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
“When aggregating data, having common units is necessary, but not sufficient; environmental equivalence is needed.”
“When aggregating data, having common units is necessary, but not sufficient; environmental equivalence is needed. 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

Nitrogen footprint

Milk
Pig meat
Cereals

kg N/kg product N

Water footprint

Milk
Pig meat
Cereals

m³ water/kg product N
A sum of physical flows related to a product

Nitrogen footprint

- Milk
- Pig meat
- Cereals

Water footprint

- Milk
- Pig meat
- Cereals
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?


