TEEBAgriFood

The evolution of the Project
Paris workshop, May 2016

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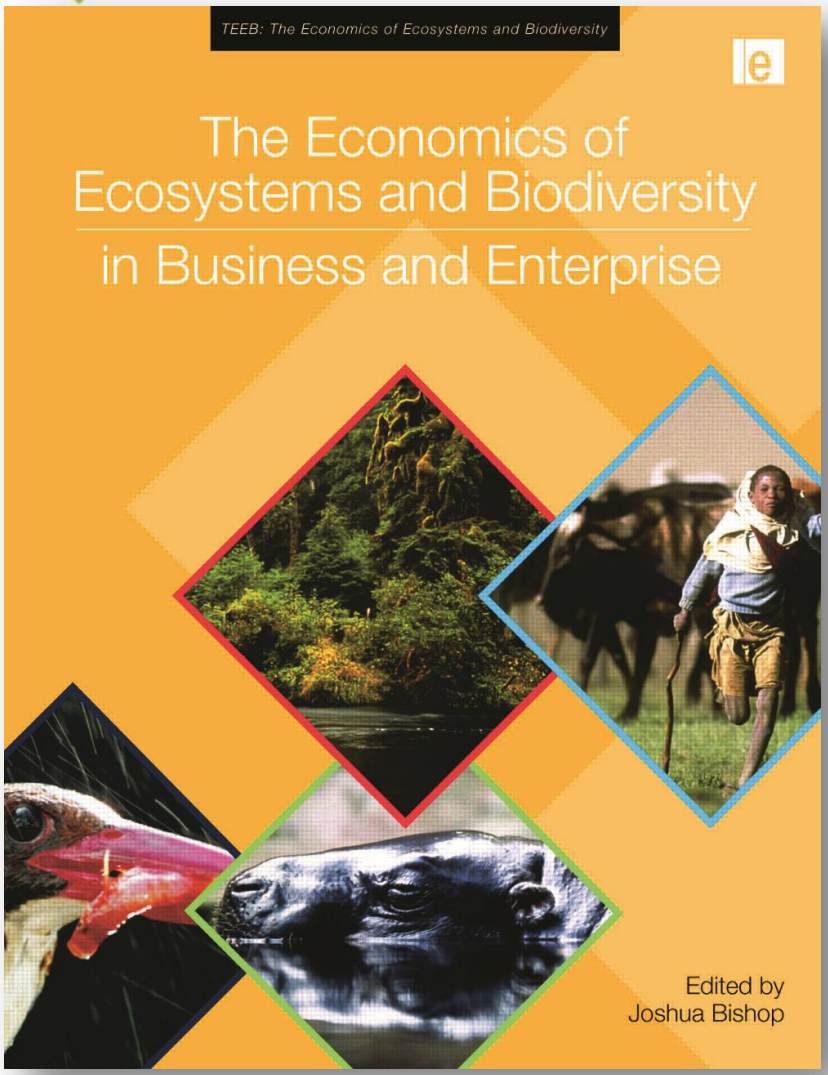
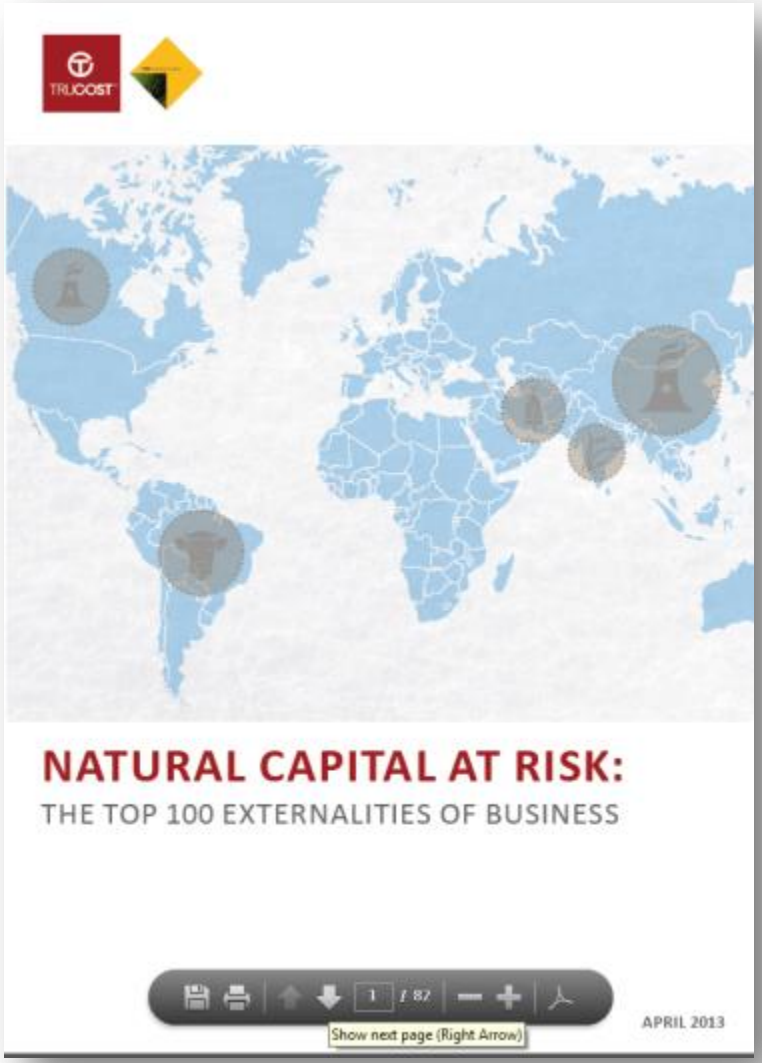
TEEB for Business





Why select the Agriculture sector?

7.1.2 THE GLOBAL 20 REGION-SECTORS

Ranking of the 20 region-sectors with the greatest total impact across the 6 EKPIs when measured in monetary terms.

RANK	SECTOR	REGION	NATURAL CAPITAL COST, US$ BN	REVENUE, US$ BN	IMPACT RATIO
1	COAL POWER GENERATION	EASTERN ASIA	452.8	443.1	1.0
2	CATTLE RANCHING AND FARMING	SOUTH AMERICA	353.8	16.6	18.8
3	COAL POWER GENERATION	NORTHERN AMERICA	316.8	246.7	1.3
4	WHEAT FARMING	SOUTHERN ASIA	266.6	31.8	8.4
5	RICE FARMING	SOUTHERN ASIA	235.6	65.8	3.6
6	IRON AND STEEL MILLS	EASTERN ASIA	225.6	604.7	0.4
7	CATTLE RANCHING AND FARMING	SOUTHERN ASIA	163.0	174.0	0.8
8	CEMENT MANUFACTURING	EASTERN ASIA	147.0	5.8	23.0
9	WATER SUPPLY	SOUTHERN ASIA	111.7	14.1	7.9
10	WHEAT FARMING	NORTHERN AFRICA	100.1	7.4	13.6
11	RICE FARMING	EASTERN ASIA	99.3	91.2	1.1
12	WATER SUPPLY	WESTERN ASIA	86.7	18.4	4.7
13	FISHING	GLOBAL	86.1	136.0	0.6
14	RICE FARMING	NORTHERN AFRICA	84.2	1.2	69.6
15	CORN FARMING	NORTHERN AFRICA	80.4	1.7	47.8
16	RICE FARMING	SOUTH-EASTERN ASIA	79.7	41.0	1.9
17	WATER SUPPLY	NORTHERN AFRICA	76.4	3.4	22.2
18	SUGARCANE	SOUTHERN ASIA	75.6	6.0	12.5
19	PETROLEUM AND NATURAL GAS EXTRACTION *(excludes water and land use)*	EASTERN EUROPE	72.6	371.6	0.2
20	NATURAL GAS POWER GENERATION	NORTHERN AMERICA	69.4	122.7	1.0

Summary statement

The **TEEBAgriFood** study is designed to:

1. provide a comprehensive economic evaluation of the *'eco-agri-food systems' complex*
2. demonstrate that the economic environment in which farmers operate is distorted by *significant externalities*, both negative and positive, and a lack of *awareness of dependency on natural and social capital*

NC Accounting: A *typology* of farms

+ Agriculture employs 1 in 3 of the world's economically active labour force, or about 1.3 billion people. For the 70 per cent of the world's poor living in rural areas, agriculture is the main source of income and employment.

+ Smallholder farms (i.e. less than 2 hectares) represent over 475 million of the world's 570 million farms and, in much of the developing world, they produce over 80 per cent of the food consumed.

+ Food production systems produce approximately 2,800 calories per person per day which is enough to feed the world population.

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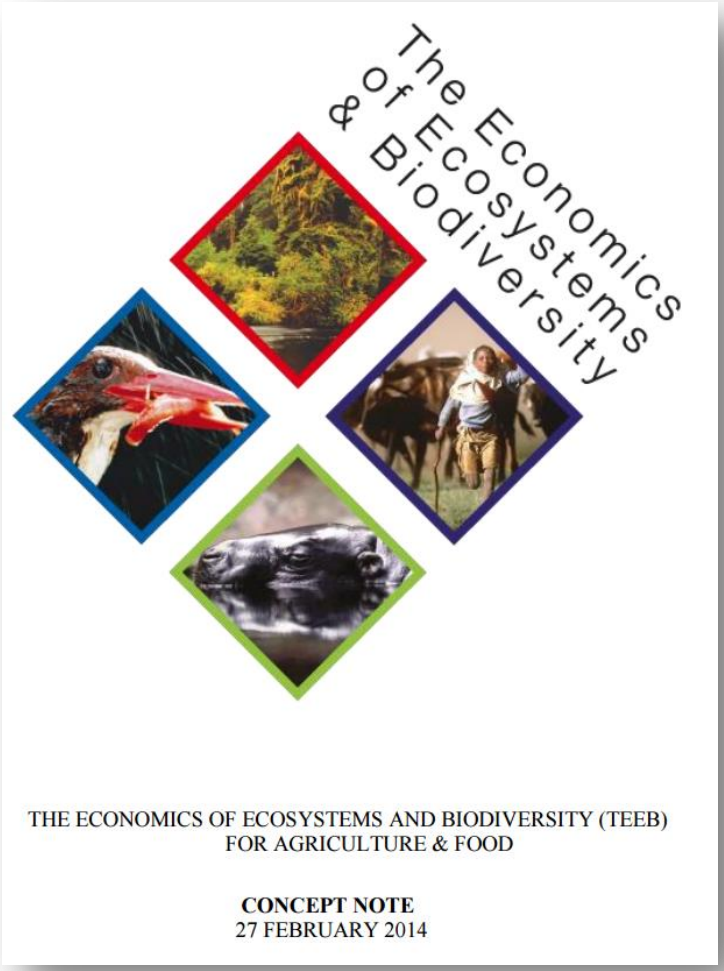
The need to assess *landscapes*

- Eighty per cent of new agricultural land has replaced tropical forests since the 1980s, a trend resulting in significant biodiversity loss and ecosystem degradation.

- Crop and livestock farming produce between five and six billion tons of CO_2-equivalent in greenhouse gas (GHG) emissions each year, mostly in developing countries where the agricultural sector has expanded in recent years.

- The agricultural sector utilizes 70 per cent of the water resources we withdraw from rivers, lakes and aquifers, raising serious concerns in terms of sustainability and security.

February 2014:
developing the Concept



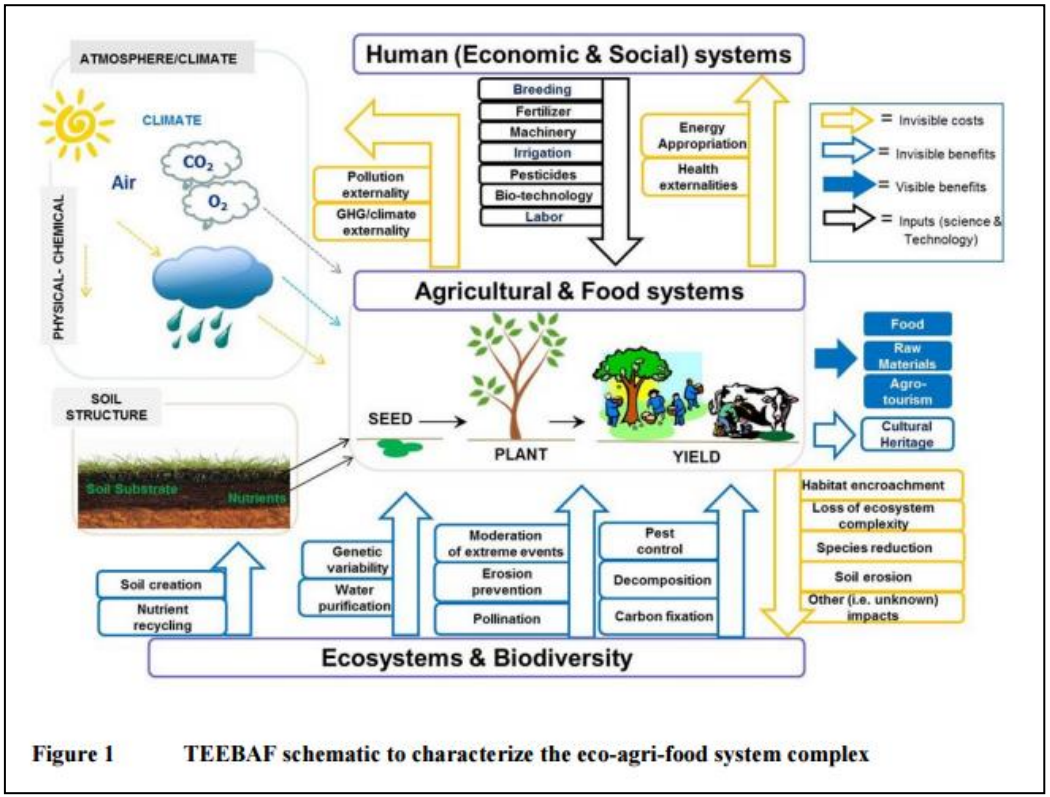
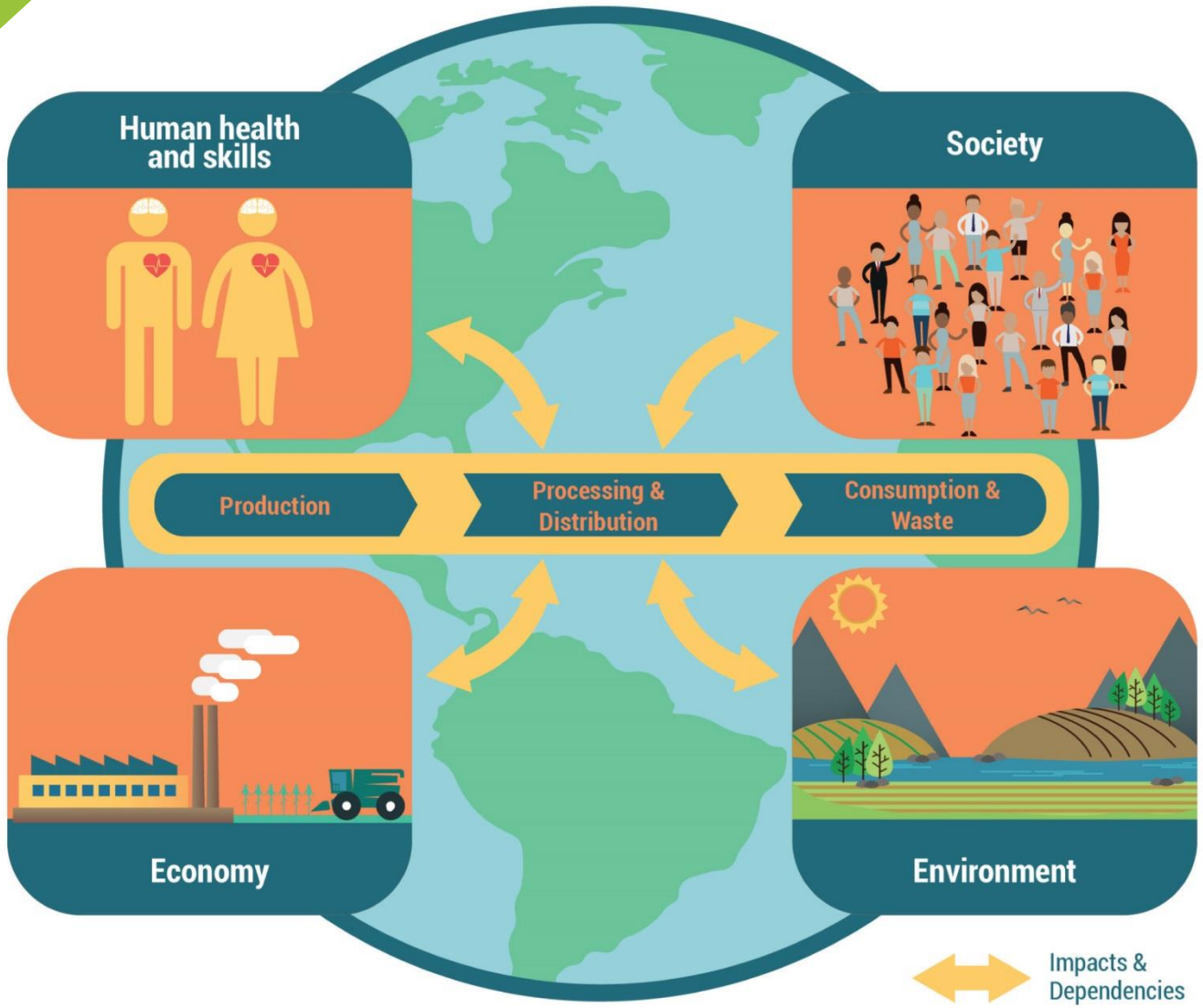


Figure 1 **TEEBAF schematic to characterize the eco-agri-food system complex**

Eco-agri-food systems complex – impacts and dependencies



The visible and invisible flows of agricultural production

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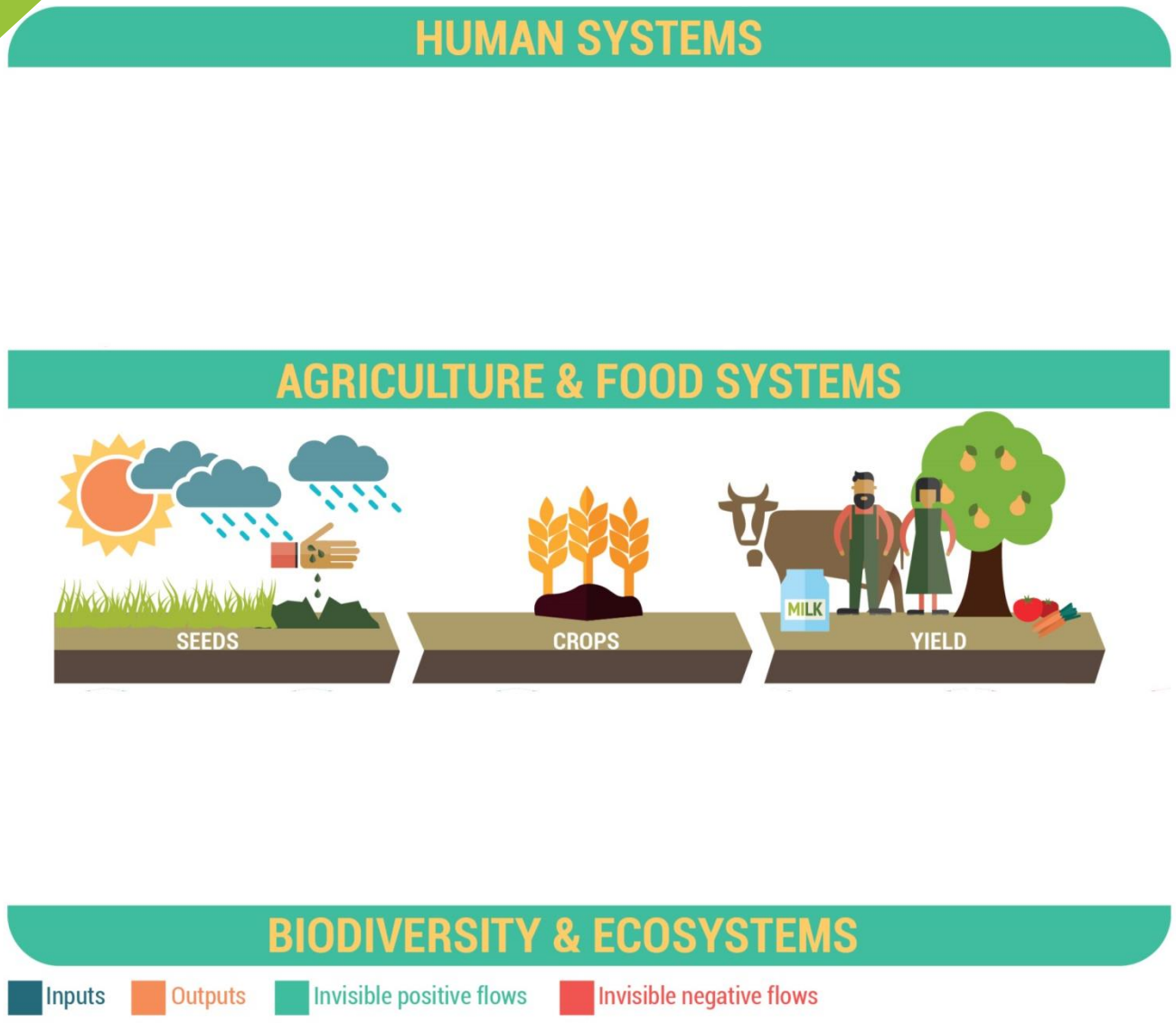

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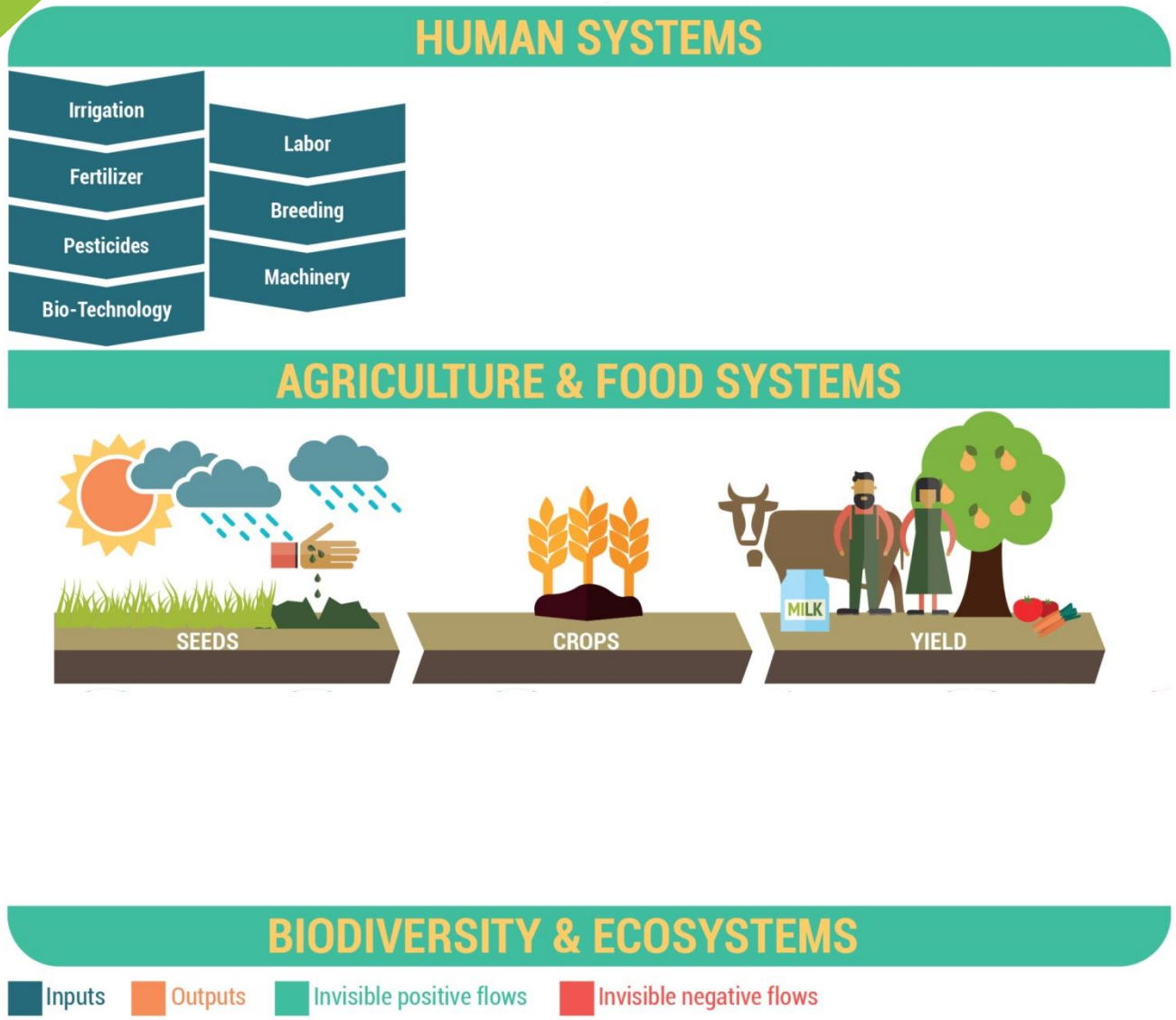

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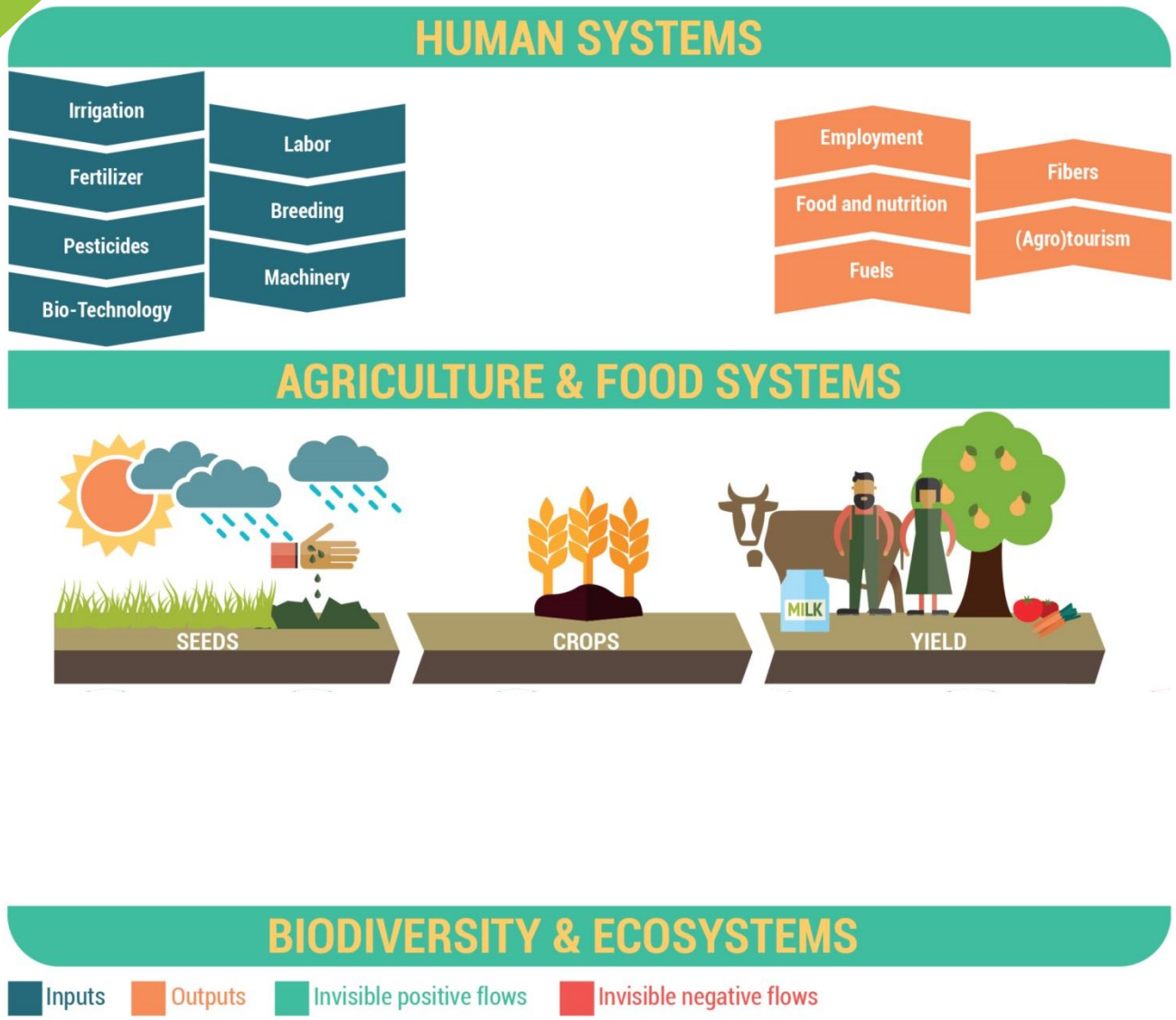

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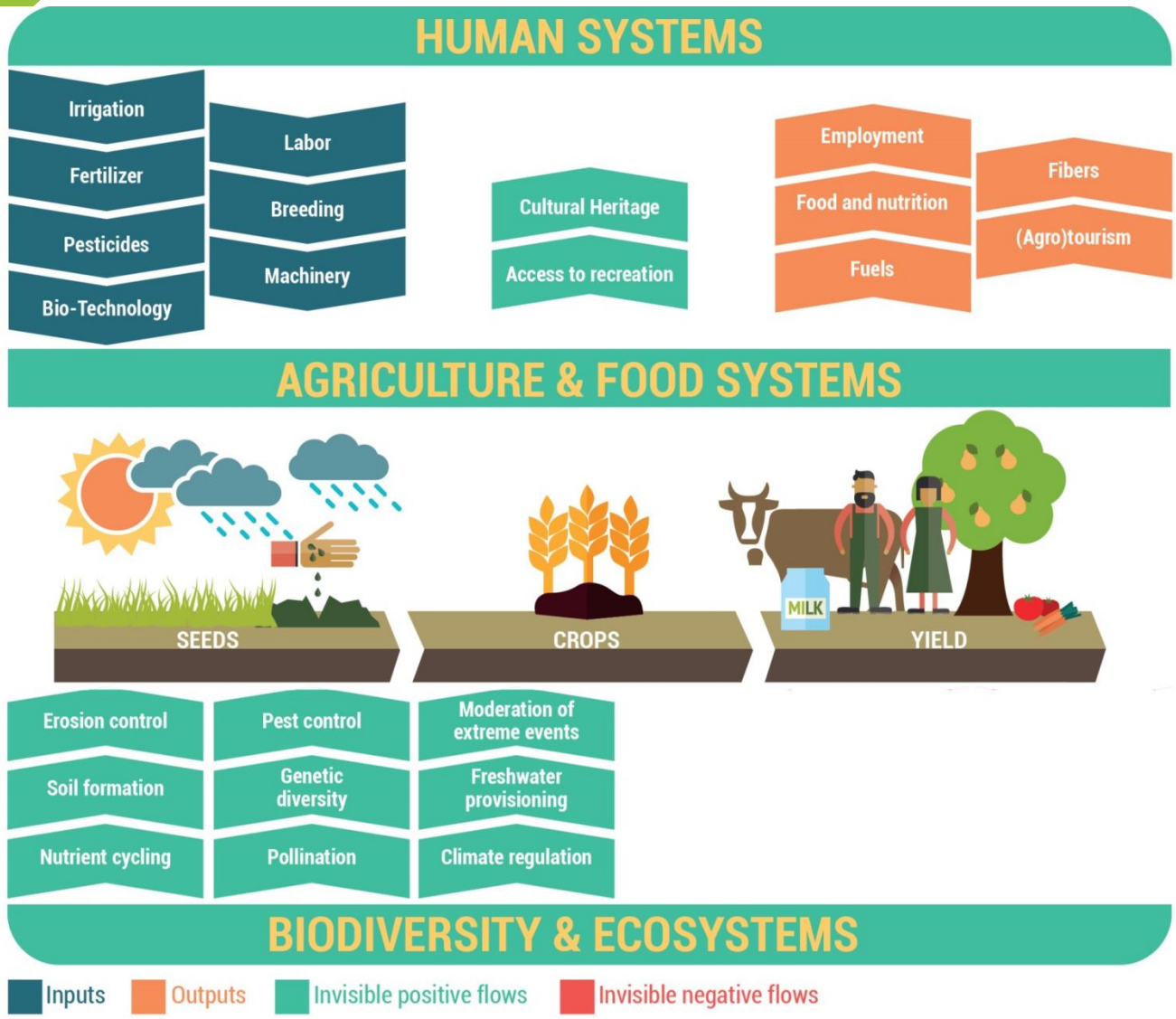

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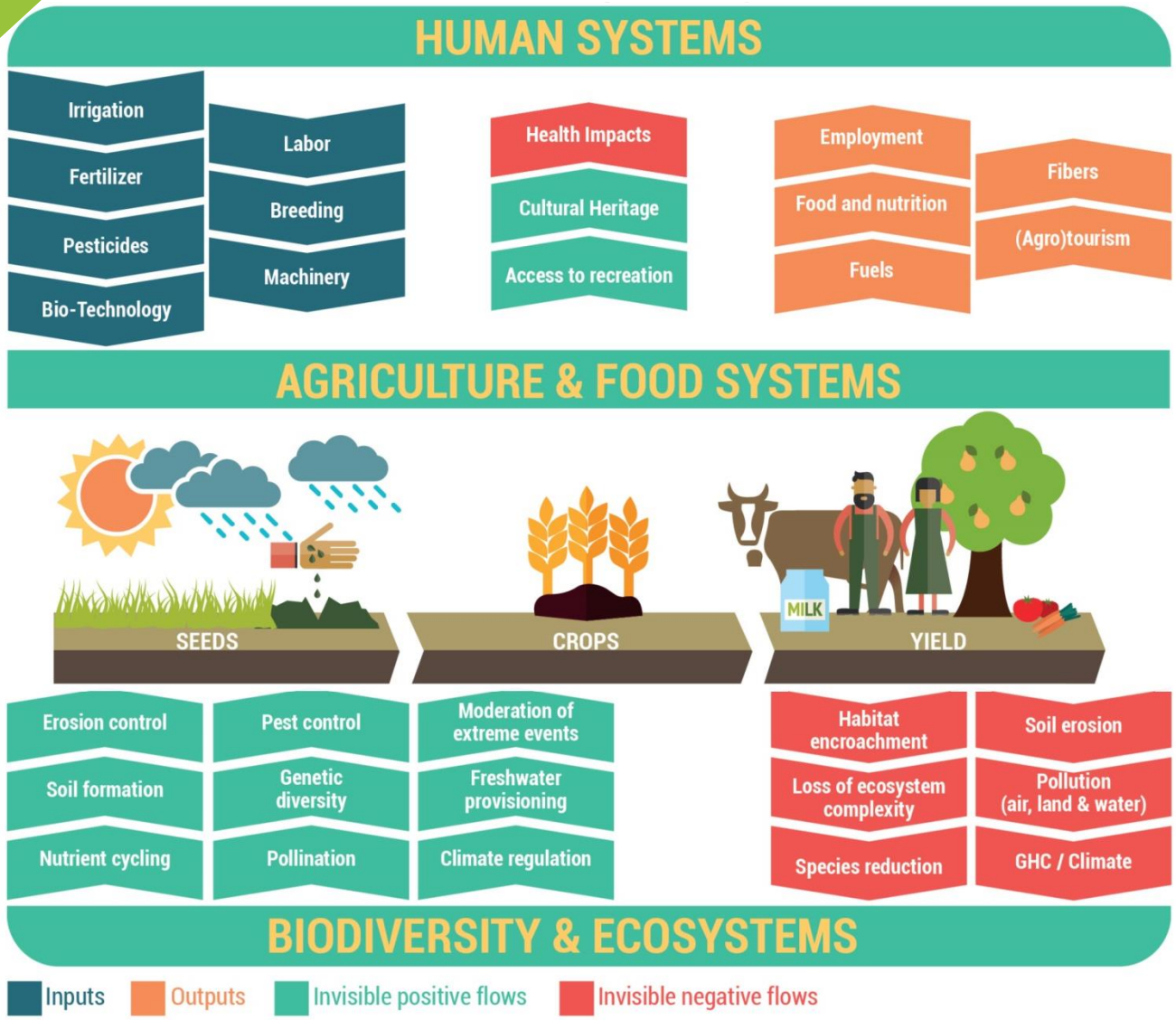
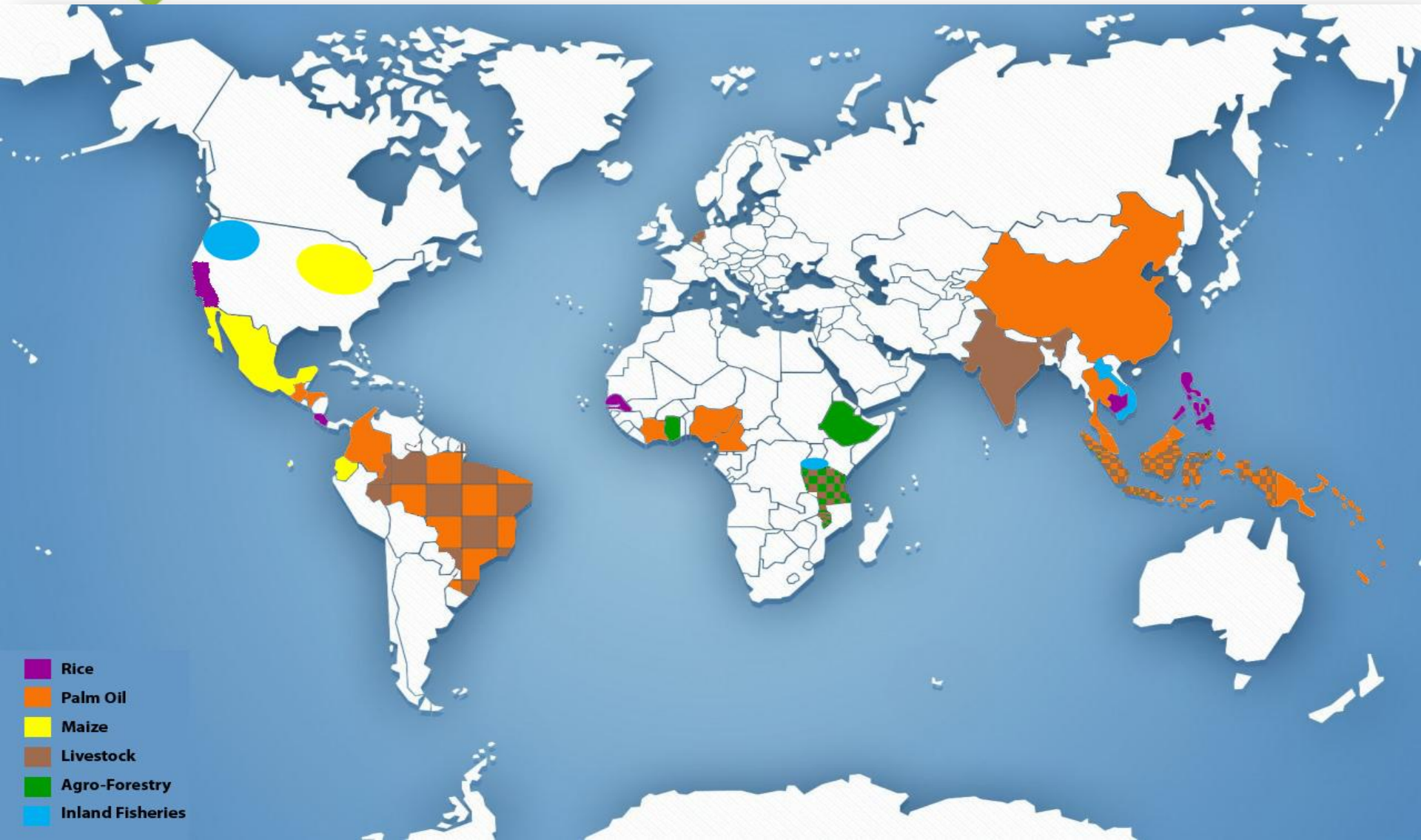


Feeder studies on NCA

Competitive tendering process (April 2014):

- No single consortia submitted a bid that included **full value chain** impacts/dependencies
- **Health** impacts were barely considered
- Range of case studies did not fully cover the **heterogeneity** in production systems/socio-cultural and ecological contexts *within* sectors
- Research consortia led by experts in **bio-physical assessment**
- **ESs scope:** range and depth of assessment dependent on data availability, resources and time
- Therefore **some subset** of the eco-agri-food systems complex would be valued

Feeder Studies



Valuation Approaches

TEEB Framework

- Human (Economic and Social) Systems
- Agricultural and Food Systems
- Ecosystems and Biodiversity

Assessments

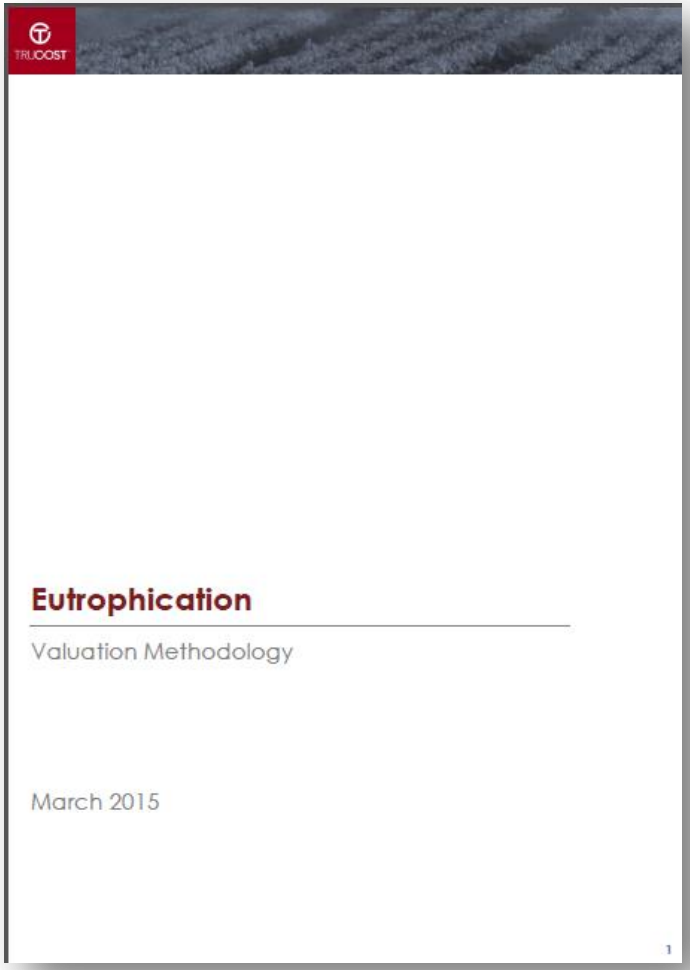
1. Top down *[Livestock]*
   - **Goal**: Identify 'hotspots' and key impact areas
   - **Biophysical data**: Use of global or country-specific data
   - **Valuation data**: Global or country-specific valuations
   - **Key strengths:** Broad coverage

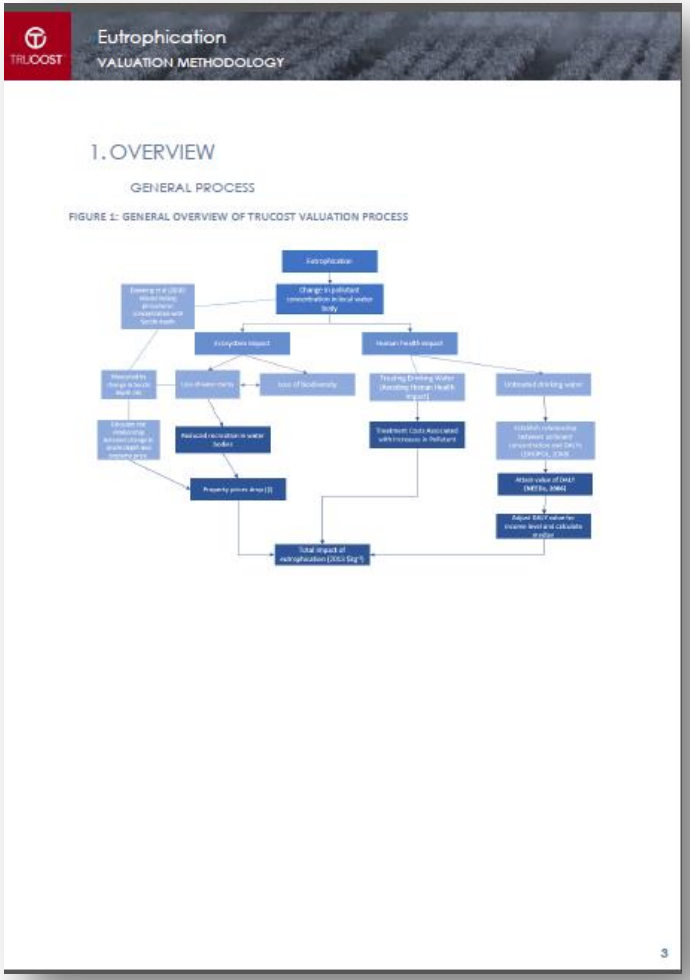
2. Hybrid *[Rice, Palm oil]*
   - **Goal**: Wide scope of analysis using a 'systems based' approach
   - **Biophysical data**: Mix of local and modelled data
   - **Valuation data**: Global, country-specific, or local valuations
   - **Key strengths:** Contextualization of local data

3. Bottom-up *[Livestock]*
   - **Goal**: Analysis of farming systems / regional contexts
   - **Biophysical data**: Local quantitative and qualitative datapoints
   - **Valuation data**: Global, country-specific, or local valuations
   - **Key strengths:** Robustness for decision making

Increasing geographic specificity

Trucost valuation approach to Eutrophication I

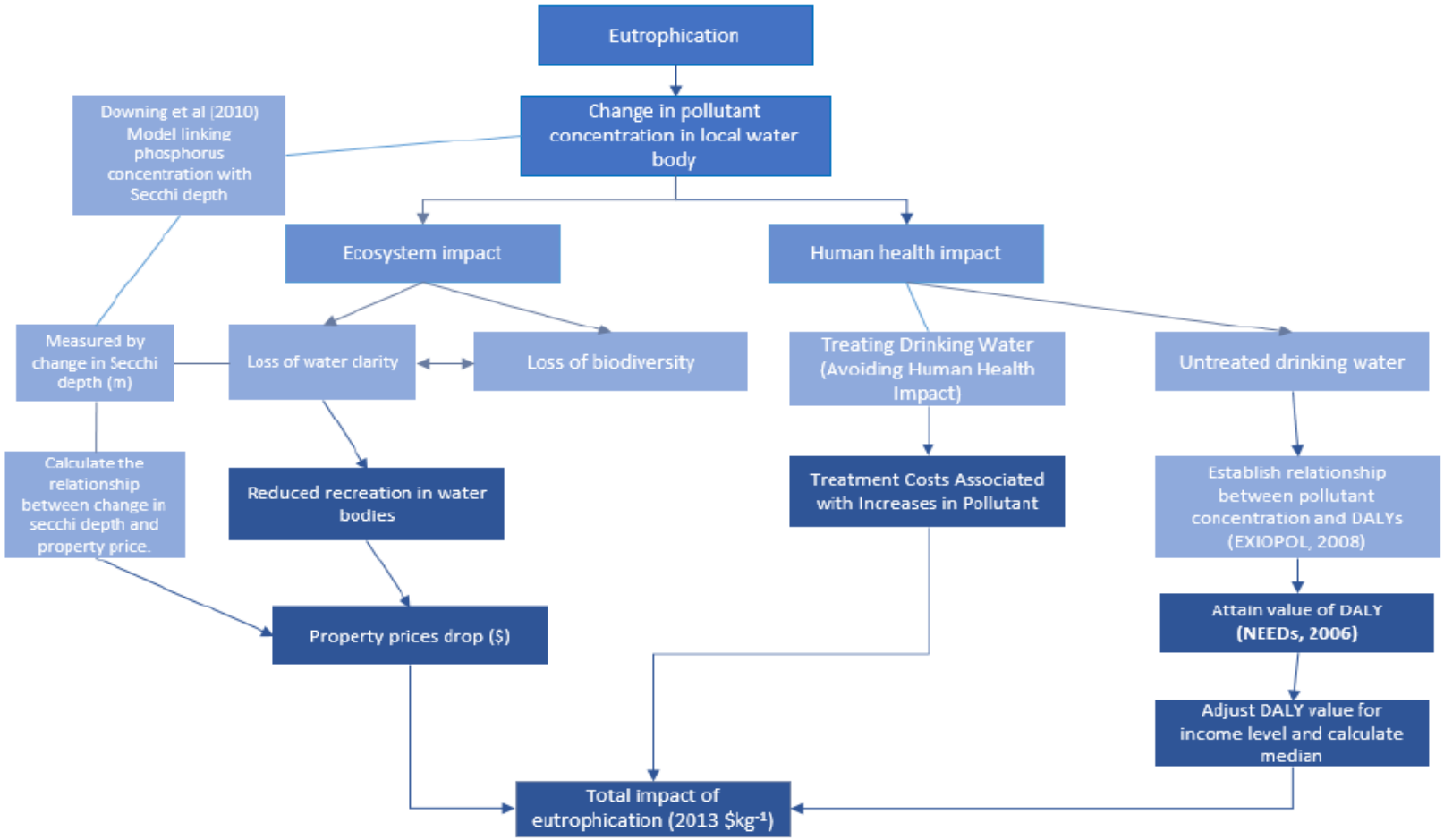




1. OVERVIEW

GENERAL PROCESS

FIGURE 1: GENERAL OVERVIEW OF TRUCOST VALUATION PROCESS



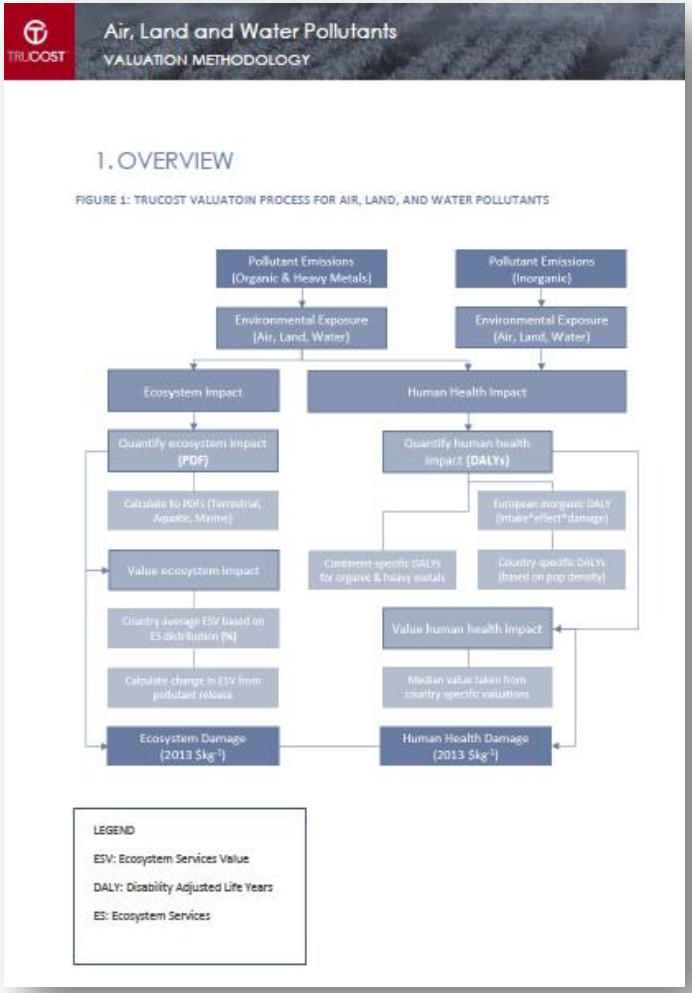
Trucost approach to Eutrophication II: scope assessment

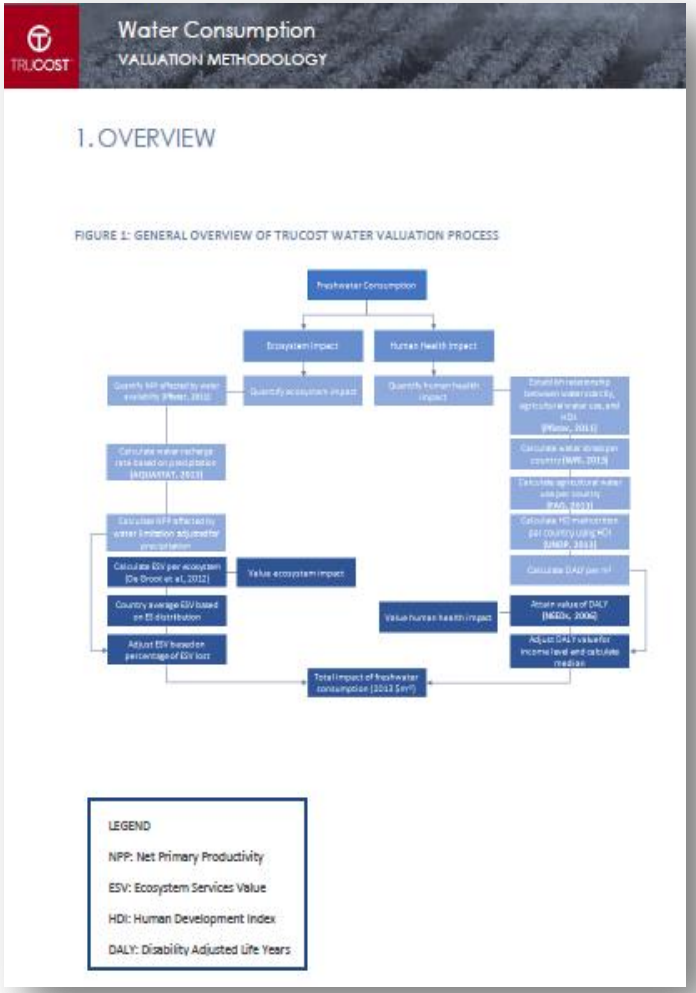
- **Out of scope:**
  - Recreational values
  - Health impacts from lack of water for sanitation
  - *Specific* distance to water bodies

TABLE 1: CLASSIFICATION OF WATER BODIES

Trophic Class	Concentration of P (µg/L)	Secchi Depth[1] (m)	Chlorophyll (µg/L)	Description
Oligotrophic	0-12	>4	0-2.6	Clear water, low levels of nutrients, very infrequent algae blooms, sufficient oxygen, high quality drinking water, high biodiversity
Mesotrophic	12-24	2-4	2.6-20	Clear water, moderate nutrients, infrequent algae blooms
Eutrophic	24-96	0.5-2	20-56	Abundance of aquatic plants and algae blooms, opaque waters, lower levels of oxygen, less fish, can smell
Hypereutrophic	>96	<0.5	>56	Low transparency, frequent algae blooms, little or no fish, episodes of severe odour

Further Trucost valuation methodologies





TruePrice Bottom-up: Measurement Approach

Example: Livestock (Supply chain)

Quantification

- Farming operations and supply chain (at least production of feed) for 5 countries and 10 practices
- LCA approach to supply chain; modelling of local systems
- Data from peer-reviewed literature, GLEAM, FAOSTAT amongst others

Non-monetary valuation

- Land occupation
- Impact on biodiversity

Monetary Valuation

- Natural capital costs of GHG, water pollution
- Natural capital dependency on water

- **Quantification**
  - Data from experts, peer reviewed literature and databases
  - Biophysical models of farming systems
  - Site-level, specific to a particular production system
- **Limitations**
  - High data requirements, limited data availability
  - Comparability is determined by scope
  - Results are situation specific and contextualisation is necessary for interpreting

What did we learn from the Feeder Studies?

- **Process:**
  - Initial results expected (contractually) by December 2014; now close to completion/published in 2016
- **Outcomes:**
  - Some robust, defensible value estimates for invisible impacts and dependencies
  - Care needed in presenting partial results
  - Need for a consistent, comprehensive valuation framework but (I) categories of value addition non-additive, and (II) impossible to fully populate
- **Research consortia:**
  - Cross-disciplinary research challenging

Interim Report Launch

Rice Study

- Worldwide, about 80 million hectares of irrigated lowland rice provide 75% of the world's rice production

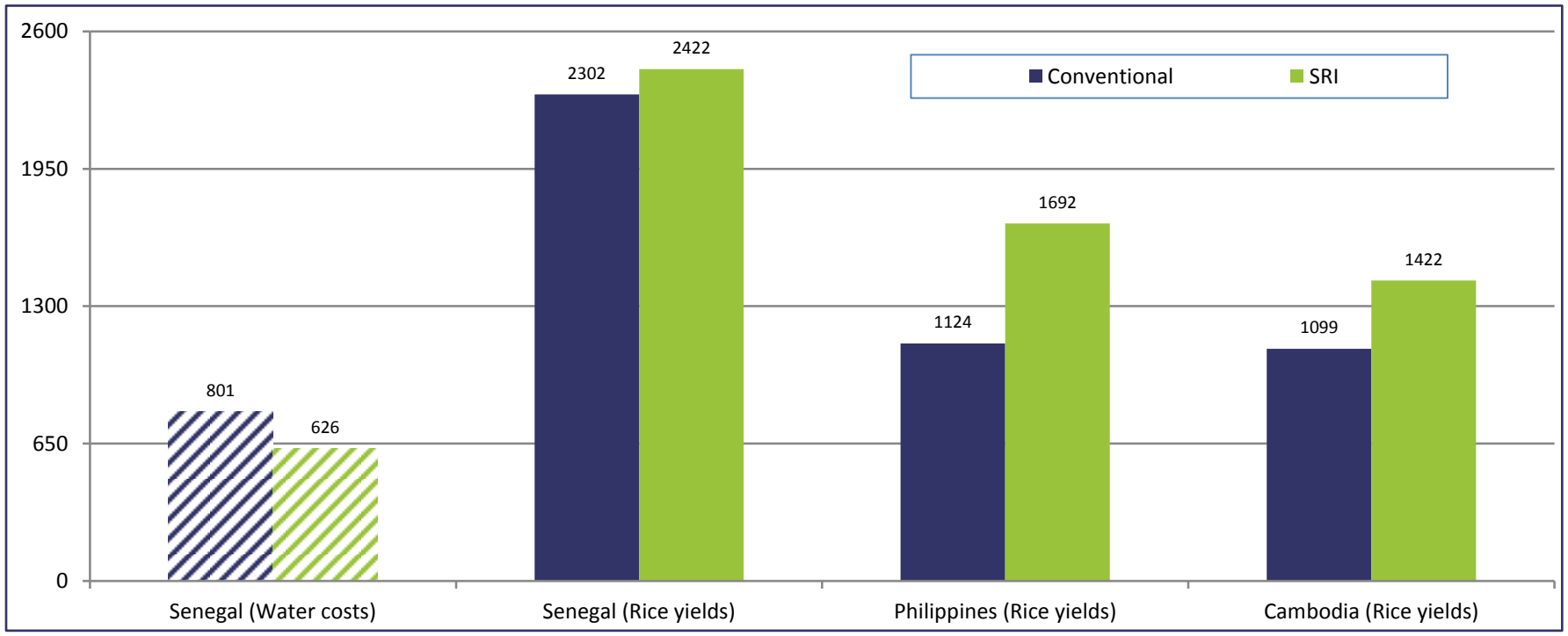
- This predominant type of rice system receives about **40% of the world's total irrigation water** and 30% of the world's developed freshwater resources

Rice Study

Conventional vs SRI production

- The System of Rice Intensification (SRI) includes intermittent flooding as part of the production package.
- SRI advises transplanting of young (eight to ten days old) single rice seedlings, with care and spacing, and applying intermittent irrigation and drainage to maintain soil aeration.
- In addition, the use of a mechanical rotary hoe or weeder to aerate the soil and control weeds is encouraged.

Increasing rice yields, Reducing water consumption



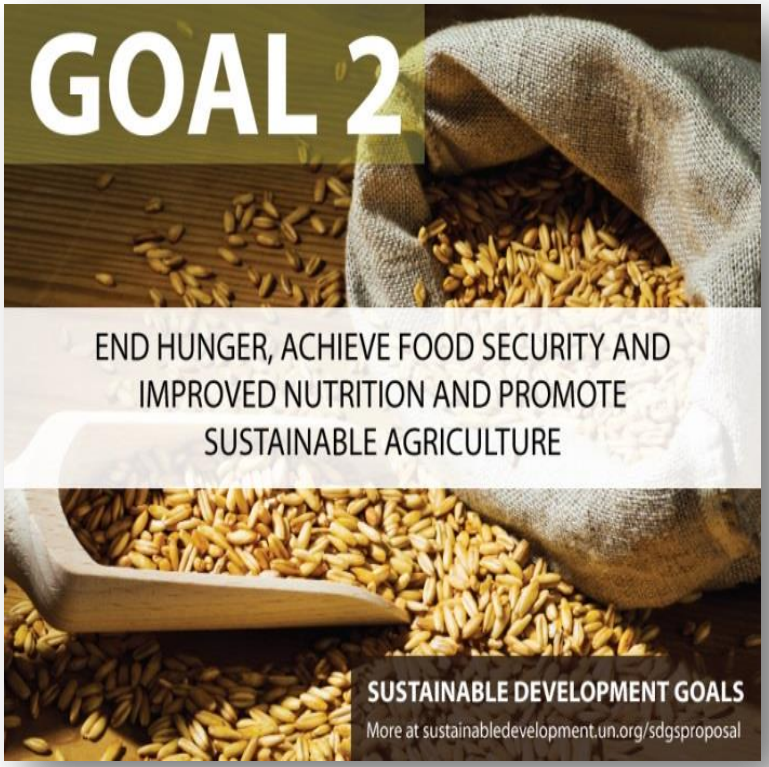
TEEB
Three different levels of action:

1. Recognizing value – identifying the wide range of benefits in ecosystems, landscapes and biodiversity, such as provisioning, regulating, habitat/supporting and cultural services

2. Demonstrating value – using economic tools and methods to make nature's services economically visible in order to support decision-makers wishing to assess the full costs and benefits of land-use change

3. Capturing value – incorporating ecosystem and biodiversity benefits into decision-making through incentives and price signals

TEEBAgriFood > SDGs



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