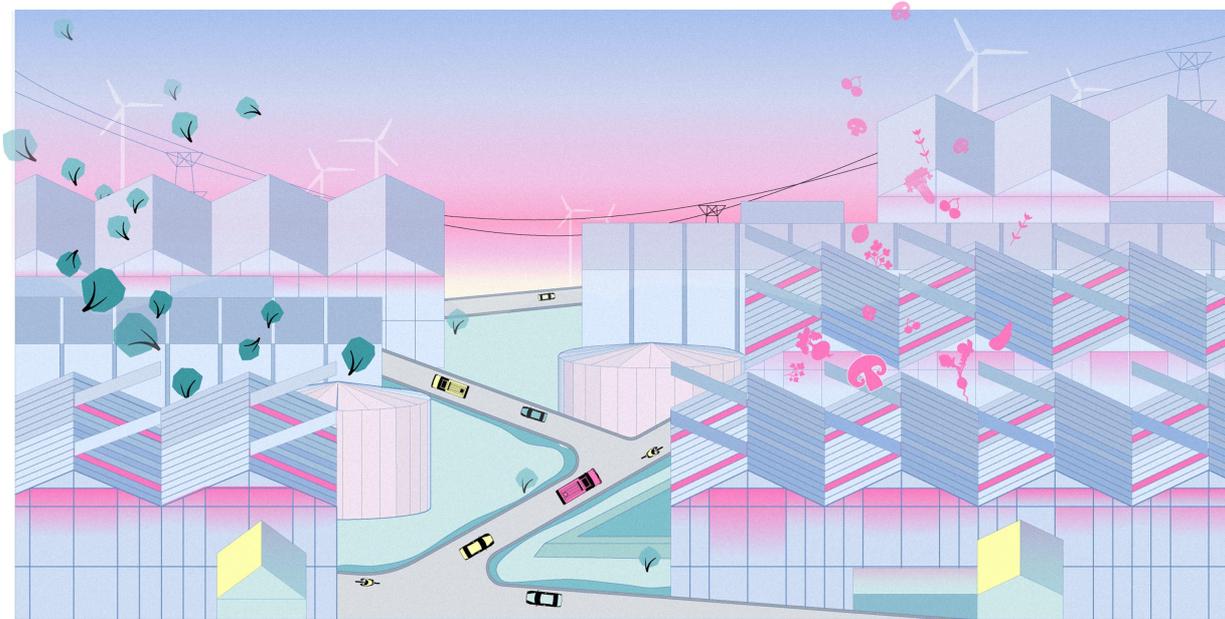


# From Glass to Grove

P5 presentation



Urban forestry Lab-Wooded common  
Xinran Wang







(foto:Historisch Archief Westland)



Wateringe  
(Rijksmuseum, 2024)



De Poeldijker  
(Koos van Leeuwen (n.d.). Een praatje bij een plaatje)



Loss of wooded landscape through time



Greenhouse Horticulture Industry in the Westland Region  
(foto: Ter Laak Orchids)





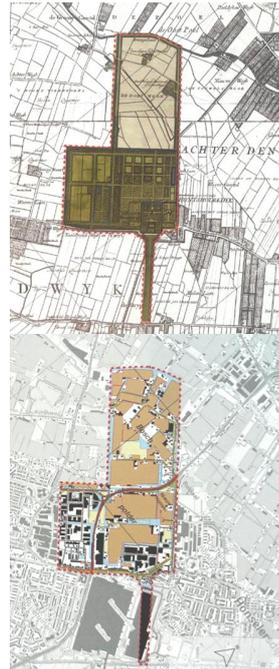
A family working under a vine in a greenhouse  
(foto:Historisch Archief Westland)

# Social-ecological Challenges



(Google Earth)

Unsustainable economy



(Topographical Service)

Culture Decline



(Gebruik van bestrijdingsmiddelen in een band, ANP)

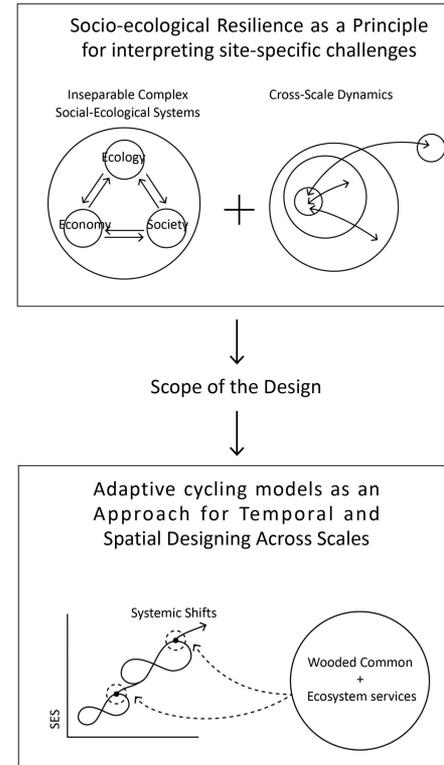
Environment degradation



Social isolation

How to improve landscape quality and foster a resilient social-ecological system in an economic-driven region like Westland through redesigning wooded common?

## Theoretical framework



Theoretical framework  
(adapted by Reyers et al., 2018, pp.270)

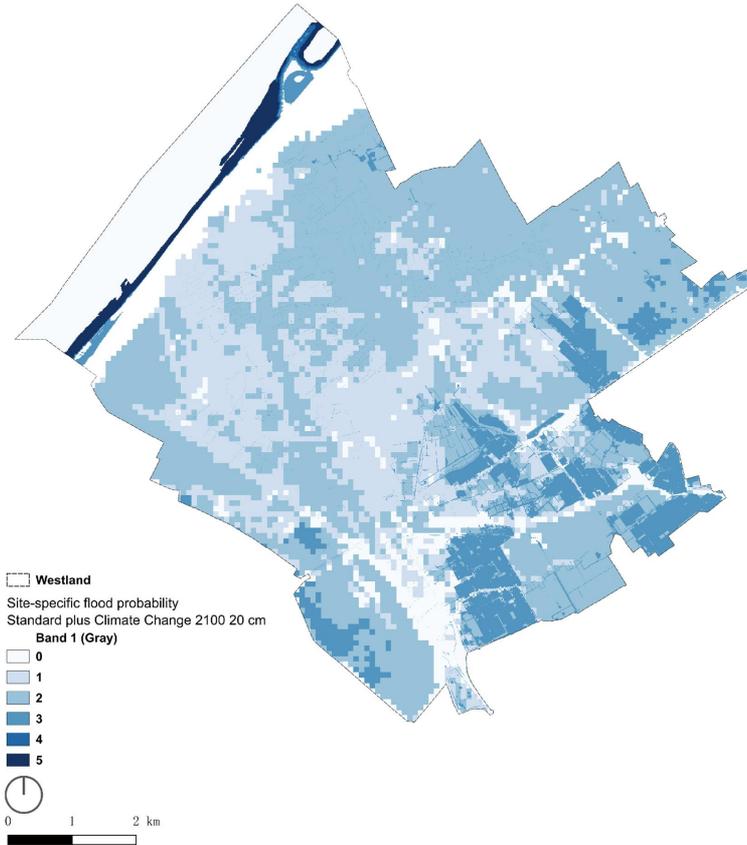
# Habitat Fragmentation

Complex and multi-scale interaction among social, ecological, and economic subsystem

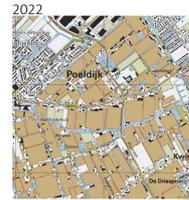


# Water-related Risks

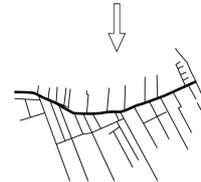
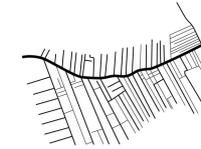
## Extreme rainfall Risk



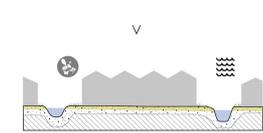
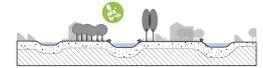
## Watercourse reduced and narrowed Decrease in ecological diversity



(nationaalgeoregister, 2022)



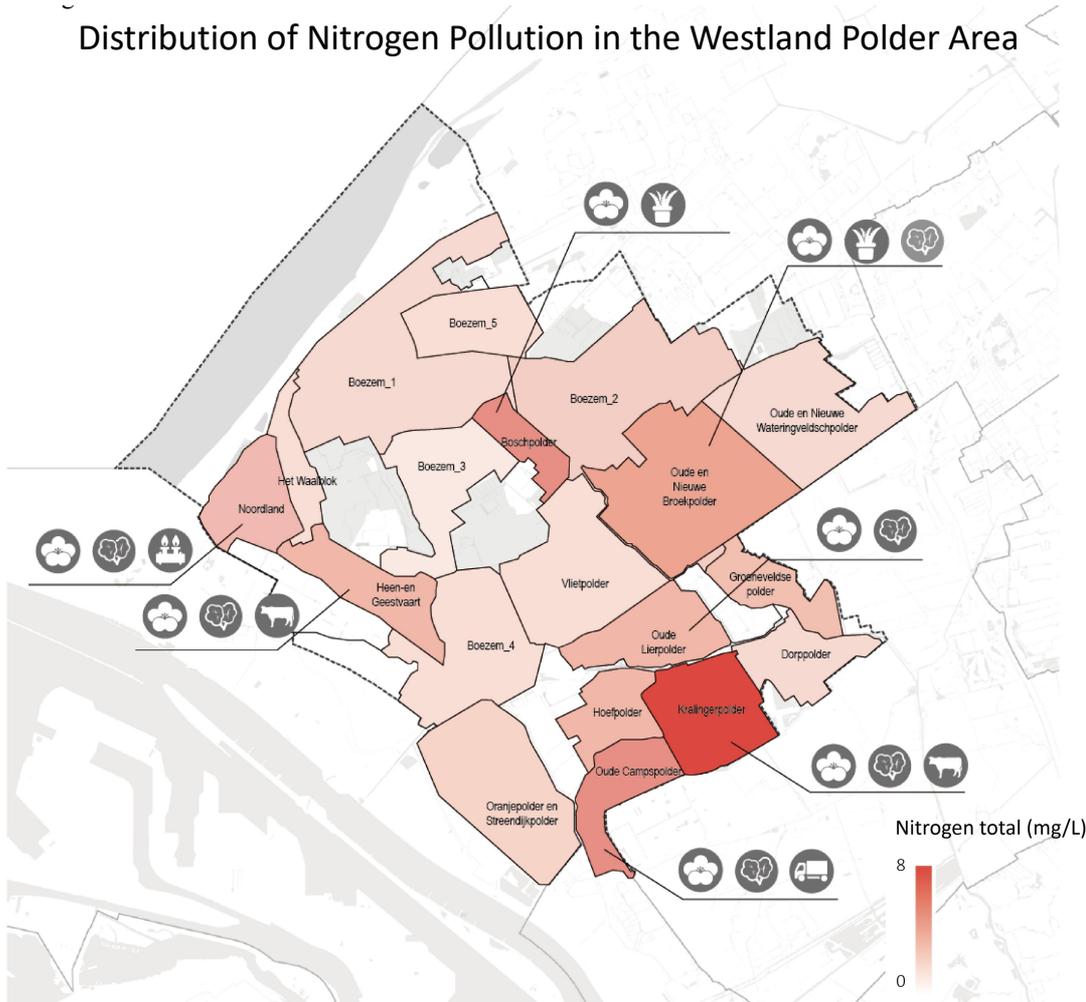
Watercourse reduced and narrowed



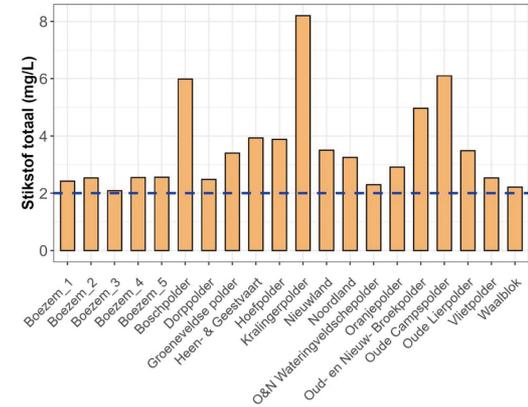
Decrease in ecological diversity

# Pollution

## Distribution of Nitrogen Pollution in the Westland Polder Area



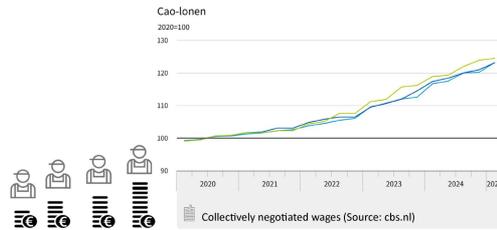
Nutrients (Polders in Gemeente Westland, 2025)



Map created by the author based on data from Hoogheemraadschap van Delfland (<https://www.hhdelvland.nl/ontdek-werk/schoon-gezond-water/glastuinbouw/glastuinbouwgebieden/polders-gemeente-westland/>) accessed November 2024

# Unsustainable economy

## Labor Cost Pressures



## Energy Cost Pressures

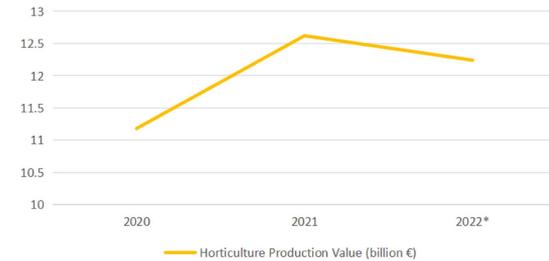


(WarmtelinQ, gasunie.nl, 2025)

Energy (natural gas) prices exploded in 2022: mid-2022 gas costs were roughly 10x higher than pre-crisis(nieuweoogst.nl,2022)

## Disruptions: COVID, Ukraine War, Brexit

### Horticulture Production Value (billion €)



COVID-19 (2020–21) hit demand for out-of-home food and flowers(glastuinbouwnederland.nl,2025). The Ukraine war (2022–) then imposed an energy shock(rabobank.nl,2022).

Nationally, average CAO wages rose 6.8% in late 2024 (the highest in decades)(CBS.nl, 2025)

# Culture Decline - Separation of life and horticulture



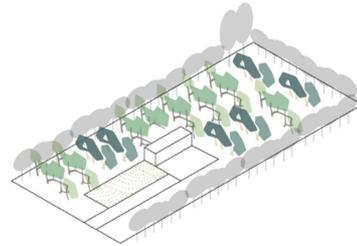
De Lier, print by G. van Giessen from 1729. Tower of the Cathedral (not yet leaning) with agriculture in the foreground (Photo: Historical Archive Westland)



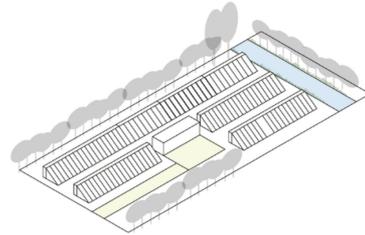
Glasshouse along canal and forest 1950s. Koos van Leeuwen (n.d.). Een praatje bij een plaatje. De Poeldijker.



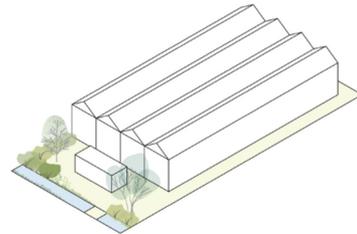
Horticultural company



Warmoezerij



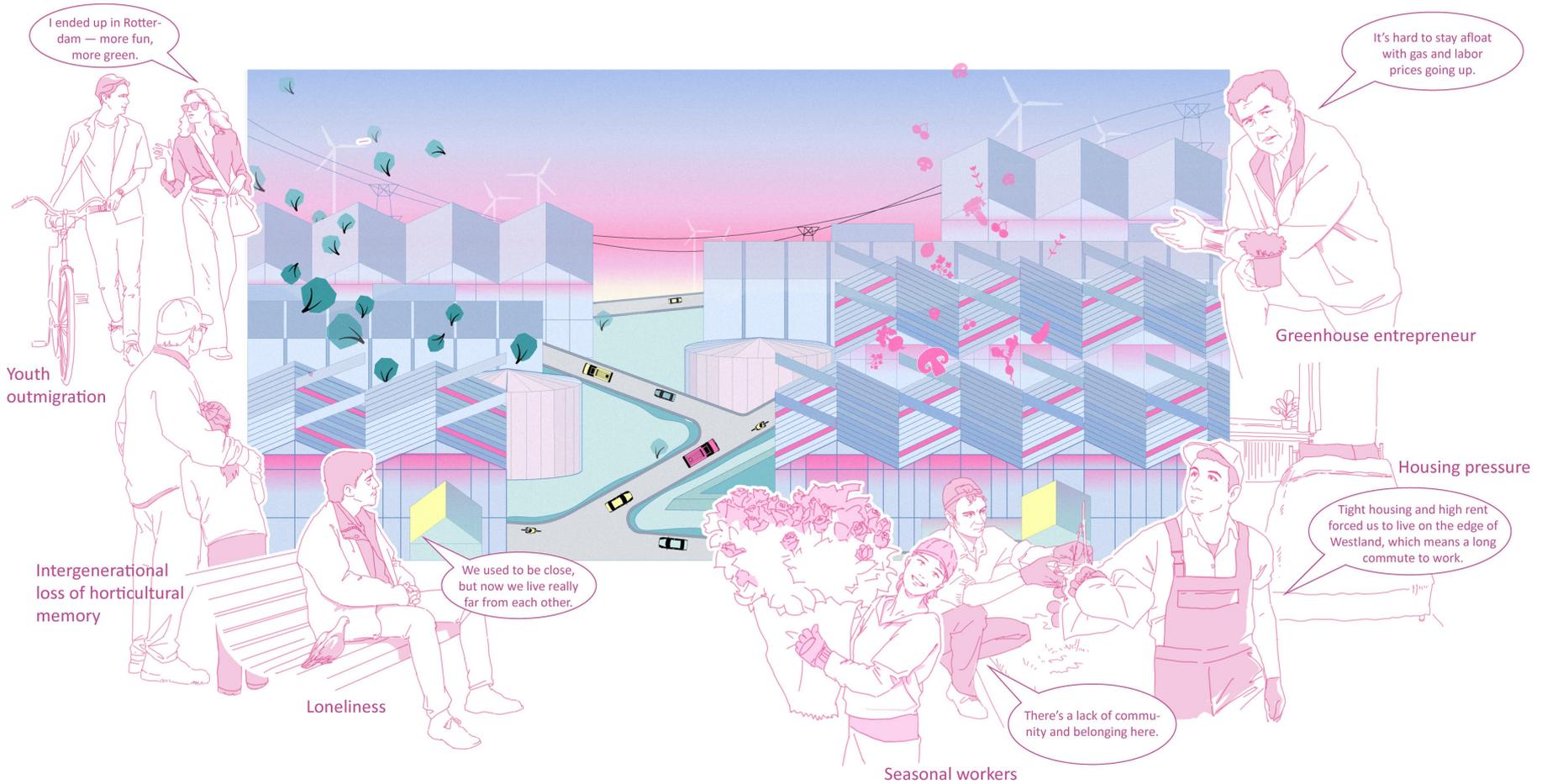
Family-run Greenhouses



Large commercial greenhouse operations

?

Future



I ended up in Rotterdam — more fun, more green.

Youth outmigration

Intergenerational loss of horticultural memory

Loneliness

We used to be close, but now we live really far from each other.

It's hard to stay afloat with gas and labor prices going up.

Greenhouse entrepreneur

Housing pressure

Tight housing and high rent forced us to live on the edge of Westland, which means a long commute to work.

There's a lack of community and belonging here.

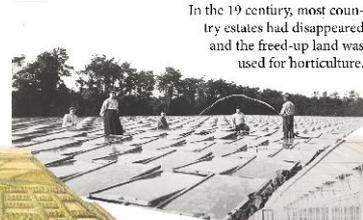
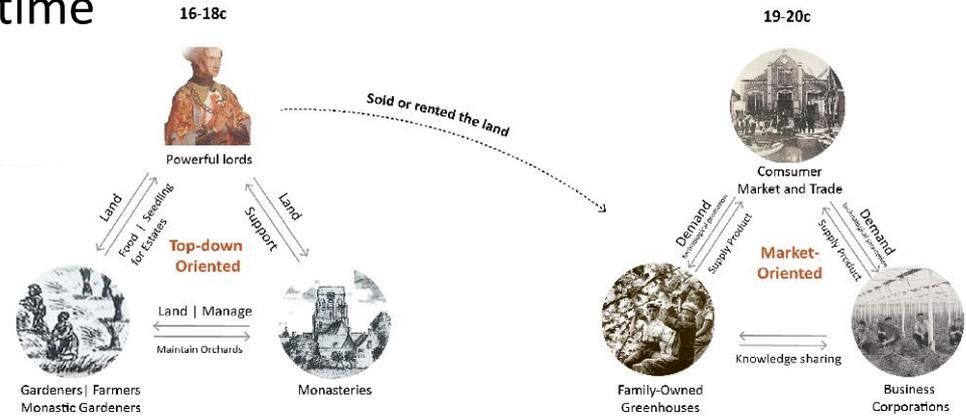
Seasonal workers

# Inspiration—— SES system in old time

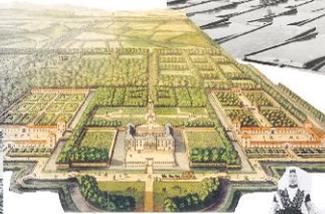


Monasteries and castles in the Westland also had orchards and fruit walls. Market gardeners could lease a piece of land to engage in 'warmoezerij'

From the sixteenth century onwards, powerful lords and wealthy merchants built country estates in the Westland. These houses had large gardens where fruit and vegetables were grown.

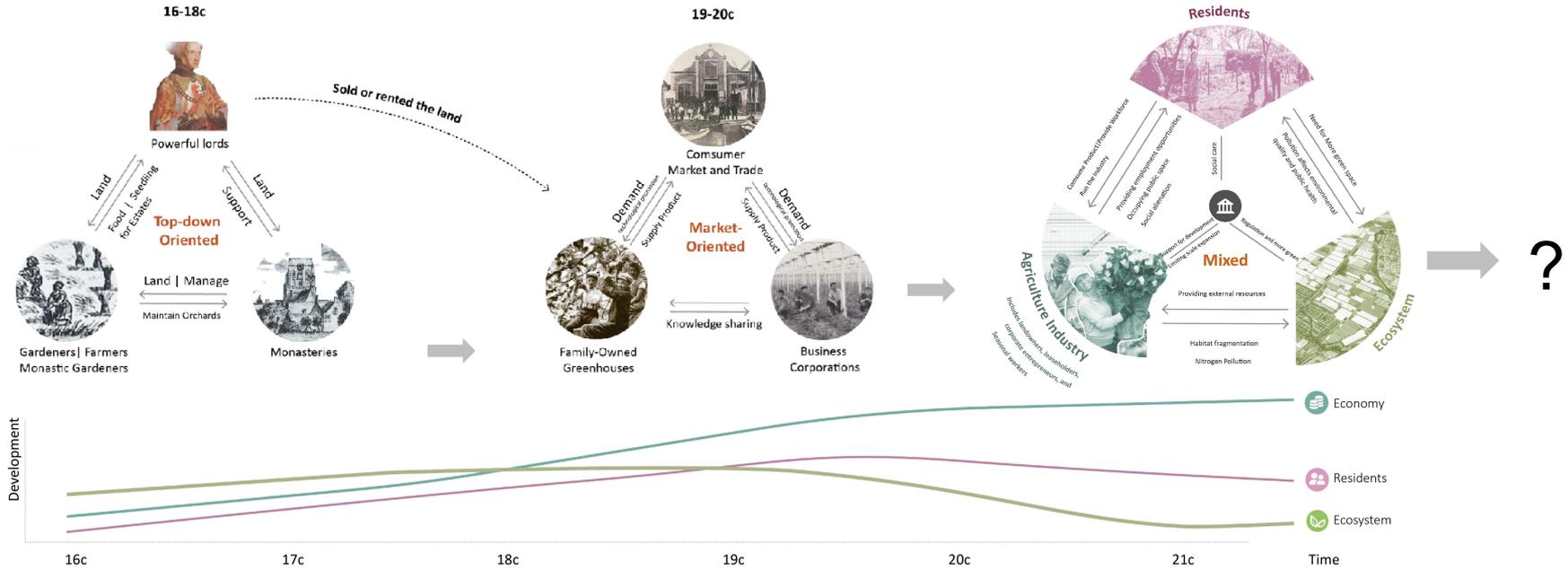


In the 19 century, most country estates had disappeared and the freed-up land was used for horticulture.



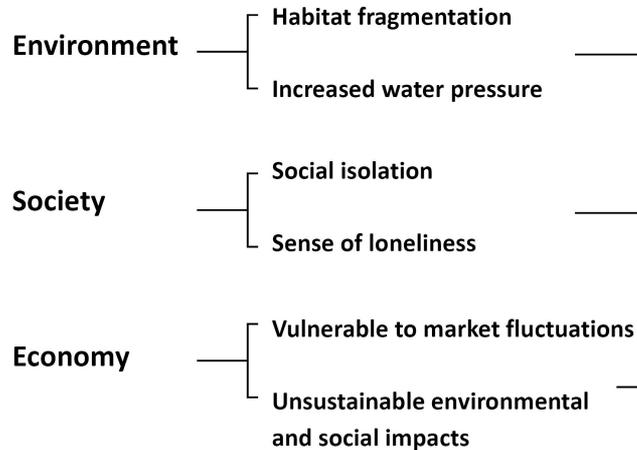
At the end of the nineteenth century, trade with England took off. After that, things went fast. Modern developments in transport, export and technology created the greenhouse area that we know today in the twentieth century.

# Inspiration— SES system in old time

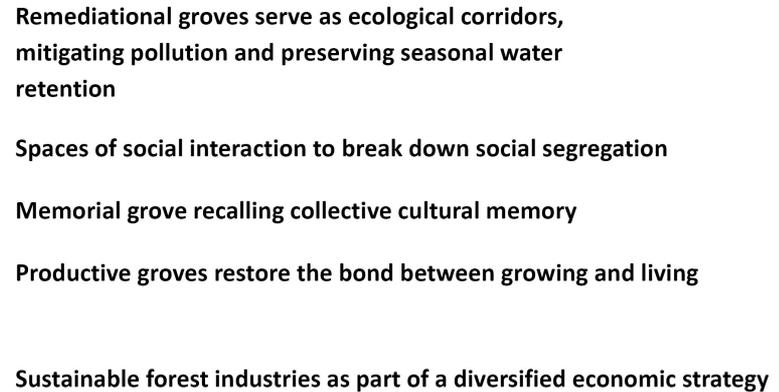


# Objectives and Scope of the Design

## Issues of concern to the project

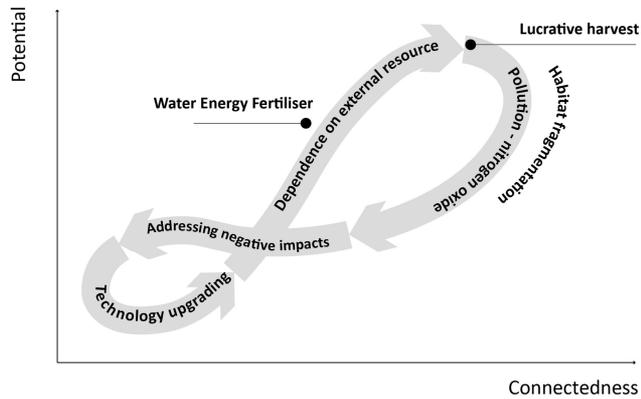


## Grove of Westland in the future could be:

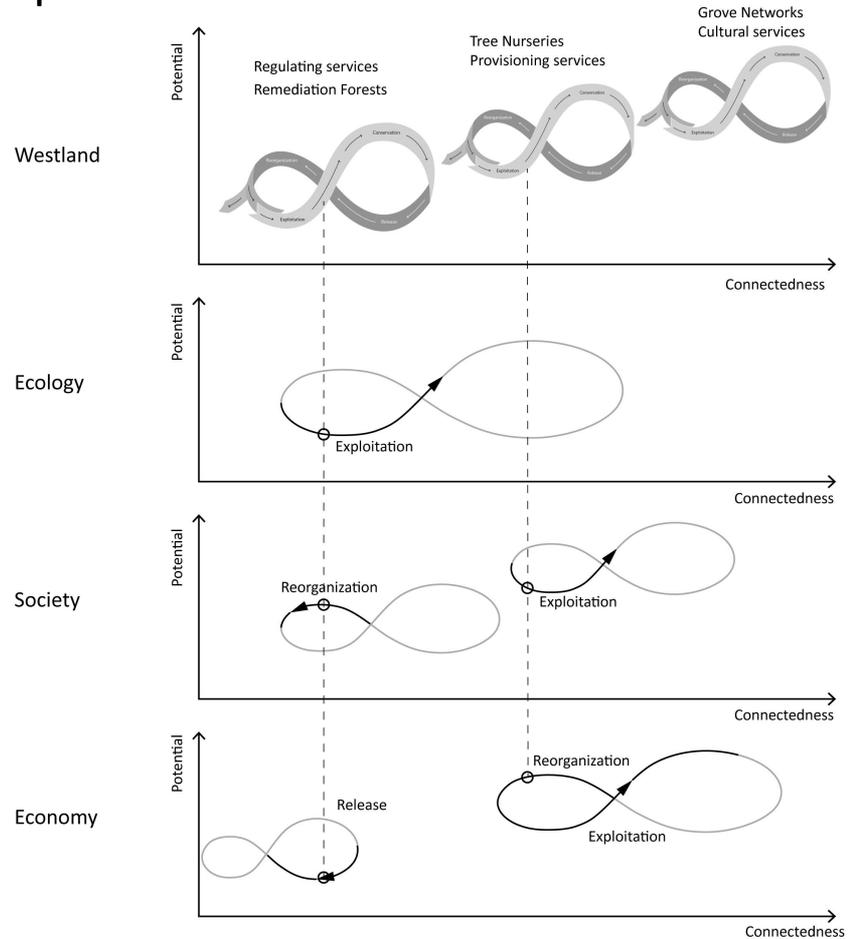


# Approach and Temporal Design Concept

**Current Greenhouse industry Adaptive cycle**

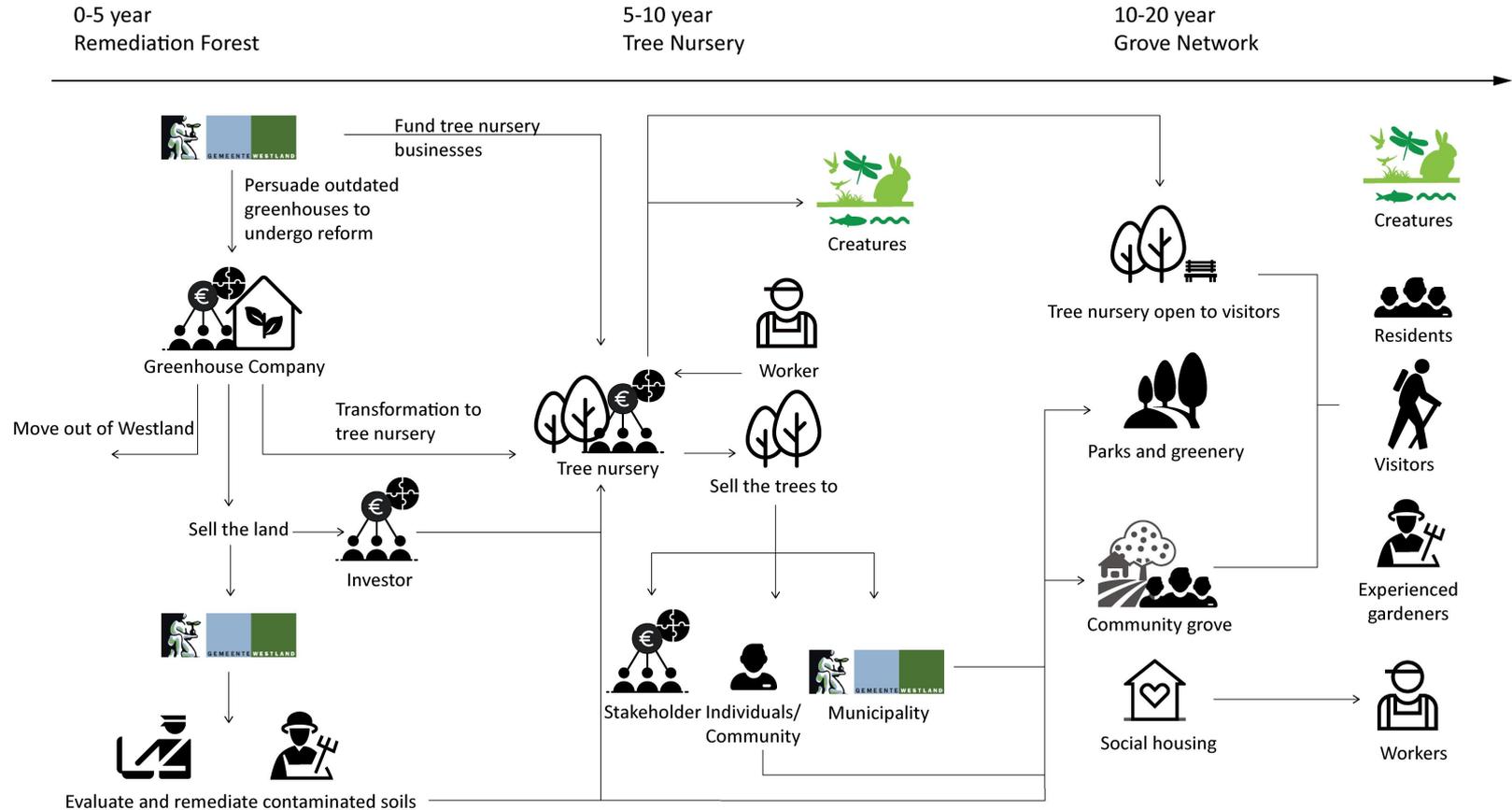


Current Greenhouse industry adaptive cycle  
(adapted by Gunderson & Holling, 2002)

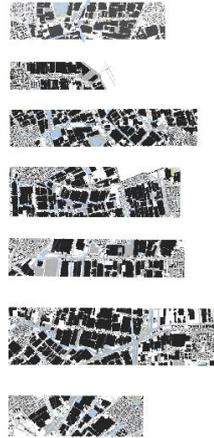


Westland's Temporal Concept

# Actors in Temporal Design Concept



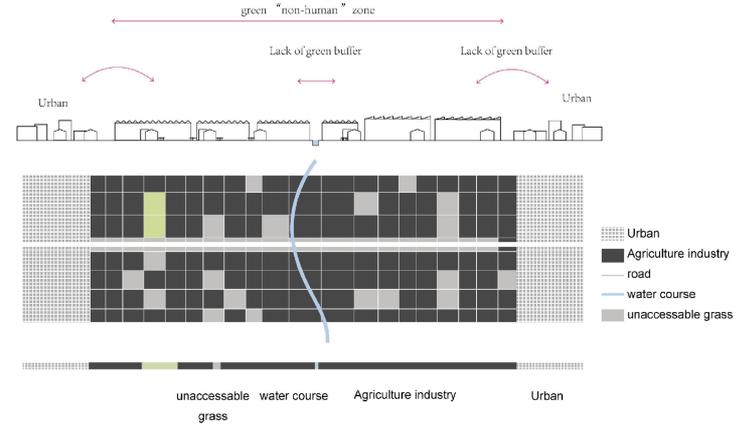
# Spatial Design Concept



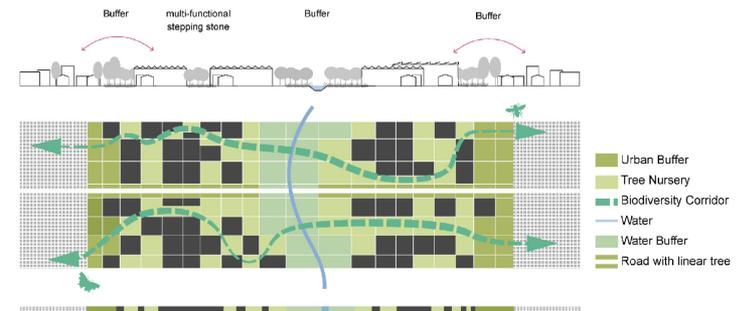
Abstracting Key Landscape Patterns

## Current Landscape Patterns and Future Concept

Current

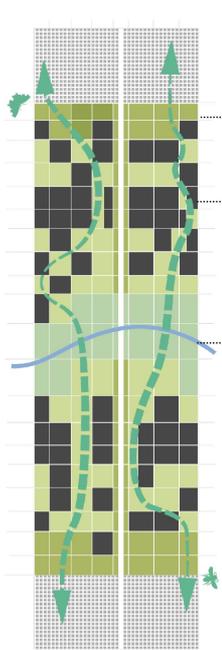


Concept

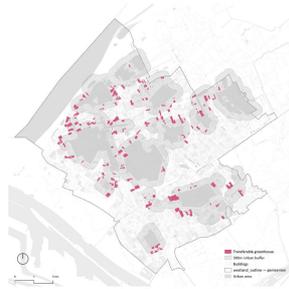


Observation of Landscape pattern and elements

# Spatial Concept for Westland



Landscape Pattern Vision



**Urban Buffer Zone**  
Transferable Greenhouses  
within 300m urban buffer



**Tree Nursery**  
Transferable Greenhouses  
inbetween



**Water Buffer Zone**  
Transferable Greenhouses  
within 50m water buffer

## Overlay of the Three Spatial Layers



# Westland Vision

## Westland Vision for 20 years

0-5 years

5-10 years

10-20 years



NOx pollution

Remediation Forest

Urban buffer

Tree nursery

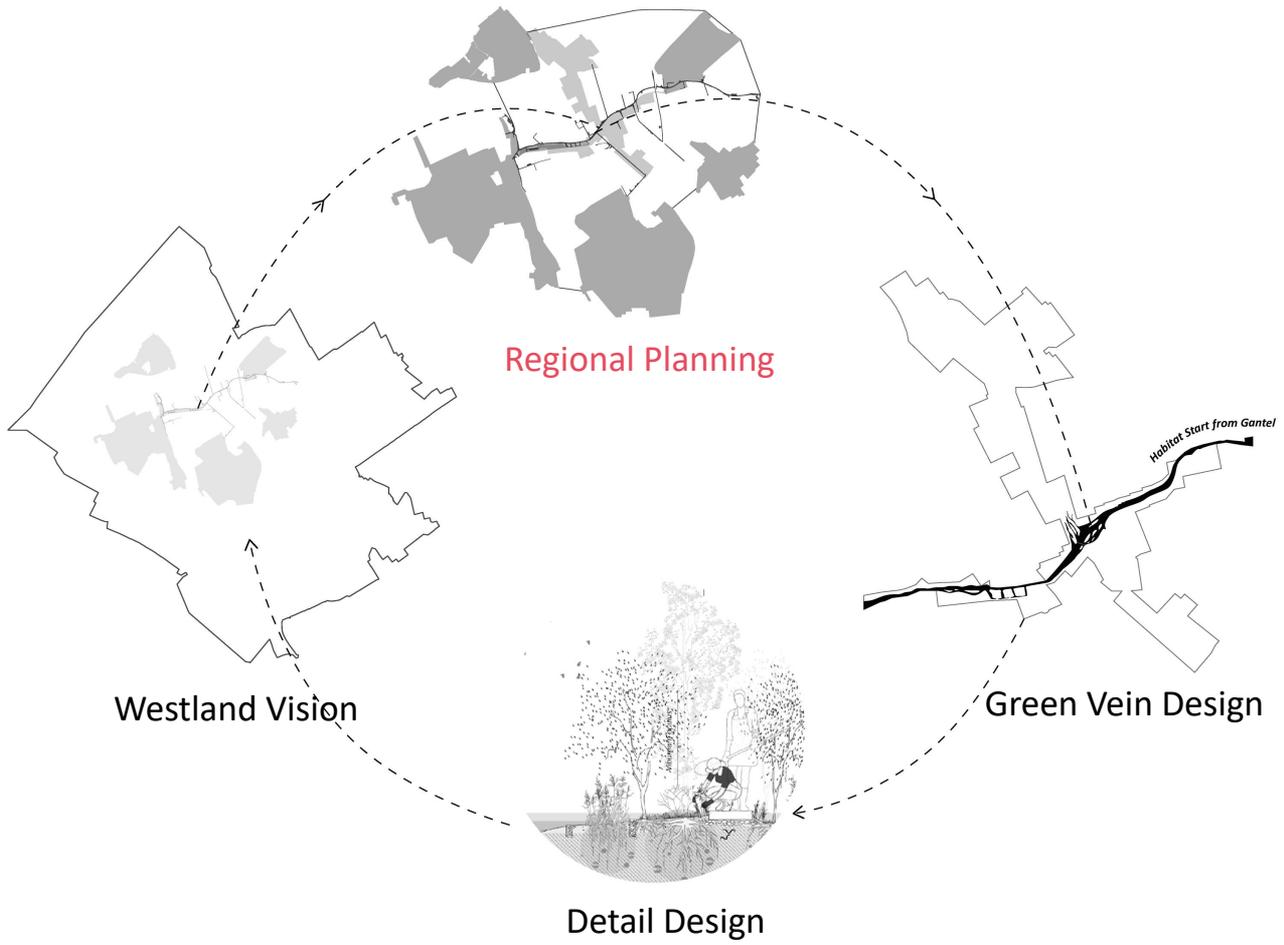
Water buffer

Transferable greenhouse of urban buffer

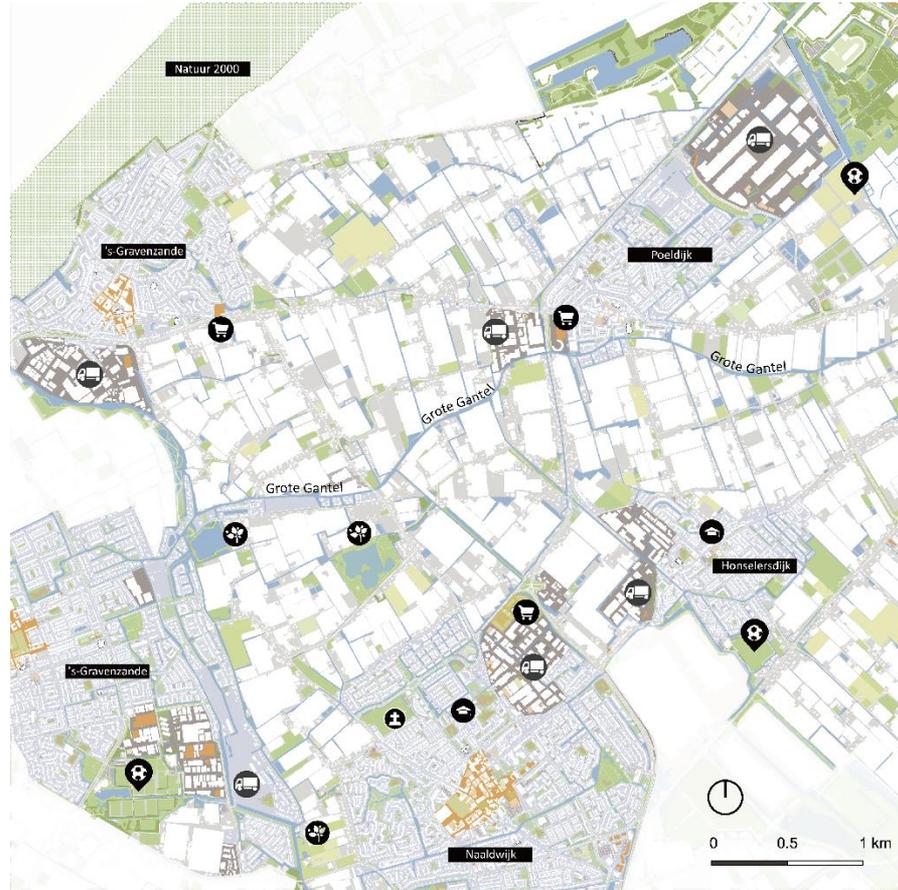
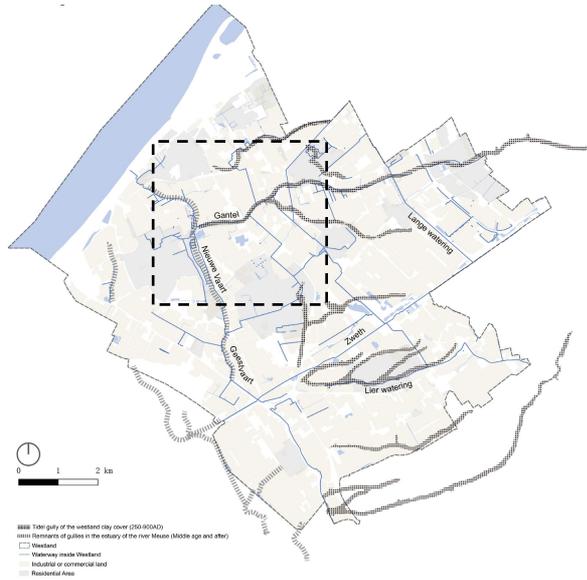
Transferable greenhouse of water buffer

300m Urban buffer

waterbuffer50m

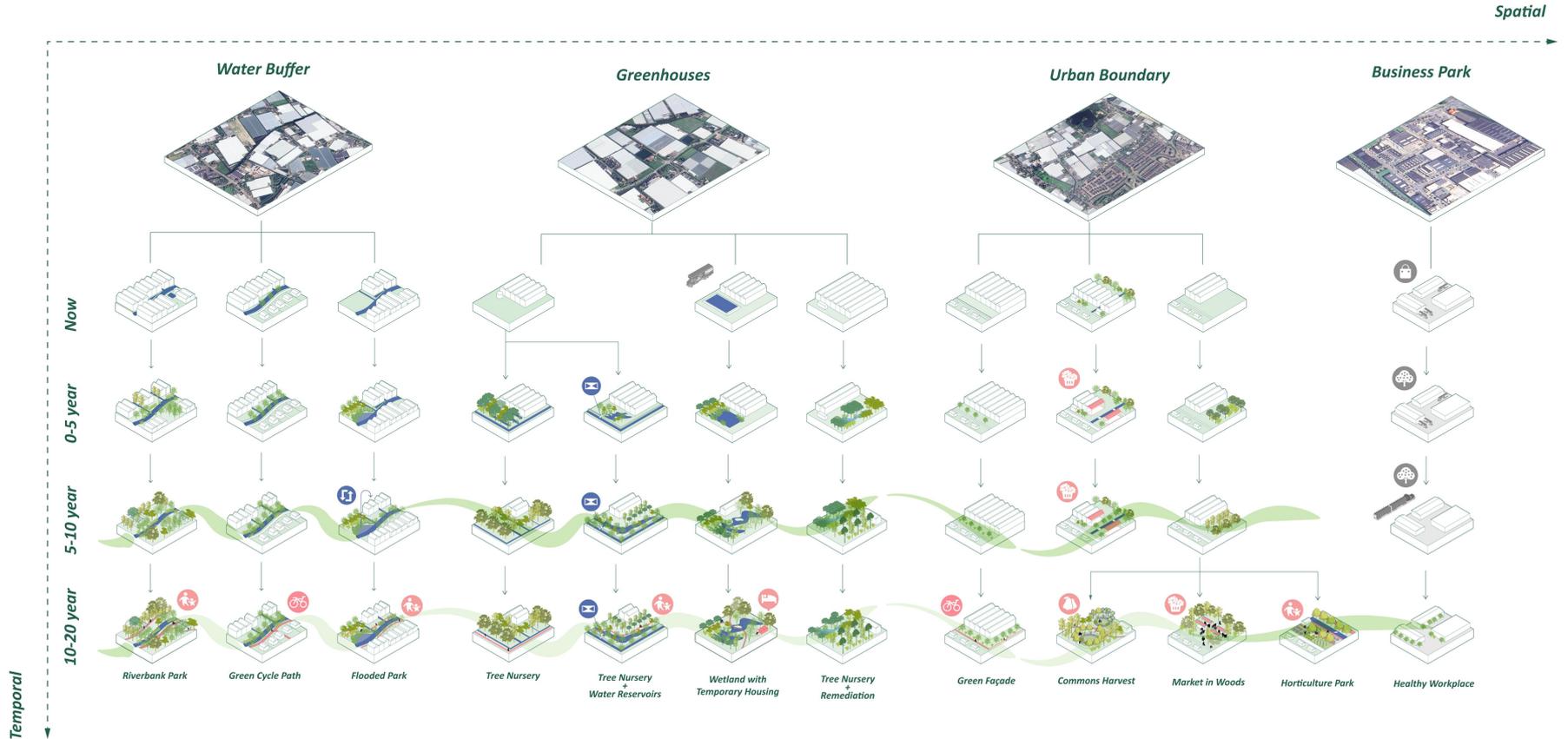


# Gantel river region



# Temporal and Spatial Design Strategy Framework

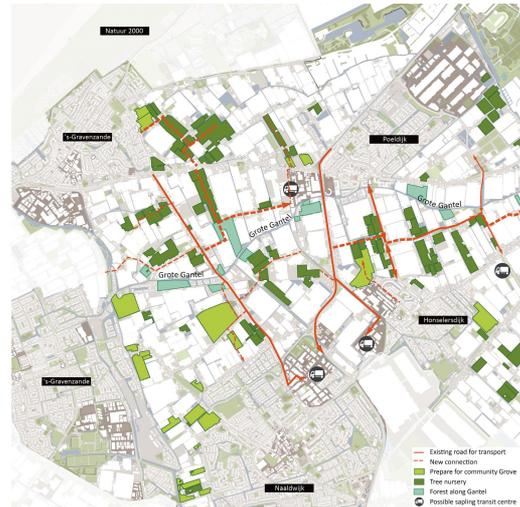
## Strategy Framework



# Regional Plan Through Time



0-5 year



5-10 year



10-20 year

# Regional plan



## Water Buffer

Riverbank park



Green path

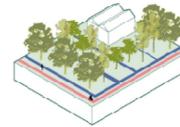


Flooded park



## Tree Nursery

Tree nursery



Tree nursery+  
Water reservoirs



Tree nursery with  
Temporary housing

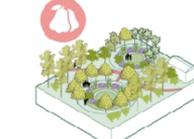


## Urban Boundary

Green façade



Commons Harvest



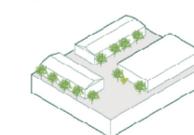
Market in wood



Horticulture Park



Healthy Business park



Commercial Area



Cycle path

# SES in Regional Planning



Ecological value



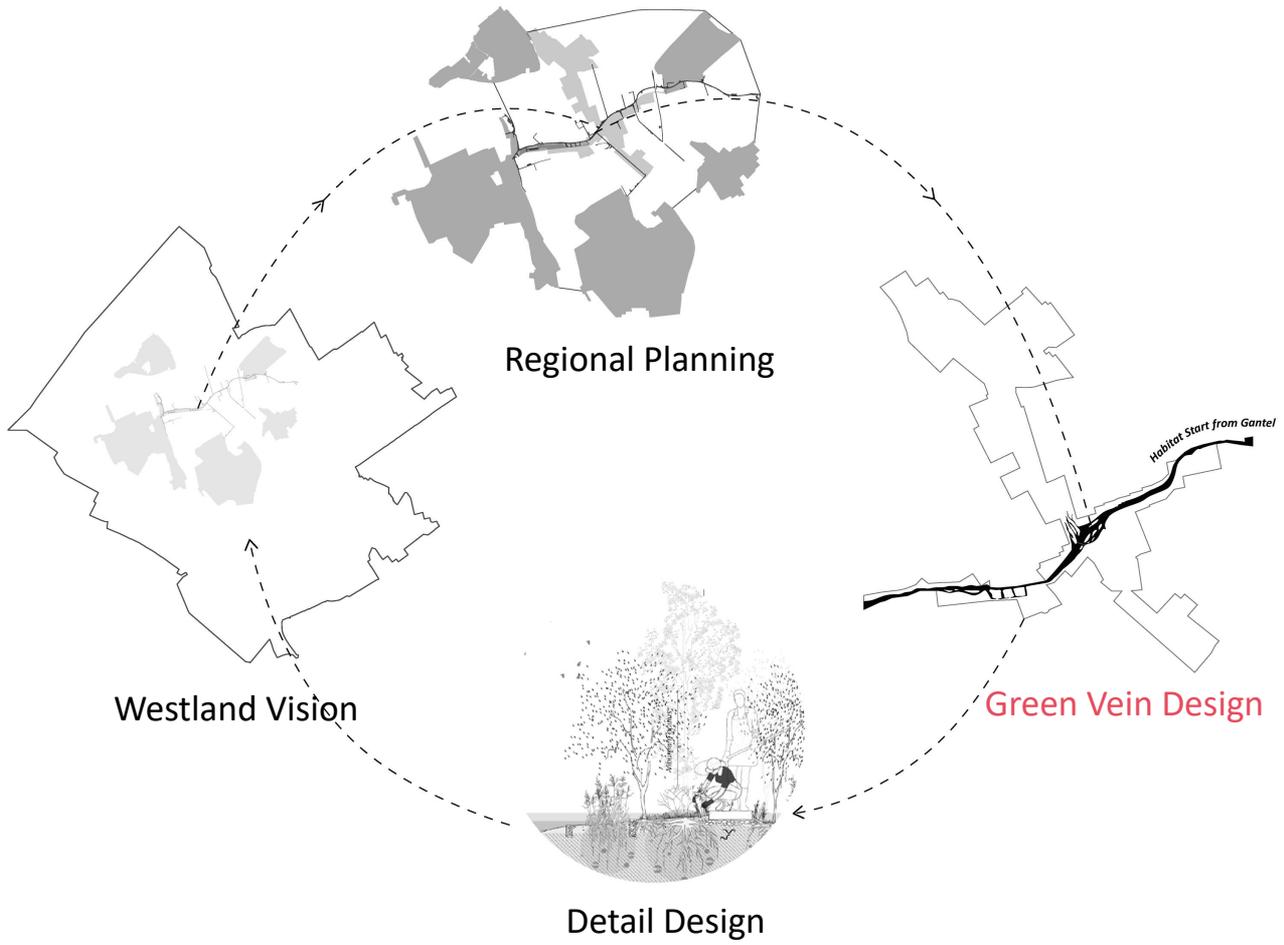
Addressing extreme weather events(Climata adaptation strategies)



Social connectivity

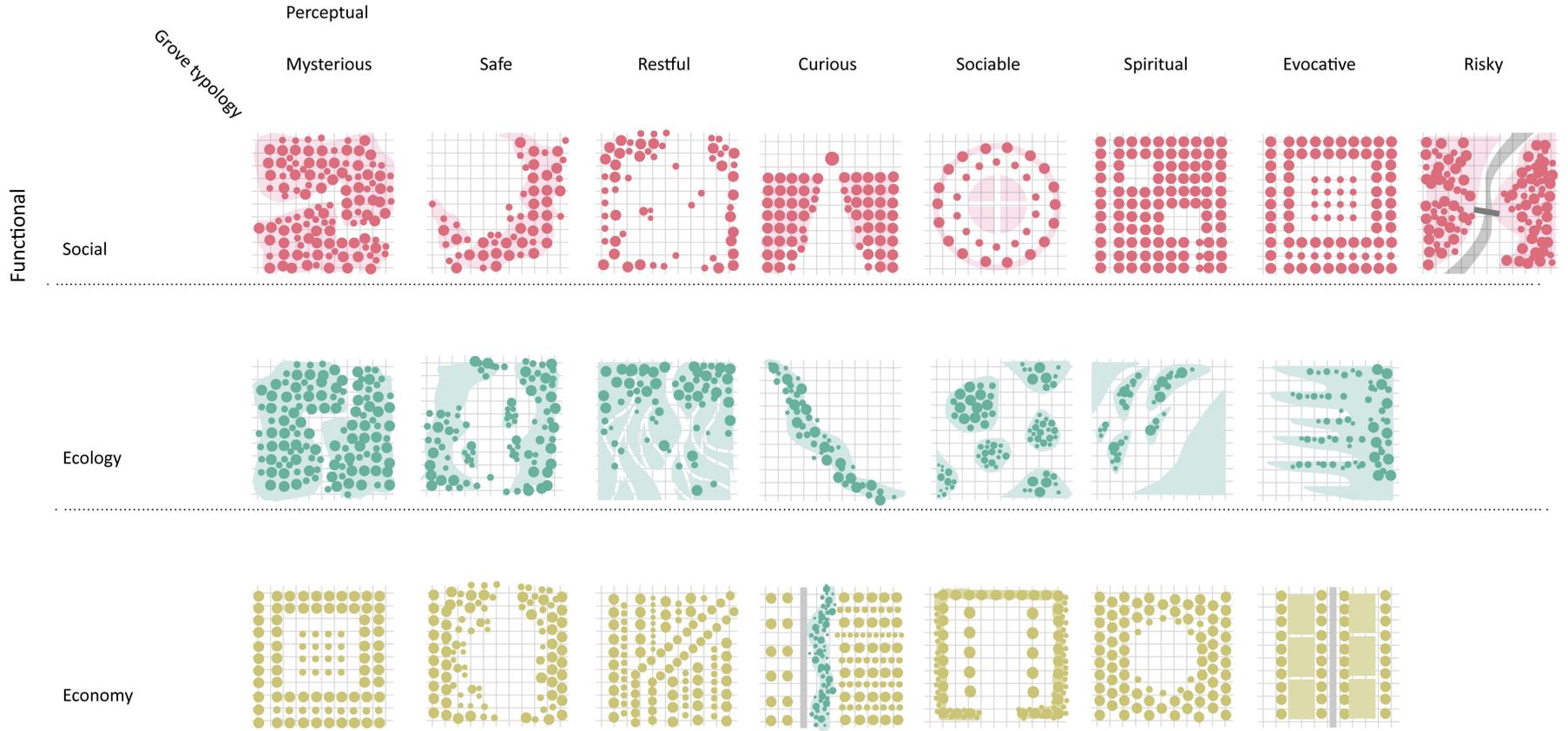


Resilient local economy



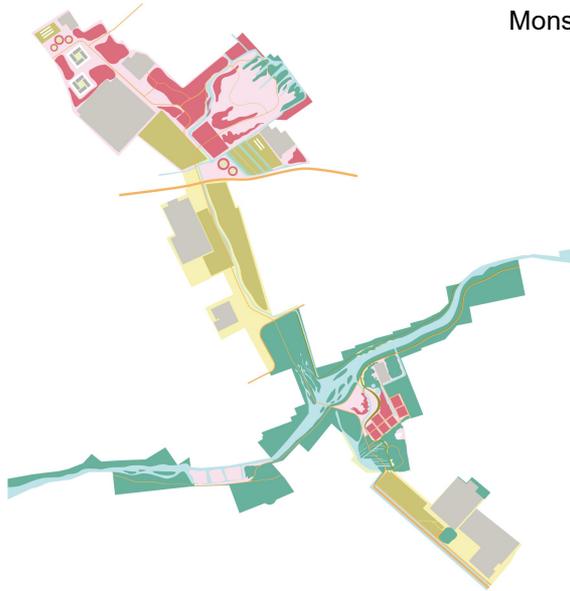
# Medium Scale Design

## Grove Typology

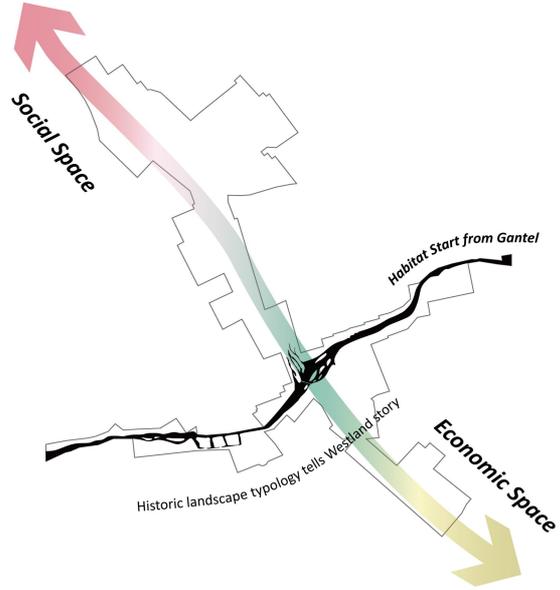


# Medium Scale Design

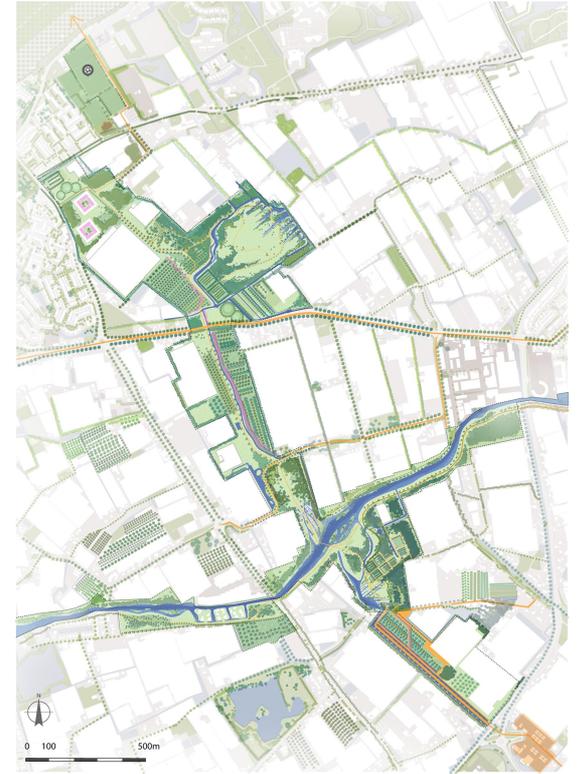
Logic of typology plan



Monster



Business Park



# Green vein plan through time



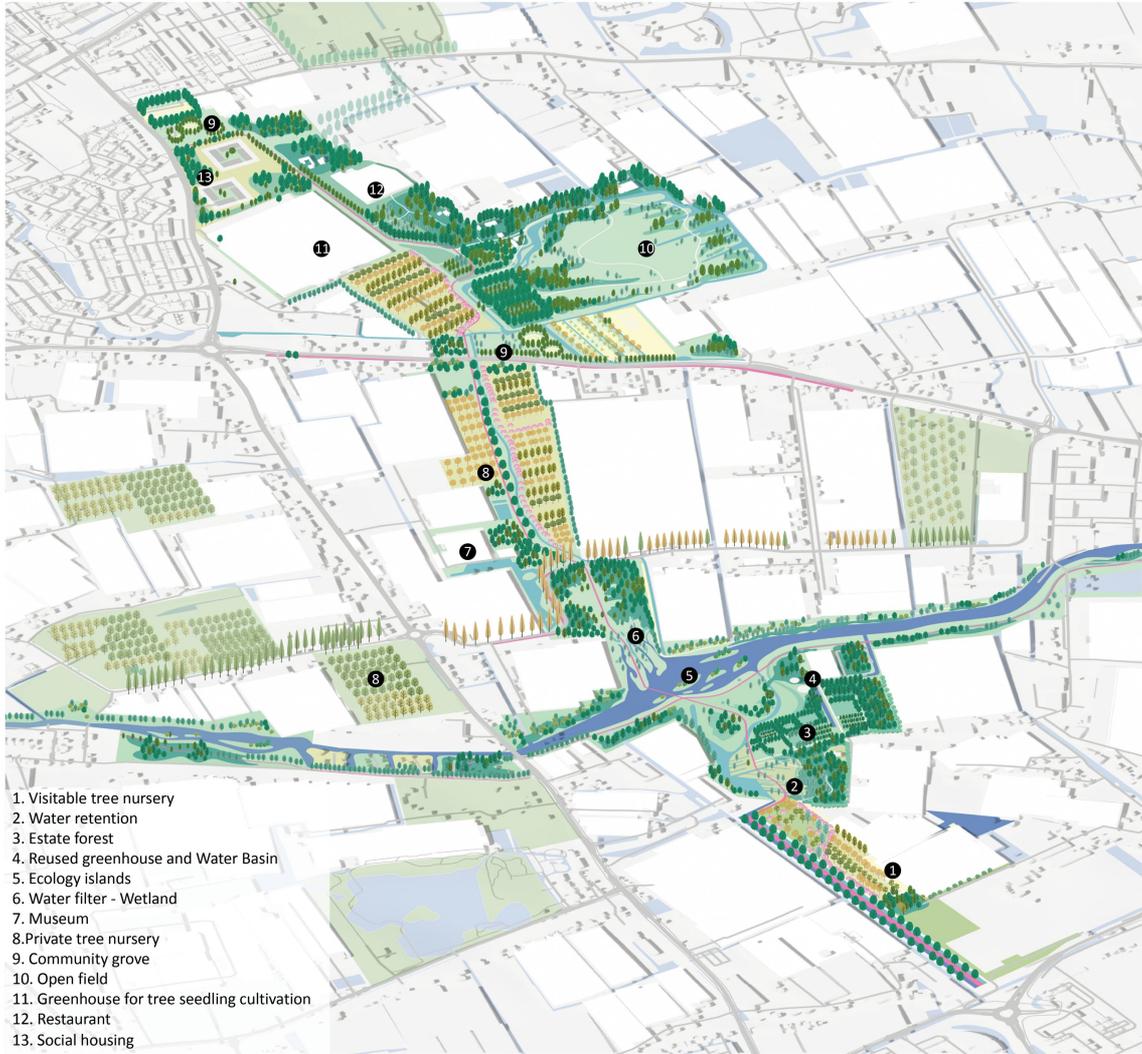
0-5 year



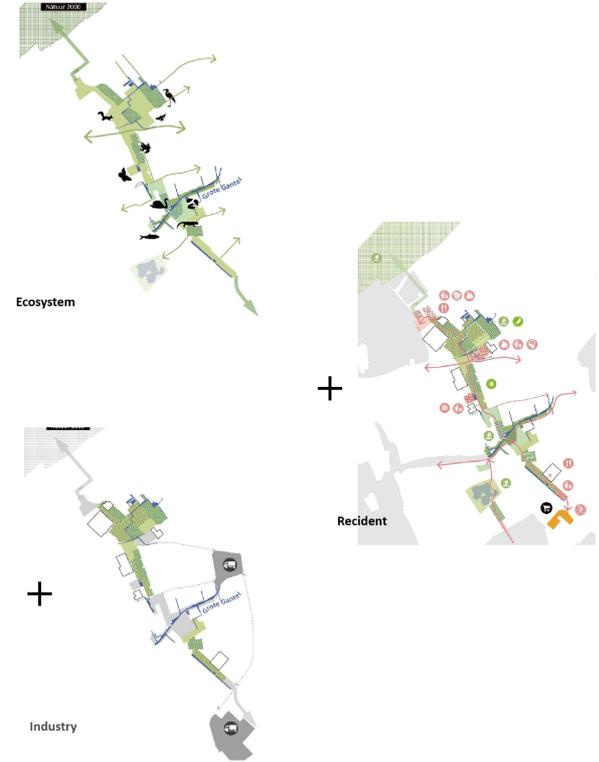
5-10 year

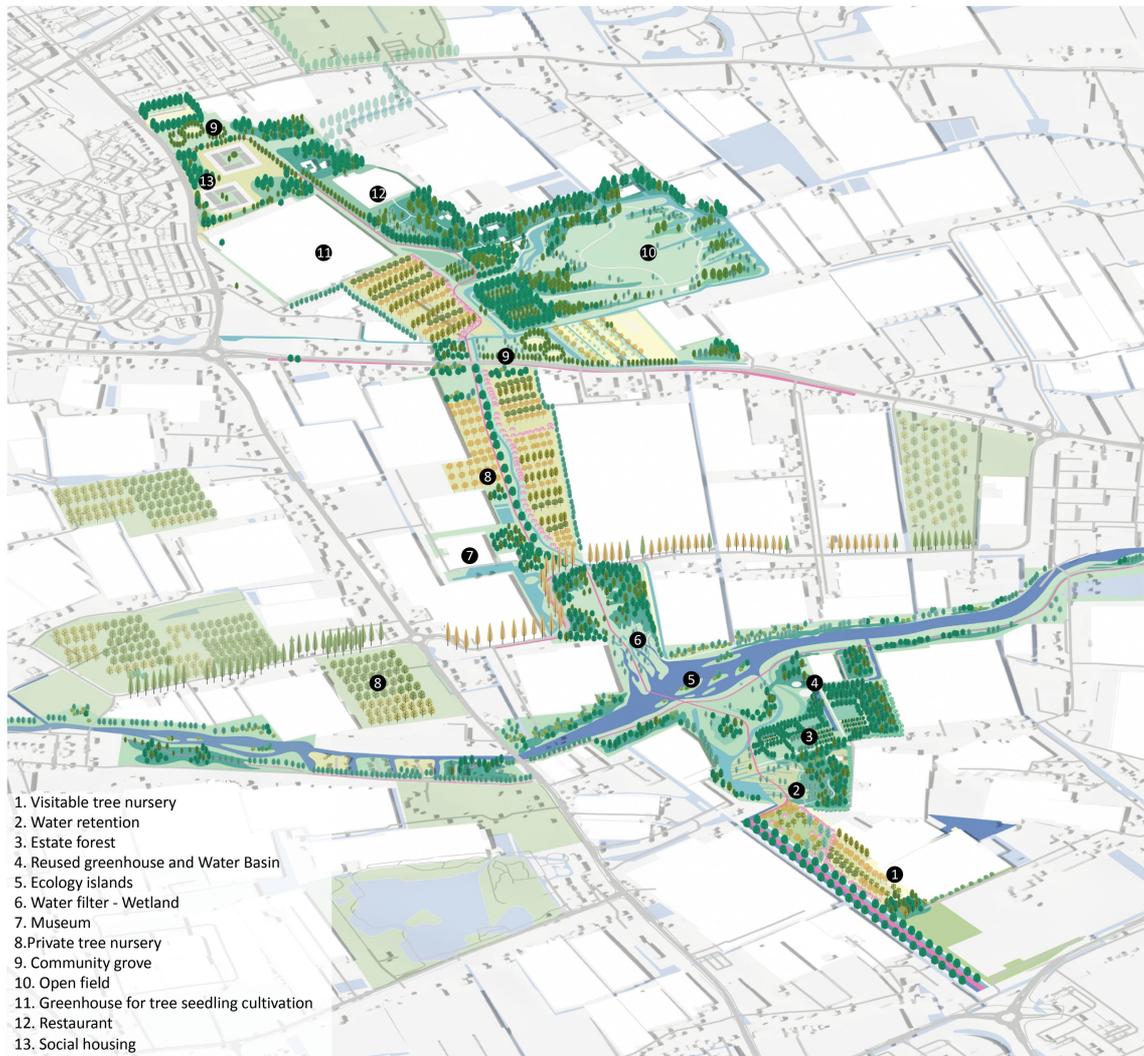


10-20 year



1. Visible tree nursery
2. Water retention
3. Estate forest
4. Reused greenhouse and Water Basin
5. Ecology islands
6. Water filter - Wetland
7. Museum
8. Private tree nursery
9. Community grove
10. Open field
11. Greenhouse for tree seedling cultivation
12. Restaurant
13. Social housing

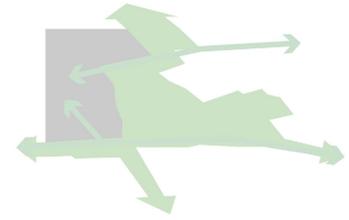




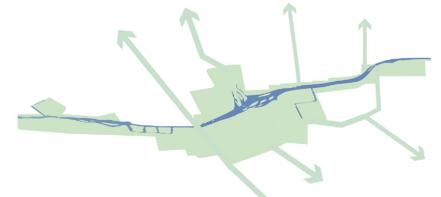
1. Visitable tree nursery
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5. Ecology islands
6. Water filter - Wetland
7. Museum
8. Private tree nursery
9. Community grove
10. Open field
11. Greenhouse for tree seedling cultivation
12. Restaurant
13. Social housing



## Spatial Vision With Increased Funding and Policy Support



More Connected Urban Buffer



Wider Water Buffer



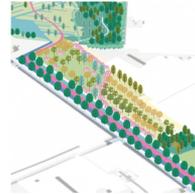
More Tree Nurseries and Communities in Woodland

# Central and Flexible Strategies

Ecological Approach



Tree Nursery



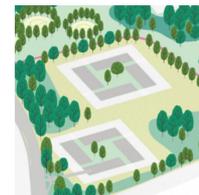
Social Common



Community Grove



Reuse of Greenhouses



Shared Space  
in Social Housing

Central

Led by the Municipal  
and Water Boards

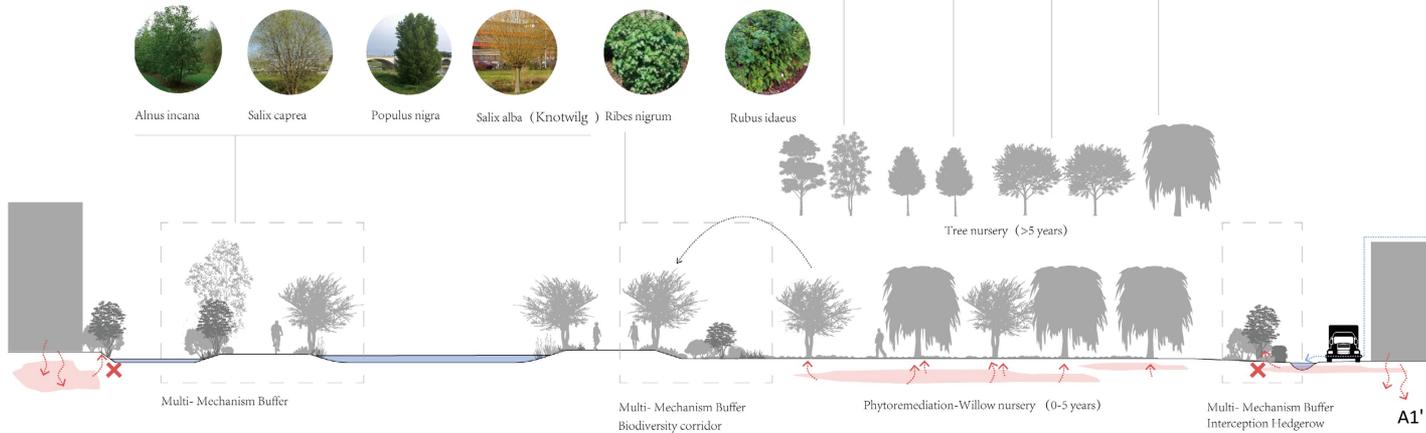
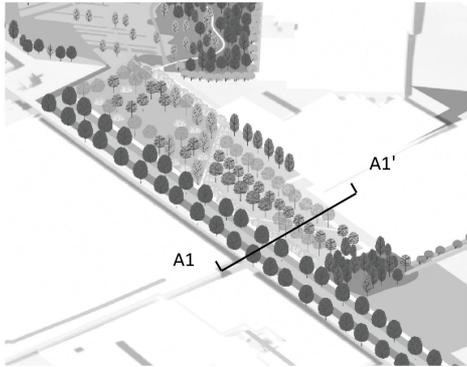
Semi-Flexible

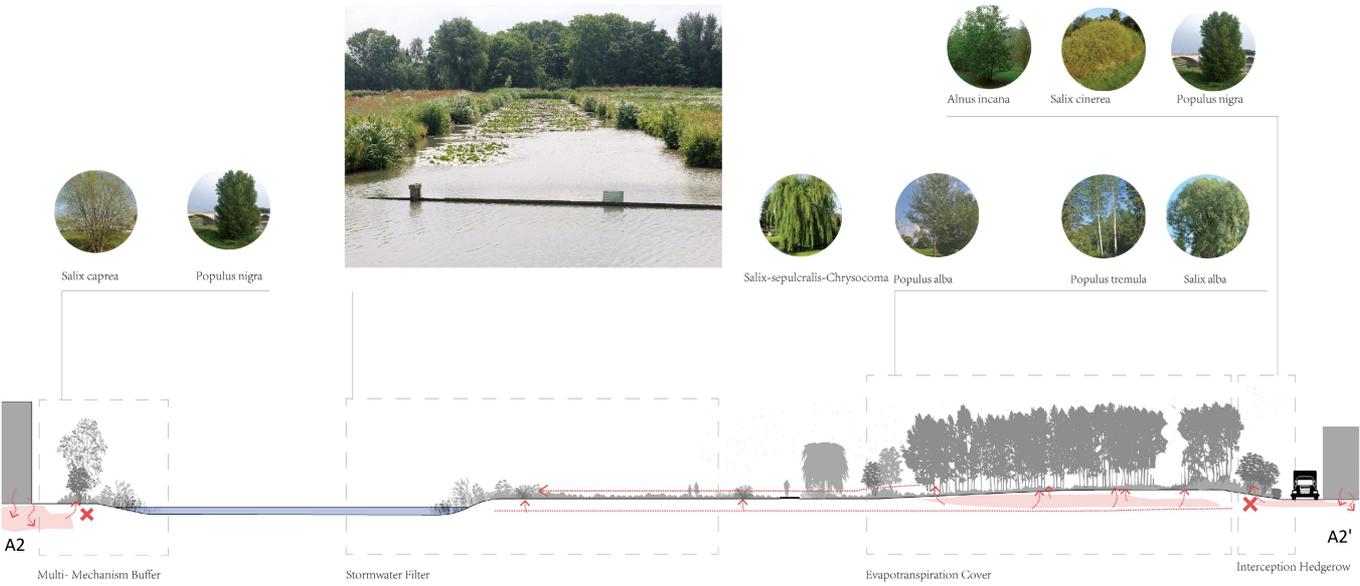
Tree nursery operators  
decide when and how to  
open the public tree nursery

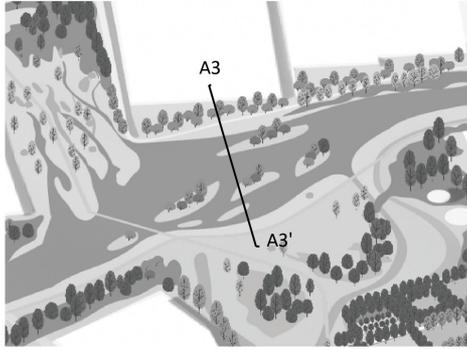
Flexible

Space users can decide or  
propose the spatial form

# Ecological Strategies







Salix caprea



Betula pendula



Salix-sepulcralis-Chrysocoma



Water lily



Salix cinerea



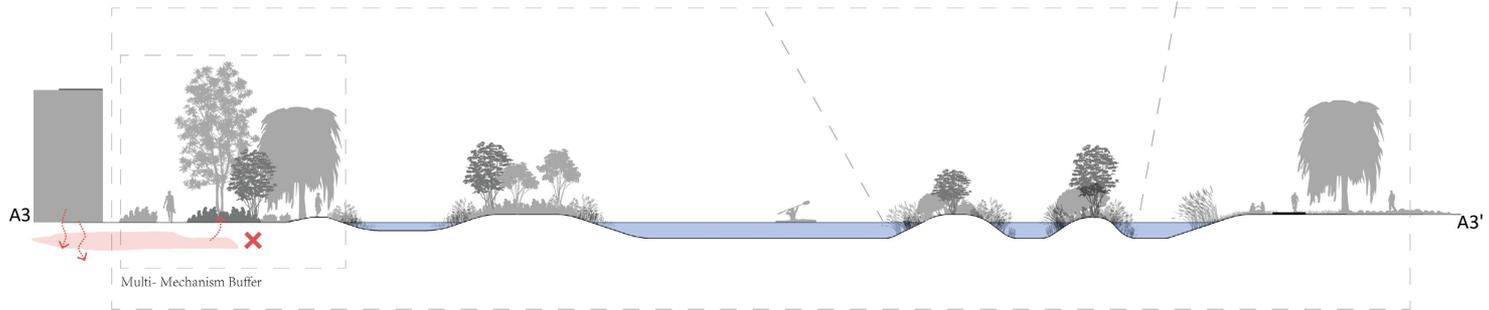
Alnus incana



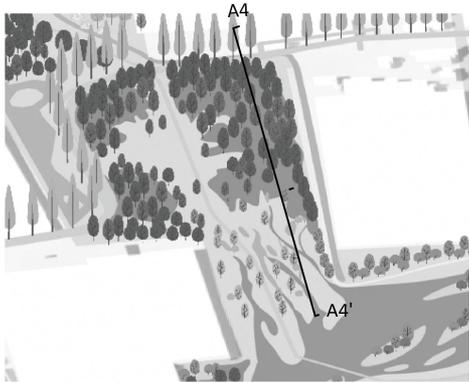
Typha latifolia



Salix-sepulcralis-Chrysocoma

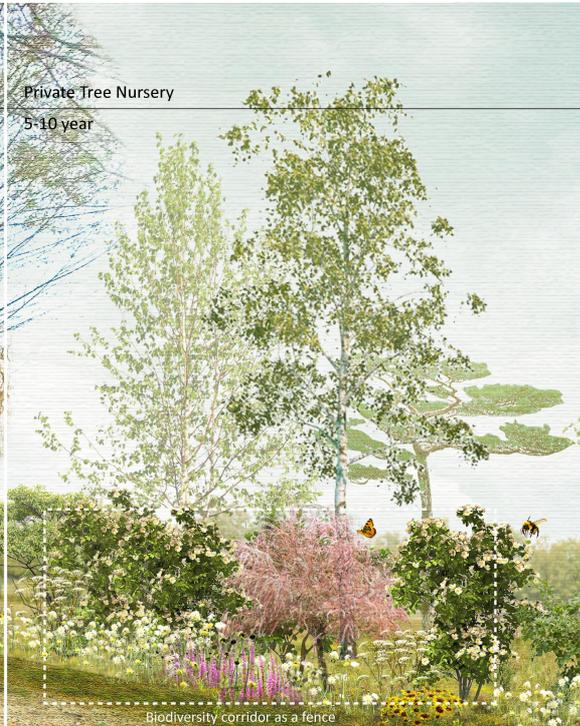


Biodiversity island



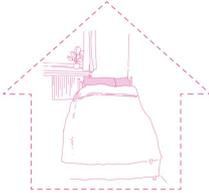


## Tree Nursery in 20 Years



# Social groups and potential spatial outcome

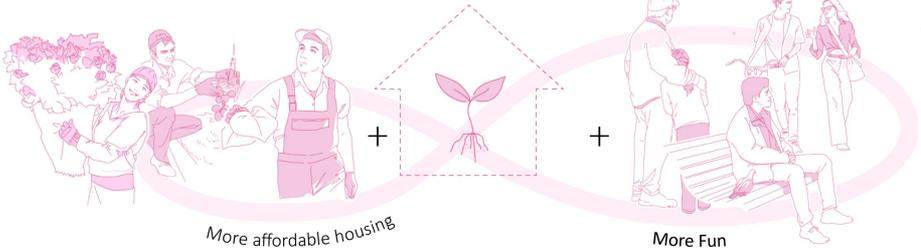
Seasonal Workers



Housing Pressure + Lack of Community

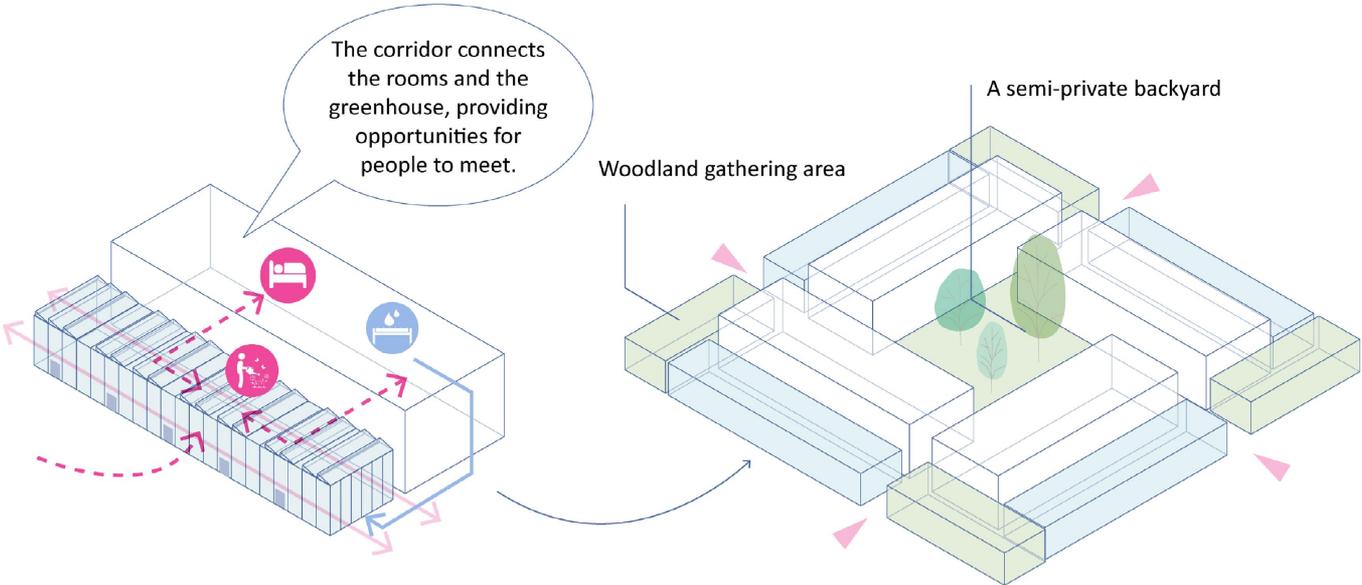


More Connection



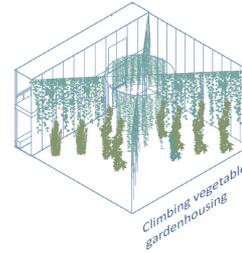
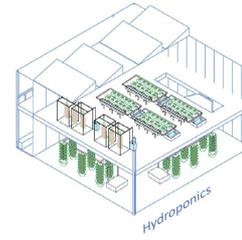
# Cultivating Belonging

## Integrating Greenhouses into Social Housing to Foster Community Ties



# Potential spatial outcome

## Knowledge exchange





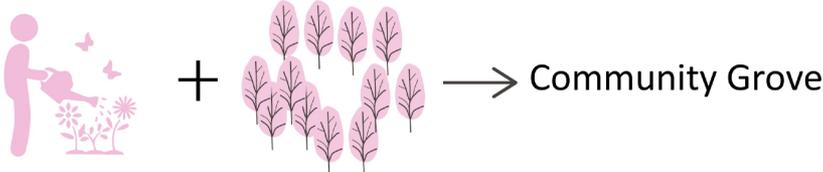
The connection between social and developable housing and woodland

# Social groups and potential spatial outcome

Senior citizens

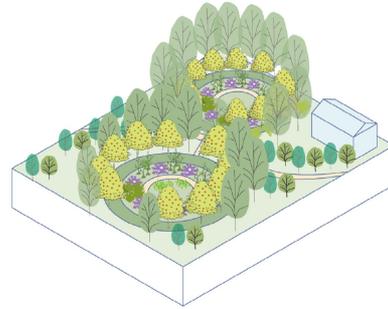


Loneliness + Loss of horticultural memory

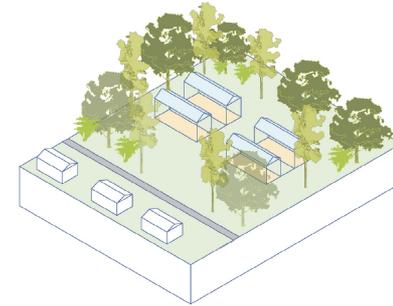


# Potential spatial outcome

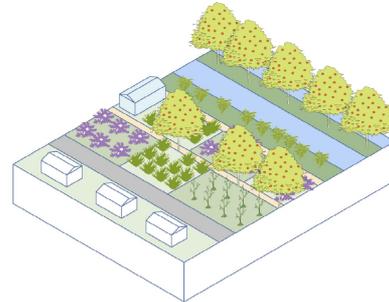
## Possible Community Grove Typology



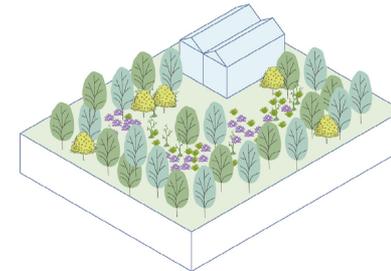
A concentric structure of windbreaks, fruit trees, and vegetable gardens



Market in woodland



Mimicking traditional layouts of gardens, fruit trees, and water canals



A more flexible form of agriforest

## Potential spatial outcome



Shared groves between neighborhoods help strengthen social ties across communities

# Social groups and potential spatial outcome

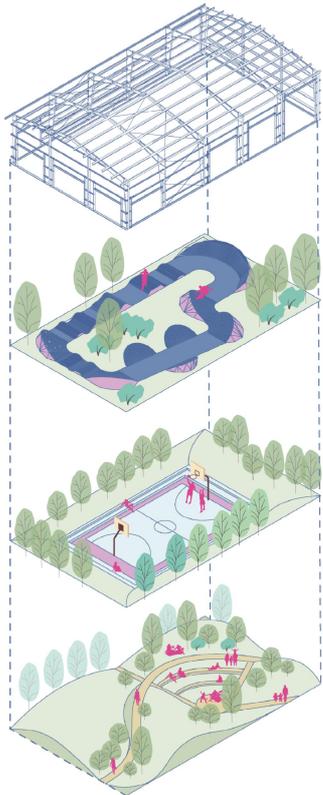
Young People



The space lacks appeal to young people



# Possible Typologies for Greenhouse Reuse

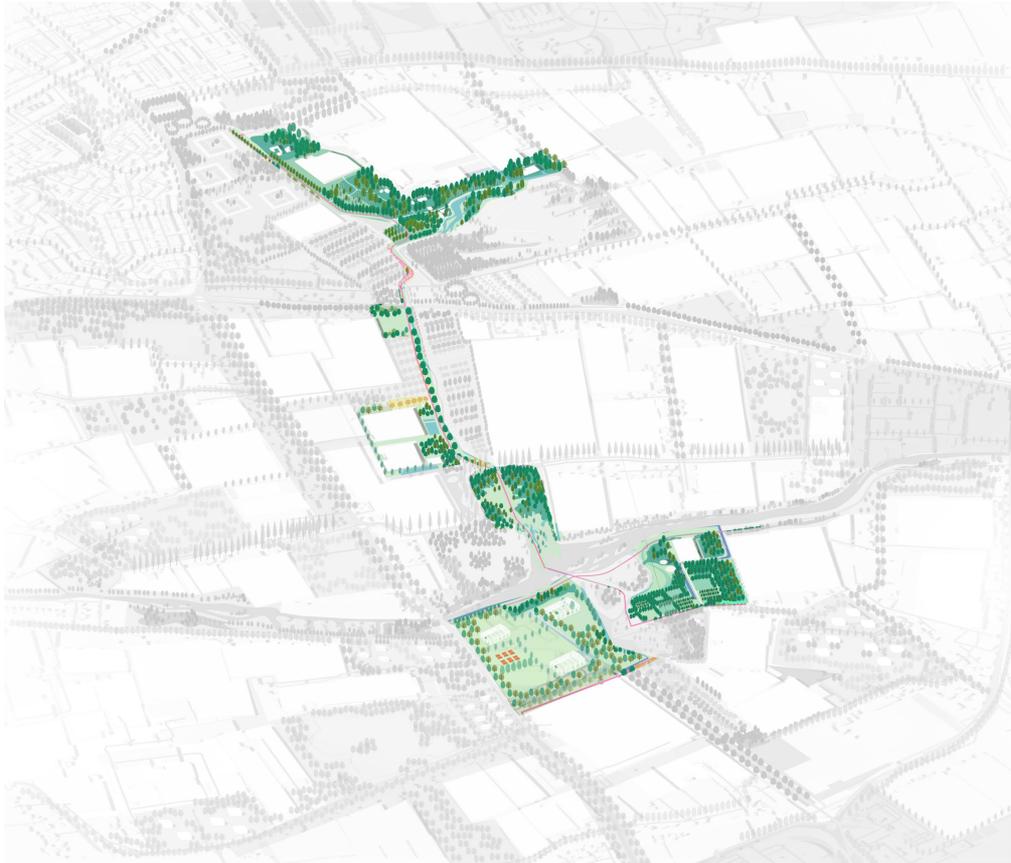


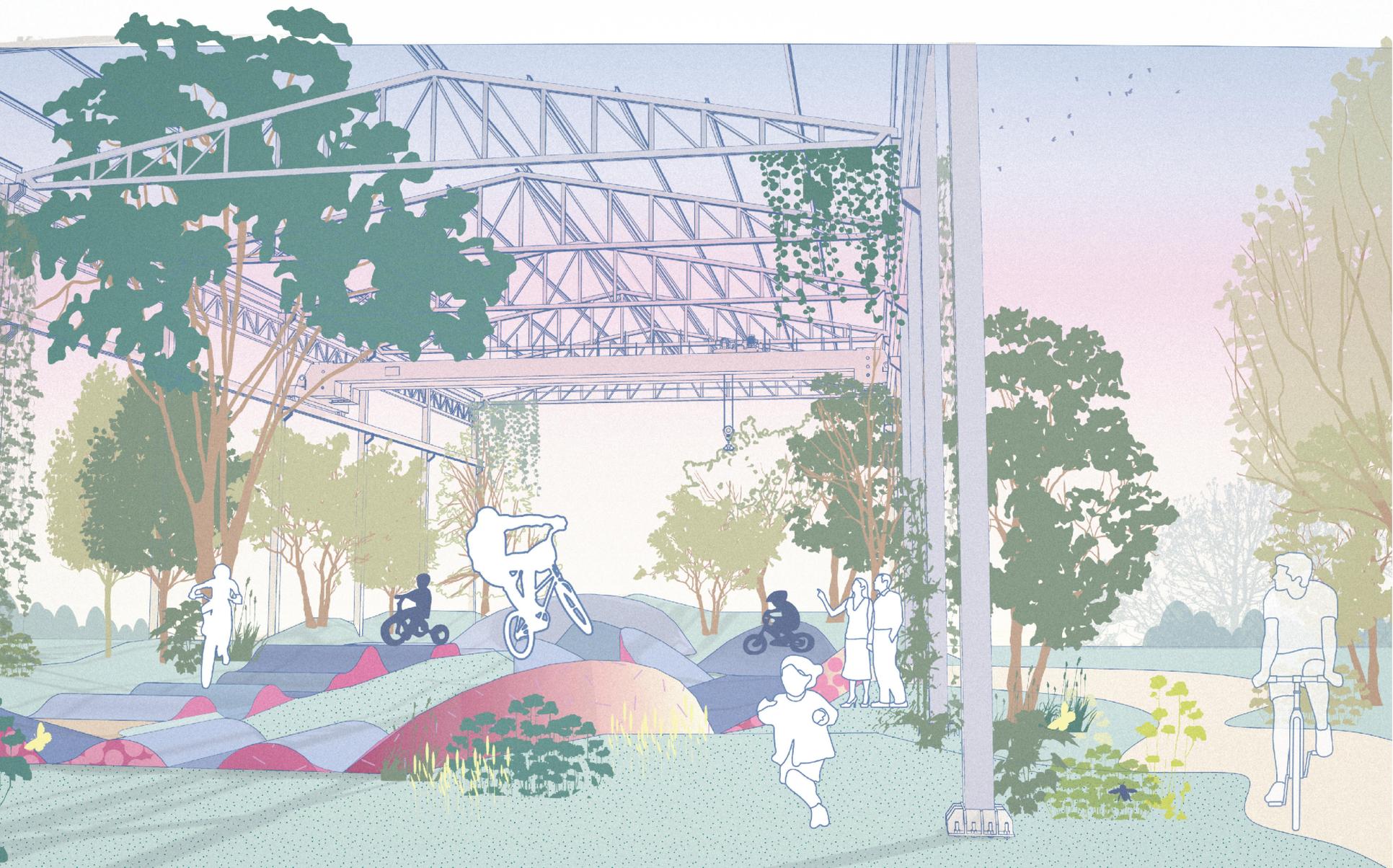
Pump track

Sports field

Park and stage

# Enhance park accessibility and stimulate local vitality

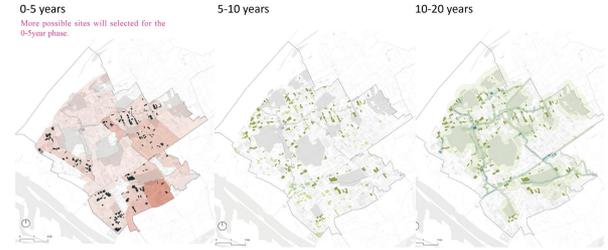




# Conclusion

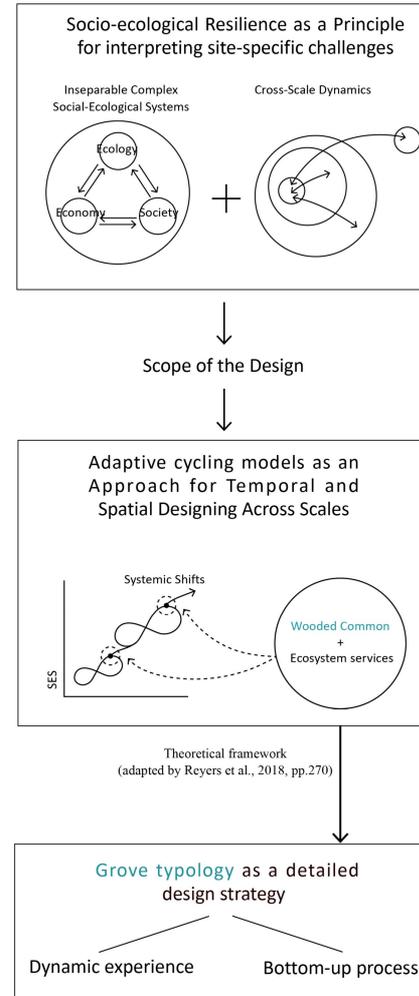
How to improve landscape quality and foster a resilient social-ecological system in an economic-driven region like Westland through redesigning wooded common?

- By understanding Westland issues through the socio-ecological resilience principle----Inseparable complex social-ecological systems + cross-scale dynamics
- By using adaptive cycling models as an approach for temporal and spatial designing across scales
- Wooded common with ecosystem services as an intervention to stimulate adaptive cycle shift
- Grove as a spatial and perceptual framework, integrating ecological, social, and economic functions through different types of woodland spaces
- Possibility of a space for social group-orientated thinking
- Design outcome: A 20-year regional woodland plan and design for Westland



# Reflection

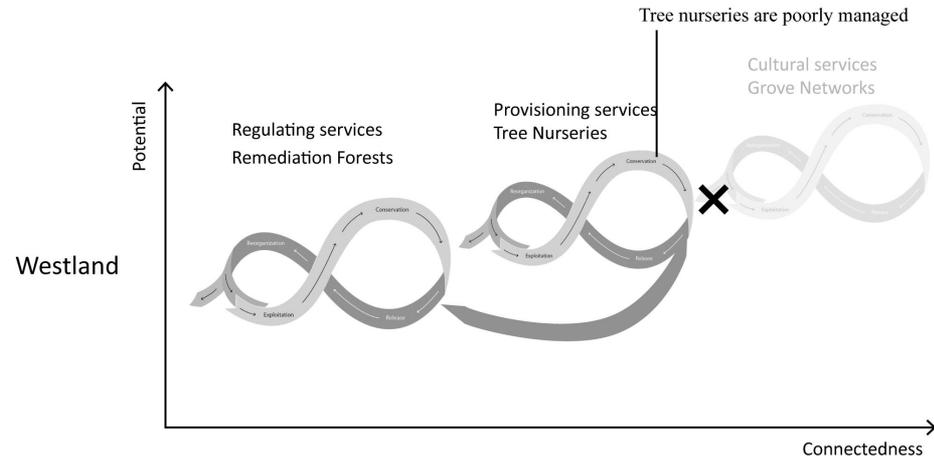
## Reflection on SES and Theoretical Framework

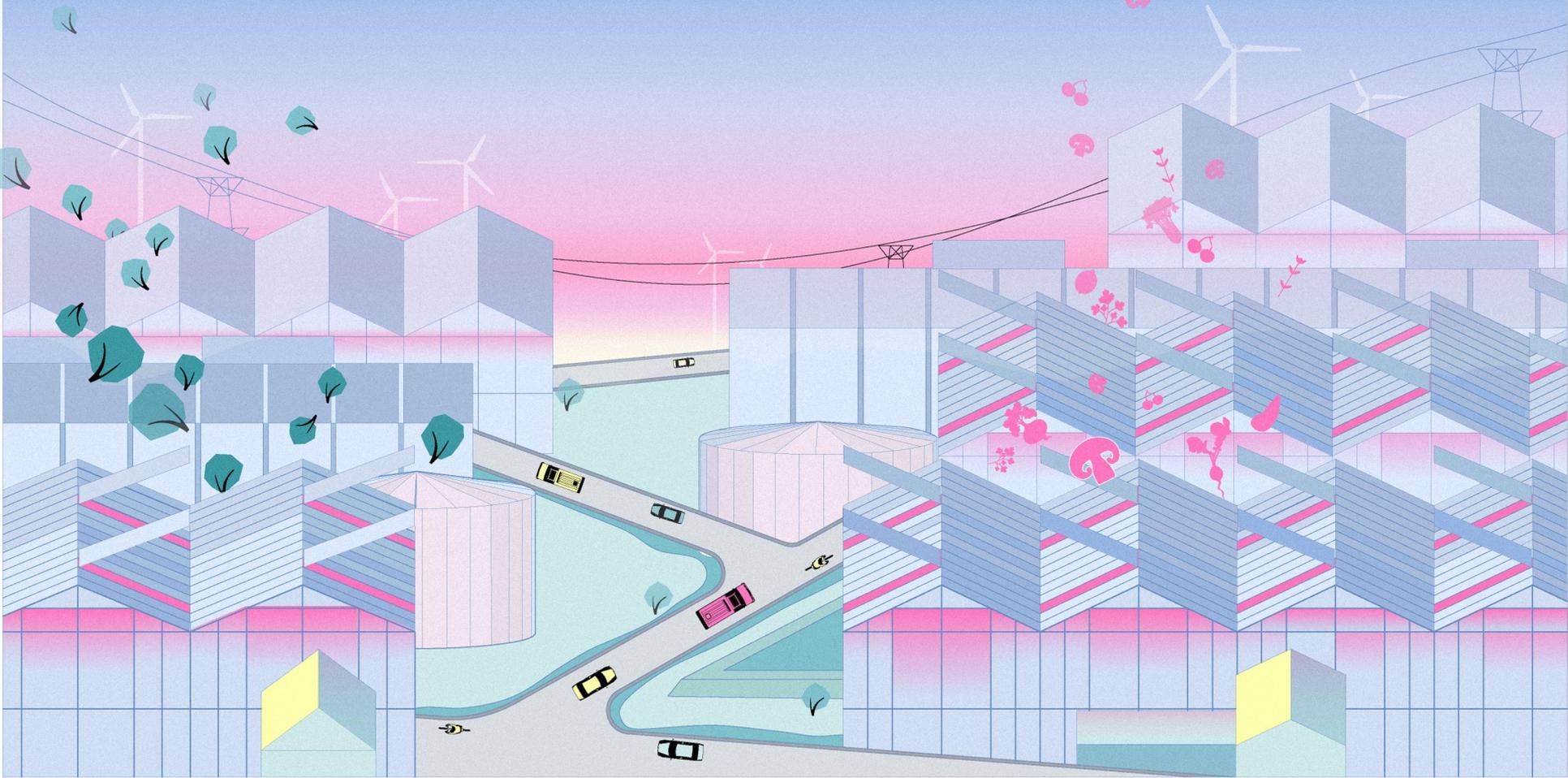


# Reflection

## Reflection on Adaptive cycle

How this system is not linear?  
How could the strategy be applied to the same area under different conditions?





Thanks!