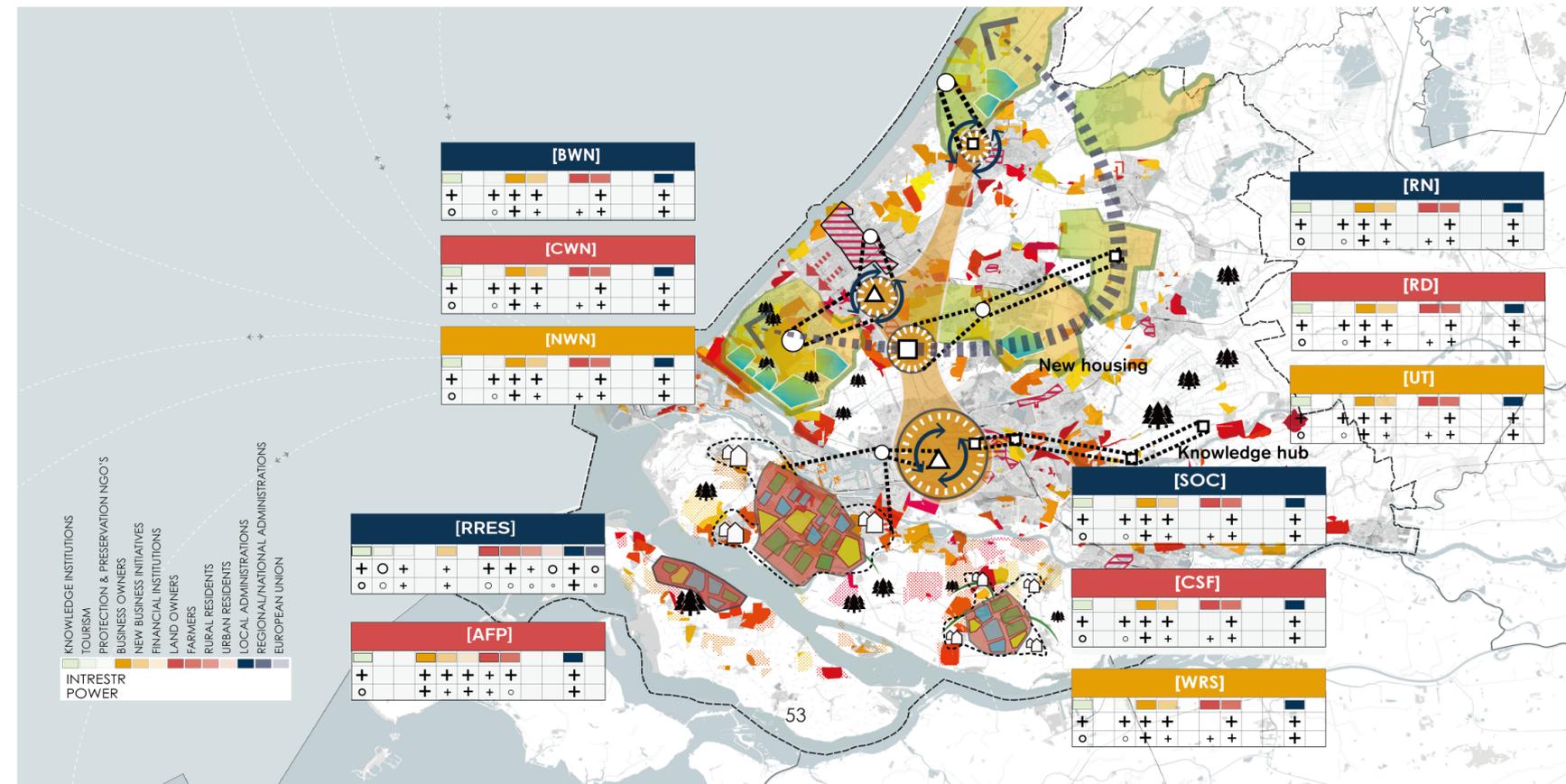


WATER FRONT

RURAL AREA

GREEN HOUSE + PERI-URBAN

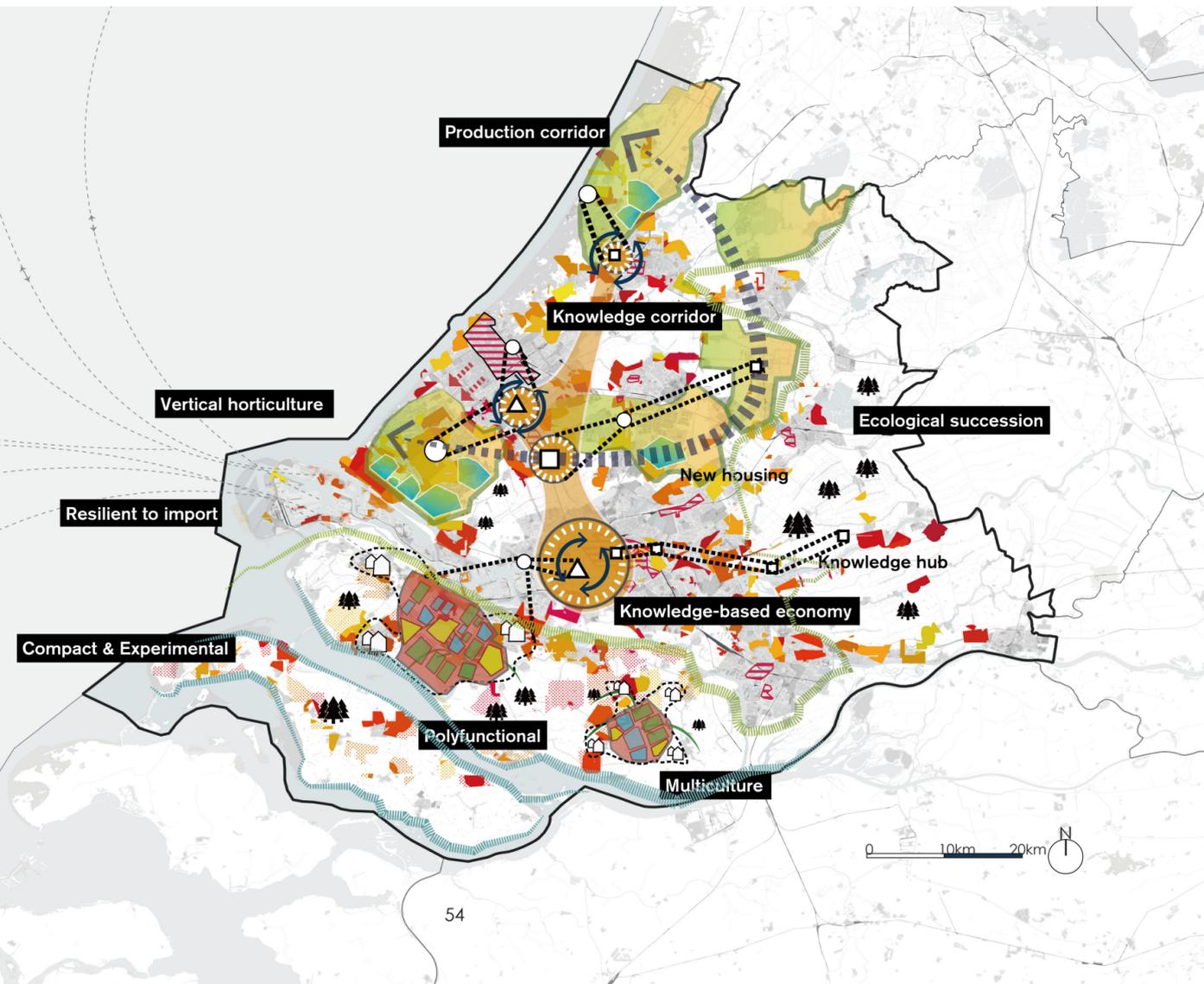
PERI-URBAN + URBAN AREA



6.4 Hypothetical vision

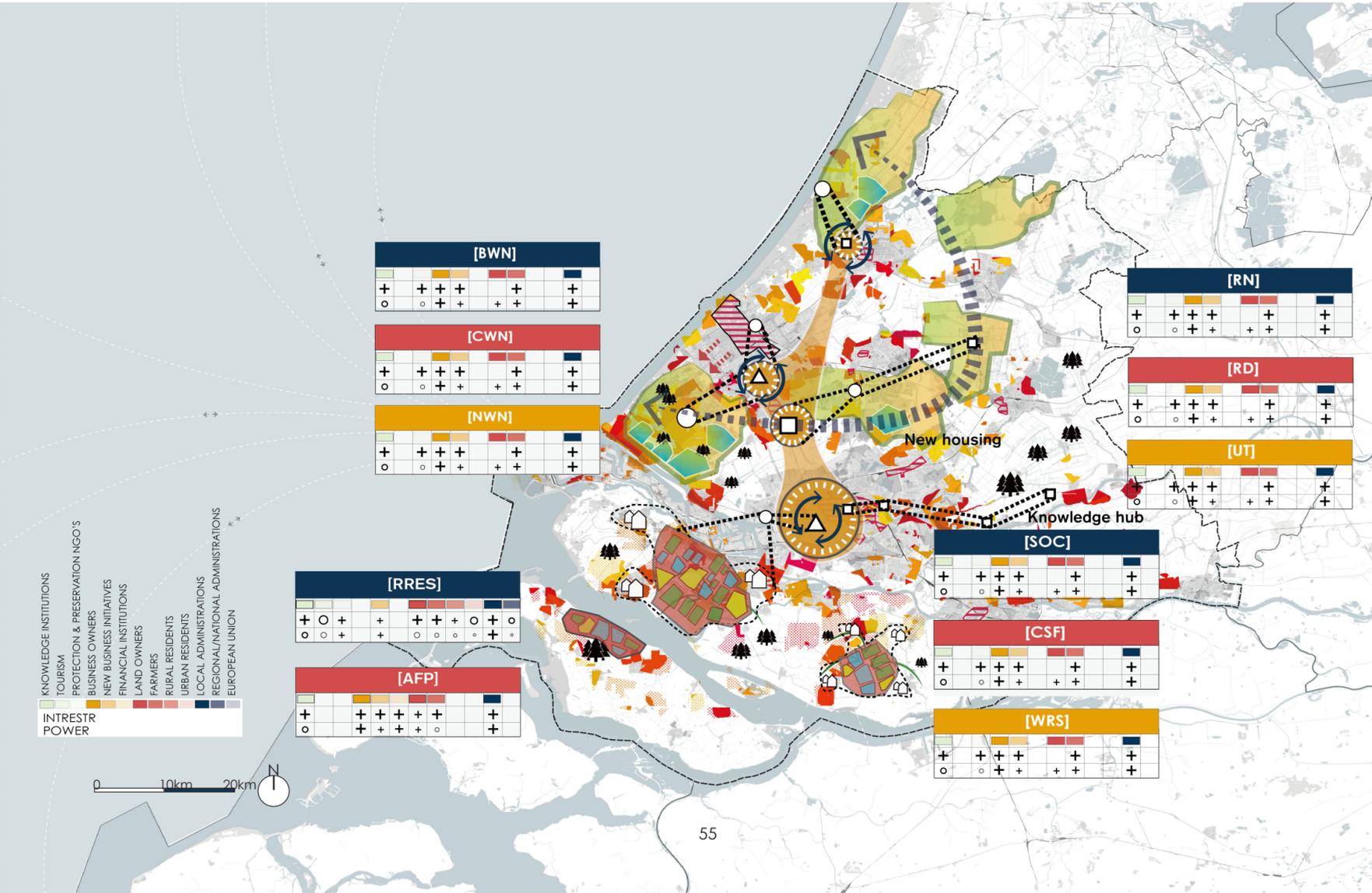
This map does not serve as the final map, but more as a way of being able to determine which sites would be of interest for further detailing in the next chapter. The main components are the following elements;

- a production corridor from the north towards the greenport,
- a knowledge corridor connecting all 3 universities within South Holland,
- ecological succession which allows the change of drosscapes over long periods of time,
- compact & experimental upscaling,
- polyfunctional industries,
- multicultural integration with the industries,
- vertical horticulture,
- a knowledge based economy,
- and resilience to import.



6.5 The four area of interest

This is the right place to zoom closer in the province and explore it's differences. It will give answers how to measure problems and adopt the vision in specific places. That is the reason to choose four most different and characteristic areas in South Holland.



Greenhouses
One of the most intensively cultivated organic production areas in the world next to Den Haag. Yet the innovation and economic benefits have side effects. There is a huge light and heat pollution.



Waterfront & seafood
Despite the rising land value in the south of the province, the land here is not cultivated very intensively. On the opposite, the protected areas here can contribute to more sustainable food production and delta tourism.

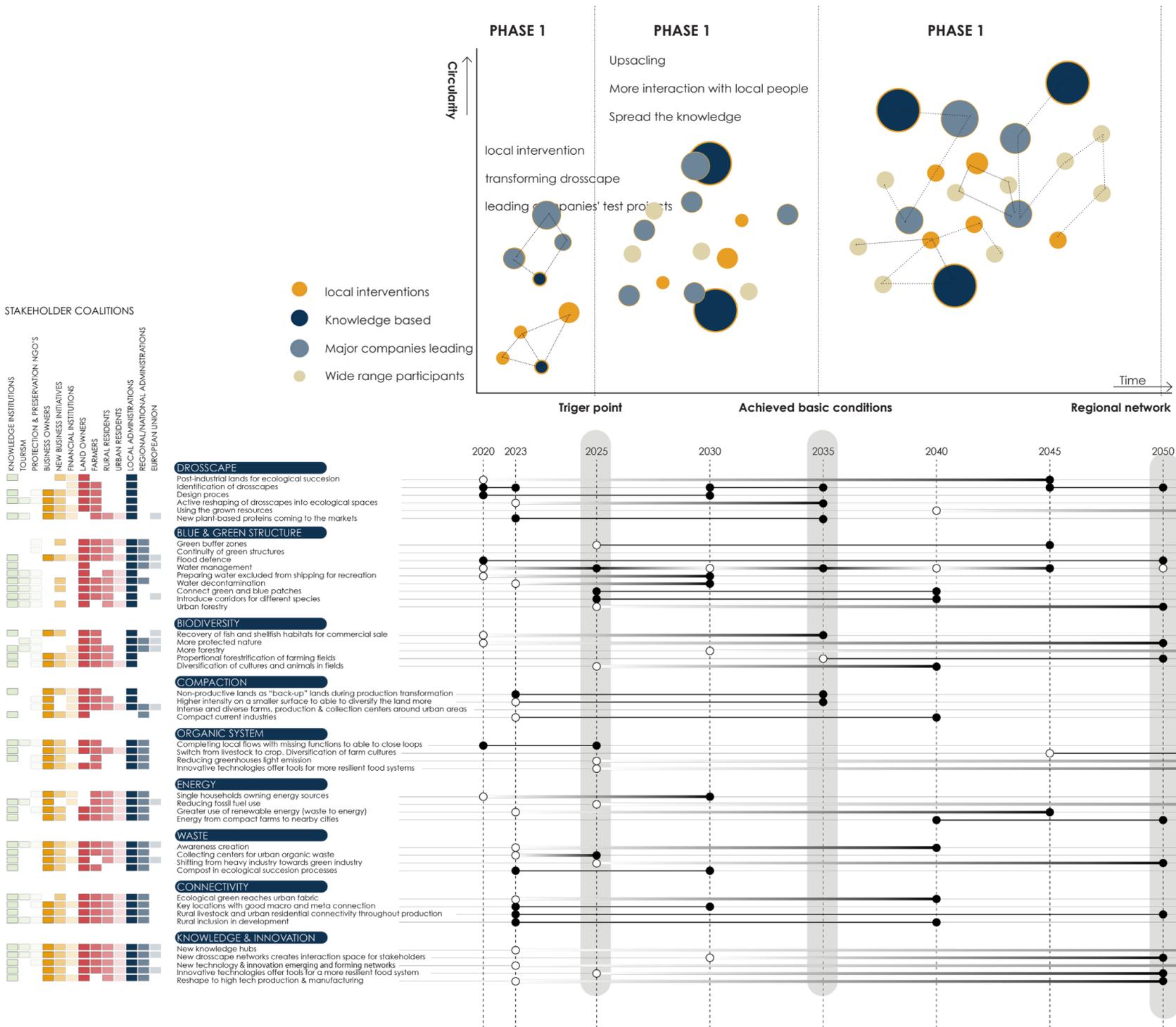


Rural area
The area called "Green Heart" is mostly dedicated to animal, dairy farms and tourism. However, the livestock farming has a limited future and is one of the biggest pollutants of the atmosphere in the world.



Urban area
The province is unimaginable without its port and cities like Rotterdam. The main issue is integration of circular organic sector in cities as well. Rotterdam could become an example how to negotiate with surrounding farms and farmers for the sake of circular economy.

6.6 Dynamic road map



6

DETAILING MESO/MICRO

6.1 WATERFRONT

6.1.1 THE WATERFRONT AREA_ PHYSIOGNOMY

In Goeree-Overflakkee, 75% of the land is meant for open cultivation. In the same time, the island has ambitions to create a renowned natural protected habitat.

Rediscovered potential of a place

Goeree-Overflakkee, an island to the South from the Port of Rotterdam, is a local natural treasure for South Holland. Due to its low urbanization, it managed to maintain a natural character. According to the forecasts, this is an area of the fastest land value growth in the province. This may happen due to its excellent location on the way from Rotterdam to Antwerpen, but also thanks to some natural features like soil stability, accessibility to water or presence of local ecosystems. The province has ambitions to restore bird and fish habitats as well as regulate the river flow. Many of these actions are already being undertaken by Haringvliet natural park.

The urgency to close the loops in the island

Unlike the other parts of South Holland, Goeree-Overflakkee turned towards less intense cultivation. Thus, the agricultural landscape is vast and monotonous. It may seem that a secluded place is perfect for closed food flows, especially considering the natural conditions, but in fact, the island does not facilitate all the necessary stages of production. Despite access both to the river and the sea, there are no fishing places nearby. Such intervention demands more coordinated action, but there are more striking examples of open loops. Compared to the vast amount of cultivation patches, the very processing takes place in the mainland, meaning unnecessary commuting distance and resource loss risk. There is also lack of supply management, meaning that energy and gas are being transported from the North of the province.



7,15% URBAN
74,93% AGRO
16,72% NATURE
1,19% INDUSTRY

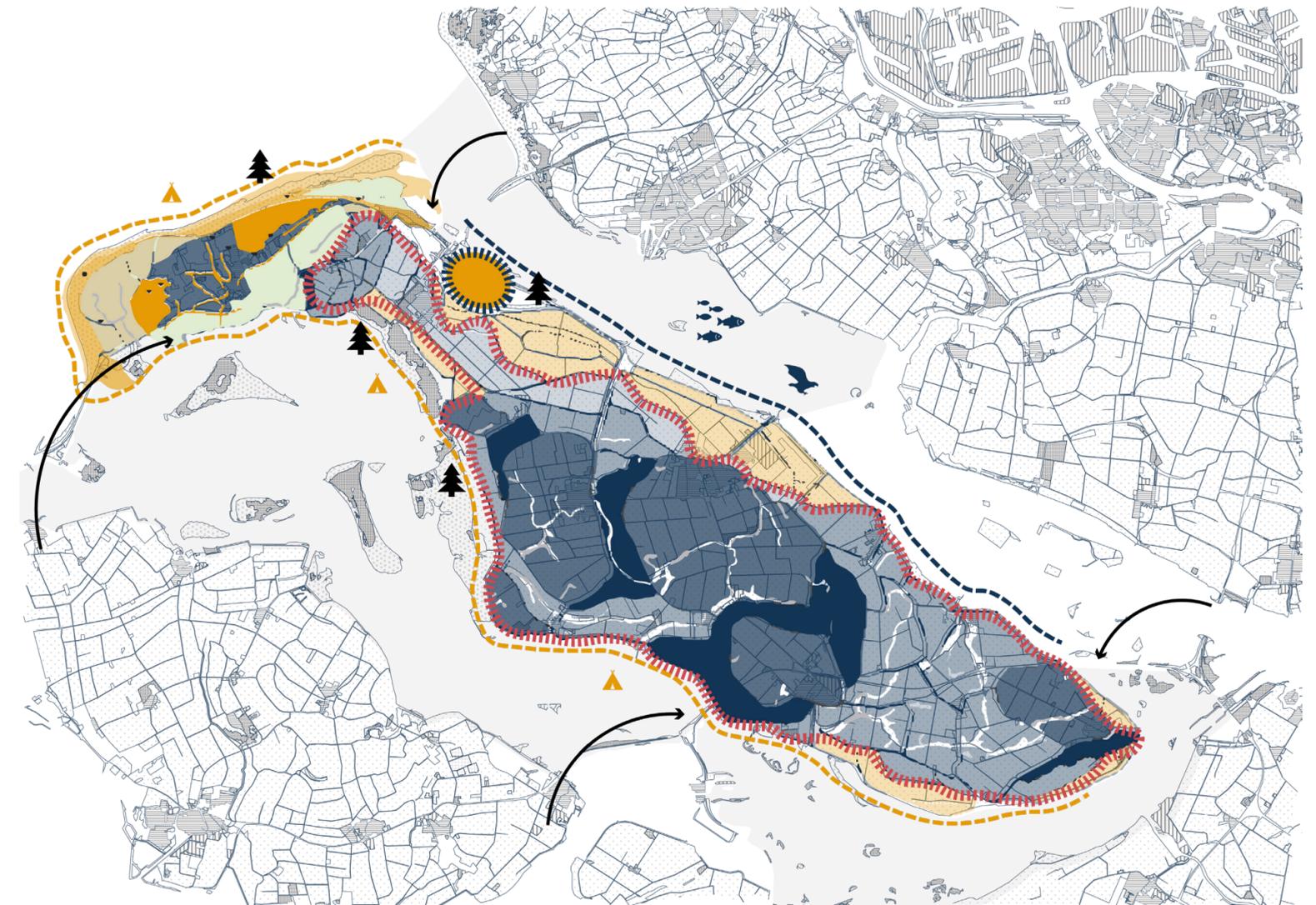
Open lands in Goeree-Overflakkee occupy 19 631 hectares, while greenhouses only 91 hectares. Due to the protected character, the agriculture cannot be invasive, but its current shape is not innovative considering the place's potential.



Organic flows. From the top left: Animals, Food
From the bottom left: Fish, Flowers

- Animals - closed chain
- Flowers - closed chain
- Fish - open chain
- Food - open chain

6.1.1 CHALLENGE IN THE WATERFRONT AREA_ MONOTONOUS LANDSCAPE AND EXCLUSION



- ▲ Campings
- Touristic path
- Natural path
- Knowledge hub
- Equal clay landscape
- - - Drosscapes
- ▲ Protected nature
- Fish habitat
- Bird habitat

Current state. Monotonous clay landscape dominates over the island. There are also two clear facets - tourism and protected nature.

6.1.2 THE WATERFRONT AREA_ REGIONAL INTERVENTIONS

Many of the interventions demand regional governance and involvement of international stakeholders. This only confirms the importance of the site.

Regional actions

One of the main ambitions of the province is to restore bird and fish habitats. Having plans like these, such actions cannot be run bottom-up or depend on local governance. As both the species belong to groups of animals high mobility, it is not possible to draw borders of interventions locally. There are pivotal factors on a regional scale, that need to be considered.

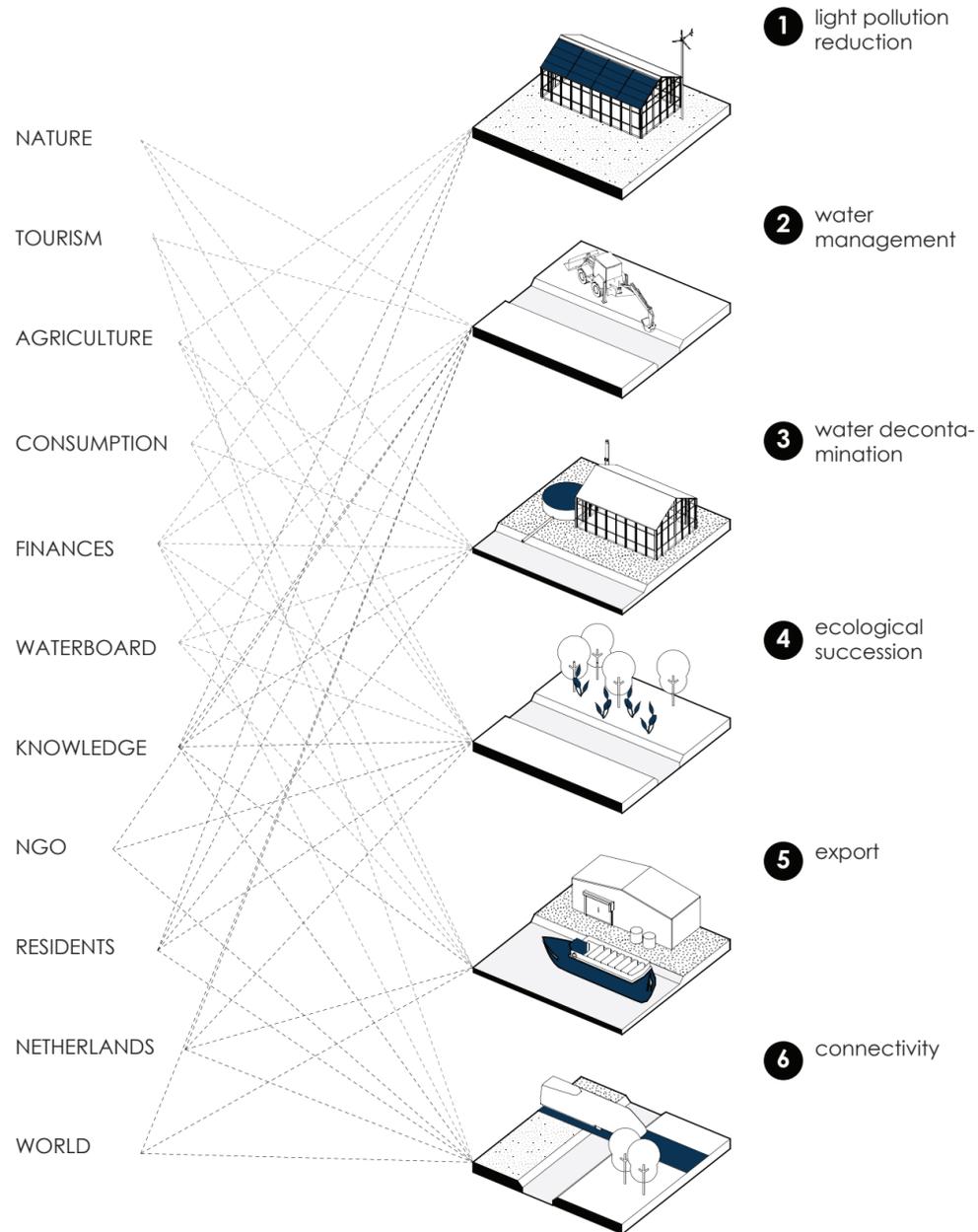
Following the environmental ambitions, the regional goal would be to carry out reforestation. Trees growing in clusters are reinforcing the soil, but they are also able to produce more oxygen than fields. For the landscape, trees are an essential diversification and their presence allows for animal habitats creation.

Another action that has already been permanently assigned to the delta region, is the constant water management. Some steps were already undertaken to regulate the river flow ("Room for the river", but also Delta / Meuse works).

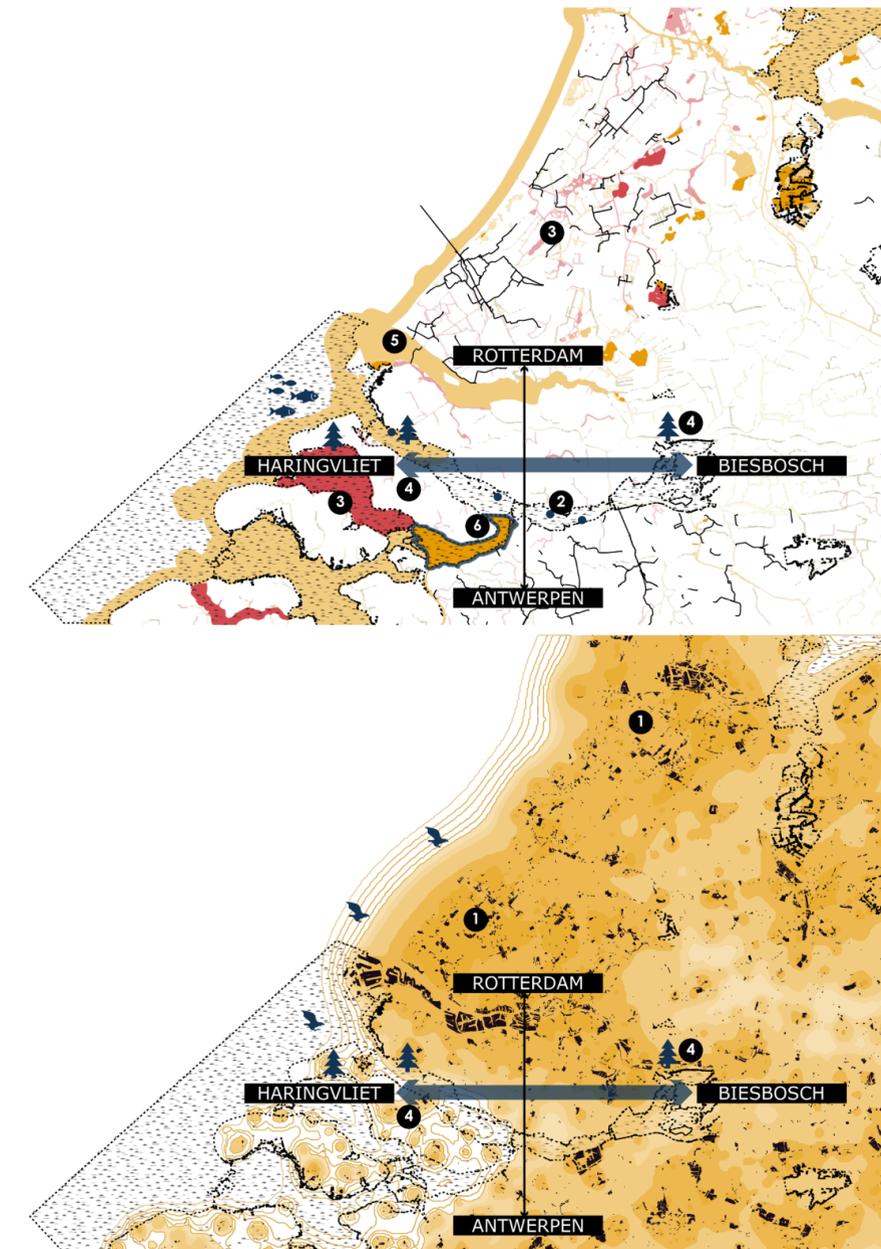
Considering Goeree-Overflakkee's excellent location, the island would easily gain meta-regional importance within the Eurodelta region. One of the real potentials is introducing aquaponics and creating innovative hub for fish habitat development. Such goal demand both better connection with the Rotterdam-Antwerpen route, but also built-up knowledge facilities.

Regional stakeholders

Above actions demand international stakeholders. There is already a representation of foreign actors, concerned with water management or restoration of the habitats. In fact, such engagement naturally works for growing recognition of the region, and it helps to bring more stakeholders to the table.



6.1.3 THE WATERFRONT AREA_ REGIONAL INTERVENTIONS



Water hazards

Although innovative agriculture in South Holland strives towards sustainable use of water, there is still a lot of pollution circulating in the surface waters. It is especially striking, that the contamination happens in the protected area, where the ambition is to bring back fish habitats and where no inland shipping happens. This raises awareness about the quality of waters that surround the area of intervention, but also waters, that reach the Netherlands.

The decrease in fish habitats in the recent years may be worrying and their recovery needs to be aligned with general decontamination of the surface waters.

Successful fish restoration is also associated with the river profile and artificial barriers, that may help to regulate the flow, but can disturb smooth migration of the fish.

Light hazards

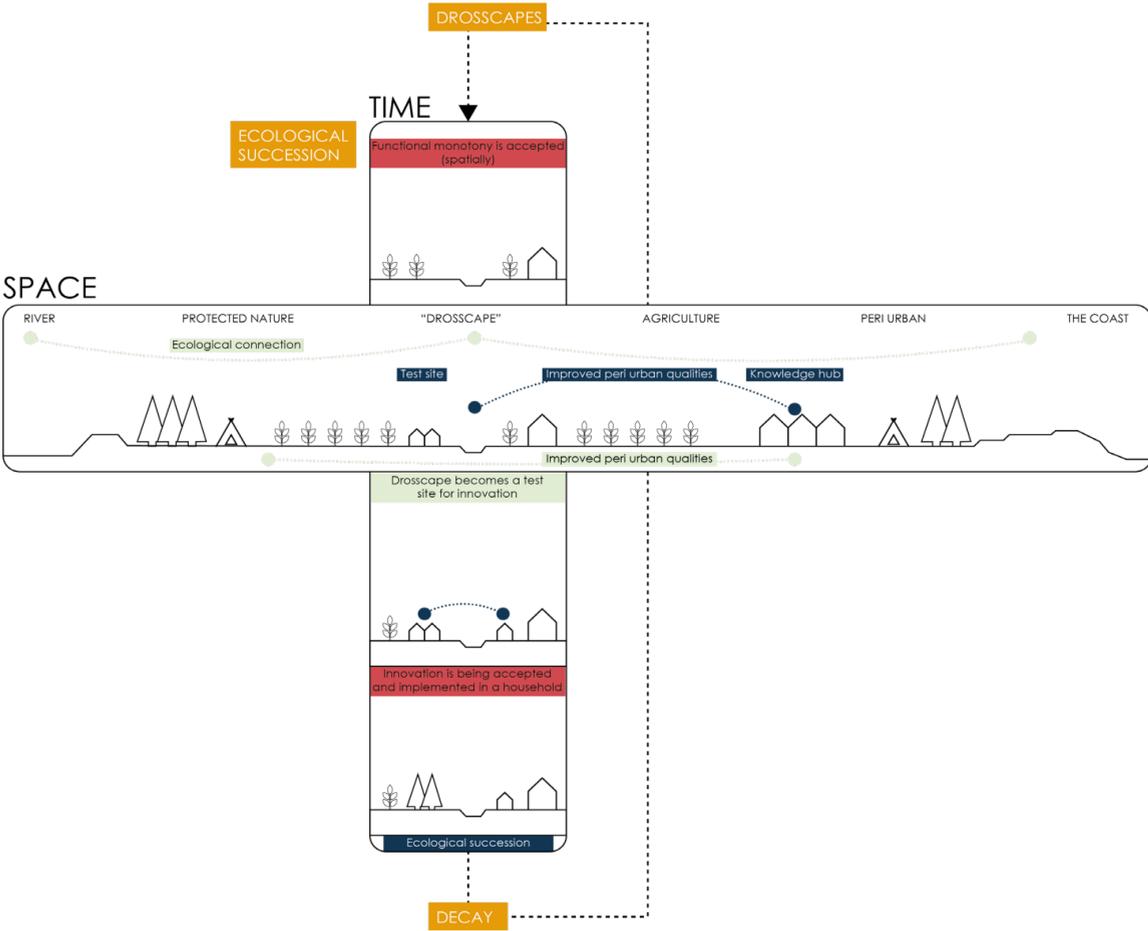
Restoration of bird habitats is tightly associated with the decrease of light pollution. Despite the fact, that the majority of greenhouses is located at a distance from the island, the light pollution can transmit further than their surface. Moreover, as birds are constantly moving, their habitat cannot be simplified to a particular area, but needs to be considered wider.

Currently, the greenhouses light emission is not only affecting the quality of people's life, but more importantly - confuses birds and affect their navigation capability.

The goal for the province would be to introduce a programme, based on which farmers would be obliged to adjust their infrastructures in a way that they would emit less light. Otherwise, increasing light pollution may permanently affect birds flows and put threat to their populations.

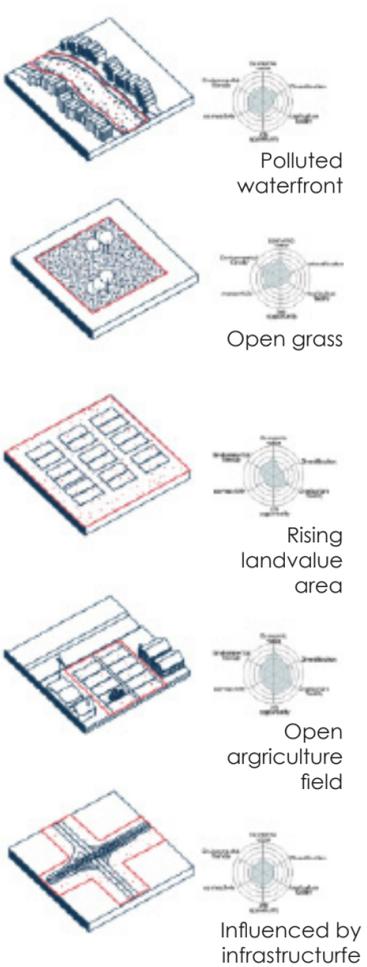
6.1.4 THE WATERFRONT AREA_ TIME AND SPACE RELATION

The monotonous clay landscape has been recognized as a type of drosscape associated with inefficient, non diversified land use.

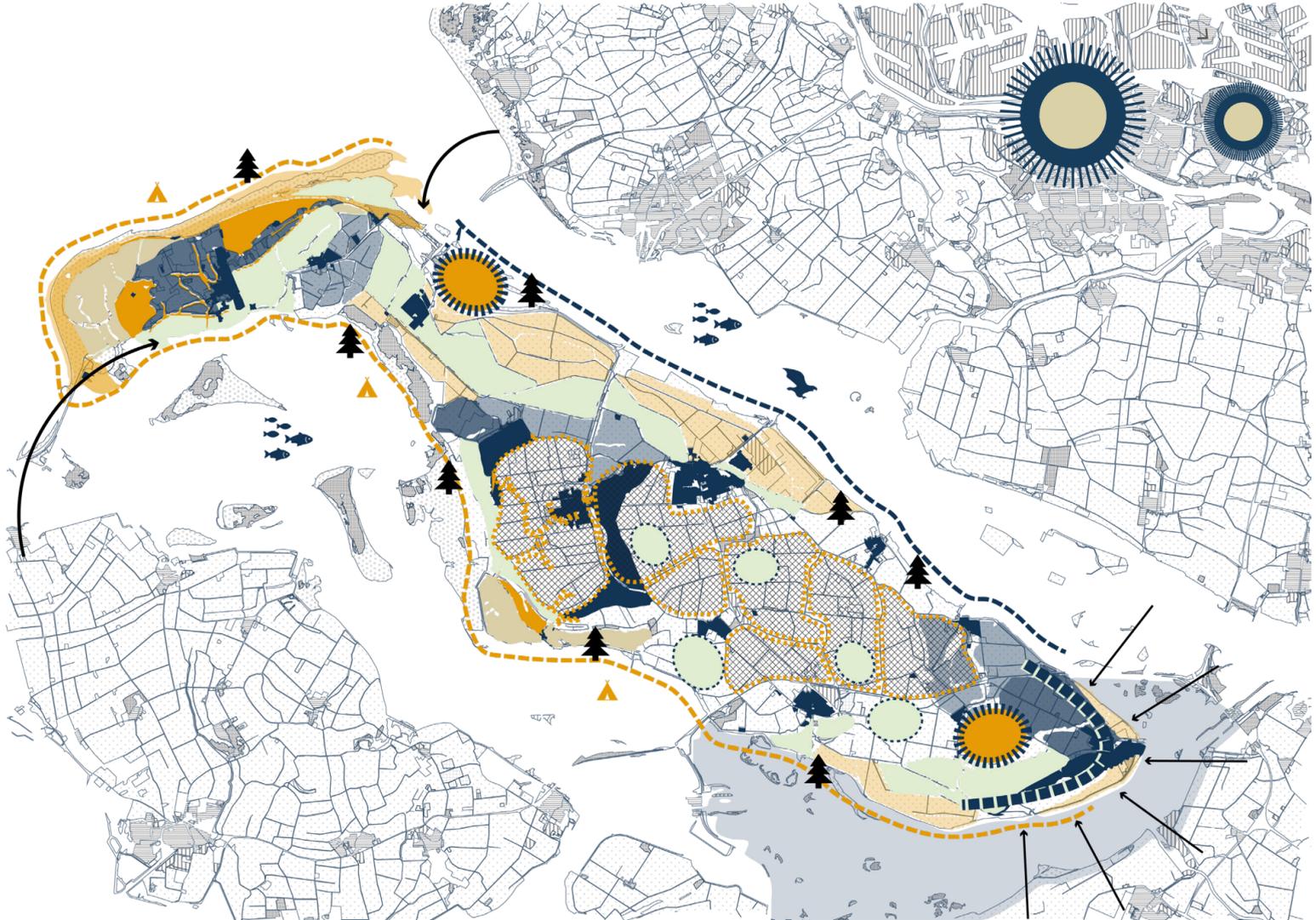


Drosscape intervention in a time and space relation. The process of drosscapes regeneration is circular meaning, that both ecological succession and decay are a part of it.

6.1.5 INTERVENTION IN THE WATERFRONT AREA



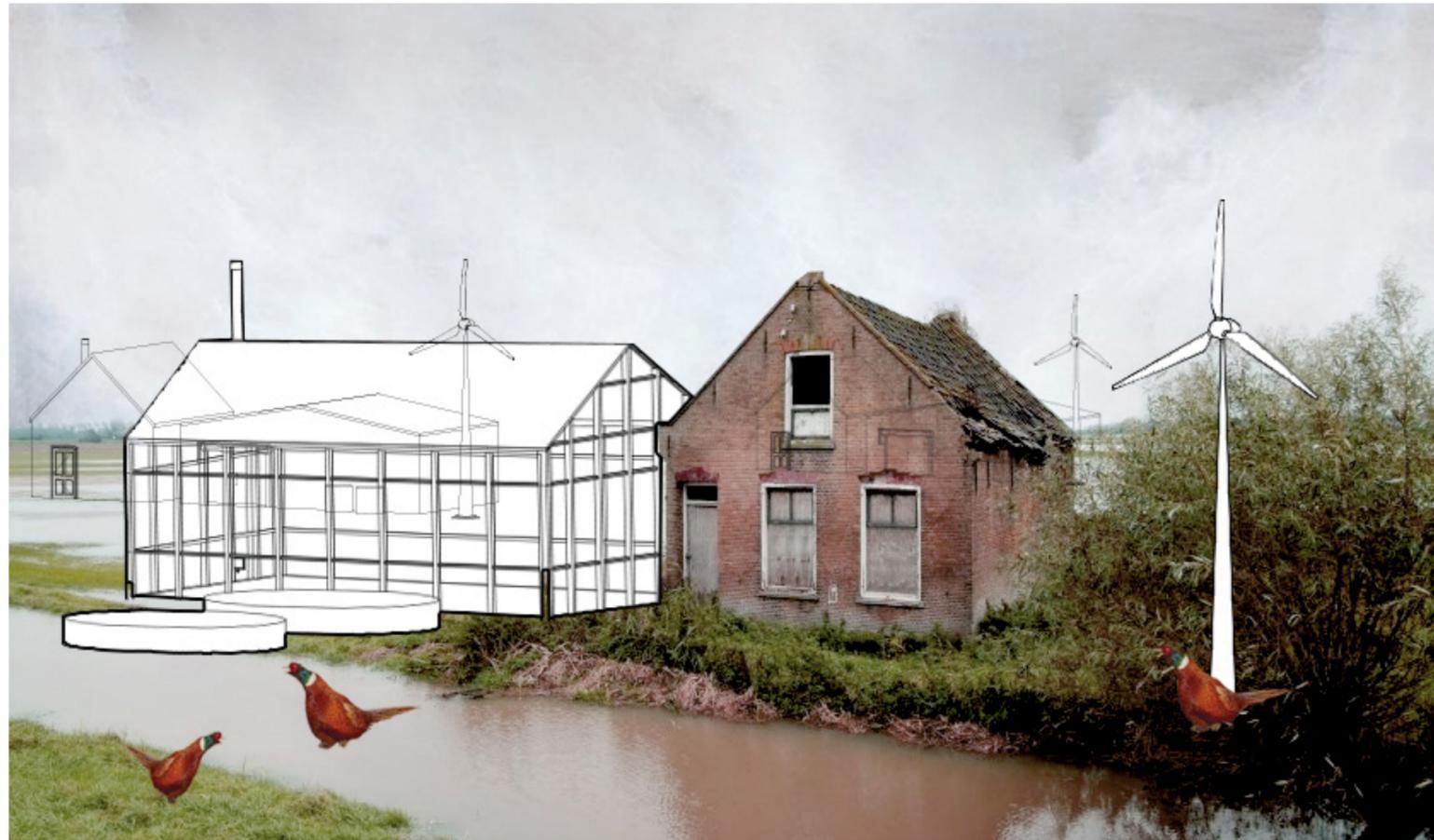
Types of drosscapes in the area of intervention.



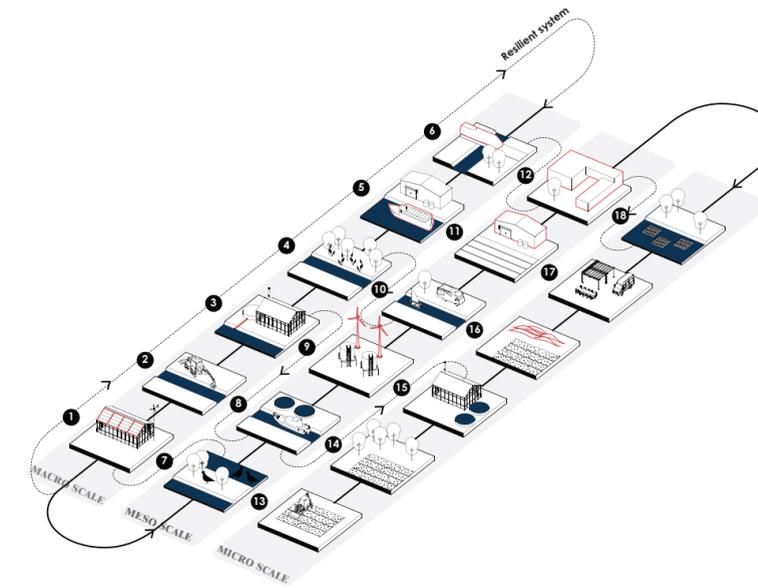
- ▲ Campings
- Touristic path
- Natural path
- ☀ Knowledge hub
- Local ecosystems
- Rotterdam-Antwerpen gateway
- 🌲 Protected nature
- 🐟 Fish habitat
- 🐦 Bird habitat

Patch intervention. Current agricultural patches would be more compact and biodiverse.

6.1.8 PROPOSED VISION



6.1.9 DESIGN OF URBAN & PERI-URBAN FLOW IN DIFFERENT SCALE



Macro scale

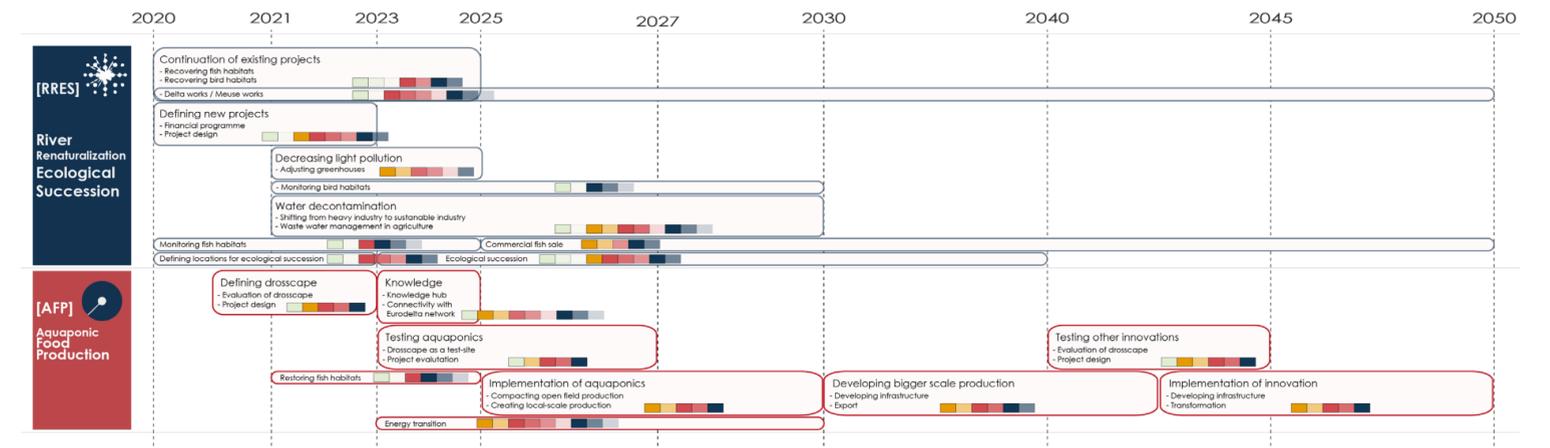
1. light pollution reduction
2. water management
3. water decontamination
4. ecological succession
5. export
6. connectivity

Meso scale

7. bird habitat
8. fish habitat & fishery
9. renewable energy
10. recreation
11. on-site processing
12. knowledge hub

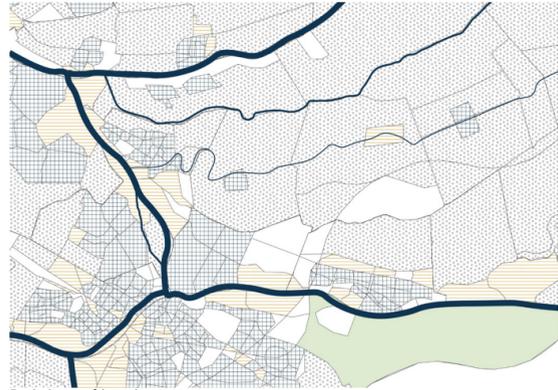
Micro scale

13. compact agriculture
14. biodiverse agriculture
15. aquaponics
16. on-site compost
17. local market
18. innovative projects



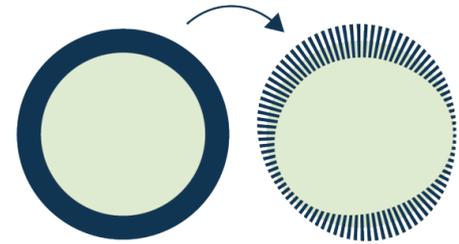
6.2 RURAL AREA

6.2.1 CHALLENGE IN RURAL AREA_ SEGREGATED LANDSCAPE



Patches of landscape

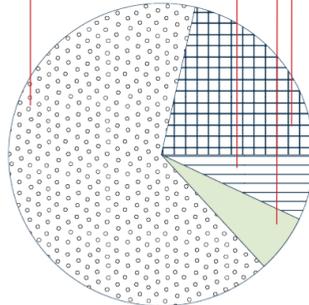
The focus area encompasses the so called "Green Heart" and the urban patches of several cities around Dordrecht in east of the province. Open land in Het Groene Hart Occupies 180,824ha, while urban areas only 65,215ha. The patches are clearly segregated and work separately. However urbanized territories hold only 22,3% of all the territory. Meanwhile green pastures use 61,4%. Profile of farms is livestock, dairy production and producing and tourism. The urban areas include heavy industry, neighbourhoods, R&D centers. Natural and protected areas takes only 7,6% of all the space which is even less than industrial parcels in total



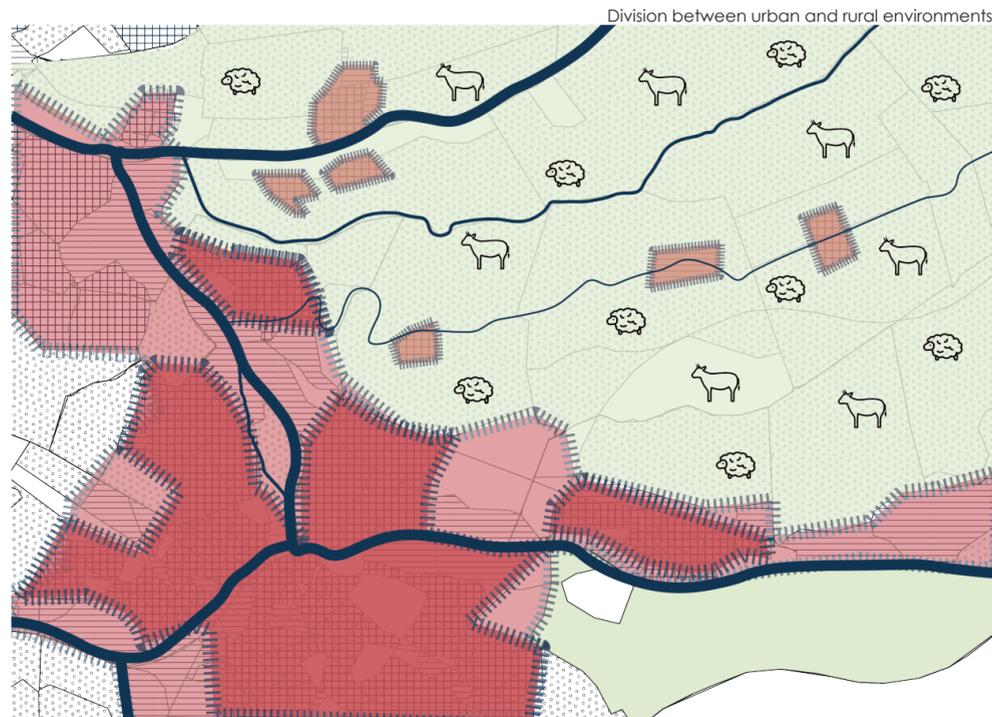
POTENTIAL & AMBITION FOR RE-DEVELOPMENT:

- Compact urban-rural integration
- Biodiverse landscape
- Transition from livestock to diverse farming
- River renaturalization
- Knowledge stripe
- Balanced urbanization
- More natural habitats in farms

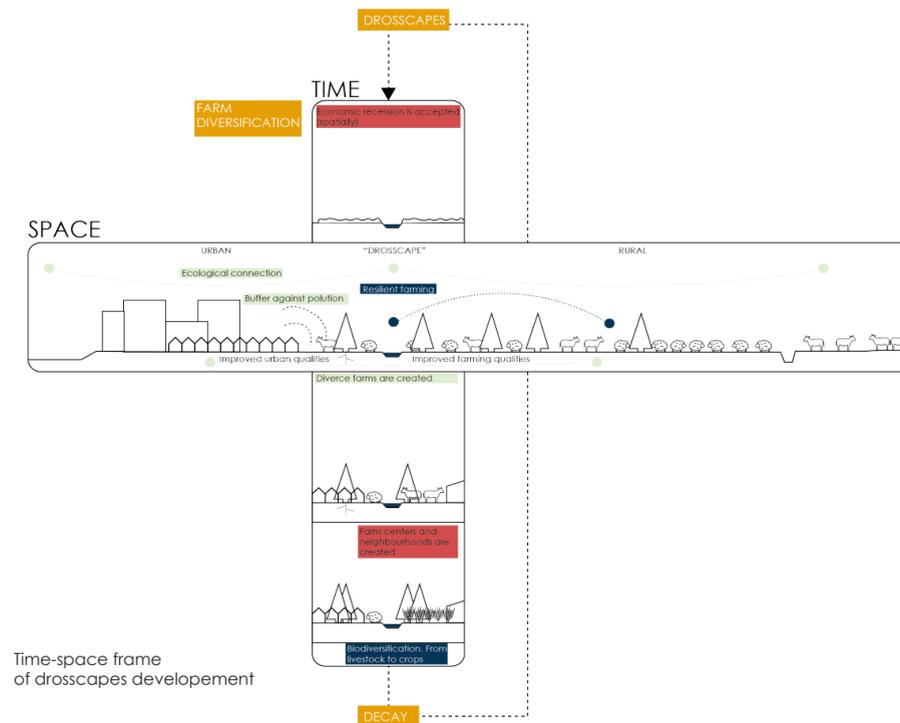
22,3% Urban land
61,4% AGRO LAND
7,6% Nature land
8,7% Industrial land



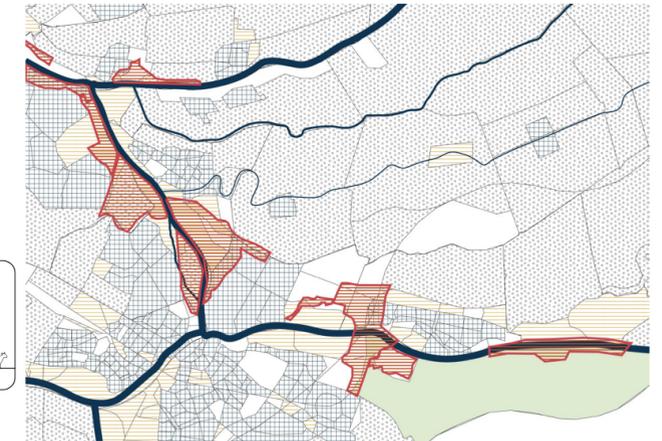
The location and all the other features were stimulus for the key principles in this territory



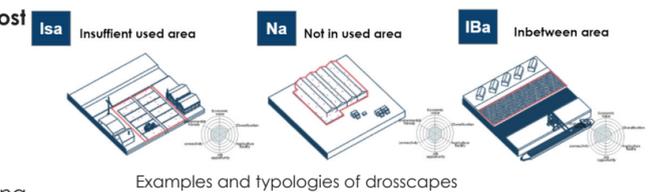
6.2.2 DROSSCAPES INTERVENTION_ THE CATALYST FOR CHANGES



Time-space frame of drosscapes development

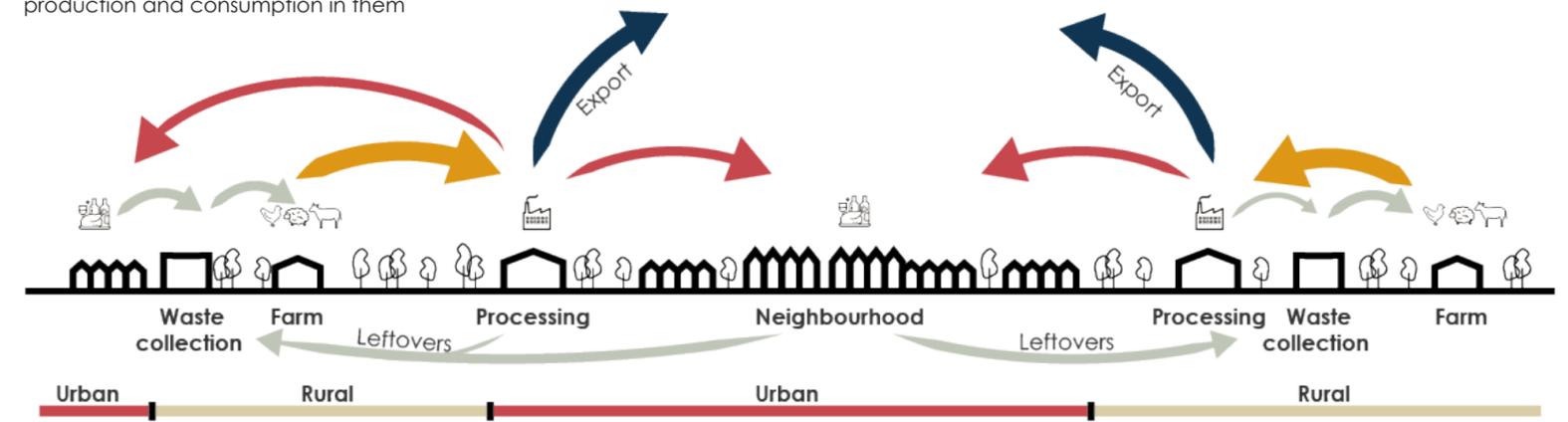


The main challenge in the project is to facilitate drosscapes on a local scale. The most usual types of drosscapes in this area are:



- insufficient uses of land (for e.g. monocultural organic fields)
- totally unused (for e.g. abandoned former industrial fields)
- areas that are in between (for e.g. along infrastructural corridors)

Drosscapes become more intensified and diversified throughout the time. New farming methods would be introduced here in the first years. Later, the infrastructure of farming dwelling and recycling appear. Finally, such areas could work in full capacity with production and consumption in them



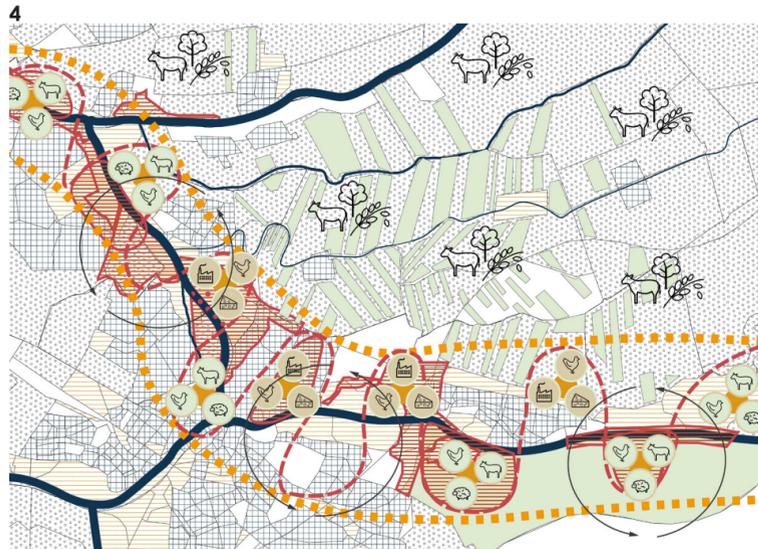
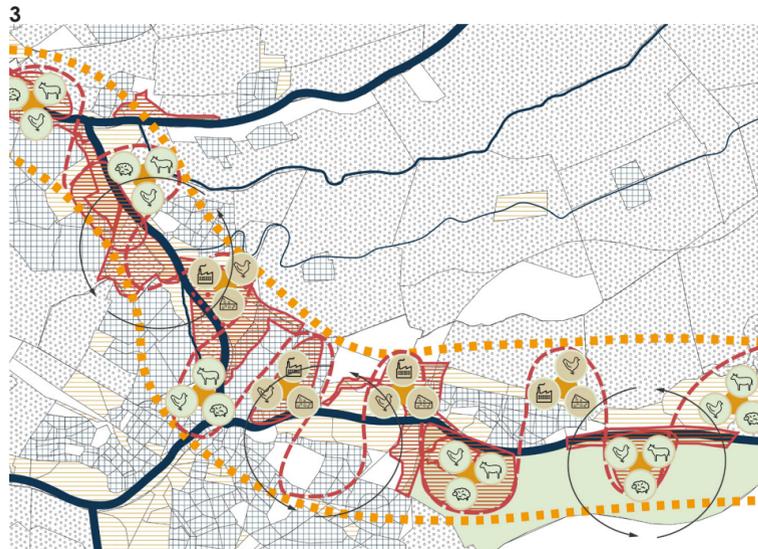
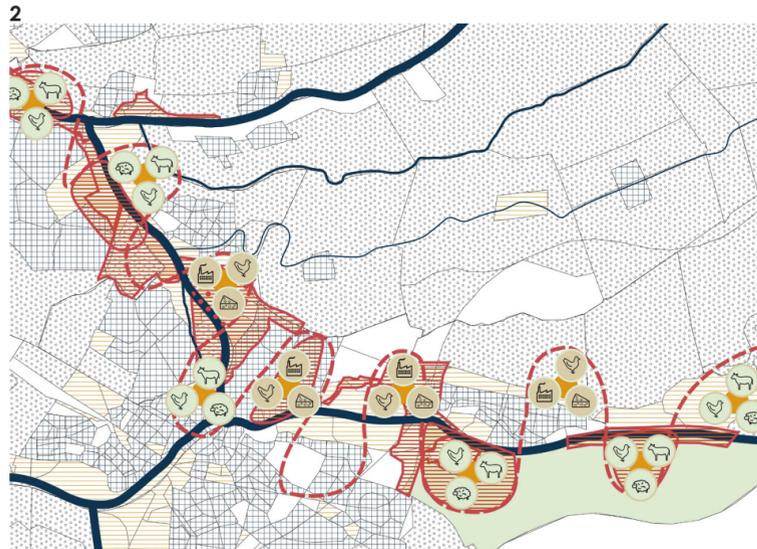
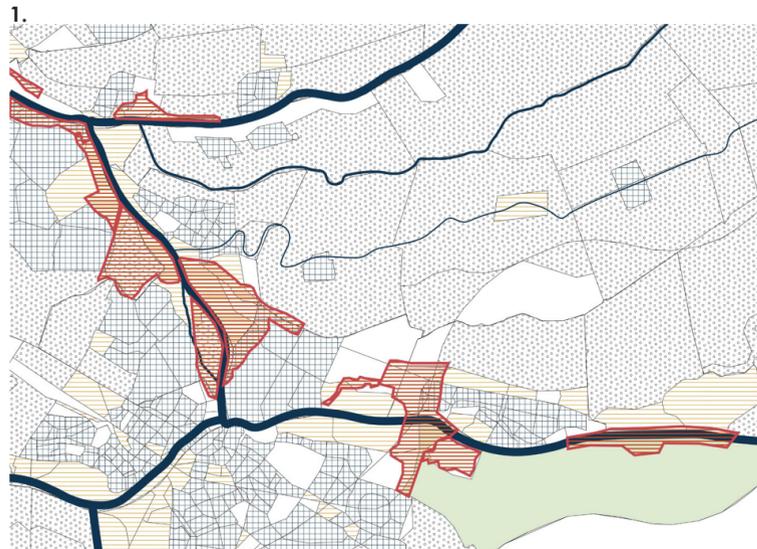
Principle section of interventions in drosscapes

6.2.3 STEPS OF THE PROJECT

The essence of the vision is urban and rural integration and diversification of agrofields for closing the loops of materials

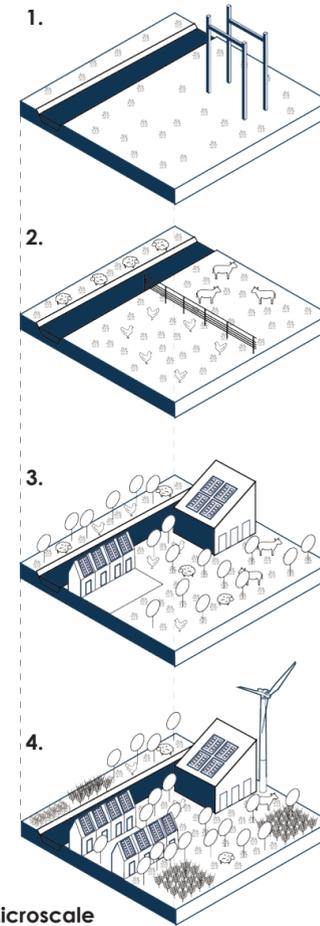
The main stages of the implementation:

1. Identification of drosscapes on the edge of the "Green Heart"
2. Creating the clusters of new farms, production and waste collection centers
3. Implementation of new neighbourhoods and new farms and envision the knowledge corridor in an intensified area
4. The biodiversification of existing fields and moving towards alternative production of meat



70 Maps depicting principle interventions

6.2.4 DESIGN OF RURAL FLOW AND LOCAL STAKEHOLDERS



Microscale

process of implementation shows the changes in small scale - one farm size.

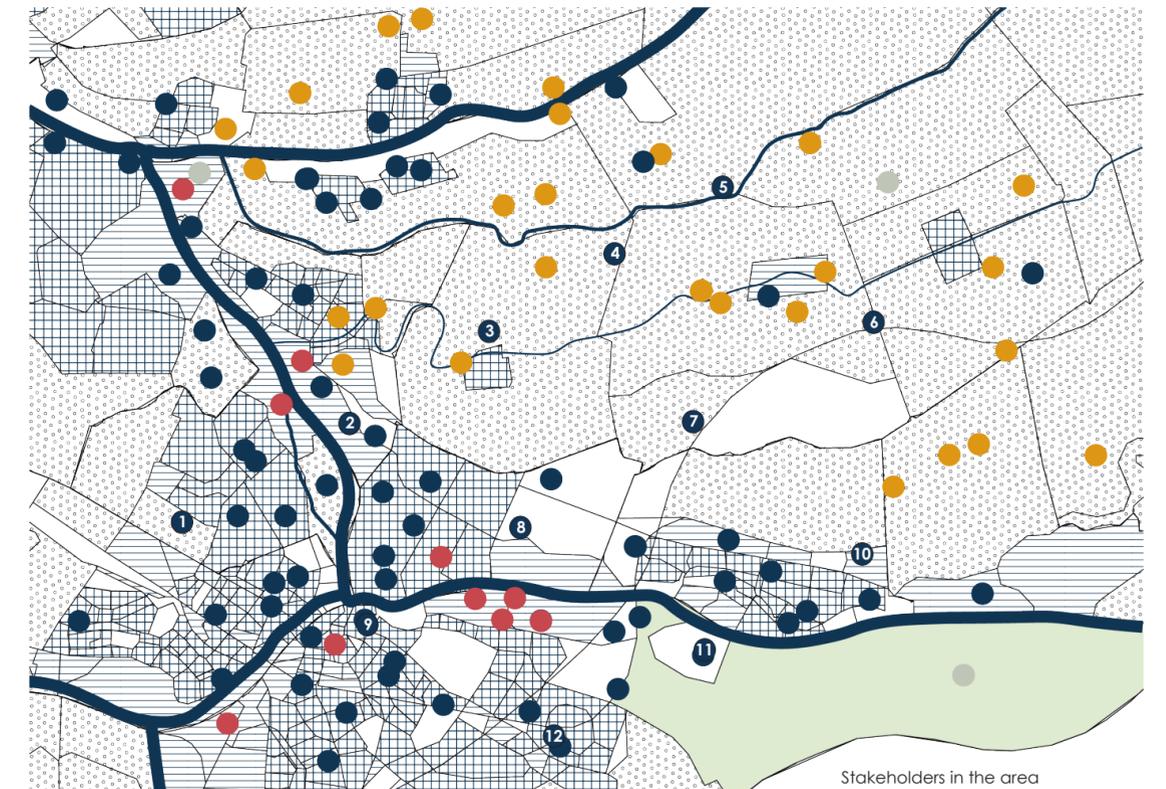
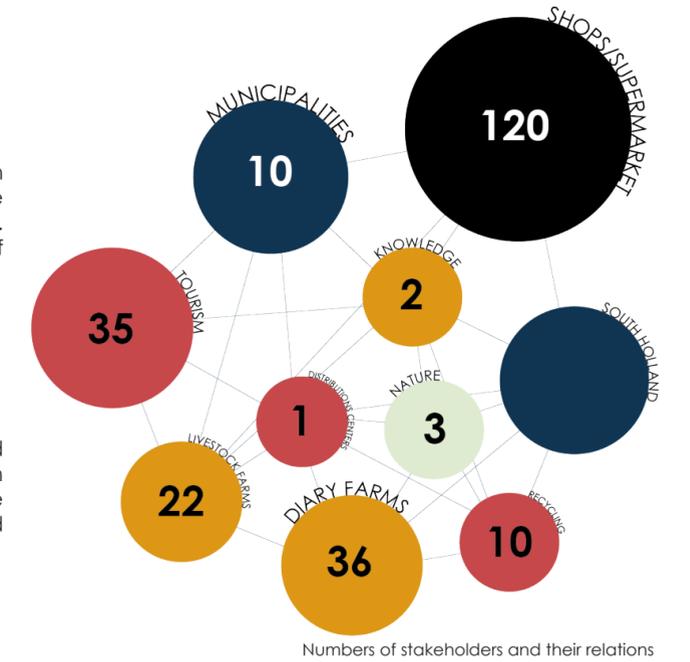
1. Traditional open agriculture. Finding drosscape both in a form of land in between and non-diversified field
2. Using drosscape to create a test site. Shifting (partially) towards own energy sources in private households
3. Implementing tested solution in a private household. On-site compost. Test site remaining
4. Transforming former test site into ecological succession site (no longer drosscape). Diverse household. Mix of residential and production landscapes

Stakeholders

In order to create knowledge based urban rural interaction, the actions need to be counted mainly on the local stakeholders. One of the most important groups of stakeholders:

- tourism
- animals and dairy farms
- municipalities
- retailers

Tourism sector together with animal and dairy farms encompass the decisions in the "Green Heart" territory. Meanwhile retailers are the most influential and numerical actors in urban area



Stakeholders in the area

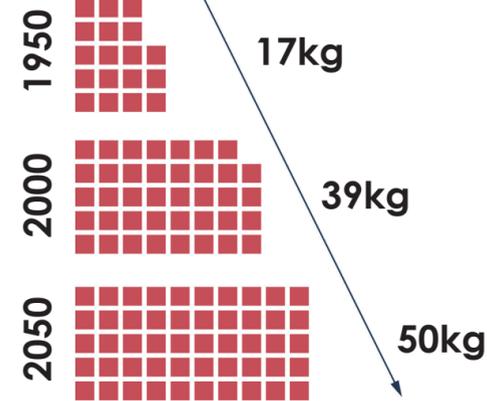
6.2.5 BUSINESS MODEL

The meat as food production is growing every year all over the world. From 1950 to 2000 the amount of meat increased **22kg** per person per year. It is expected that it will reach as much as **50kg in 2050**. The consumption is growing proportionally. As a result, it is becoming extremely difficult to compete in such an industry for the province of South Holland. The amount of land is the main limiting resource that blocks the dramatic increase in livestock production. It is even more complex when looking at the statistics of Dutch meat consumption. It is almost double the world consumption. In total it was **85kg** of meat per person in 2011. Still, there is evident a slight drop in consumption.

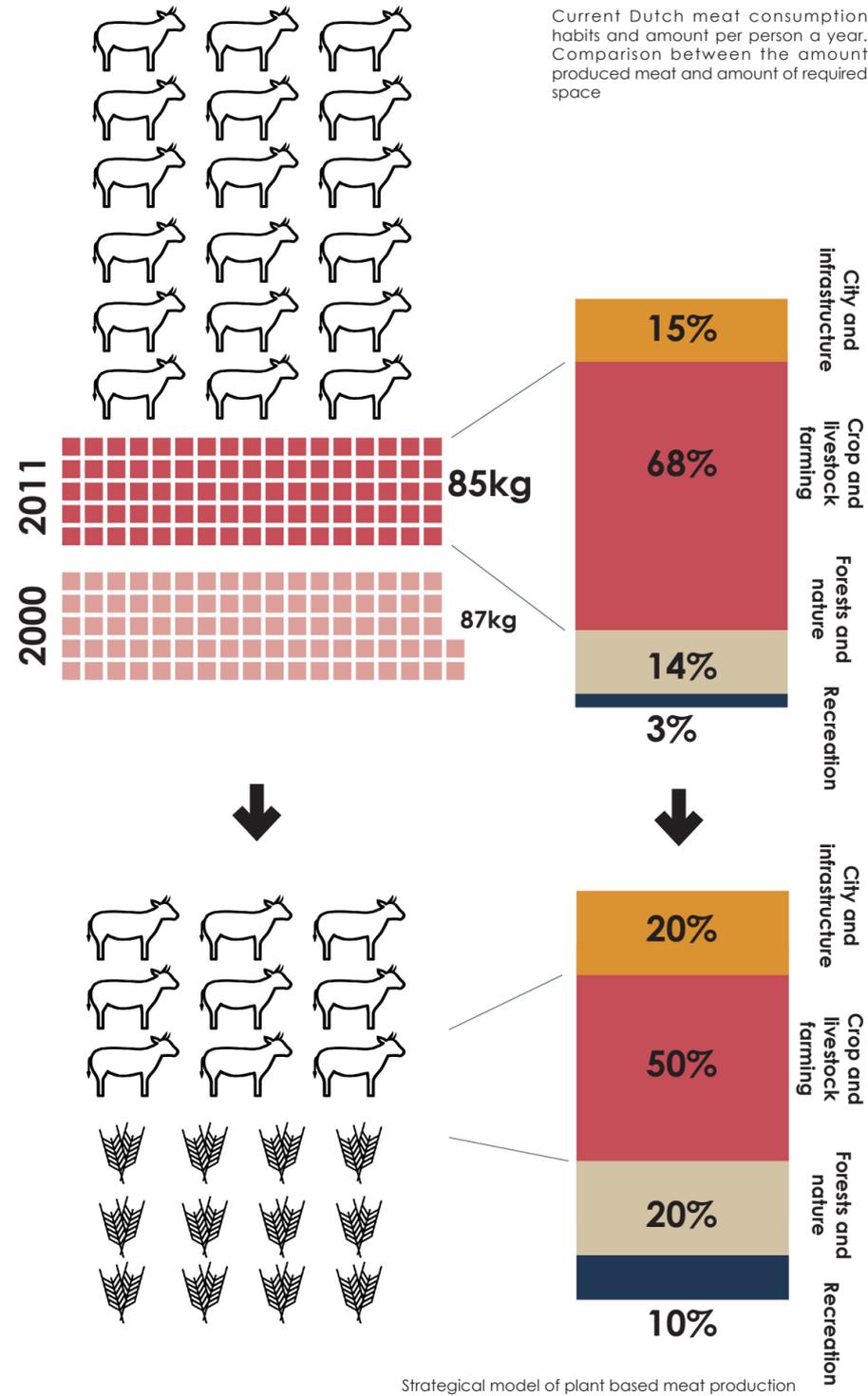
Taking everything into account, the industry of livestock is experiencing a number of challenges very soon. As a result, it requires alternative ways of production in order to meet the need of food all the world and the Netherlands in the beginning.

The local universities like Wageningen are already testing the **plant based meat** production out of crops like wheat. Such an innovation would let use less space for such meat production and biodiversity the agrarian lands. Nonetheless, the traditional meat production would not be abandoned but enriched instead. The two farming traditions would fit into one field.

Finally, this innovation is the key element in exporting the knowledge of alternative farming methods and feeding the growing population with a locally based food production.

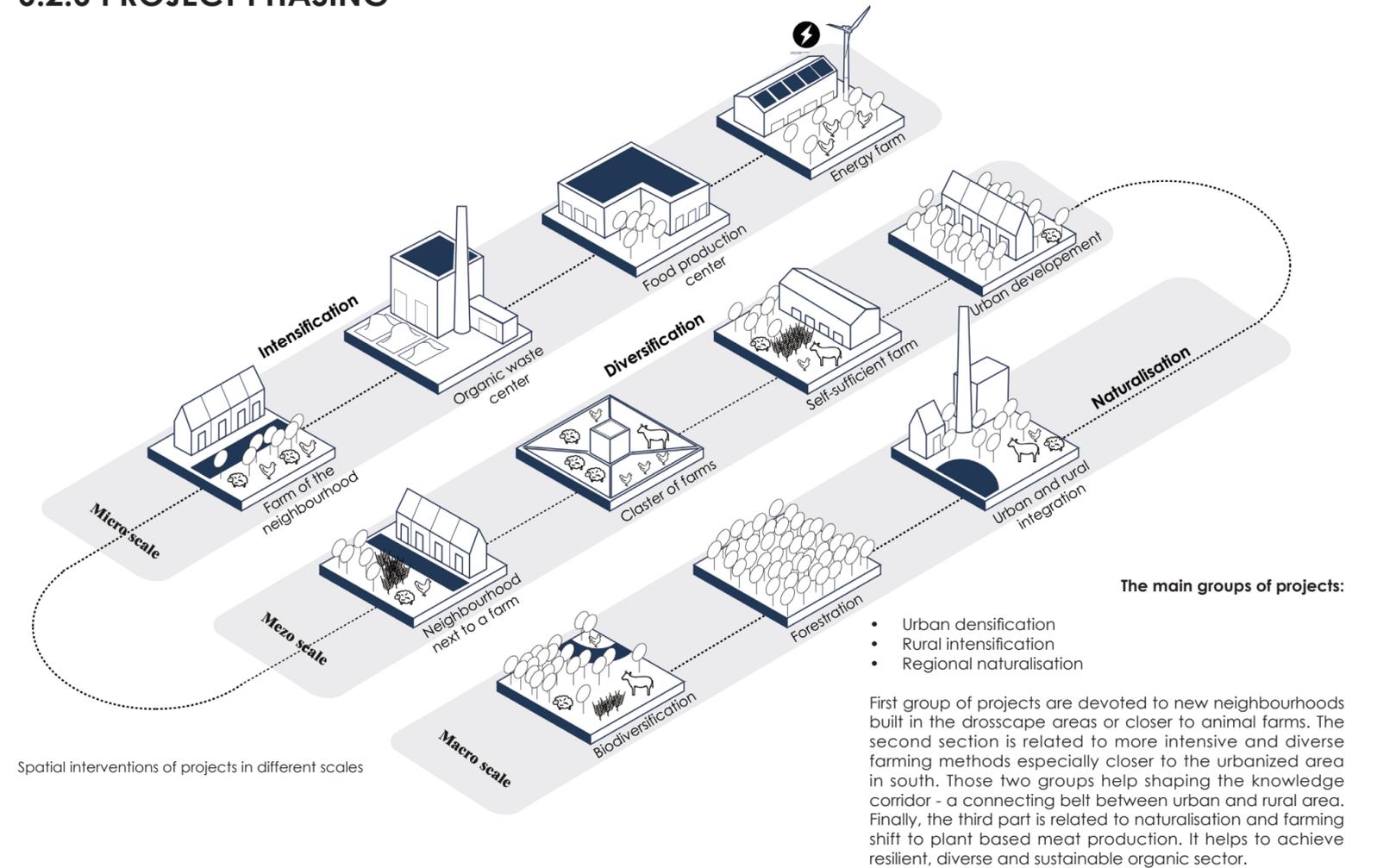


Global meat consumption per person a year

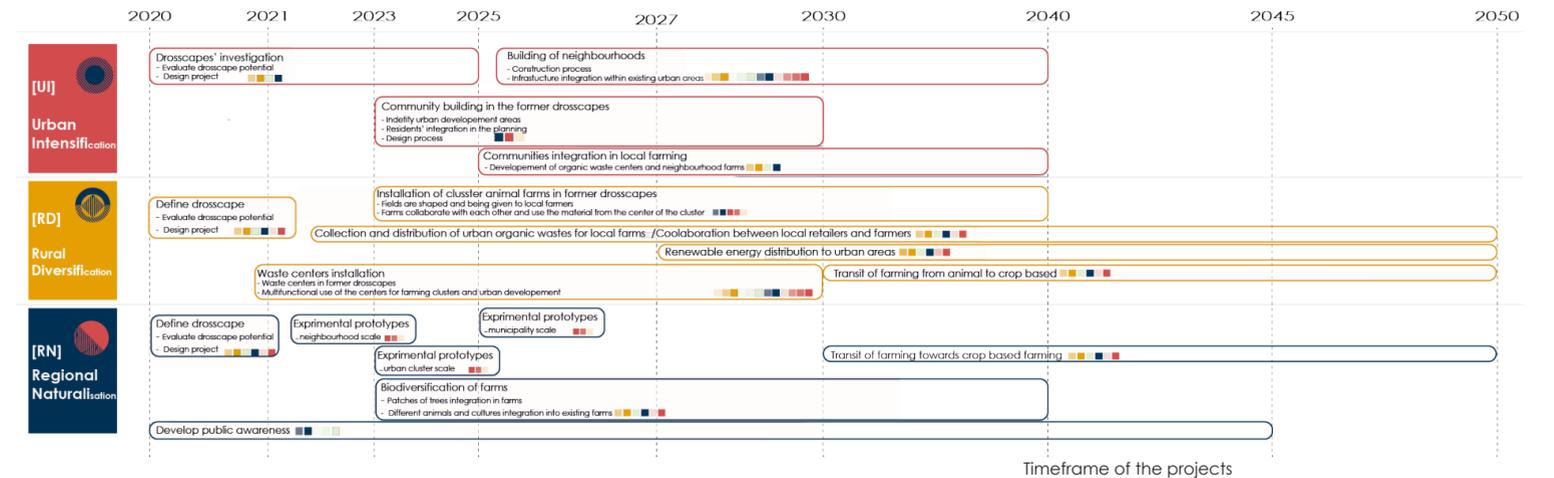


Strategical model of plant based meat production

6.2.6 PROJECT PHASING



Spatial interventions of projects in different scales

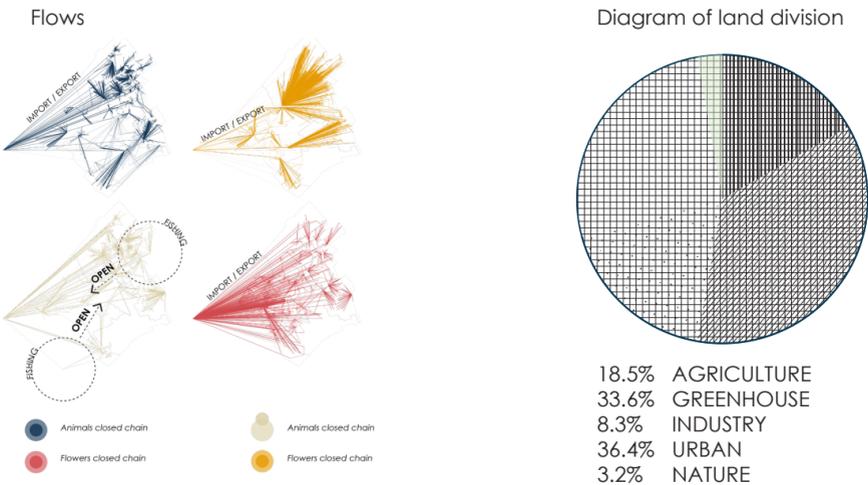


Timeframe of the projects

6.3 GREENHOUSE

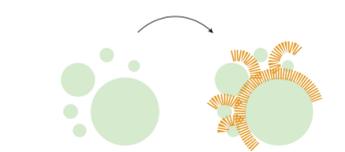
6.3.1 Principles

For the Greenhouse Zoom In it's all about the current greenhouse industry and its interaction with the urban fabric in its vicinity. As can be seen on the map and the land division diagram, the greenhouse industry takes up most of the area, approximately 5000 hectares. There are pockets of nature, consisting of seaside, forestry, and small green patches, but they are very disconnected from one another. Another major point of interest is how the organic flows that were investigated, already have the potential to be closed apart from the fishing industry, as can be seen in the diagram of flows. Based on this information, using the design principles, the potential and ambition for this area were developed and can be seen on the diagram below. It consists of compacting the current clusters, achieving a biodiverse landscape, connecting the now disconnected patches of nature, implementing ecological succession, giving space to the river by renaturalization, and creating locally developed resources to sustain urban growth.



A diagram showing the division of types of land within the Greenhouse zoom in. Own image.

A diagram showing the division of types of land within the Greenhouse zoom in. Own image.



- COMPACT CLUSTERS
- BIODIVERSE LANDSCAPE
- CONNECTED BLUE & GREEN STRUCTURE
- ECOLOGICAL SUCCESSION
- RIVER RENATURALIZATION
- LOCALLY DEVELOPED RESOURCES TO FACILITATE URBAN GROWTH

The possibilities of this area.

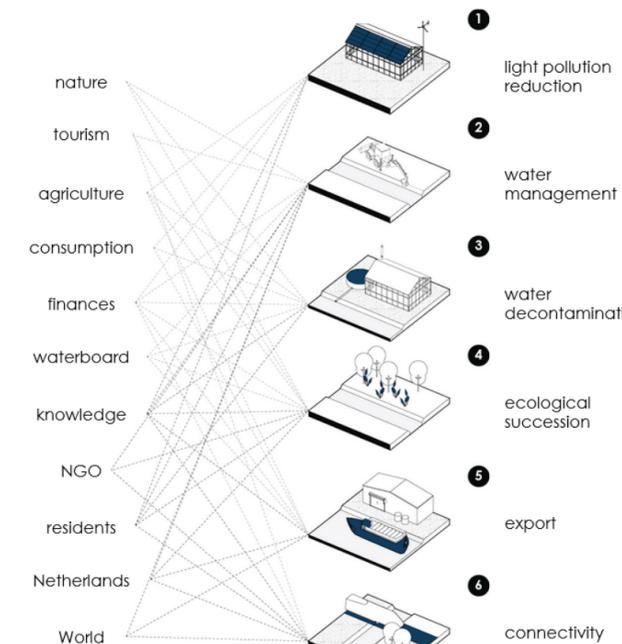


6.3.2 Regional framework

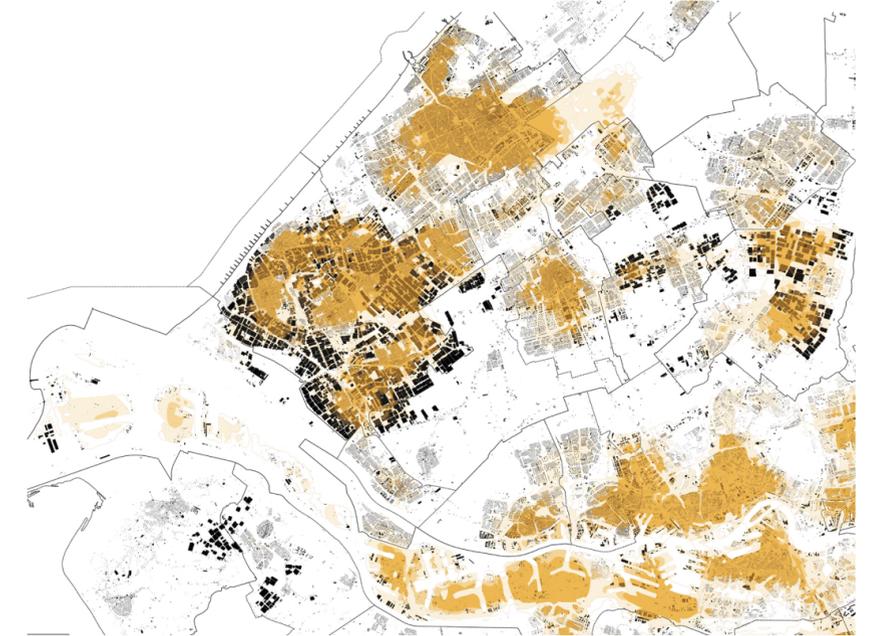
The main issues that this zoom in will try to approach are the issues of soil salinization, as can be seen in Figure -SALINIZATION, and light pollution, as can be seen in Figure -LIGHT. The soil salinization is a major issue within this part of South Holland. Over time it can be severely harmful to the agriculture industry, and at the same time it could be harmful to the places where groundwater is extracted for drinking. Light pollution could be considered as an excess product of the greenhouse industry, which, currently, is now simply being cast into the atmosphere. The transformed drosscapes should be able to diminish or utilise these types of pollution. Figure #INTERVENTIONS#, shows which interventions are possible and help to transition this area into a patched up region.



Areas of salinization. Reference: Based on Deltares data. Illustrated by authors



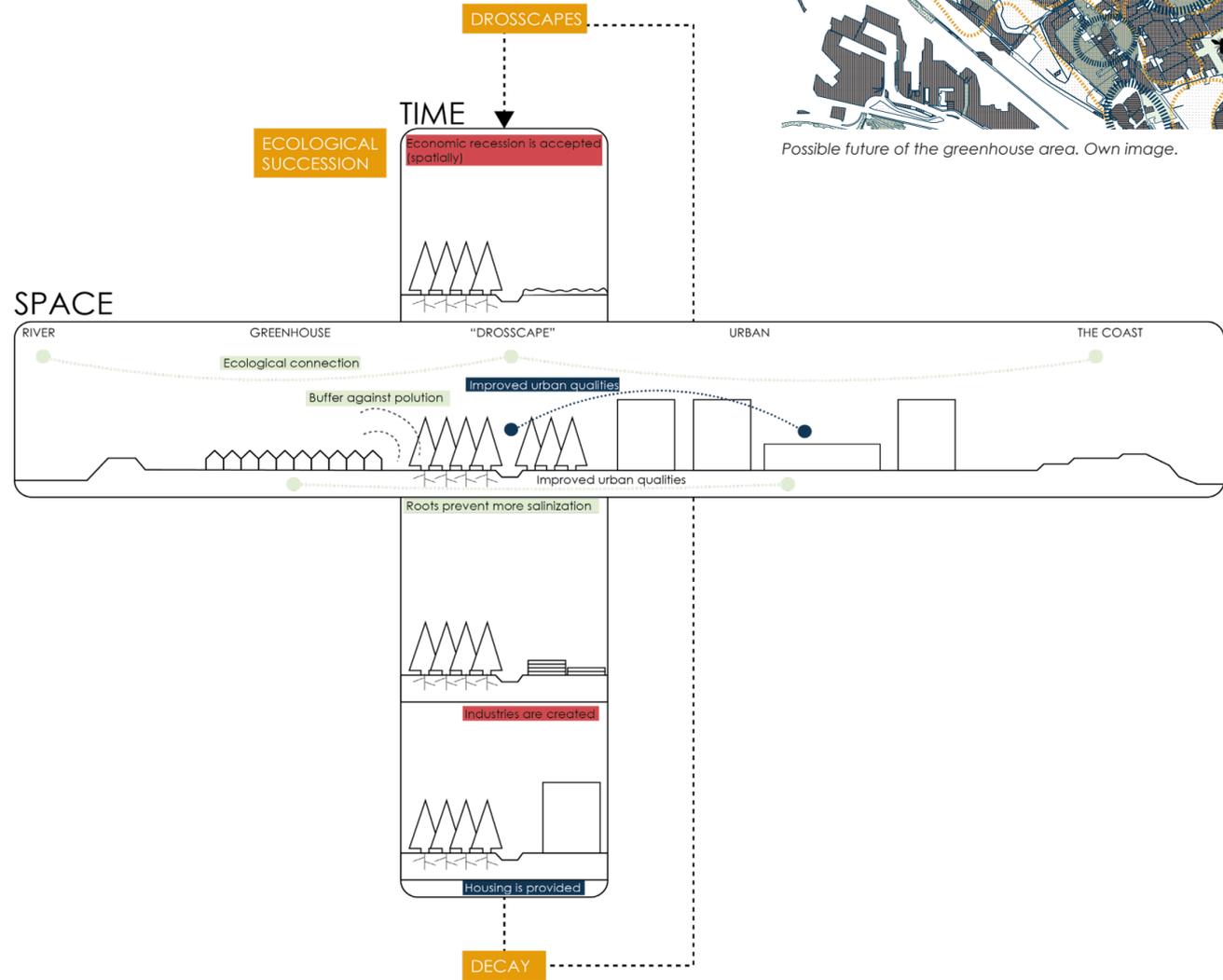
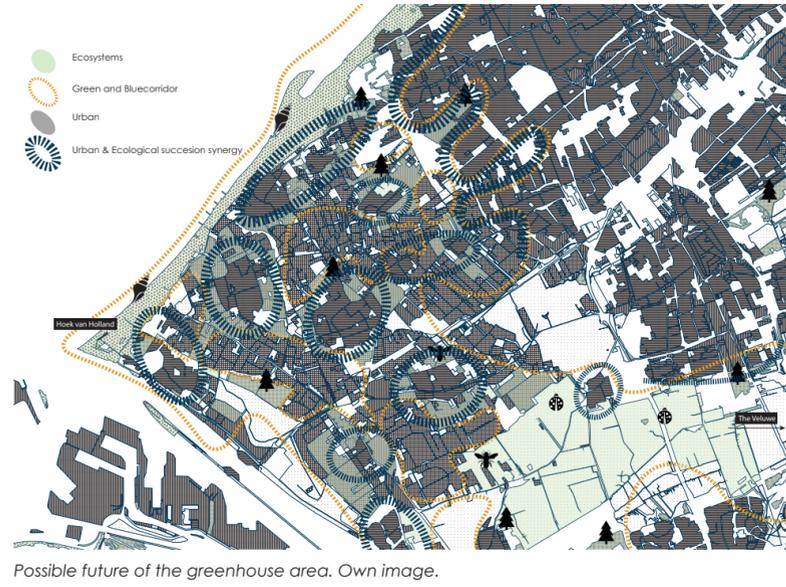
Interventions & stakeholder relation. Own figure.



Areas of light pollution. Based on Klimateffectatlas data. Illustrated by authors

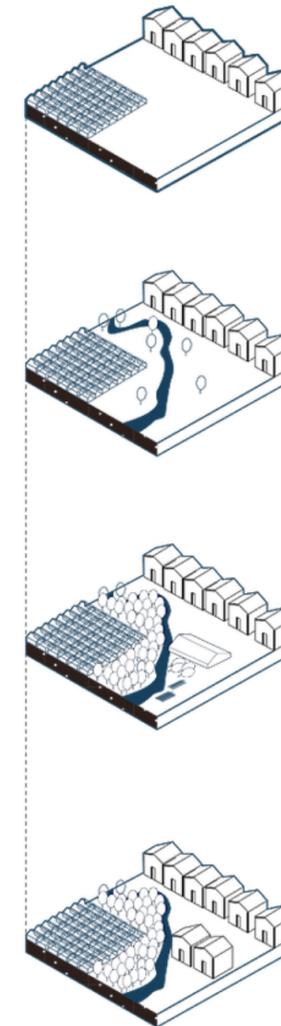
6.3.3 Meso scale

There are several types of drosscapes within this zoom in, but the main ones are shown on the page 77. They consist of the outskirts areas on the side of roads used to facilitate the greenhouse industry, in-between areas near industry, in-between areas near the river, and unused areas. In the time and space diagram, a section that shows the approach in space and time of how these drosscapes, implementing ecological succession, could help mitigate the issues illustrated in the previous section. At the same time, it helps shape the drosscape into a functional area that can help shape new types of industries related to ecological succession. Utilising this framework this part of South Holland could be reshaped into a place looking like on the map to the right, where natural patches form a green & blue corridor, and in which the drosscapes form a buffer and space of growth for new initiatives.

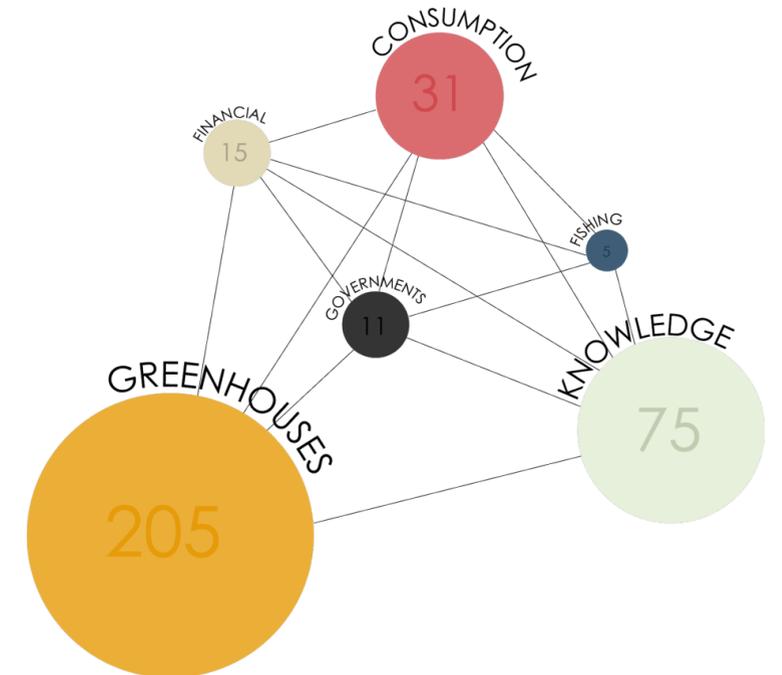
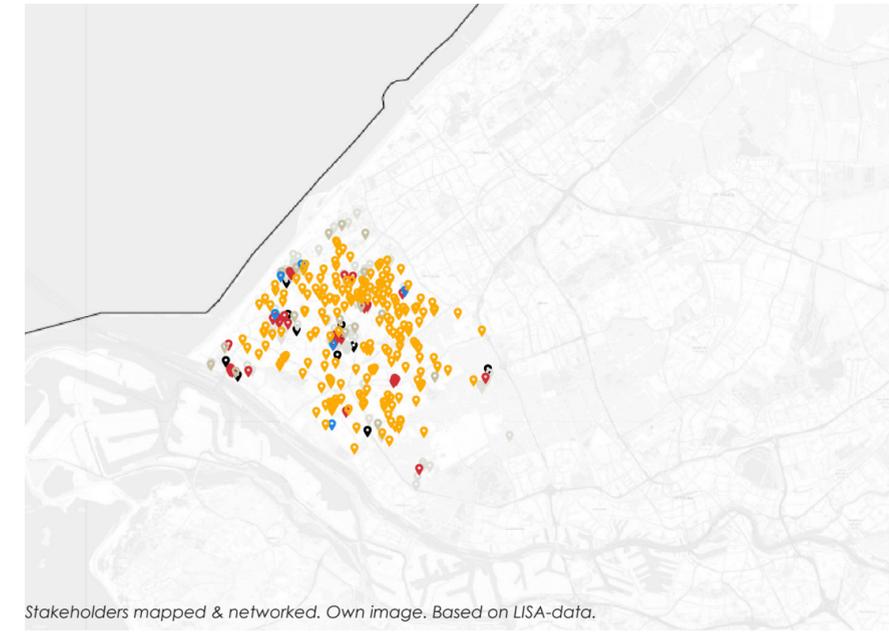


6.3.4 Microscale

Placing the main involved stakeholders on the map results in Figure #STAKE#, these are the main points of interest where the change of the drosscape on microscale can function as shown in Figure #DROSSTRANSITION#. It starts off with an in-between drosscape between greenhouse and urban fabric. Then this place is allowed, naturally, and/or with assistance, to transition into a more natural ecosystem. Afterwards, over time, these new ecosystems provide resources that facilitate new types of industries. Finally, the resources are used to sustain urban development, after which, the cycle can begin anew.



- 1 Inbetween drosscape between greenhouse & urban fabric.
- 2 Natural and assisted transition towards natural ecosystem. At the same time connect with other ecosystems. Creates a buffer between industries and urban.
- 3 Created resources facilitate new industries that make use of the resources.
- 4 Resources can be applied to facilitate local growth of the urban fabric.

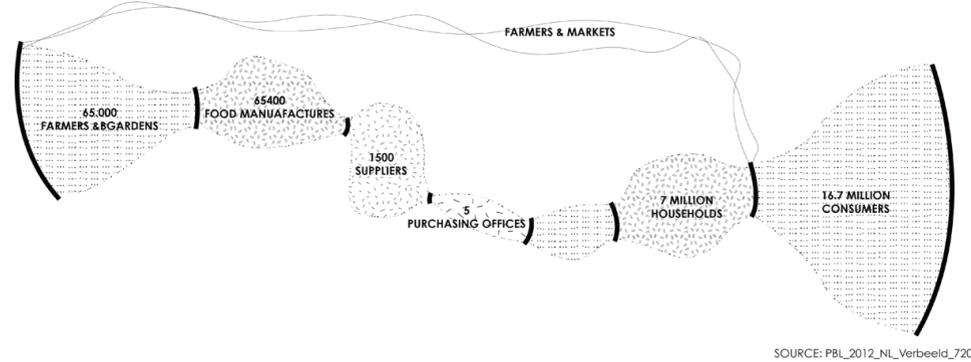


6.4.2 CHALLENGE IN URBAN AREA_ MONOPOLIC FOOD CHAIN

The strong concentration in the food chain gives supermarkets & purchasing offices a great deal of power, Makes wide range of participants difficult.

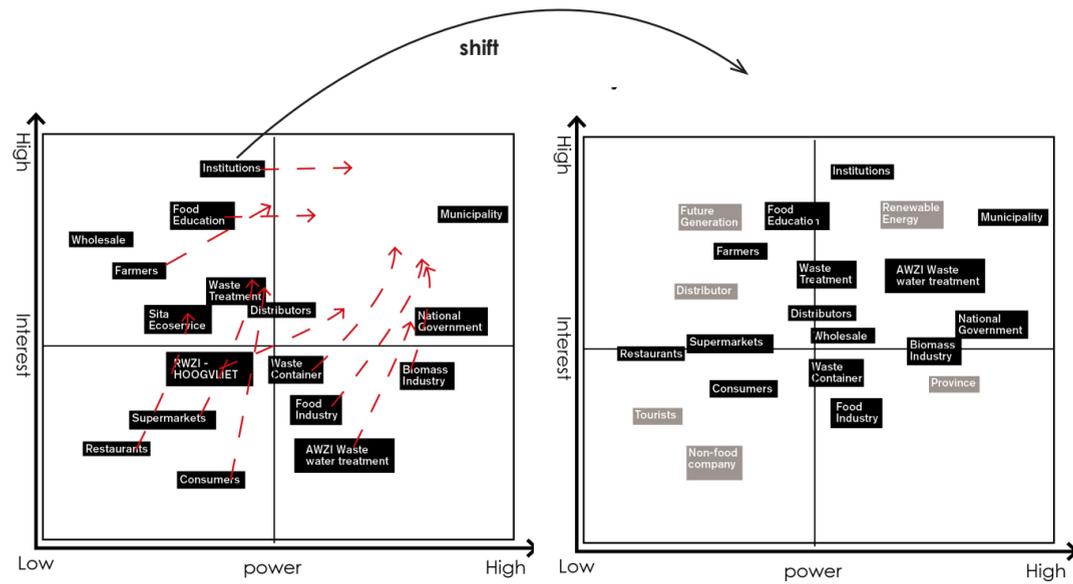
Transform drosscape & Source food locally

Another objective in city is to make more people get involved in the food chain. Which can also use drosscape as a production field to source the food more locally. While urban farming can provide cities with some vegetables and fruits, it is currently limited in its ability to satisfy people's broader nutritional needs. However cities can source substantial amounts of food from their peri-urban areas. By reconnecting cities with their local food production supports and transforming drosscapes to facilitate these new functions. It allows cities to increase the resilience of their food supply by relying on a more diverse range of suppliers, and supporting native crop varieties. It offers city dwellers the connection with food and the farmers who grow it. Local sourcing can also reduce distribution supply chain.

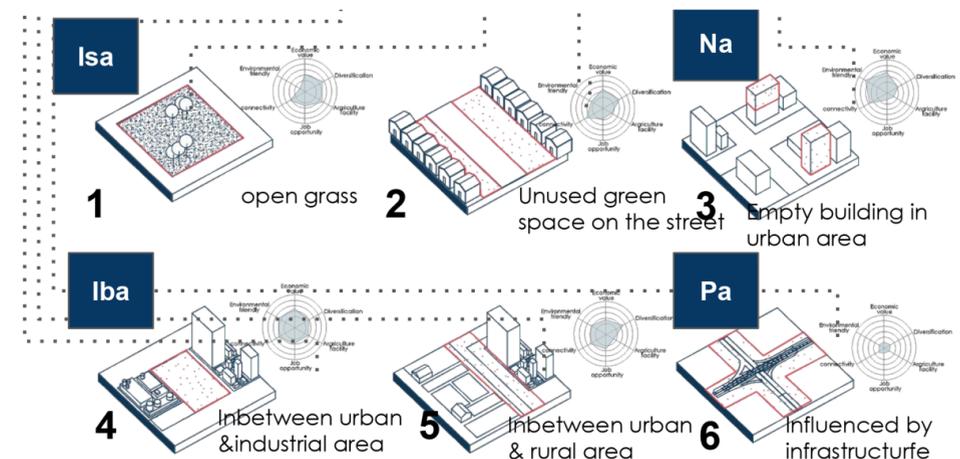
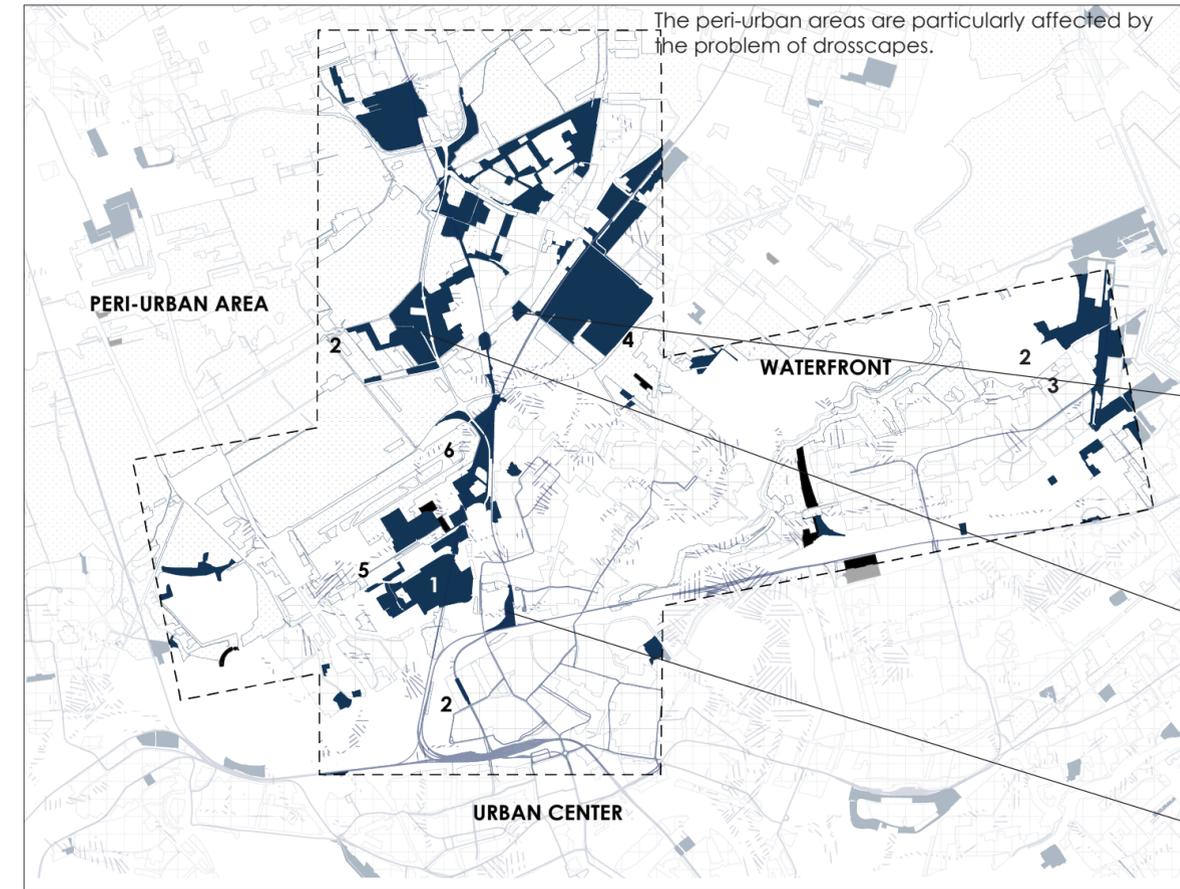


Shift Power in food chain

To give citizens more power in the food chain we need to start implementing change through the consortium of key actors from across the value chain.



6.4.3 SITE ANALYSIS

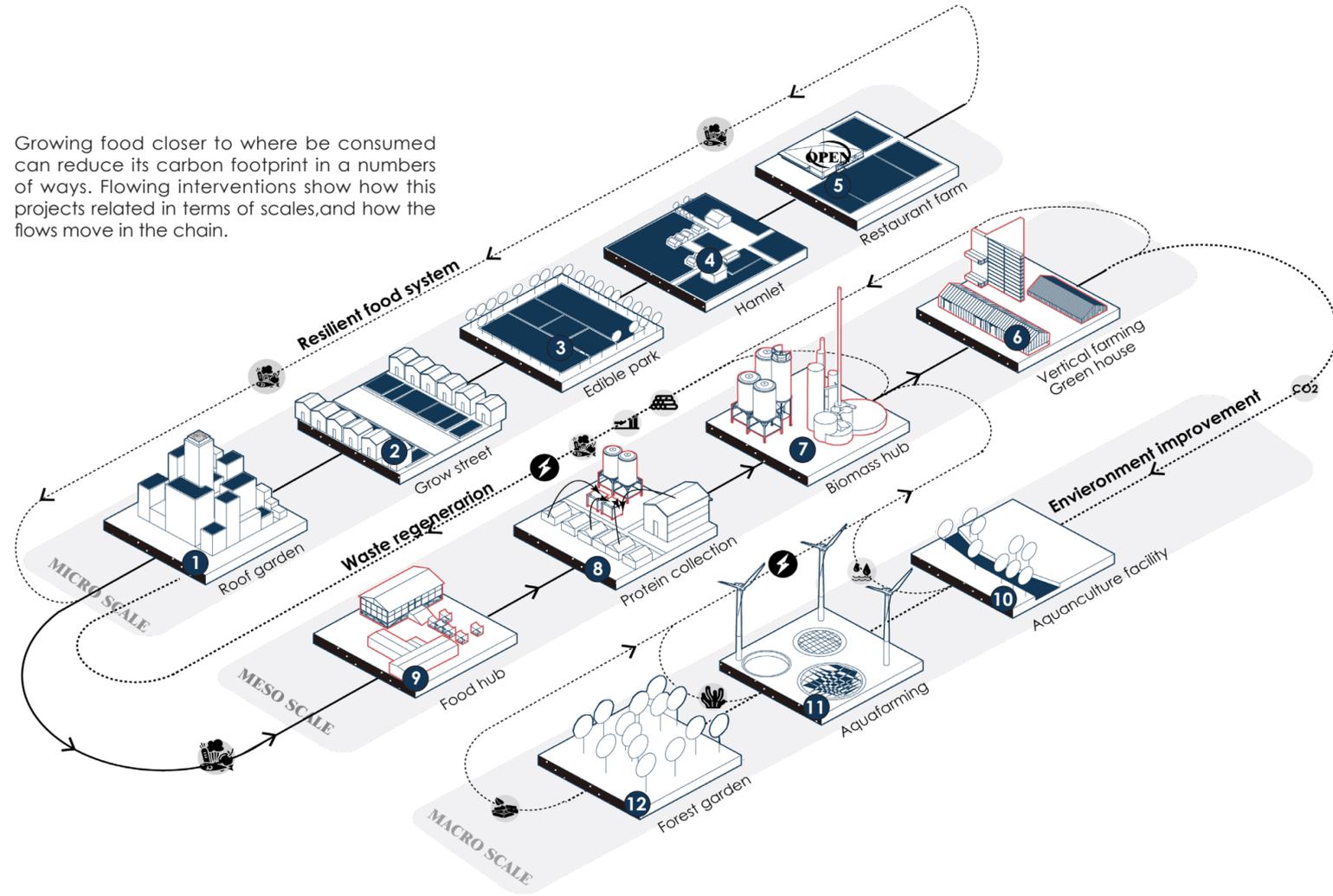


Drosscape: The experimental site chosen in the Rotterdam city, at the edge of urban center. The drosscape in this area is quite diverse and has full potential to transform.

Types of intervention: Collaborative food processing spaces, Local food hub, Waste-to-energy processing

6.4.4 DESIGN OF URBAN & PERI-URBAN FLOW IN DIFFERENT SCALE

Growing food closer to where be consumed can reduce its carbon footprint in a numbers of ways. Flowing interventions show how this projects related in terms of scales, and how the flows move in the chain.



1 Roof garden
High rise building roof has potential for plant.

2 Grow street
Public that incorporate food production involving orchard-lined street, fruit boulevards, planting strips or tree lawns, and edible front yard.

3 Edible park
Public open landscape mixed uses, including food production.

4 Hamlet
A form of peri-urban cluster development including a group of houses and processing facilities arranged around agricultural production.

5 Restaurant farm
Farm to table compact

5 Restaurant farm
Farm to table compact

7 Biomass hub
Collection and regeneration products from organic waste

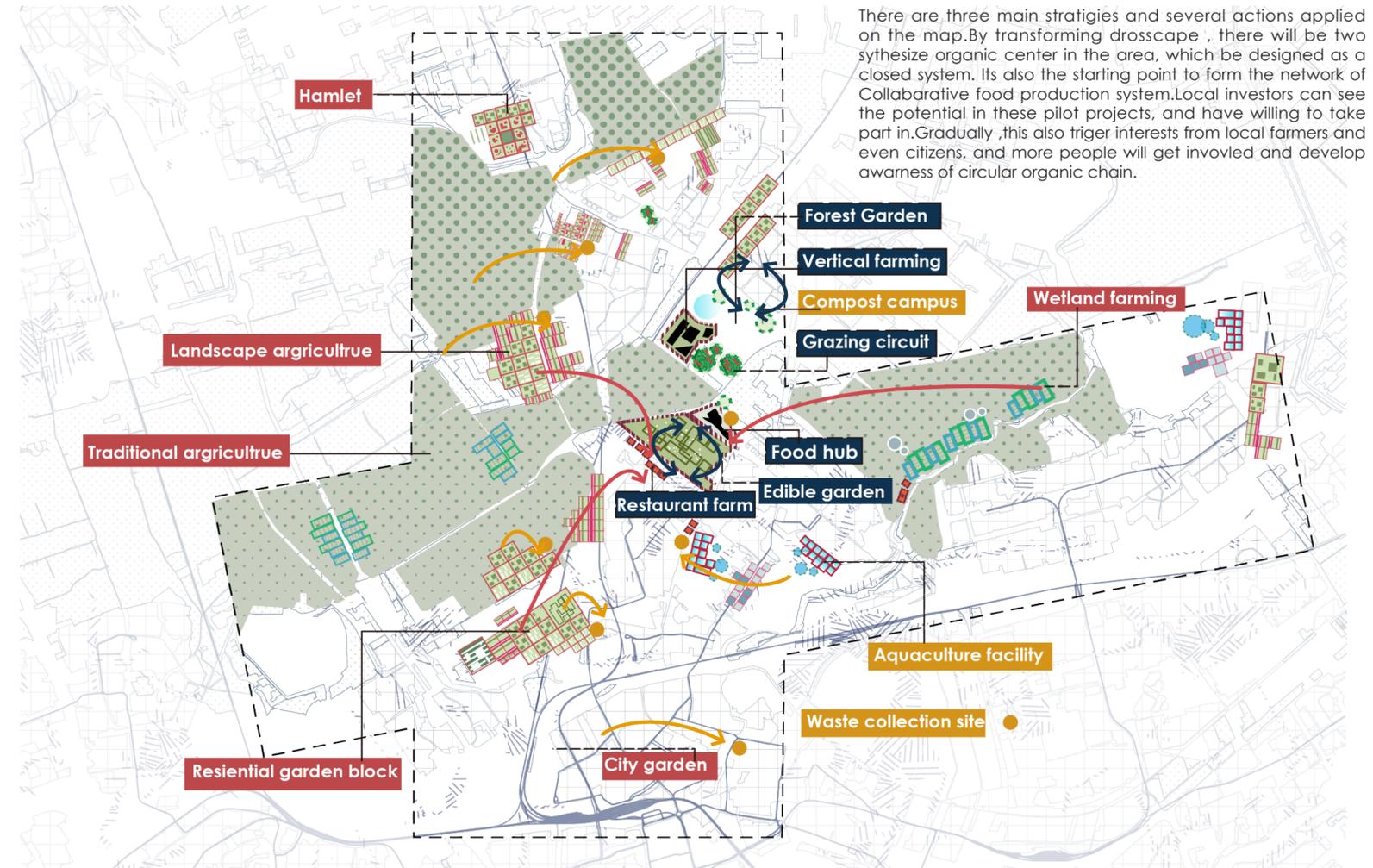
8 Protein collection
Local organic collection point

9 Food hub
Multifunctional food center, providing food production, food market, education of food knowledge.

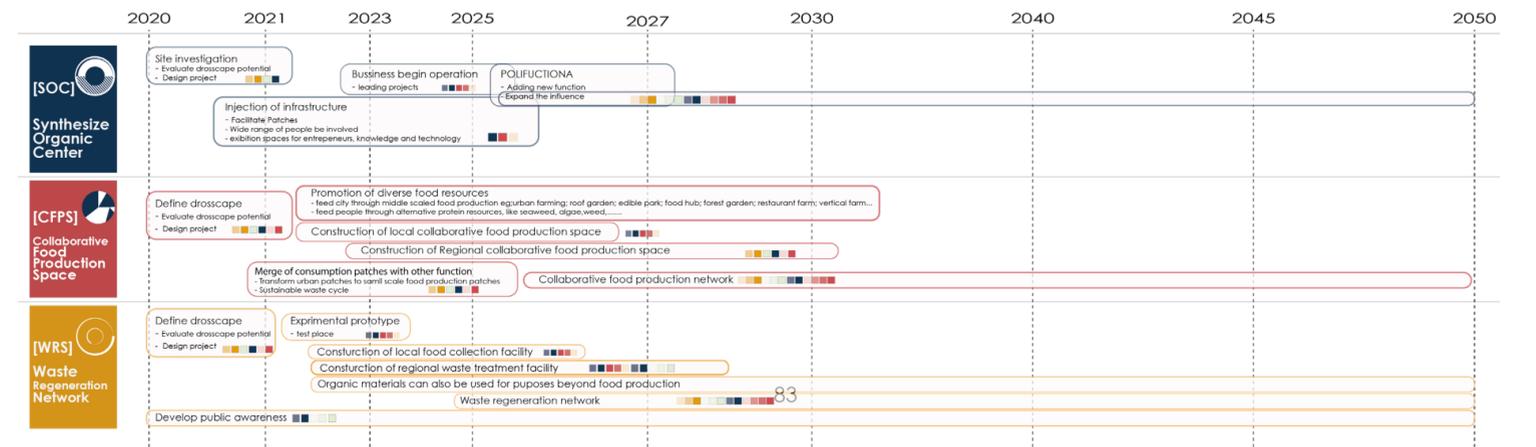
10 Aquaculture facility
Complex for the farming of aquatic organisms, including fish, crustaceans, mollusks, and plants in closed loop system.

12 Forest garden
Edible forest which connect the big green structure beyond the city.

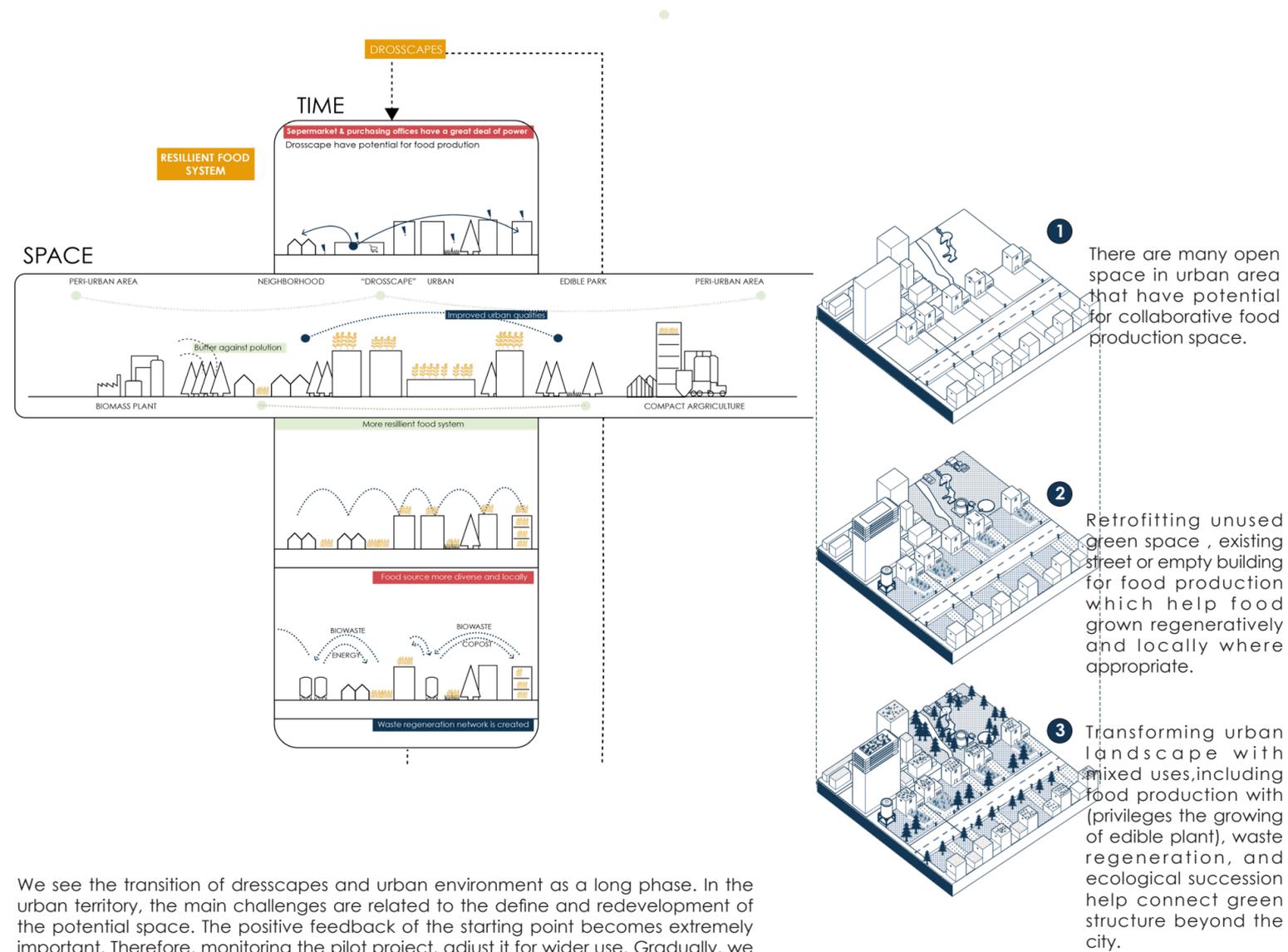
6.4.5 PROPOSED VISION



There are three main strategies and several actions applied on the map. By transforming the cross-section, there will be two synthesized organic centers in the area, which will be designed as a closed system. It is also the starting point to form the network of Collaborative food production system. Local investors can see the potential in these pilot projects, and have the willingness to take part in. Gradually, this also triggers interests from local farmers and even citizens, and more people will get involved and develop awareness of the circular organic chain.



6.4.6 DYNAMIC INTERVENTION



We see the transition of dresscapes and urban environment as a long phase. In the urban territory, the main challenges are related to the define and redevelopment of the potential space. The positive feedback of the starting point becomes extremely important. Therefore, monitoring the pilot project, adjust it for wider use. Gradually, we hope that the circular interventions in the organic sector can become a network in the regional scale.

7

CONCLUSION & REFLECTION

7.1 ETHICAL DIMENSION

The Netherlands, compared to other countries, might not have very obvious disadvantaged groups.

In our case, our design tries to organize a broad organic industry towards a more knowledge-based one. By the organic, we mean food and waste sectors and by-products that may follow. In theory, the knowledge-based approach could decrease production in South Holland and thus, the distribution of food on a global scale, having an unfair effect on poor countries and their citizens that rely on food from the Netherlands. On the other hand, though, we consider knowledge as an export product itself, so in the longer run, the countries of food insecurity would eventually upgrade their own efficiency.

We have also researched South Holland's capacities in comparison to other provinces. We want to make sure that our decisions will not shift attention from other provinces towards South Holland, making them even more disadvantaged. While transforming open field agricultural production into a more compact one (or even changing land's current use) we always look for possibilities to relocate these functions to places that also have agricultural traditions and lands that are able to accommodate them more intensively. By doing so, we would look into existing agricultural lands, where production is either not highly intensified or effective, and propose technological shifts towards higher effectiveness within upgraded standards of sustainability. Such investment would create job opportunities in disadvantaged regions, so technically should also be supported from the top-down.

There is a risk that we will deepen spatial injustice. The current organic sector, such as animal farms or greenhouses, is using some land patches very intensively, which leaves no space for other uses or diversification of the area. The farmers might create opposition when we suggest changing some agricultural lands into different uses like forests or grasslands. We suggest using the patches model to first develop ideas and estimate their attractiveness to be able to convince landowners to invest in transformation. Sometimes it wouldn't necessarily mean giving away land, but using it in a smarter and more sustainable way. Biodiversification of rural areas might affect farmers negatively in the short run. The possible switches to diversified organic production (animals-forest; animals-greenhouses) fields or compensation of fields in different areas could soften the negative effects. The key aspect is then to plan the strategy over time with respect to these changes and compensatory actions (see the strategic timeline). The gradual plan assumes that we first adapt drosscapes and turn them into experimental fields to demonstrate and encourage stakeholders to allow further changes in their own fields.

We identify several main environments (urban, rural, port industry and natural) that are interconnected in the project. The most distribution is expected between urban and agro production areas which should cooperate hand in hand sharing energy, CO2 emissions, leftovers or profit. This is how they can compensate for each other's externalities. The organic production fields would also benefit from nature while following the ecological succession and diversification approaches. Finally, the current export/import of the region would be balanced. The import would be minimized in order to make the region more self-sustained. Meanwhile, the export of food production would be limited. Instead, the export would be based on knowledge technologies of organic production under different environments.

Future generations and the planet are taken into consideration because our design adds a dimension of time and landscape cycling. This should lead to a situation where the resources that we use now, are still available in the future. We also acknowledge the value of the land. While the vast majority of landscapes in the Netherlands is dedicated to cultivation, nature reserves are at risk. The green, protected network sometimes is missing links and this discontinuity is profitable to stronger stakeholders. We consider nature as a silent one, being gradually pushed outside the land. Thus, we see the importance of protecting the remnants of natural landscape as much as possible. In our strategy, we don't expand the design horizontally. We rather try to make the existing functions more compact.

The strategy especially caters towards the SDG's formulated by the United Nations. There are several goals which are hopefully indirectly affected by the strategy as well. But the main focus is towards the goals which can be seen below.



Applied SDGs through the scope of Strong Sustainability within the organic sector of South Holland
..Illustrated by authors

STRONG VS WEAK SUSTAINABILITY MODEL

"a more small-scale decentralized way of life based upon greater self-reliance, so as to create a social and economic system less destructive towards nature." Strong sustainability does not make allowances for the substitution of human, and human made capital for Earth's land, water, and their biodiversity. The products created by mankind cannot replace the natural capital found in ecosystems. According to Van Den Bergh,[28] resilience can be considered as a global, structural stability concept, based on the idea that **multiple, locally stable ecosystems can exist**. Sustainability can thus be directly related to resilience. With this in mind, weak sustainability can cause extreme sensitivity to either natural disturbances (such as diseases in agriculture with little crop diversity) or economic disturbances (as outlined in the case study of Nauru above). This high level of sensitivity within regional systems in the face of external factors brings to attention an important inadequacy of weak sustainability.

7.2 SCIENTIFIC RELEVANCE OF ANALYSIS

Circular economy concept is more practical than theoretical subject. Apparently, this project helps to define what this new type of economy encompasses in organic sector. Circularity becomes not only tool for "closing loops" and reusing leftovers of certain material, but also measuring landscapes, envisioning experimental farming ways and implementing spatial justice.

Definition of drosscapes and their identification is usually an issue in practical projects. Consequently, they are identified in specific locations and features. This method helps not only to identify drosscapes as such, but suggests the framework under which the drosscape could be identified in different contexts. One of the most contextual type is drosscapes of monofunctional farming fields or greenhouses. In spite of an intensive production, such patches are considered as insufficiently used lands. This method widens the meaning of drosscapes.

Patches were defined strictly in this project, although they are still an abstract definition of such a landscape feature in general. The differently zoned areas of the landscape are considered as a feature causing a number of challenges. Still, the patch system can be considered as a tool to tackle the challenges.

One of the most unique subjects is an organic sector in the project. This specificity of South Holland had to be customly identified. As a result, the term became very broad including food and flowers production, producing, retailing, consuming and waste management. It helps both for the region to define its sector and others to explore the sector in other geographies.

7.3 SOCIAL RELEVANCE

Spatial justice is the key concept steering this project. The social balance can be achieved only by incorporating different social groups into the strategy. Considering farmers, other import or export countries, citizens, policy makers, the port, private initiatives or business, universities and future generations responsible and benefiting in a just way.

The future predictions proof that globalisation and urbanisation will increase for at least coming 40 years. It is expected that around 63% of all the humankind will live in cities by 2050. On that account, people from cities will remain the main consumers of organic production. That is why they are incorporated into the strategy of circular South Holland. The habits of consumption, direct relation with the farmers and waste collection are upon citizens. Urban residents are mostly responsible for segregation from rural residents and balanced use of agricultural fields. The universities as part of cities are also actively and hopefully ethically contributing to the organic sector system.

Farmers are one of the most vulnerable social group which is responsible for the production and directly affected by organic sector decisions at the same time. Spatial justice can be implemented by giving the farmers the right tools to push the changes the circular way.

Finally, tourists are one of the most powerful and responsible for a number of constraints group. The region is popular through its organic sector: flowers, dairy farms, products and greenhouses with vegetables. This social group could be given more responsibility in protected areas in south or farming areas in east to engage the tourism in a balanced way.

7.4 ADVANTAGES AND LIMITATIONS OF THE PROJECT AND RESEARCH

The project successfully embraced the objectives like landscape importance for the circular economy or geopolitics and sustainable decisions in different scales. However, circular economy appeared as a very abstract and fragmented concept. The lack of proper data supplemented such an observation.

One of the main strengths of this project became the vision how landscape can contribute to the circular economy. Furthermore, the drosscapes are the central concept and the object for the strategy. This feature makes more powerful the performance of spatial and regional planning.

Multiscale perspective is another advantage of the project. The observation started from the global context and geopolitical topic. It continued to national scale and competition of different provinces. Eventually, the focus area limited the province itself, different municipalities and separate districts or fields of production. The multiscaling advanced the project from very local one family view to the global, worldwide scale.

Synthesis of different concepts like drosscapes and circular economy progressed the research questions and the strategy. It also suggested to combine two independent challenges in order to tackle both of them. In other words, symbiosis became the answer to the local problems.

Nonetheless, circular economy concept still implies a collection of vague and separate ideas from several fields and semi-scientific concepts. It limits the scientific argumentation and proof of the success of the project. As a result, the ground for arguments supporting spatial justice or organic sustainability becomes guesses without proofs. The project can be considered as a test strategy for the real one.

Most of detailed and organics related data are private or non systemized. Therefore, the quality and accuracy of strategy and actions are questionable. Moreover, the data is changing drastically over time. This feature implies that such a project has to be carried out for a longer period of time.

Many other sectors like plastic or construction are related directly to organic flows, still the effects and influence of other sectors are unrecognized. All, organic, construction and plastic sectors can affect each other and decisions.

7.5 OUTLINE FOR THE FURTHER RESEARCH

Other sectors are related to the organic flows and need to be investigated at the same time. The example has been given from construction or plastic sectors. Almost 40% of all the plastic is produced for packaging in EU. It implies that organic sector uses a lot of packaging for the reason of export. Additionally, many innovations suggest organic based plastic which would dramatically change the organic sector and its strategies.

Moreover, the South Holland region is full of experimental and alternative ways of farming or R&D centers. The Wageningen University is one of many institutions which develops advanced farming techniques and technologies. The investigation of alternative innovations would help to broaden the list of interventions in the region. At the same time it would insist to farmers to make strategies how to implement it in a bigger scale.

8

REFLECTION

Kevin Hollander

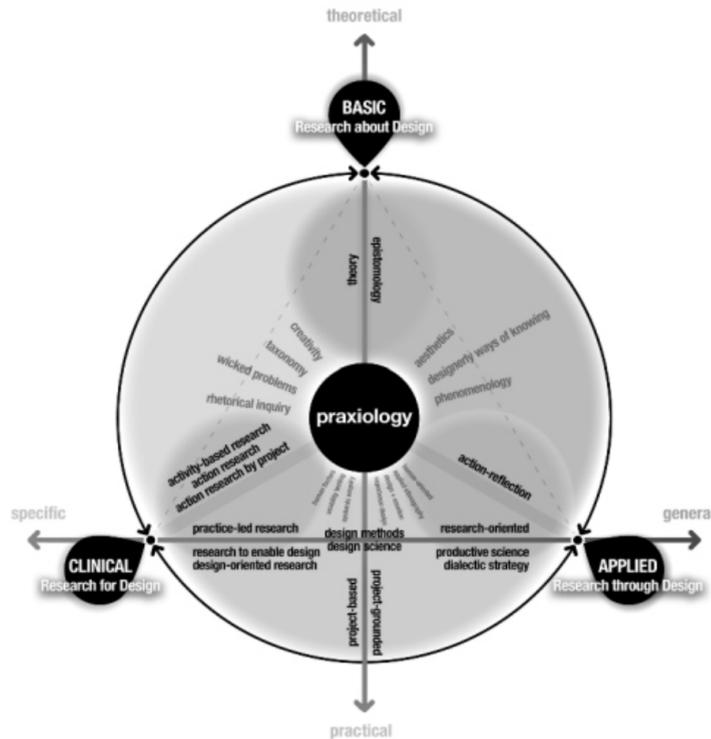
What is the relationship between research and design in your group project?

I think the group project has always been heavily intertwined with research during this course. There is not one point in the whole course where I could say, this is either just design or just research. Considering the triangle of Frankel & Racine, 2010, see Figure ##(TRIANGLE), I would place our project near the bottom right, towards the practical and general part of Research through Design. That is not to say there was no relationship in a Research for Design, or Research about Design kind of way.

Why Research through Design?

The start of the project was already a part where research was needed. We were given the task of transitioning South Holland into a circular economy. But what does really mean? What is circularity, strong sustainability, spatial justice, and so on? Even if we are able to define this through reading theoretical work, we as urban designers, seek a way to implement these features through spatial design. How are we able to transition drosscapes in a circular way? How can we achieve localization of organic processes within South Holland? These questions can't be answered in a theoretical way, they must be answered through design, by making concepts and interventions that

a way of researching through design whether this vision is feasible. In the zoom ins we analysed what are the specific possibilities of the area tied the previous principles, what the specific transitions of certain types of drosscapes are within the area, and so on. Finally, having this information we went back to the larger scale, the scale of the whole region, and redeveloped our vision map, now knowing what the actual possibilities are. In this sense we achieved research through design by going from a theoretical possibility or hypothesis, to verification using detailed design, to a redeveloped vision.



Reprint of The Complex Field of Research: for Design, through Design and about Design by Frankel & Racine, 2010.

Paulius Kliučininkas

2) 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?

The main vision was developed in a very early stage of this project. The first weeks were dedicated to the observation and preparation for research. The preliminary vision indicated that we couldn't develop the research further. As a result, the vision became the tool to coordinate the process and understand each other. Furthermore, every new step in the research let us question the ambitions we drew by hand in the beginning. Although patch landscapes and their relations remain story line through all the planning process. Many presentations were started with the vision. It became clear that was the same important to show to others as to us, what is the ambition and emotional goal. Yet, the key focus projects were changed every now and then. The topic of knowledge was introduced a bit later and stick as a main narrative for innovation. Still, industrial or production corridors were topics of debates. The vision was not that strict on program interventions. We changed and improved the vision after detailing and looking closer into smaller details of the region. The vision became more precise, clear, specific to the landscapes, businesses and places like flower fields in North or the delta island in South. This improvement let us to construct the strategy and policy further. The vision is located in the middle of the report. It makes the shift from observation and investigation part to the decision and making of responsibilities chapters. Therefore, the vision is a shifting tool to action related part in our project. The finalized vision map helped us to formulate the values and principles which we followed in

the strategy. 5 principles (Integrating blue and green structure, polyfunctionality, Biodiversity, Compact and wide range of participants and stakeholders) came after the vision and were grounded in the strategy scheme as well as micro areas. As a result, strategy became more concrete and expressing clear values. Additionally, policy was formulated based on the principles and their implementation in different scales. In short, the vision was a base layer for values which resulted in the vision map and the policy directly. Finally, the action plans were based on focus areas. There was more improvisation. Each person of the group could choose particular area and depict the implementation of the strategy. The timelines were adopted to particular micro areas. Although, it helped to structure the policy and action plans the vision is open ended and could encompass different implementation of strategies. The strategy is closely tied to the vision. Yet, it is still open for different interpretations under clear values and principles of the project and the team.

Reprint of The Complex Field of Research: for Design, through Design and about Design by Frankel & Racine, 2010.

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

If I could indicate one particular value, that was a guidance both in the research and the design face, I would point out into harmlessness. From the very beginning, our group was trying to be very delicate and considerate while defining problems and seeking solutions. Although one may think, that the ideal strategy is the one that gets the most out of what is given, our proposal never wanted to develop South Holland upon unprivileged regions of the Netherlands. We started to build our strategy around the definition of justice. The research played a key role while collecting data not only about the province of South Holland, but also the other ones. With our actions, we tried to visualize what would happen to the rest of the country. The research we conducted already proved, that South Holland is facing migrations from depopulating regions. We speculated, considering rising land values, job opportunities and the quality of life. We also compared agricultural capacities and tried to reflect on the reasons, why certain regions profit less and how to guide our design process in order to push the country, instead of pulling it back. We never strived to turn South Holland into the so-called 'center of the Universe', although many local stakeholder would probably not mind. In our case, the research played a role of a positive restraint. While exploring the topic of the food geopolitics, for instance, we were aware of the real expectations that will imposed on the planners in the upcoming decades. The easy scenario would assume decreasing the import value, while developing South Holland towards higher food security and independence. However,

we used the research to actually reflect on justice on the food market globally. There are many countries with a moderate security performance that rely on export (just to name India). Aware of the obligations that the province has towards the country, the European Union and the global market, we built our strategy on a prospective knowledge sector wondering, how we could still contribute to the global market, while importing less. Without the proper research (of any kind – literature review, data collection, speculations), there was a trap, that the proposal would be selfish and superficial. Although I feel like we proposed quite complex and comprehensive scenario which is trying to invest in the province in the best way, what I really remembered from the entire process of designing was questioning our ambitions, asking: "Are we harming someone with our actions?".

When I looked back on our project, our main focus comes directly on the spatial characteristics of the region, because of the strong impression we got during the first field investigation. After we got in the depth of the terms like "strong sustainability concept " "drosscapes", " patch system" and "organic sector" it is interesting to see the interrelationship between each system. Through the reading of academic research, we entered a more reasonable definition of these terms that targeted the South Holland region which helps us to formulate a diagnosis of the current problem field we would like to focus on. Also, the SDS and Capita Selecta lecture/workshop series, give us thinking that implementing design it's also a process of researching which related to an adjustment of design instruments and potential consequences. Based on former researches, our team proposed a transition of drosscapes that can be given back into the organic system and facilitate a strong sustainability concept circular economy at the same time. During the study of regional planning, spatial elements, and landscape transition have always been part of my interests. I have been fascinated and inspired by the work of Carlo Pisano's Coloring the patchwork metropolis. He tried to bring the field of guiding the patchwork metropolis in terms of their compatibilities. This also guides us to think another way of drosscape can be embraced in the patch system to make patches in the organic sector compatible together. My critique at this point on the academic significance of our project is that designing such a complex regional project, It will be nice to have a multi-demission angle to look at the region. However, during the searching phase, I also found that digesting the huge amount of information and tracing the one that useful

for our project its one important skill that I need to develop more. Even though we use large quantities of evidence-based analysis to make the project feasible it's also quite important to make a knowledge-based assumption. As I mentioned, I sometimes get lost in the huge amount of information, which will distract my main focus. In my opinion, research and design can be seen as a closed-loop, which will never end. As an urbanist, we take a step in design, and look back in research, continues observing, testing, and fill in the new research. Hence, this regional project it's a testing ground to learn this approach and help me to apply it during further studying. As a conclusion, the complexities arising from different systems, coupled with an increasing necessity to deal with uncertainty(Prominski,2005), call for a solid relationship between design and academic research. And our project reflects the complexities in a multiscale perspective, synthesis of different concepts and dynamic actions. However, some of the details like the triggering projects, and the synthesis of each action reflet on spatial environment needed to be refined further based on more research.

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