The nitrogen footprint: environmentally relevant?

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The N footprint links pollution to consumption

"the total amount of N_r **released to the environment** as a result of an entity's resource **consumption**"

Leach et al. (2012); emphasis added

Environmental relevance: Equivalence of units

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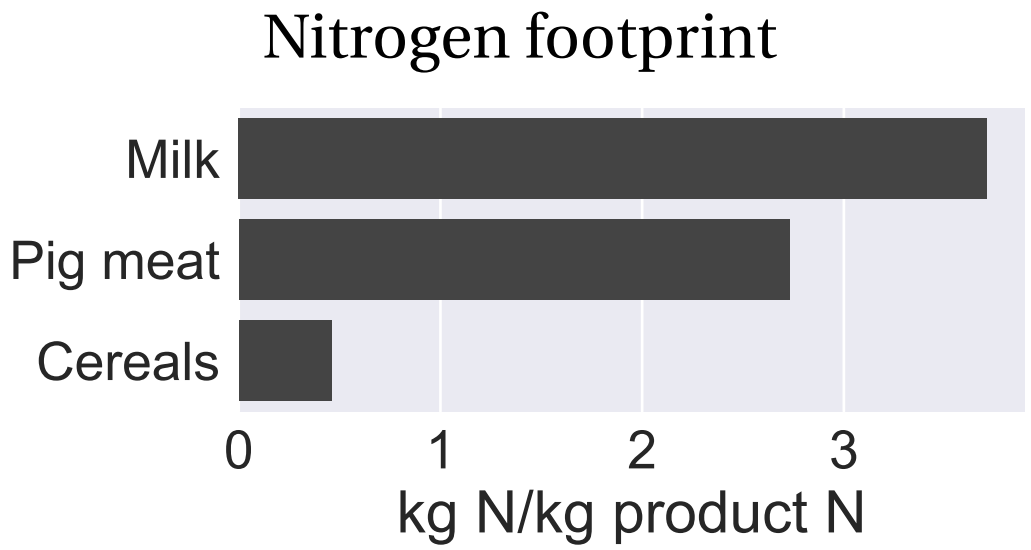
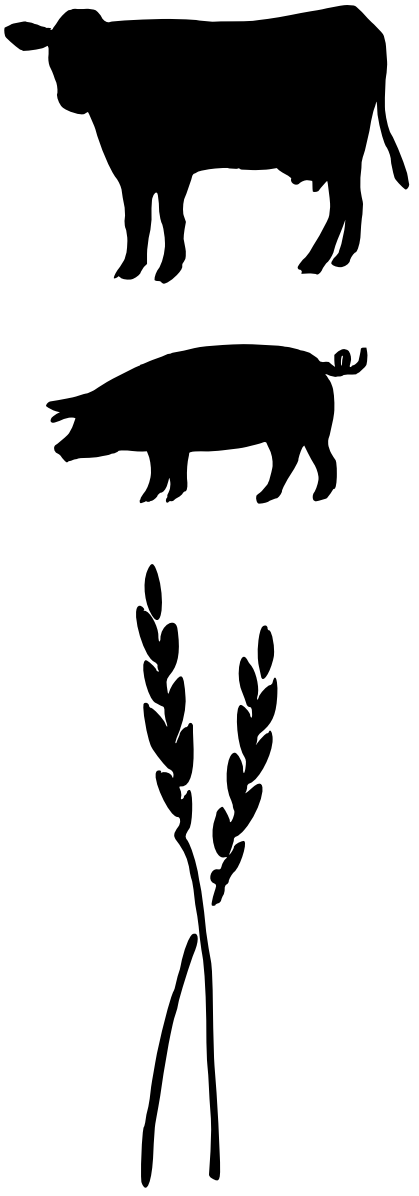
To illustrate, . . . emissions of different greenhouse
gases [must be weighted with factors] describing the
relative global warming potentials."

Ridoutt et al. (2015); emphasis added

A sum of physical flows related to a product





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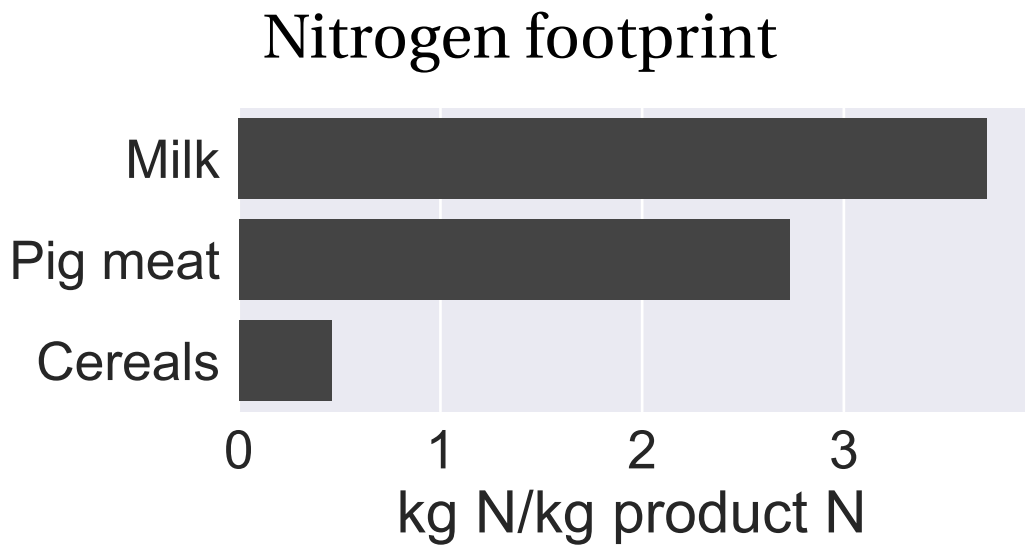
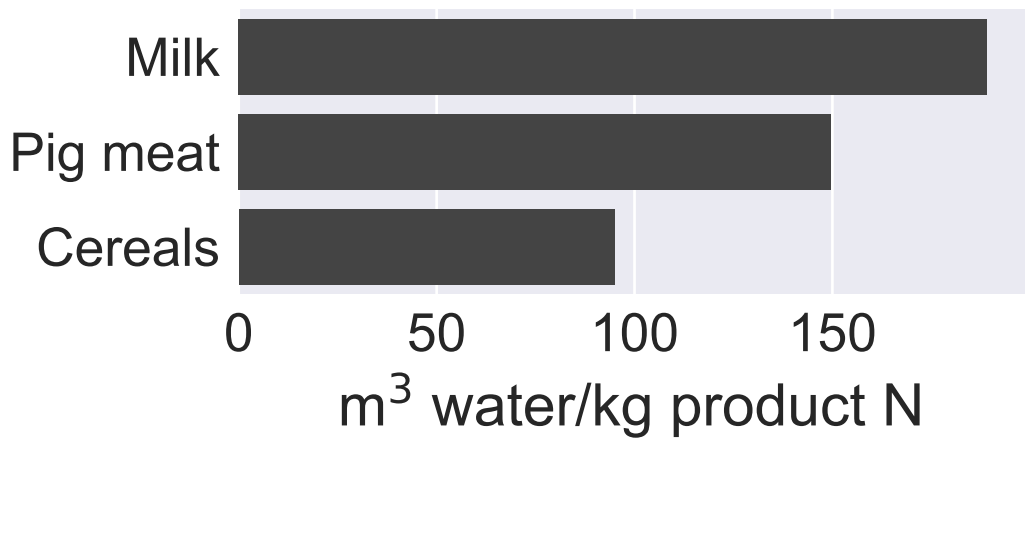
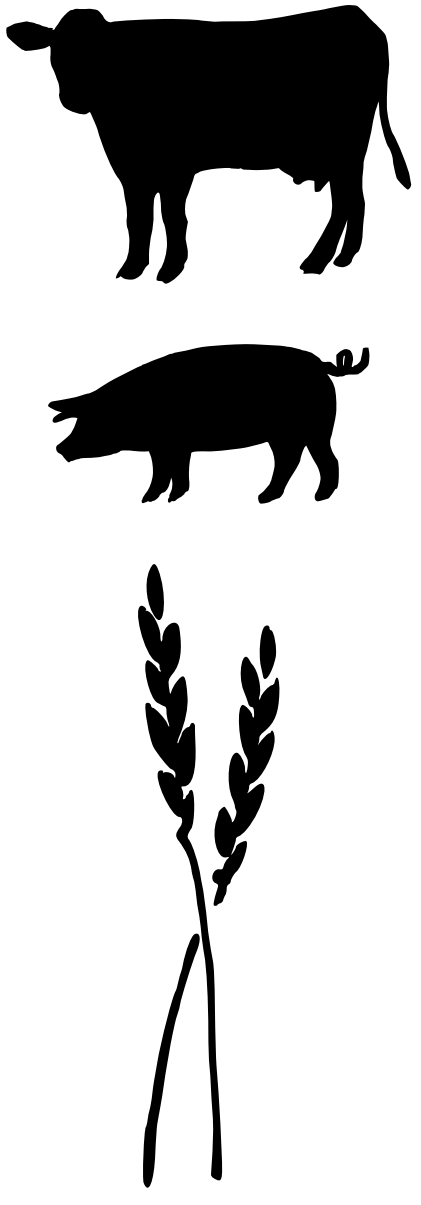
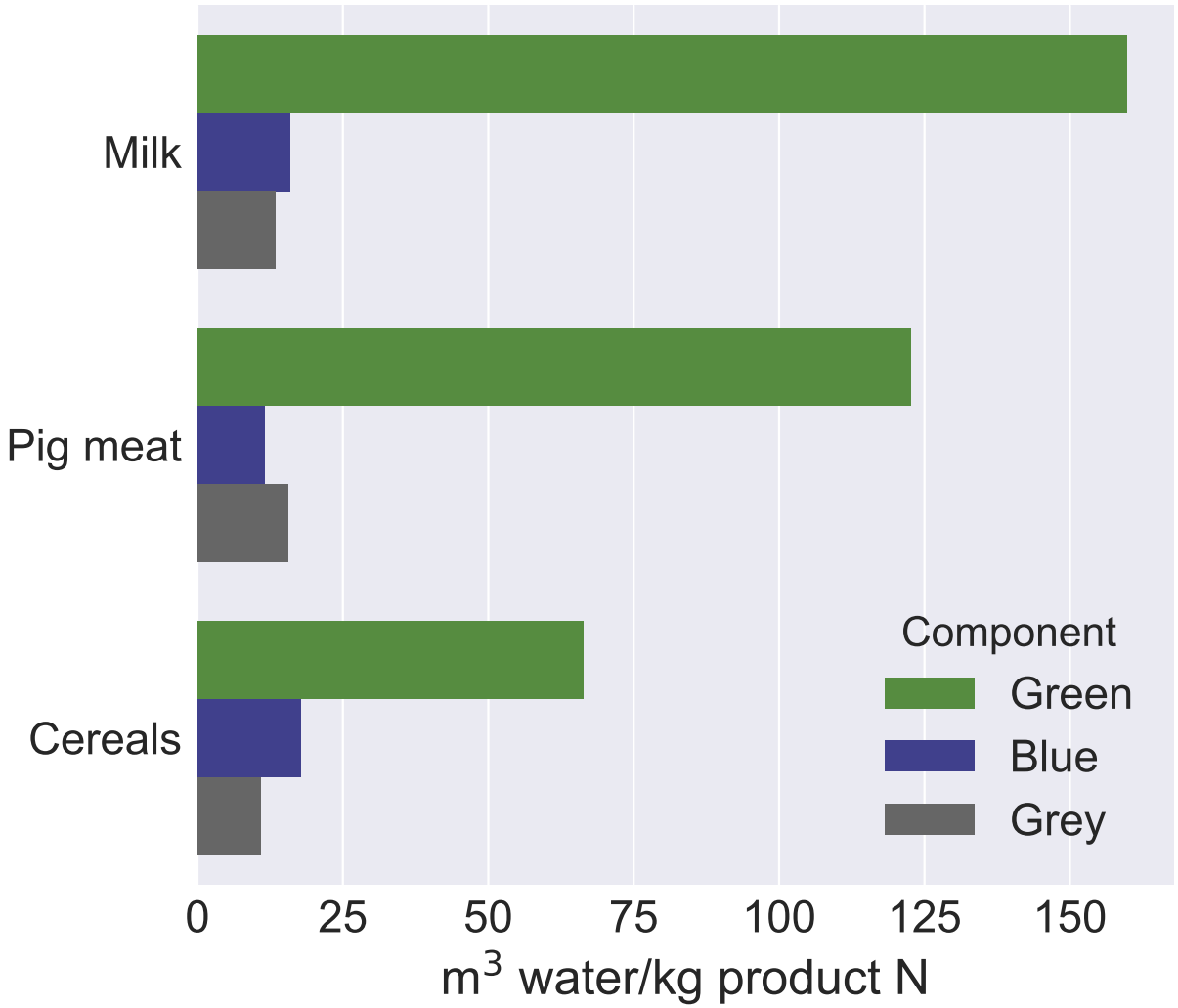
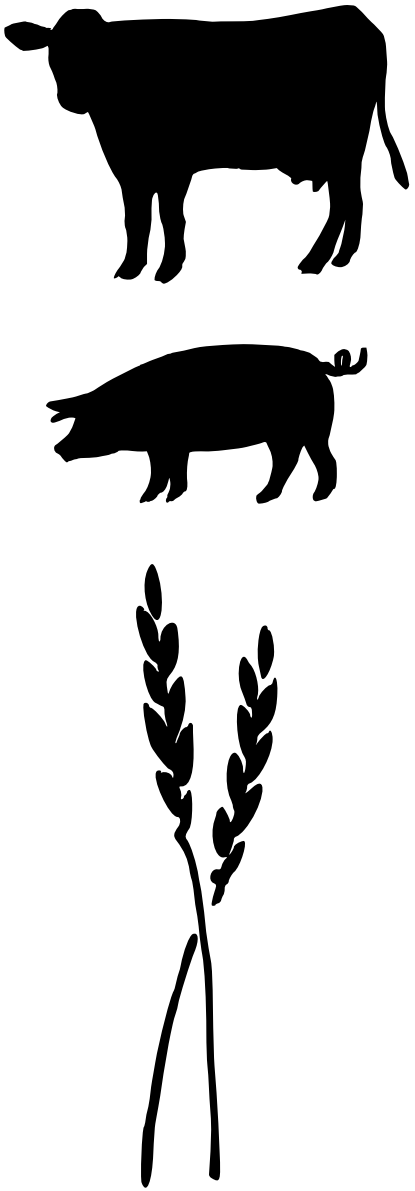






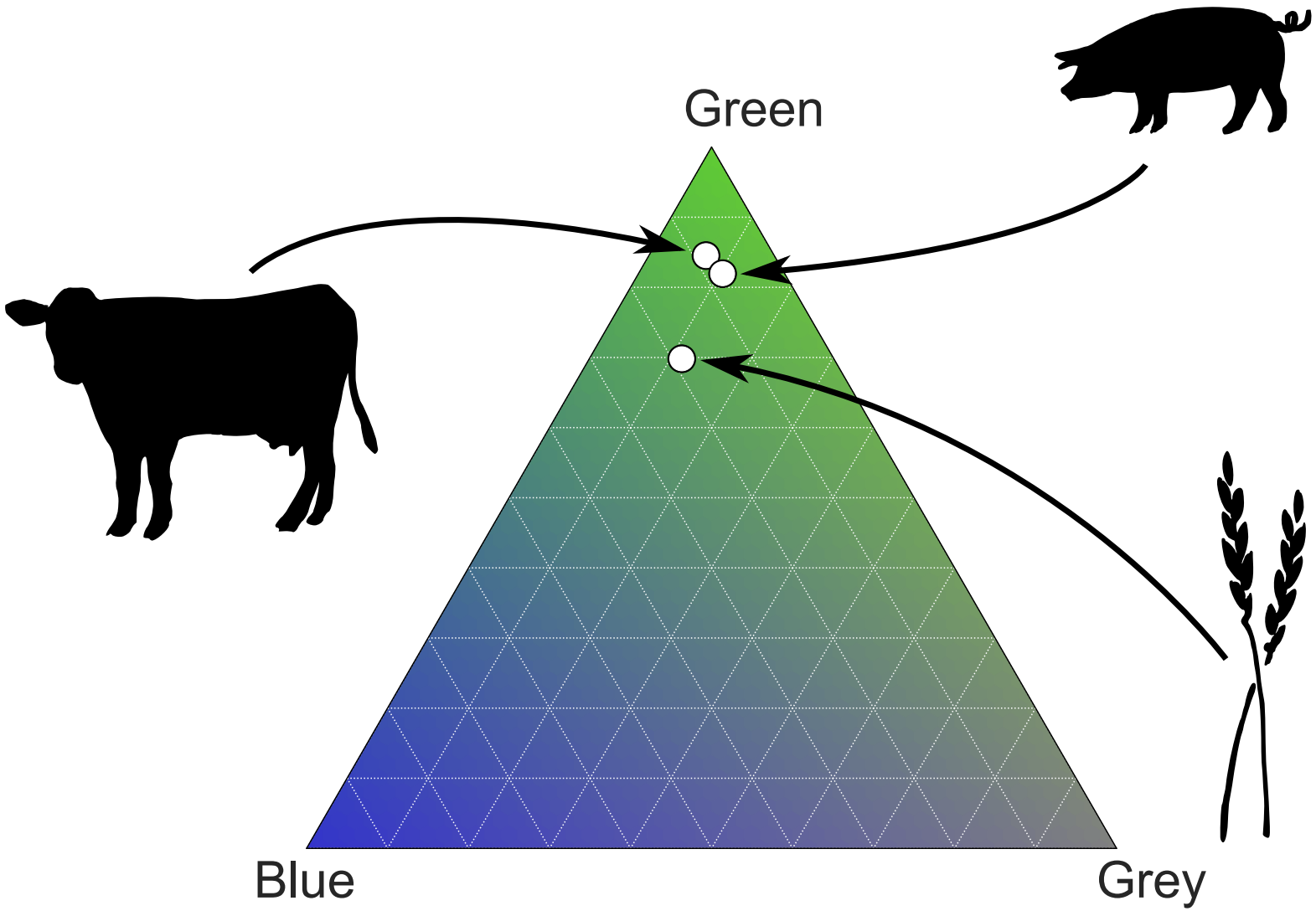
Water footprint consists of three components





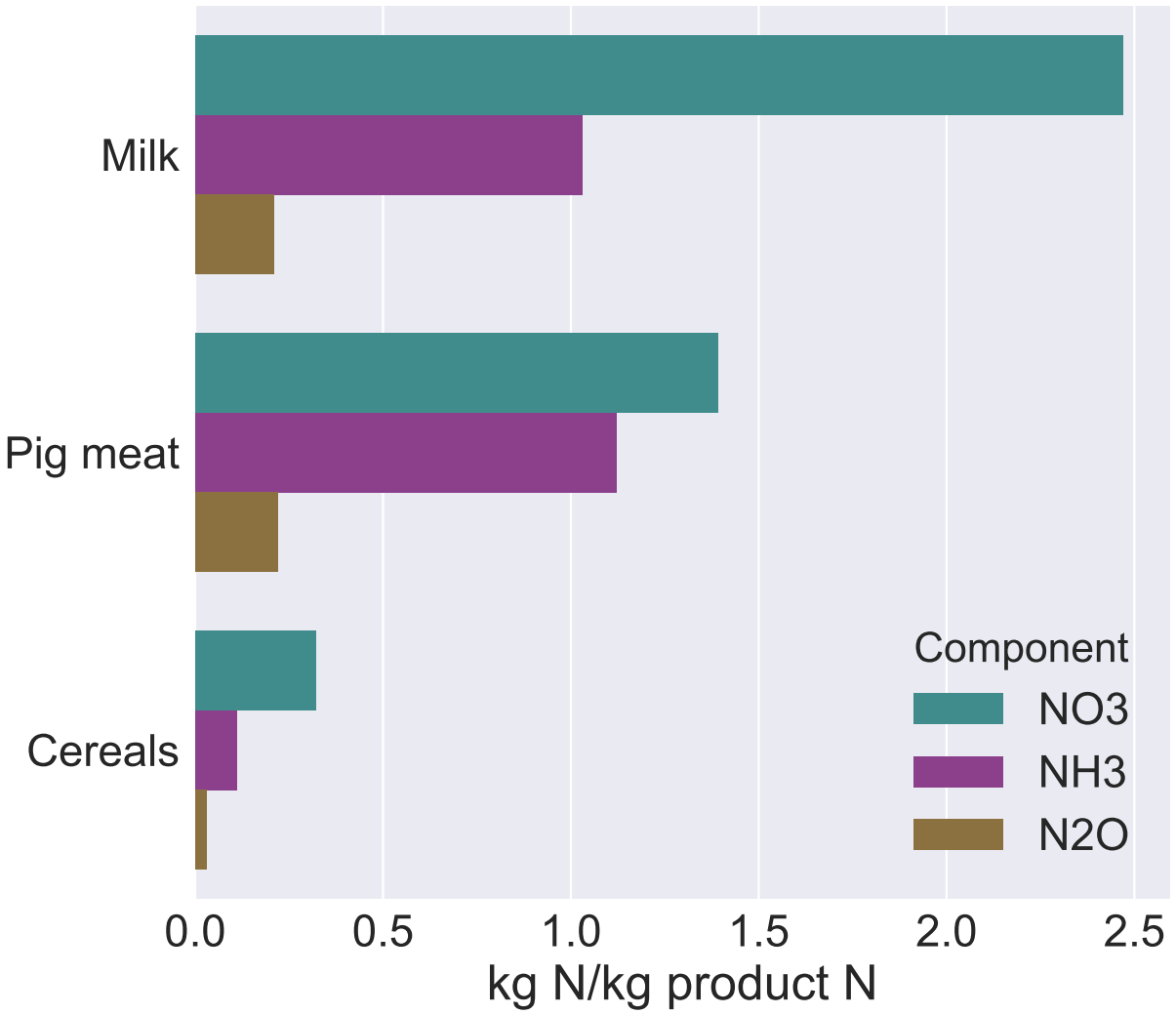
Based on Mekonnen and Hoekstra (2010) and Mekonnen and Hoekstra (2012)

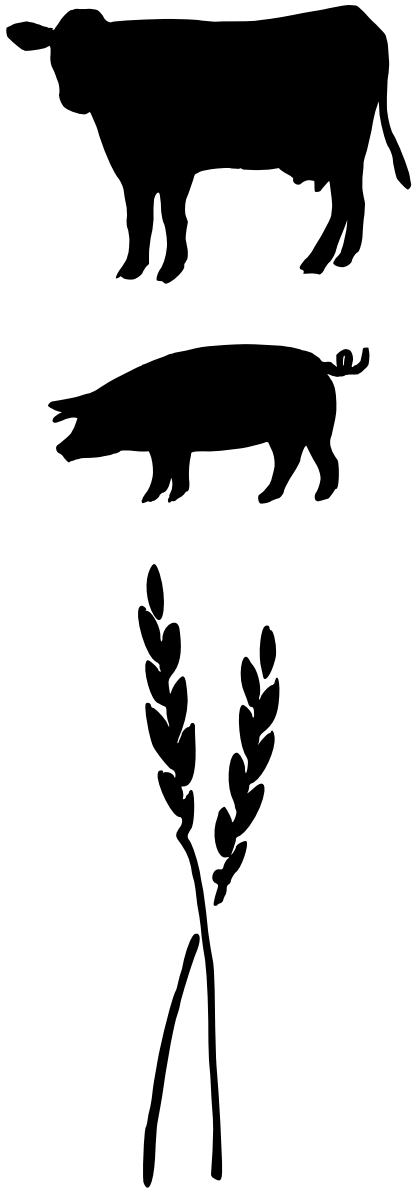
Each product has its own “water fingerprint”



Based on Mekonnen and Hoekstra (2010) and Mekonnen and Hoekstra (2012)

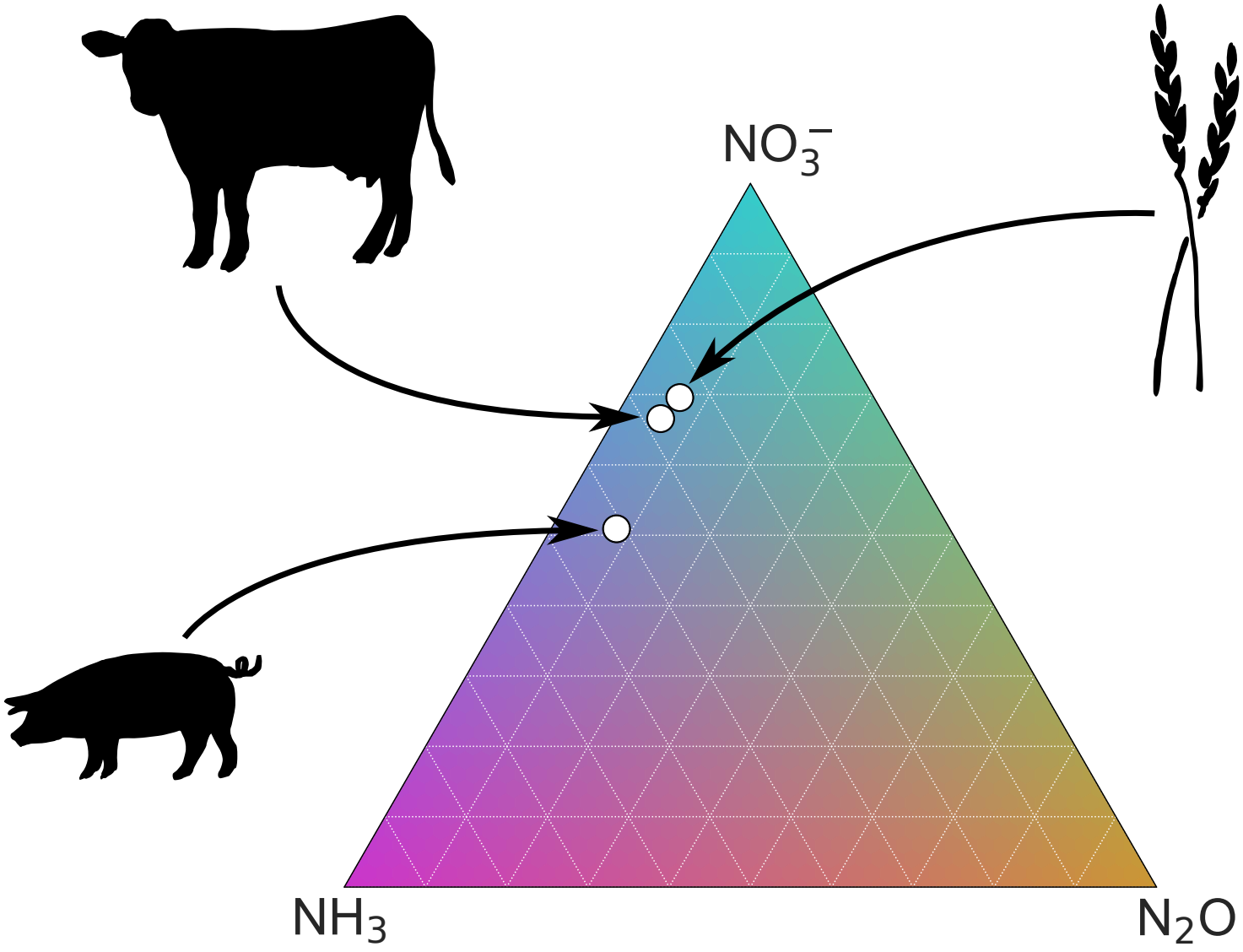
We can split up the N footprint, too





Based on Leip et al. (2014) in Westhoek et al. (2015)

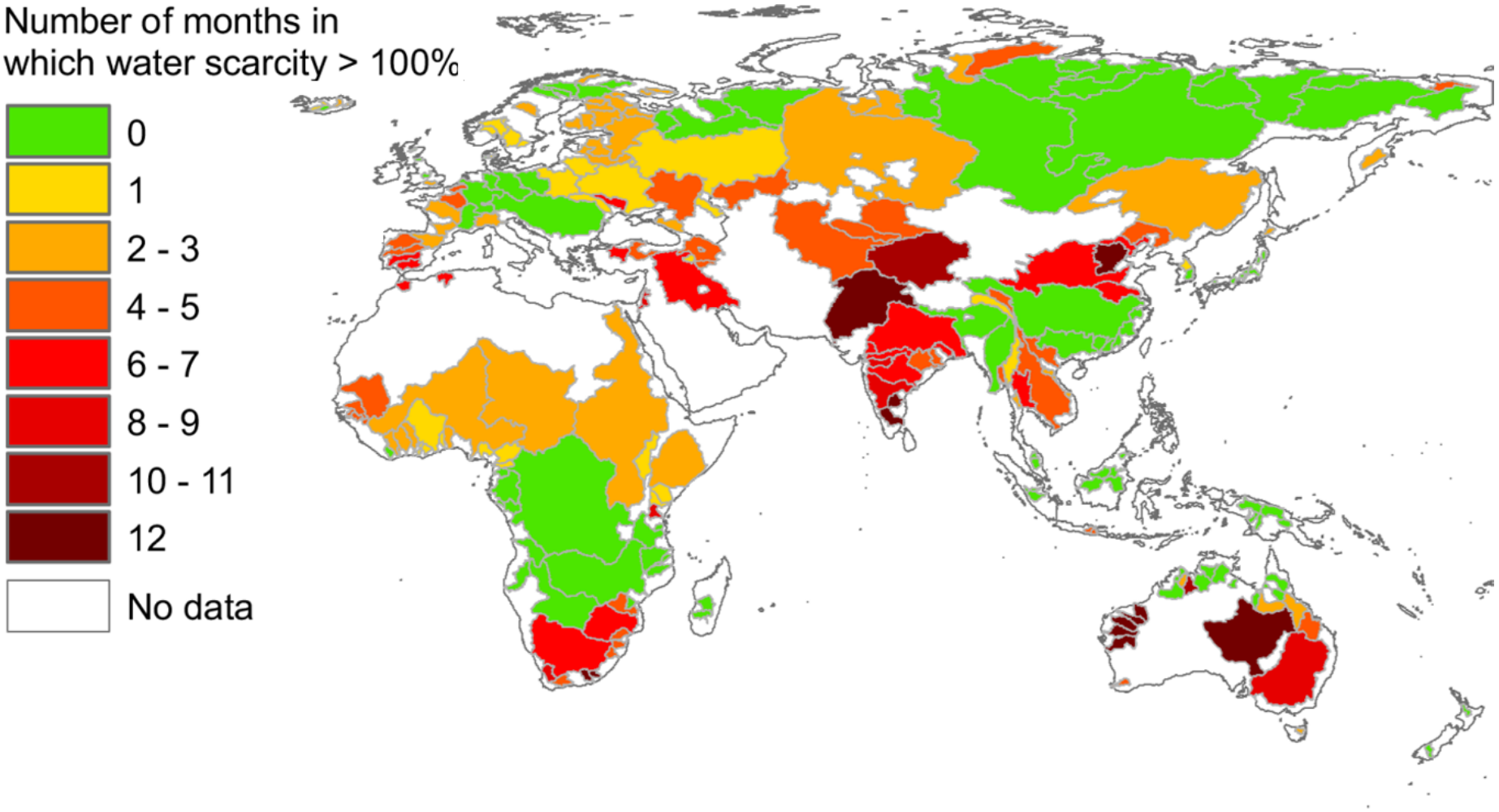
The “nitrogen fingerprint” of products



Based on Leip et al. (2014) in Westhoek et al. (2015)

Damages are not proportional to footprints

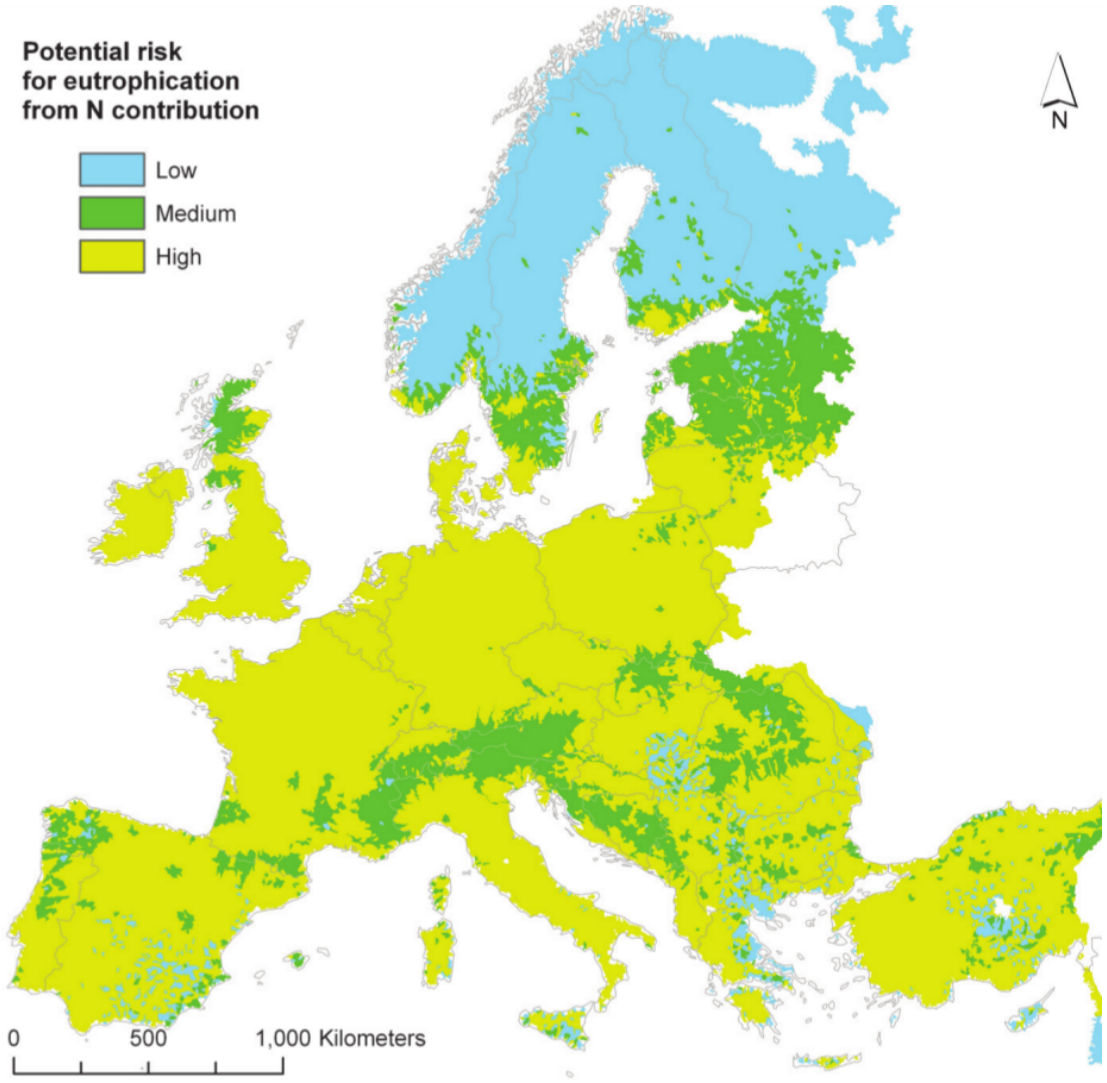
Case in point: Water scarcity



Part of figure from Hoekstra et al. (2012)

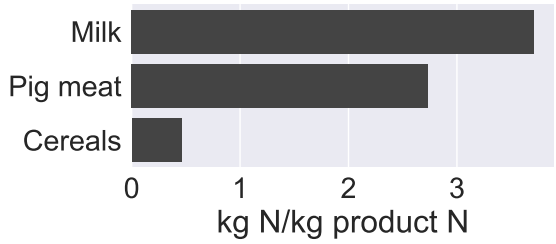
Damages are not proportional to footprints

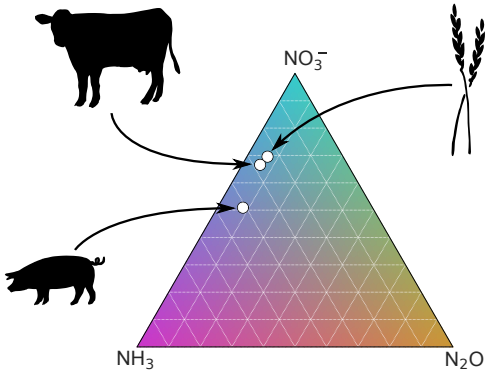
Case in point: Surface water eutrophication

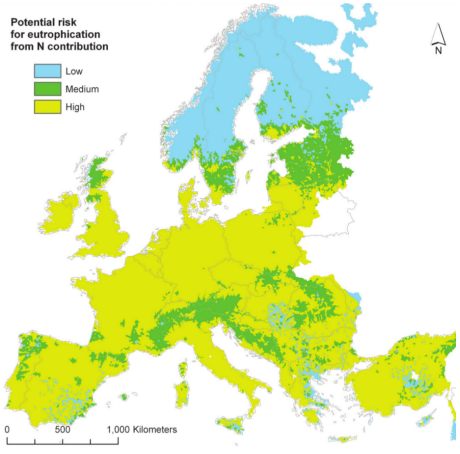


Grizzetti et al., Ch. 17 in Sutton et al. (2011)

A tough trade-off: Simplicity vs. relevance



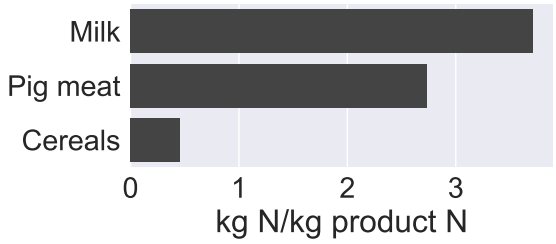


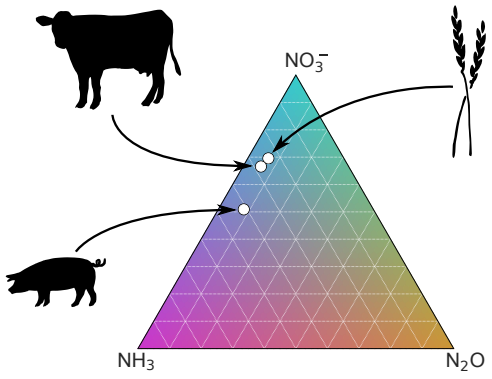


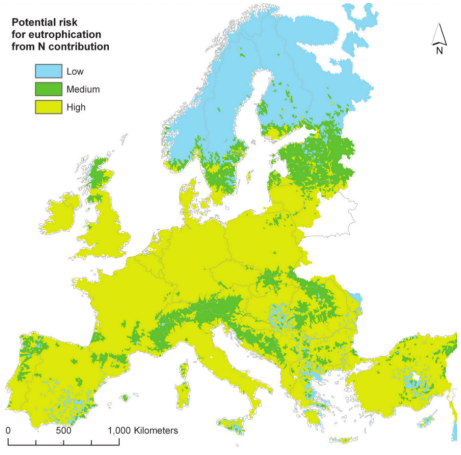
One-dimensional
Concrete
Certain
Objective
Less relevant

Multi-dimensional
Abstract
Uncertain
Subjective
More relevant

A tough trade-off: Simplicity vs. relevance







Conclusions and questions:

- The water footprint is 15 years ahead of the N footprint. Let's learn from that!
- Strict environmental relevance is not possible, but could we take a step in that direction?
- Who should use the N footprint? For what purpose?

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