



Netherlands Environmental Assessment Agency

Intensification: solution or problem?

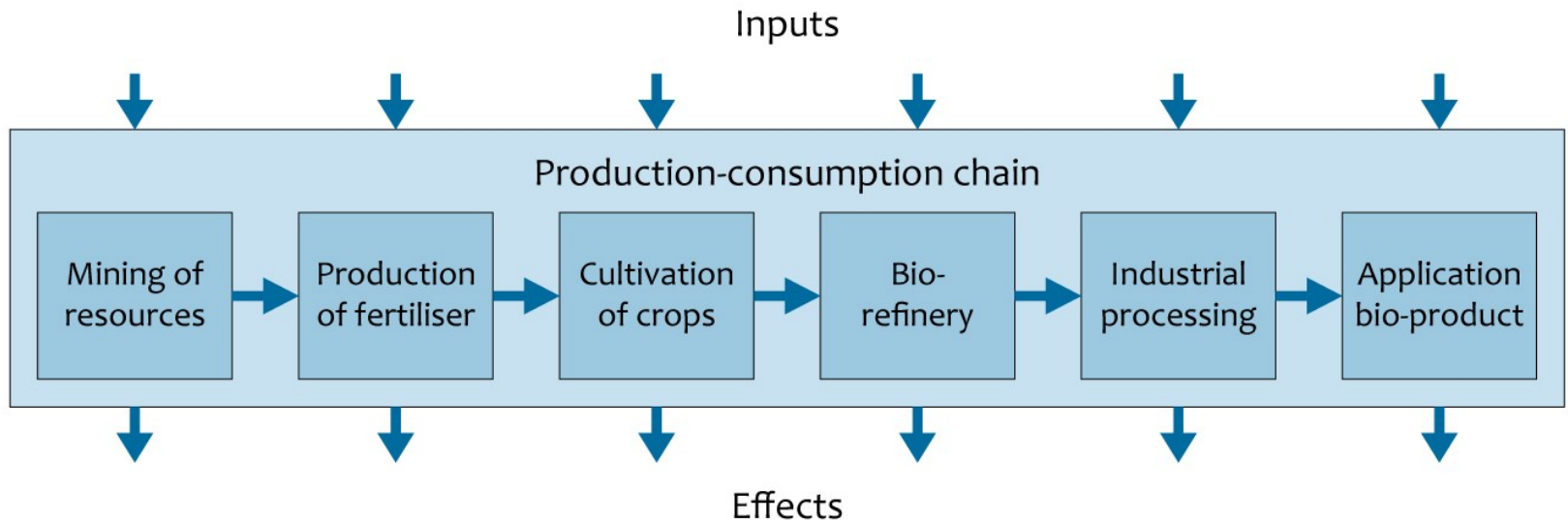
Indirect intensification effects of biofuels

Jan Ros



What are direct effects?

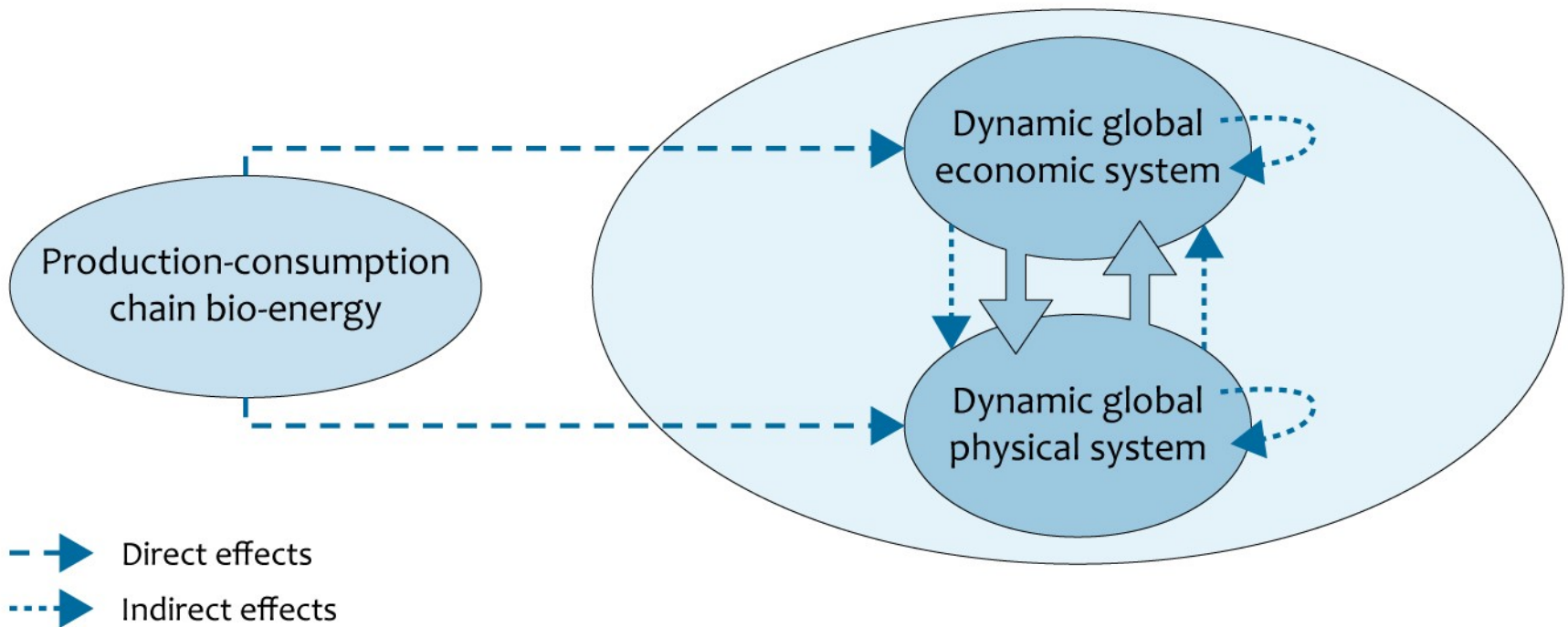
Production-consumption chain of a bio-energy product



Responsibility producers

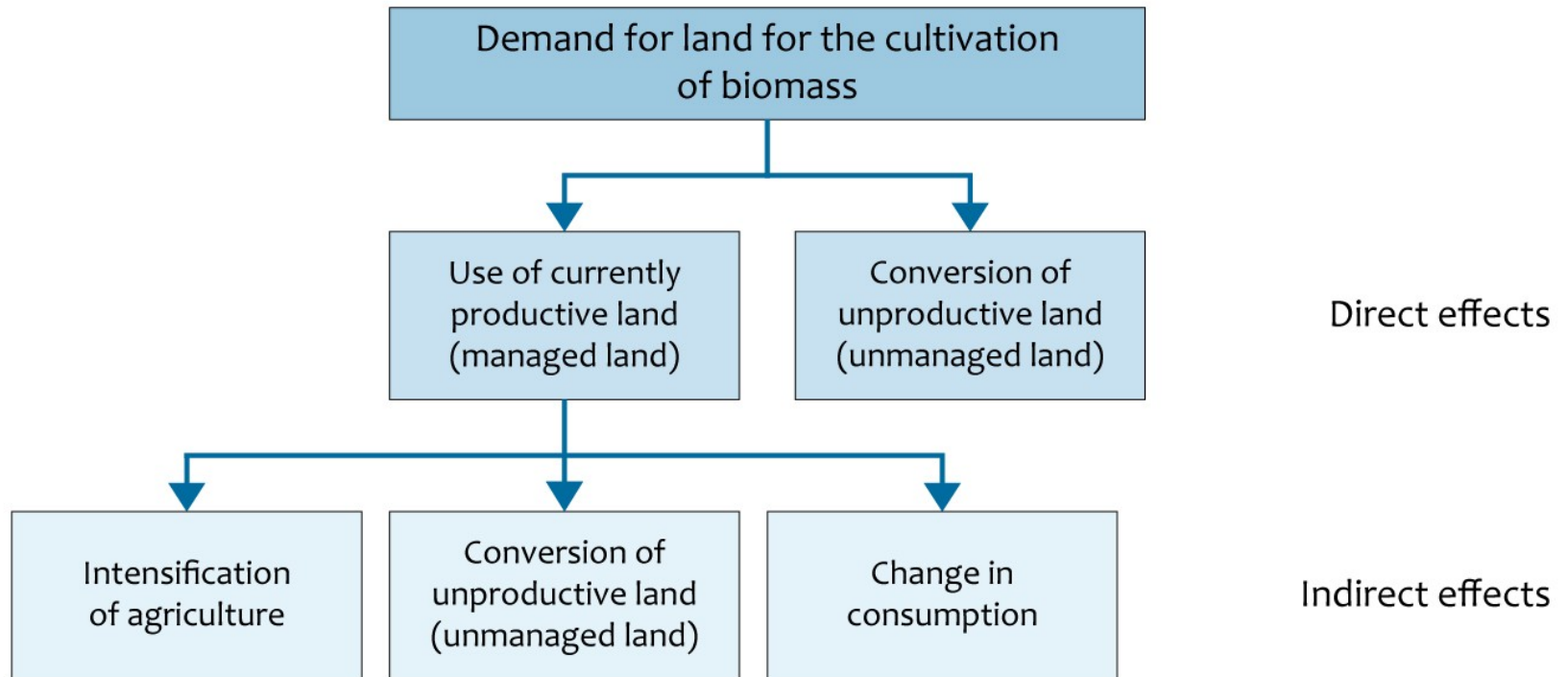
What are indirect effects?

Direct and indirect effects of a (new) bio-energy product

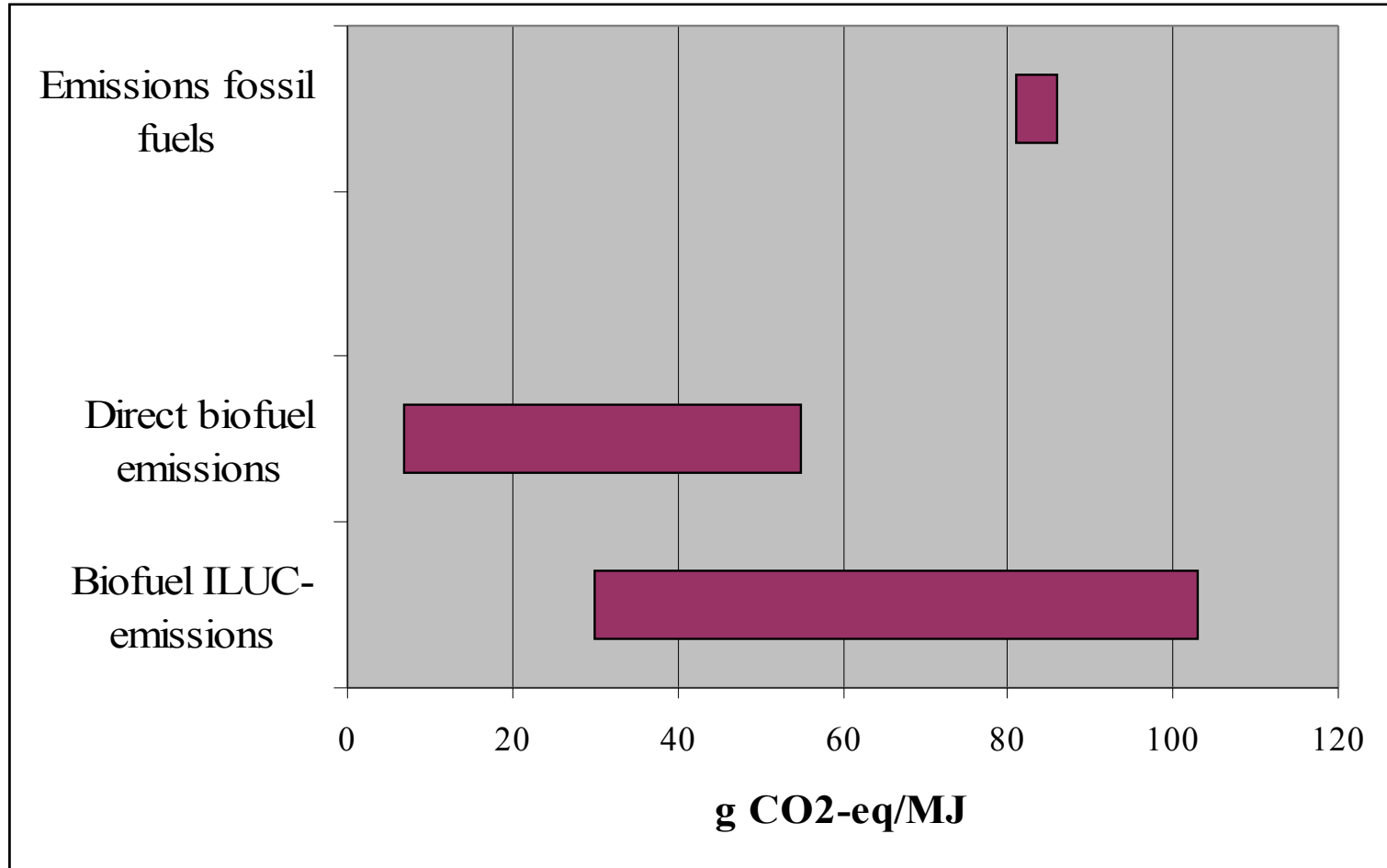


Indirect effects of land use

Direct land use for bio-energy and its indirect effects



Indirect Land Use Change (ILUC)



Indirect effects of intensification

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Potential indirect greenhouse gas emissions

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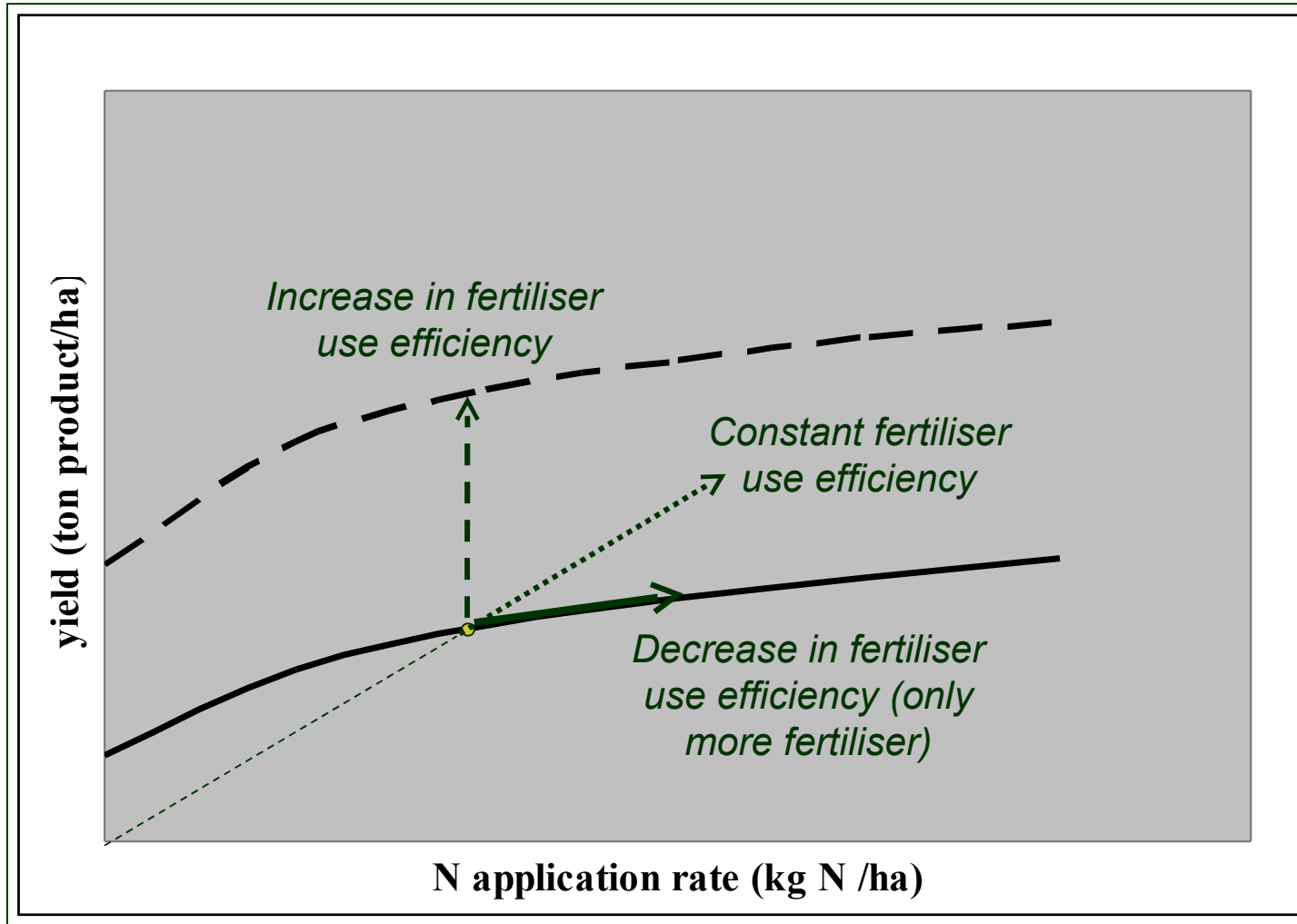
- Nitrogen fertiliser use
 - Part of the N is emitted as N_2O
 - N_2O emissions from the production of N-fertiliser



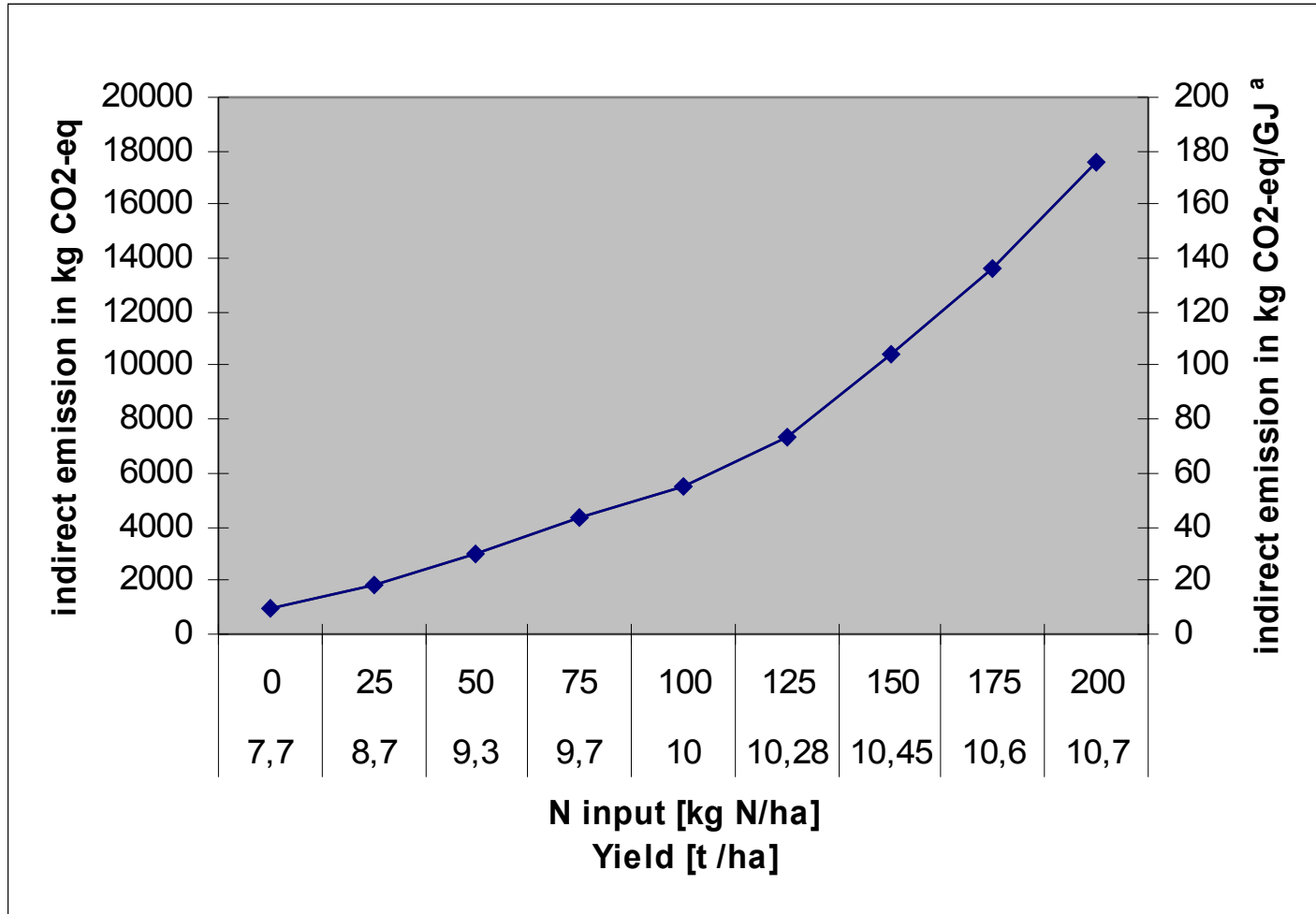
- Mechanisation:
 - Energy efficiency is the highest in a natural system
 - Energy related CO_2 -emissions

Relation between N-fertiliser use and yield

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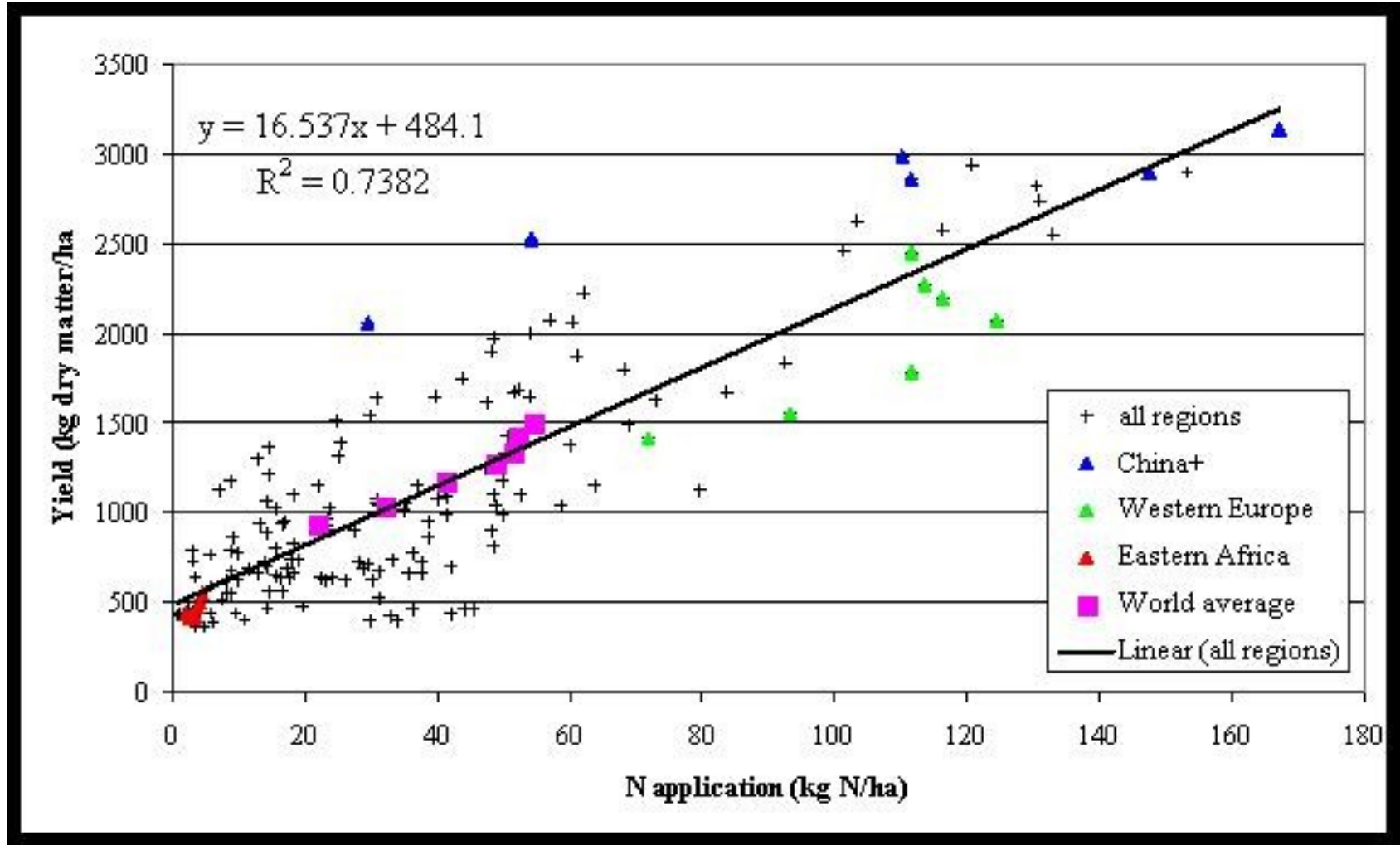
Indirect greenhouse gas emissions due to (only) N-fertiliser use in intensification



a: for 100 GJ/ha

FAO-statistics on fertiliser use and yields for cereals

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**Land use:
Short term
loss**

versus

**Climate
change:
Long term
gain**

A quantitative approach

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- Need for an indicator: ***Mean Species Abundance*** a measure for naturalness
- Combination of quantity (area) and relative quality (% of optimum)
 - so MSA in m² of optimal quality area
- Based on many empirical data about the impact of specific stress-factors on ecosystems

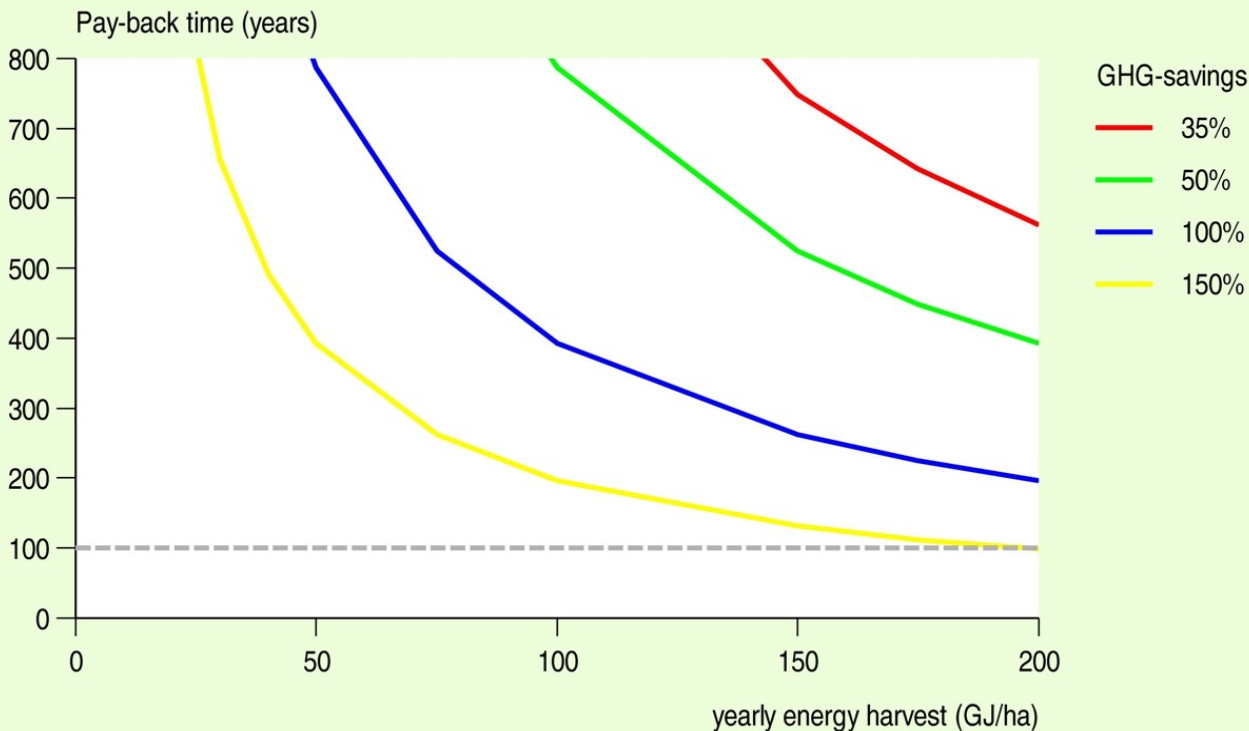
Compensation period

Example sugar cane



Direct effects of land use change on biodiversity

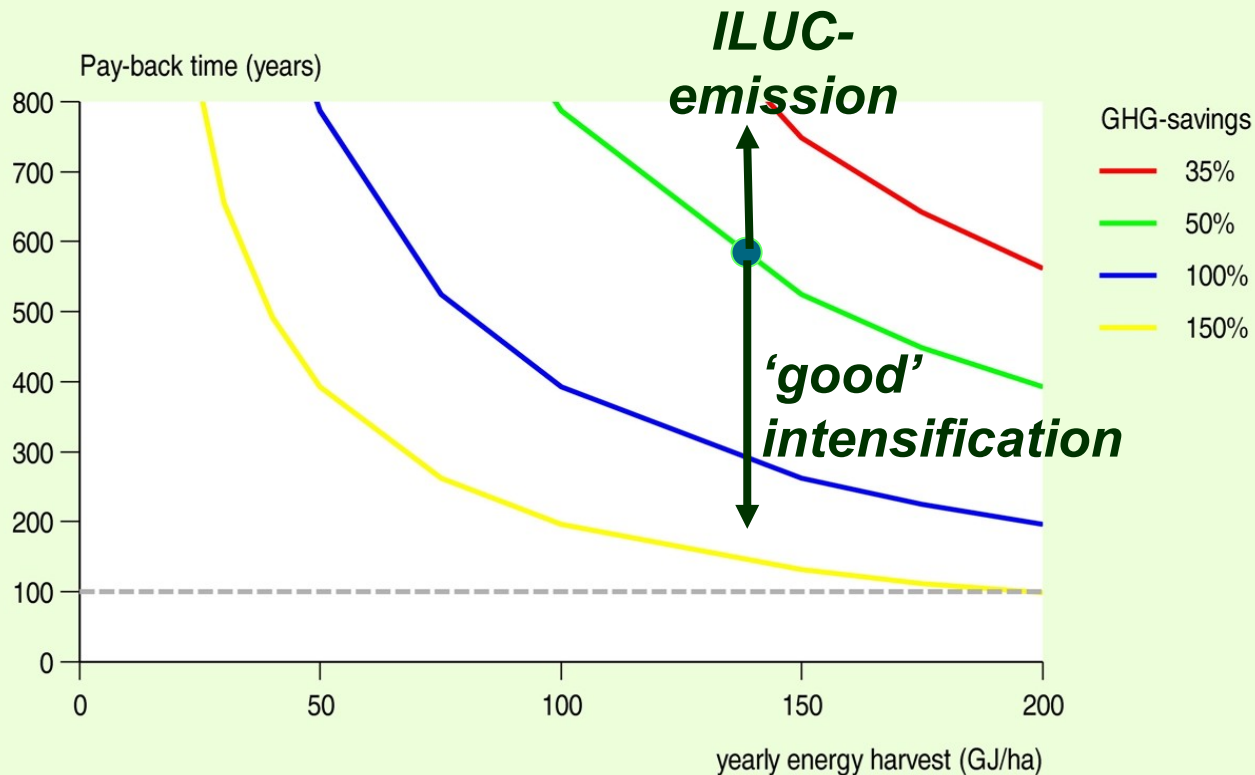
Biodiversity Compensation Period (at different levels of GHG-savings)
LU-change: intensive use of natural ecosystems



Grafieknnummer: Isoclines payback_time v3
Datum: 12-feb-2010

Concept

Biodiversity Compensation Period (at different levels of GHG-savings)
LU-change: intensive use of natural ecosystems



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Questions or remarks