



# The importance of biodiversity and (genetic) variation in Dutch landscapes

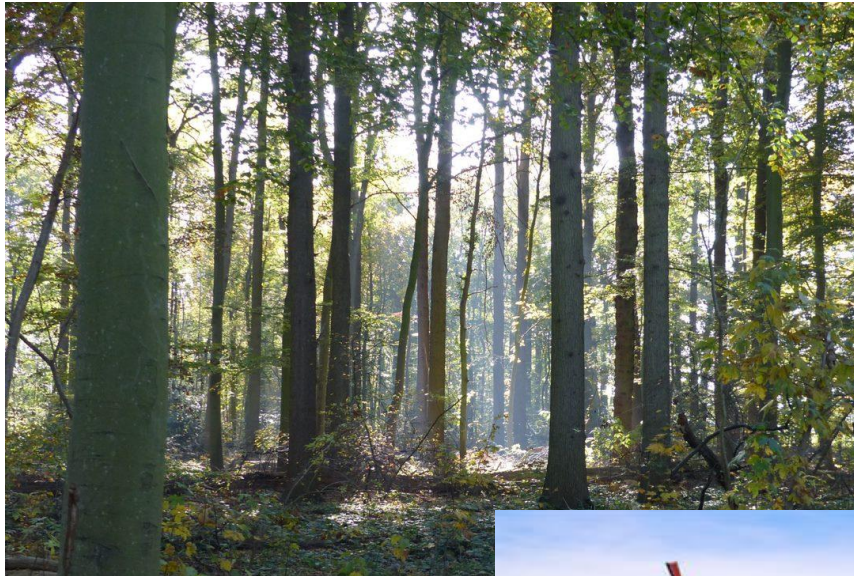
Hank Bartelink

# Biodiversity down the drain: how to stop the loss of species and landscape degradation?

## Contents

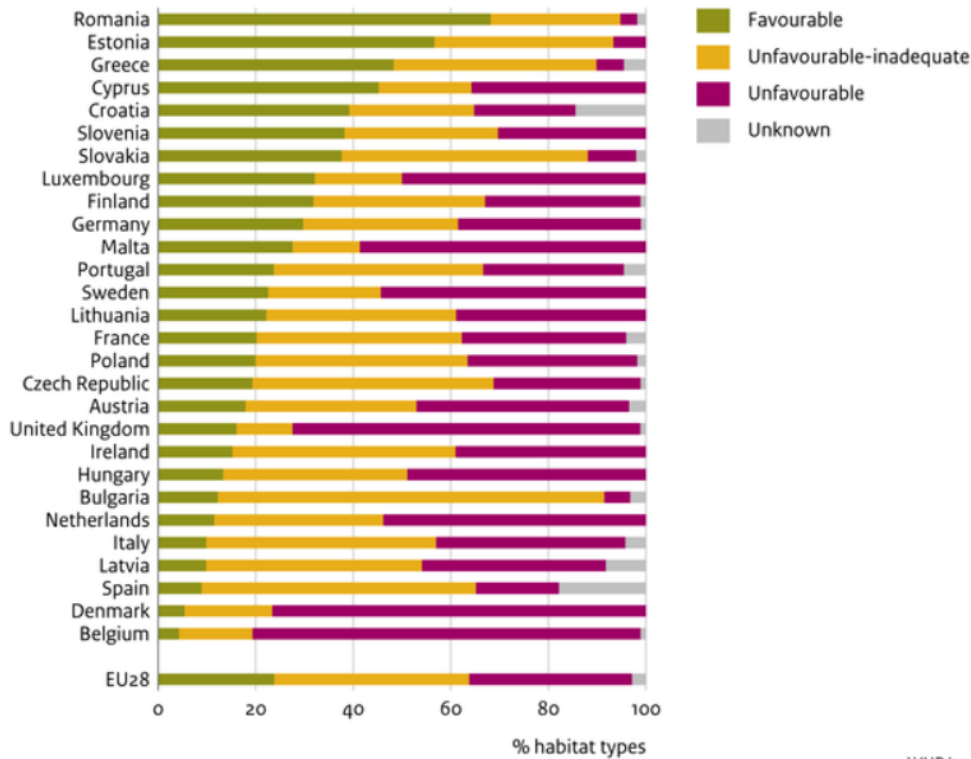
- Some sad pictures of loss & degradation to start with
- Responses & actions
- Including the importance of better utilization of our (forest) genetic resources
- Trees and forest, part of the solution!
- Remaining struggles, challenges; happy end

# Shifting baseline: 'nature'?



# Netherlands bad boy in European classroom

Conservation status of habitat types in the EU28, 2013 – 2018

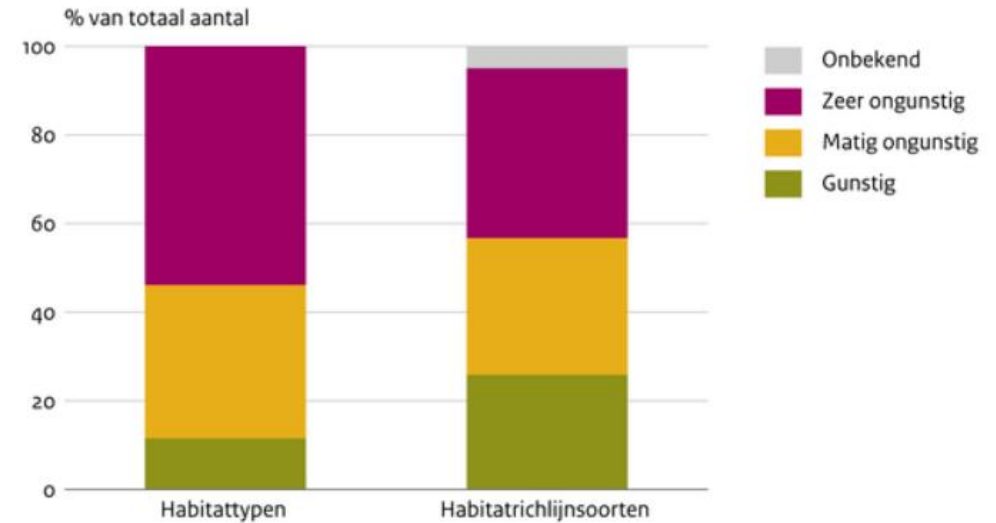


Source: EEA 2020

WUR/nov21  
www.clo.nl/em148305

Conservation status of habitat types & species in NL

Staat van instandhouding van Habitatrichtlijn, 2013 – 2018



Bron: Ministerie van LNV

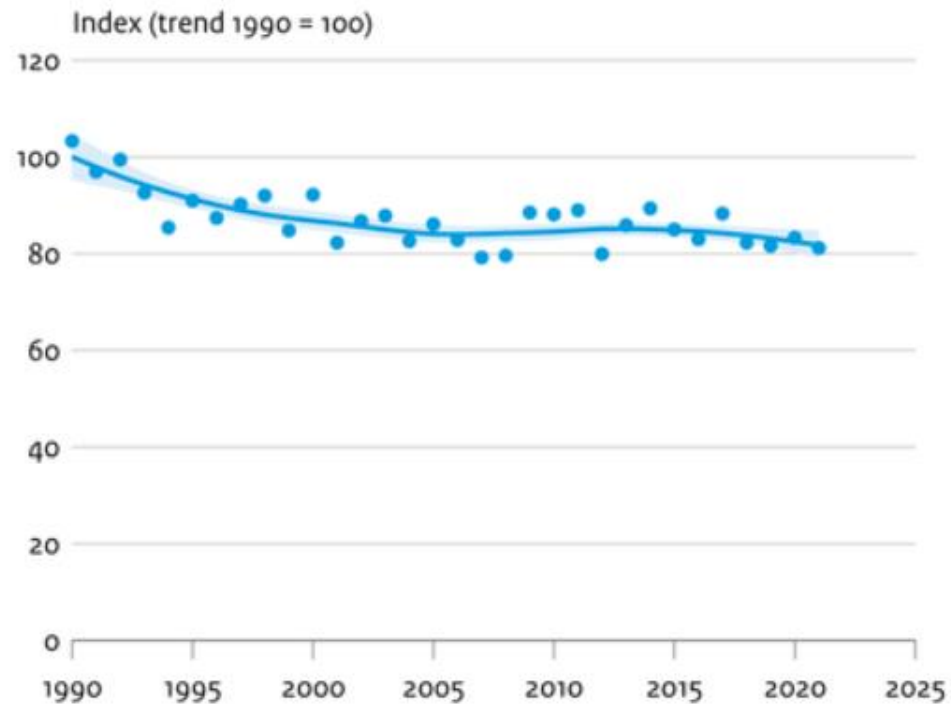
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# State of Dutch nature quality (example)

Fauna terrestrial areas

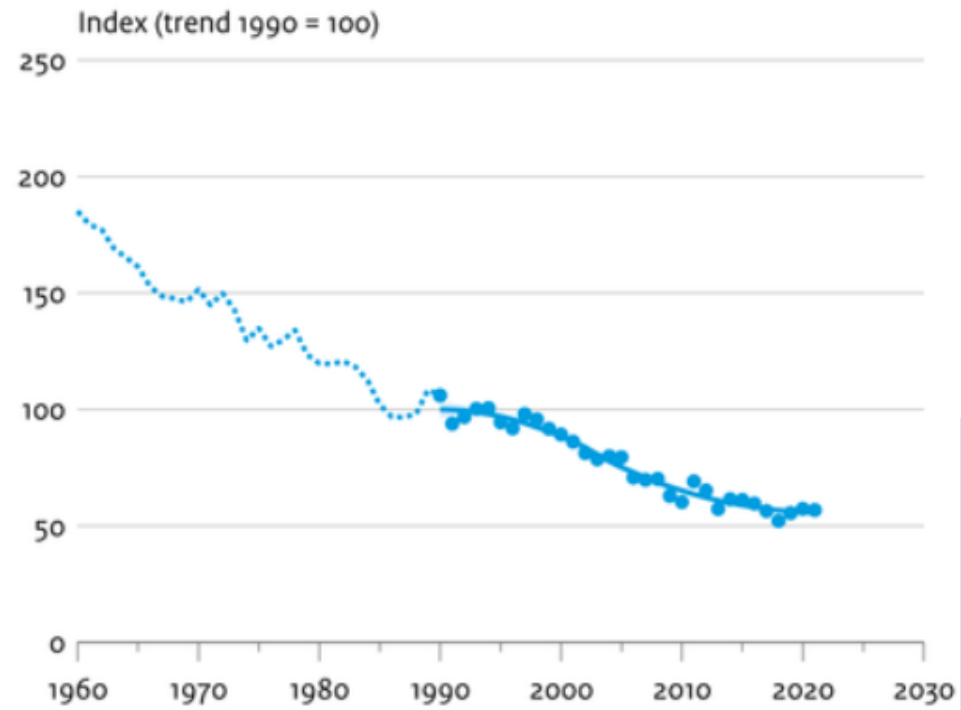
## Terrestrische fauna



Bron: NEM (Soortenorganisaties, CBS)

Farm land birds

## Boerenlandvogels in Nederland



Bron: NEM (Sovon, CBS)

# Disappearing cultural-historical landscape

Colmschate area, near the city of Deventer



1900



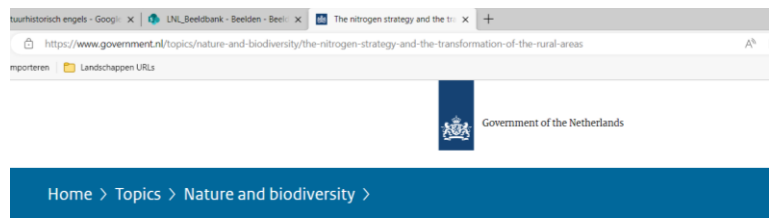
1960



2000

# Some (governmental) responses:

- Delta plan Biodiversity Recovery
- National Forest Strategy
- Aanvalsplan Landschap (on restoring the landscape (elements))
- National nitrogen strategy & the transformation of the rural areas



## The nitrogen strategy and the transformation of the rural areas

Excessive nitrogen deposition in the Netherlands has been a problem for many years. It is harmful for both nature and public health. The Dutch government is introducing measures for industry, agriculture, transport and the construction sector in order to reduce nitrogen deposition and improve the quality of nature areas.

The Netherlands is also being confronted with climate change and threats to the quality of the soil and water. That is why the government is combining nitrogen measures with other



# Where do we stand now - NL:

- Biodiversity still going down
- Large parts of countryside = ecological desert
- Degradation of landscape continues
- Environmental conditions still poor (nitrogen, pesticides, water, ..)
- Climate change (CO<sub>2</sub>, drought, mismatch timing pollination, ..)



## But also: great believe in forest/ trees being part of the solution

- Expanding forests, new forests
- Restoration of landscape (-elements) → contributes to agricultural shift
- Species rich, genetically diverse, adapted to local climate & site

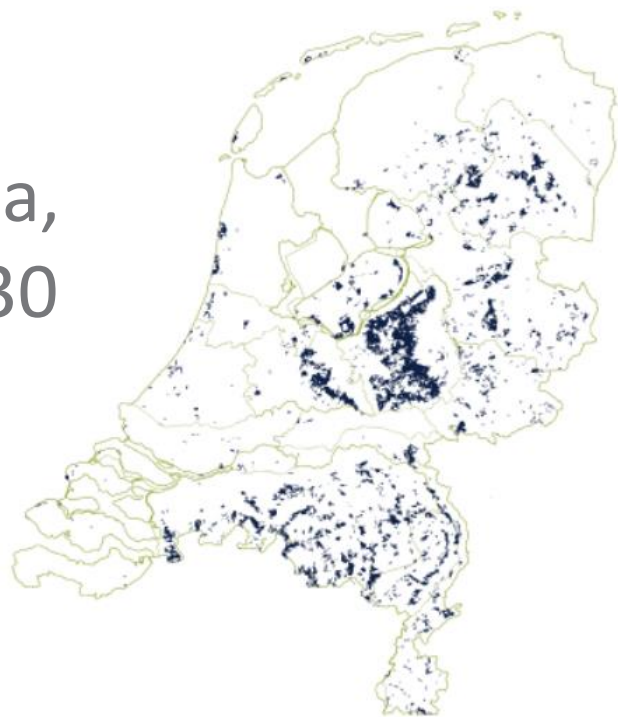




# Ambitions: expanding forest area & number of trees

Forest area:

- now 380,000 ha,
- + 37,000 in 2030



*Bron: 6e NBI*

Needs: > 160 million trees:

Landscape (elements):

- 10% 'veining' rural areas with 'green & blue' elements
- 10,000 ha in Forest Strategy
- 6,000 ha Agroforestry

Add. CO<sub>2</sub> sequestr.:

- annually 0,4 Mj ton

Planten voor de toekomst

Advies over de bescherming van autochtone genenbronnen en de beschikbaarheid van plantmateriaal voor bos en landschap



# What kind of planting material is needed?

*Over 160 million trees:*

Autochthonous (native) trees & shrubs

→ biodiversity, mainly landscape purposes

Forestry plant materials

→ multipurpose goals, including wood production

Climate-resilient species (including non-native)

→ preparing the forest of the future



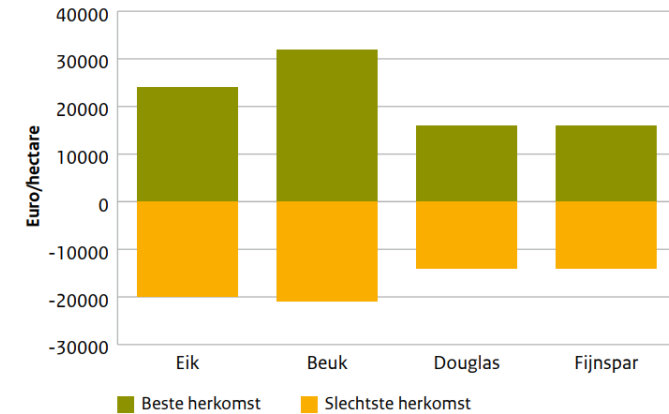
Sorbus torminalis

# Genetic diversity, backbone of forestry

*Forest & trees: long-term planning*

## Important traits:

- growth rate
- resistance to pests & diseases
- timing of budburst (late frost)
- stem form (timber)
- adaptedness



Figuur 2.3: Opbrengsten aan het eind van de omloop voor de beste en slechtste herkomsten ten opzichte van de gemiddelde opbrengst (euro/ha) (figuur op basis van Kleinschmit, 2002).

## Planting material requirements:

- adapted to local conditions
- genetically diverse populations
- resilient to climate change
- tomorrow's forests & landscape

# Importance of conserving autochthonous plants

Left-overs since last ice-age: 3-8% (relict populations)

- Biodiversity hotspots
- Cultural-historical value
- Seed stands for next-generation plantmaterial

Shrubs & trees (populations & individuals) with known historical use and autochthonous origin (source: RCE).



# Selecting plant material: how?

Potentially important tool:

National List of recommended provenances of trees ('Rassenlijst Bomen')

*(European Council Directive 1999 on the marketing of forest reproductive material)*

List of accepted forest stands (species, breeds/ varieties)

Information on genetic quality & origin of the plant material.

→ **Conditions for commercial trade.**



# High demand for forest reproductive material

## Main sources:

- 1 gene bank (autochthonous)
- 15 seed orchards (commercial species)
- 260 selected forest stands (comm. spec.)
- 400 in situ locations (autochthonous)

Categorie plantmateriaal	Officiële bronnen opgenomen in de Rassenlijst Bomen
1) Autochtoon plantmateriaal	Genenbank (1 locatie); In situ locaties autochtone bomen en struiken (SI-locaties) (400 locaties)
2) Bosbouwkundig (niet autochtoon) plantmateriaal	Zaadgaarden (14 locaties)
	Selectieopstanden (235 locaties)
	Buitenlandse herkomsten (127 locaties buiten NL)
3) Plantmateriaal van nieuwe (klimaatslimme) soorten	Noorse esdoorn



# Many more plants needed: Gene bank

Gene bank Roggebotzand: autochthonous individuals of 60 indigenous tree & shrub species. Originally conserving genetic diversity only, now aiming at plant material also: harvesting seeds.



# Hick-up's

Dutch nurseries: seed origin	Share	Applied in NL	Applied abroad
Dutch	45%	1/3	2/3 (oak!)
Abroad	55%	1/10	9/10

- Shortage forest reproductive material: annually doubling needed
- Export 'leaks' of planting material
- No guarantees for seed & tree growers: confidence needed
- Knowledge gap regarding autochthonous plants: where/ how to find?  
+ conflicts of interests: conserve, restore, produce?
- Land, areas (!!)
- Climate change
- Unstable policies
- Use of recommended provenances/seed sources should be promoted





# Trees, forest & landscape: to do



- Enlarge availability of autochthonous plantmaterial
- Management rules regarding protection of autochthonous relicts
- Investments in seed availability, and quality, in general
- Certainty & assurance for growers to allow investments
- Obligatory use of National List of recommended provenances of trees in forest management
- Research on climate-adaptive/ resilient tree & shrub species
- Governmental commitment/ responsibility in plan *realisation*
- Education: from student to forester to grower to policymaker

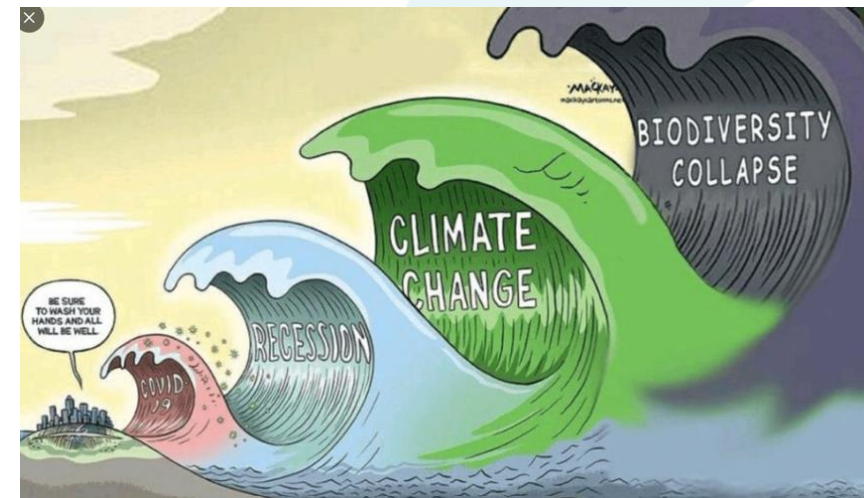


# Take home

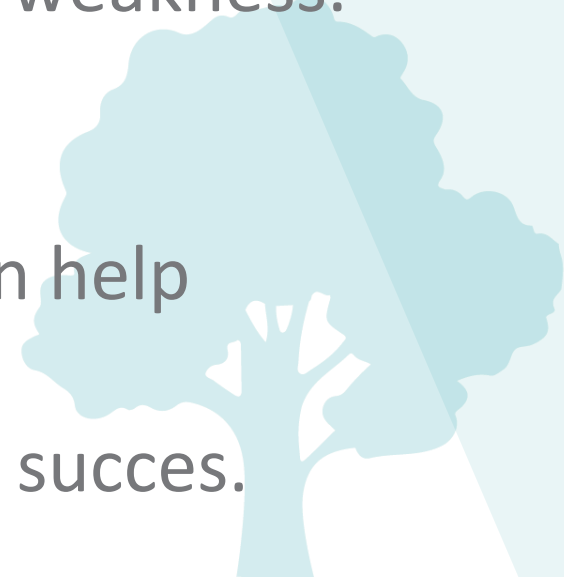
- A solid policy (rural planning, environmental restoration, financially) on afforestation, landscape recovery & nature conservation should be starting point to restore biodiversity.
- Operationalization of such policies appear still to be a weakness.

But the good news is:

1. Growing more forests and restoring the landscape can help biodiversity to recover.
2. Quality, including genetic quality, is a prerequisite for success.



(Graeme MacKay)



# *Thank you for your attention*



*Thanks to Arno Willems, Joukje Buiteveld & Martijn Boosten*

*References:*

- [www.pbl.nl](http://www.pbl.nl)
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