Ministerie van Landbouw,
Natuur en Voedselkwaliteit

Food from the oceans

Committee on World Food Security, Wednesday 23rd

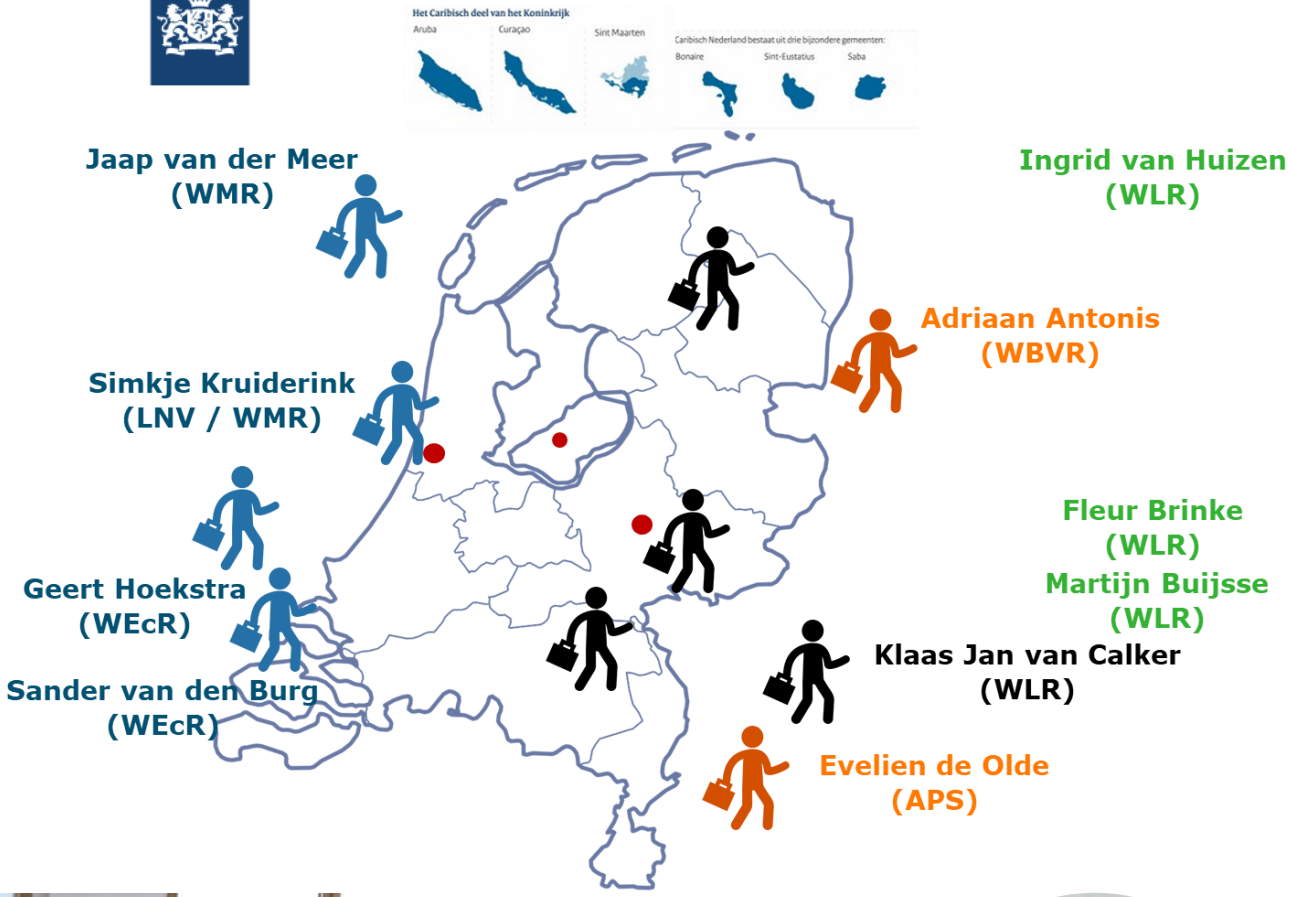
Ir. Simkje (S.) I. Kruiderink

TEAM C

for a circular food system

GOALS:

1. **New groundbreaking ideas regarding resource security (circularity)**
2. **New connections to test concepts in breakthroughs (Finding Answers Together)**
3. **A translation to education (from curricular to professional)**
4. **New proposals for research (from fundamental to practical)**



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A common "Land and Sea" language for a Circular Food System

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Safety Issues in a Circular Food System

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Water's role in a Circular Food System

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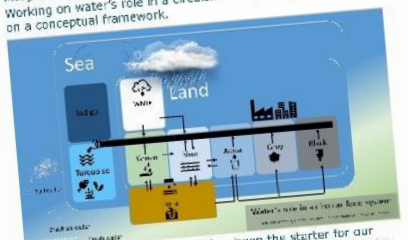
Water is a connecting element in the system 'earth' and one of the most essential natural resources. It is also the carrier of life providing nutrients within land as also within and to waterways including the sea.

The global food system harvests from saline (turquoise) as well as with green, white and blue water, much of which is stored underground in groundwater (terral) reserves. Society uses potable (aqua) water in their households and deliver process (grey) and sewage (black). Current linear (extractive) agricultural practices is one of the largest (92%) users of fresh water as well as one of the largest polluters of green, blue and turquoise water. In addition to transitioning to a more sustainable and equitable use of limited resources, we will also have to deal with climate change. Pressure on ecosystems and drinking supply will increase as well as aggravating existing problems with surface water quality and depletion of limited reserves of groundwater. The global hydrological cycle will change. In practice this means dealing with more salinization in specific agricultural areas as well as an increase of wetted zones in other areas combined with an increase of mosquitoes and the risk of vector borne diseases.

The transition towards a circular food system requires optimizing the use of earth's natural resources. This implies: minimizing the input of finite resources, encourage the use of regenerative ones, prevent the leakage of resources and stimulate the reuse and recycling of inevitable resource losses in a way that adds the highest possible value to the food system with the least possible damage to nature. In practice this means e.g. reusing green, grey and black water as well as the nutrients that it carries and minimizing the use of ground water to safeguard the availability for future generations well- managed "common" requires an integrated approach of scientists with different expertise.

Working on water's role in a circular food system, TEAM C worked on a conceptual framework.



Within WUR are projects that have been working on water as a circular food system resource. TEAM C explored the existing knowhow about water in food systems and inventories required knowhow about the role of water for a successful circular vision (kringloplandbouw) by Minister Schouten. Highlighting these is a first step towards further developing circular food system thinking that combines food production from land and sea. Knowledge lacuna will be highlighted where additional research is needed. Team VC has had water's role on the regional, national and international agenda's.

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Circularity in Live Stock and Fish supply chains

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Knowledge Exchange Circular Food Principles

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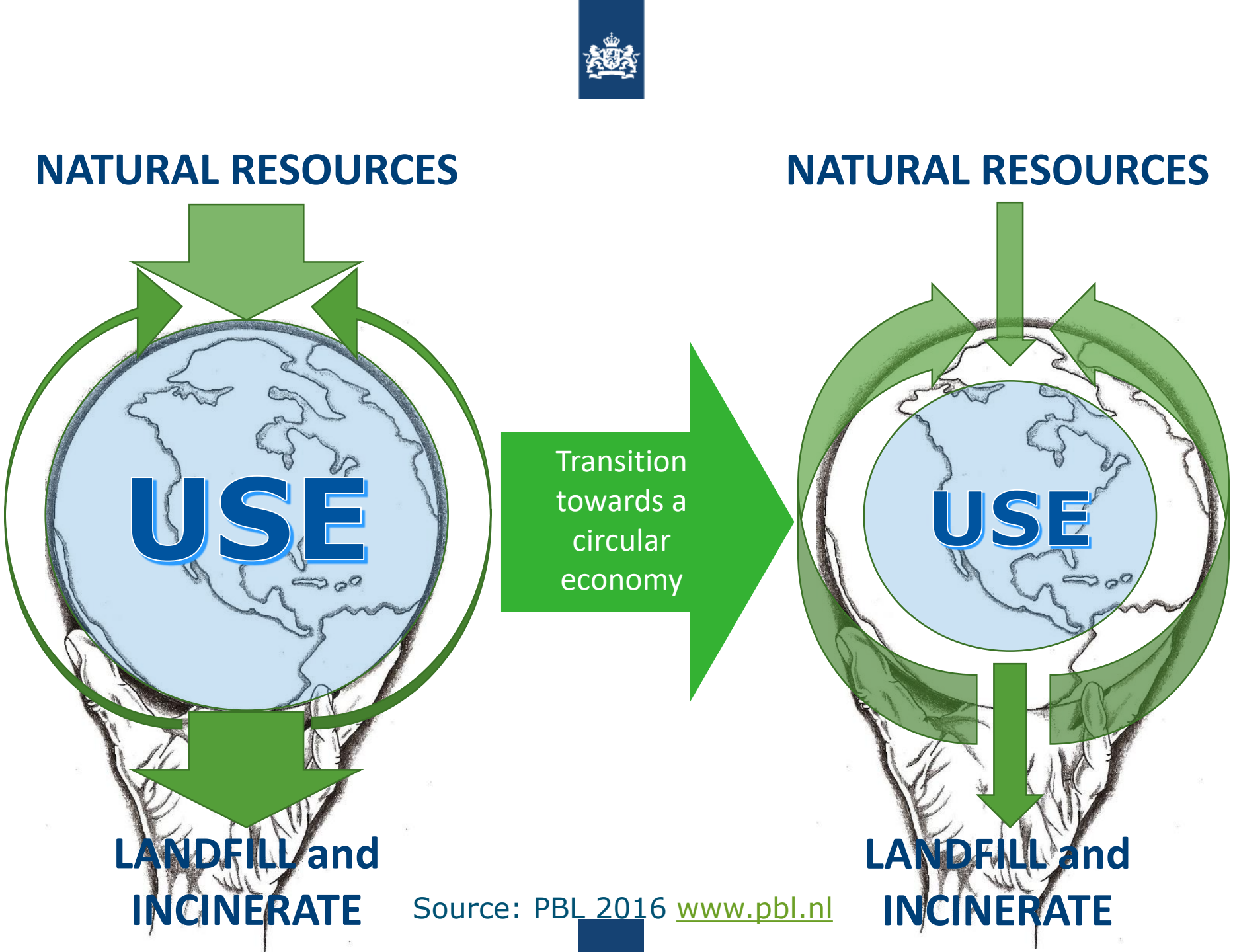
Implementing Circular Food Systems in the Dutch regions

The animal farming sector on the sandy soils of Limburg and Brabant is the main example of intensive agriculture which is on the eve of major shifts in the coming years driven by changing governmental policy and regulations. What will this region look like in 2030? Both on the landscape level as well socio-economically and how can actors respond to this? Additionally the province of Zeeland has very specific land and aquatic resources linked to the food system. Research is needed concerning the interactions of land and sea and the food system linked to. Salinization linked to the availability of fresh water for [illegible] and the efficiency of nutrients used in [illegible] that would benefit [illegible]



Source: PBL 2016 www.pbl.nl

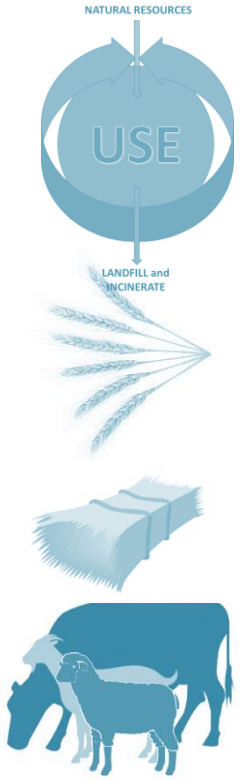
Perspectives of a circular food system

P0: Safeguard natural resources (e.g. soil, water, air and biological resources).

P1: Plant biomass is the basic building block of food and should be used by humans

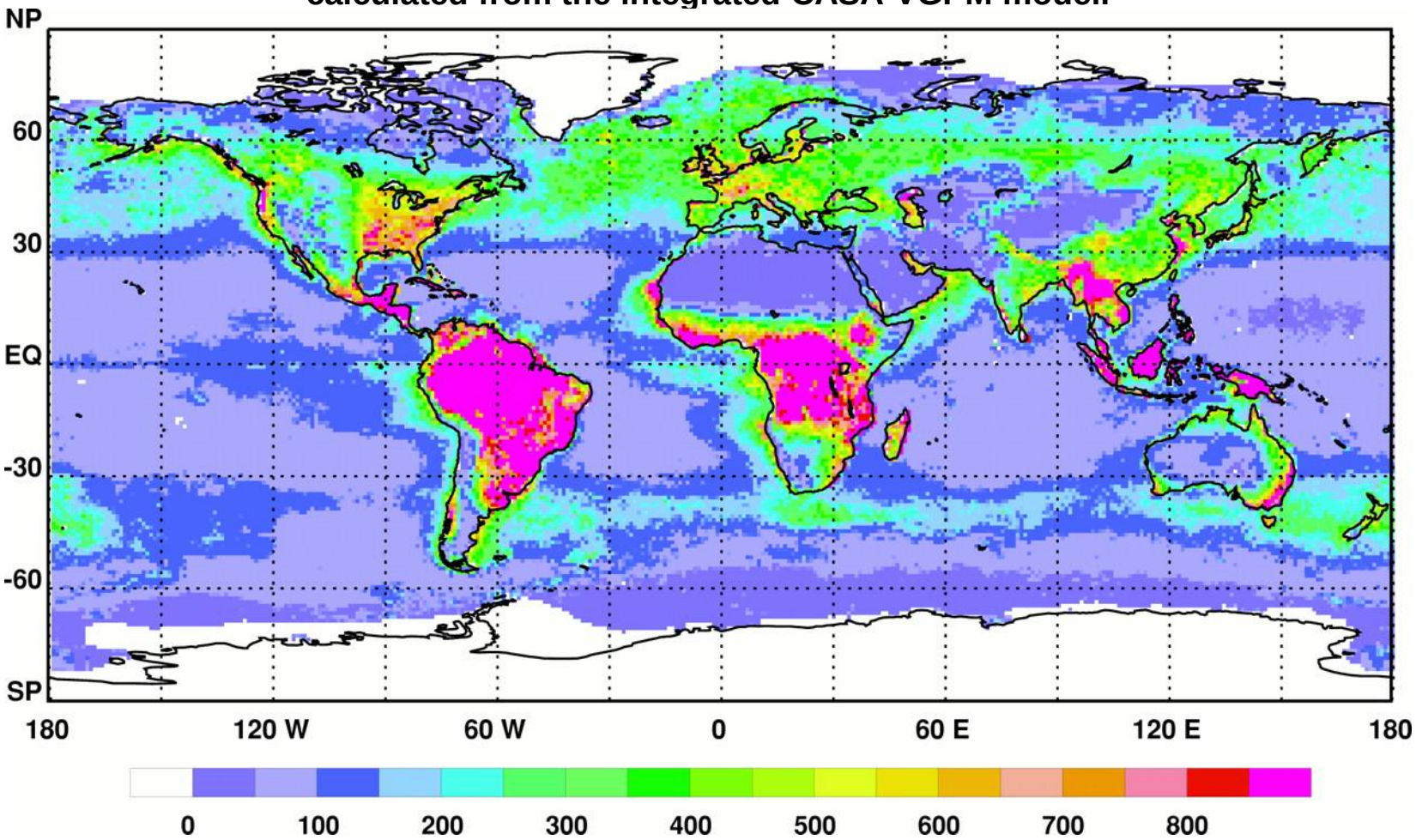
P2: By-products from food production, processing and consumption should be recycled back into the food system

P3: Use animals for what they are good at



Acknowledgements:
Professor Imke de Boer (Animal Production Systems)
Professor Martin van Ittersum (plant production systems)
See Mansholt Lecture from Louise O. Fresco (Executive Board President WUR

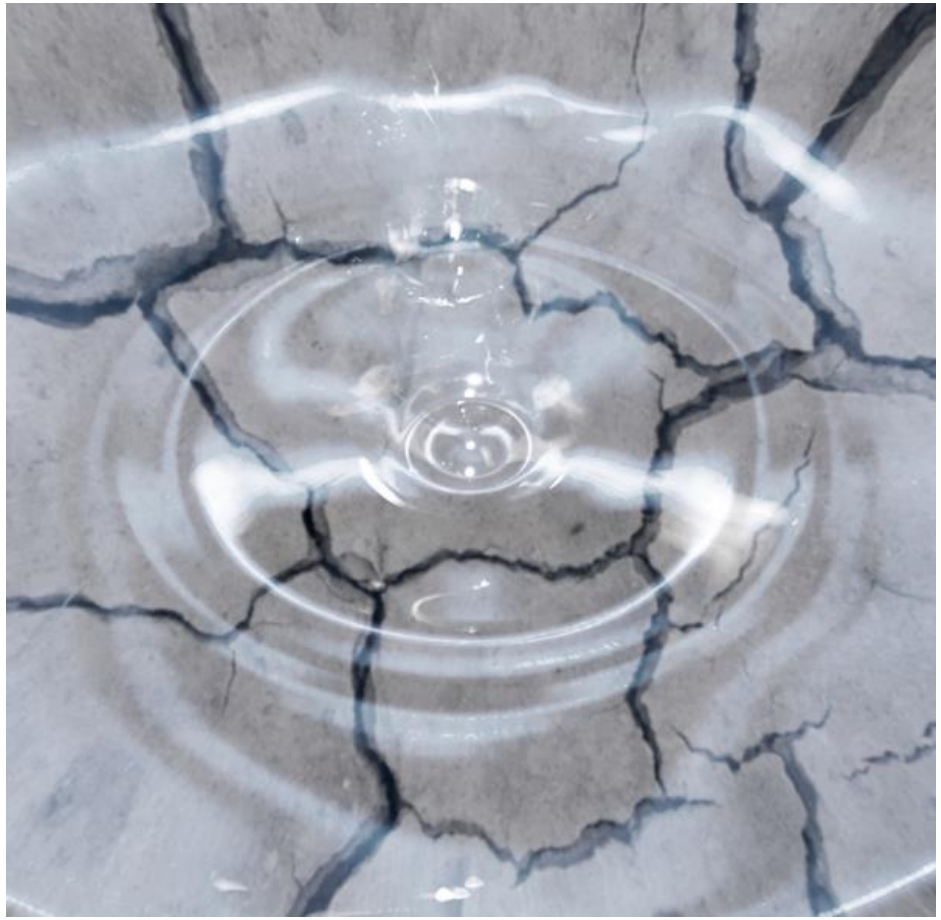
Figure 1 Global annual NPP (in grams of C per square meter per year) for the biosphere, calculated from the integrated CASA-VGPM model.



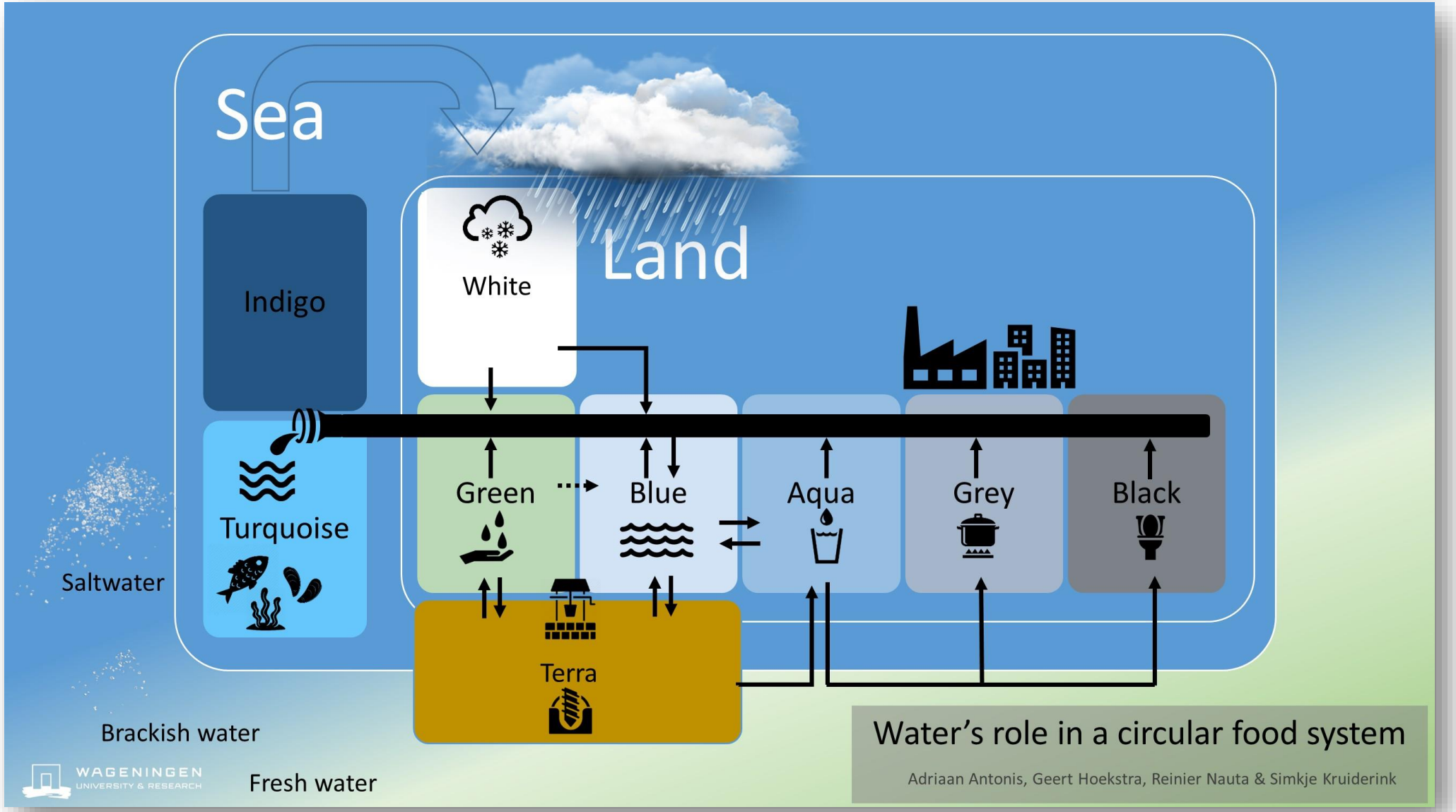
Christopher B. Field et al. Science 1998;281:237-240

Safeguard natural resources (P0) → water

- Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such (*)
  - Essential and connecting element
  - In every living organism
  - In the air, in ice caps, in the ground, in seas and oceans
  - Earth covered for 71% with water
- Water's role in our food system



* European Commission (Directive 2000/60/EC)


Sea
Land
Indigo
White
Turquoise
Green
Blue
Aqua
Grey
Black
Terra
Saltwater
Brackish water
Fresh water
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Water's role in a circular food system
Adriaan Antonis, Geert Hoekstra, Reinier Nauta & Simkje Kruiderink

How food connects all the SDGs

Graphics by Jerker Lokrantz/Azote