38º CONGRESO ARGENTINO DE PRODUCCION ANIMAL

Ciencia y Tecnología, pilares del desarrollo ganadero sustentable

23-25 septiembre 2015

Santa Rosa La Pampa Argentina

AAPA Asociación Argentina de Producción Animal

Huella Hídrica: Nociones generales, aspectos metodológicos y desafíos para Argentina

Jorge Francisco Manazza, INTA

Water Footprint NETWORK

Taller de indicadores ambientales

23 de Setiembre de 2015, Santa Rosa, Argentina.

Instituto Nacional de Tecnología Agropecuaria

Ministerio de Agricultura, Ganadería y Pesca
Presidencia de la Nación

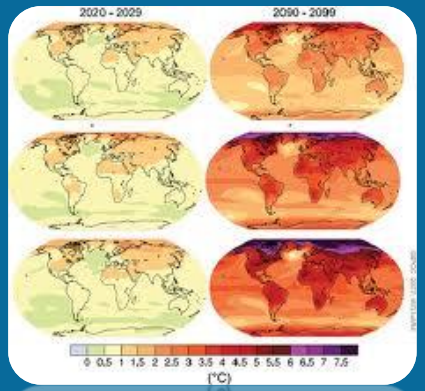
INTA

El desafío para Argentina: producir más, con menos:

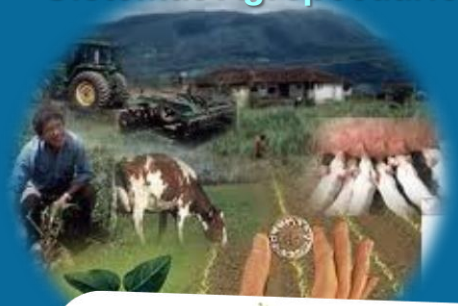
Escenario global Agroalimentario, desafío para Argentina

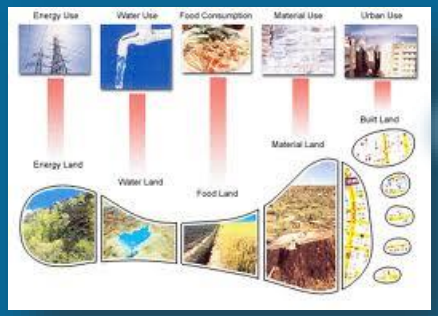
menor impacto – Ecoeficiencia – Minimizar su Huella Ecológica

Cambio Climático

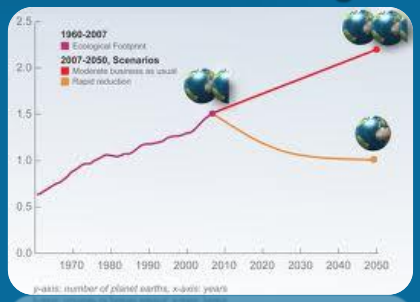


Sistemas Agropecuarios





+ Huella Ecológica



+Población +consumo +alimentos

+Uso de recursos naturales

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Huella Ecológica

Global Footprint Network
Advancing the Science of Sustainability

World Footprint

Do we fit on the planet?

Today humanity uses the equivalent of 1.5 planets to provide the resources we use and absorb our waste. This means it now takes the Earth one year and six months to regenerate what we use in a year.

Moderate UN scenarios suggest that if current population and consumption trends continue, by the 2030s, we will need the equivalent of two Earths to support us. And of course, we only have one.

Turning resources into waste faster than waste can be turned back into resources puts us in global ecological overshoot, depleting the very resources on which human life and biodiversity depend.

RELATED
- Case Stor
- 2015 Data
- Our Work
- Publicatior

COUNTRY
Curious inc
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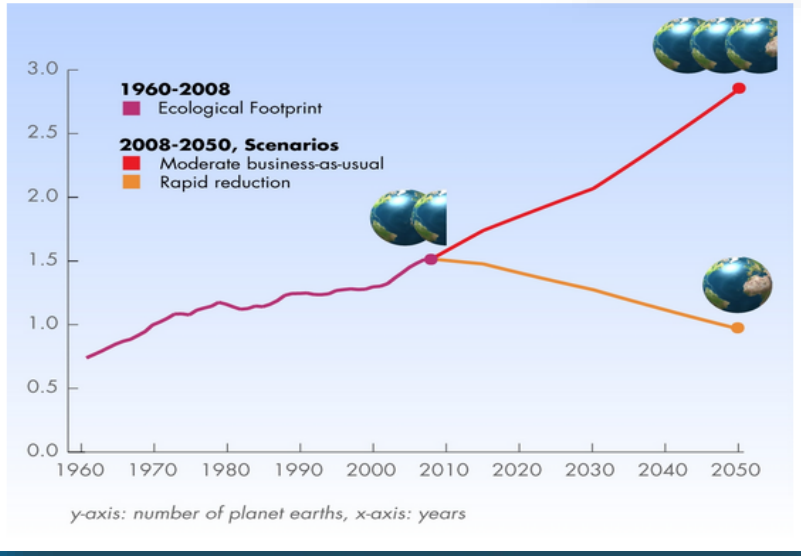
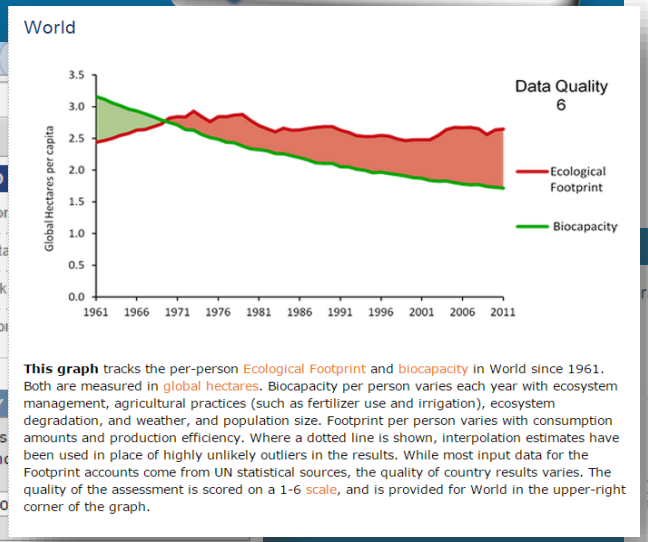
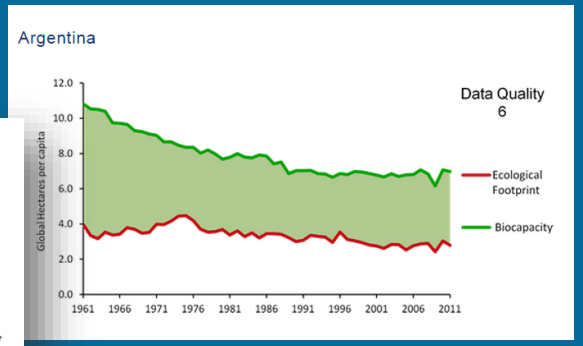
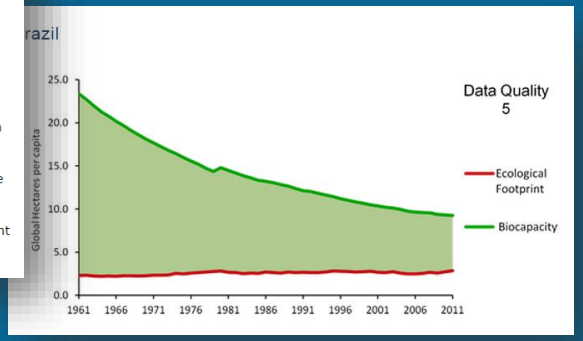
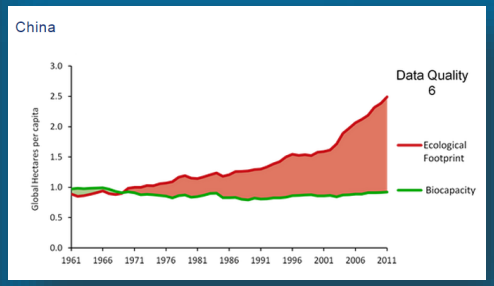


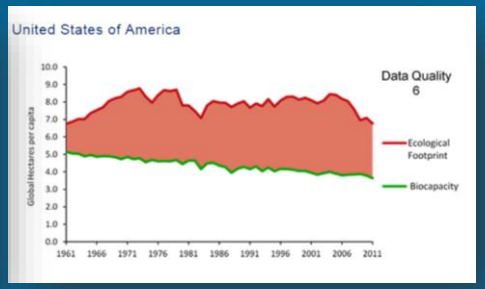


This graph tracks the per-person Ecological Footprint and biocapacity in World since 1961. Both are measured in global hectares. Biocapacity per person varies each year with ecosystem management, agricultural practices (such as fertilizer use and irrigation), ecosystem degradation, and weather, and population size. Footprint per person varies with consumption amounts and production efficiency. Where a dotted line is shown, interpolation estimates have been used in place of highly unlikely outliers in the results. While most input data for the Footprint accounts come from UN statistical sources, the quality of country results varies. The quality of the assessment is scored on a 1-6 scale, and is provided for World in the upper-right corner of the graph.









Gran Aporte! Visibilizar la transferencia / flujo de bs y ss ambientales entre regiones

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Huella Hídrica Concepto
Uso consuntivo

Huella Hídrica de un indicador del volúmen de agua dulce que se utiliza –directa e indirectamente- para producir los bienes y servicios **consumidos** por un individuo, país; o producidos por una empresa.

Comprende el Agua utilizada en todo el ciclo de vida de un producto – cadena productiva

Huella Hídrica incluye una dimensión temporal y **espacial**

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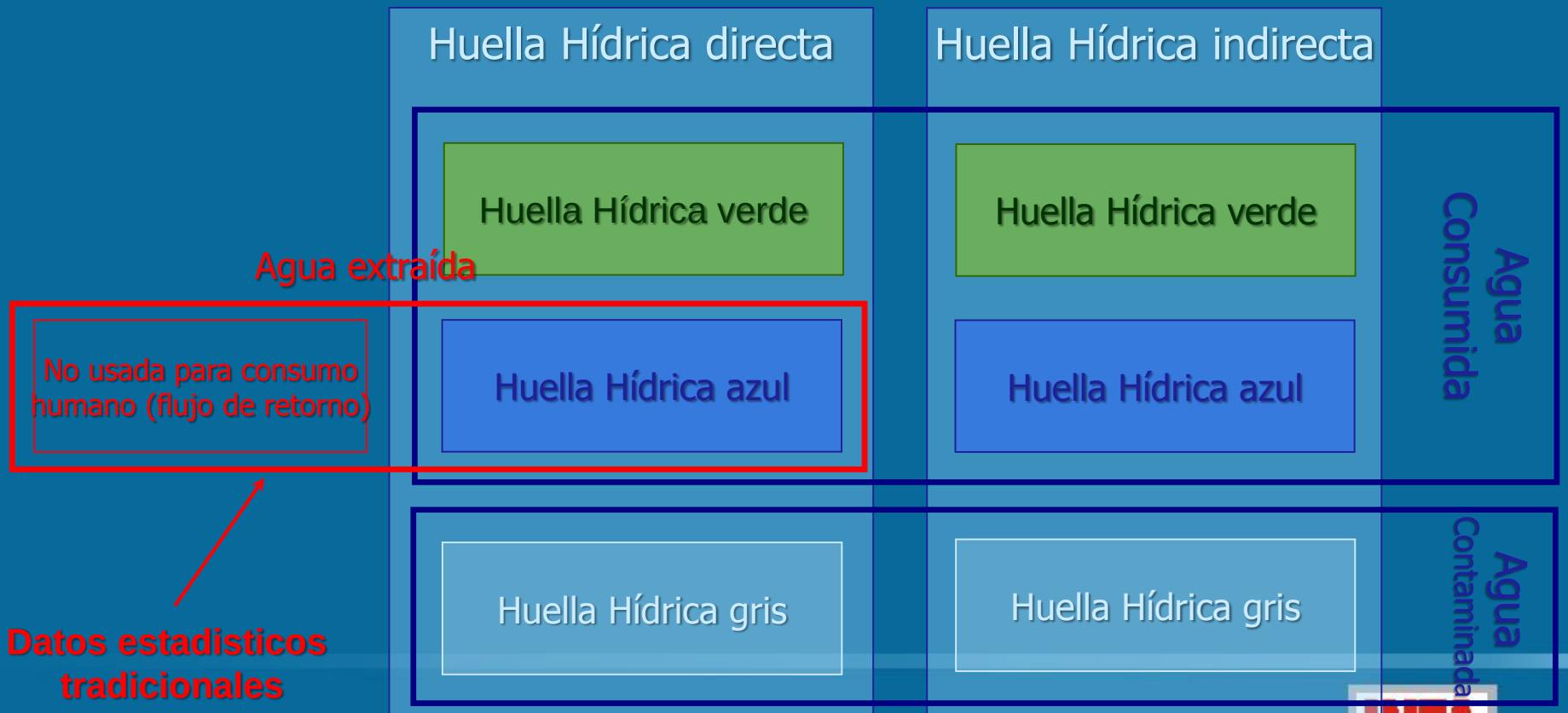
[Hoekstra, 2008]

Huella Hídrica Concepto
Uso consuntivo: **componentes**



Datos estadisticos tradicionales sobre uso de agua

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[Hoekstra, 2008]

Huella Hídrica de productos animales y vegetales

HH de Cultivos

- Uso consuntivo de agua (m^3/ha) / Rendimiento (ton/ha)

HH de productos animales

- Suma del agua usada para alimentación y bebida.

Requerimientos hídricos de cultivos

1. **Referencias para el calculo de la evap**
   ***ET_0* (mm/day)**
   e.g. Penman-Monteith equation

2. **Calculo de la evapotranspiracion *Et_c* (mm/day/mes)**
   $Et_c = ET_0 \times K_c$ donde K_c = coef. del cultuvo

3. **Calculo del requerimiento de agua *CWR* (m^3/ha)**
   $CWR = \Sigma\, Et_c$ [acumulada sobre el periodo de crecimiento

clrederick os

Riego

Alt.1- Irrigación requerida = requerimiento de agua del cultivo – lluvia efectiva

Alt. 2- Aplicación efectiva

Uso de Agua Cultivos

HH Verde usada por cultivos =

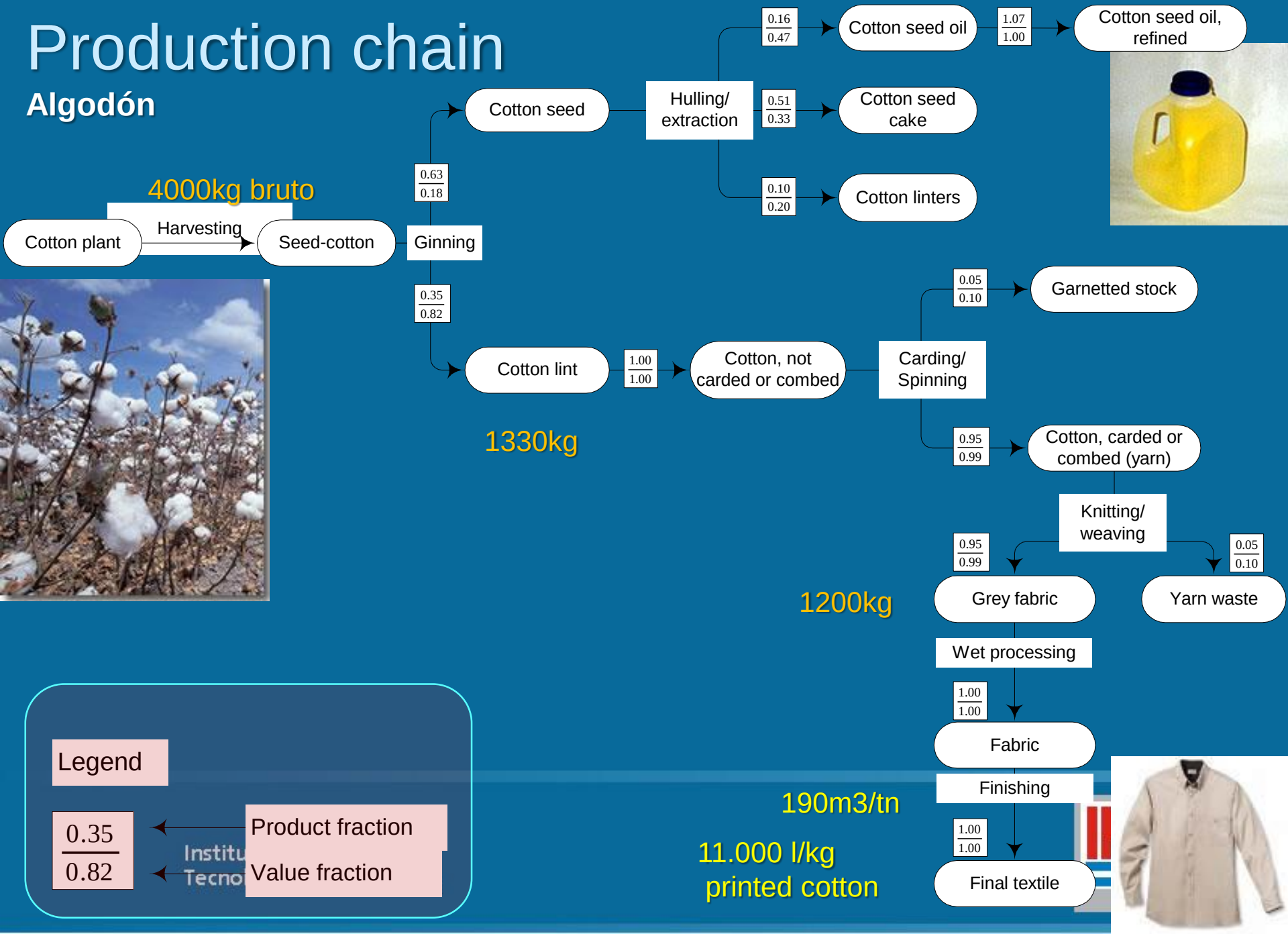
min (requerimiento de agua del cultivo, precipitaciones efectivas)

HH Azul usada por cultivos =

min (requerimientos de irrigacion, riego efectivo)

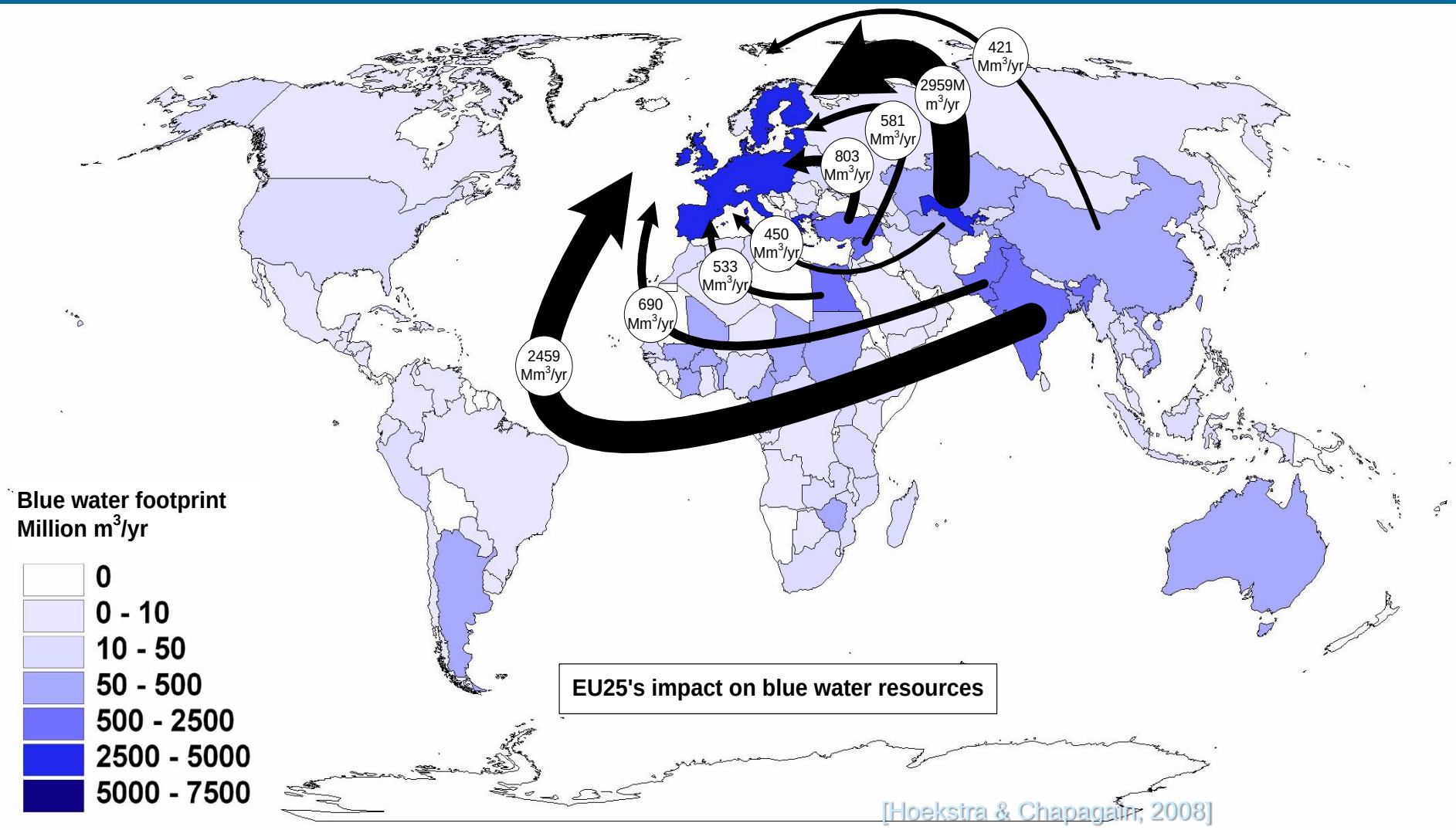
Production chain

Algodón



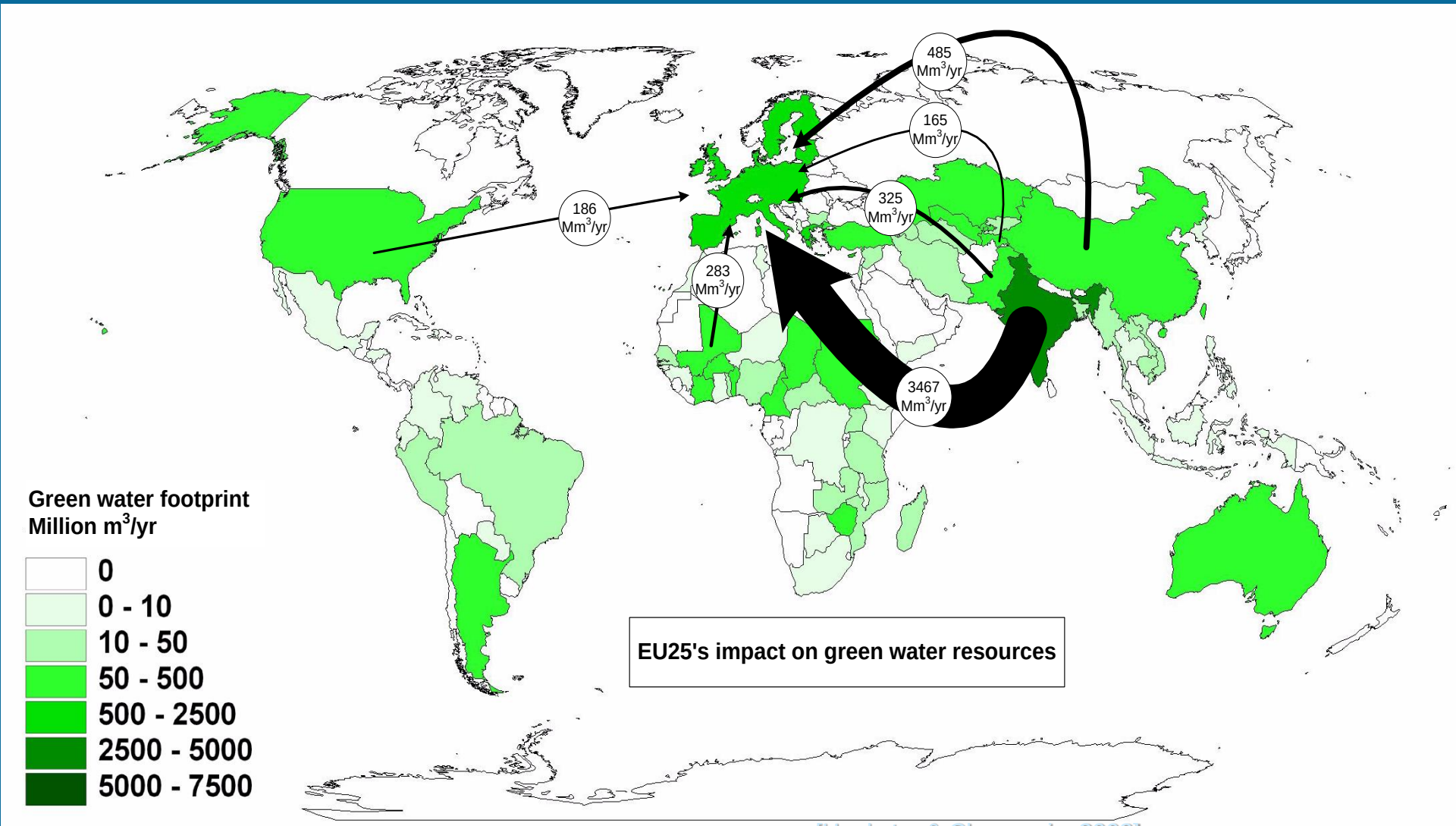
[Hoekstra & Chapagain, 2008]

Water footprint of EU's cotton consumption (blue water)



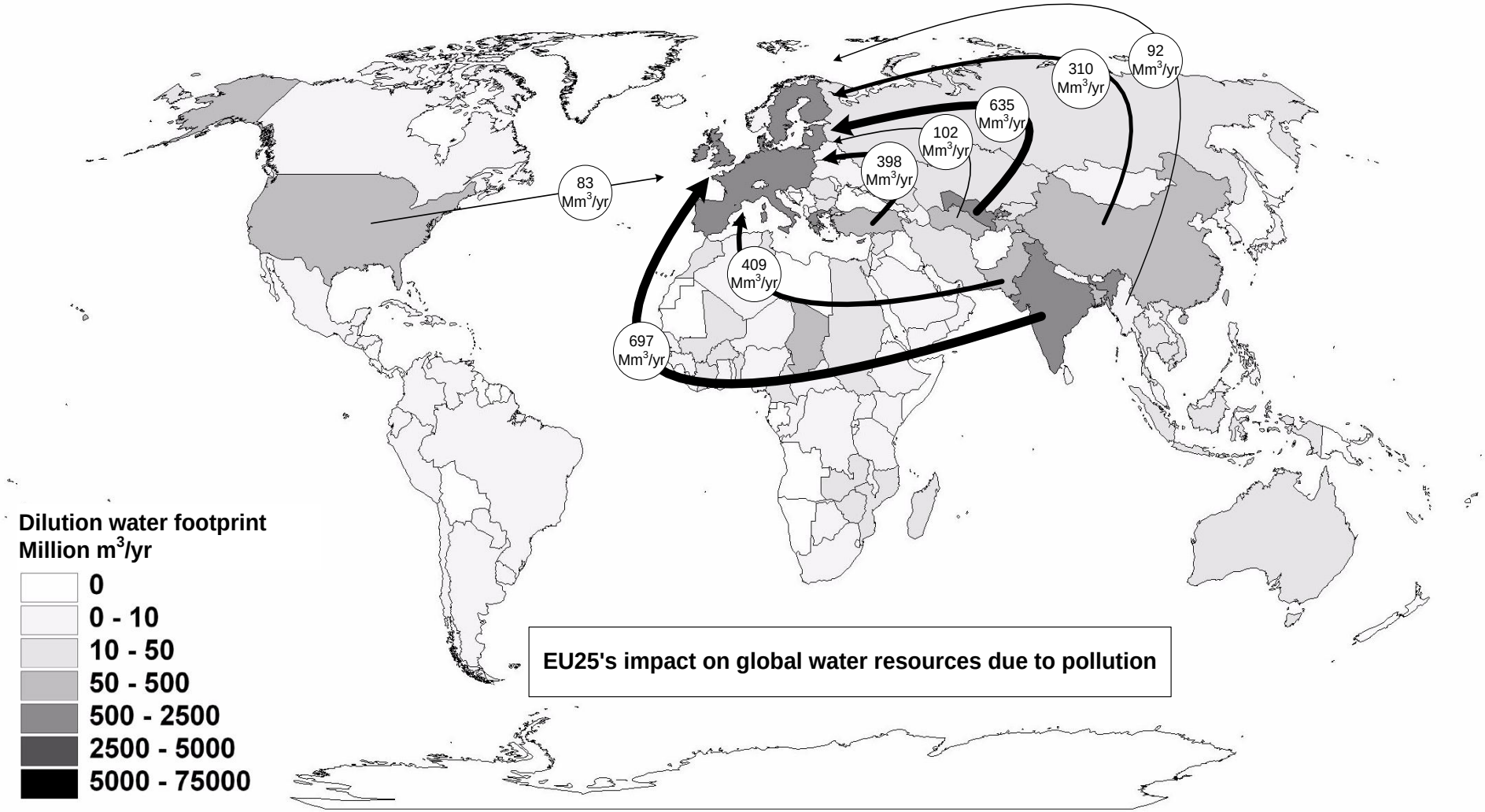
[Hoekstra & Chapagain, 2008]

Water footprint of EU's cotton consumption (green water)



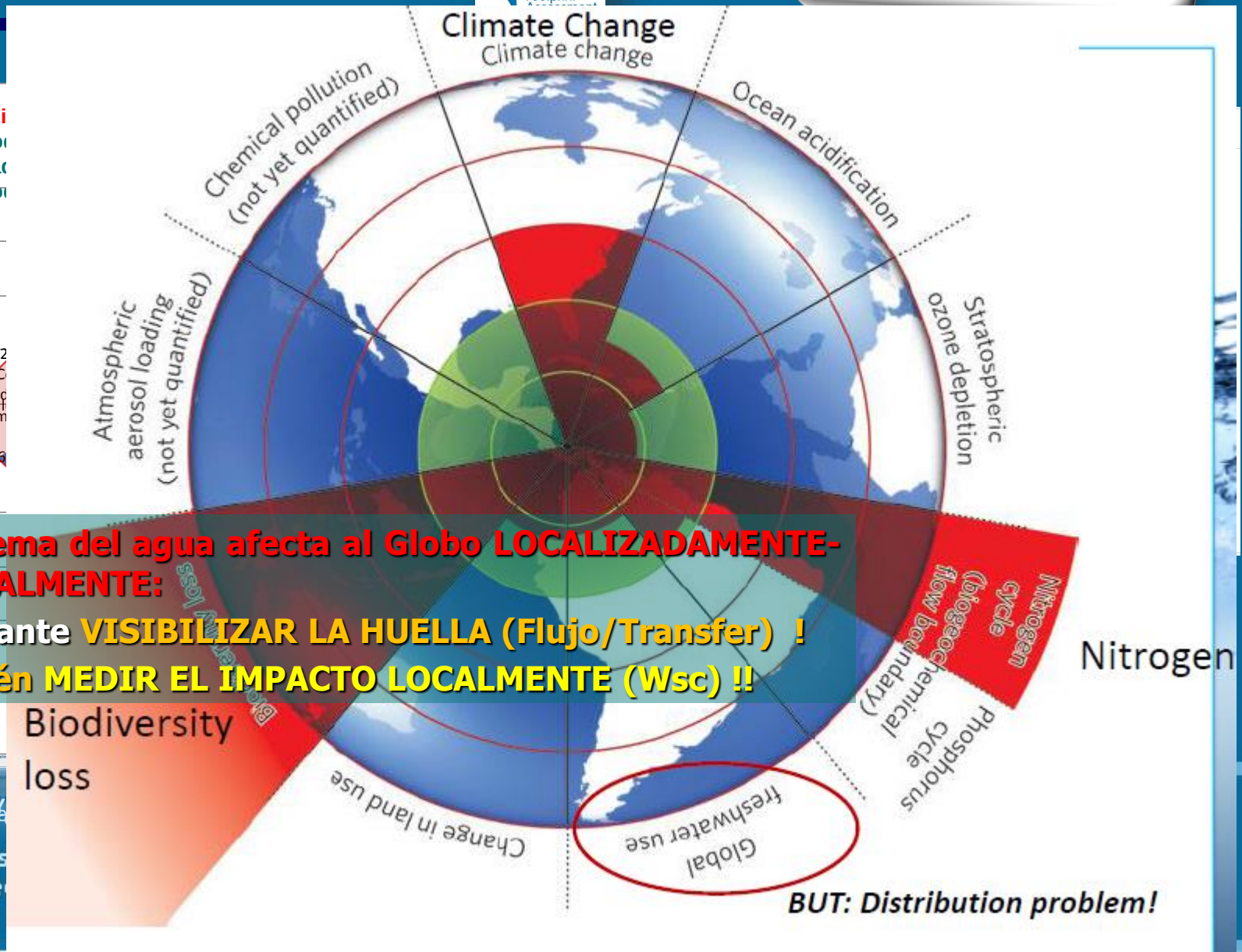
[Hoekstra & Chapagain, 2008]

Water footprint of EU's cotton consumption (grey water)



[Hoekstra & Chapagain, 2008]

Estado del Arte



El problema del agua afecta al Globo LOCALIZADAMENTE-REGIONALMENTE:

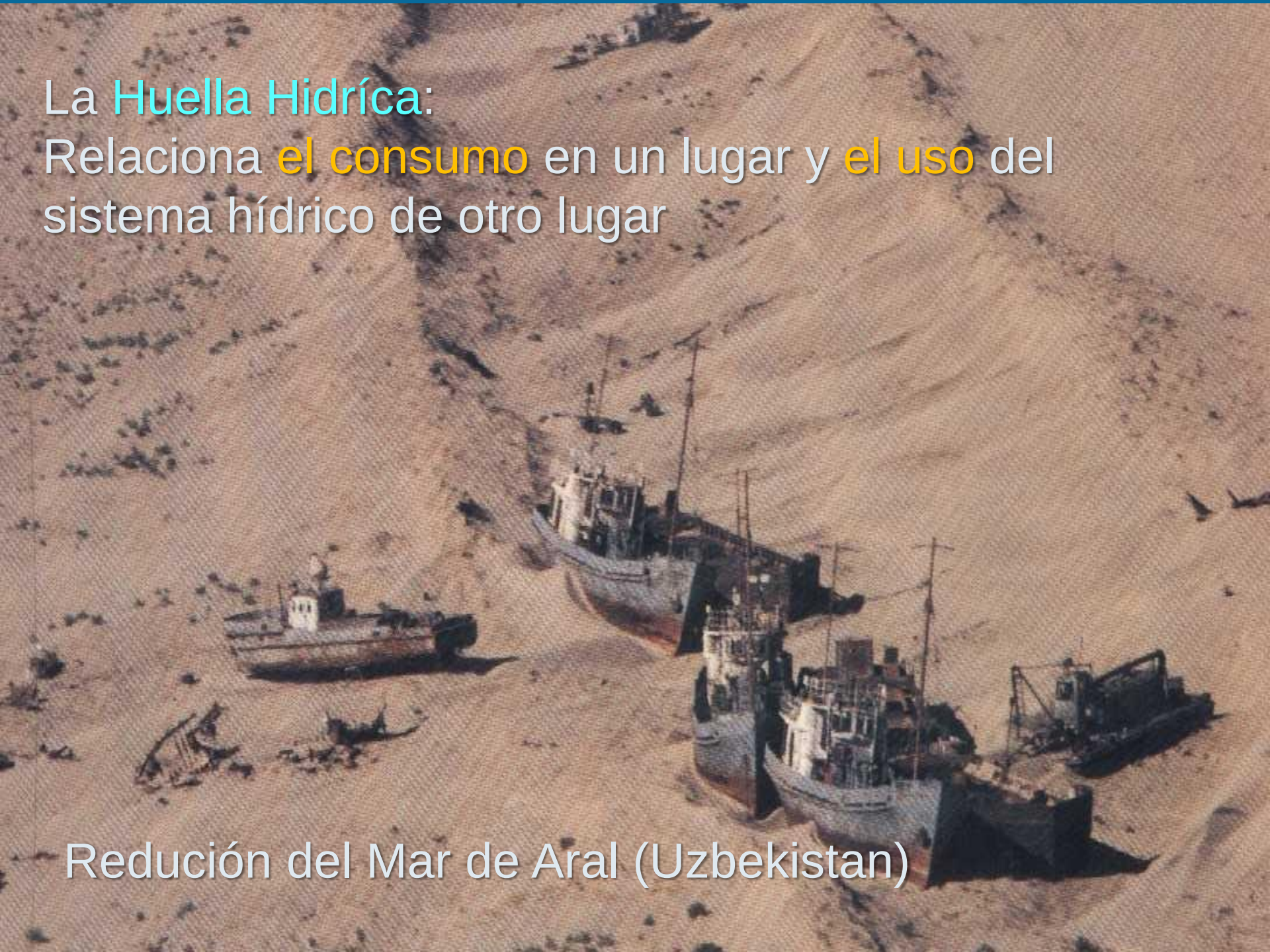
¡ Importante VISIBILIZAR LA HUELLA (Flujo/Transfer) !

y también MEDIR EL IMPACTO LOCALMENTE (Wsc) !!

Mekonnen, M.M. and Hoekstra, A.Y. (2010, 2012, 2012, Animal PE

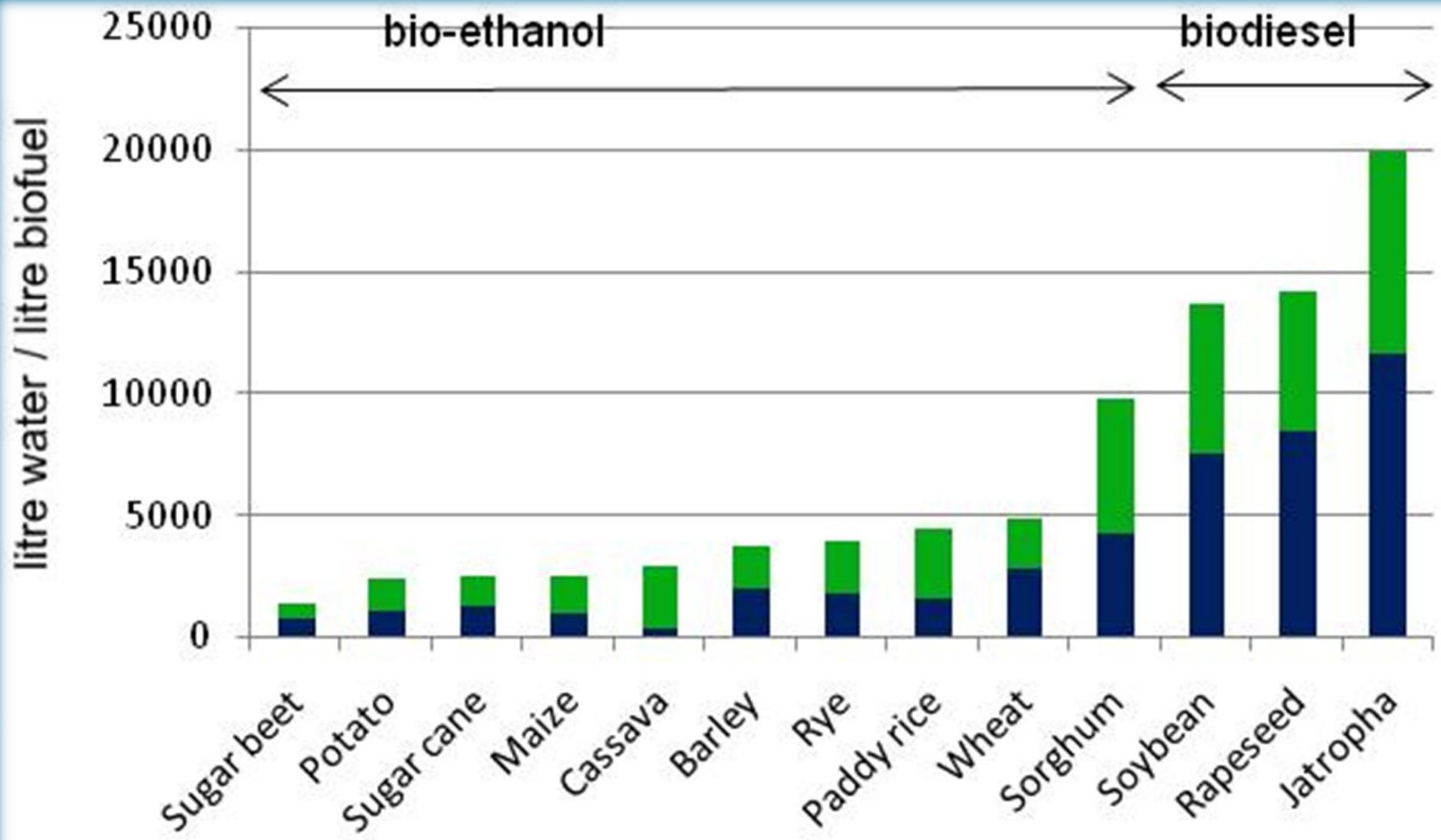
Categoría

La Huella Hidríca:
Relaciona el consumo en un lugar y el uso del sistema hídrico de otro lugar



Redución del Mar de Aral (Uzbekistan)

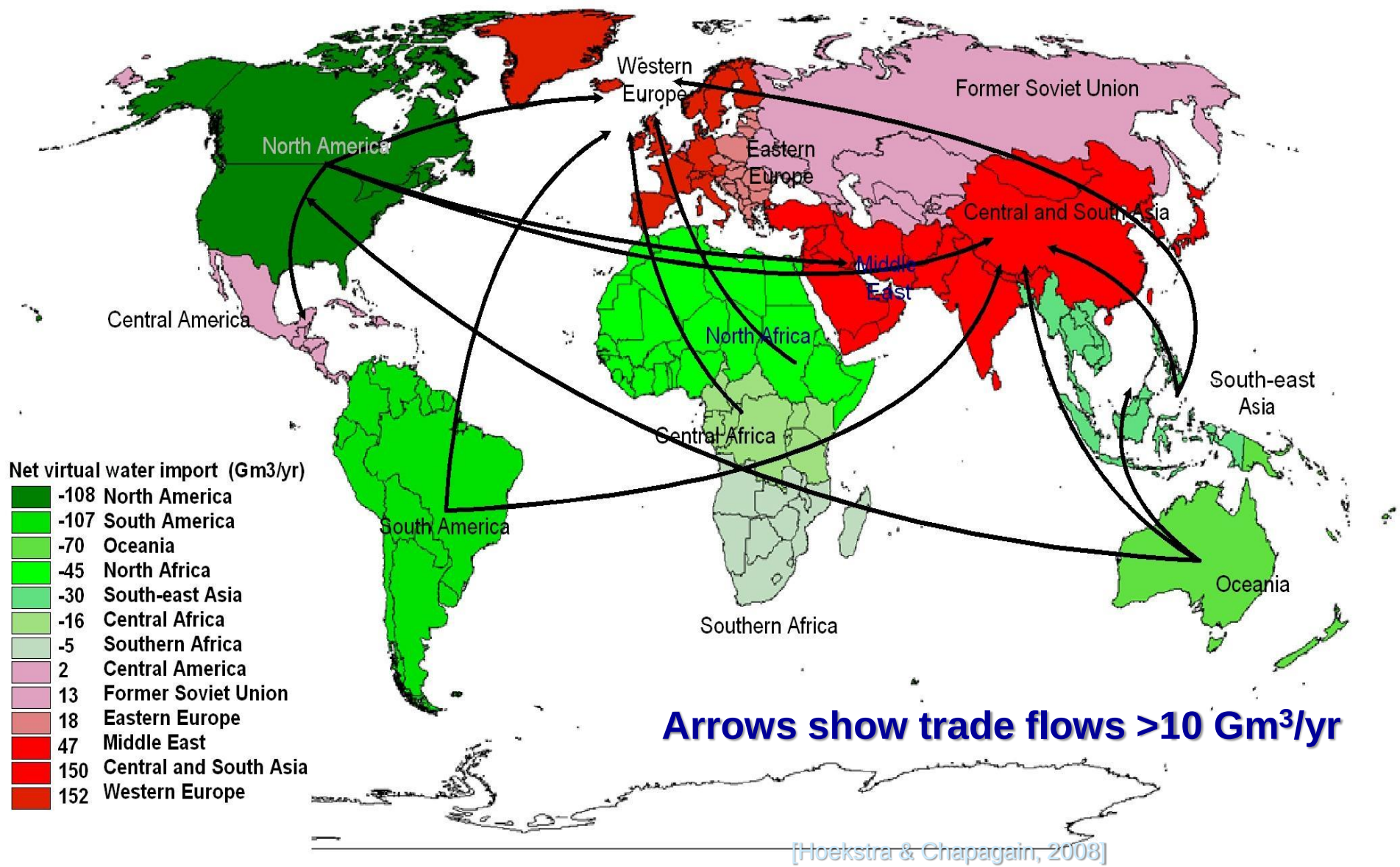
Eficiencia de uso del agua de productos *–volumen de agua/tn producto-*
Comparación de Huella Hídrica de Biocombustibles de diferentes cultivos [litro/litro]



[Gerbens-Leenes, Hoekstra & Van der Meer, 2009]

Balance de Agua Virtual Regional

(solo comercio agricultura)



[Hoekstra & Chapagain, 2008]

Mayores determinantes de la Huella Hídrica

1. Caracteristicas del Consumo
   - Volumen Consumido
   - Patrones de Consumo

2. Caracteristicas de la Producción
   - Clima: demanda de evaporación en el lugar de producción
   - Prácticas Agrícolas: Eficiencia del uso del agua

ISO 14046 WF impact Assessment - LCA

Examples of water related initiatives

ISO International Organization for Standardization

The CEO Water Mandate

Life Cycle Initiative

Global Reporting Initiative

EPA WaterSense

Aquawareness

ALLIANCE FOR WATER STEWARDSHIP

Global Water tool

The Nature Conservancy
Protecting nature. Preserving life.

Water Stewardship Initiative

water neutral

GEMI
Global Environmental Management Initiative

Water Footprint NETWORK

!Non exhaustive list!

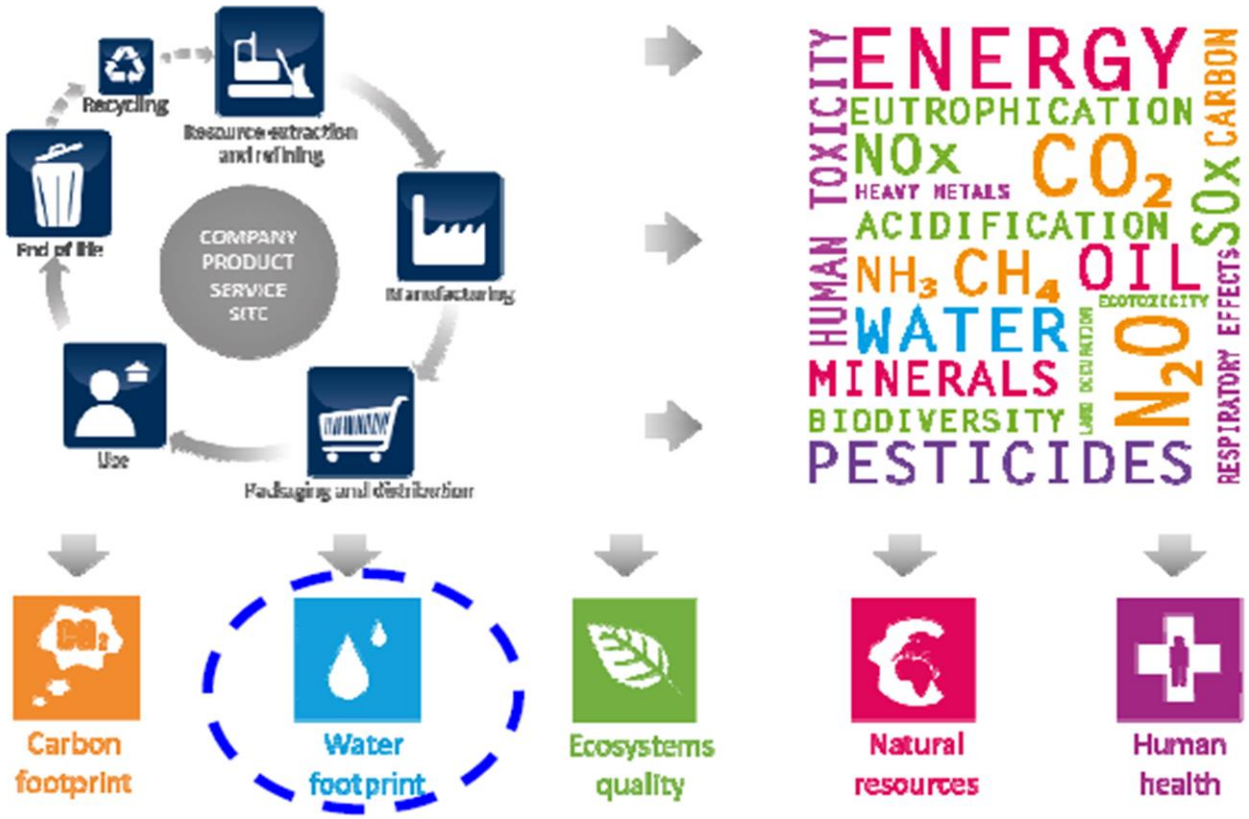
Quantis
Sustainability counts

ISO: In summary

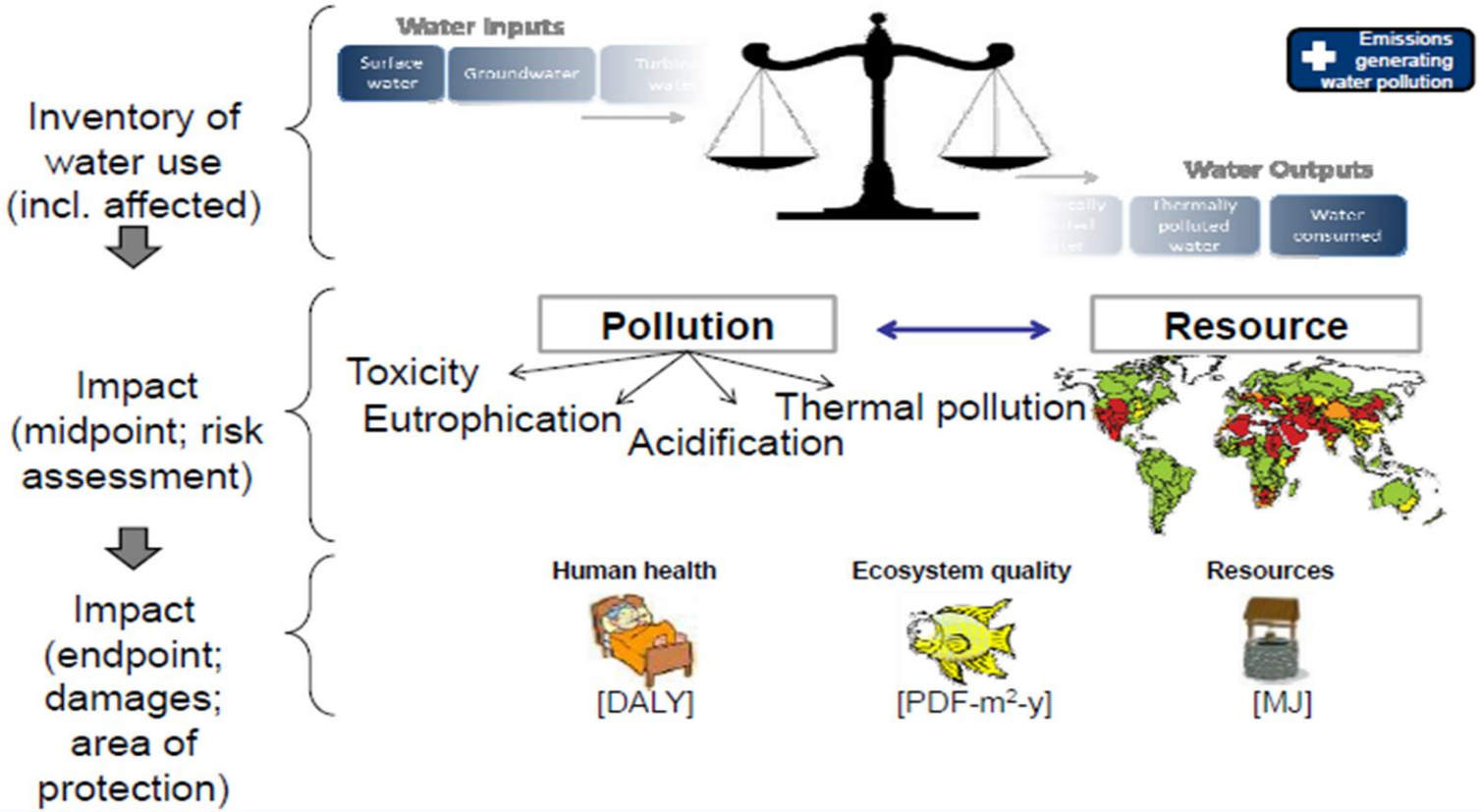
- "Water Footprint: Requirements and Guidelines"
- International standard for water footprinting
  - ***This International Standard specifies requirements and guidelines to assess and report water footprint based on LCA***
    - Terminology, communication
    - Important stages to consider
    - Consistency with carbon footprinting and other LCA impact categories
      - Scope, system boundary
    - Review/Validation
    - Reporting
- Begin 2009, end 2011
- Towards industry and practitioners

ISO International Organization for Standardization

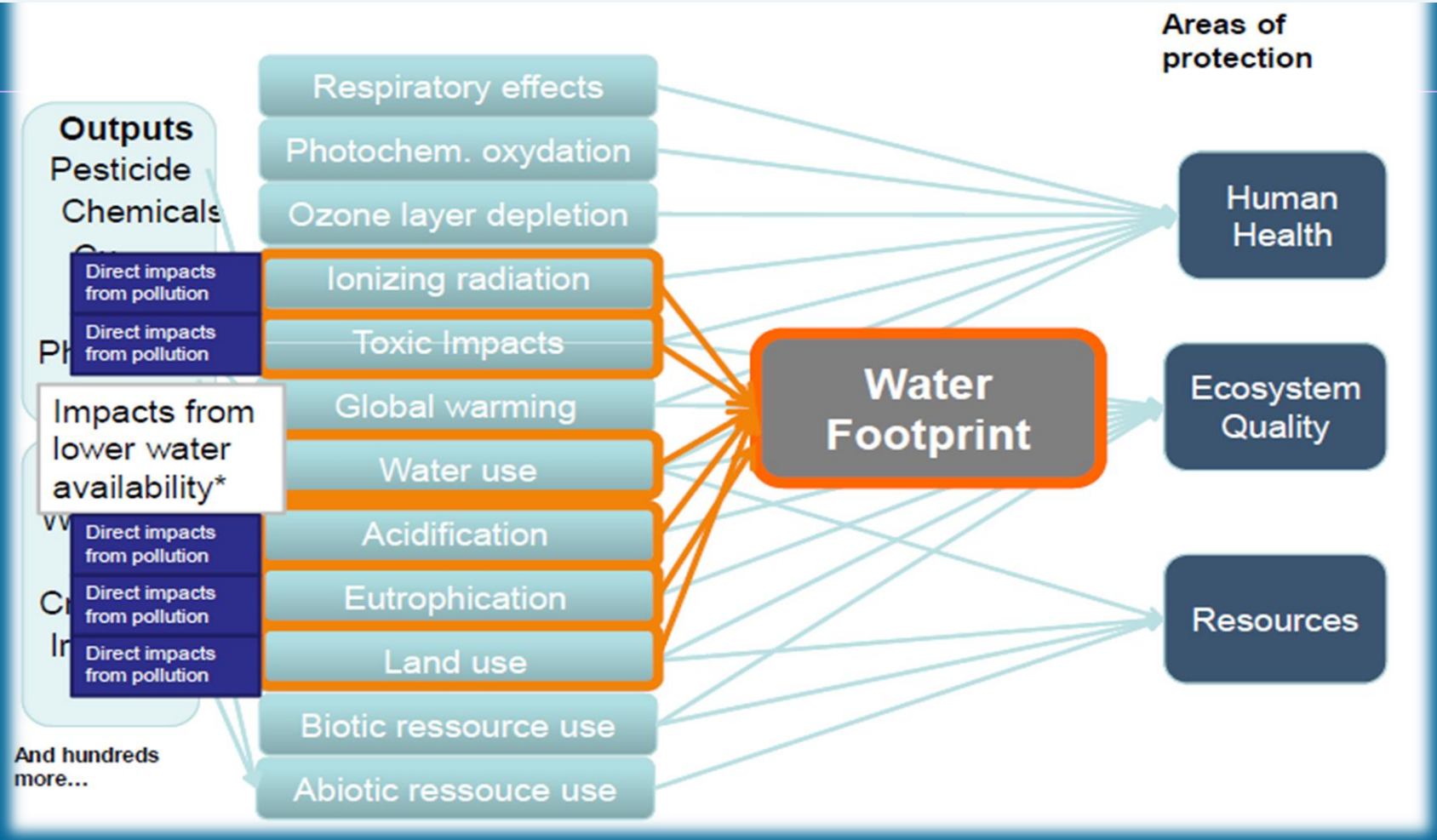
Life Cycle Assessment: multiple synthetic indicators for decision-making



Going from inventory to risk and impacts



Huella Verde no es considerada por no tener impacto asociado



DRAFT INTERNATIONAL STANDARD **ISO/DIS 14046**

Environmental management — Water footprint — Principles, requirements and guidelines

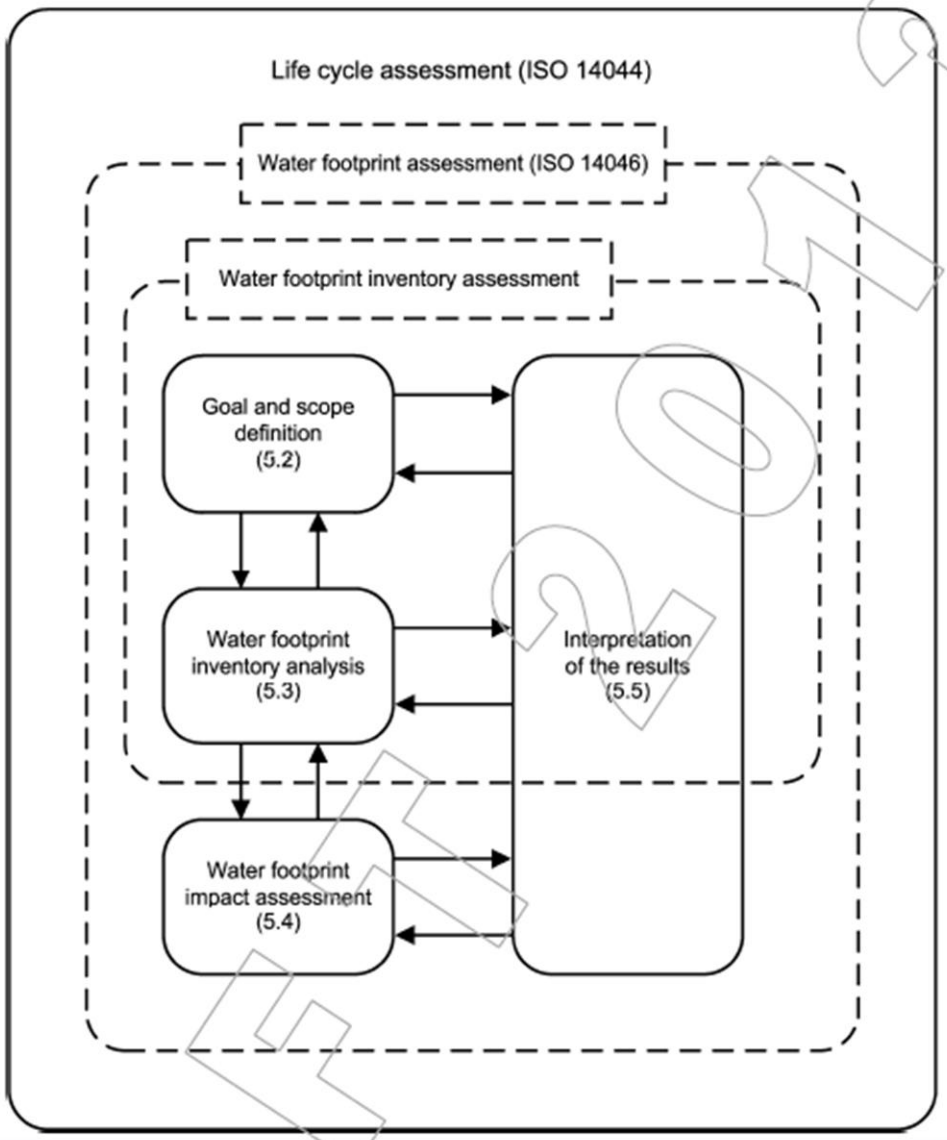
1 Scope

This International Standard specifies principles, requirements and guidelines related to water footprint assessment of products, processes and organizations based on life cycle assessment (LCA).

This International Standard provides principles, requirements and guidelines for conducting and reporting a water footprint assessment as a stand-alone assessment or as part of a more comprehensive environmental assessment.

The result of a water footprint assessment is a single value or a profile of indicator results.

NOTE Specific requirements and guidelines for organizations are given in Annex A.


Life cycle assessment (ISO 14044)
Water footprint assessment (ISO 14046)
Water footprint inventory assessment
Goal and scope definition (5.2)
Water footprint inventory analysis (5.3)
Water footprint impact assessment (5.4)
Interpretation of the results (5.5)

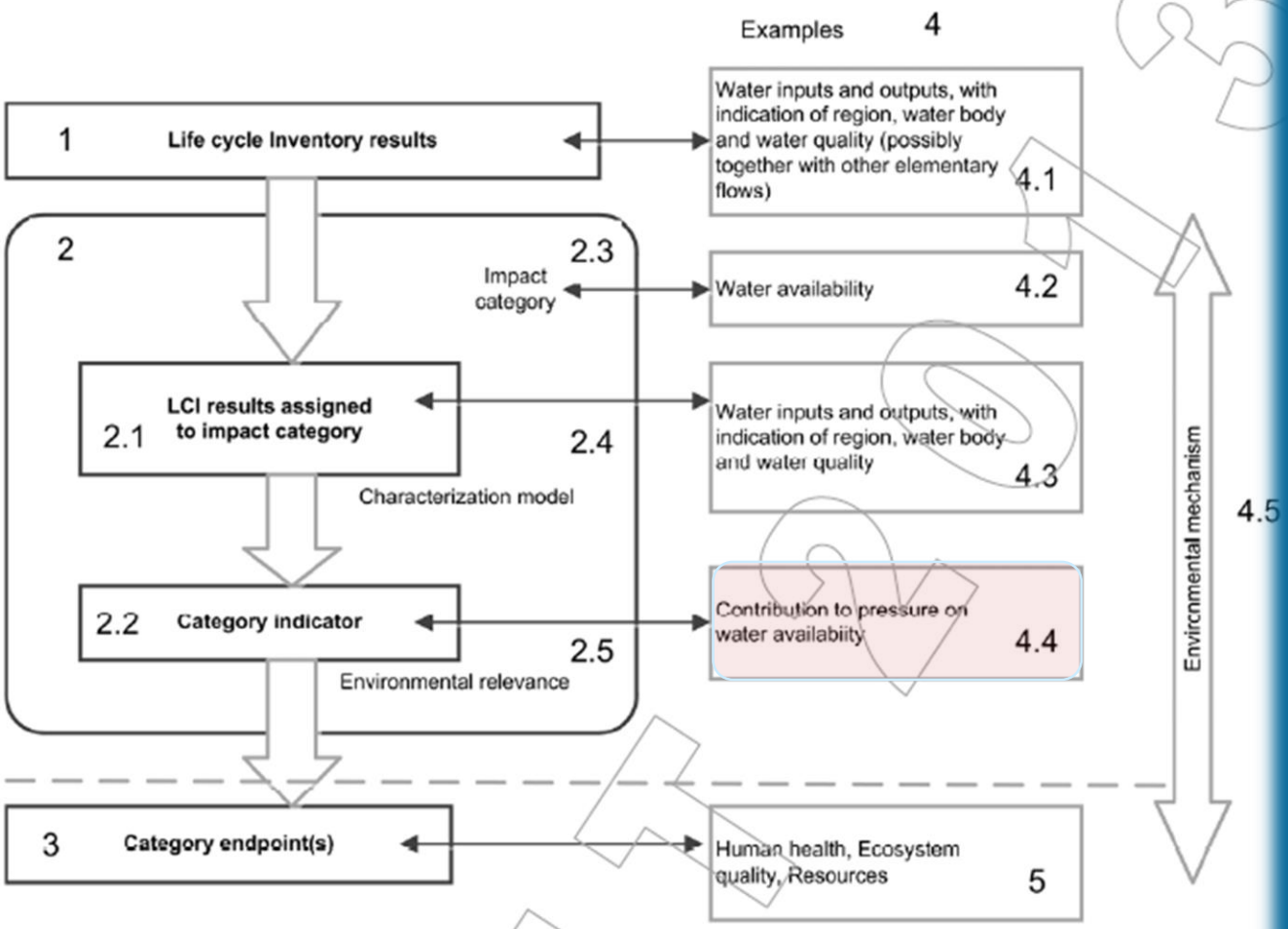
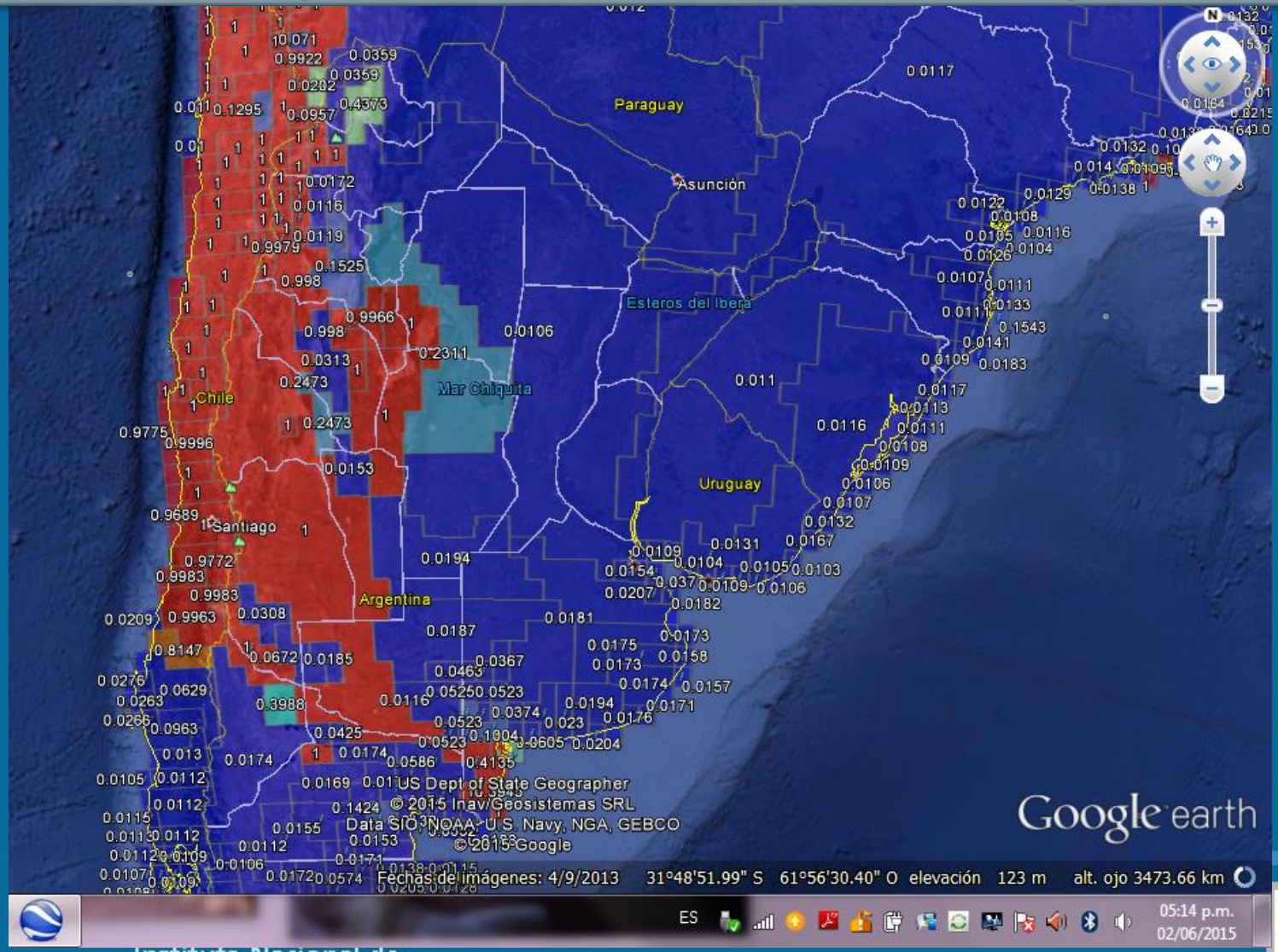


Figure 4 — Concept of category indicators illustrated for an impact category addressing water availability footprint (adapted from Figure 3 of ISO 14044:2006)

Caracterización de Impacto : Water Scarcity (agua azul)
Modelo de impacto: Water Stress Index (Pfister, 2009)



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Muchas gracias

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