

The Glass Ceiling

Radical Imaginaries of Spatial Justice in Westland's Horticultural Landscape

Bram Terwogt
P5
20th June, 2025

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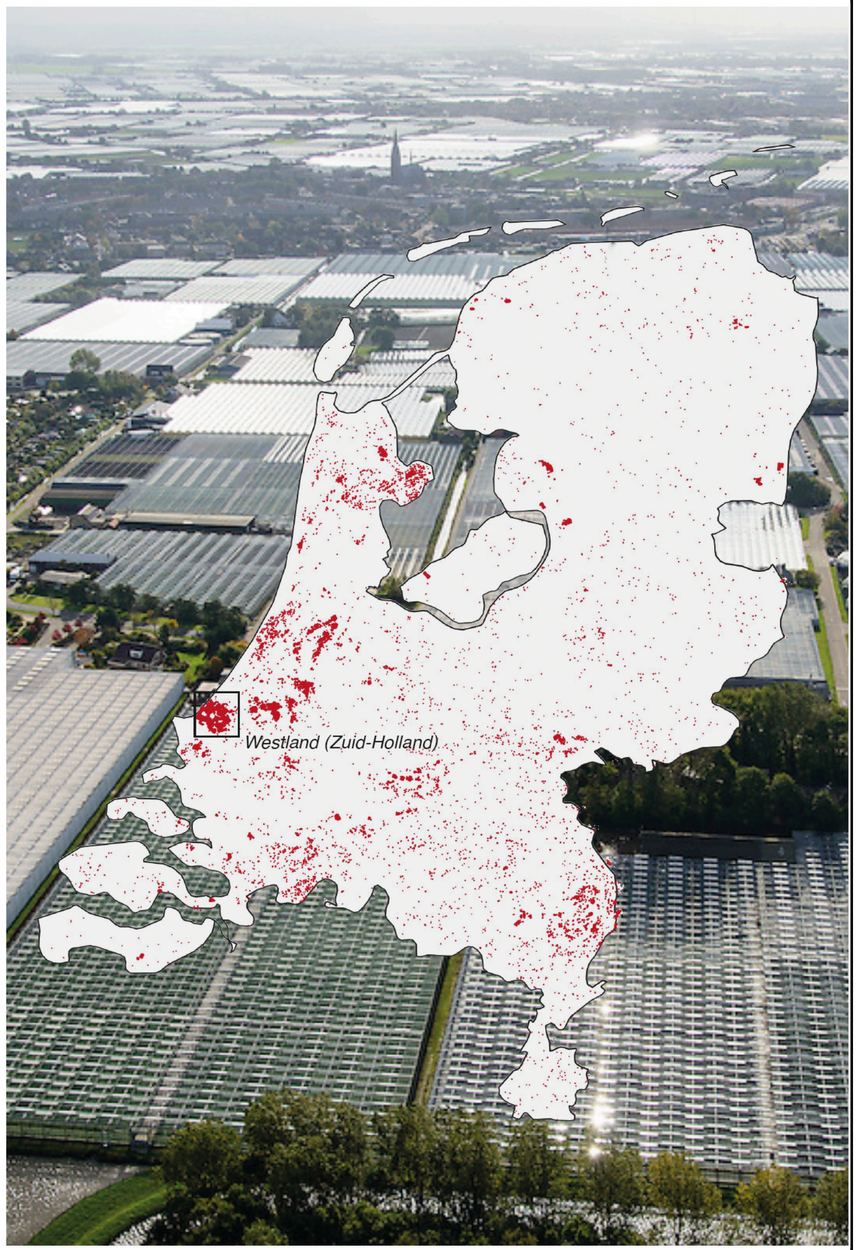
2nd supervisor: dr. Juliana Gonçalves
Delegate board of examiners: dr. Aleksandar Staničić



Westland

Legend

- greenhouse



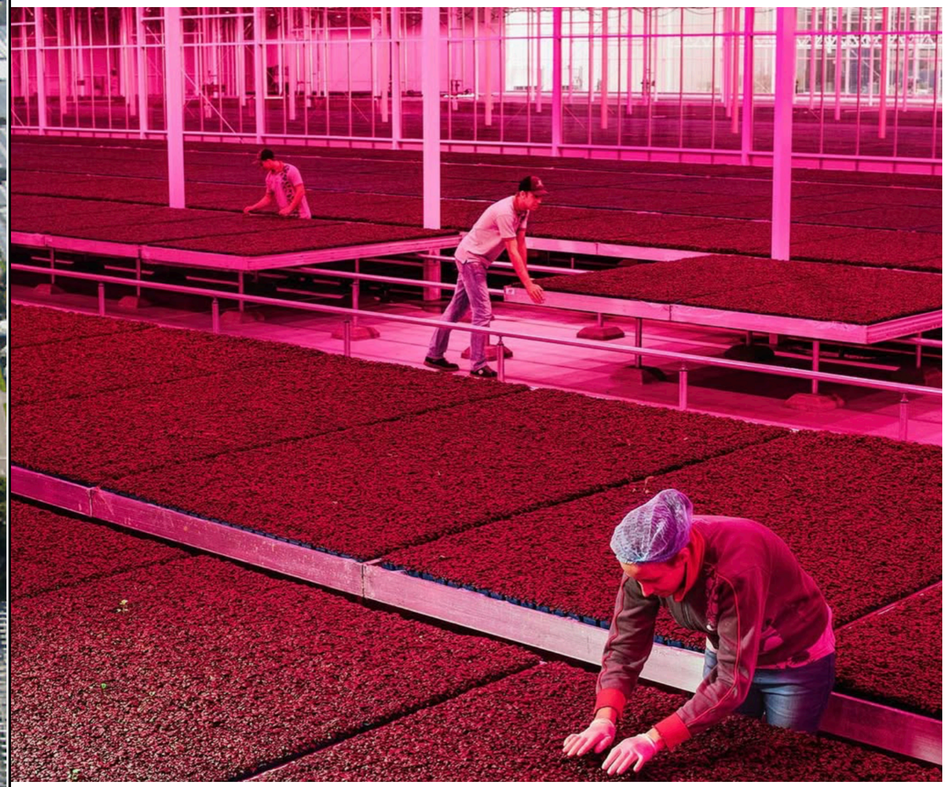


image from Luca Locatelli (2020)

Legend

greenhouse



image from Luca Locatelli (2020)



image from Luca Locatelli (2020)



Ben




Aldo Flex


VAN IPEREN
VOOR VLOEIBARE ENKELVOUDIGE MESTSTOFFEN
80
1814
80
2031
80
2795


B
AldoFlex


VAN IPEREN
VOOR VLOEIBARE ENKELVOUDIGE MESTSTOFFEN
80
1814
80
2031
80
2796











image from Luca Locatelli (2020)



image from AD (2023)



image from Luca Locatelli (2020)



image from AD (2023)

spatial injustice

spatial design problem?



image from Provincie Zuid-Holland (2018)



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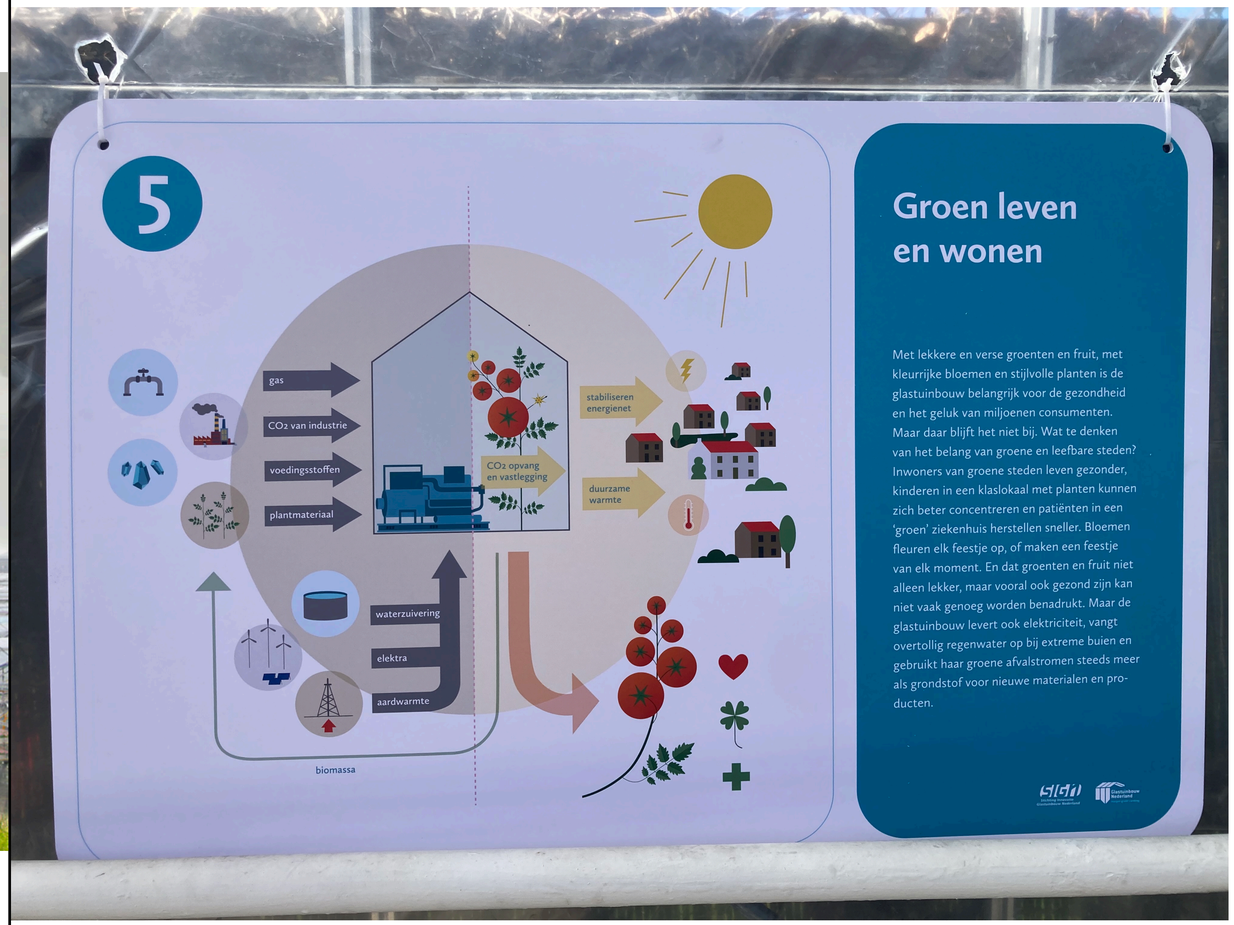
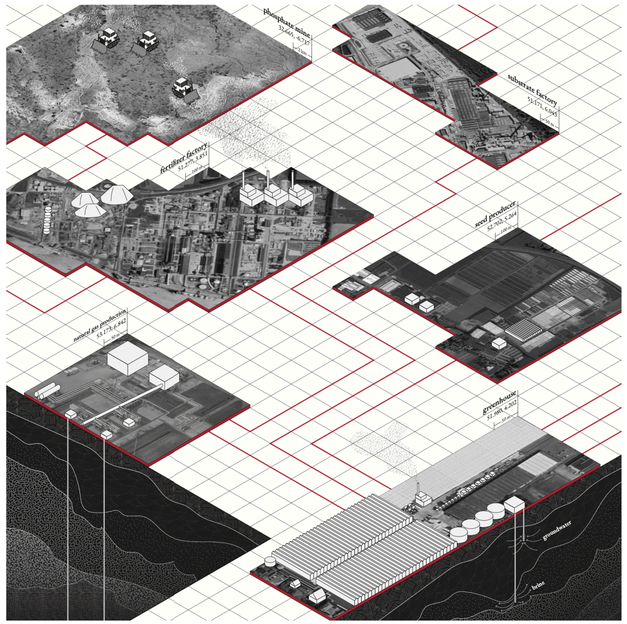
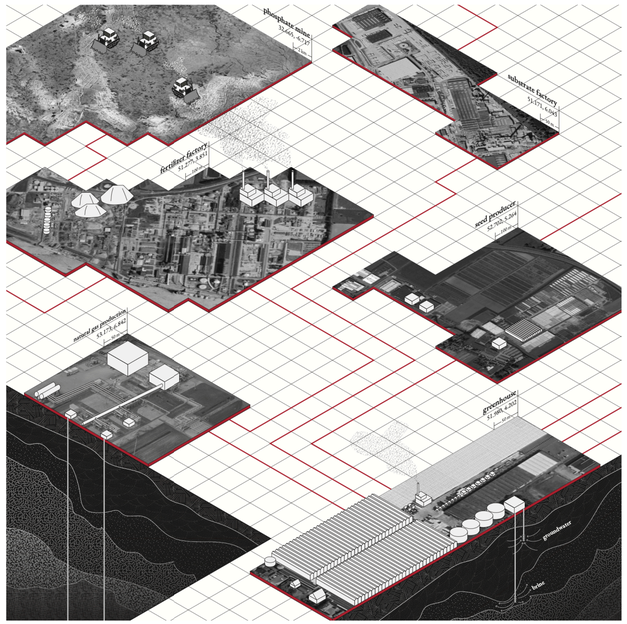


image by author, infographic by Glastuinbouw Nederland


phosphate mine
32.660, -6.737
substrate factory
53.171, -6.093
fertilizer factory
52.277, 5.851
seed producer
52.702, 5.244
natural gas production
53.173, 6.842
greenhouse
52.986, 4.202
greenhouse
brine







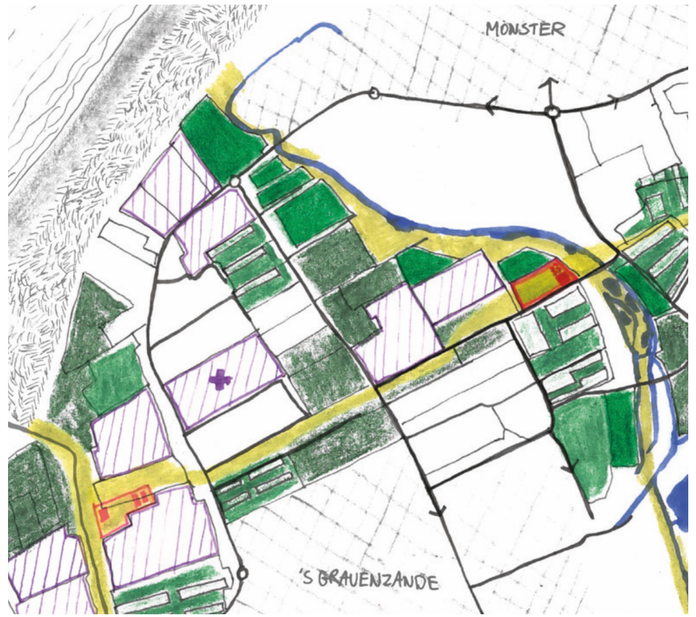

MONSTER
'S GRAVENZANDE



image from Lenteland (2025)

Toekomstboeren

Federatie van Agro-ecologische Boeren

Plenty Food

lenteland

Land van Ons 5 JAAR

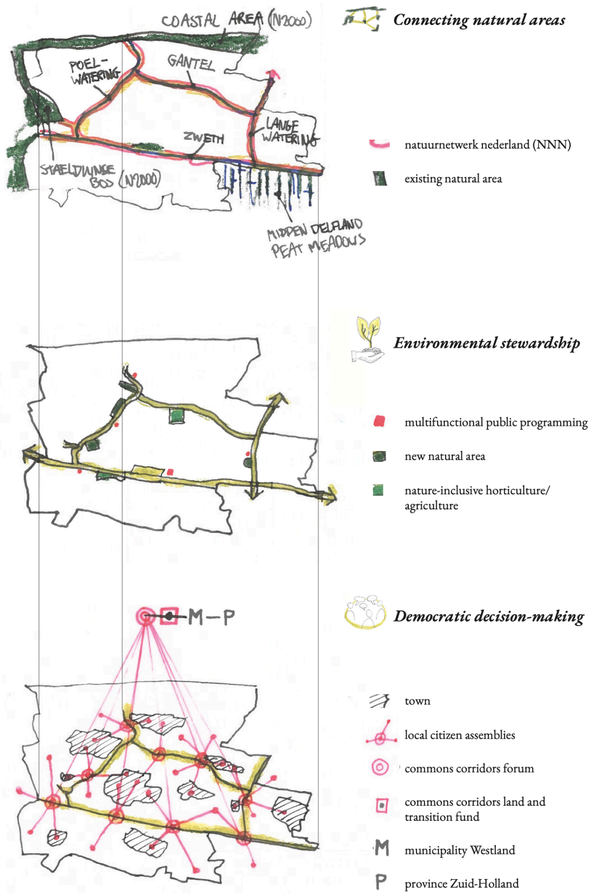
HERENBOEREN
SAMEN DUURZAAM VOEDSEL PRODUCEREN



image from Lenteland (2025)



Toekomstboeren Commons Handboek (2024)



Connecting natural areas

- natuurnetwerk nederland (NNN)
- existing natural area

Environmental stewardship

- multifunctional public programming
- new natural area
- nature-inclusive horticulture/ agriculture

Democratic decision-making

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

theory

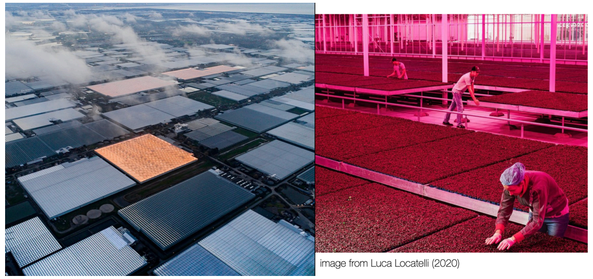
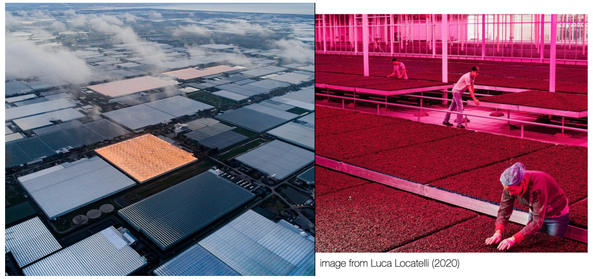


image from Luca Locatelli (2020)

operational landscape & socio-technical system

theoretical framework



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operational landscape & socio-technical system

spatial justice & autonomy



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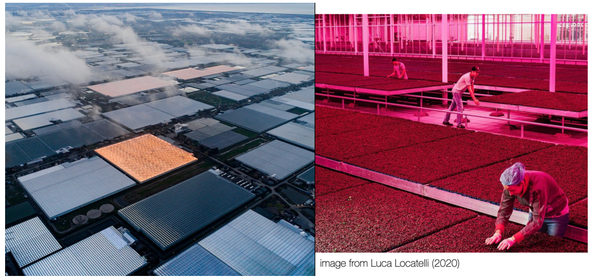

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operational landscape & socio-technical system

spatial justice & autonomy



image from AD (2023)

image from Luca Locatelli (2020)

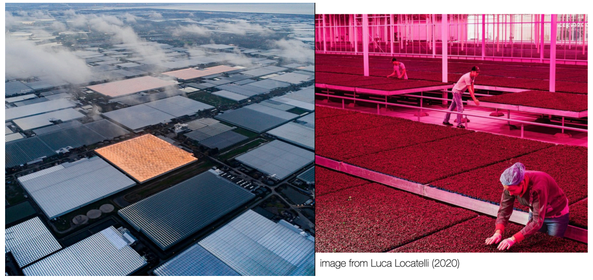
radical imaginaries



image from Lenteland (2025)



theoretical framework



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operational landscape & socio-technical system

Westland territory

spatial justice & autonomy



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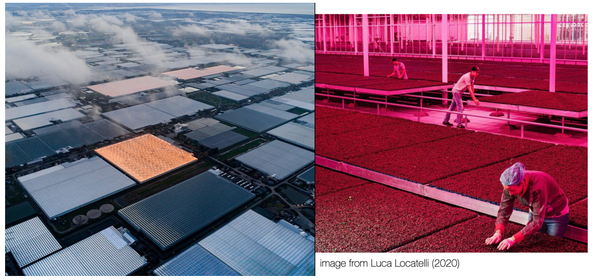

image from Luca Locatelli (2020)

operational landscape & socio-technical system

understand

Westland territory

spatial justice & autonomy



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theoretical framework

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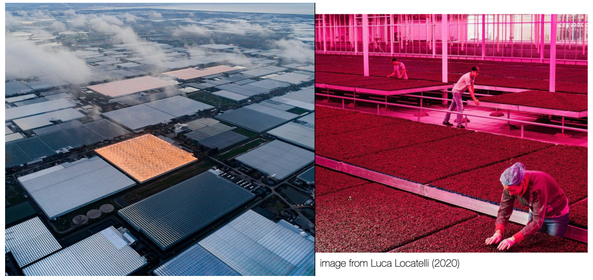

image from Luca Locatelli (2020)

operational landscape & socio-technical system

understand

Westland territory

critically evaluate

spatial justice & autonomy



image from AD (2023)

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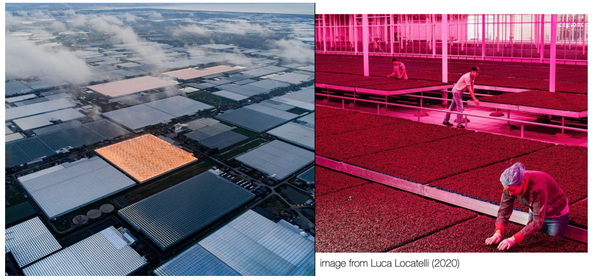

image from Luca Locatelli (2020)

operational landscape & socio-technical system

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critically evaluate

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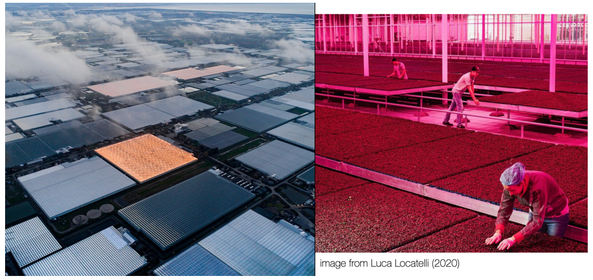

image from Luca Locatelli (2020)

operational landscape & socio-technical system

understand

Westland territory

challenge?

operate within?

critically evaluate

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spatial justice & autonomy



image from AD (2023)

image from Luca Locatelli (2020)

radical imaginaries



image from Lenteland (2025)



theoretical framework

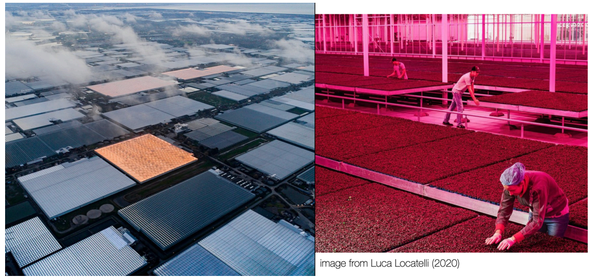

image from Luca Locatelli (2020)

operational landscape & socio-technical system

understand

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challenge?

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image from AD (2023)

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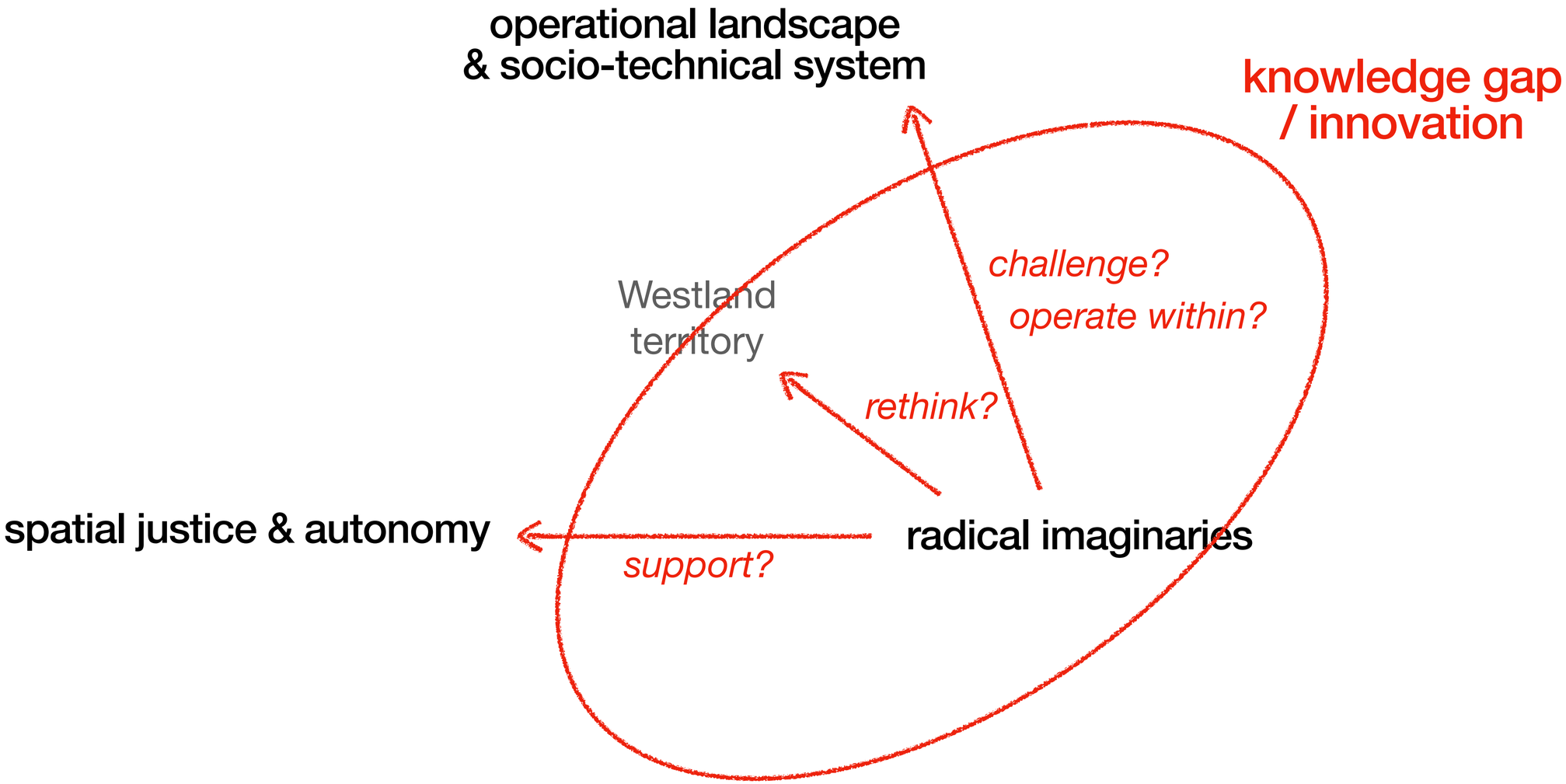
image from Lenteland (2025)



theoretical framework


operational landscape
& socio-technical system
knowledge gap
/ innovation
Westland
territory
challenge?
operate within?
rethink?
spatial justice & autonomy
support?
radical imaginaries

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

Sub-Research Questions

Limits

[1.1] What historical factors have shaped the territorial organisation of the Westland horticulture landscape up until now?

[1.2] What are the consequences of the above for spatial justice and autonomy?

Imaginaries

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

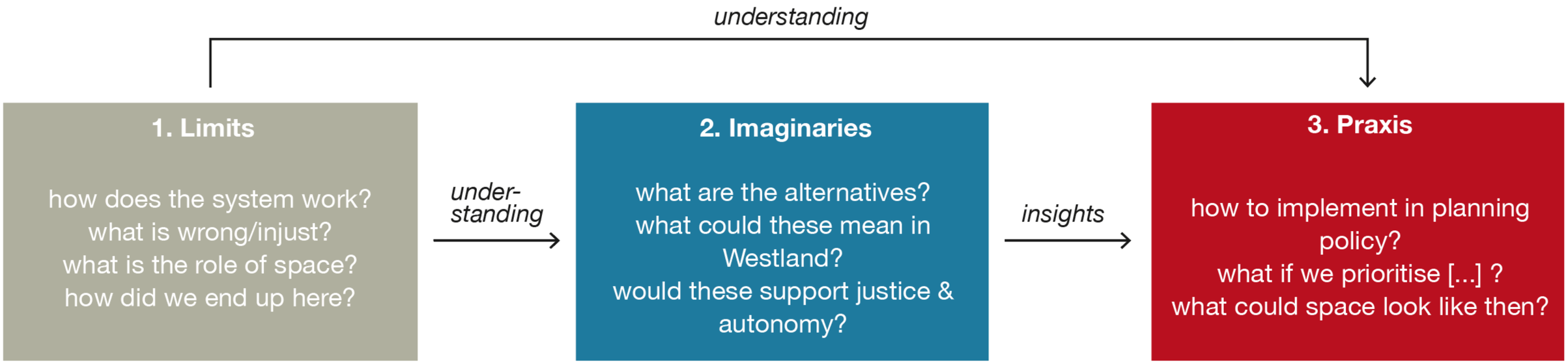
[2.2] Could these associated spatial practices undermine or promote spatial justice and autonomy?

Praxis

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

[3.2] How can urban design interventions facilitate this?

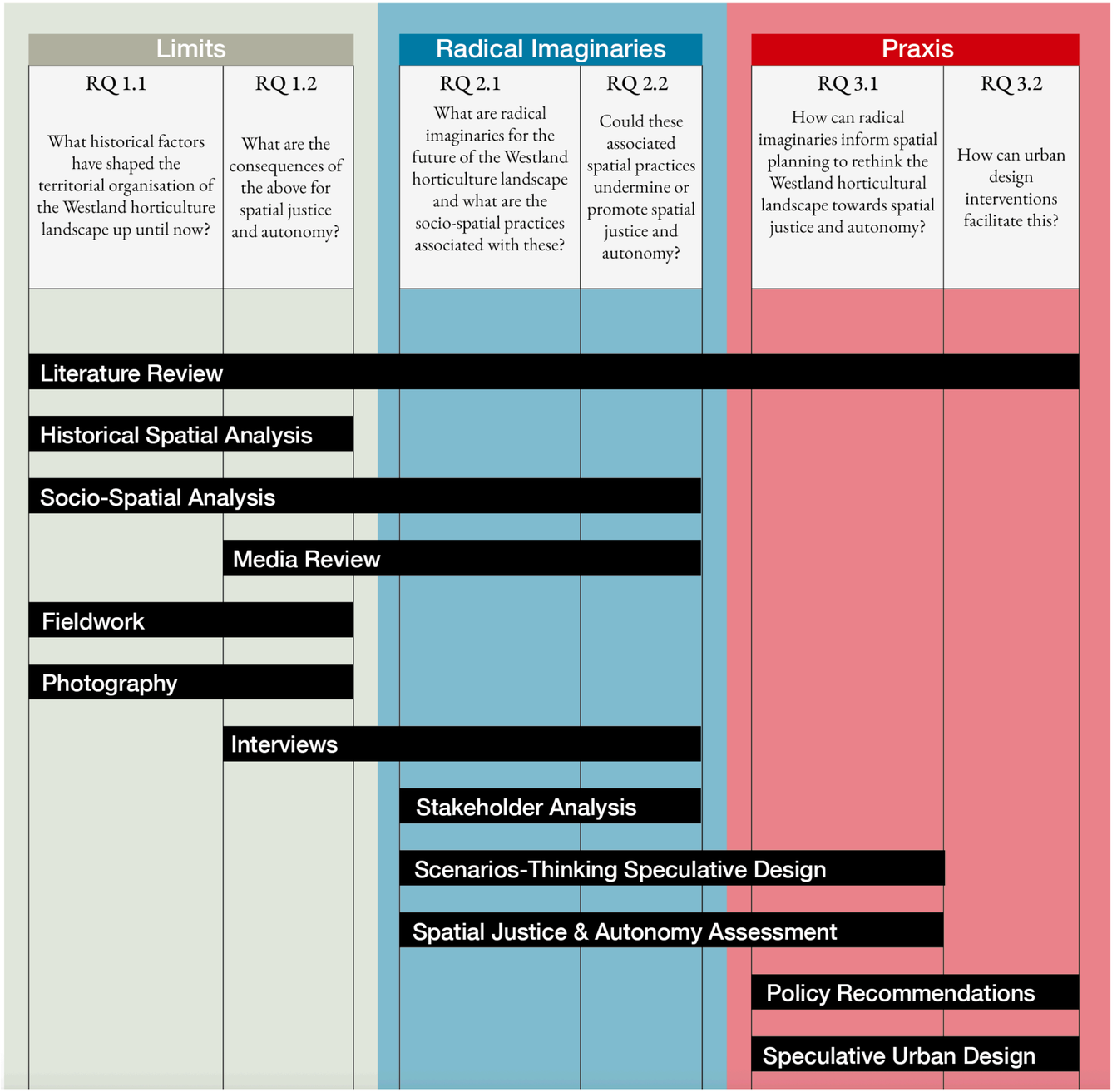
How can radical imaginaries inform spatial planning and design interventions to rethink the Westland horticultural landscape towards spatial justice and autonomy?


understanding
1. Limits
how does the system work?
what is wrong/injust?
what is the role of space?
how did we end up here?
under-
standing
2. Imaginaries
what are the alternatives?
what could these mean in Westland?
would these support justice & autonomy?
insights
3. Praxis
how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

questions

1. Limits	2. Imaginaries	3. Praxis
gain understanding of Westland horticulture	reveal alternative visions and practices	propose spatial policy
gain an understanding of the problem field	use scenarios-design to translate to Westland	propose a set of values to prioritise
expose injustices and problems	evaluate scenarios on justice and autonomy	speculate on possible outcomes through design

actions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Radical Imaginaries
Praxis
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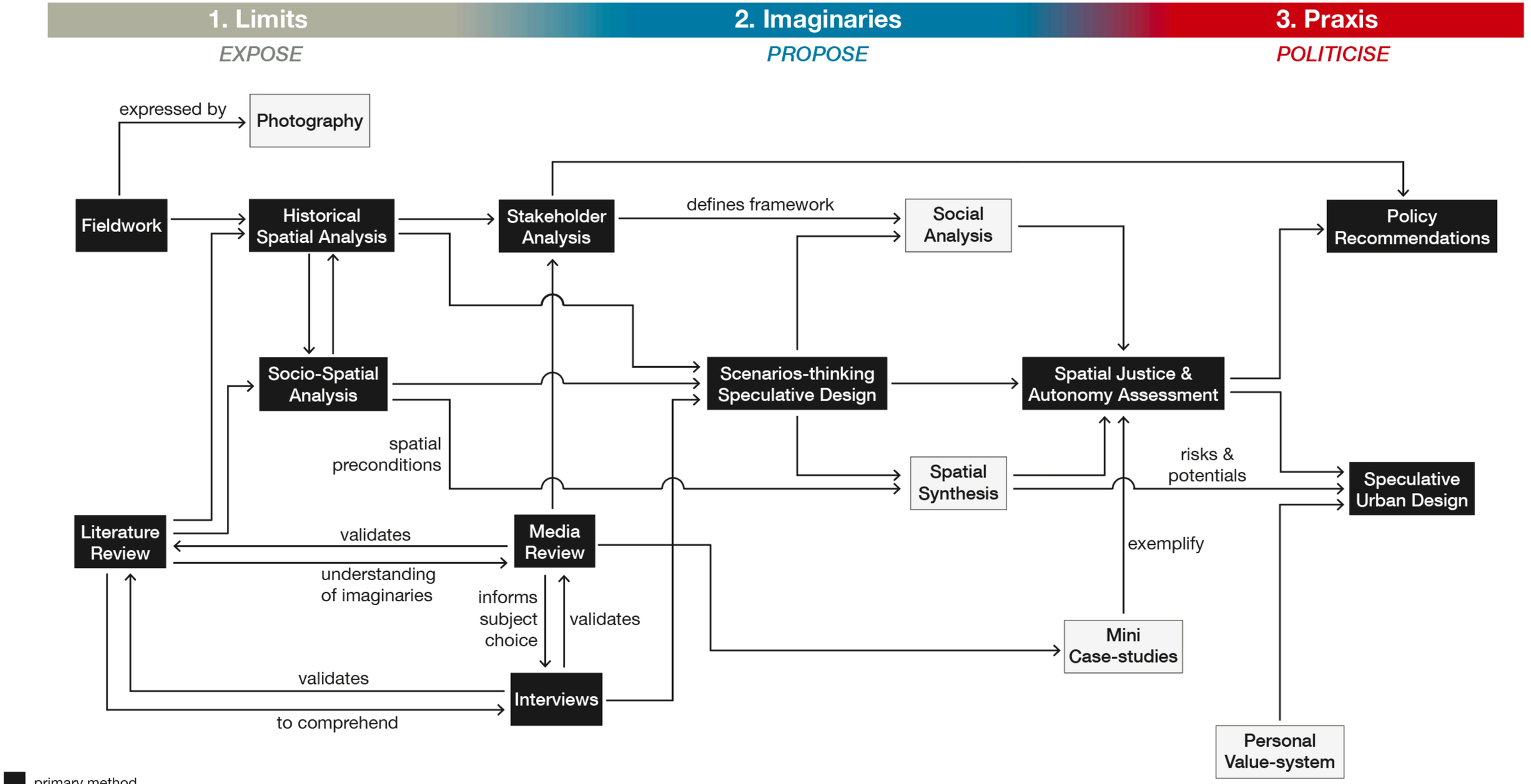
RQ 3.1
How can radical imaginaries inform spatial planning to rethink the Westland horticultural landscape towards spatial justice and autonomy?
RQ 3.2
How can urban design interventions facilitate this?
Literature Review
Historical Spatial Analysis
Socio-Spatial Analysis
Media Review
Fieldwork
Photography
Interviews
Stakeholder Analysis
Scenarios-Thinking Speculative Design
Spatial Justice & Autonomy Assessment
Policy Recommendations
Speculative Urban Design


1. Limits
EXPOSE
2. Imaginaries
PROPOSE
3. Praxis
POLITICISE
expressed by
Photography
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Historical Spatial Analysis
Stakeholder Analysis
defines framework
Social Analysis
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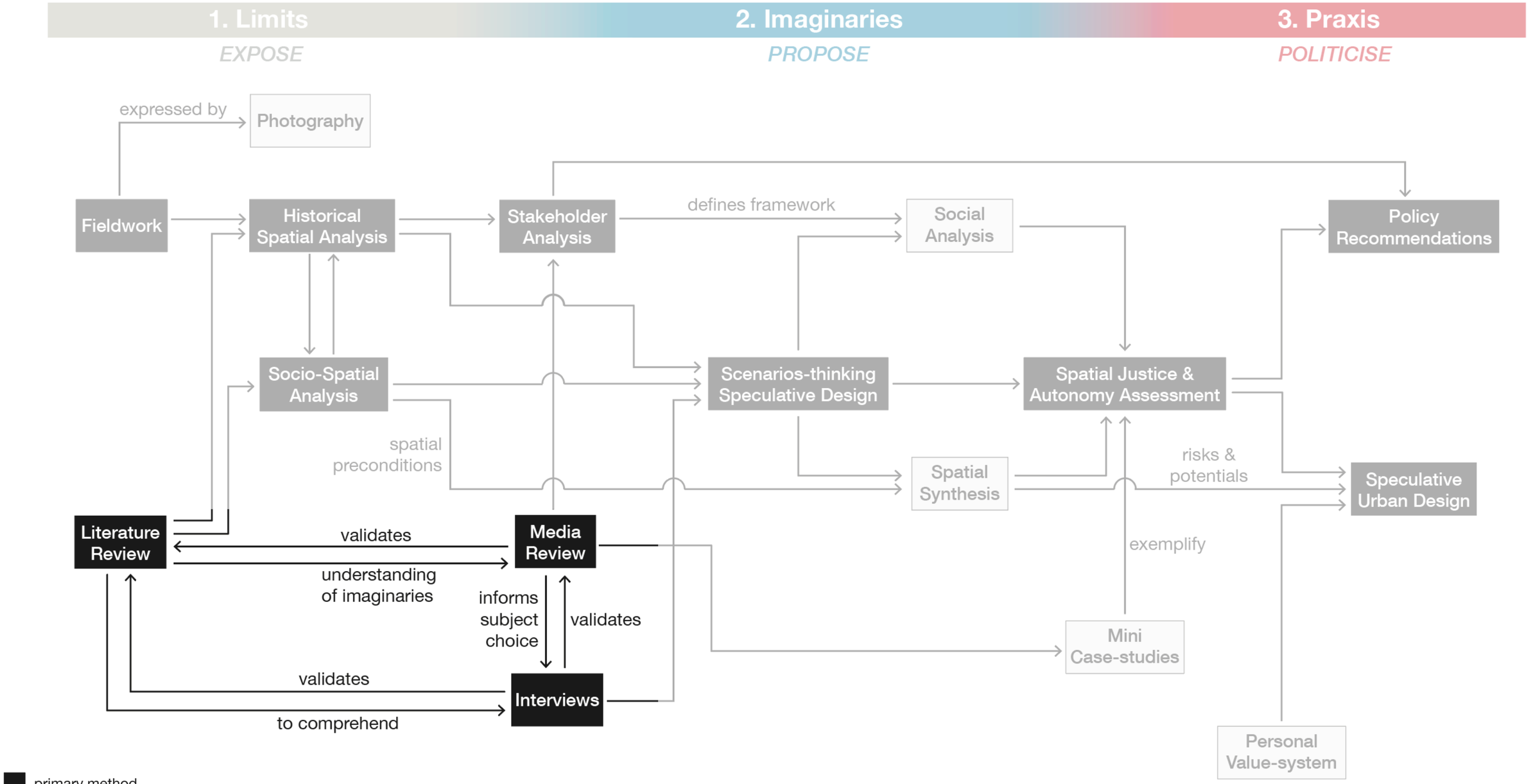
spatial preconditions
Spatial Synthesis
risks & potentials
Speculative Urban Design
Literature Review
validates
Media Review
understanding of imaginaries
informs subject choice
validates
exemplify
Mini Case-studies
validates
Interviews
to comprehend
Personal Value-system
primary method
secondary method / input
feedback loop with specific description where necessary

methods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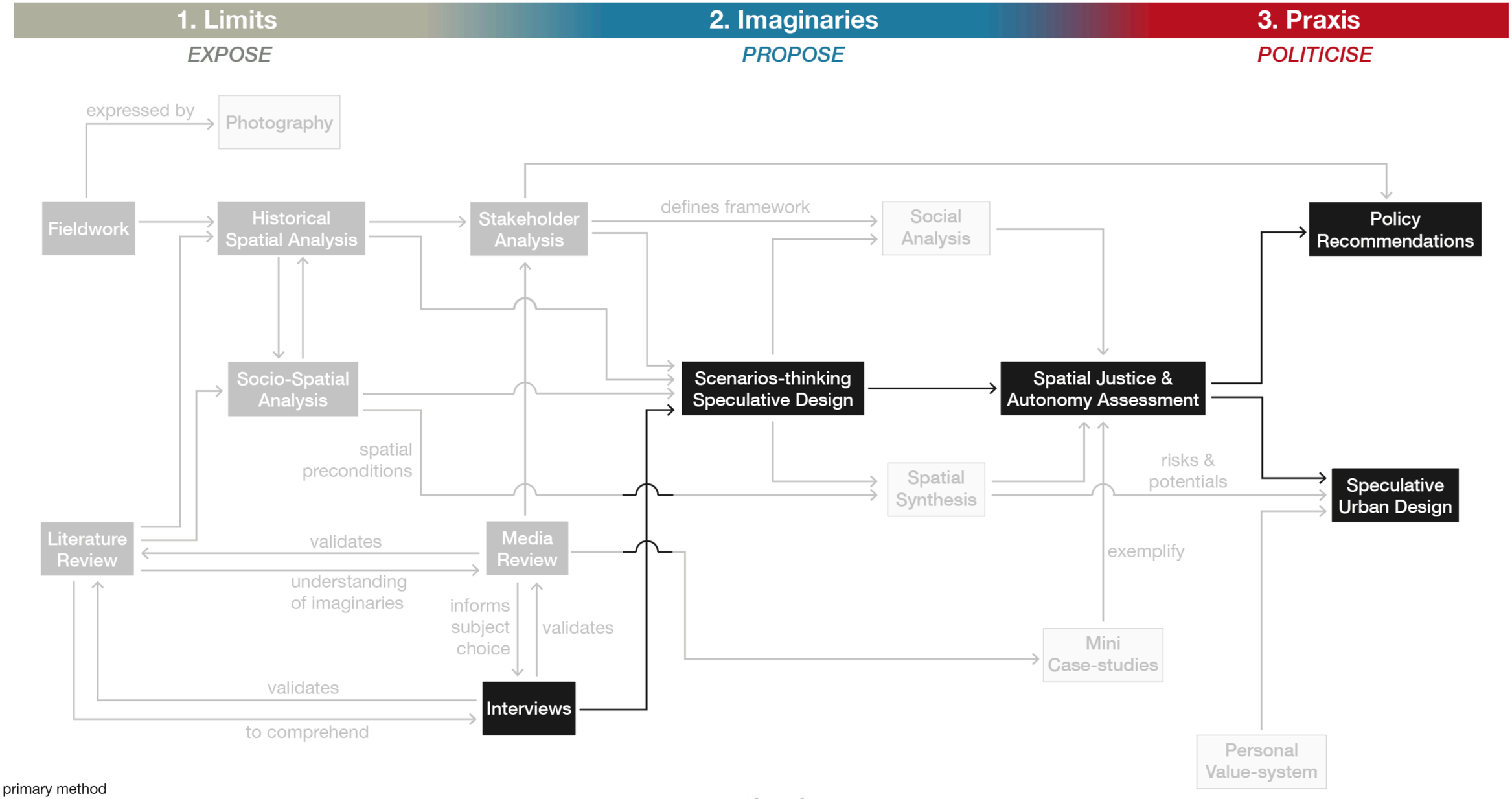
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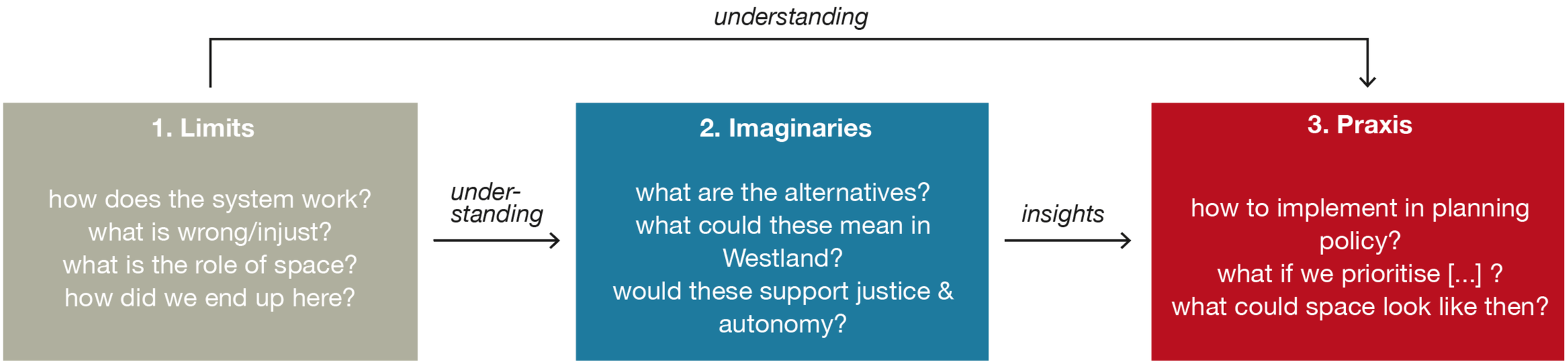
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1. Limits

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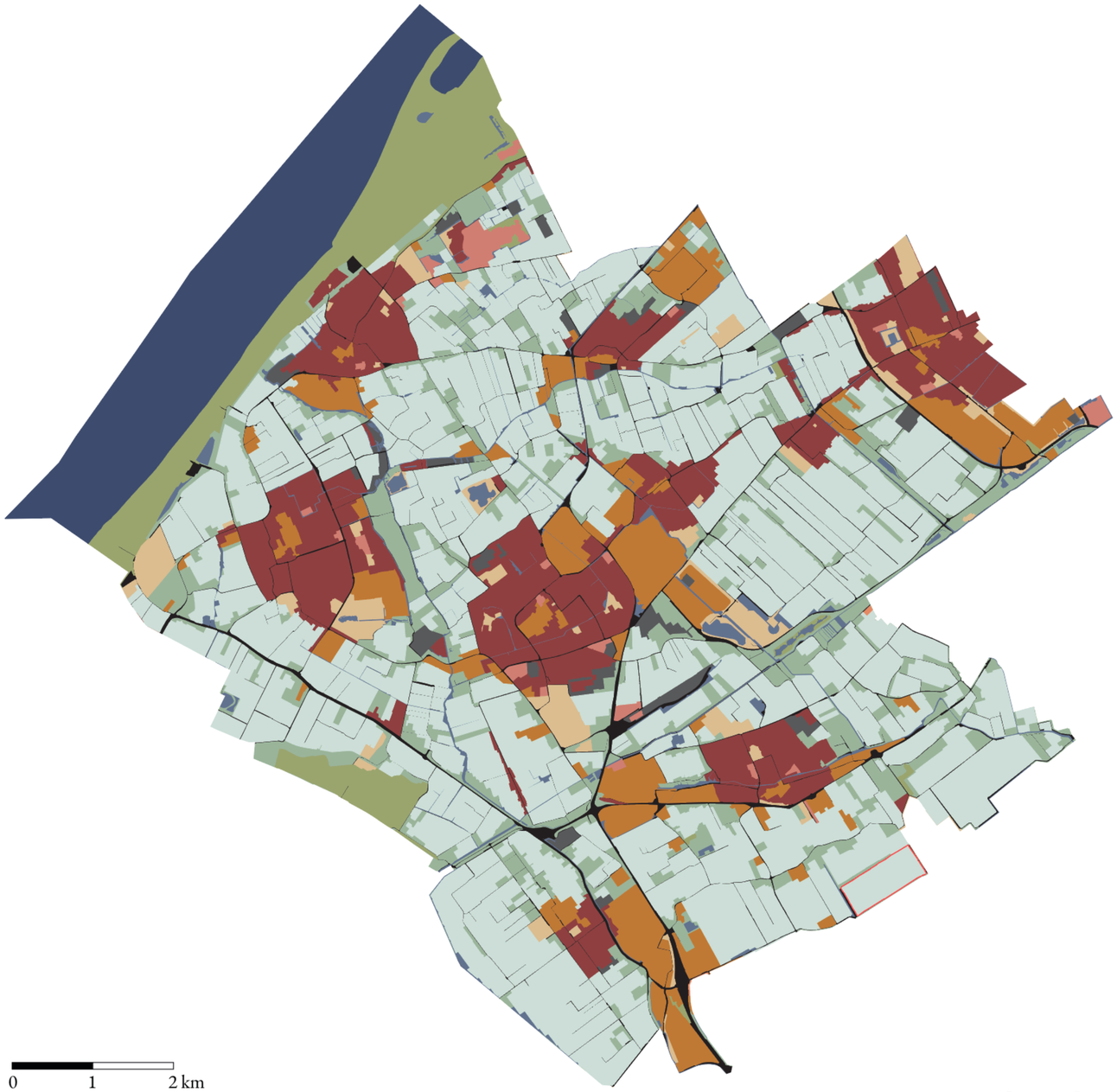
spatial injustice

relation nature-agriculture

limited autonomy



Gemeente Westland
9059 ha

horticulture
3846.5 ha

residential
1084.2 ha

other agriculture
972.6 ha

North Sea
772.6 ha

industrial
725.4 ha

natural
530.6 ha

roads
424.6 ha

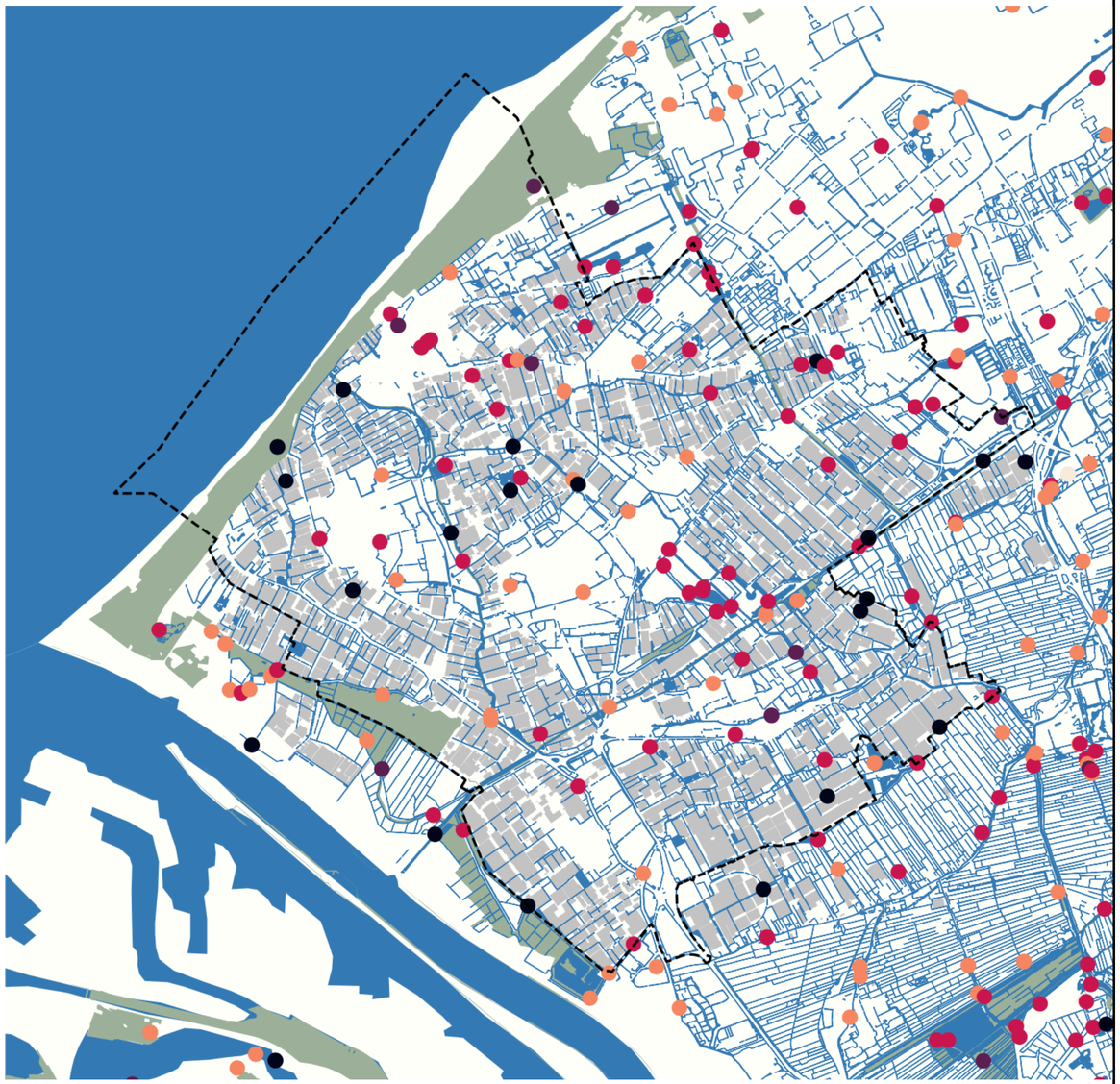
parks, sports & recreation
276.0 ha

inland water
225.4 ha

construction
133.1 ha

public & cultural amenities
81.2 ha

land use

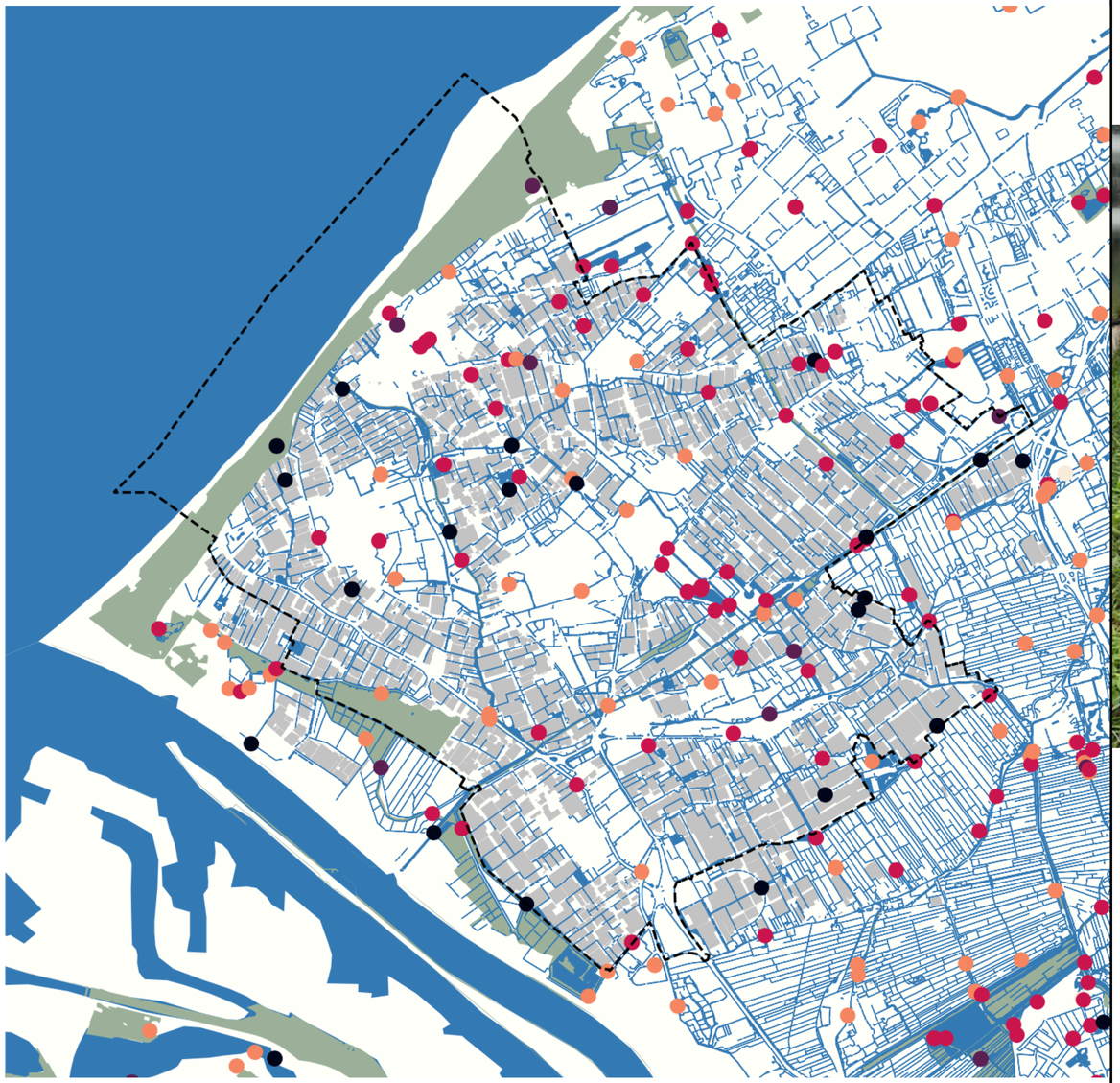


Water Toxicity Pressure

Data: Stowa in Atlas Leefomgeving (2022)

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

0 2 km N

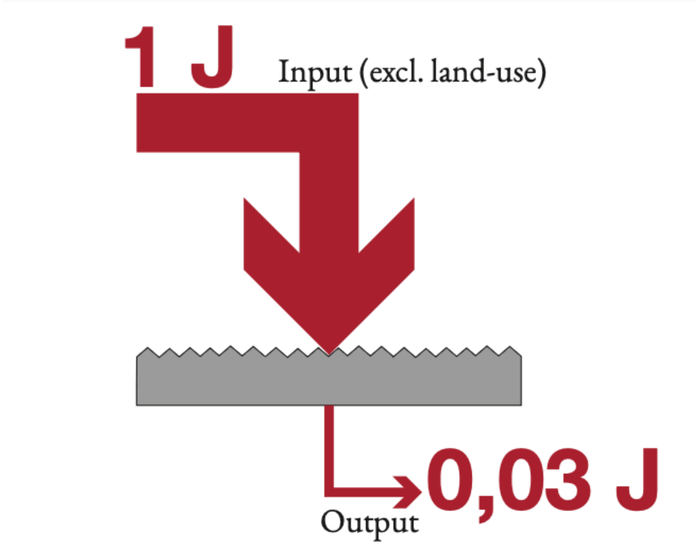




▲ Een medewerker van het Hoogheemraadschap van Delfland meet de waterkwaliteit tussen de kasser
© Hoogheemraadschap van Delfland

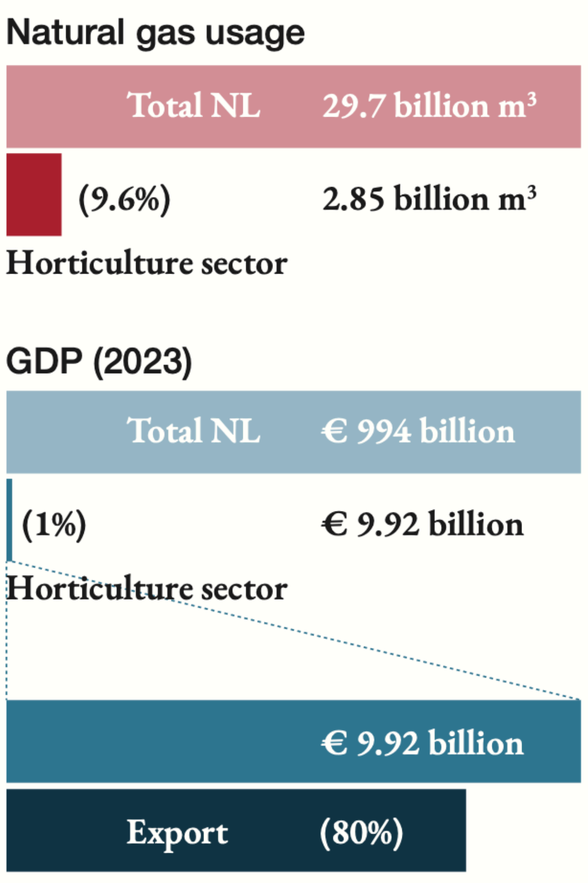
Waterkwaliteit in Westland is weer niet verbeterd: ‘Dit is onacceptabel’

from AD (25-04-2025)



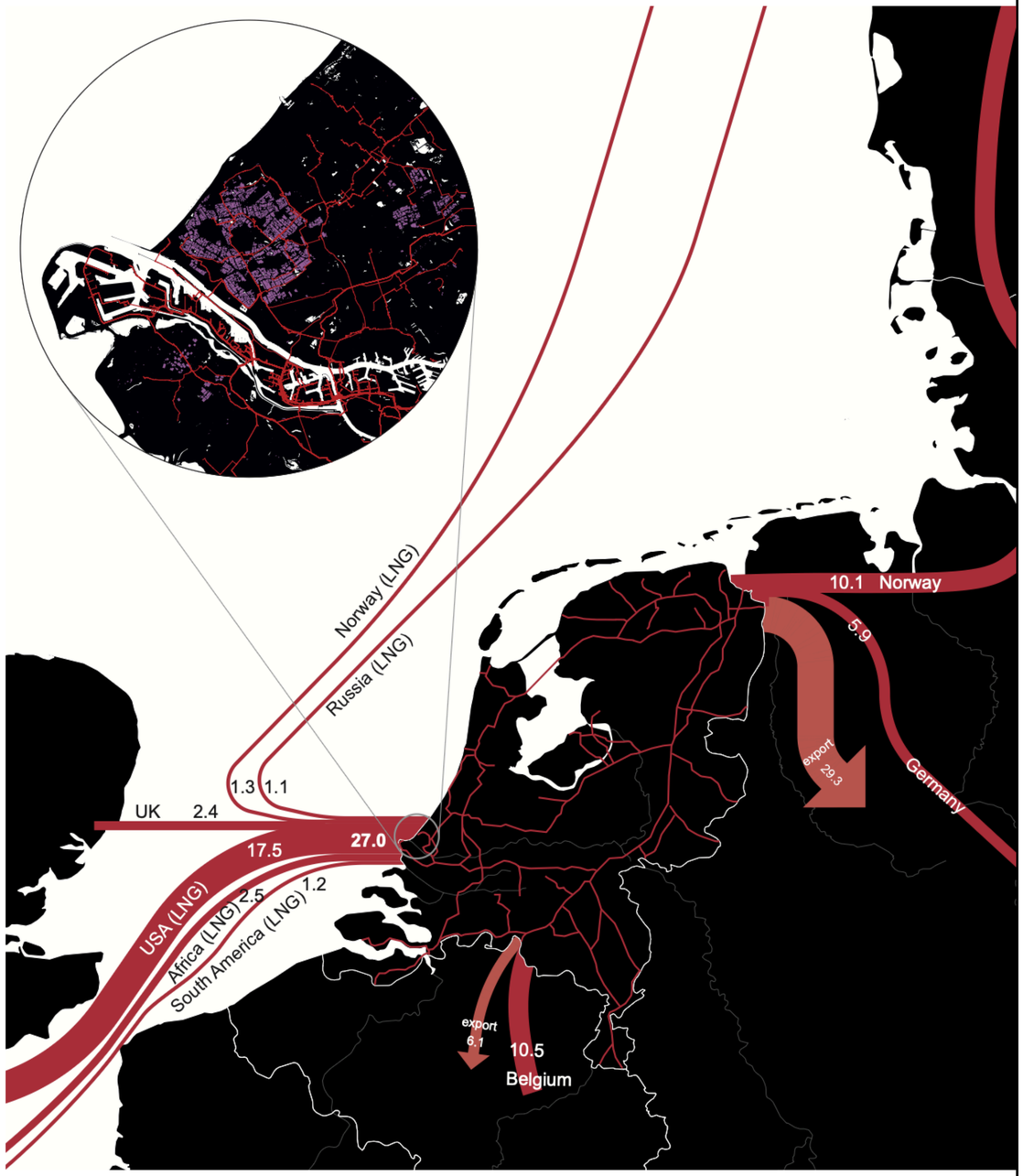
Horticulture's energy input/output ratio
(Smit, 2018)

efficient agriculture?



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

economic significance



Gas Imports & Infrastructure

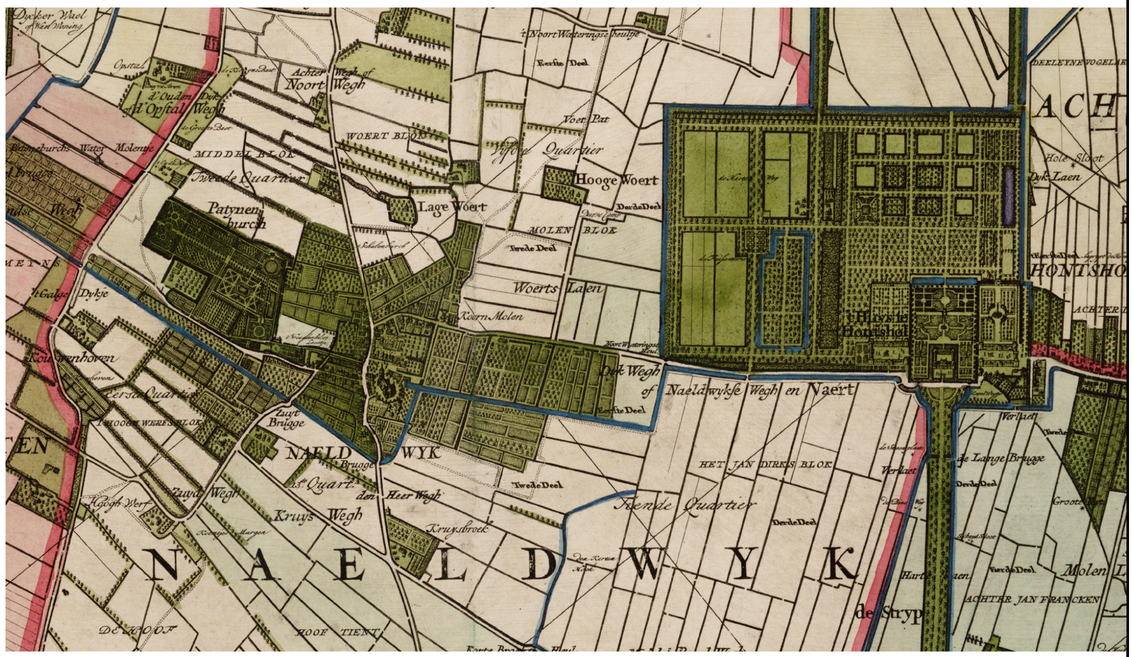
Gas infrastructure in the Netherlands and Westland (zoom in). Exports and inports are indicated by volume.

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

- gas imports and exports
- greenhouses
- gas pipelines

relation nature-agriculture

beginnings



Huis Honselersdijk and fruit orchards around Naaldwijk

Map by Kruikius, N. & J. 1712, Hoogheemraadschap Delfland

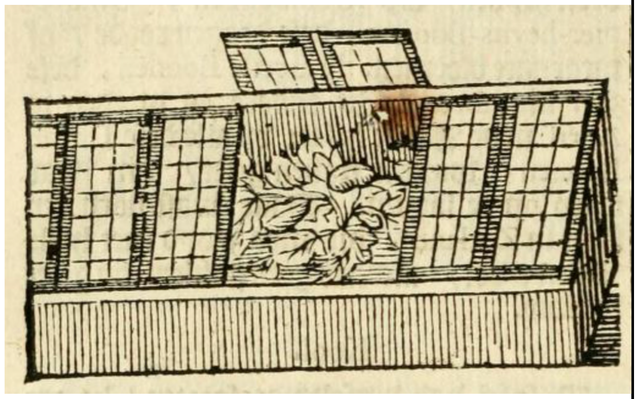
16th & 17th century ‘buitenplaatsen’

employed gardeners to care for exotic finds

Huis Honselersdijk (completed 1647)

beginnings





coal-heated rooms (top) and low glass structures (bottom)

Drawings in van der Groen (1699)

first controlled environment growing techniques

beginnings



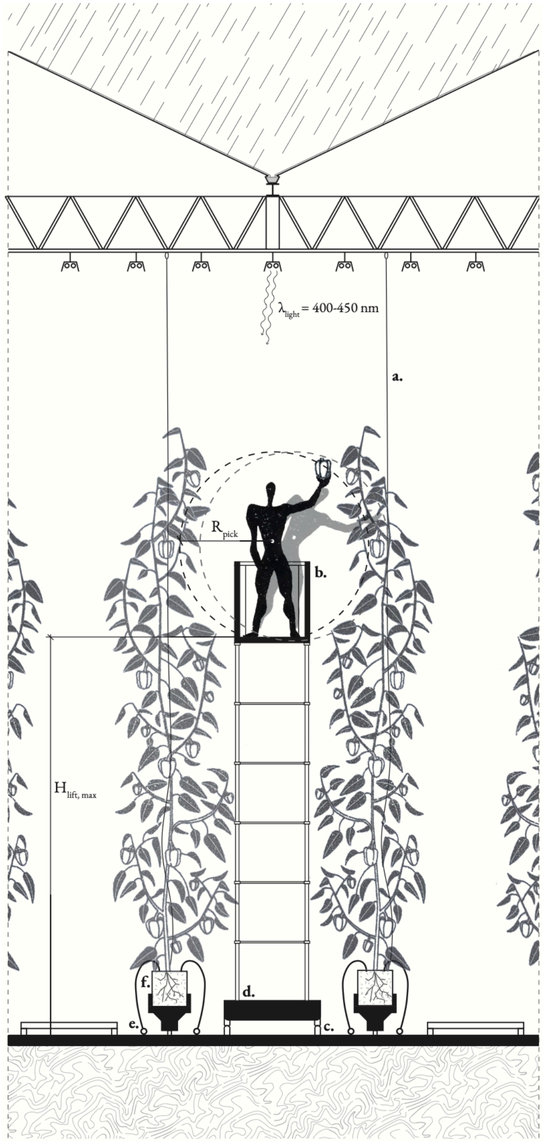
Honselersdijk Palace, Westland, drawn in 1683.



Site of Honselersdijk Palace, Westland, 2019. Driessen in Koolhaas (ed.) (2020)

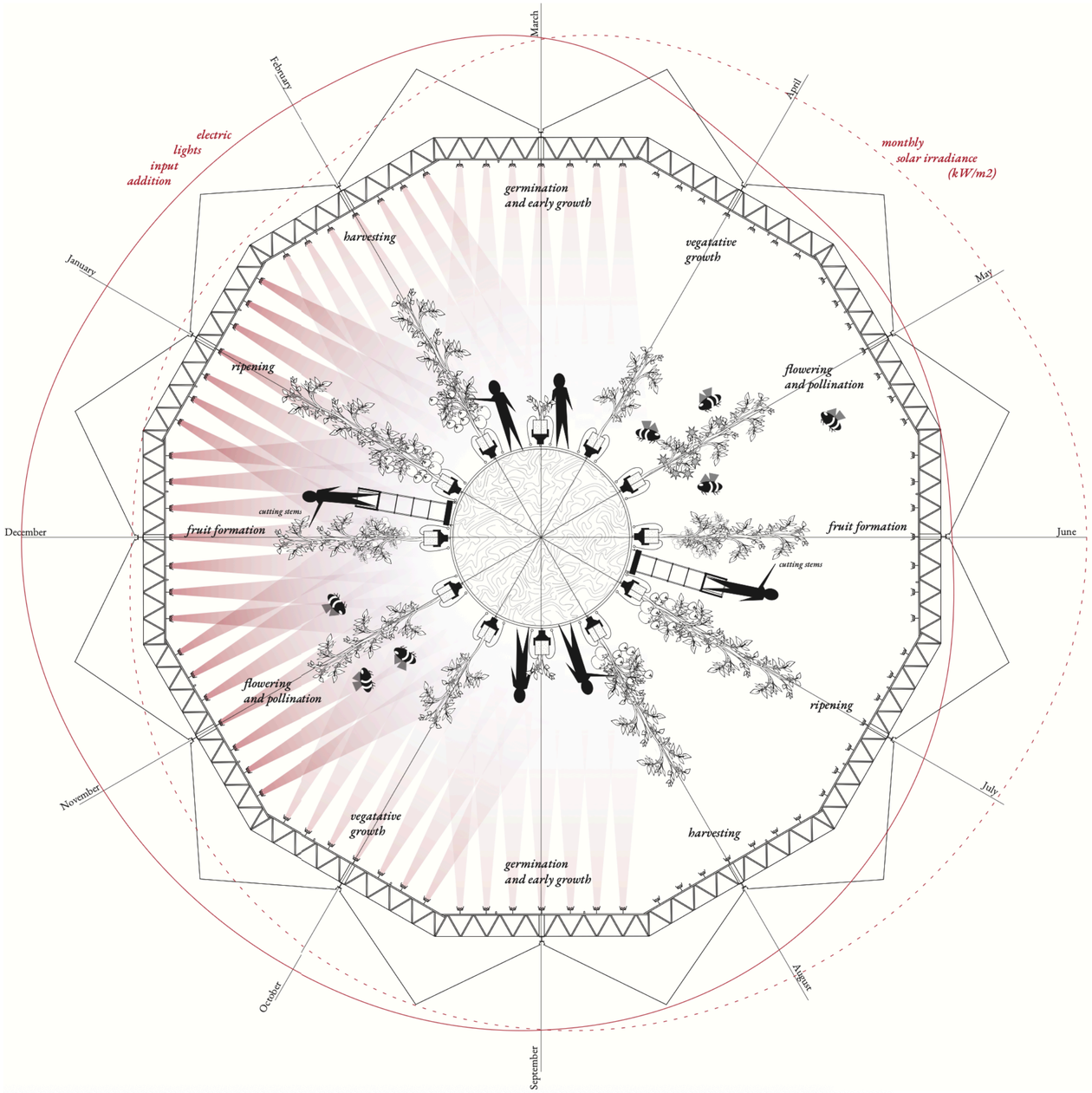
Descartes' "masters and possessors of nature" (1637)

colonial nature

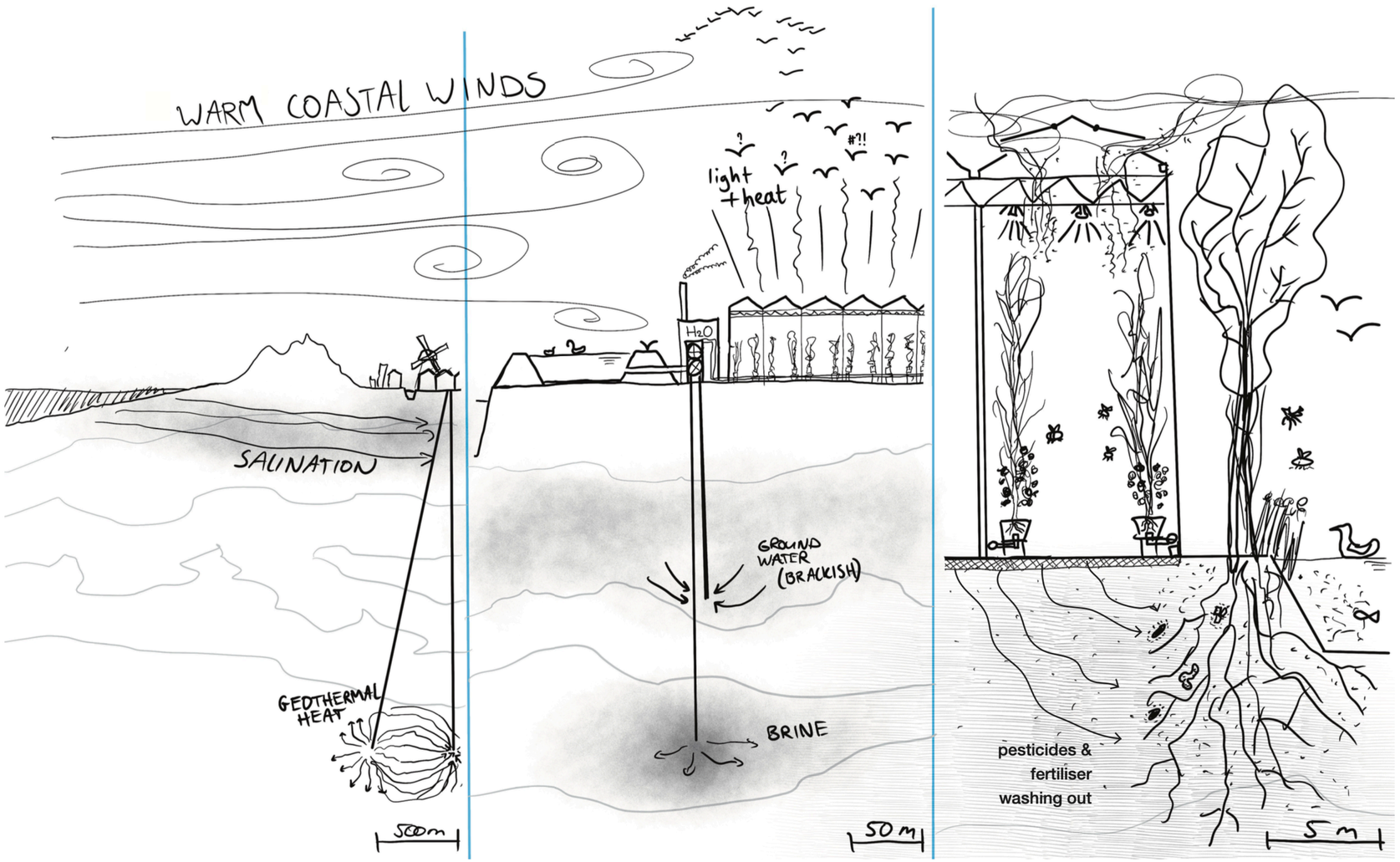


a. suspension rope
b. aerial lift unit
c. guiding rails
d. automated guided vehicle (AGV)
e. irrigation piping
f. rockwool substrate

control over (more-than-) human work



year-round production



hybridity of nature and (horti)culture

limited autonomy



Globalised Horticulture Production and Trade

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

Major greenhouse clusters

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

The Netherlands vegetable exports (non-EU)

The Netherlands vegetable exports (EU)


SE: $252M
DK: $166M
UK: $610M
PL: $173M
BE: $872M
DE: $1550M
FR: $273M
IT: $264M
15°
30°
45°
60°
75°
Japan: $28.2M
USA: $62.0M
UAE: $49.2M
Saudi Arabia: $38.0M
Egypt: $29.0M
Algeria: $32.6M
Sénegal: $58,2M
Côte d'Ivoire: $53,9M



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

regime
greenhouse production starts to take its place in Westland institutionally, economically, culturally and spatially

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

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









institutional infrastructure
collective goods & infrastructures
cultures of (re-)production
natural goods

Patatoes main agricultural production in WL
Nieuwe Vaart waterway connects WL to The Hague
Honselersdijk Estate completed for F.H. van Oranje
First agricultural lobby organisation, HML, established
biodynamic farming movement (Steiner)
First auctions and cooperations
Steam shipping connection to GB established
Loosduinen fruit and wine orchards
Excavations to improve soil conditions start, continue until 1950
Rijkstuinbouwschool established to help WL transition to new crops
Warehouse greenhouse largely adopted
Rapid growth of the Rotterdam harbour
Steam tram connecting WL to The Hague, Delft
Steam tram used only for harvest transport
Multiple waterways built new and broadened
Church reform: protestantism
Road transport takes over in WL
Common Agricultural Policy
Groningen gas field discovered and operationalised
Gas heated greenhouses adopted
National greenhouse areas scale up policy (RROG)
Rotterdam port expansion
FloraHolland Auction built
GMO crops adopted
Greeenport PPP
First geothermal well in WL
Topsector AgriFood

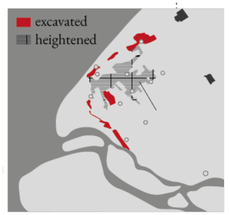
horticultural businesses in NL (x1000)
21 21 19 18 18 17 16 16 15 15 15 15 14 14 14 13 12 11 10 9 8 7 6 4 4 4 3 3
horticultural productivity of tomatoes in NL (kg/m2)
0 10 20 30 40 50 60

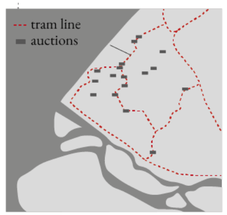
VOC | Industrial revolution, started in GB | Agricultural crisis | WW1 | WW2 | Green revolution | Oil crisis | Gas crisis

1500 late midieval | 1700 | 1850 pre-modern times | 1900 | 1950 modernisation | 1970 | 1990 intensification | 2000 | 2010 liberalisation | 2025 climate crisis

projects



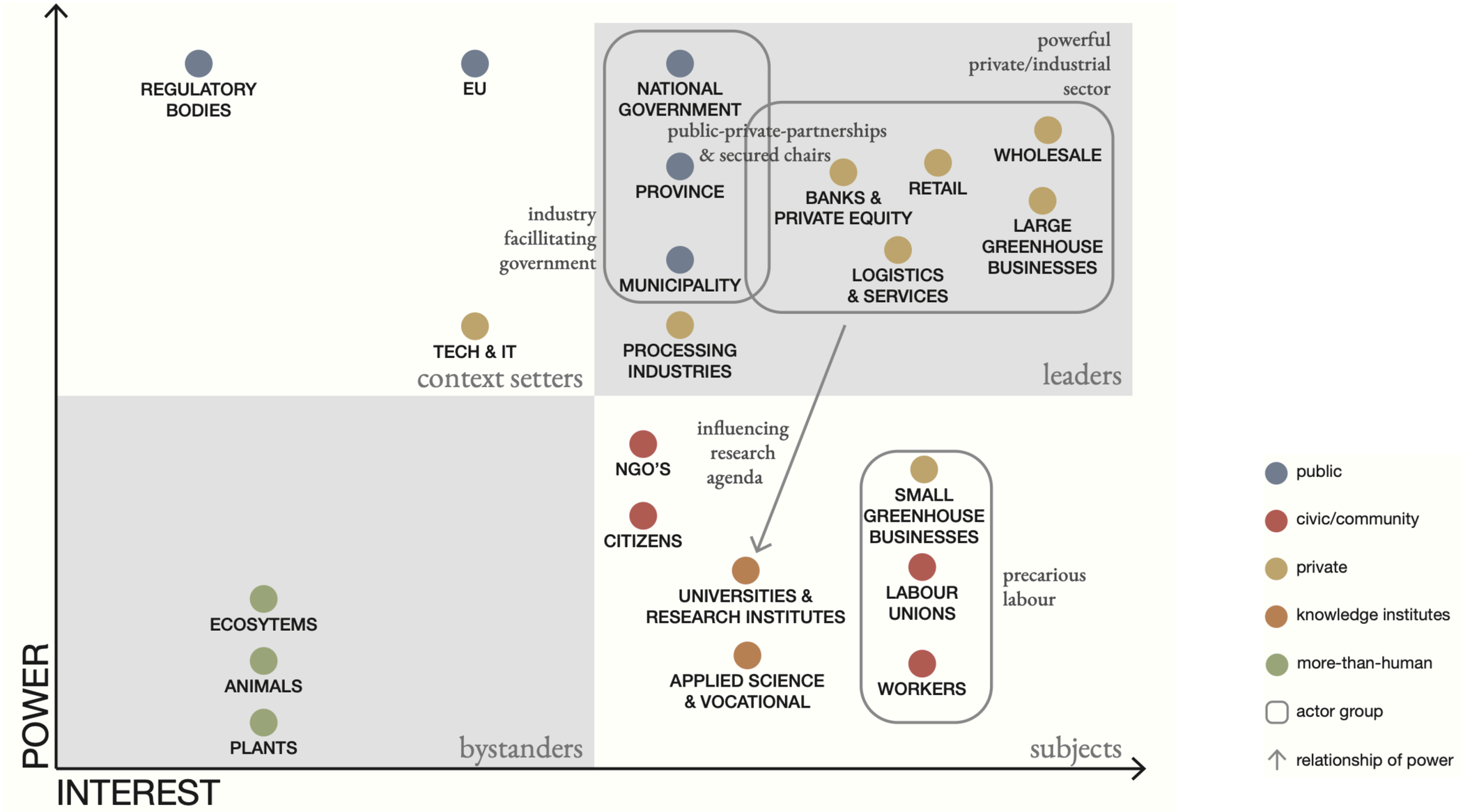












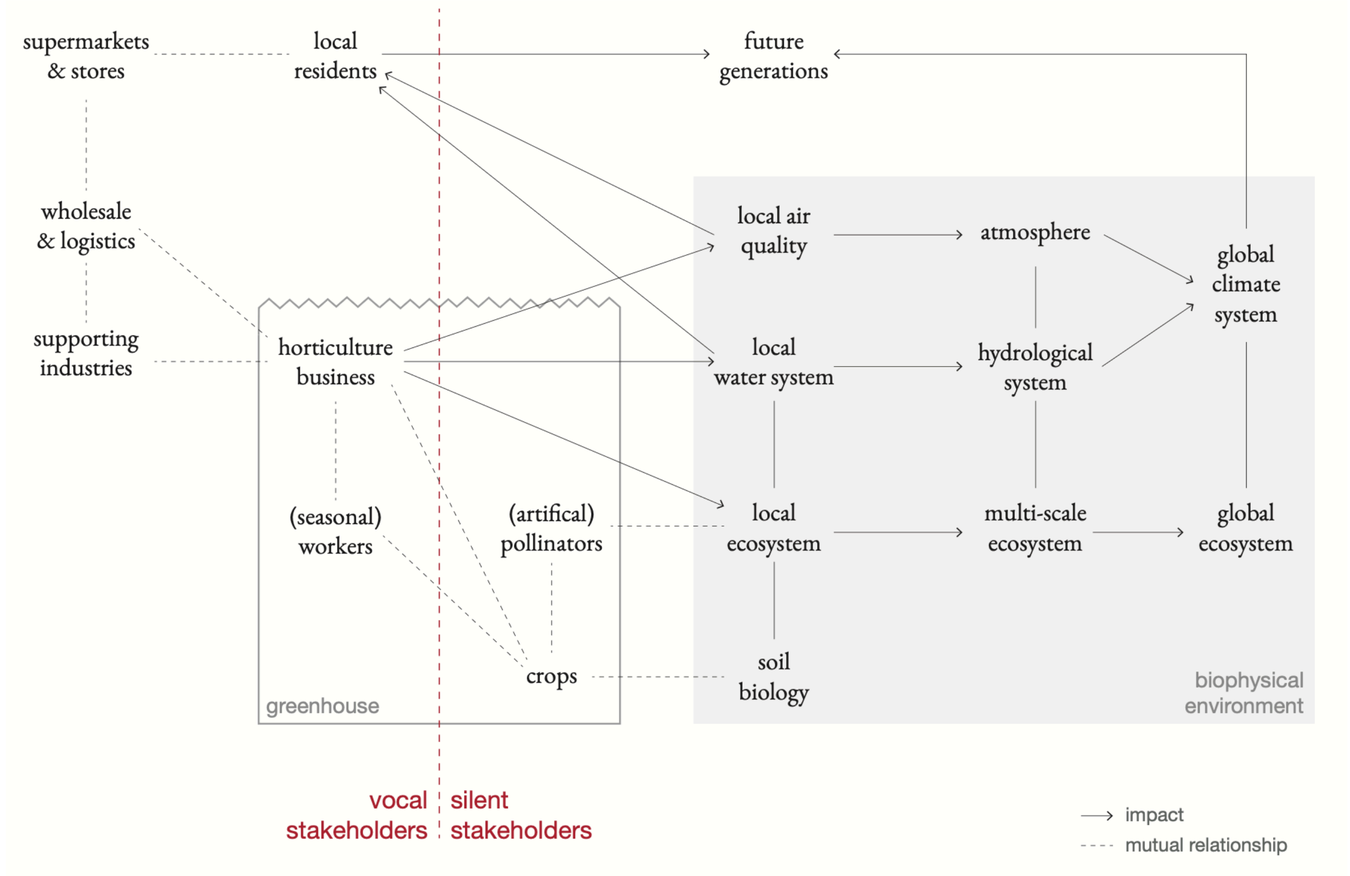
power-interest configurations

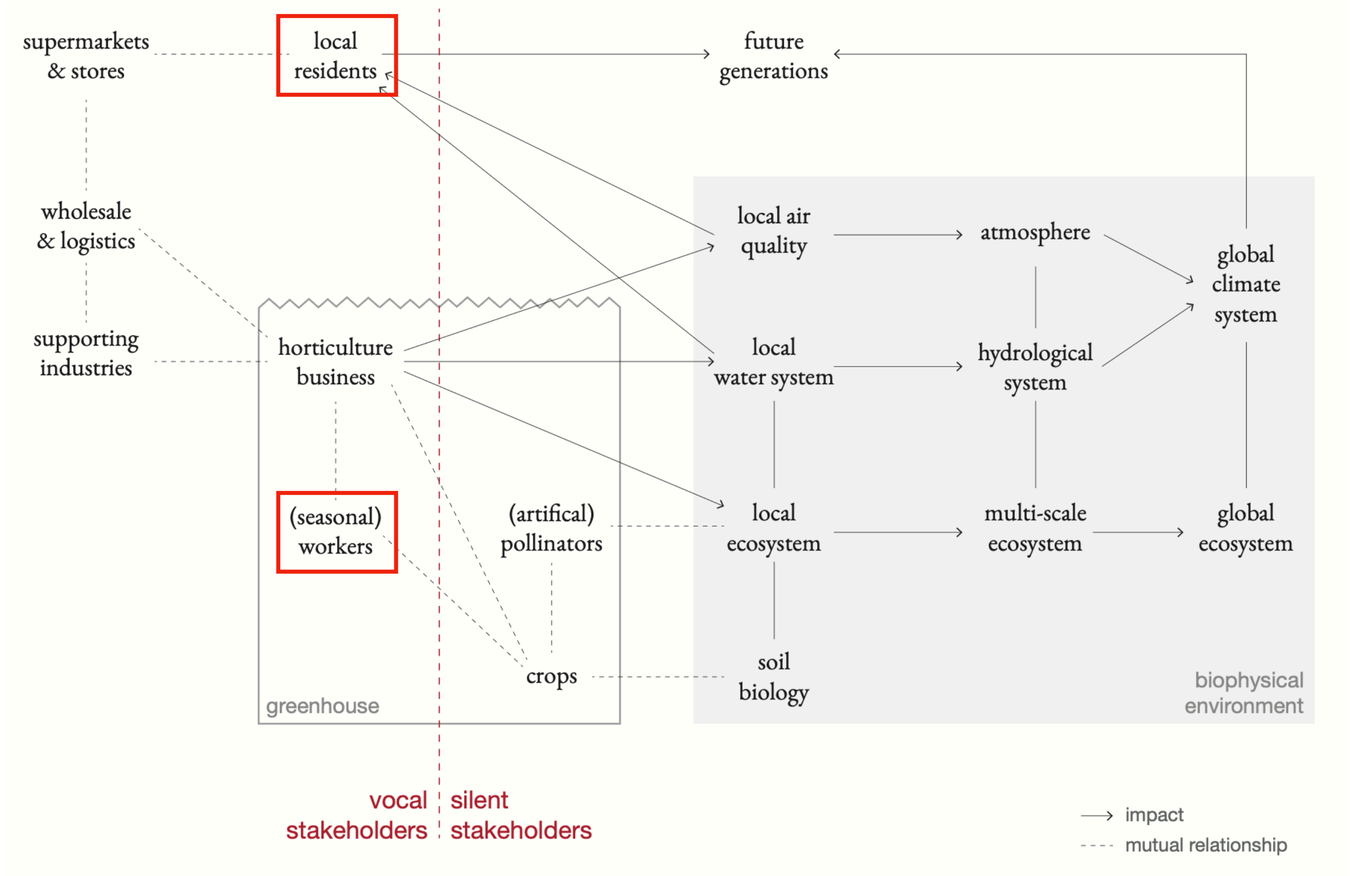

GREENPORT
West-Holland


TOPSECTOR
TUINBOUW & UITGANGSMATERIALEN

1. Limits

how does the system work?
what is wrong/injust?
what is the role of space?
how did we end up here?


supermarkets & stores
local residents
future generations
wholesale & logistics
supporting industries
horticulture business
local air quality
atmosphere
global climate system
local water system
hydrological system
(seasonal) workers
(artifical) pollinators
local ecosystem
multi-scale ecosystem
global ecosystem
crops
soil biology
greenhouse
biophysical environment
vocal stakeholders
silent stakeholders
impact
mutual relationship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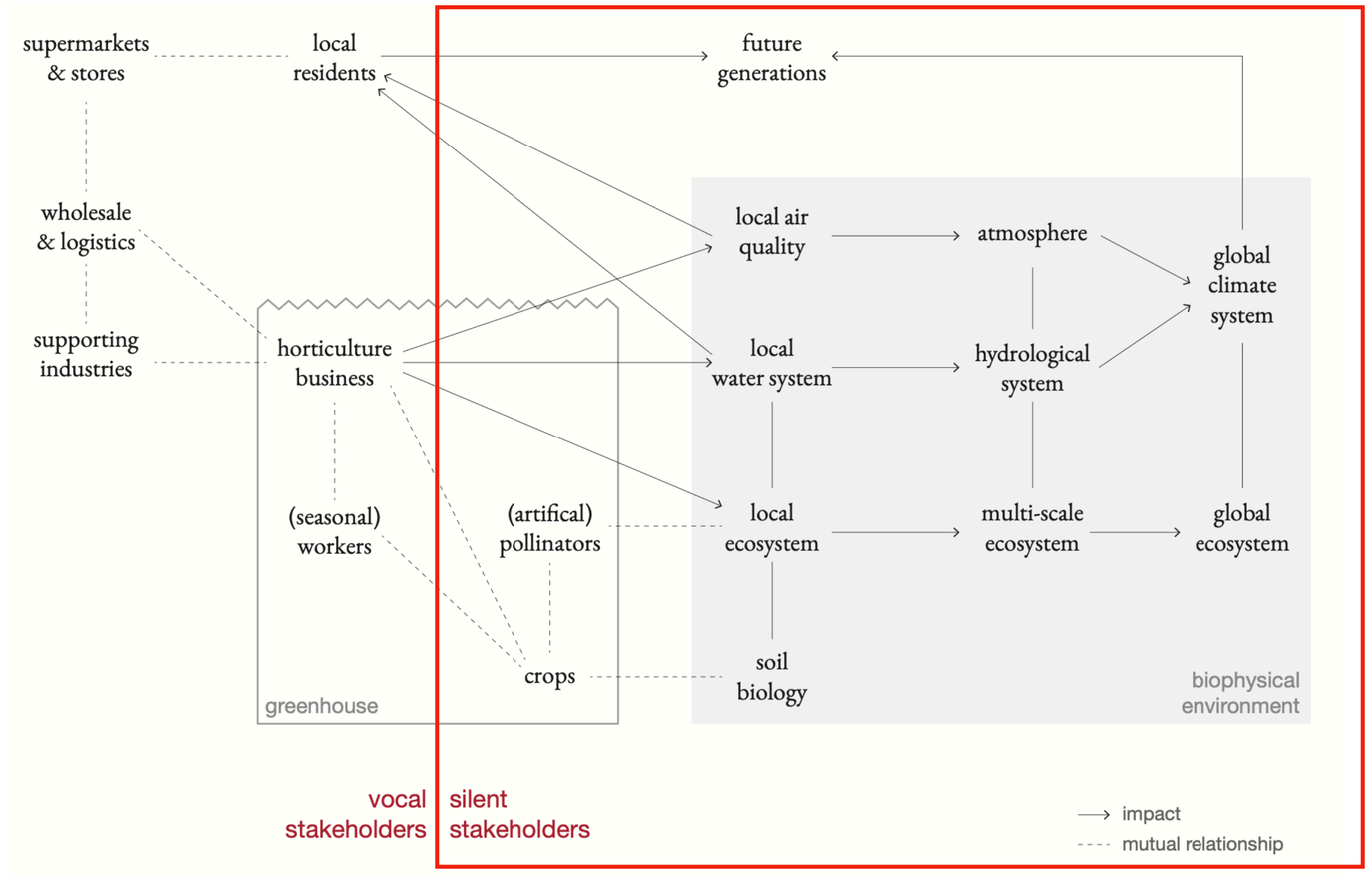
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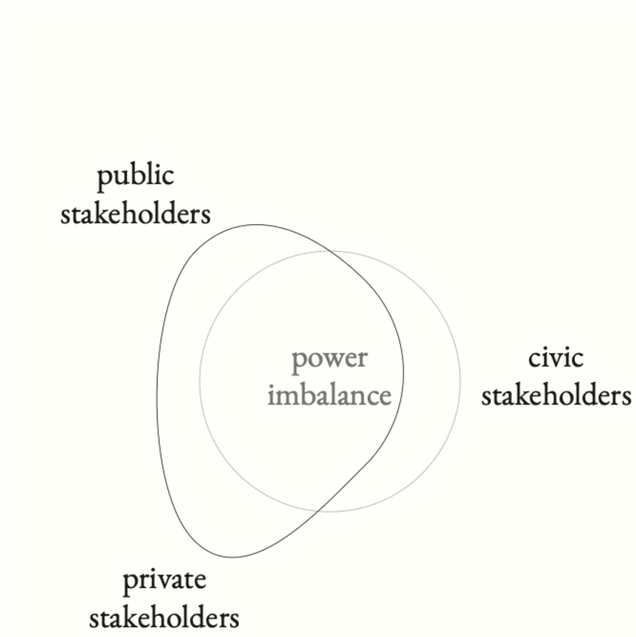
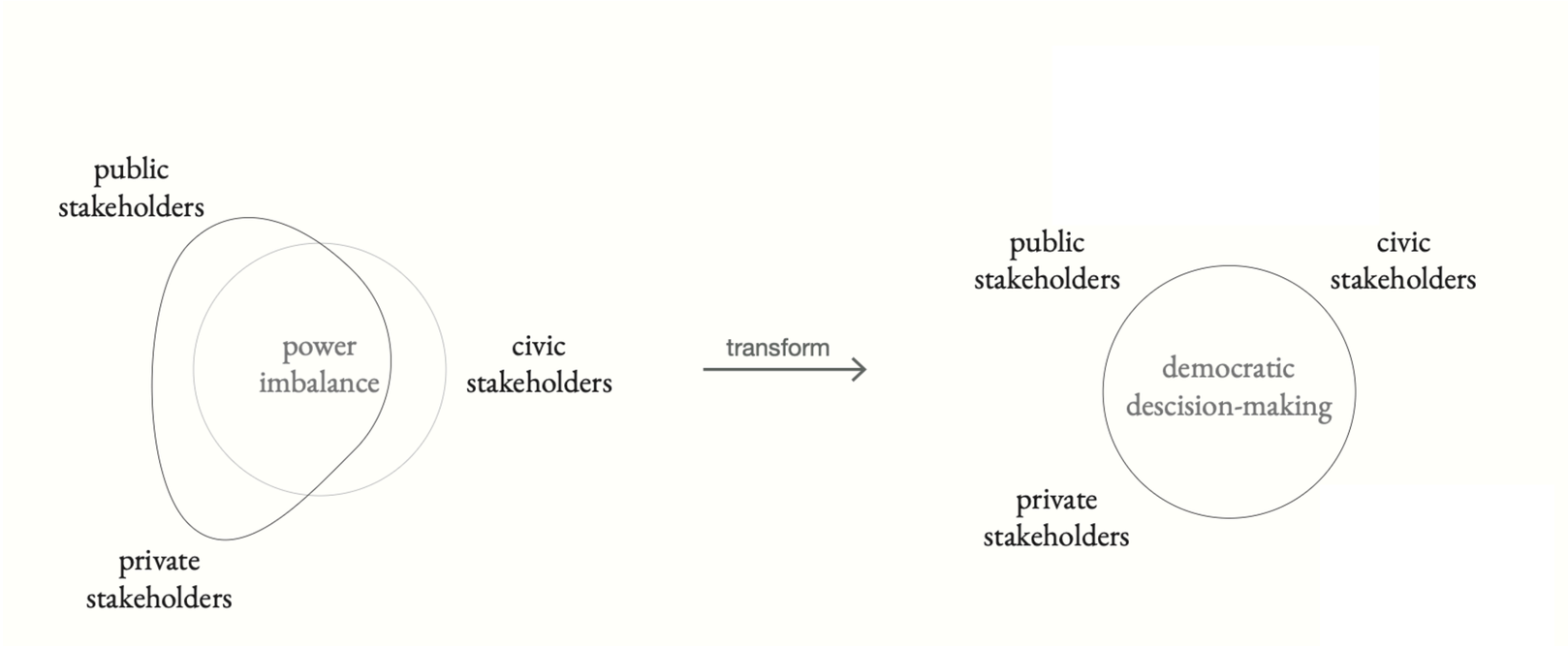

public
stakeholders
power
imbalance
civic
stakeholders
private
stakeholders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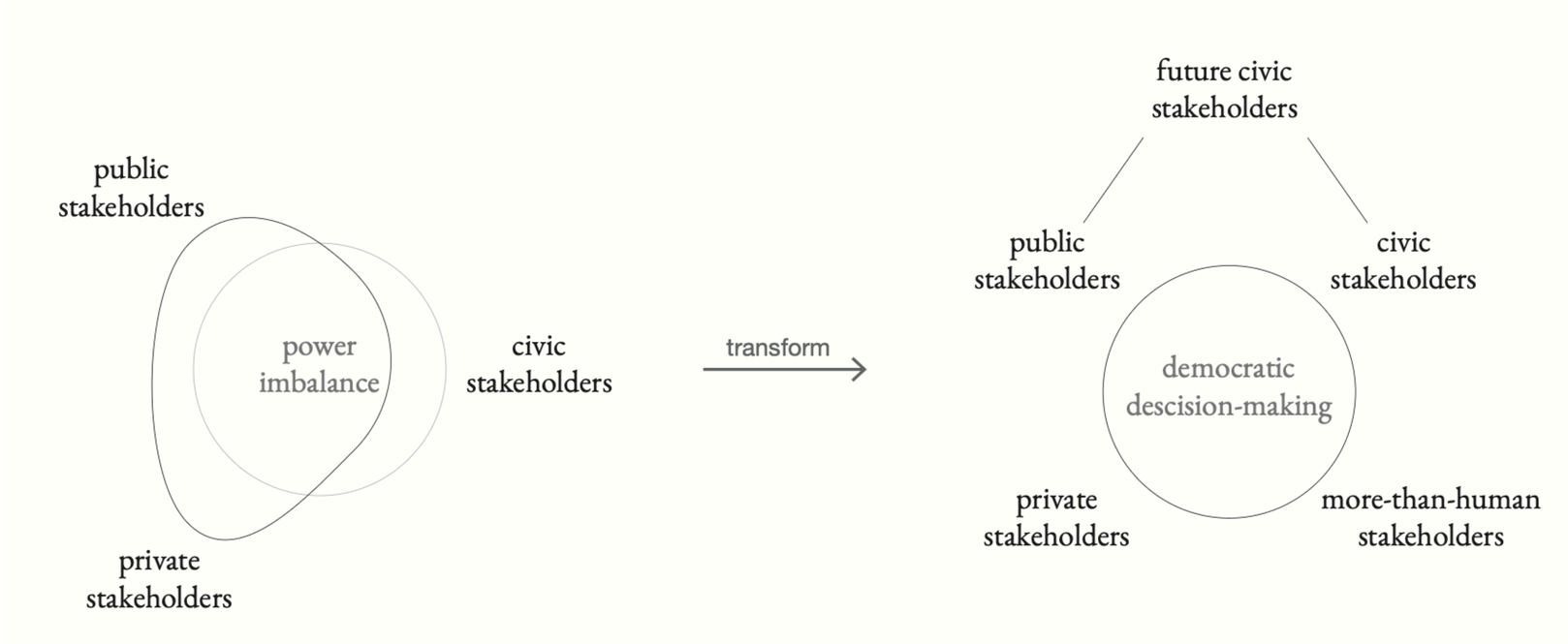
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more-than-human
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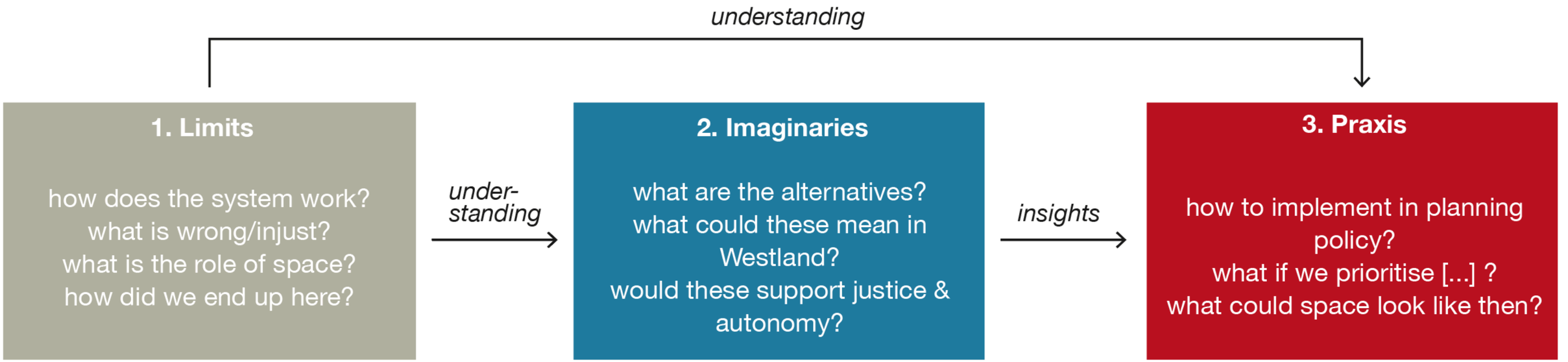
understanding
1. Limits
how does the system work?
what is wrong/injust?
what is the role of space?
how did we end up here?
under-
standing
2. Imaginaries
what are the alternatives?
what could these mean in Westland?
would these support justice & autonomy?
insights
3. Praxis
how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

2. Imaginaries

what are the alternatives?
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2. Imaginaries

what are the alternatives?

radical imaginaries

Federatie van Agro-ecologische Boeren

Toekomstboeren

radical imaginaries

HERENBOEREN
SAMEN DUURZAAM VOEDSEL PRODUCEREN

Land van Ons 5 JAAR

lenteland

Plenty Food


Alleen toegankelijk
voor medewerkers
BoerenGoed



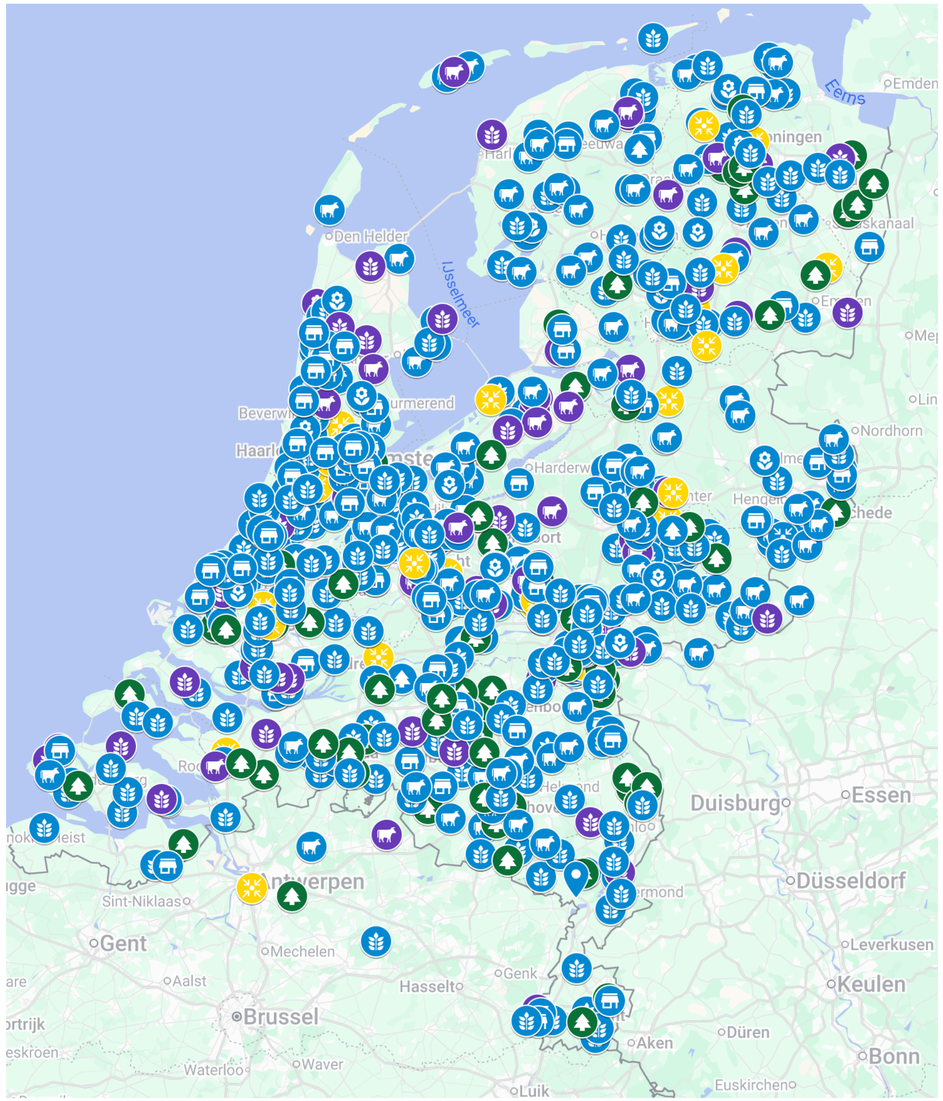

image from Regeneratie Kaart & Google (2025)

> 600 ‘gemeenschapsboerderijen’

key findings

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

Toekomstboeren ambassador

FAILIING GOVERNMENTS

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

M. Visser, Lenteland management (Schulte, 2025)

interview media review literature review

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

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"The [health of] residents of Delfland are more important than corporate profits. There must be a **licence to produce**, in which corporate social responsibility is guaranteed"

Former horticulture consultant and waterschap Delfland commissioner

ECOLOGICAL STEWARDSHIP

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

Land van Ons farm coordinator 1

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

(Ditzler & Driessen, 2022)

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

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

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

Toekomstboeren ambassador

SOCIAL VALUE OF AGRI-FOOD

"Together with the participants of the fieldlab, we gradually understood that the initial ambition of initiating food system transformation needed to be downscaled to a more pragmatic aim of **(re)building social ties** in the region and connecting local citizens and farmers, who have become disconnected through the expansion of capitalist agriculture and neoliberalism."

(van Oers et al., 2024)

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

Land van Ons farm coordinator 2

AUTONOMY

"On the 'plantation', there are no more autonomous farmers, because **the goal of scaling up justifies the means.**"

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

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

Toekomstboeren ambassador

interview media review literature review

"You can work on policy, but it will never be foolproof and can sometimes go wrong. I think there is also a great **responsibility among citizens** themselves."

Toekomstboeren ambassador

THE COMMONS

"By restoring relationships [between farmer, citizen and nature], we can make land more accessible and food production more sustainable. **The commons offers an opportunity for this regeneration.** "

Commons guidebook Toekomstboeren (Bakker et al., 2022)

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interview media review literature review

LAND SCARCITY

"Finding land is made difficult by rigid zoning plans or a rigid interpretation thereof. For future-proof agriculture **land security is the most important prerequisite.**"

Land scarcity report Toekomstboeren (Bakker, 2024)

"A **sustainable land tenancy law** [is needed]."

Toekomstboeren ambassador

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NATURE-CULTURE FALSE CONTRADICTION

"Exploring the added value of agroecology to **challenge the apparent contradiction** between agriculture and nature."

Land scarcity report Toekomstboeren (Bakker, 2024)

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

Former horticulture consultant and waterschap Delfland commissioner

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interview media review literature review

2. Imaginaries

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what could these mean in Westland?
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2. Imaginaries

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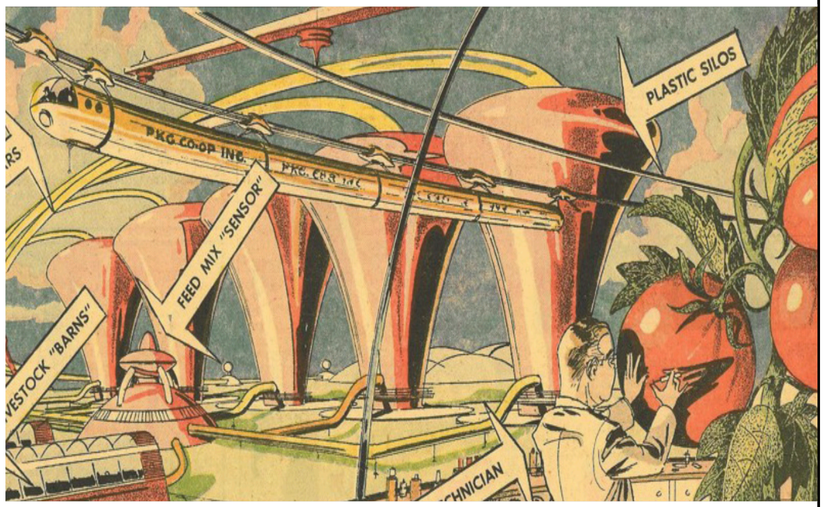
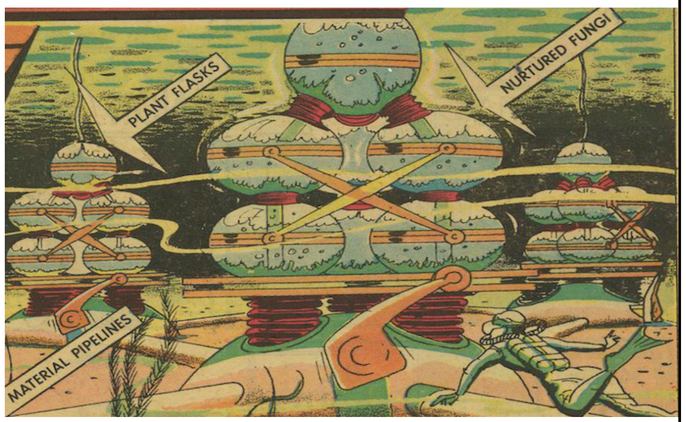
what could these mean in Westland?

scenarios-thinking





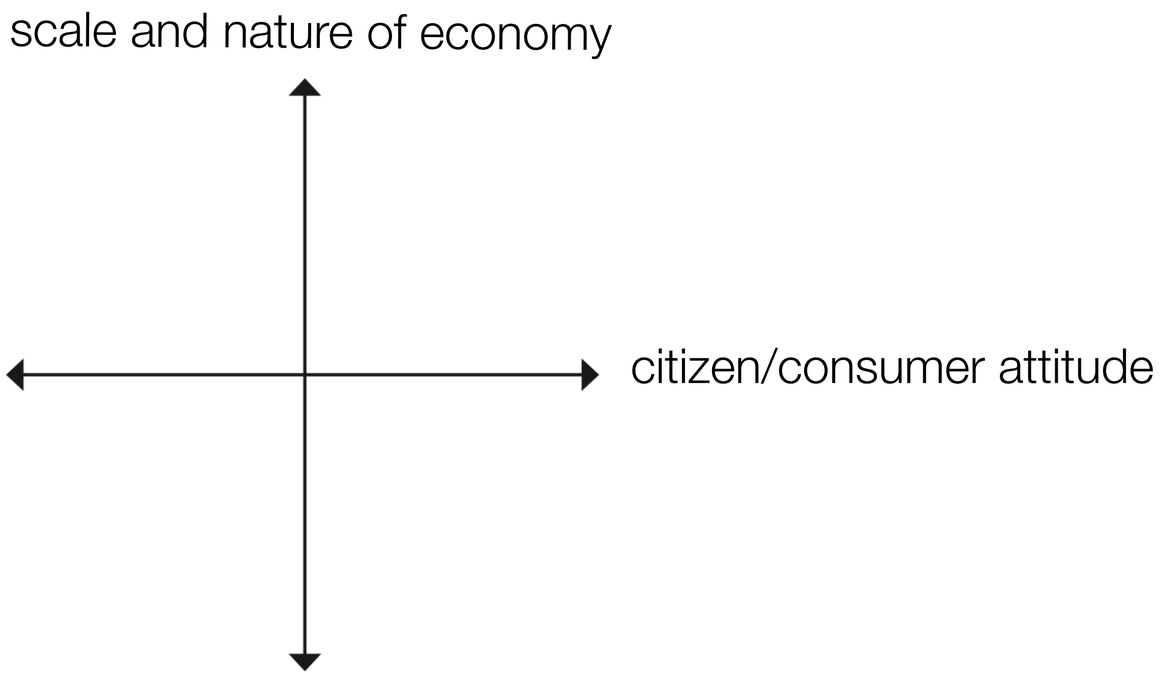
Excerpts from the Closer Than We Think comic series

image copyright A. Radebaugh in Chicago Tribune, 1961-62

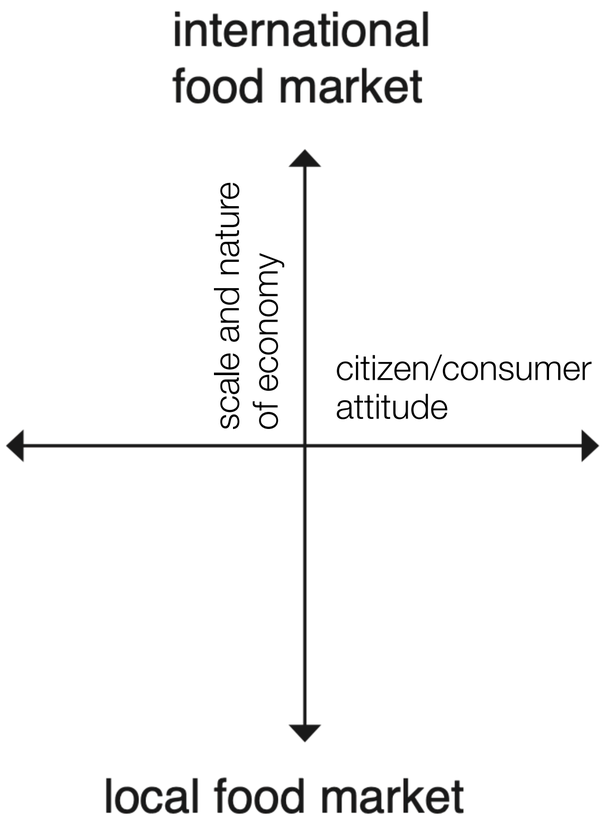
speculative design

imaginative “memories of the future” (Schwartz, 1991)

critical uncertainties



critical uncertainties axis-system

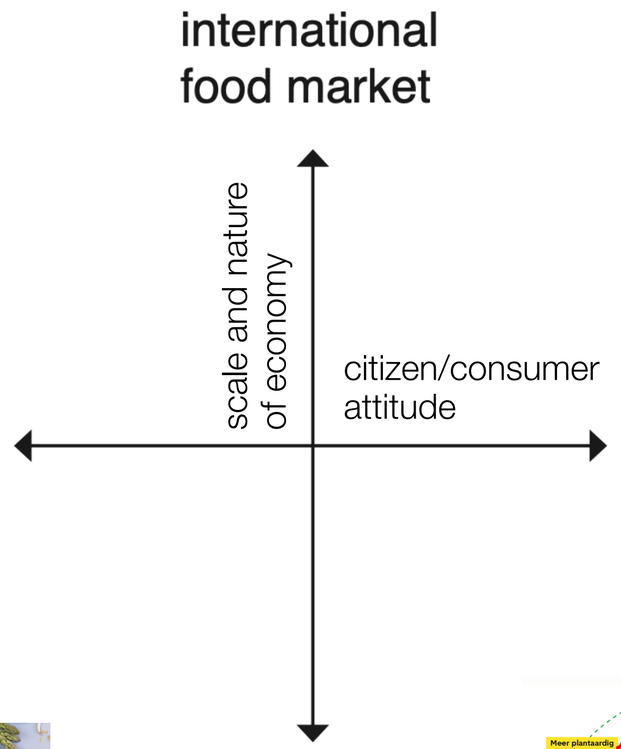


critical uncertainties axis-system

Exportwaarde Nederlandse landbouw opnieuw toegenomen

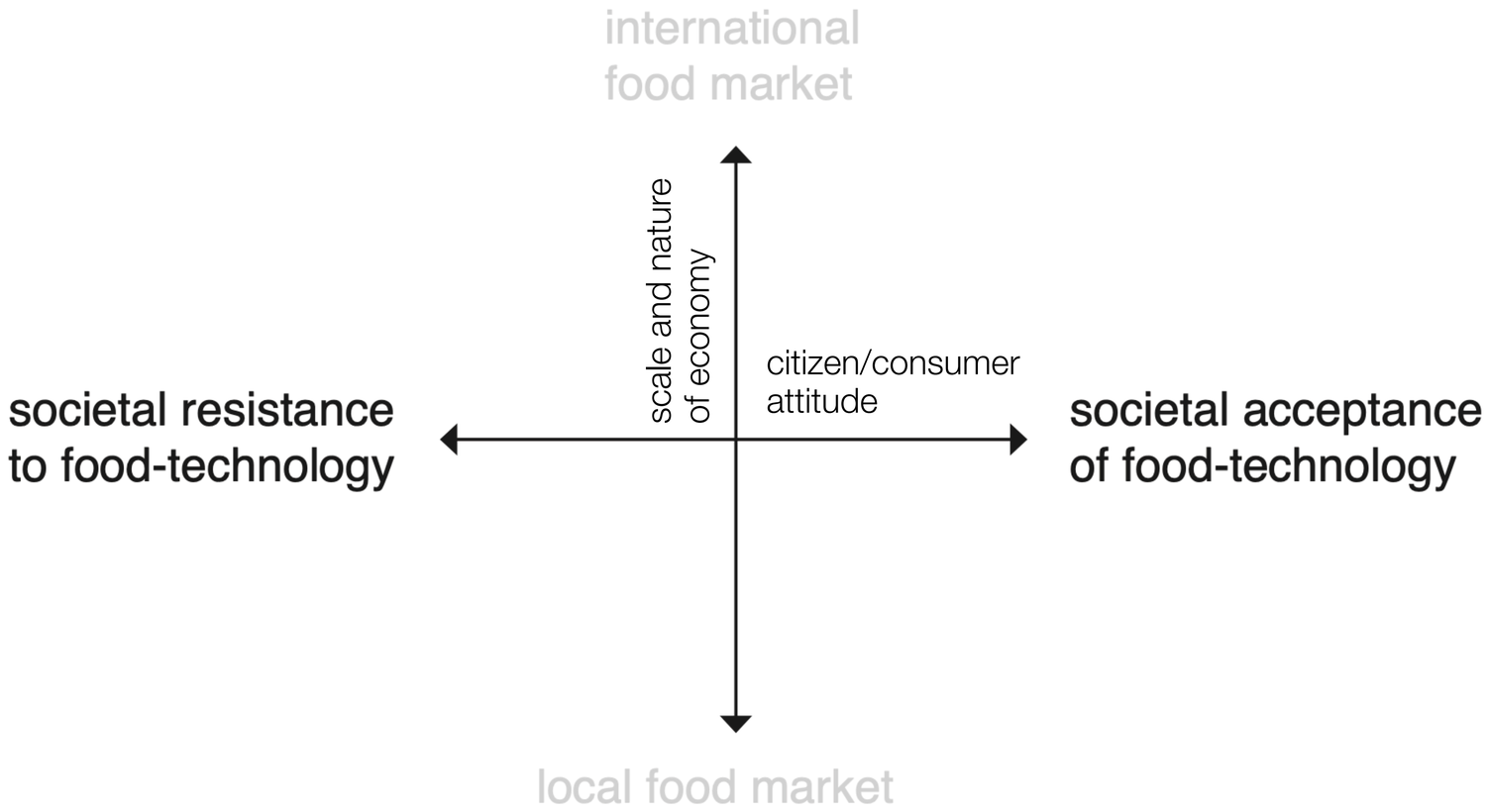
Nieuwsbericht | 17-01-2025 | 08:12

Nederland exporteerde in 2024 ter waarde van € 128,9 miljard









critical uncertainties axis-system



De terugkeer van de Gele Komkommer

SLOW FOOD

societal resistance to food-technology

international food market

scale and nature of economy

citizen/consumer attitude

societal acceptance of food-technology

local food market

Inside the meat lab: the future of food

With billions of mouths to feed, we can't go on producing food in the traditional way. Scientists are coming up with novel ways to cater for future generations. In-vitro burger, anyone?





Horsemeat scandal was a damning indictment of the state of our food

Meat is a mucky business and always has been - in the modern day it's just one facet of how food regulation fails us, writes Time Lang of City University, London.

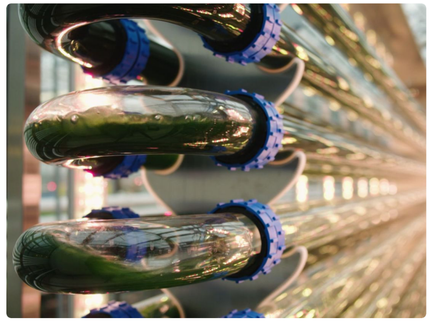
8 min read

Published 14 December 2013 6:58am
Updated 15 December 2013 10:22am

Source: The Conversation

In deze algenboerderij wordt voedsel van de toekomst gemaakt

Martijn Driessen 6 maart 2024, 10:43 • Aangepast 6 maart 2024, 17:40 • 1 minuut leestijd



NL International Agri-Food Hub





“ORGANIC FANTASTIC”
SCENARIO 1

“SUPERSIZE ME”
SCENARIO 2

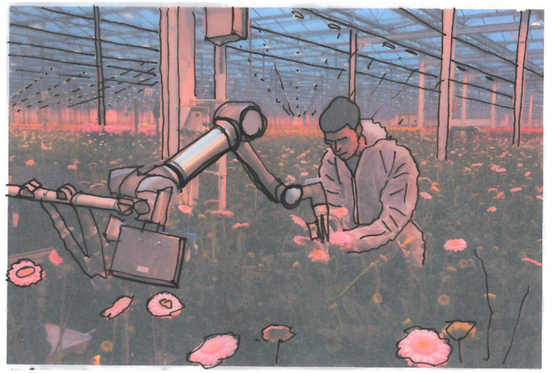
Societal Resistance to Food-Technology

Societal Acceptence of Food-Technology

SCENARIO 3
“HOME GROWN”

SCENARIO 4
“VEGGIE VALLEY”





NL Self Sufficient Agri-Food Market

NL International Agri-Food Hub



"ORGANIC FANTASTIC"
SCENARIO 1

Societal Resistance to Food-Technology

Societal Acceptence of Food-Technology

NL Self Sufficient Agri-Food Market

NL International Agri-Food Hub



“SUPERSIZE ME”
SCENARIO 2

Societal Resistance to Food-Technology

Societal Acceptence of Food-Technology

NL Self Sufficient Agri-Food Market

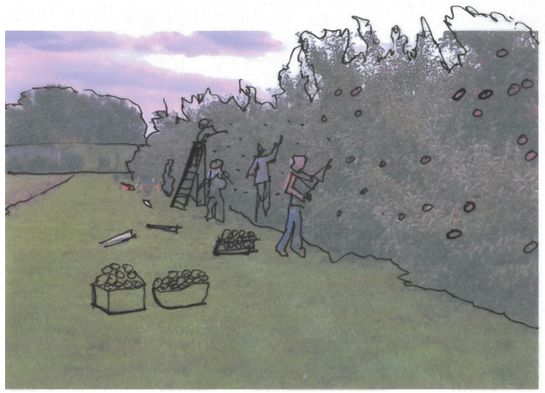
NL International Agri-Food Hub

Societal Resistance to Food-Technology

Societal Acceptence of Food-Technology

SCENARIO 3

“HOME GROWN”



NL Self Sufficient Agri-Food Market

NL International Agri-Food Hub

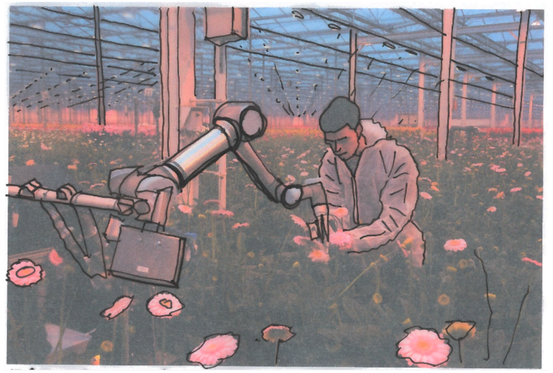
Societal Resistance to Food-Technology

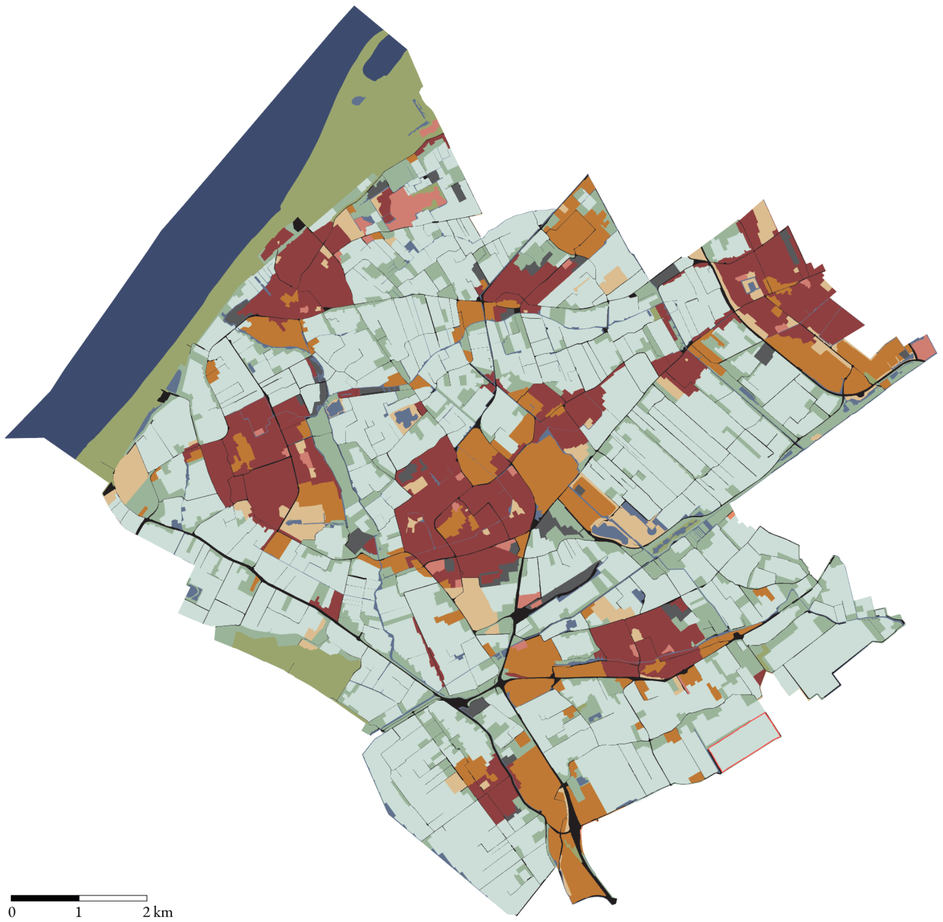
Societal Acceptence of Food-Technology

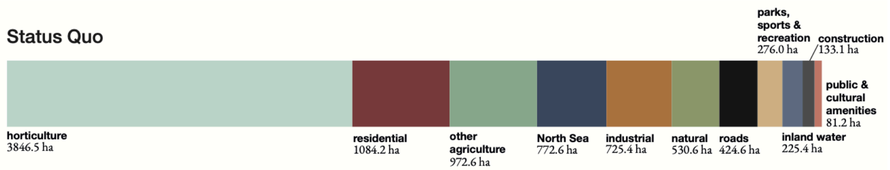
NL Self Sufficient Agri-Food Market

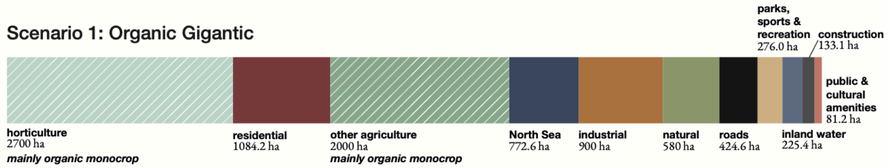
SCENARIO 4

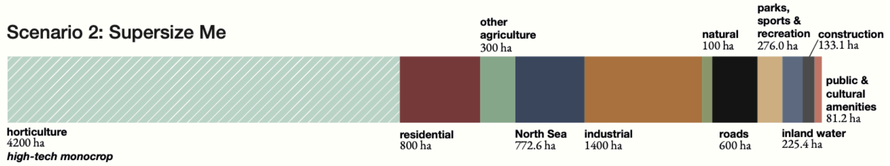
“VEGGIE VALLEY”

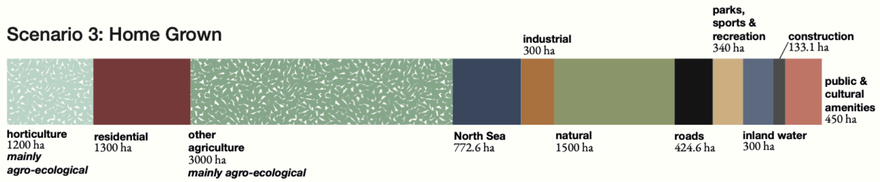


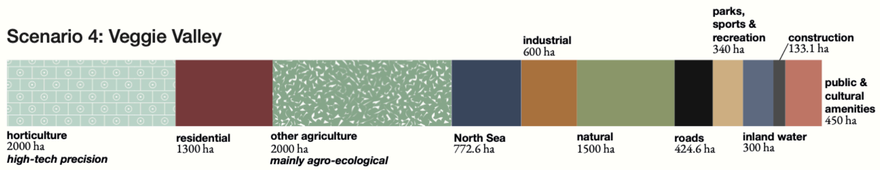












land-use variations

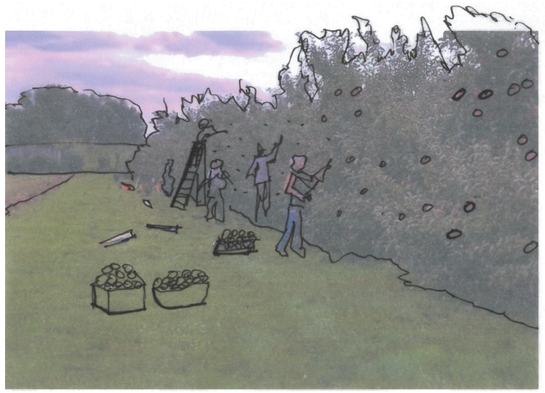
NL International Agri-Food Hub

Societal Resistance to Food-Technology

Societal Acceptence of Food-Technology

SCENARIO 3

“HOME GROWN”



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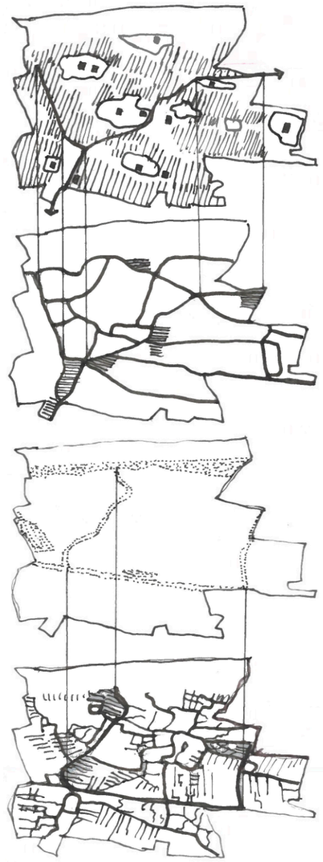
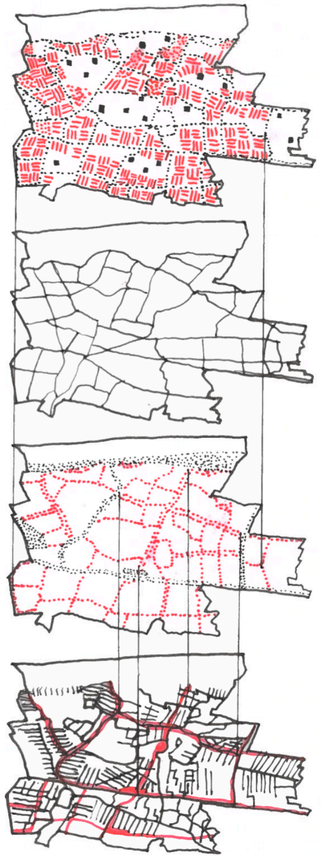


Status Quo



Scenario

Westland scale

projected **spatial footprints and networks**:

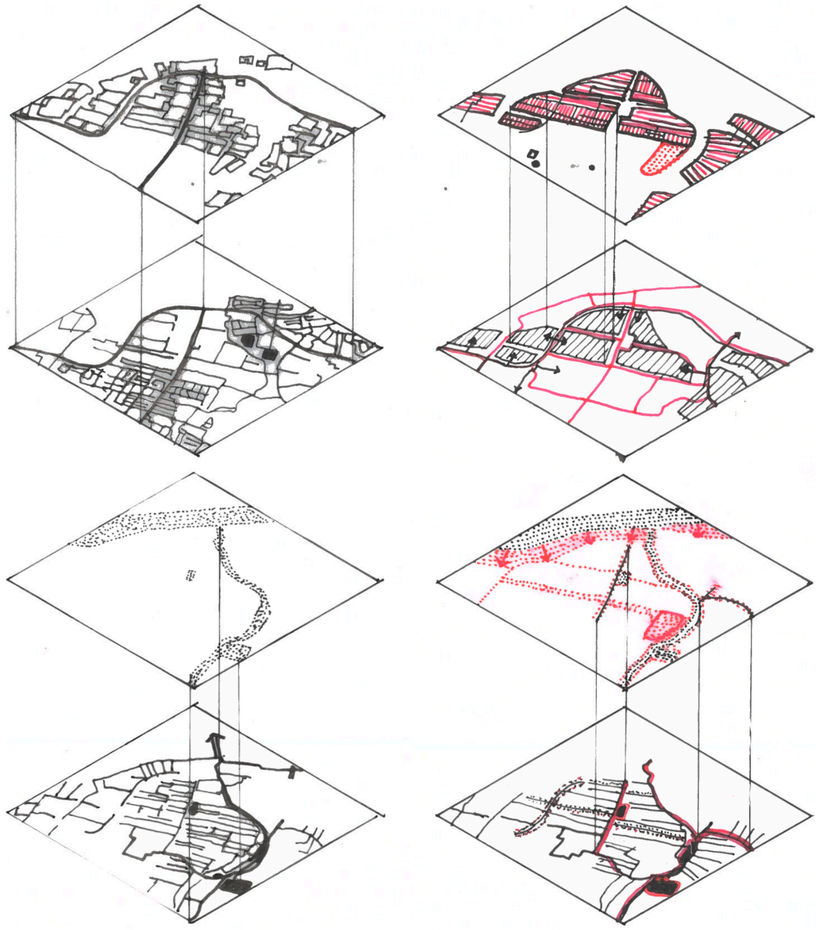
agriculture

infrastructure

ecology

water system

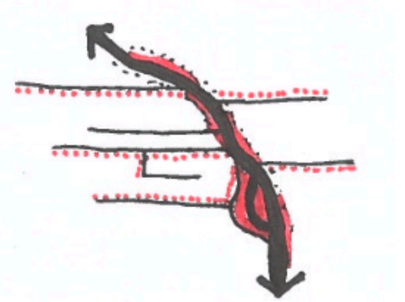
(and their **relationships**)



polder scale

local **land-use and morphology**

gain insight into **spatial relations, potentials and conflicts**



Small scale landscape elements (e.g. hedgerows) follow the drainage structure.



Greenhouses are still in use but are smaller and unheated.



The farms are highly accessible

relations, potentials and conflicts

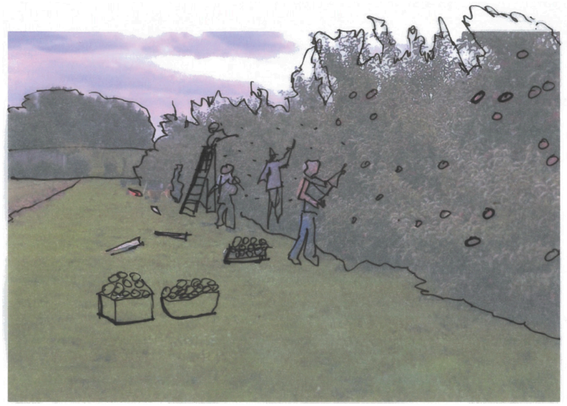


speculative “master plan”



Consumer

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



Farmer

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



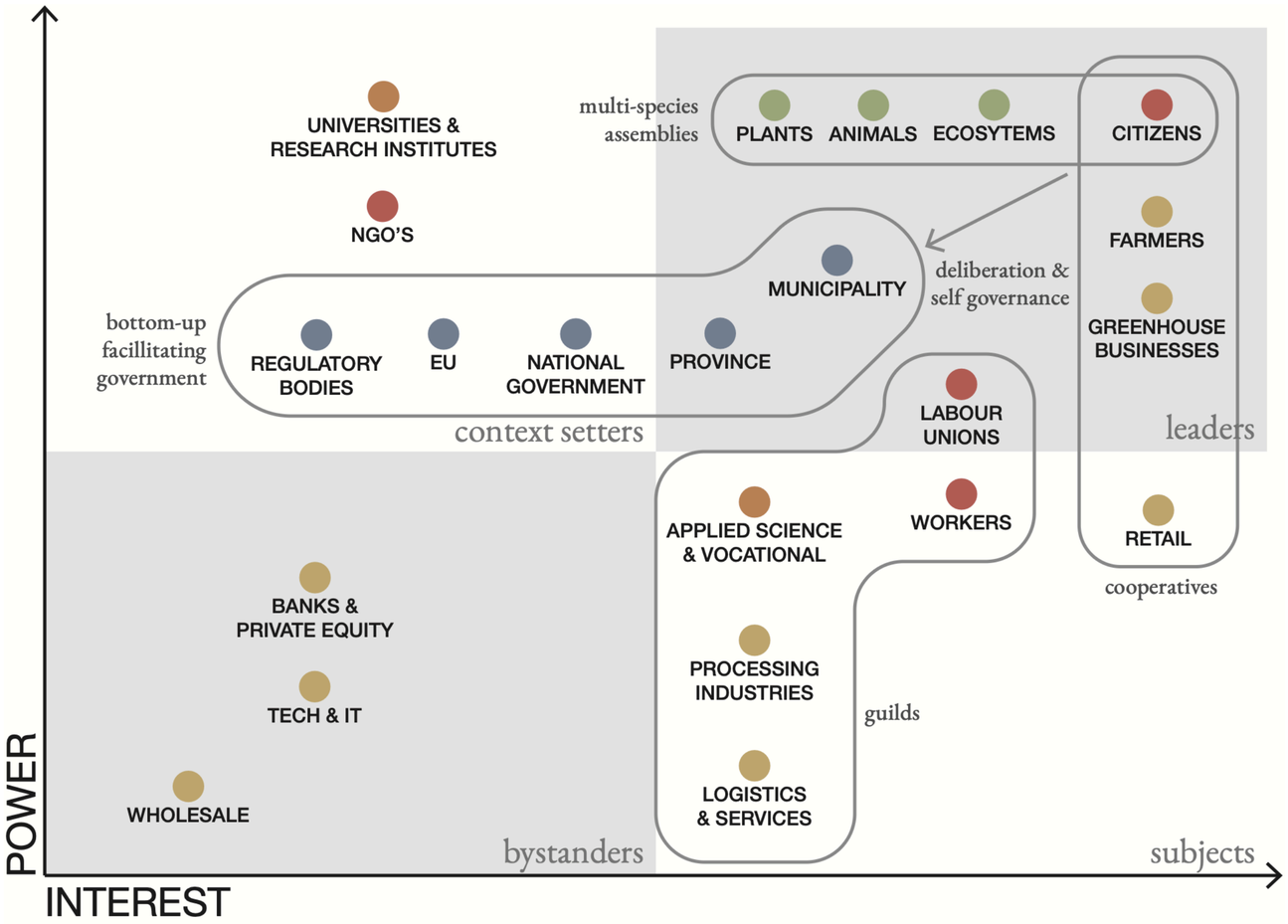
Crop

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

impressions per “role”

“HOME GROWN”

SCENARIO 3



public

civic/community

private

knowledge institutes

more-than-human

actor group

relationship of power

stakeholder configurations

2. Imaginaries

what are the alternatives?
what could these mean in Westland?
would these support justice & autonomy?

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spatial justice

which integrates the dimension of space into the moral and legal framework
that aims to balance individual rights with the common good

Soja (2010) & (Lopez et al., 2024a)

spatial justice

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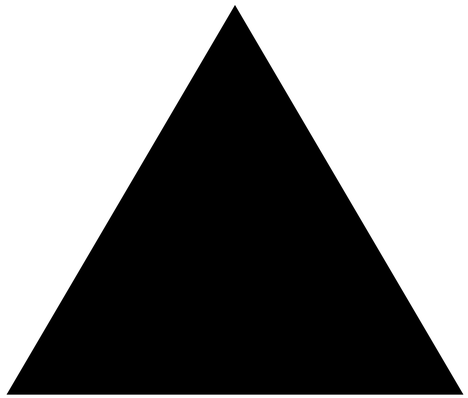
distributive justice



recognition justice

procedural justice

Soja (2010) & (Lopez et al., 2024a)

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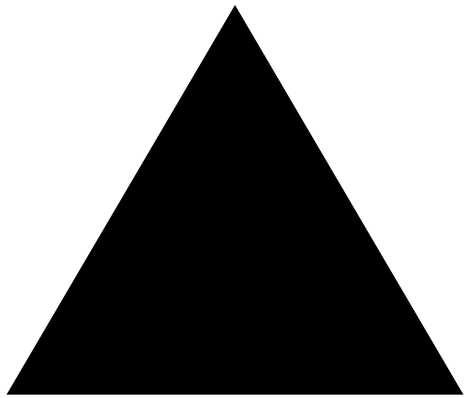

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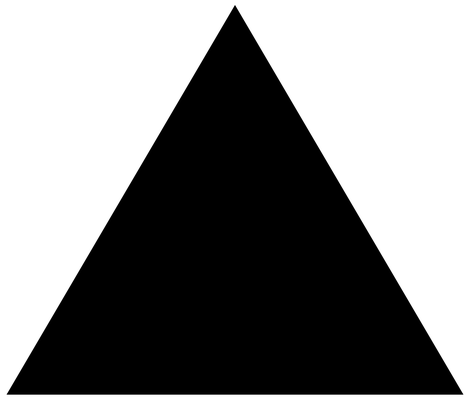
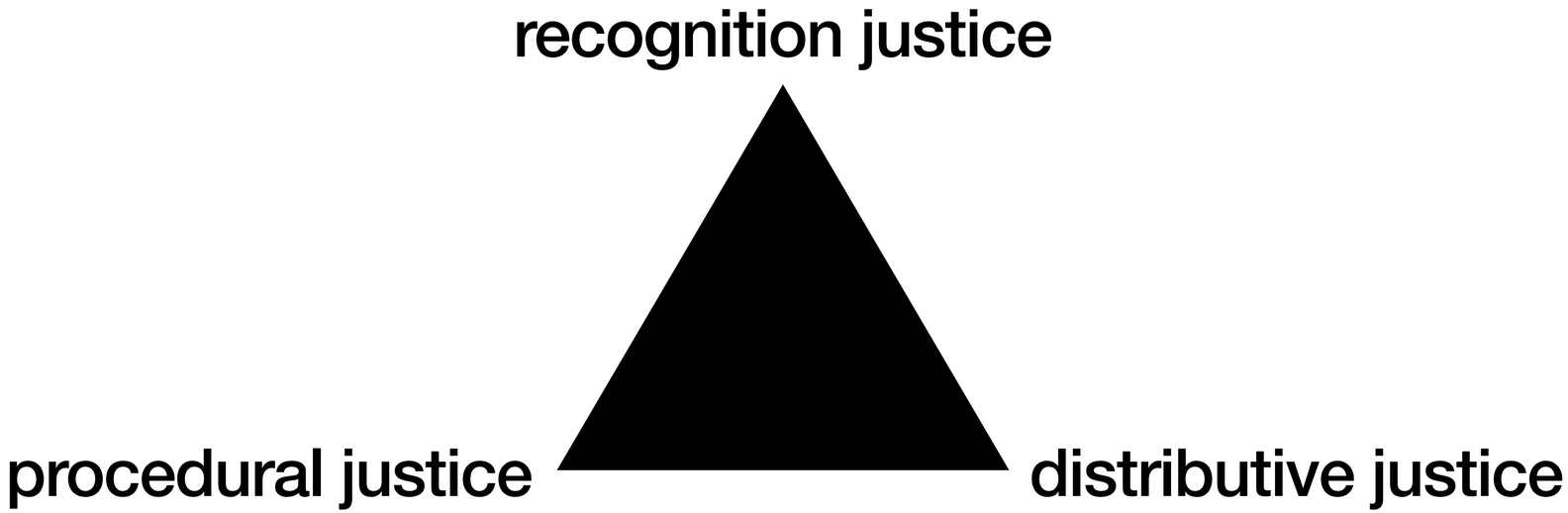


recognition justice

procedural justice

Soja (2010) & (Lopez et al., 2024a)

assessing spatial justice



Soja (2010) & (Lopez et al., 2024a)

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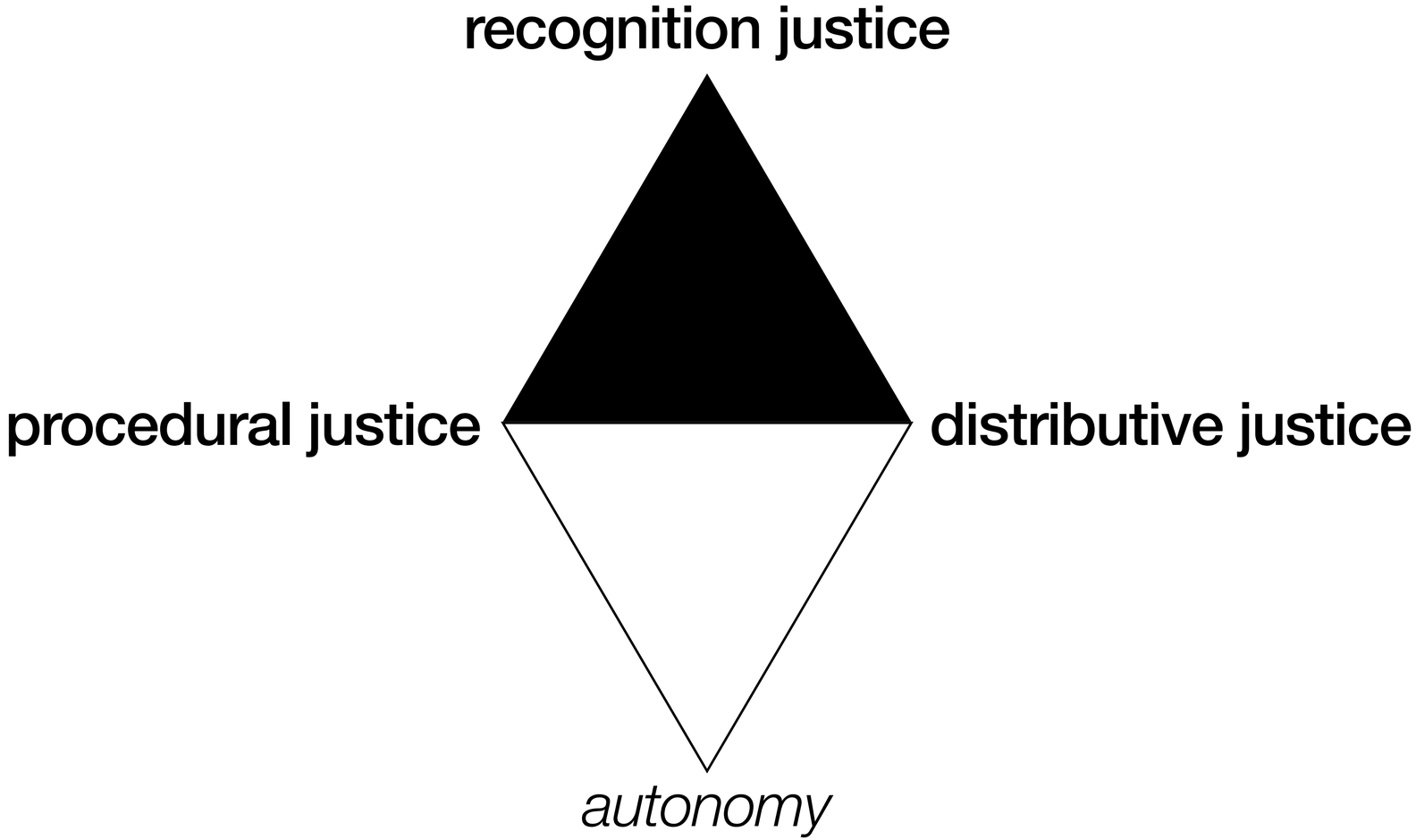

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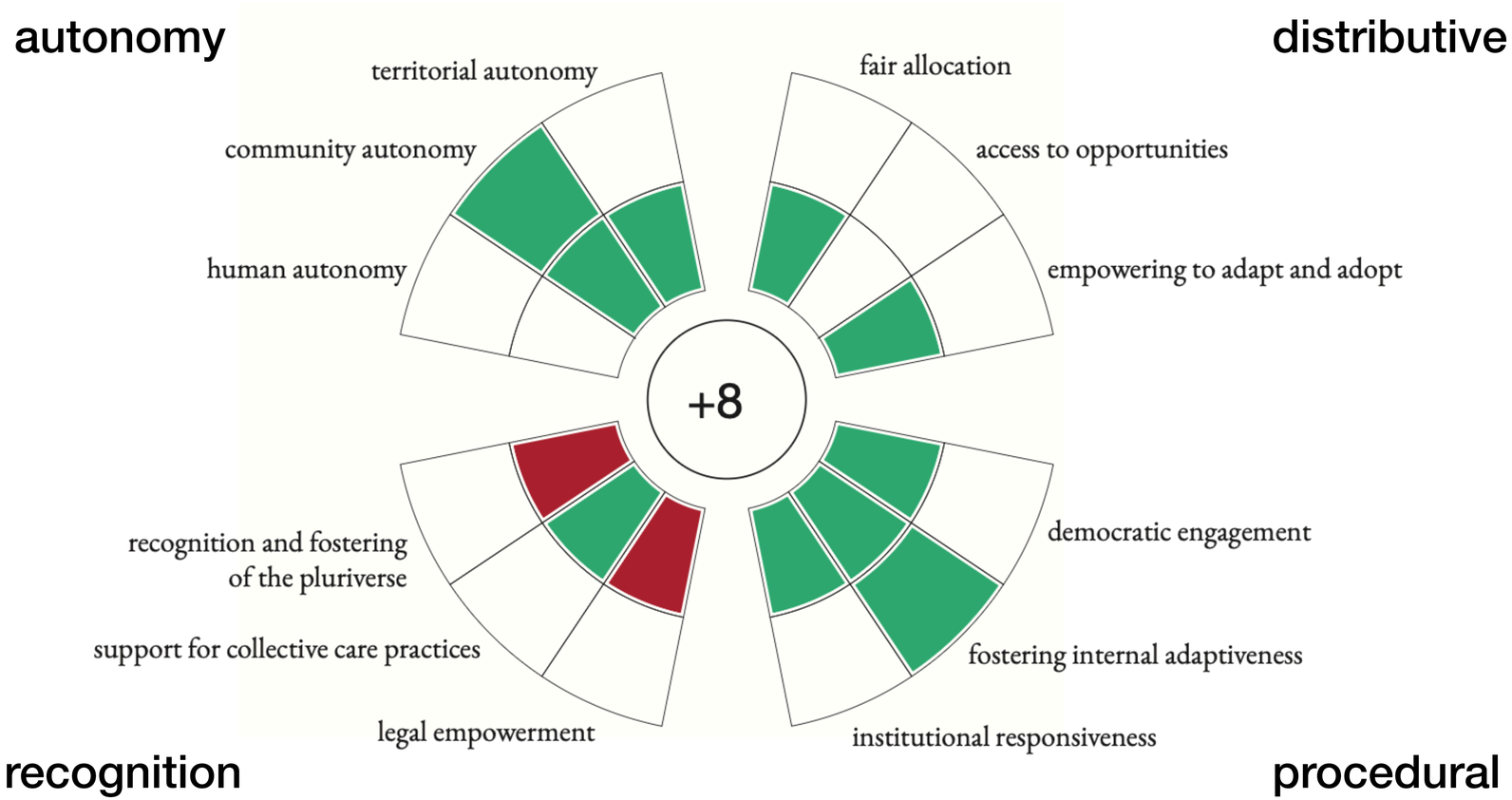
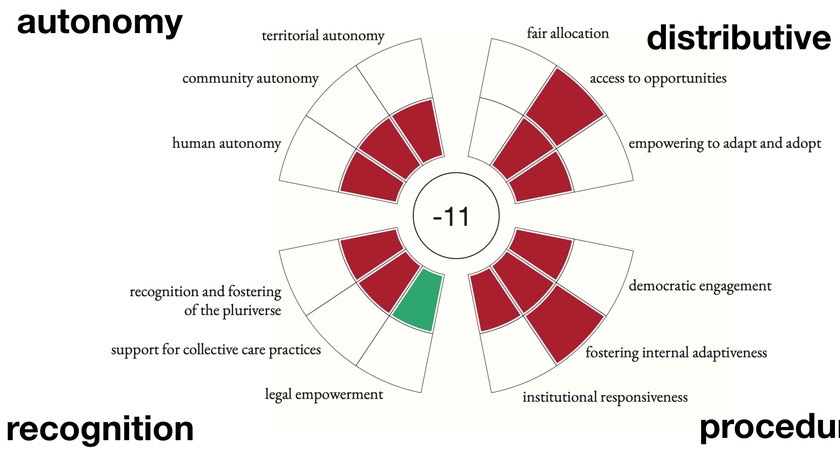

autonomy
distributive
territorial autonomy
fair allocation
community autonomy
access to opportunities
human autonomy
empowering to adapt and adopt
+8
recognition and fostering
of the pluriverse
democratic engagement
support for collective care practices
fostering internal adaptiveness
legal empowerment
institutional responsiveness
recognition
procedural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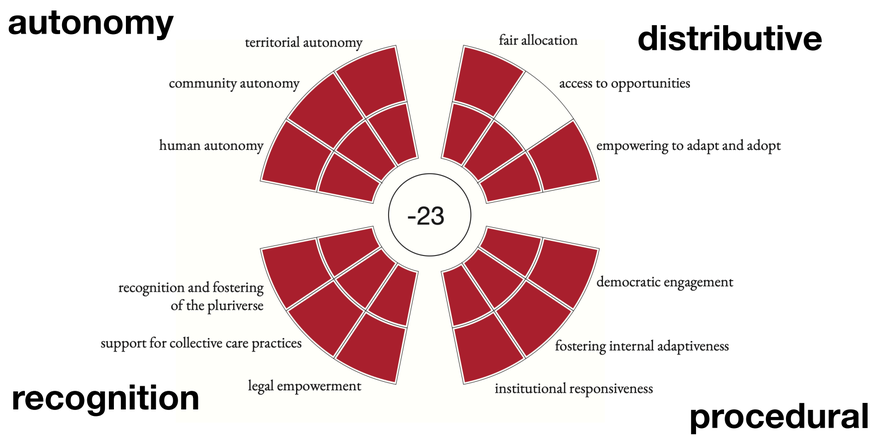
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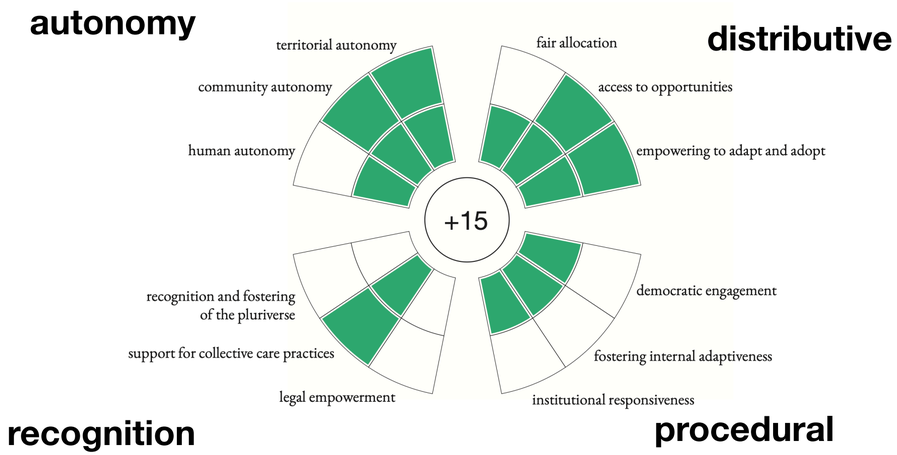
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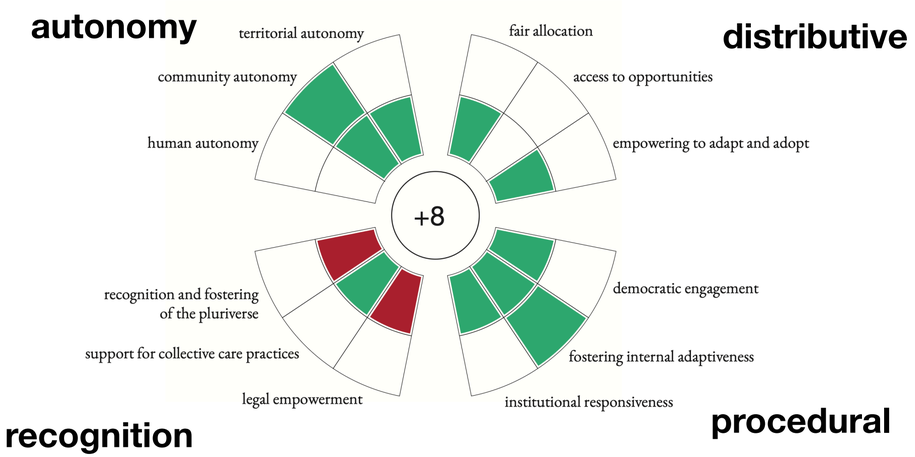
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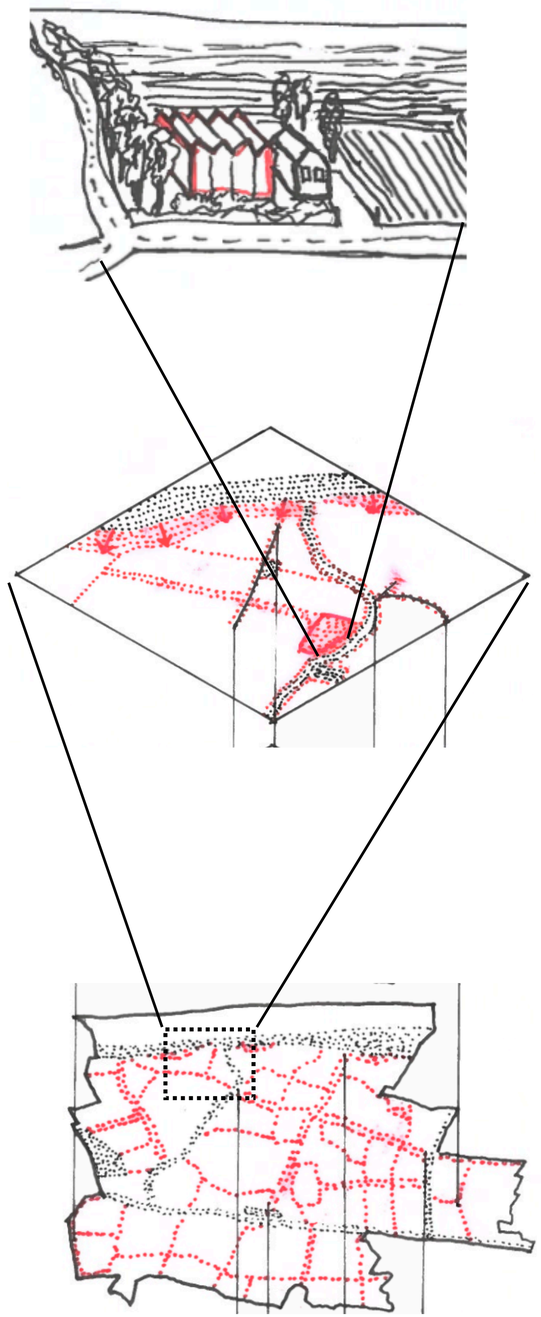
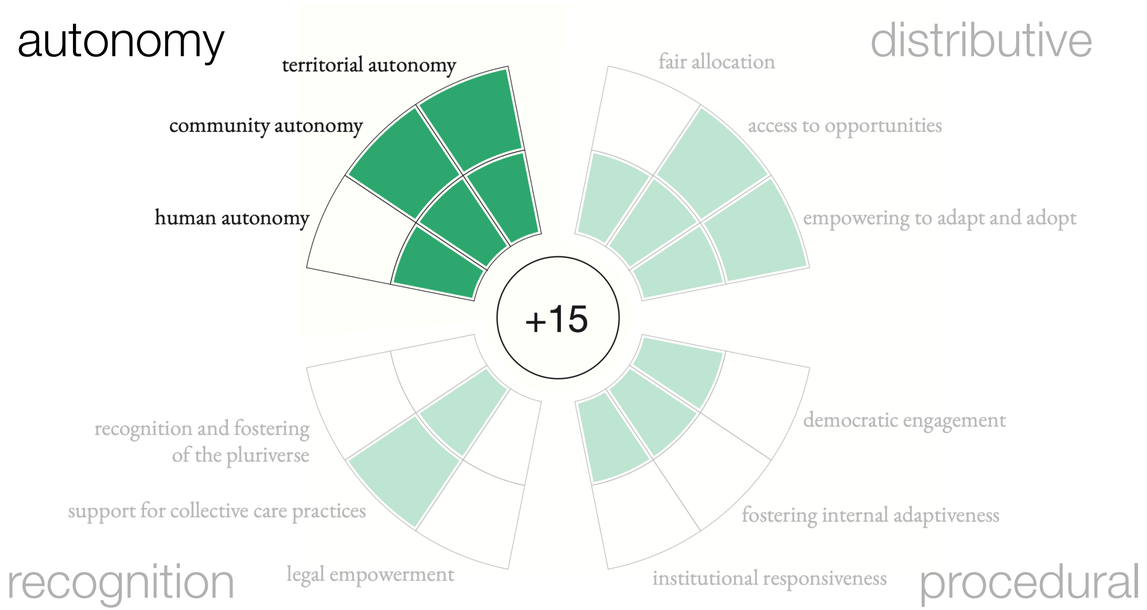
NL International Agri-Food Hub
"ORGANIC FANTASTIC"
SCENARIO 1
"SUPERSIZE ME"
SCENARIO 2
Societal Resistance to Food-Technology
Societal Acceptence of Food-Technology
SCENARIO 3
"HOME GROWN"
SCENARIO 4
"VEGGIE VALLEY"
NL Self Sufficient Agri-Food Market

insights e.g. scenario 3



space for ecological developments

synergy between ecological and agricultural landscapes



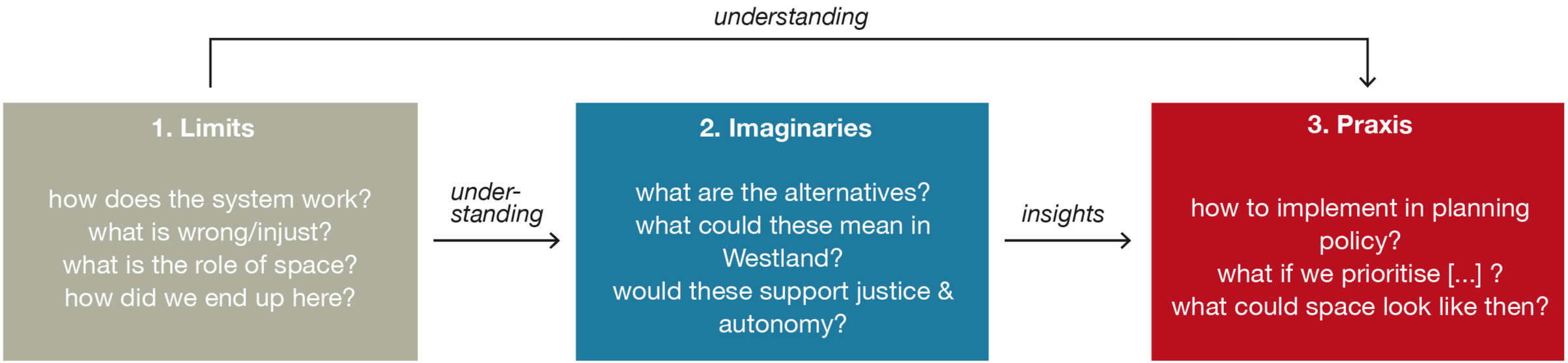
insights e.g. scenario 3 *autonomy*

individual/human: work is grounded in ecological stewardship and socially meaningful - but takes more time

communities: control over food local systems

territory: shaped by socio-ecologically embedded relations

in-between synthesis


understanding
1. Limits
how does the system work?
what is wrong/injust?
what is the role of space?
how did we end up here?
under-
standing
2. Imaginaries
what are the alternatives?
what could these mean in Westland?
would these support justice & autonomy?
insights
3. Praxis
how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

3. Praxis

how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

3. Praxis

how to implement in planning policy?

needs for spatial justice & autonomy ⟶ policy actions

	Need for spatial justice	Addresses	Policy actions	Key Stakeholders	Syner-gies
1	fair distribution of benefits of horticultural production (=healthy nutrition, knowledge reproduction, social networks)	distributional justice, regional-, communal-, individual autonomy	• foster community supported agriculture initiatives (e.g. by giving priority to horticultural land sales in zoning plans) and cooperative local food retail business models	• CSA organisations • municipality • residents • greenhouse businesses	6
2	fair distribution of the burdens of horticultural production (= CO2 emissions, pollution, scarcity of public space and spatial quality, low biodiversity and damaged ecosystems)	distributional justice	• instigate a governmentally issued 'licence to produce' that prescribes local environmental and social responsibility into the business operations (e.g. limited pesticide usage/containment): this can for example lower taxing on products • remove tax benefits on fossil fuel usage while correspondingly subsidising transitions to geothermal energy or unheated nature-inclusive greenhouse/open field cropping, to protect small greenhouse businesses' and farmers' livelihoods in the transition	• national government ministry of finance • province • greenhouse businesses • waterschap • scientific monitoring	1
3	respecting and protecting the rights and values of all horticultural workers	recognitional justice, individual autonomy	• mandatory civil registration of international workers: enables health insurance and monitoring • long term contract possibility together with possibilities for agricultural practice based-education / training in less busy months • housing on-site or within Westland municipality	• international workers • greenhouse businesses • municipality • labour unions	1
4	fostering (collective) care practices that support and protect individuals and groups in vulnerable conditions	recognitional justice, communal autonomy	• foster and support (new initiatives for) solidarity networks by combining it with community gardening and restaurants, collective meals, and arts and crafts (Reference: Social Urban Garden Rotterdamse Munt)	• community centres, gardens and stores (e.g. Boerengoed) • municipality	1
5	foster the appropriation of automation technologies for social and ecological care	distributional justice, individual autonomy	• support inclusive research into and design of agro-ecological/horticultural automation technologies that enable meaningful hybrid agricultural work	• national government • WUR and other knowledge institutes • farmers and workers	3
6	include more diverse horticultural and agricultural definitions in zoning plans and environmental regulation	procedural justice	• diversify zoning plan classifications to include agro-ecological or nature-inclusive practices as well as intensive/high tech closed environment greenhouse-practices to remove the dichotomy between agriculture and nature and with that broaden the toolset of spatial planners	• municipality • nature-inclusive farming experts • ecology experts • urban planners	1,6
7	democratic engagement of citizens, workers and more-than-human stakeholders in envisioning a future Westland	procedural justice, regional-, communal autonomy	• "Glass New Deal 2040": participatory planning project to co-design the spatial future of Westland through the UP2030 planning cycle • area cooperatives (reference: Gebiedscooperatie Buijtenland van Rhoon)	• see next page	

diversify zoning plan classifications

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

land security is the most important prerequisite. "

Land scarcity report Toekomstboeren (Bakker, 2024)

"A **sustainable land tenancy law** [is needed]."

Toekomstboeren ambassador

LAND SCARCITY

"Exploring the added value of agroecology to **challenge the apparent contradiction** between agriculture and nature. "

Land scarcity report Toekomstboeren (Bakker, 2024)

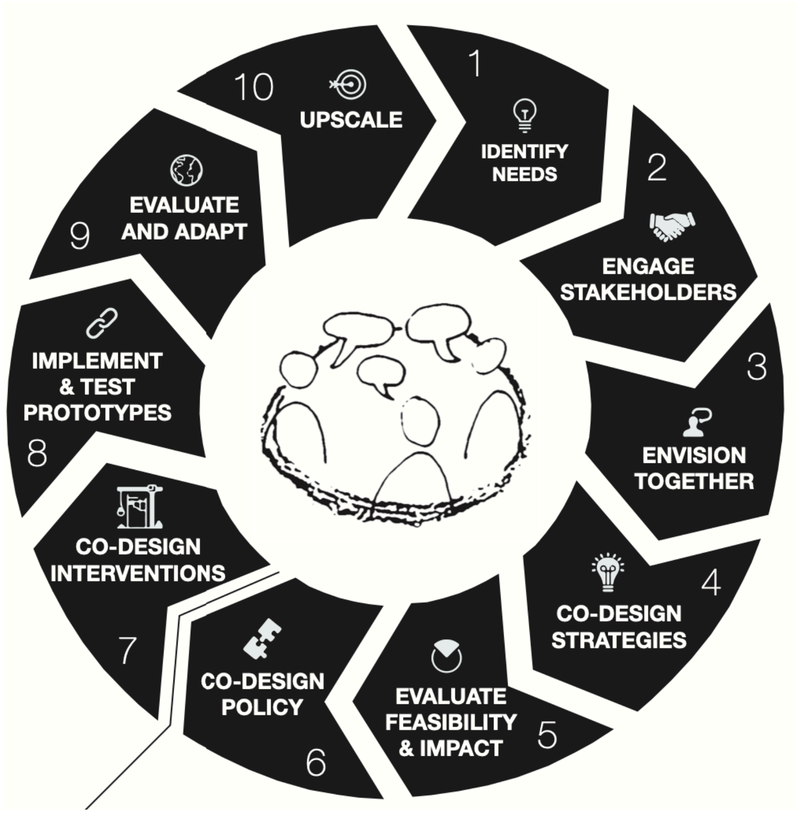
NATURE-CULTURE FALSE CONTRADICTION

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

Former horticulture consultant and waterschap Delfland commissioner

‘glass new deal’ for Westland

needs -> policy actions



UP2030 spatial planning cycle adaptation

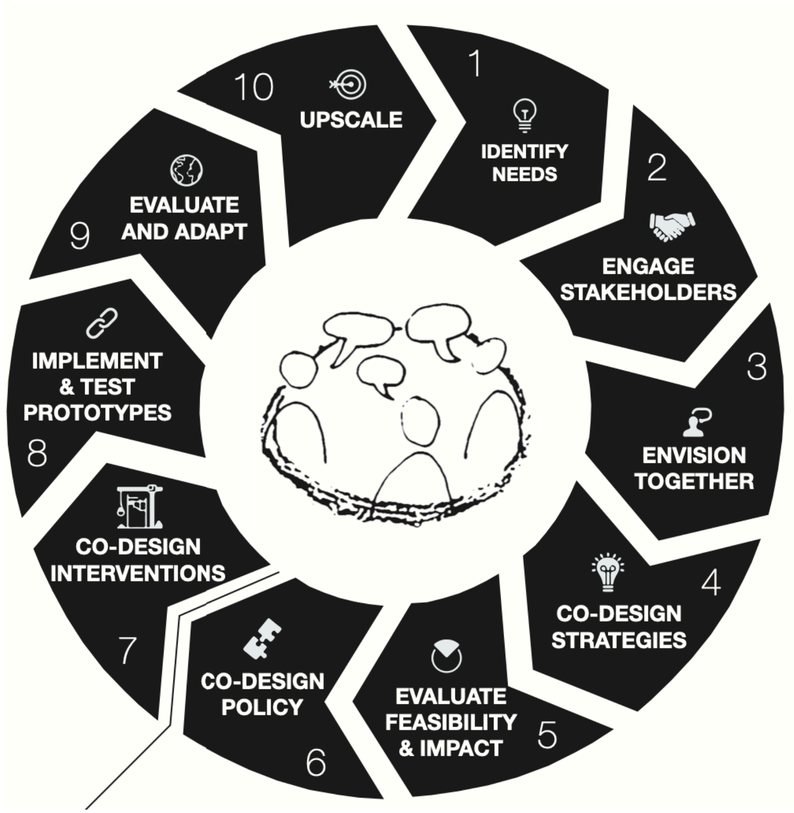
Lopez et al. (2024a))

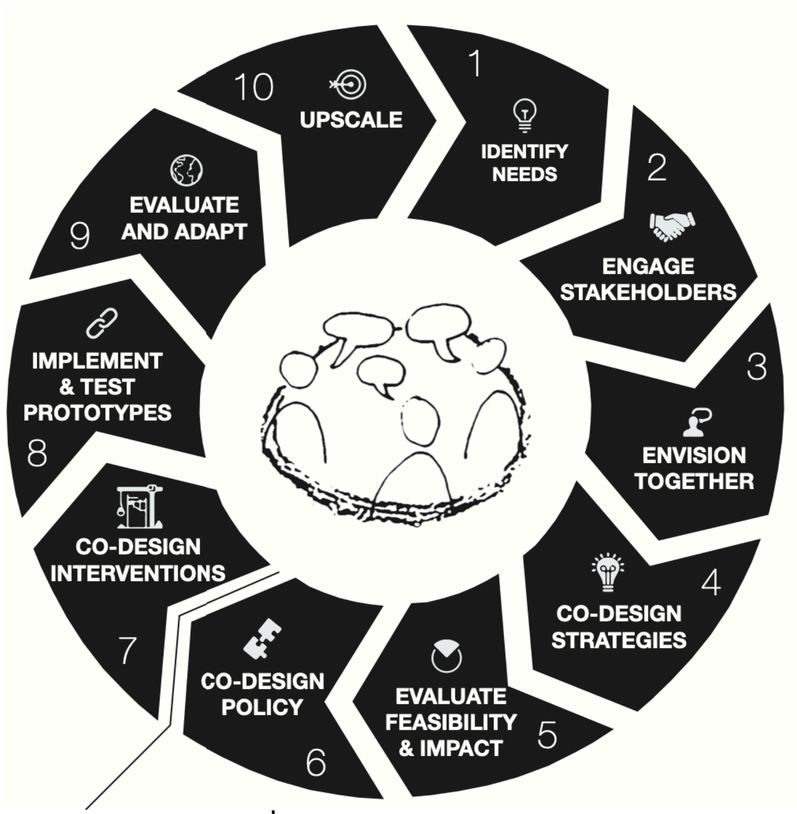


STAKEHOLDERS

are involved in every step

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





HOW? *Activities & Methods*

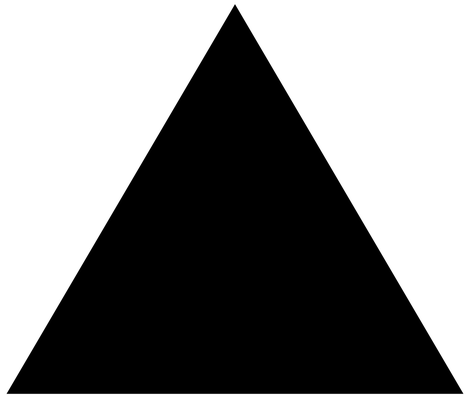
- besides effectiveness: design for equity, inclusiveness
- moral imagining workshops
- participatory budgetting
- refine governance arangements and financial mechanisms (UPSCALE)

WHO? *Facillitators & Responsibilities*

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

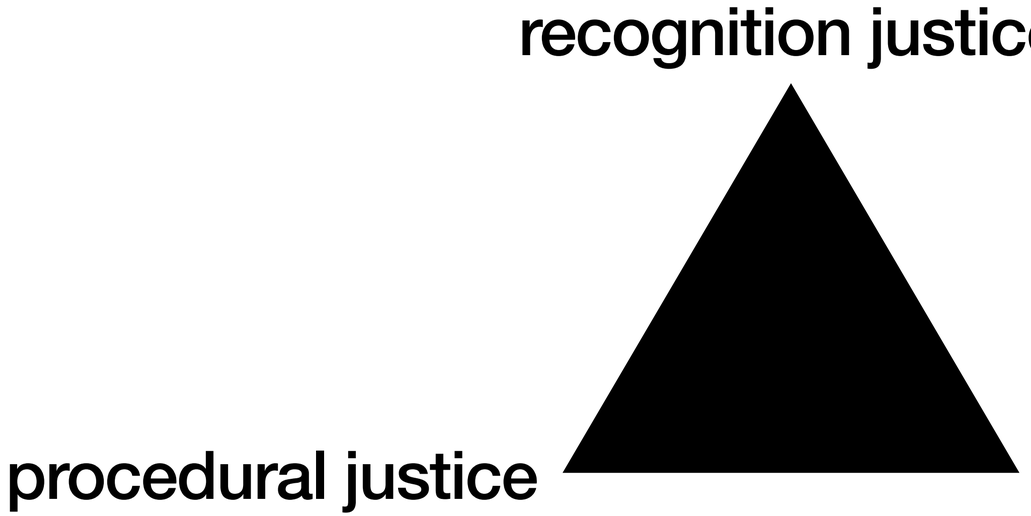
spatial justice

recognition justice



Soja (2010) & (Lopez et al., 2024a)

spatial justice



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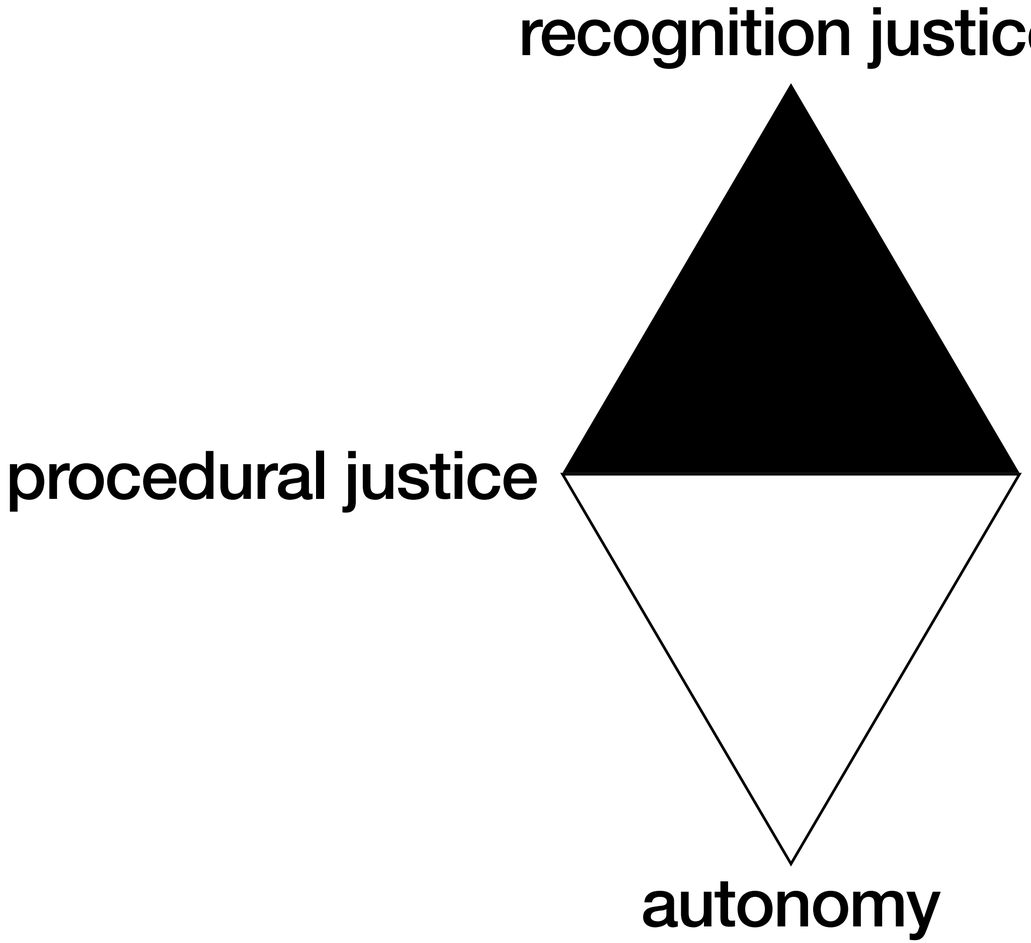

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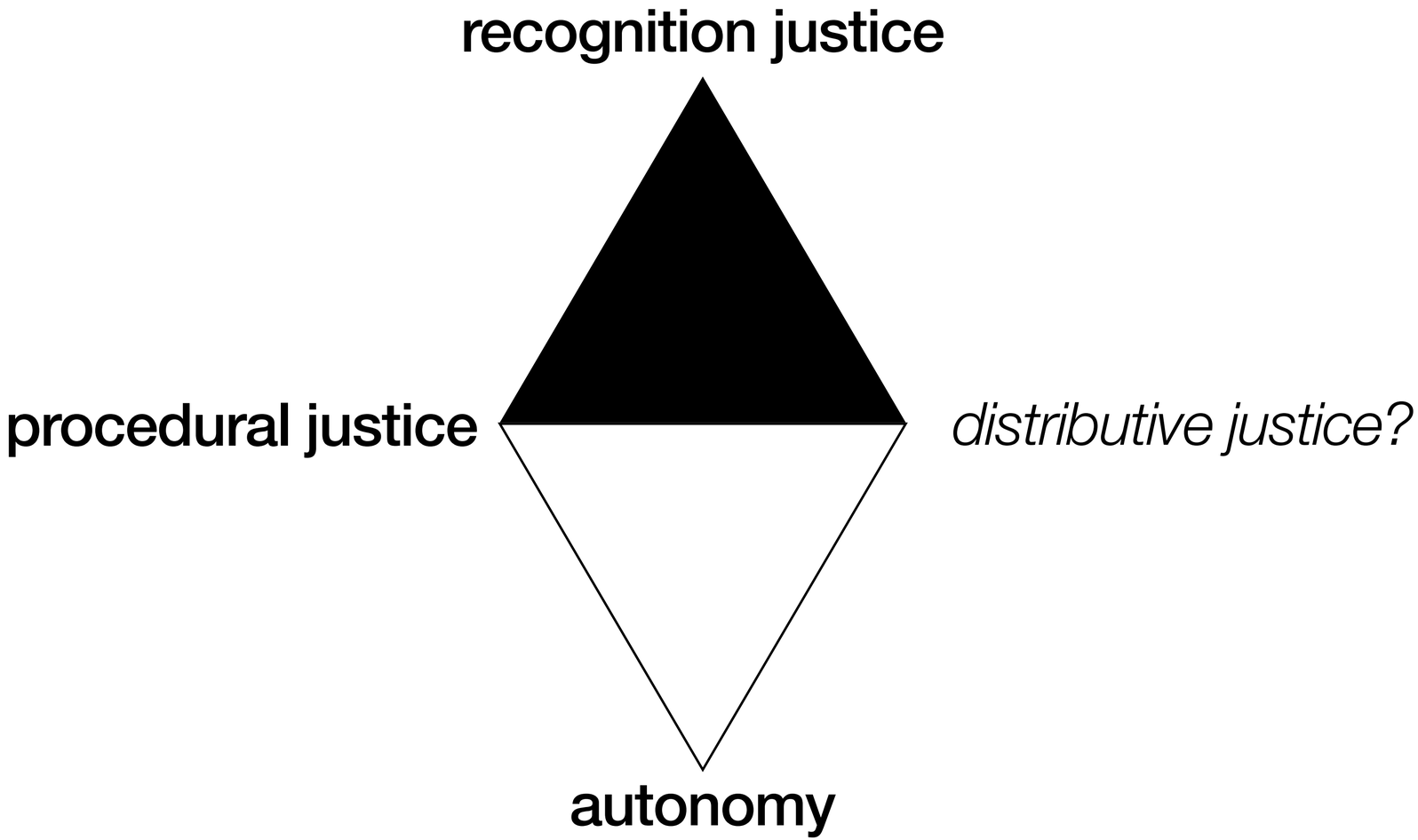

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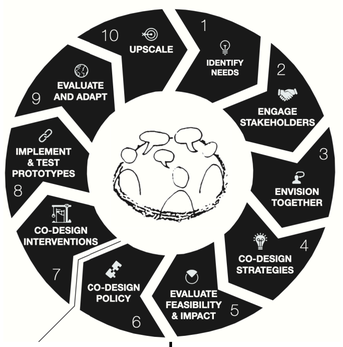
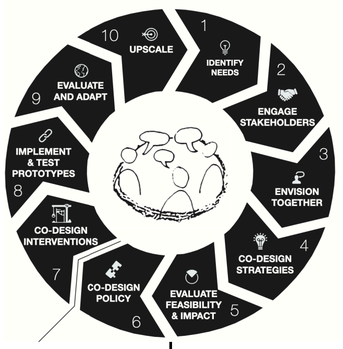

1
IDENTIFY NEEDS
2
ENGAGE STAKEHOLDERS
3
ENVISION TOGETHER
4
CO-DESIGN STRATEGIES
5
EVALUATE FEASIBILITY & IMPACT
6
CO-DESIGN POLICY
7
CO-DESIGN INTERVENTIONS
8
IMPLEMENT & TEST PROTOTYPES
9
EVALUATE AND ADAPT
10
UPSCALE

next monday





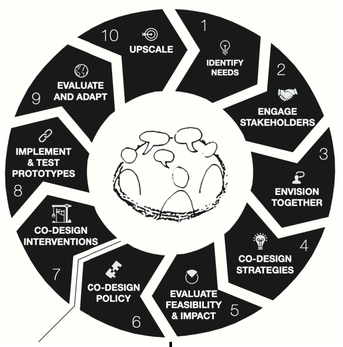
next monday

2050

values

norms

priorities





next monday

2050

values

norms

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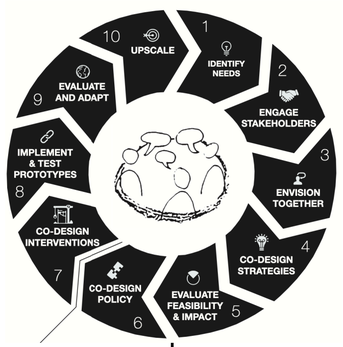
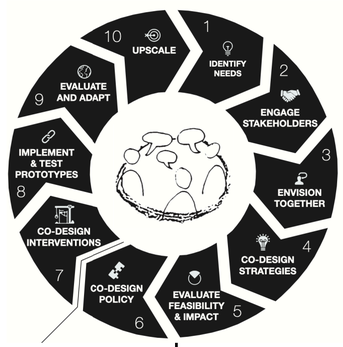


next monday



2035

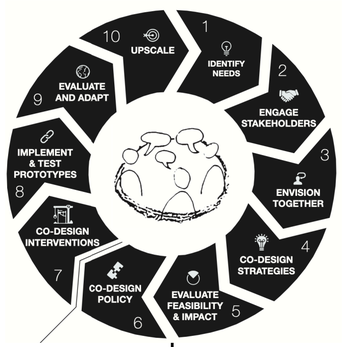


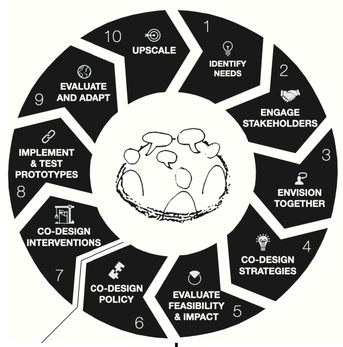
2050

values

norms

priorities





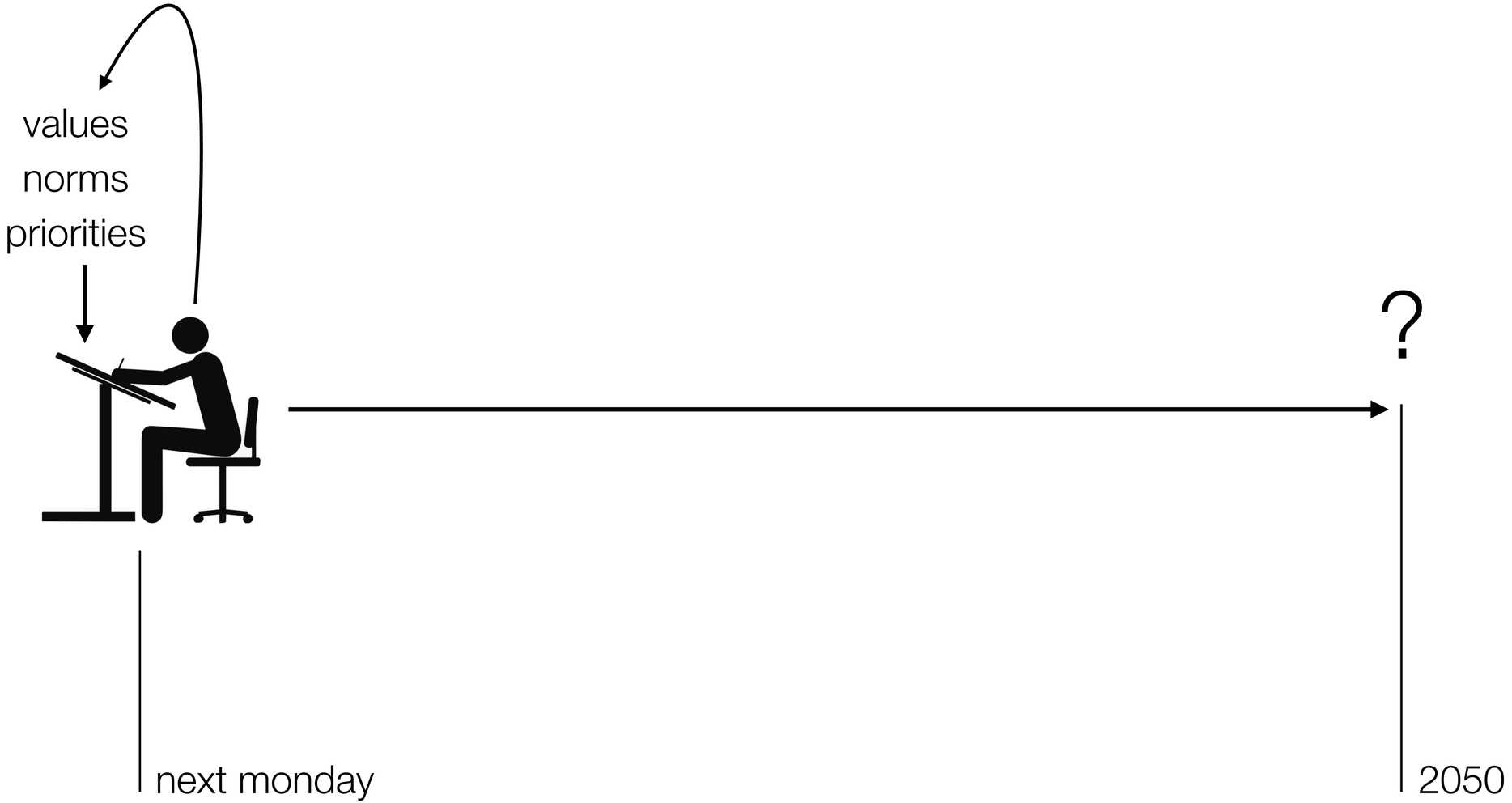


next monday

2035

2050


next monday
2050


values
norms
priorities
?
next monday
2050

3. Praxis

how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

3. Praxis

how to implement in planning policy?
what if we prioritise [...] ?

premise

based on thesis conclusions

as well as personal views

premise

based on thesis conclusions

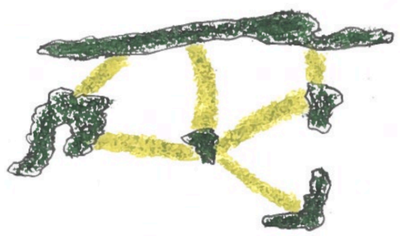
as well as personal views:

food system within planetary boundaries

healthy nutrition as a common good

active citizenship for healthy democracy

design principles



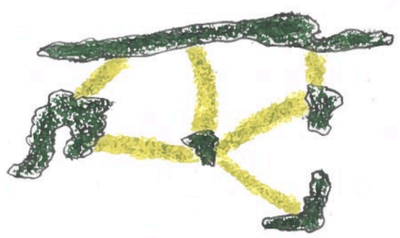
Connecting natural areas



Environmental stewardship



Democratic decision-making



Connecting natural areas



Environmental stewardship



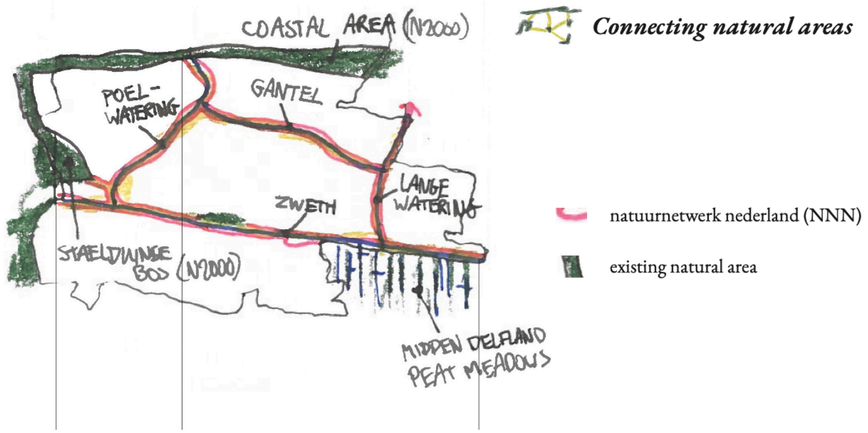
Democratic decision-making

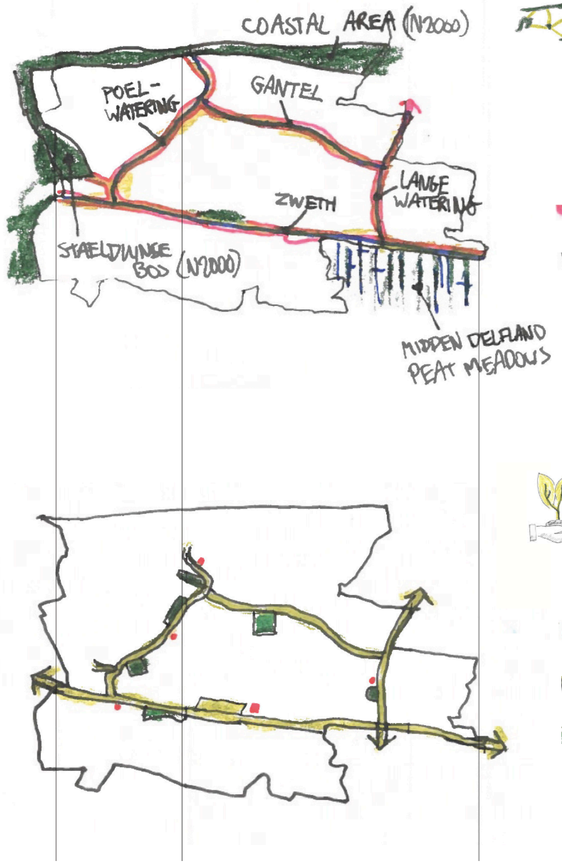
design principles

paradigm shift towards synergy between agriculture and nature

extend farmers' and citizens' role to environmental care

inclusion of diverse voices & fostering accountability


COASTAL AREA (N2000)
POEL-
WATERING
GANTEL
LANGE
WATERING
ZWETH
STAELDIJKSE
BOS (N2000)
MIDDEN DELFLAND
PEAT MEADOWS
Connecting natural areas
natuurnetwerk nederland (NNN)
existing natural area



Connecting natural areas

natuurnetwerk nederland (NNN)

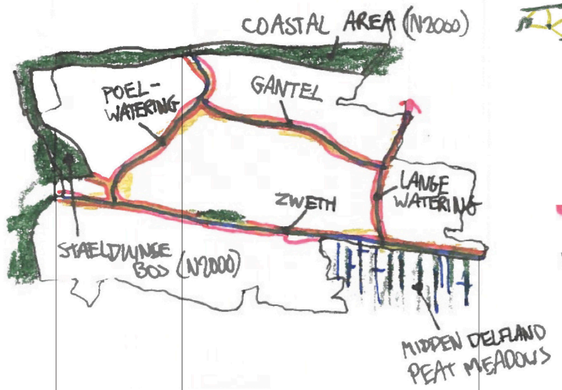
existing natural area

Environmental stewardship

multifunctional public programming

new natural area

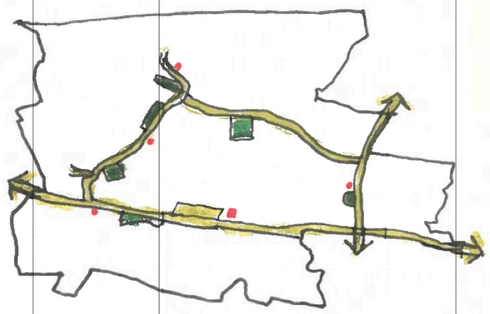
nature-inclusive horticulture/
agriculture



Connecting natural areas

natuurnetwerk nederland (NNN)

existing natural area

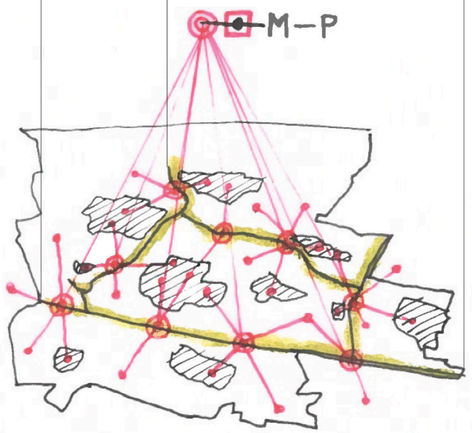


Environmental stewardship

multifunctional public programming

new natural area

nature-inclusive horticulture/ agriculture



Democratic decision-making

town

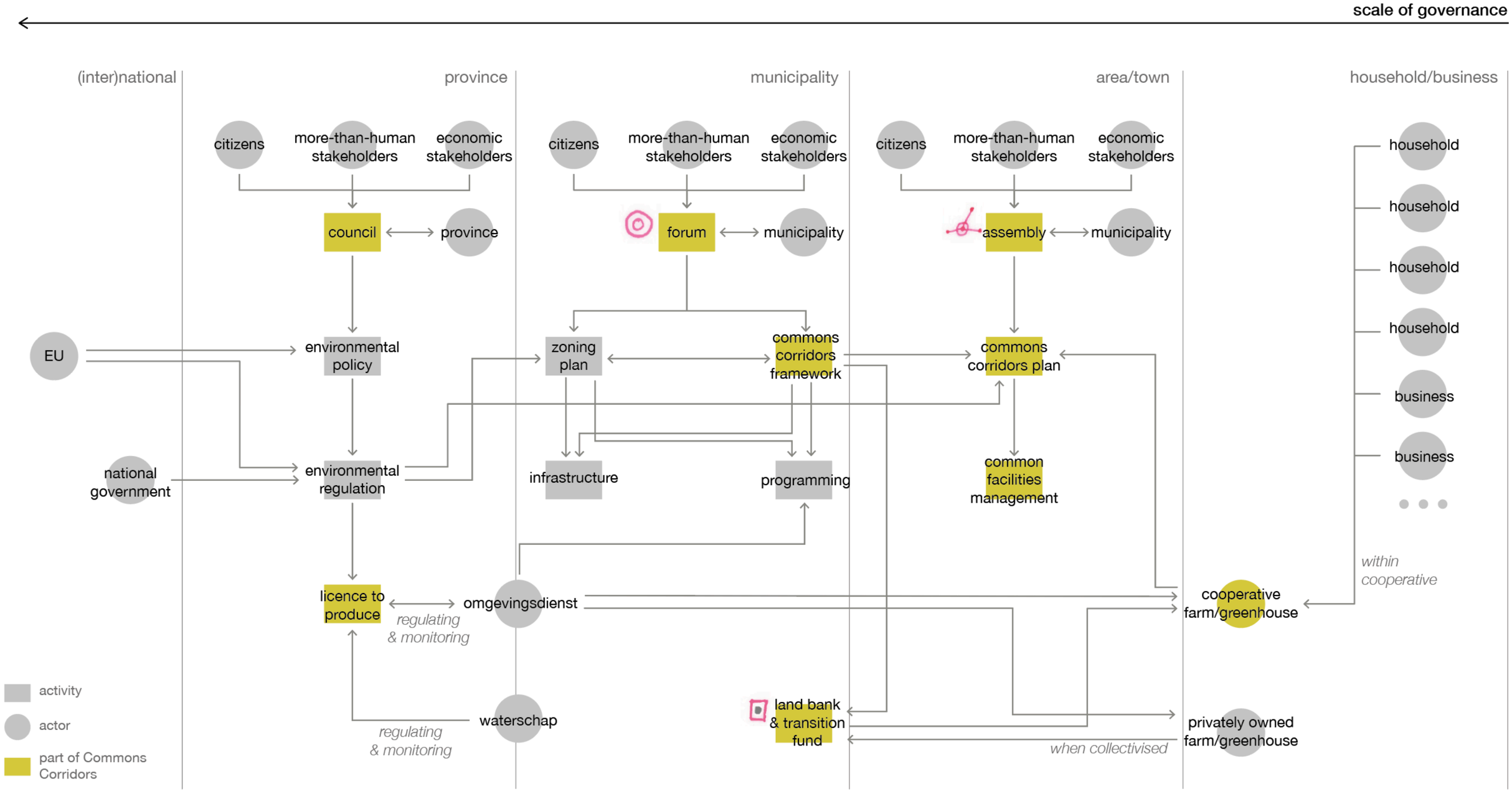
local citizen assemblies

commons corridors forum

commons corridors land and transition fund

M municipality Westland

P province Zuid-Holland


scale of governance
(inter)national
province
municipality
area/town
household/business
citizens
more-than-human stakeholders
economic stakeholders
council
province
forum
municipality
assembly
municipality
household
household
household
household
business
business
EU
national government
environmental policy
environmental regulation
zoning plan
commons corridors framework
commons corridors plan
infrastructure
programming
common facilities management
licence to produce
regulating & monitoring
omgevingsdienst
waterschap
regulating & monitoring
land bank & transition fund
when collectivised
cooperative farm/greenhouse
privately owned farm/greenhouse
within cooperative
activity
actor
part of Commons Corridors

3. Praxis

how to implement in planning policy?
what if we prioritise [...] ?
what could space look like then?

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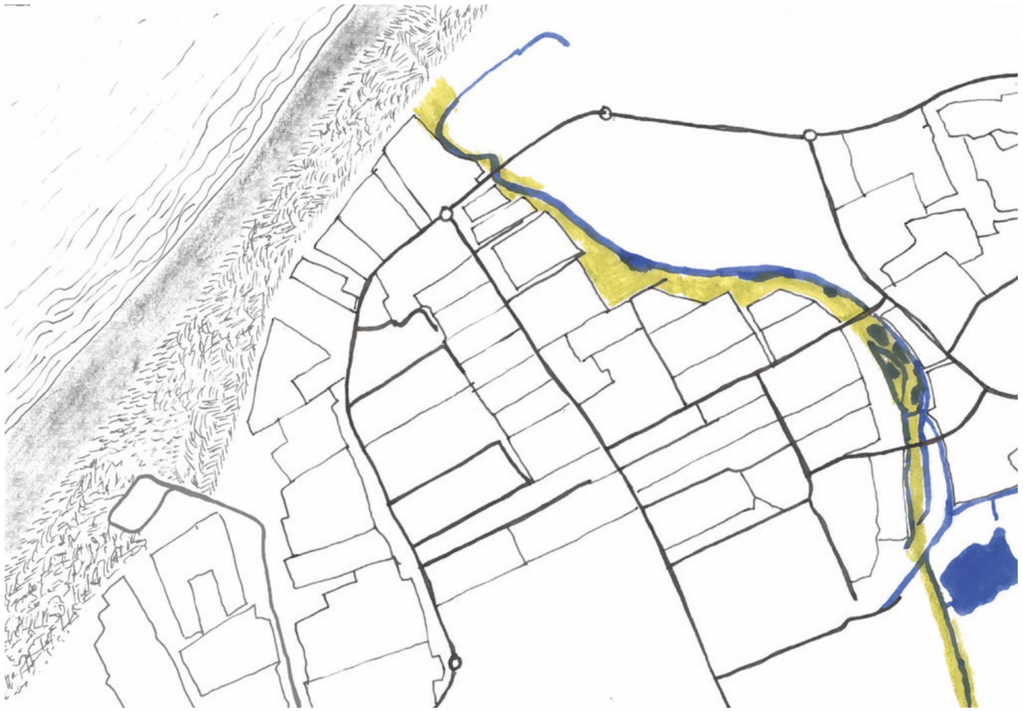

2025 — commons corridors established

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



2026 — commons house built, deliberative planning processes start

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



2030 — first adjacent nature-inclusive agriculture and horticulture plots are operational

geothermally heated greenhouses transition to circular practice

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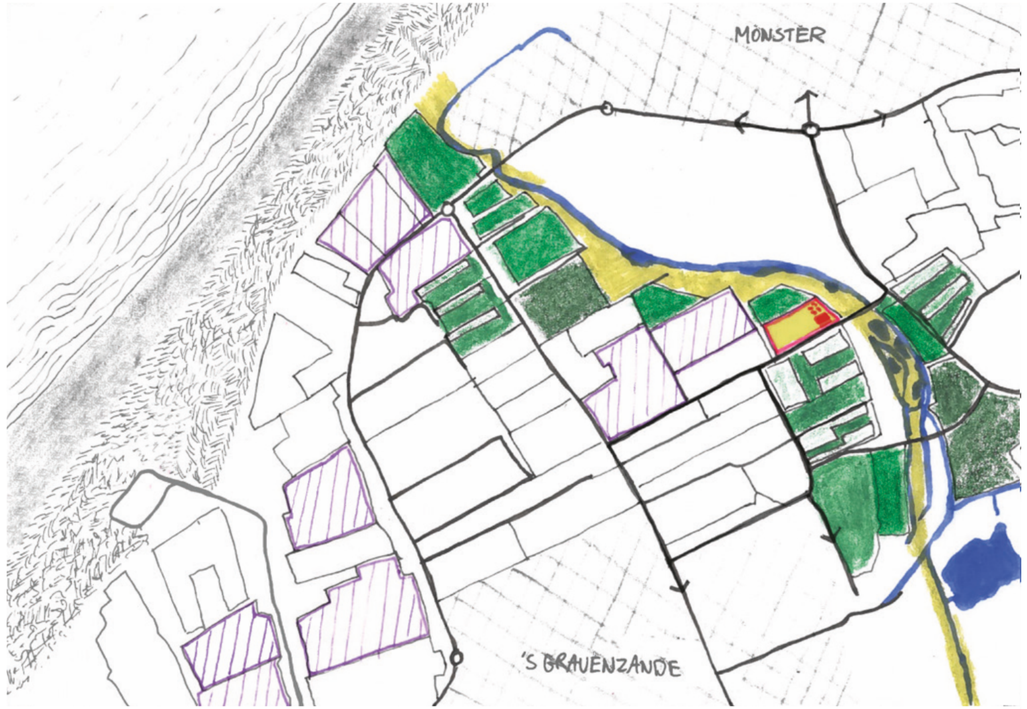
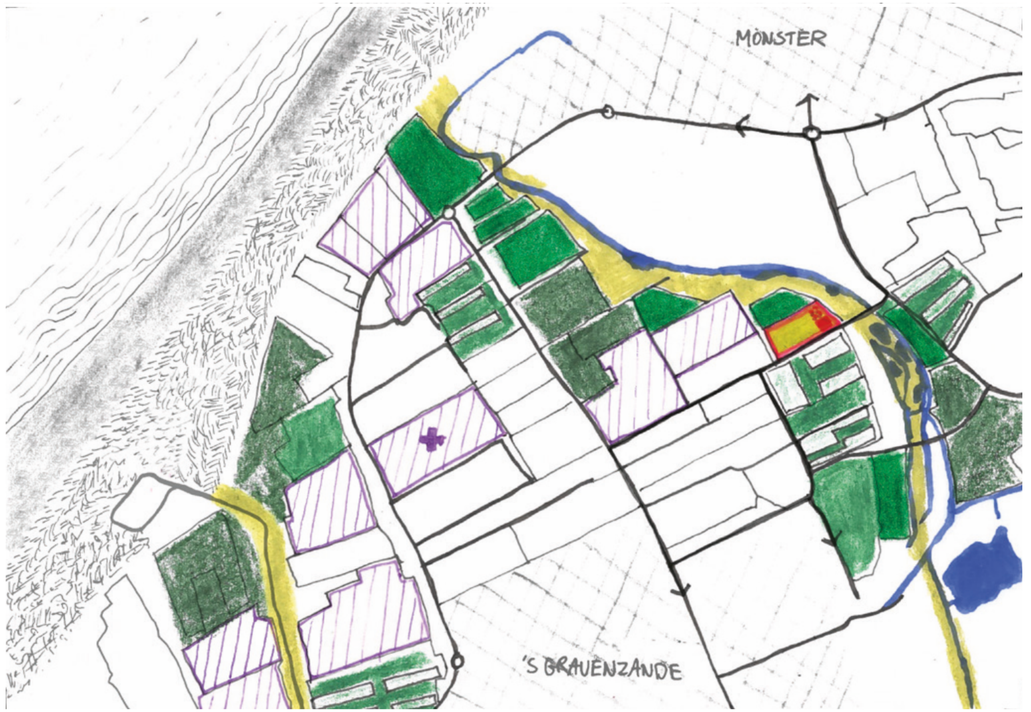


2035 — more plots have transitioned to nature-inclusive agriculture and horticulture practices

geothermally heated greenhouses transition to circular practice

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



2040 — a new commons corridor initiative is established by enthusiastic neighbours

another greenhouse is coupled to the geothermal heat network

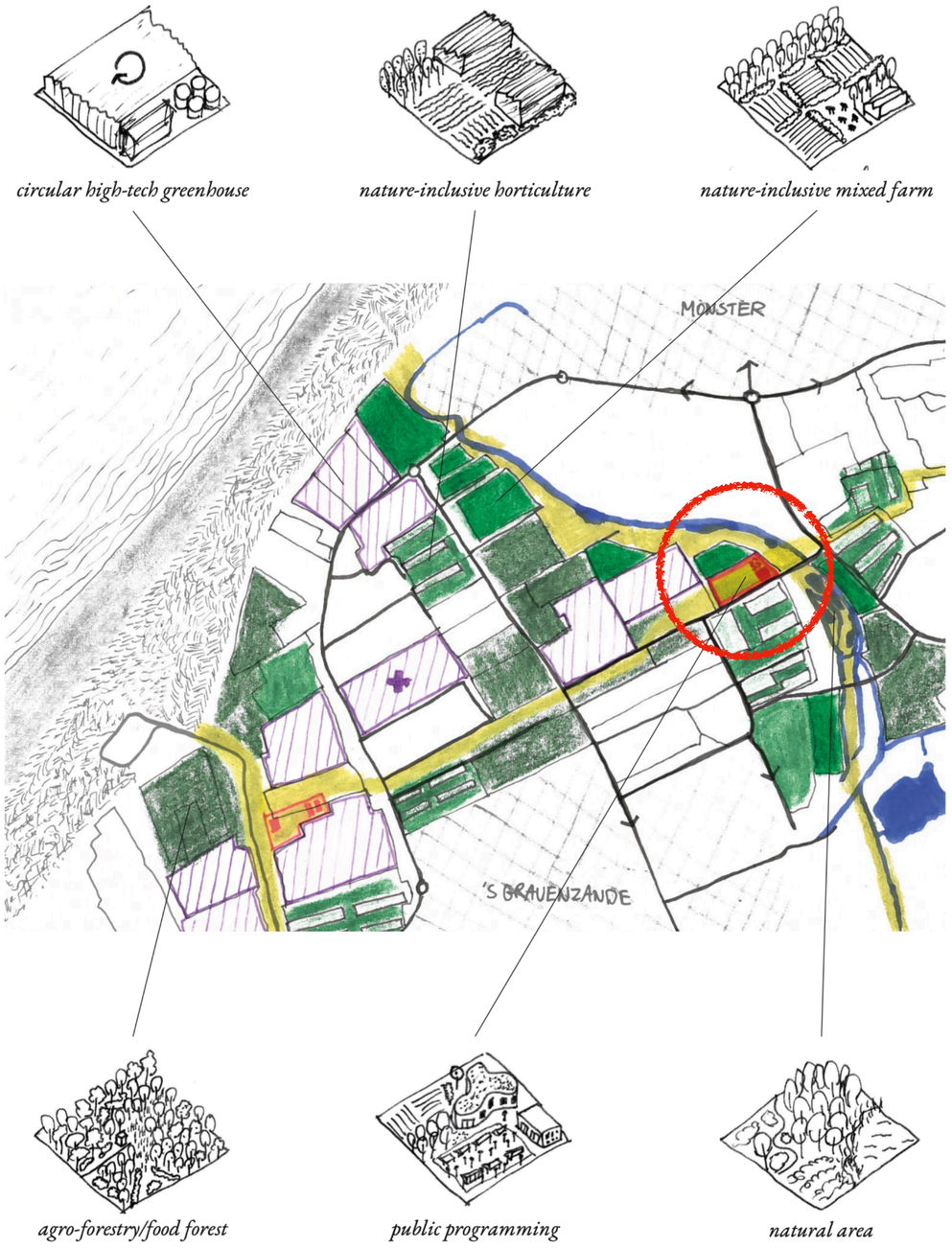
- geothermally heated, circular large scale greenhouse
- nature-inclusive horticulture
- nature-inclusive mixed farm
- agro-forestry
- commons house
- commons corridor
- residential areas
- North Sea
- coast
- dunes
- greenhouse parcel
- road
- inland water



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

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


circular high-tech greenhouse
nature-inclusive horticulture
nature-inclusive mixed farm
MONSTER
'S GRAVENZANDE
agro-forestry/food forest
public programming
(Commons House, market)
natural area
geothermally heated, circular large scale greenhouse
nature-inclusive horticulture
nature-inclusive mixed farm
agro-forestry
commons house
commons corridor
residential areas
North Sea
coast
dunes
greenhouse parcel
road
inland water
N
0
1 km


circular high-tech greenhouse
nature-inclusive horticulture
nature-inclusive mixed farm
MONSTER
'S GRAVENZANDE
agro-forestry/food forest
public programming
(Commons House, market)
natural area
geothermally heated, circular large scale greenhouse
nature-inclusive horticulture
nature-inclusive mixed farm
agro-forestry
commons house
commons corridor
residential areas
North Sea
coast
dunes
greenhouse parcel
road
inland water
N
0
1 km



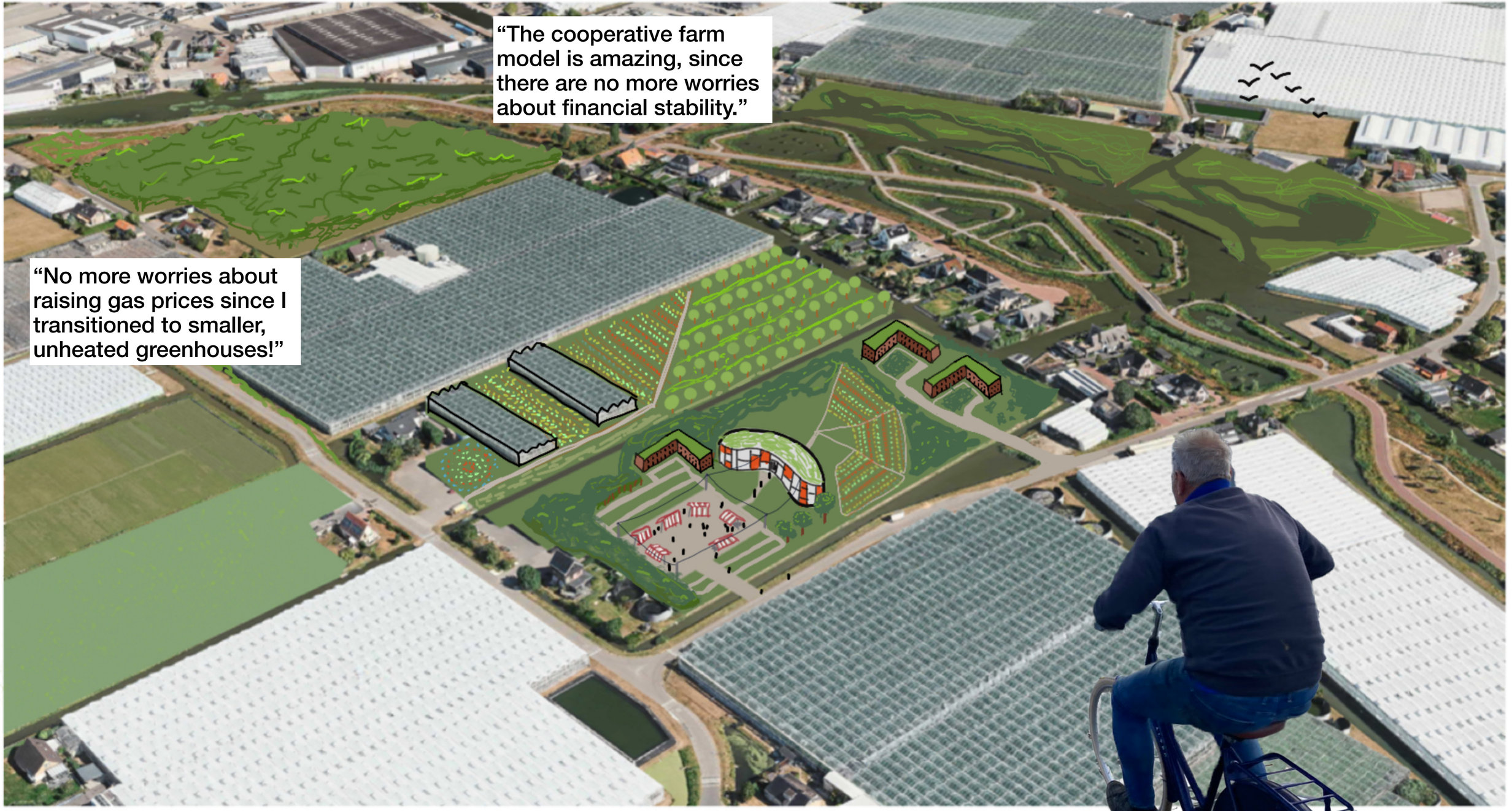


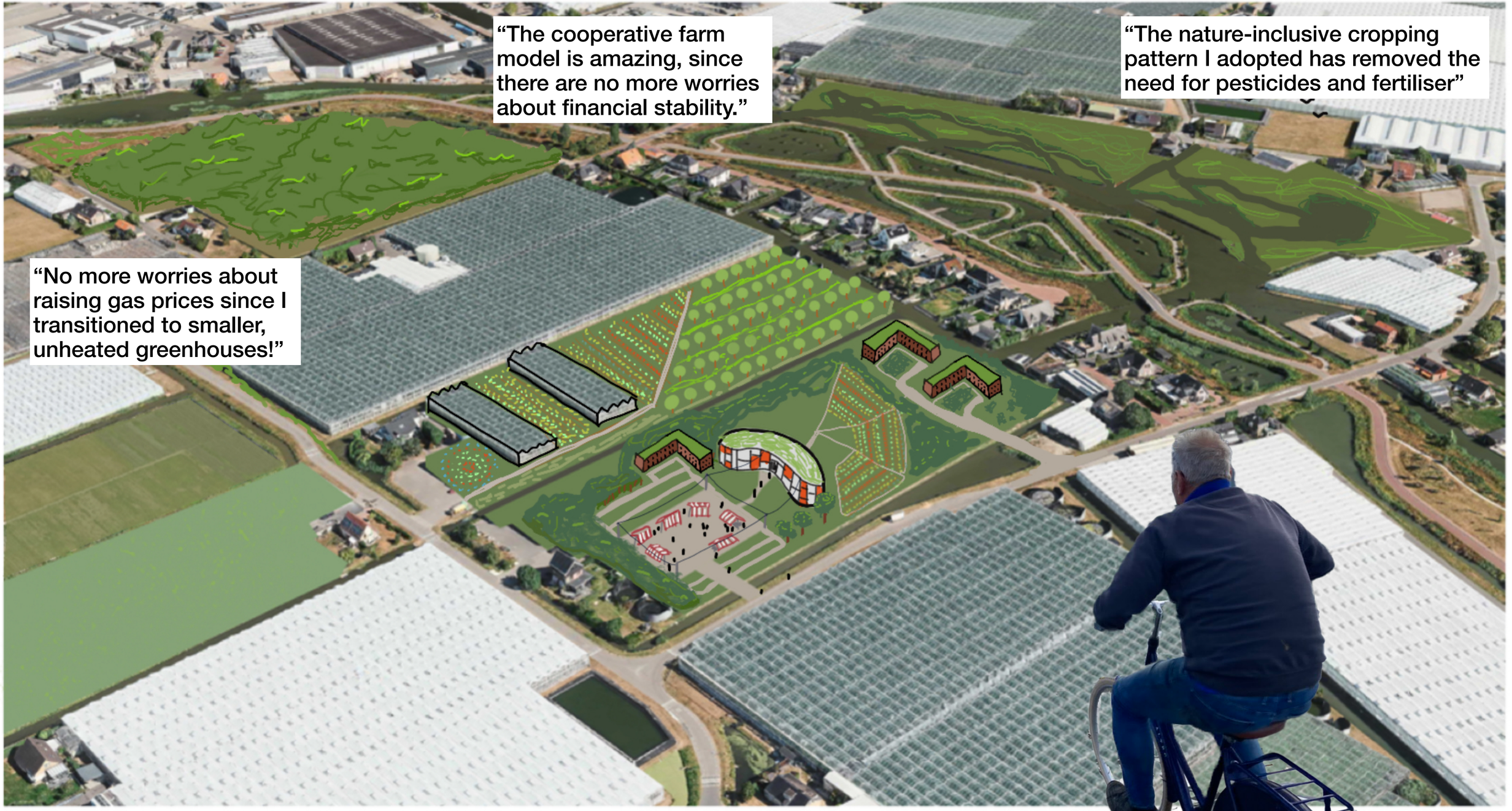







“No more worries about raising gas prices since I transitioned to smaller, unheated greenhouses!”


“The cooperative farm model is amazing, since there are no more worries about financial stability.”
“No more worries about raising gas prices since I transitioned to smaller, unheated greenhouses!”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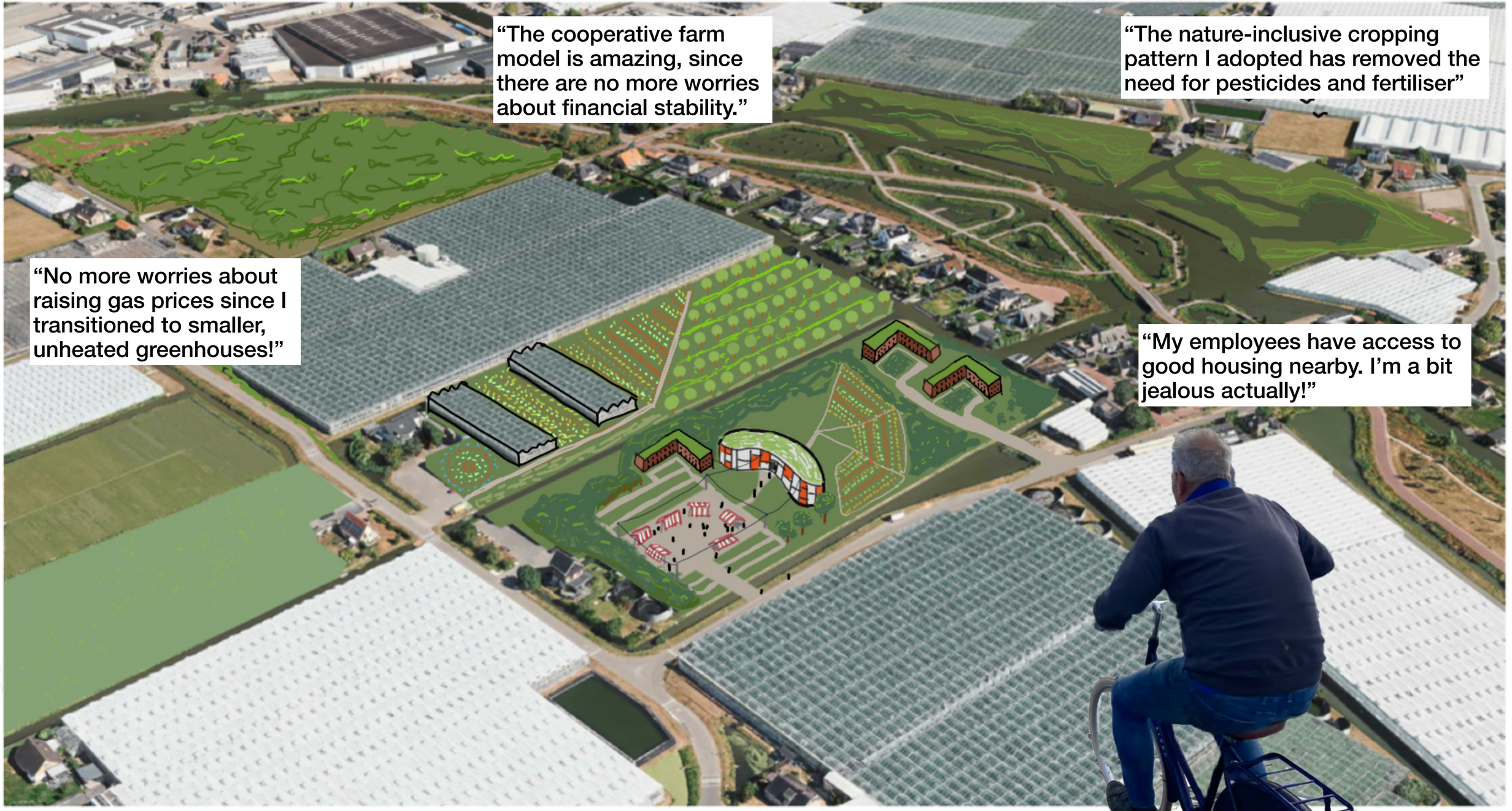
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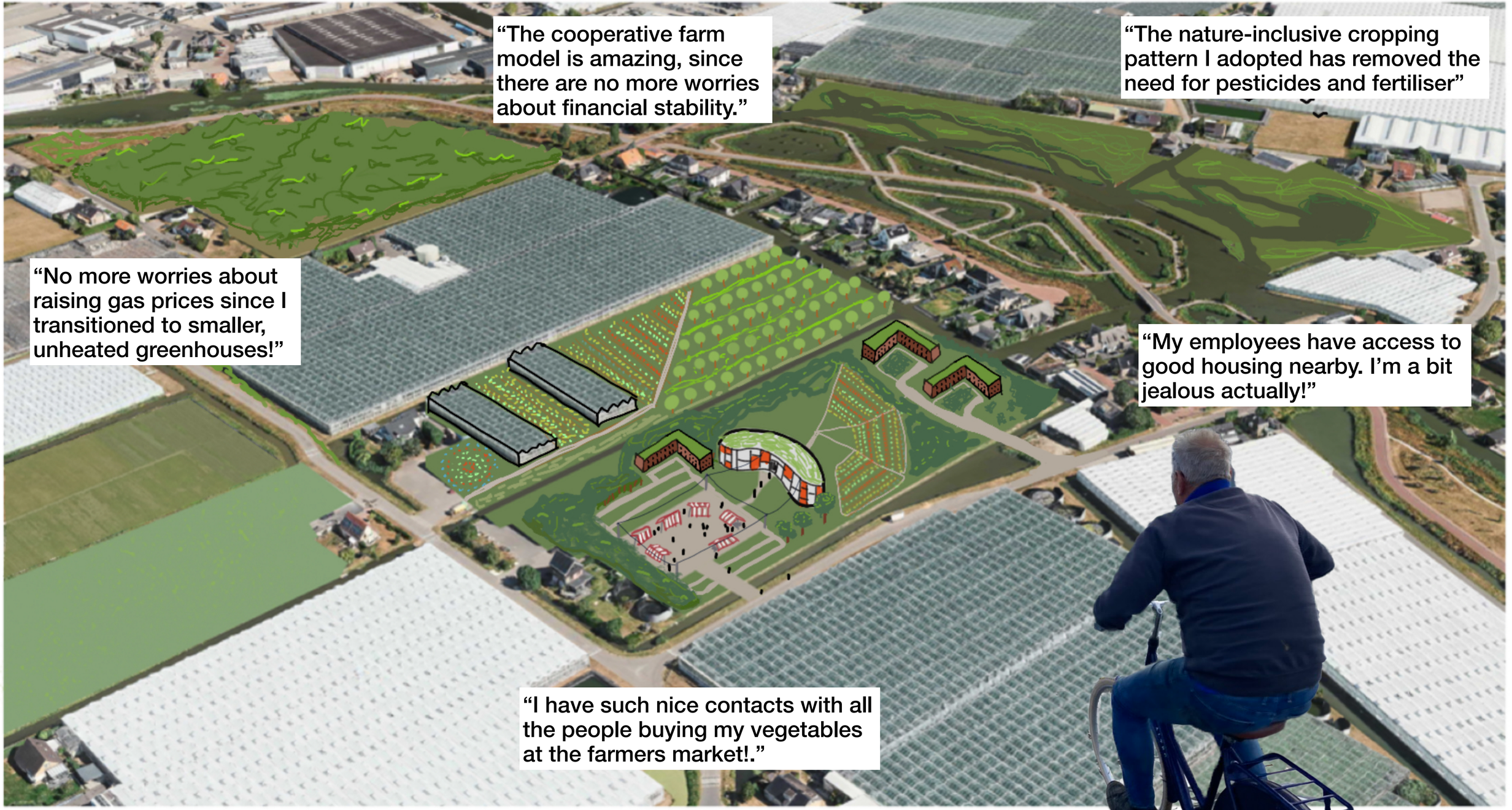
“My employees have access to good housing nearby. I’m a bit jealous actually!”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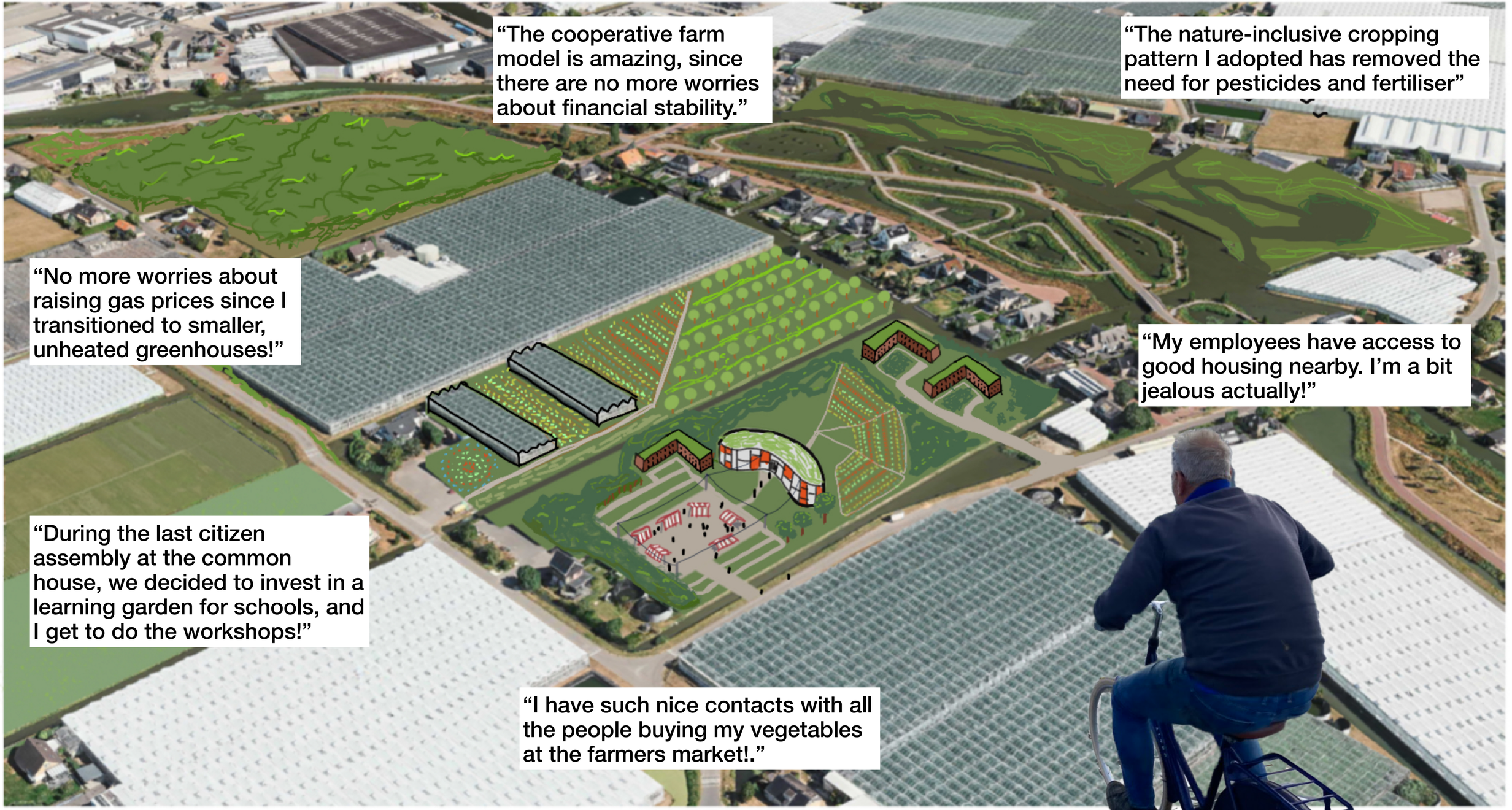
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“The nature-inclusive cropping pattern I adopted has removed the need for pesticides and fertiliser”
“No more worries about raising gas prices since I transitioned to smaller, unheated greenhouses!”
“My employees have access to good housing nearby. I’m a bit jealous actually!”
“During the last citizen assembly at the common house, we decided to invest in a learning garden for schools, and I get to do the workshops!”
“I have such nice contacts with all the people buying my vegetables at the farmers market!.”

conclusion



Image from Thierry Schut (2017)



Breaking **The Glass Ceiling**

one final thing …

TU Delft
DESIGN FOR VALUES

Student Thesis Awards: Design for Human Autonomy

Graduate on Design for Human Autonomy



Design for Human Autonomy



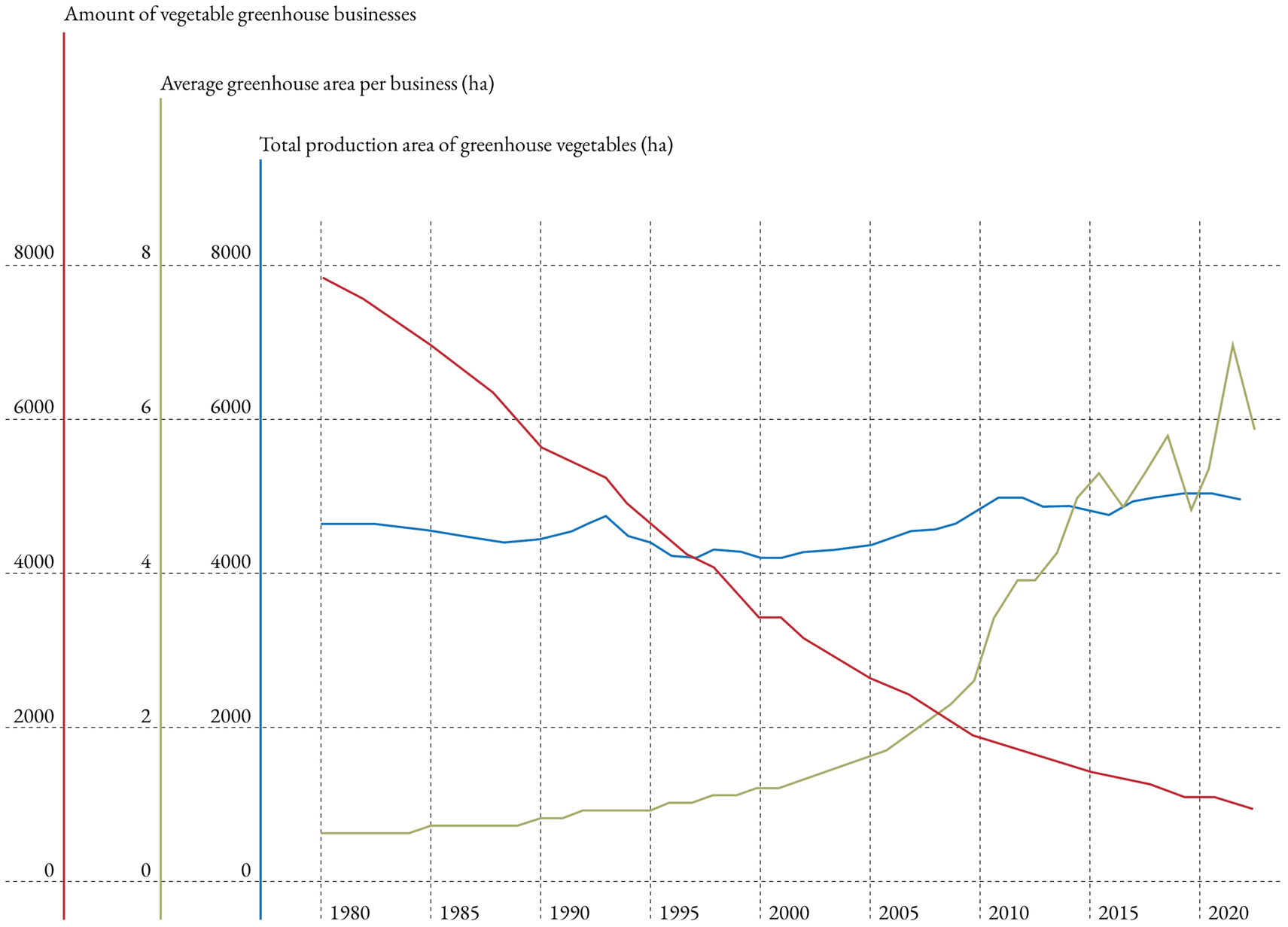
Best thesis on Design for Human Autonomy by Bram Terwogt from Architecture!

June 19th, 2025 | Categories: News from DDfV, News from TU Delft | Tags: theme year 'design for human autonomy'

After an extensive review of the jury, Bram Terwogt has won the Student Thesis Awards: Design for Human Autonomy. This was announced during the Conference: Design for Human Autonomy on the 18th of June.

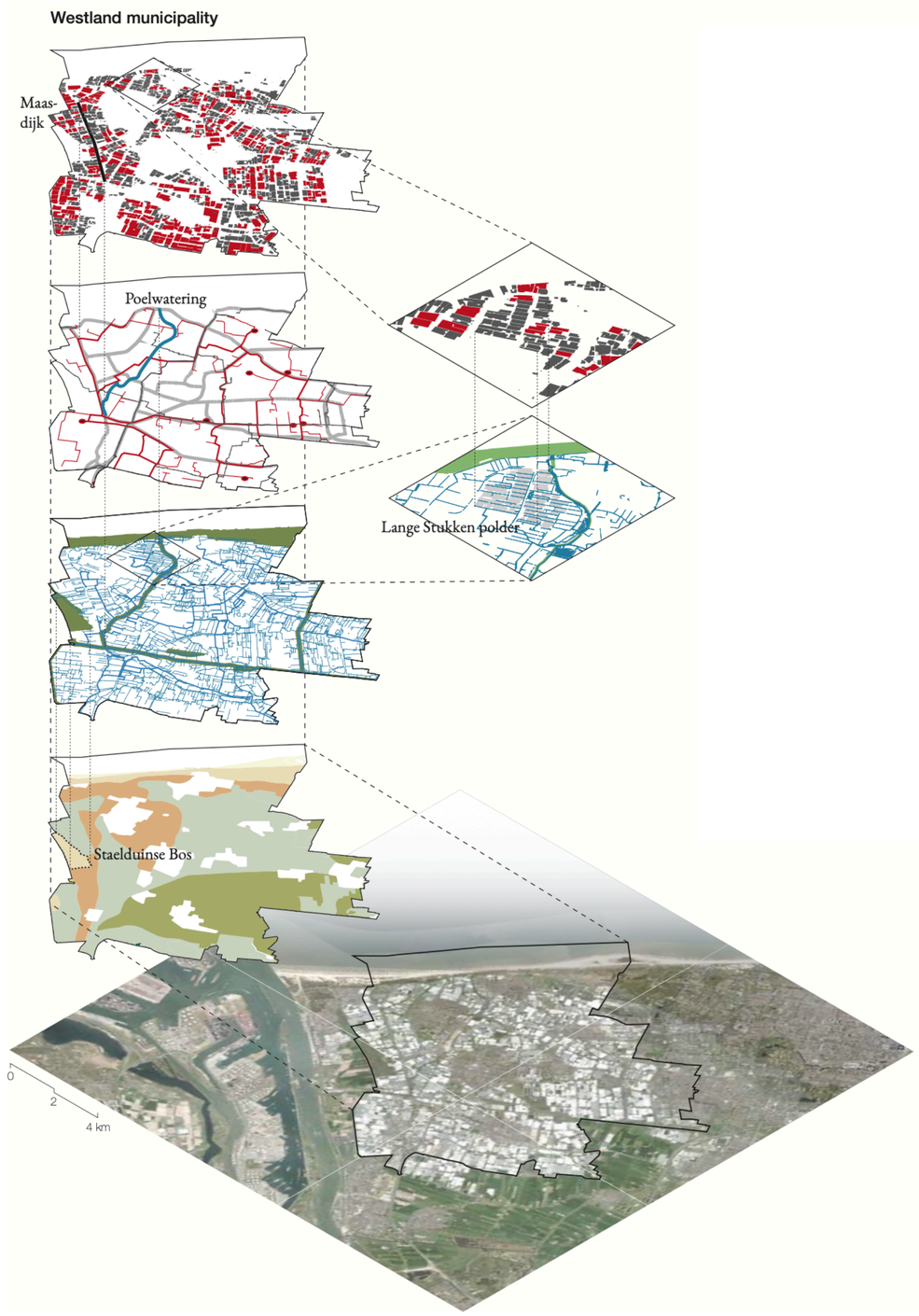
With his thesis 'The Glass Ceiling Radical Imaginaries of Spatial Justice in Westland's Horticultrual Landscape', he showed how to combine strong theoretical considerations in real-world design practices. Congratulations to Bram for his work! Karlijn Borremans and Ameya Sawant were the runner-ups and they also showed exciting research results!

appendix



scale-up stimulus

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



- greenhouses heated with geothermal energy
- greenhouses heated with fossil energy

- road infrastructure
- geothermal heat network
- geothermal production well
- natural gas network

- drainage channels
- main waterways
- ecological network

- hummus layer on sand
- peat layer on clay
- clay
- sand

further scale up is limited by the polder water-structure

labour migration



employees of House of Work temping agency at work in a greenhouse in Westland

image copyright Merlin Daleman in NRC Handelsblad

historically indispensable for Westland

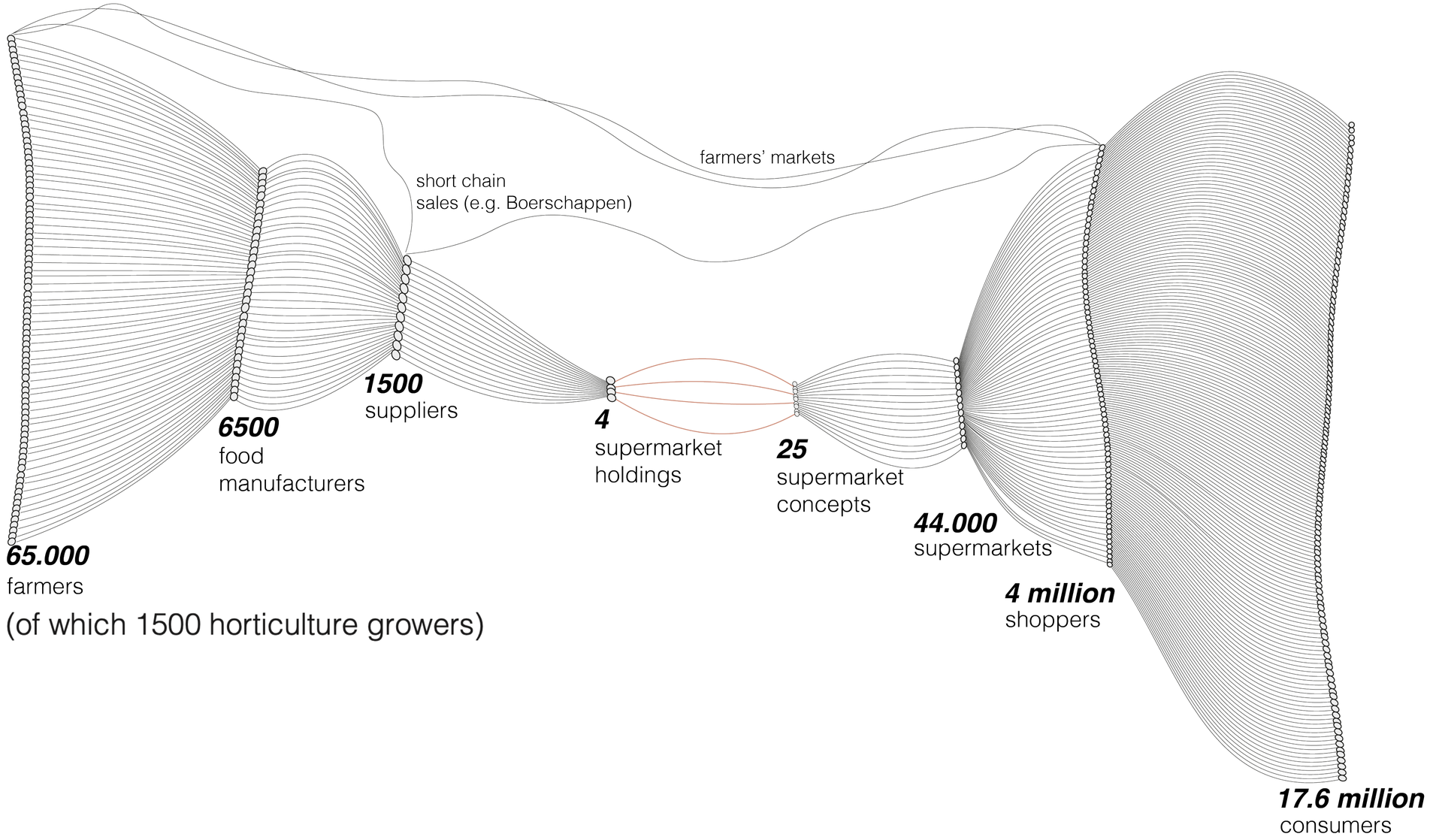
‘regulated precarity’

Siegmann et al. (2022) & Abou Jaoude & Muñoz Sanz (2025)





image from AD (2023)



hourglass food value-chain

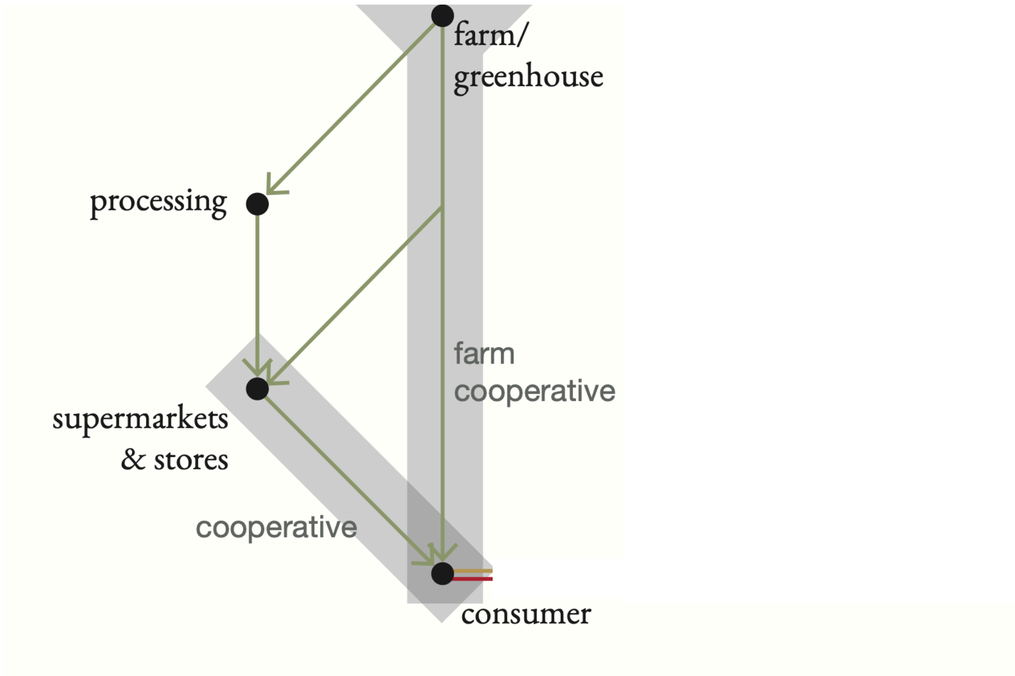
Data and drawing based on PBL, 2014

knowledge

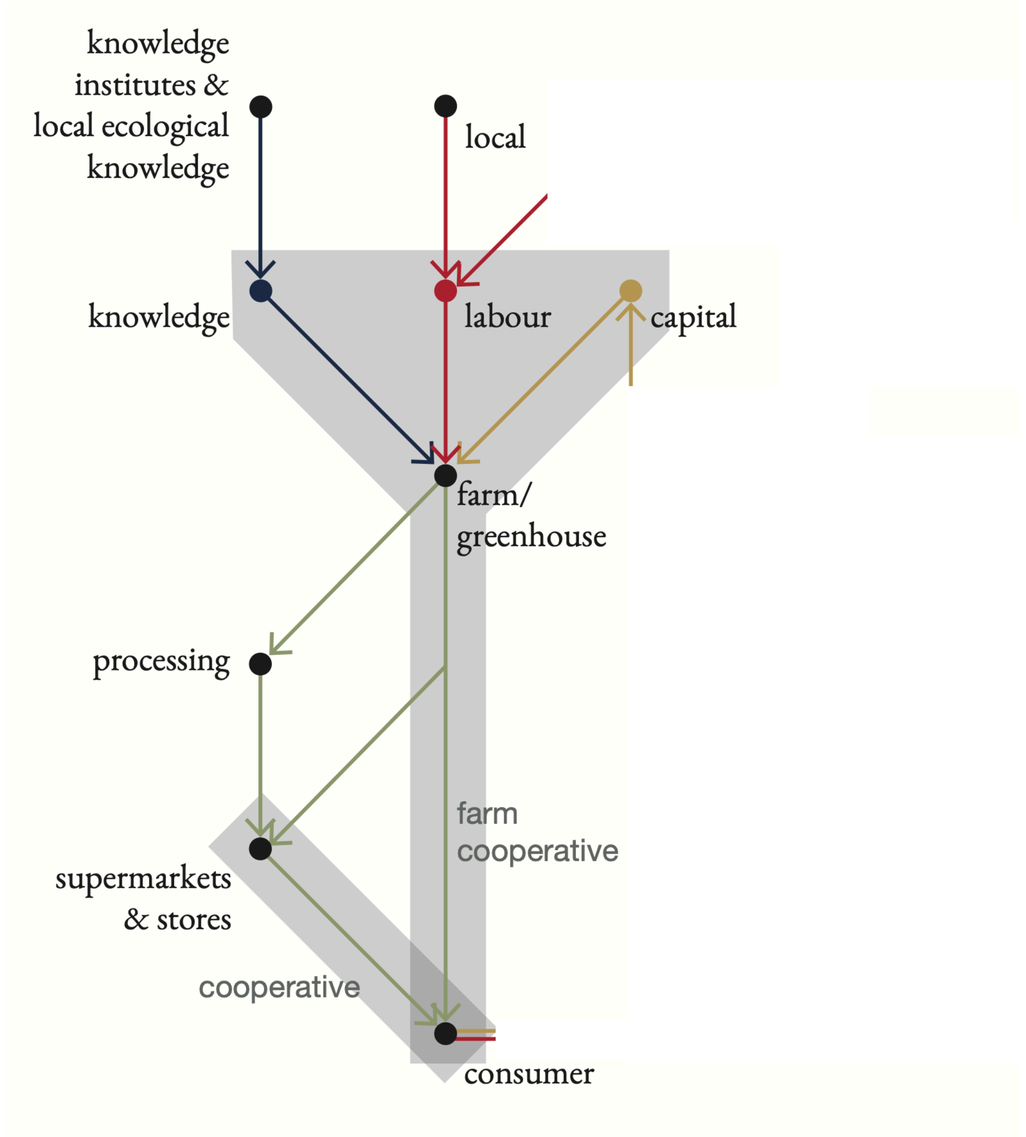
labour

capital

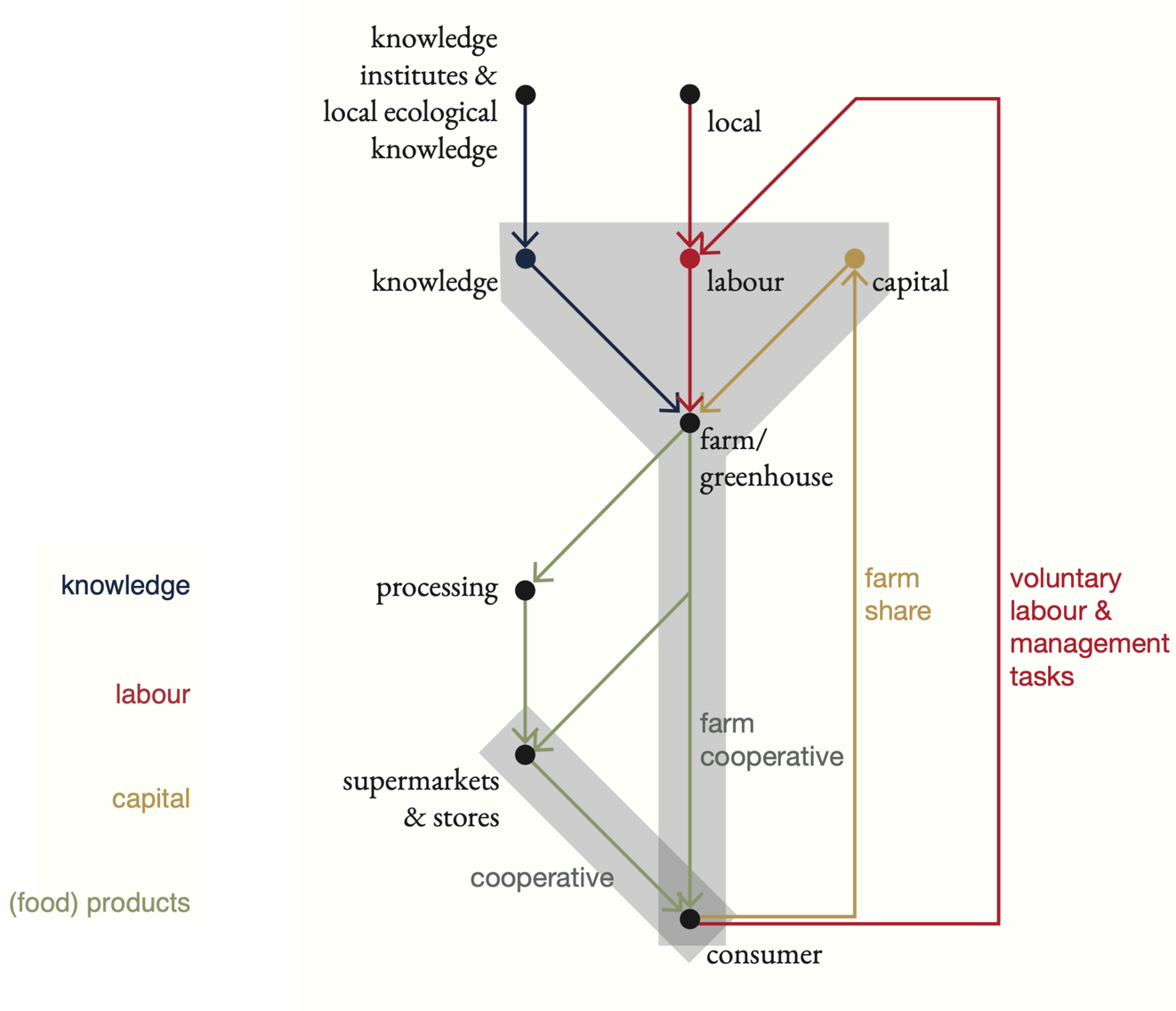
(food) products



autonomy of food system actors



autonomy of food system actors



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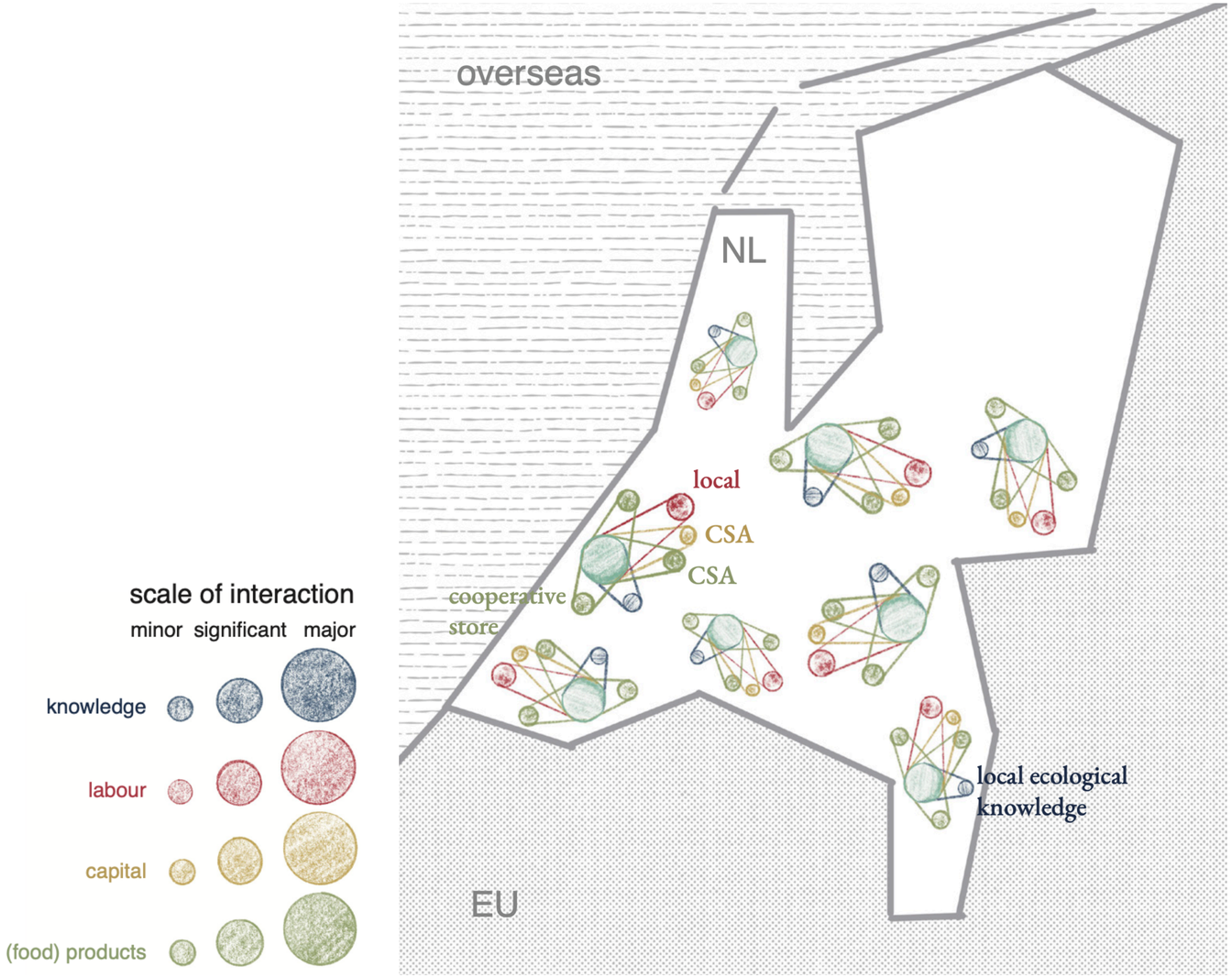


autonomy of the region(s)

inspiration



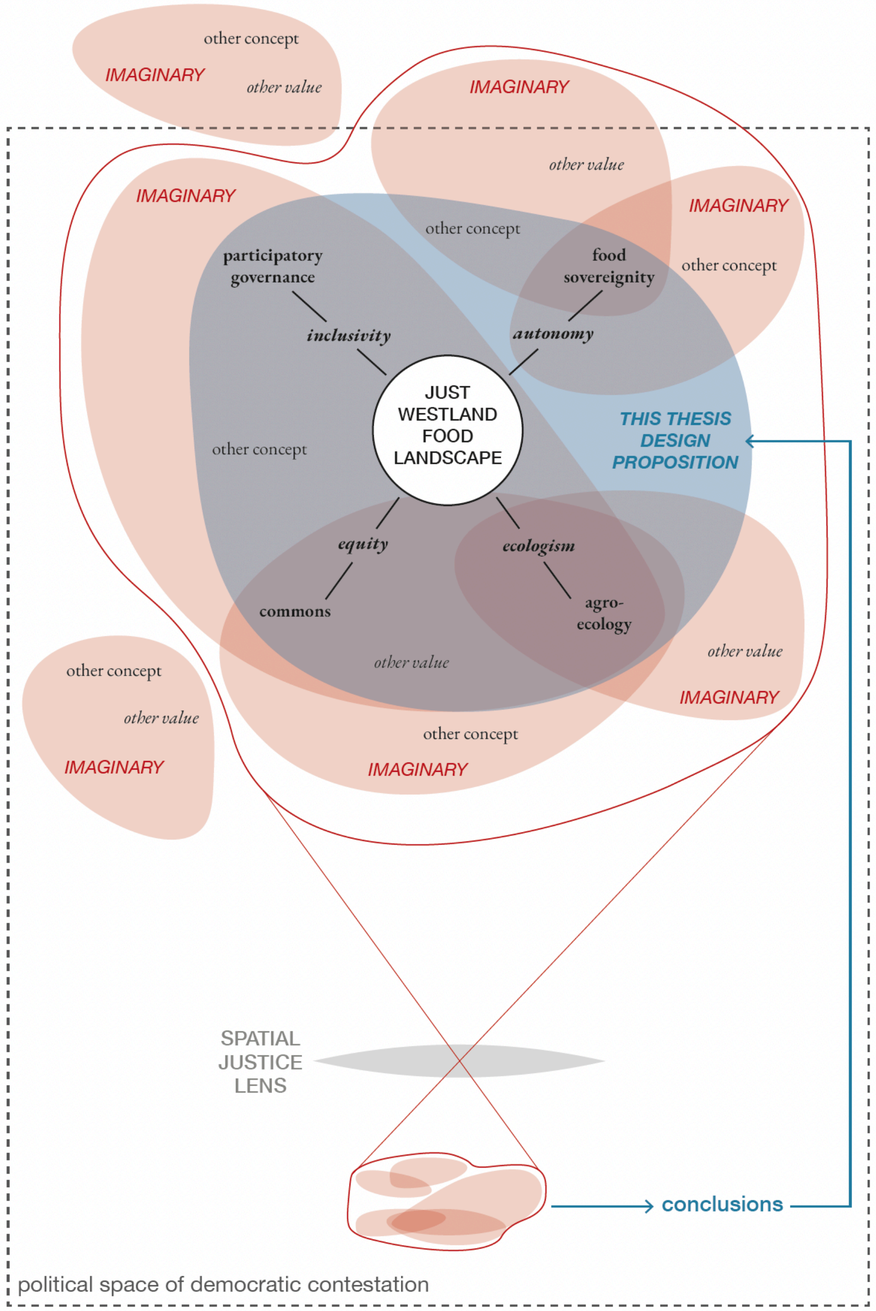
CPB scenarios for NL (2024):

1. autonomous - but sober
2. market - but inequitable
3. sustainable - but controlling government
4. together - but many taxes and responsibilities

reflecting on the assessment

reciprocity: while assessing, also shaping/imagining the scenario

collaboration: doing this in group settings with different world-views/disciplines would be more valuable



conceptual workings

two operative scales:

[1] the socio-political space where multiple imaginaries for Westland coexist and are being contested

[2] a design proposition for a transition towards a spatially just food landscape in Westland—which itself is an imaginary

conclusions

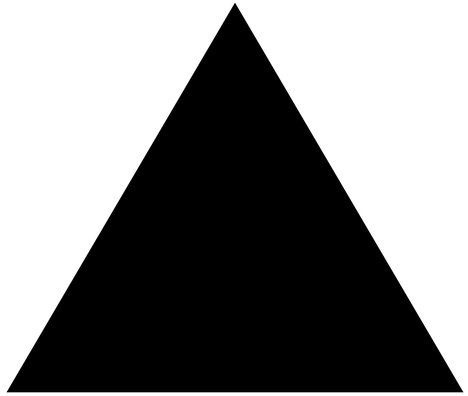


manifestation: frequently articulated through pragmatic propositions or embodied in practices of "acting otherwise" (Asara, 2018)

collective: often appeared interrelated and intertwined through shared concepts, visions, or practices

pragmatism

integration of design



positivism

physical sciences

critical theory/constructivism

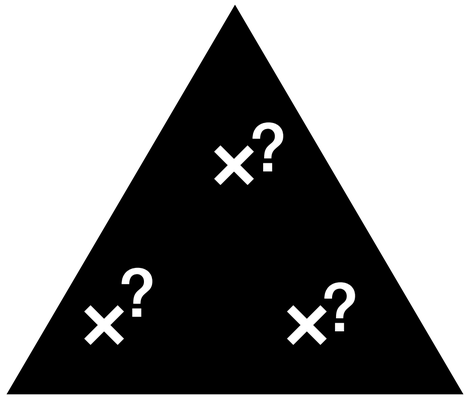
social sciences

philosophical perspective

Rocco et al. (2009) & Rocco (2024)

pragmatism

integration of design



positivism

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philosophical perspective

Rocco et al. (2009) & Rocco (2024)

Sub-Research Questions

Limits

[1.1] What historical factors have shaped the territorial organisation of the Westland horticulture landscape up until now?

[1.2] What are the consequences of the above for spatial justice and autonomy?

Imaginaries

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

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

Praxis

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

[3.2] How can urban design interventions facilitate this?

philosophical perspective

Sub-Research Questions

critical & pragmatic

Limits

[1.1] What historical factors have shaped the territorial organisation of the Westland horticulture landscape up until now?

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critical

Imaginaries

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

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pragmatic & positivist

Praxis

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

[3.2] How can urban design interventions facilitate this?

philosophical perspective

space: Westland is where intensive horticulture happens

local benefits:
profits, employment

local burden:
scarcity of housing

space: Westland is where intensive horticulture happens

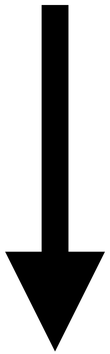
local benefits:
profits, employment

local burden:
scarcity of housing

distribution

space: Westland is where intensive horticulture happens

local benefits:
profits, employment



GREENHOUSE OWNERS & INDUSTRY

local burden:
scarcity of housing



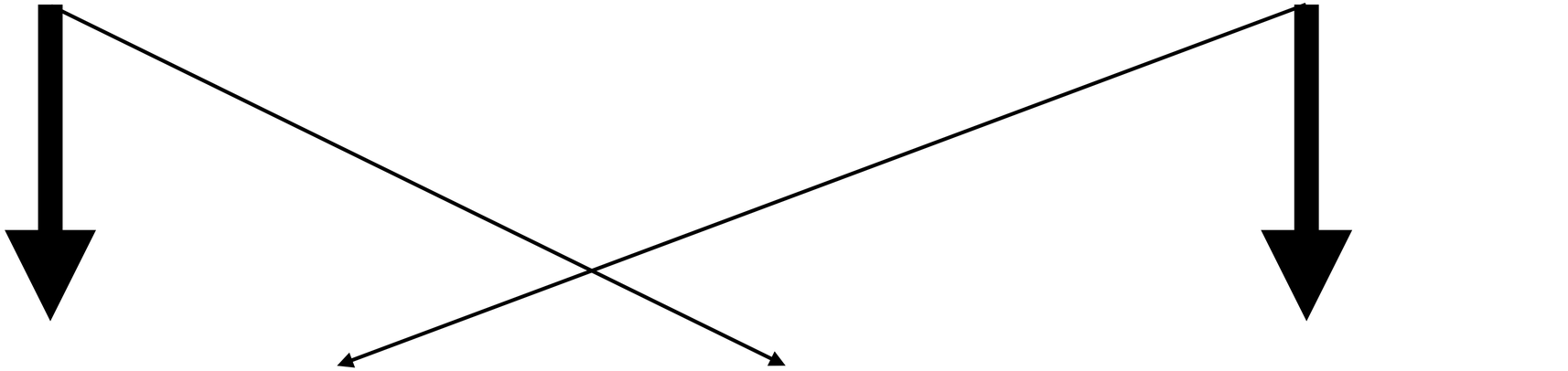
WESTLAND RESIDENTS (who voted PVV)

distribution

space: Westland is where intensive horticulture happens

local benefits:
profits, employment

local burden:
scarcity of housing



GREENHOUSE OWNERS & INDUSTRY

WESTLAND RESIDENTS (who voted PVV)

distribution

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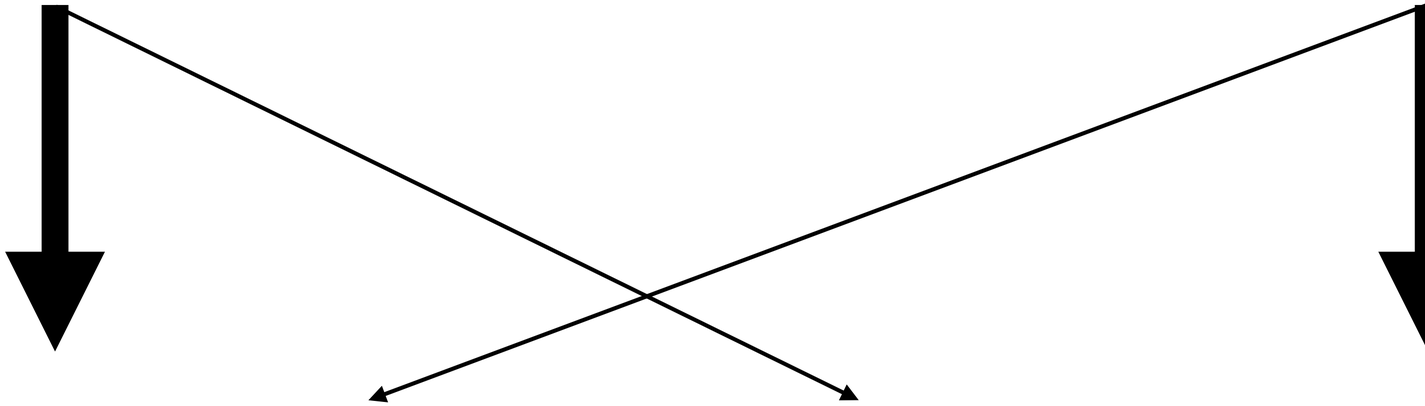


GREENHOUSE OWNERS & INDUSTRY

WESTLAND RESIDENTS (who voted PVV)

distribution
= injust

	Need for spatial justice	Addresses	Policy actions	Key Stakeholders	Synergies
1	fair distribution of benefits of horticultural production (=healthy nutrition, knowledge reproduction, social networks)	distributional justice, regional-, communal-, individual autonomy	• foster community supported agriculture initiatives (e.g. by giving priority to horticultural land sales in zoning plans) and cooperative local food retail business models	• CSA organisations • municipality • residents • greenhouse businesses	6
2	fair distribution of the burdens of horticultural production (= CO2 emissions, pollution, scarcity of public space and spatial quality, low biodiversity and damaged ecosystems)	distributional justice	• instigate a governmentally issued 'licence to produce' that prescribes local environmental and social responsibility into the business operations (e.g. limited pesticide usage/containment): this can for example lower taxing on products • remove tax benefits on fossil fuel usage while correspondingly subsidising transitions to geothermal energy or unheated nature-inclusive greenhouse/open field cropping, to protect small greenhouse businesses' and farmers' livelihoods in the transition	• national government ministry of finance • province • greenhouse businesses • waterschap • scientific monitoring	1
3	respecting and protecting the rights and values of all horticultural workers	recognitional justice, individual autonomy	• mandatory civil registration of international workers: enables health insurance and monitoring • long term contract possibility together with possibilities for agricultural practice based-education / training in less busy months • housing on-site or within Westland municipality	• international workers • greenhouse businesses • municipality • labour unions	1
4	fostering (collective) care practices that support and protect individuals and groups in vulnerable conditions	recognitional justice, communal autonomy	• foster and support (new initiatives for) solidarity networks by combining it with community gardening and restaurants, collective meals, and arts and crafts (Reference: Social Urban Garden Rotterdamse Munt)	• community centres, gardens and stores (e.g. Boerengoed) • municipality	1
5	foster the appropriation of automation technologies for social and ecological care	distributional justice, individual autonomy	• support inclusive research into and design of agro-ecological/horticultural automation technologies that enable meaningful hybrid agricultural work	• national government • WUR and other knowledge institutes • farmers and workers	3
6	include more diverse horticultural and agricultural definitions in zoning plans and environmental regulation	procedural justice	• diversify zoning plan classifications to include agro-ecological or nature-inclusive practices as well as intensive/high tech closed environment greenhouse-practices to remove the dichotomy between agriculture and nature and with that broaden the toolset of spatial planners	• municipality • nature-inclusive farming experts • ecology experts • urban planners	1,6
7	democratic engagement of citizens, workers and more-than-human stakeholders in envisioning a future Westland	procedural justice, regional-, communal autonomy	• "Glass New Deal 2040": participatory planning project to co-design the spatial future of Westland through the UP2030 planning cycle • area cooperatives (reference: Gebiedscooperatie Buijtenland van Rhoon)	• see next page	

interviewees

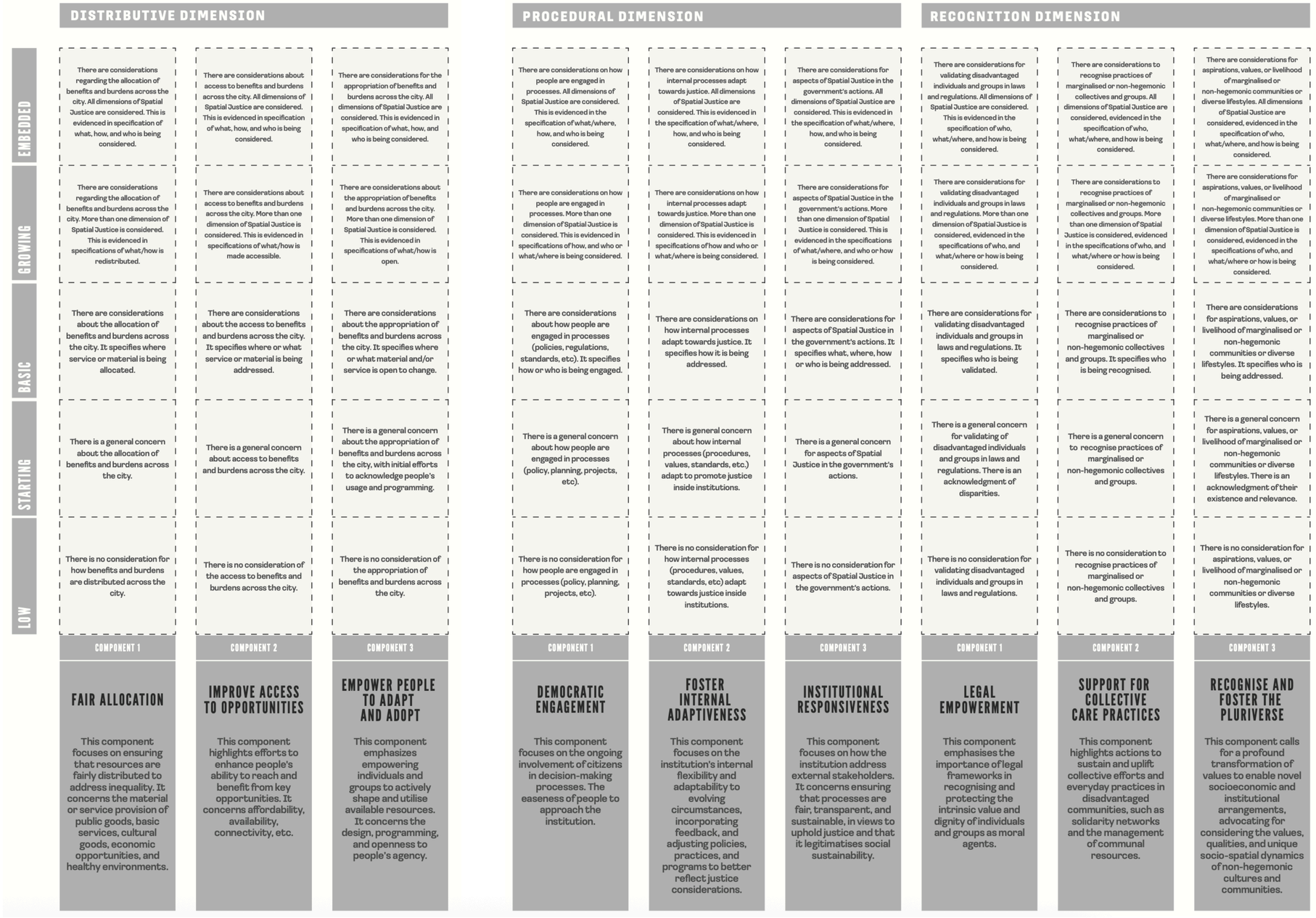
1. Land van Ons CSA farm coordinator 1;

2. Land van Ons CSA farm coordinator 2;

3. Toekomstboeren ambassador/writer;

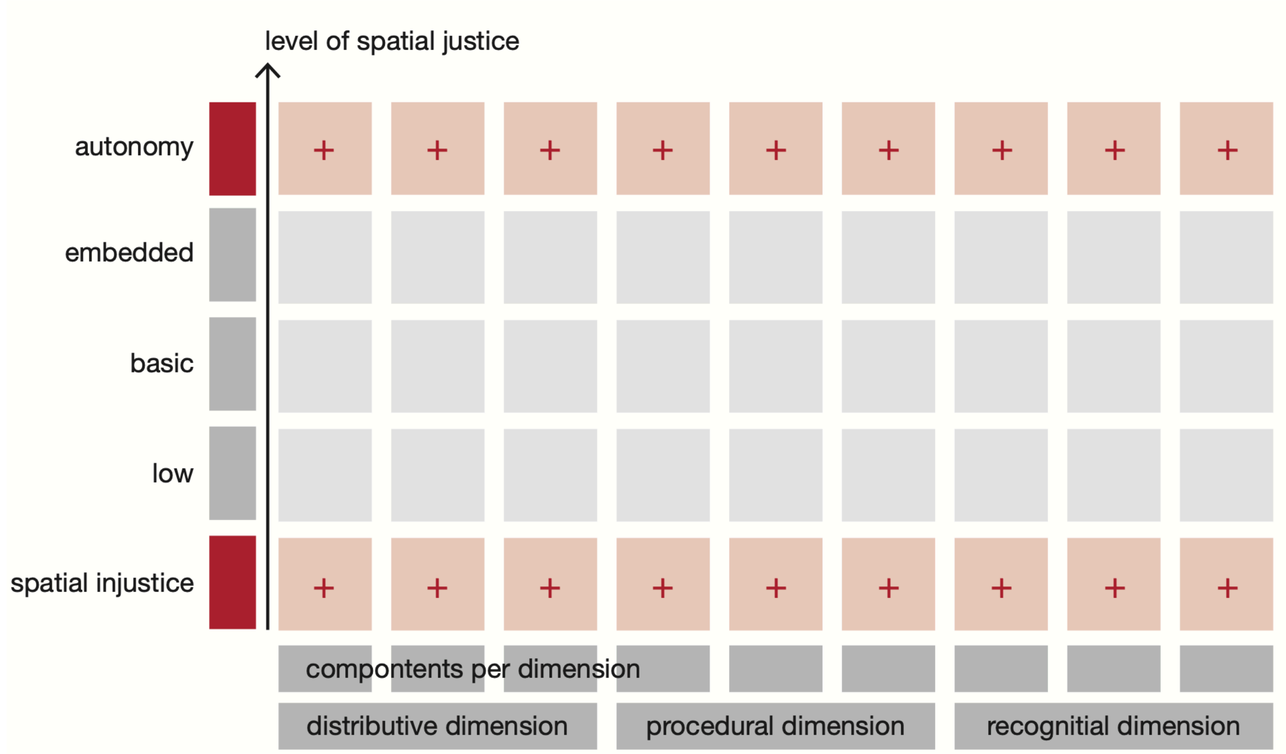
4. Westland greenhouse family business owner (2.3 ha, potted plants) that is one of the first to build on-site accommodation for international workers;

5. Hoogheemraadschap water quality commissioner (and former greenhouse cropping systems consultant in Westland)



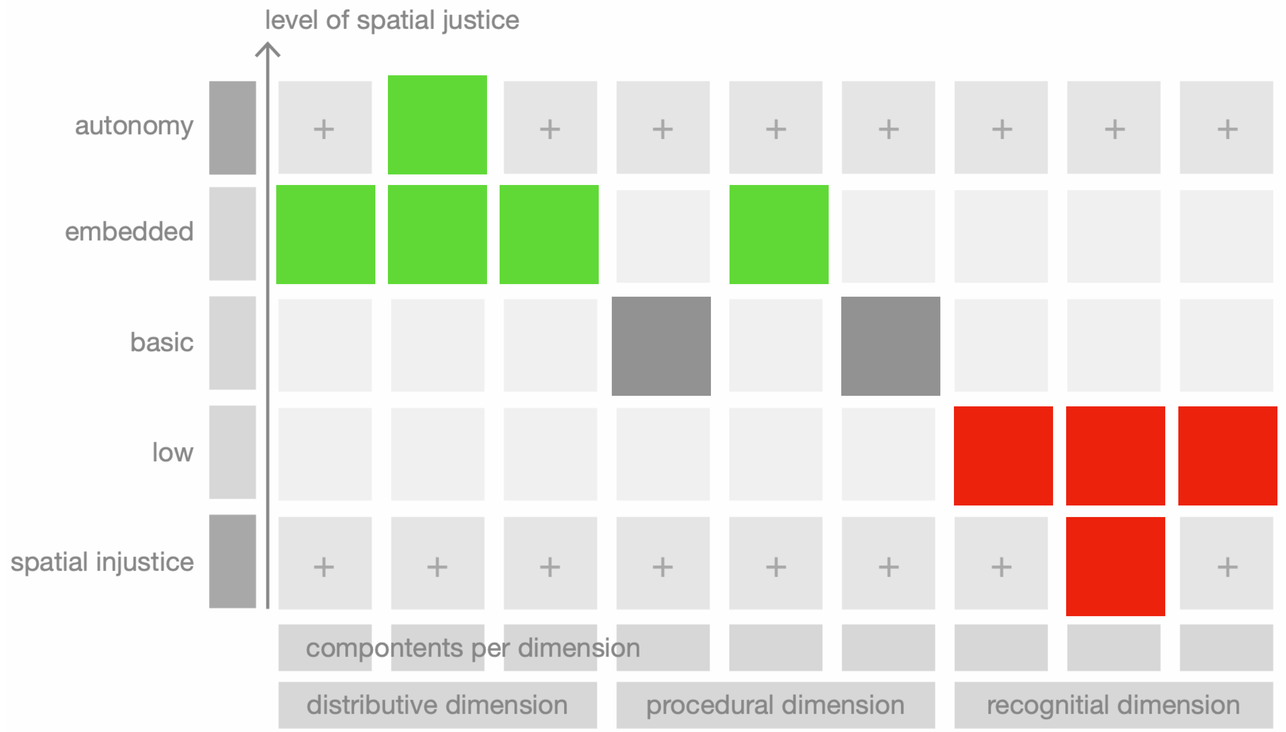
S.J. assessment framework

Lopez et al. (2024a; 2024b)

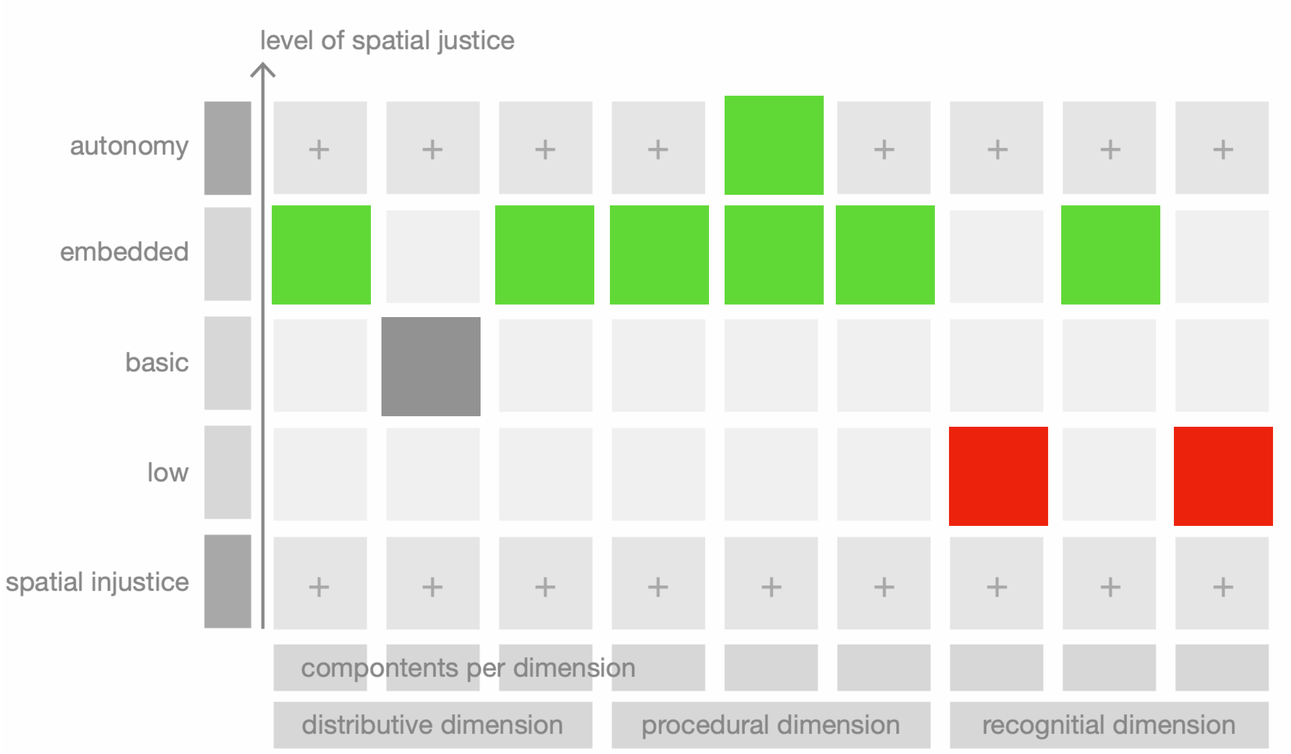


adapted assessment framework

Lopez et al. (2024a; 2024b)


level of spatial justice
autonomy
embedded
basic
low
spatial injustice
compontents per dimension
distributive dimension
procedural dimension
recognitial dimension

for example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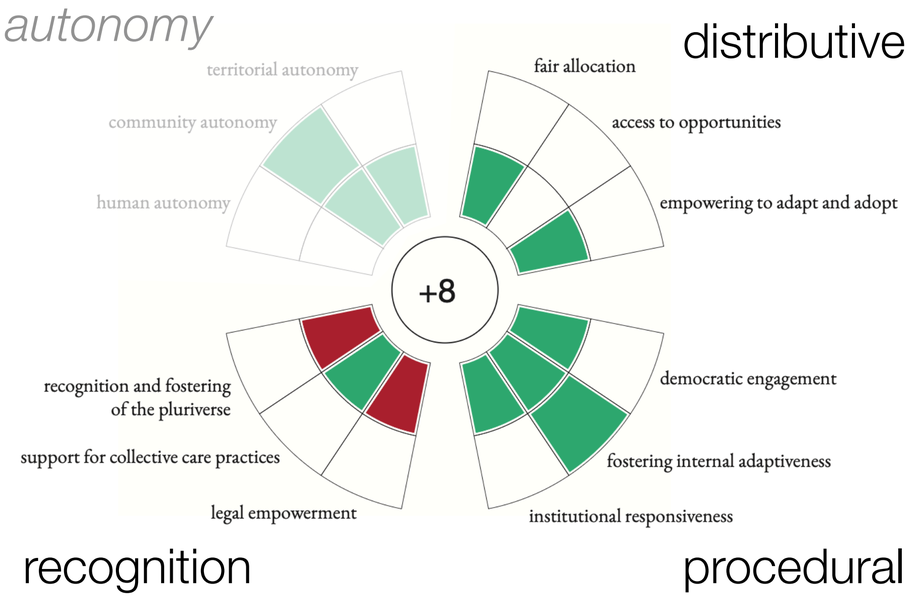

autonomy
distributive
territorial autonomy
community autonomy
human autonomy
fair allocation
access to opportunities
empowering to adapt and adopt
+8
recognition and fostering of the pluriverse
support for collective care practices
legal empowerment
democratic engagement
fostering internal adaptiveness
institutional responsiveness
recognition
procedural

for example

governing the commons

1. clear boundaries
2. context specific rules
3. participatory decision-making
4. good monitoring
5. fair sanctions
6. conflict resolution
7. right to organise
8. integration into larger networks

radical imaginaries



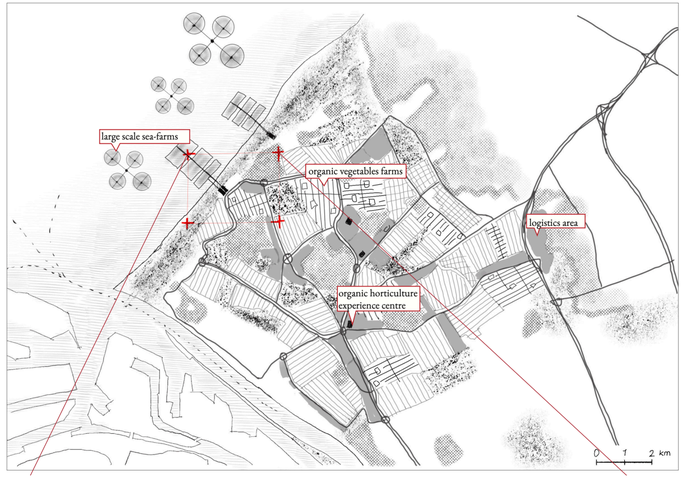
Image copyright Walter Herfst in NRC Handelsblad

ecological stewardship

food sovereignty

social value of food systems

the commons





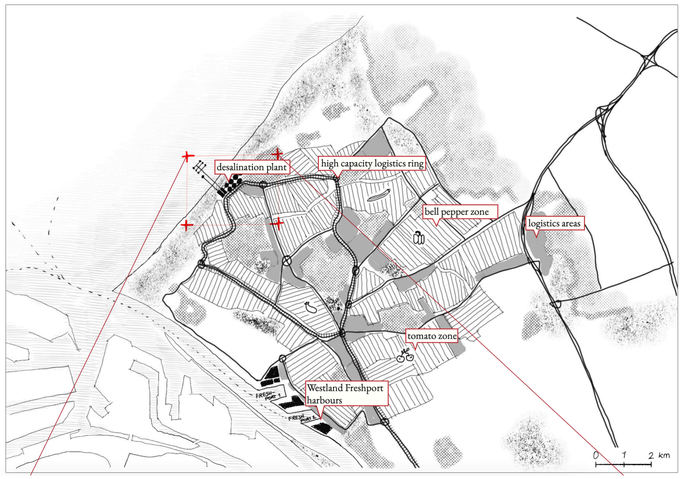
“ORGANIC FANTASTIC”

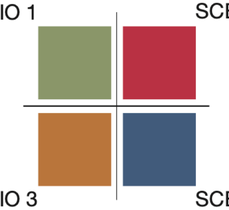
SCENARIO 1



“SUPERSIZE ME”

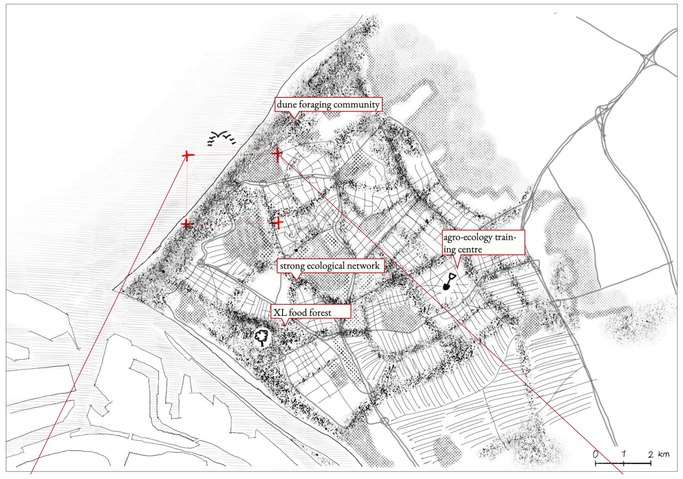
SCENARIO 2

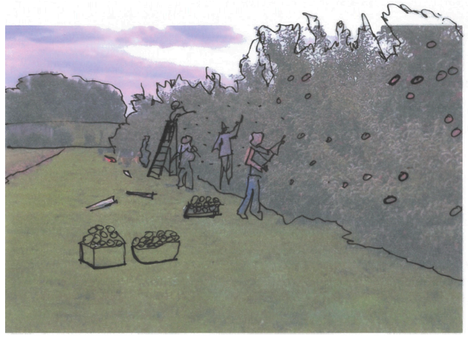




SCENARIO 3

“HOME GROWN”

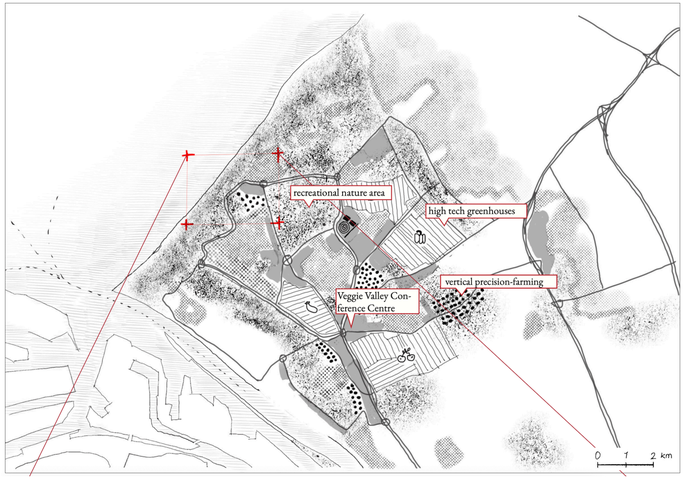


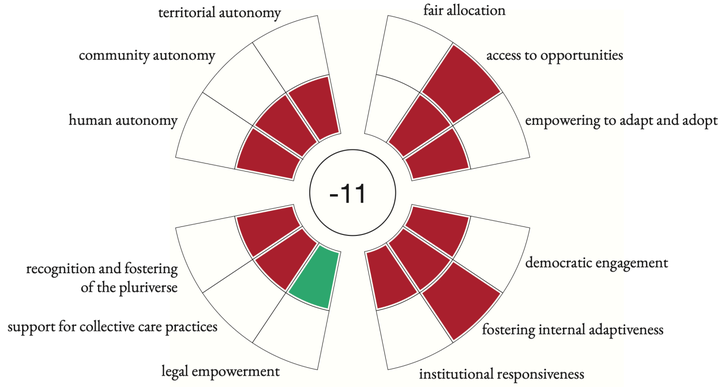


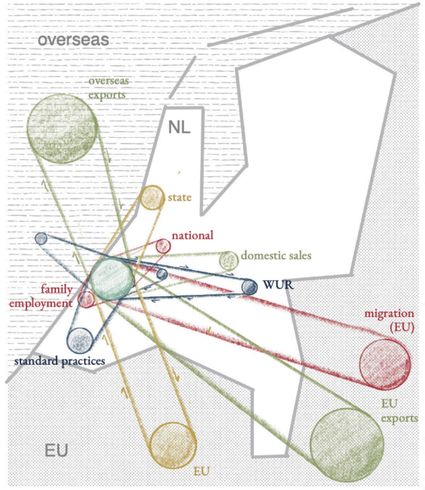
SCENARIO 4

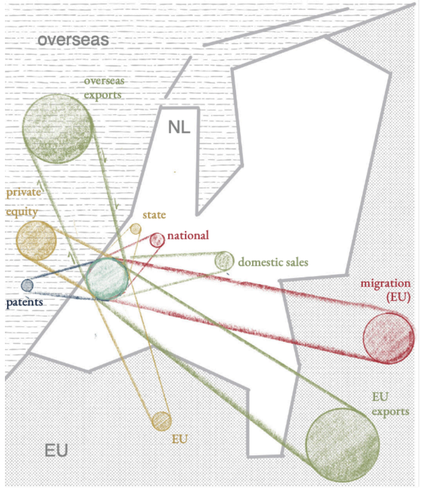
“VEGGIE VALLEY”

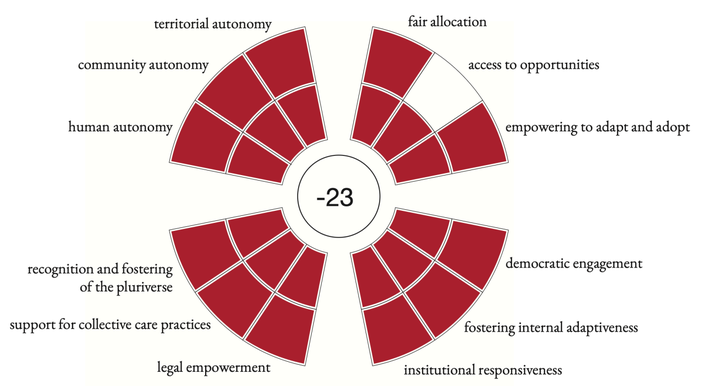












"ORGANIC FANTASTIC"
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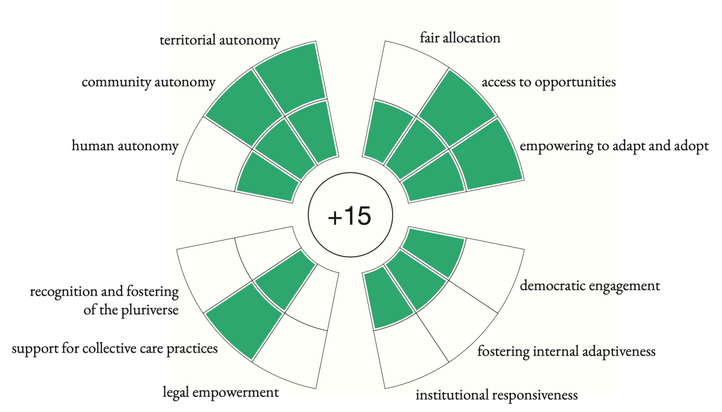

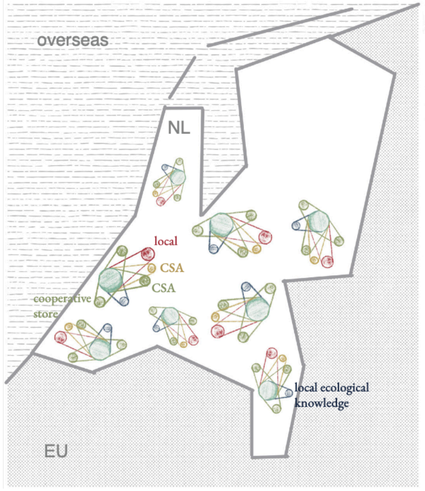

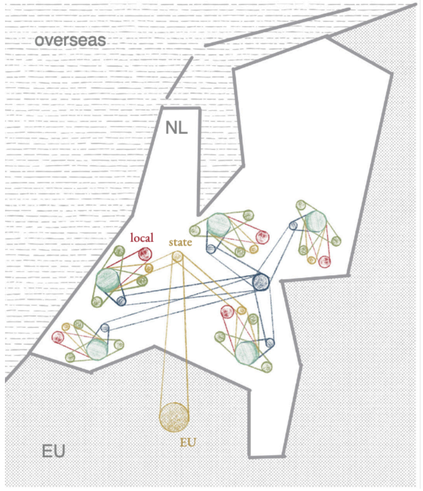

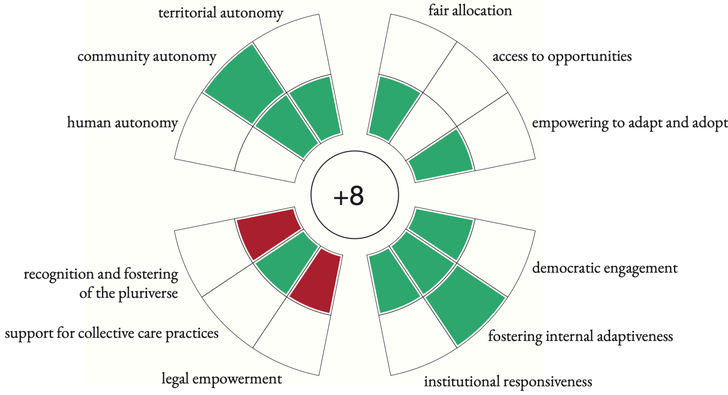

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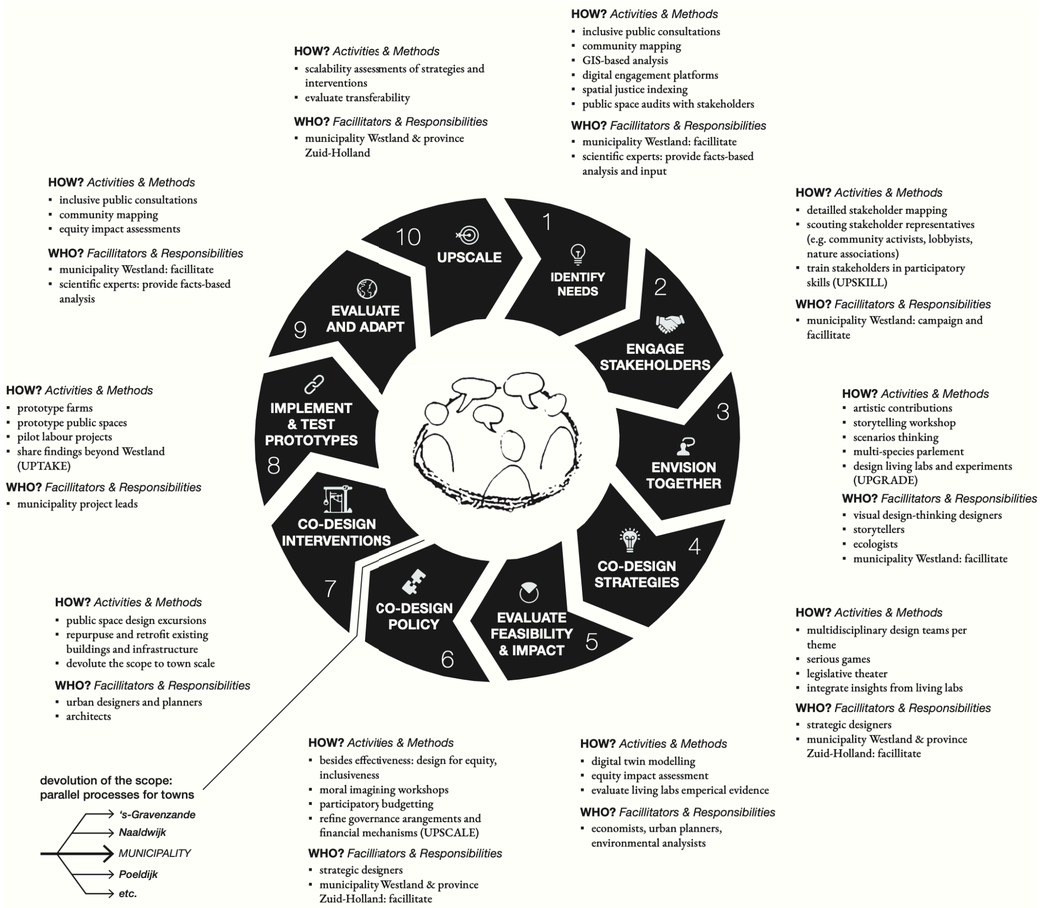
policy actions



planning cycle adaptation



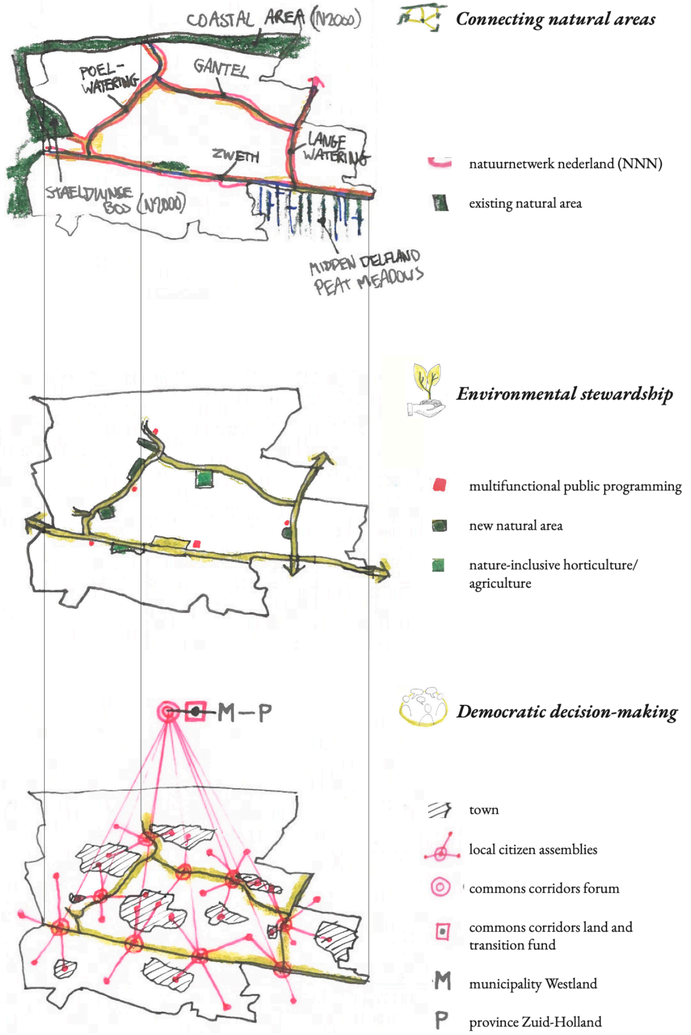
Connecting natural areas



Environmental stewardship



Democratic decision-making



Connecting natural areas

natuurnetwerk nederland (NNN)

existing natural area

Environmental stewardship

multifunctional public programming

new natural area

nature-inclusive horticulture/ agriculture

Democratic decision-making

town

local citizen assemblies

commons corridors forum

commons corridors land and transition fund

M municipality Westland

P province Zuid-Holland

radical project



patchwork of agricultural typologies