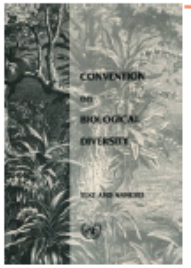
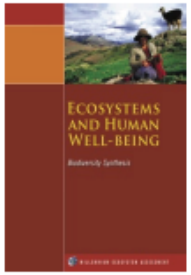
Agricultural policy for the environment or environmental policy for agriculture?

TEEB for Agriculture and Food

Dr. Salman Hussain
salman.hussain@un.org

TEEB initiative (2008-2012)





Ecol./Env. Economics literature

G8+5 Potsdam 2007

"Potsdam Initiative – Biological Diversity 2010"

The economic significance of the global loss of biological diversity….

Importance of recognising, demonstrating & responding to values of nature…

Interim Report

CBD COP 9 Bonn 2008

Climate Issues Update

Input to UNFCCC 2009

TEEB End User Reports Brussels 2009, London 2010

India, Brazil, Belgium, Japan & South Africa Sept. 2010

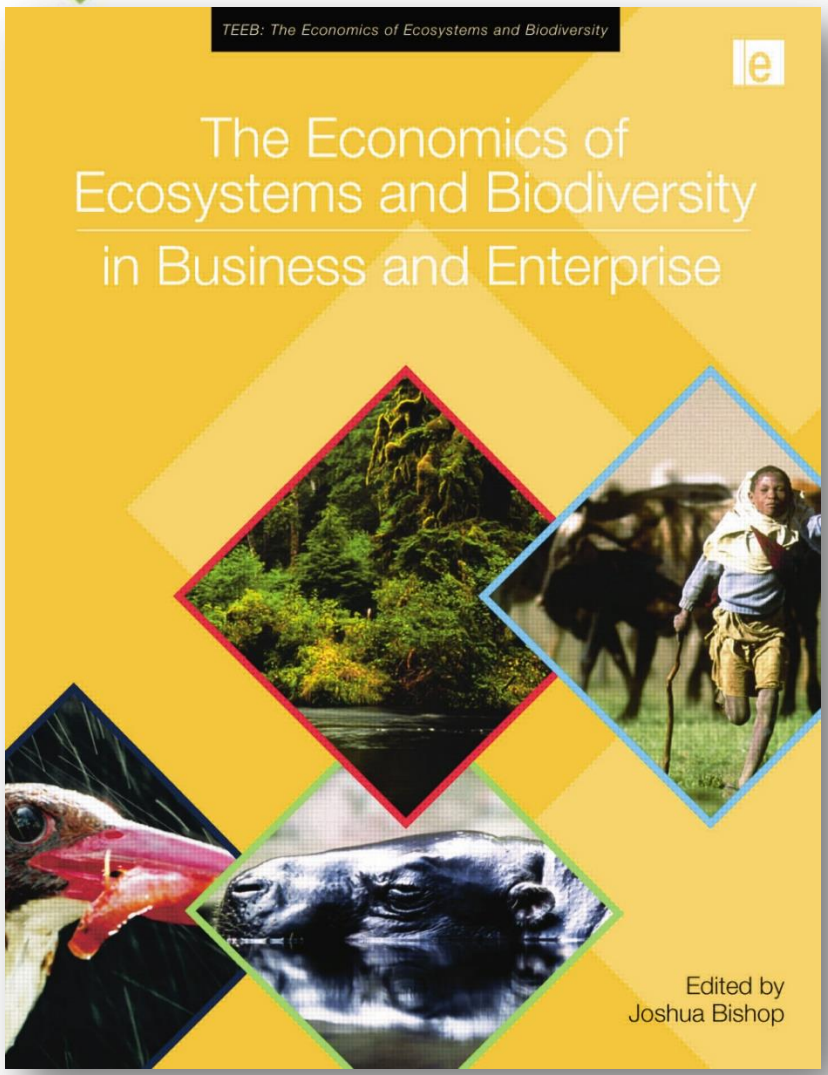
TEEB Synthesis

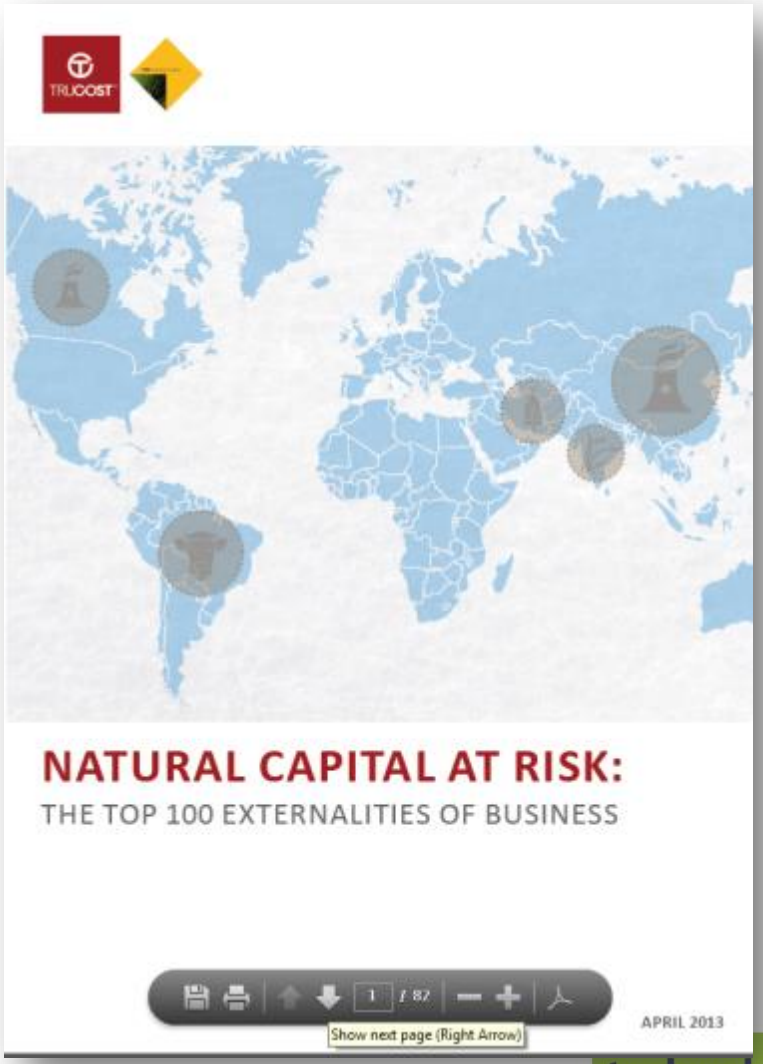
TEEB Books

BD COP 10 Nagoya, Oct 2010

- **CBD COP11 India**
- **National TEEB Work**
- **Sectoral TEEB Work**
- **Business Externalities Work**
- **Rio+20 Brazil**

TEEB for Business





Why do we need "environmental policy for agriculture"?

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***

Measuring what matters in agriculture and food systems

COMMENT

ZAKIR HOSSAIN CHOWDHURY/ANADOLU AGENCY/GETTY

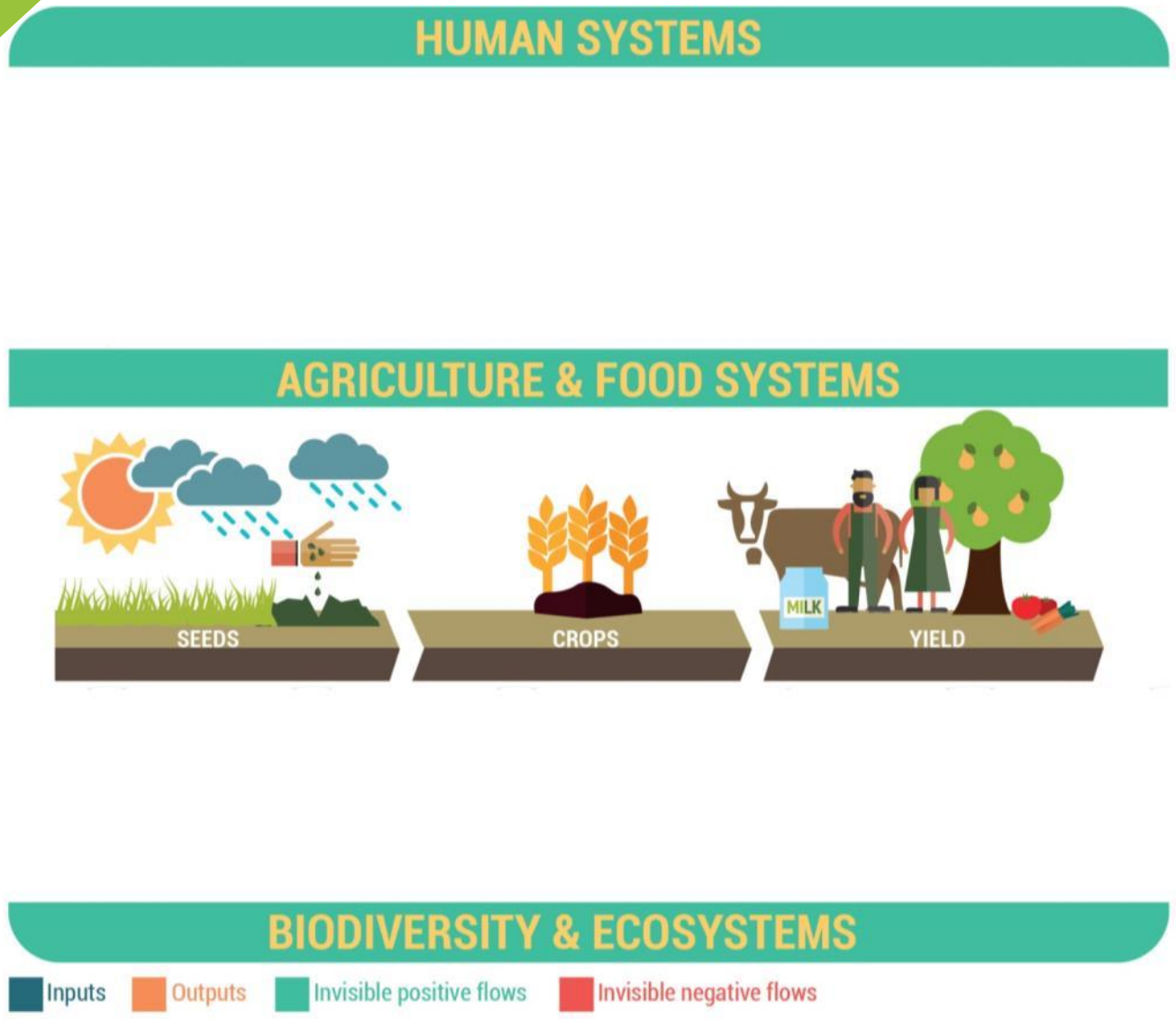
Drying red chillis under the sun provides one of the few sources of employment for women in an area of Bangladesh.

Fix food metrics

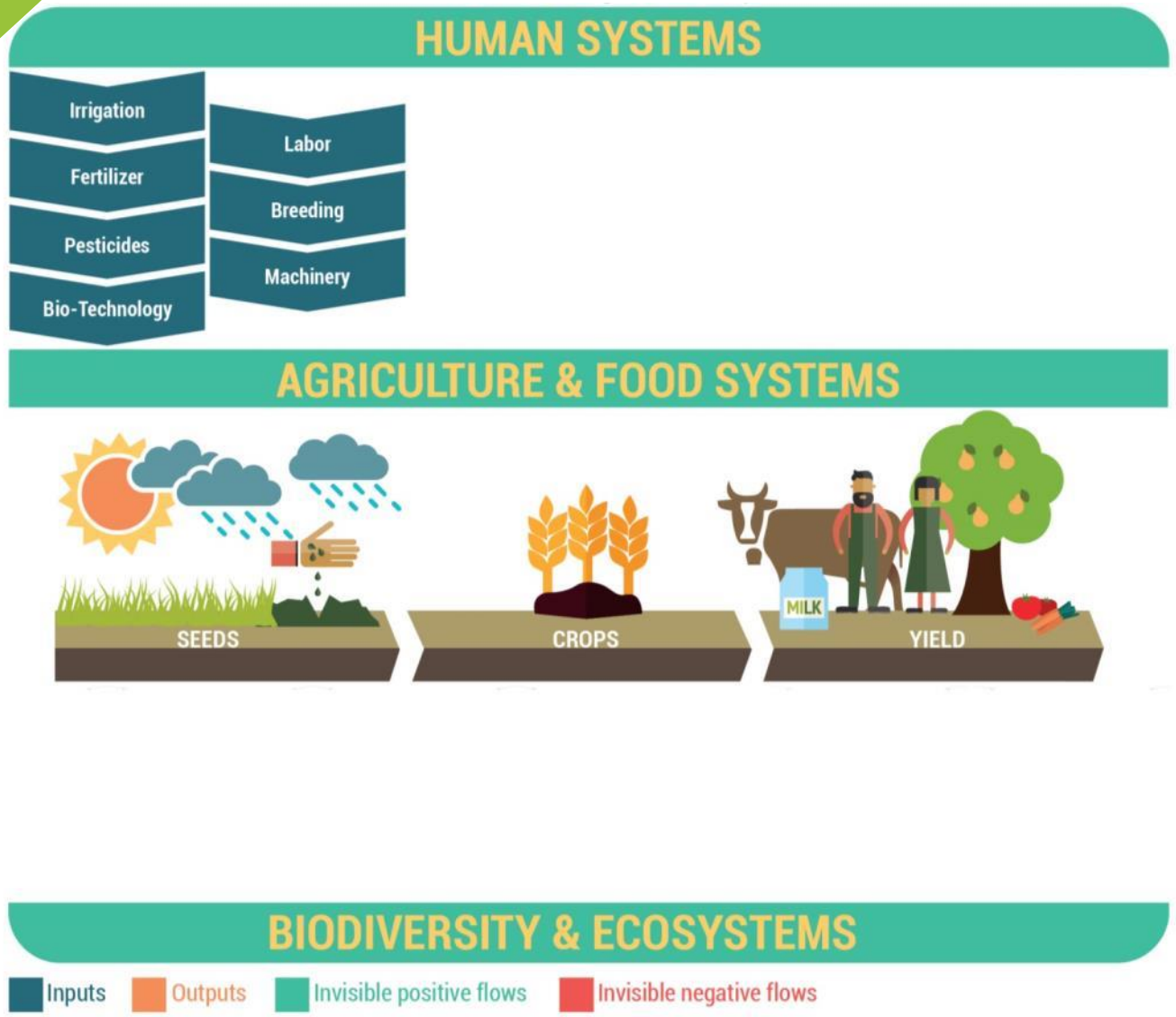
For sustainable, equitable nutrition we must count the true global costs and benefits of food production, urge **Pavan Sukhdev**, **Peter May** and **Alexander Müller**.

The visible and invisible flows of agricultural production

The visible and invisible flows of agricultural production



The visible and invisible flows of agricultural production



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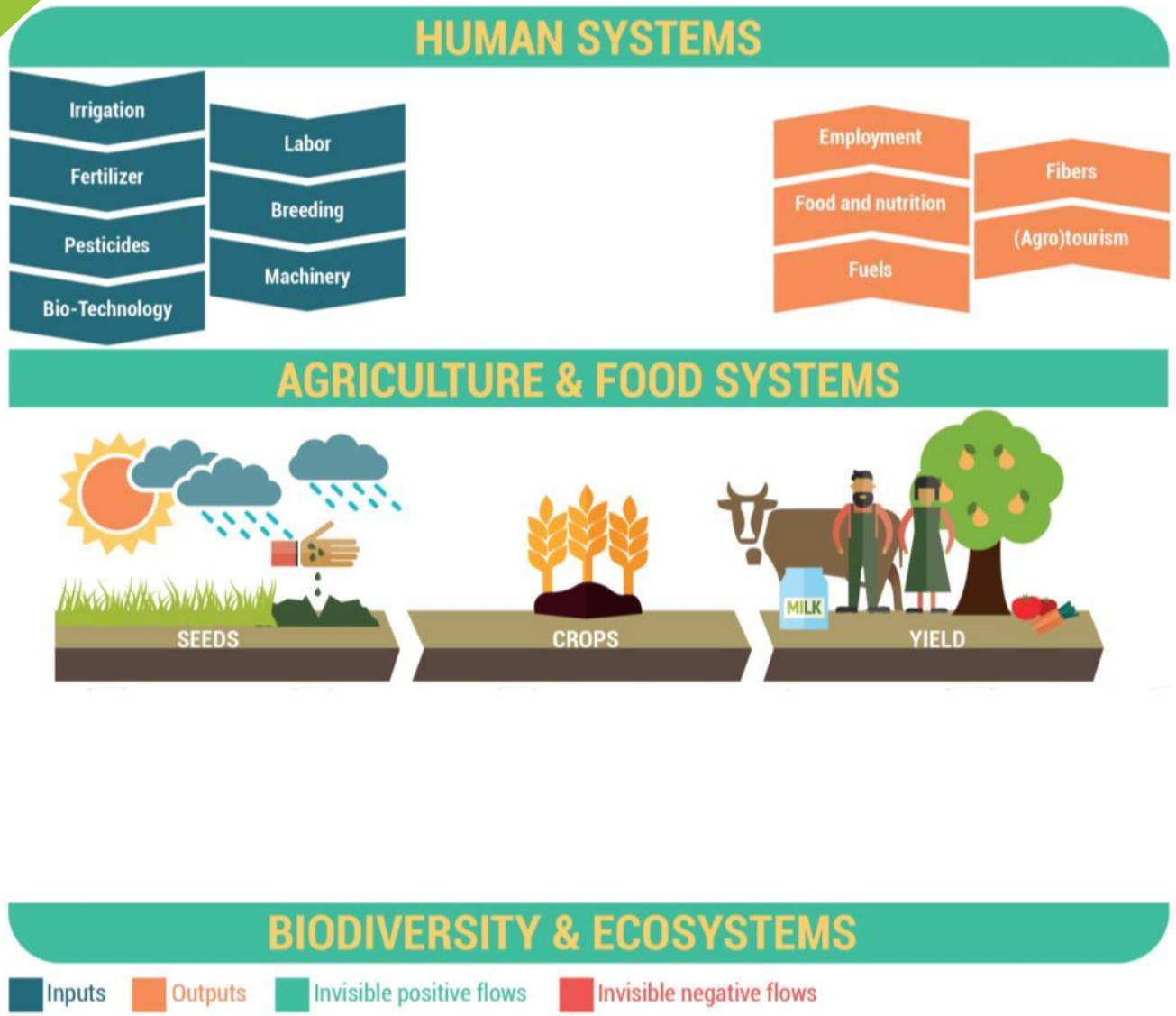

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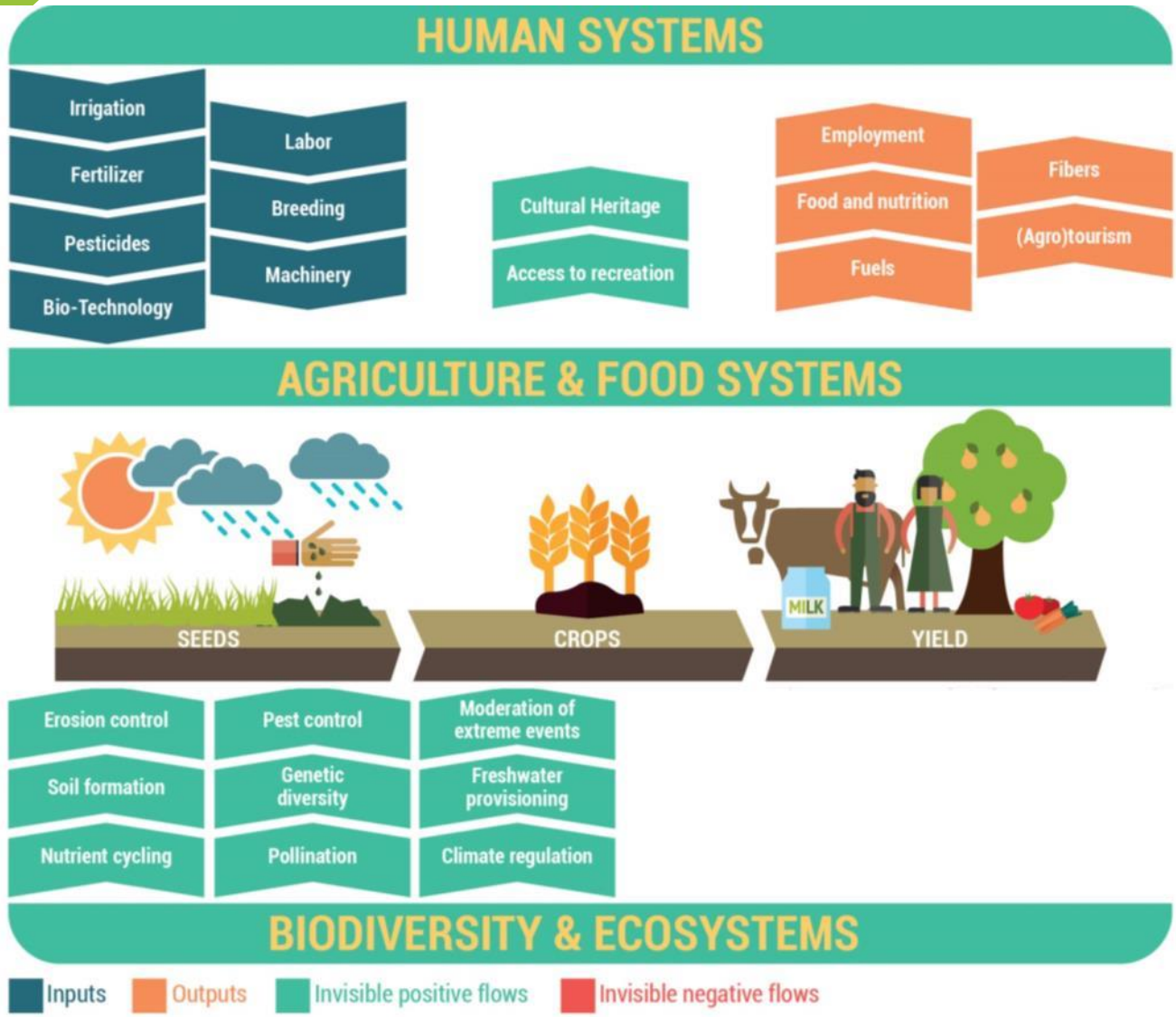
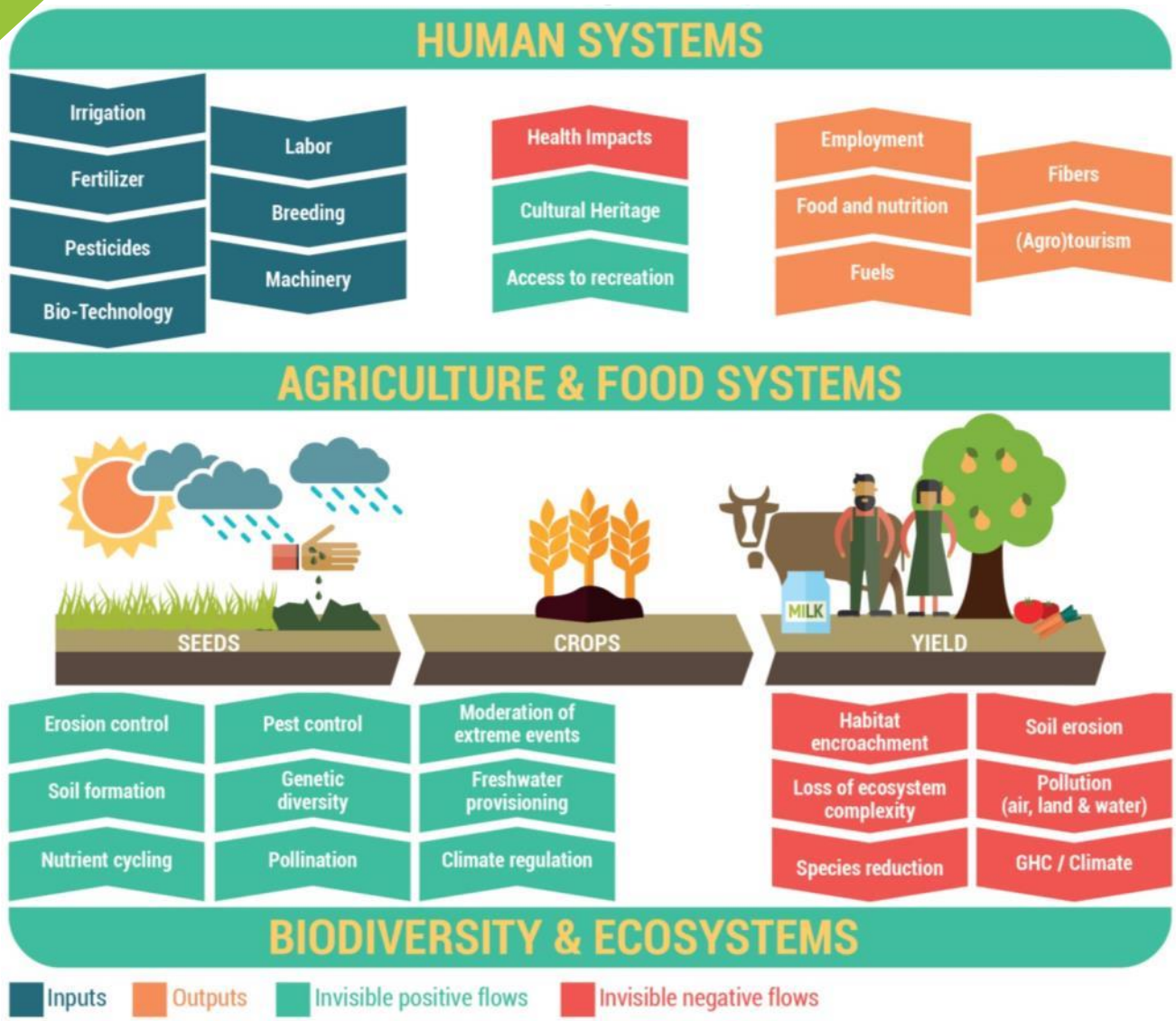


The visible and invisible flows of agricultural production



teebweb.org/agrifood/home/scientific-and-economic-foundations-report/

TEEB for Agriculture & Food

An initiative of 'The Economics of Ecosystems and Biodiversity' (TEEB)

Scientific and Economic Foundations

Scientific and Economic Foundations Report

Measuring what matters in agriculture and food systems

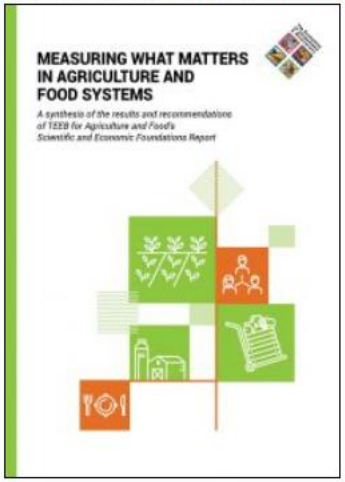
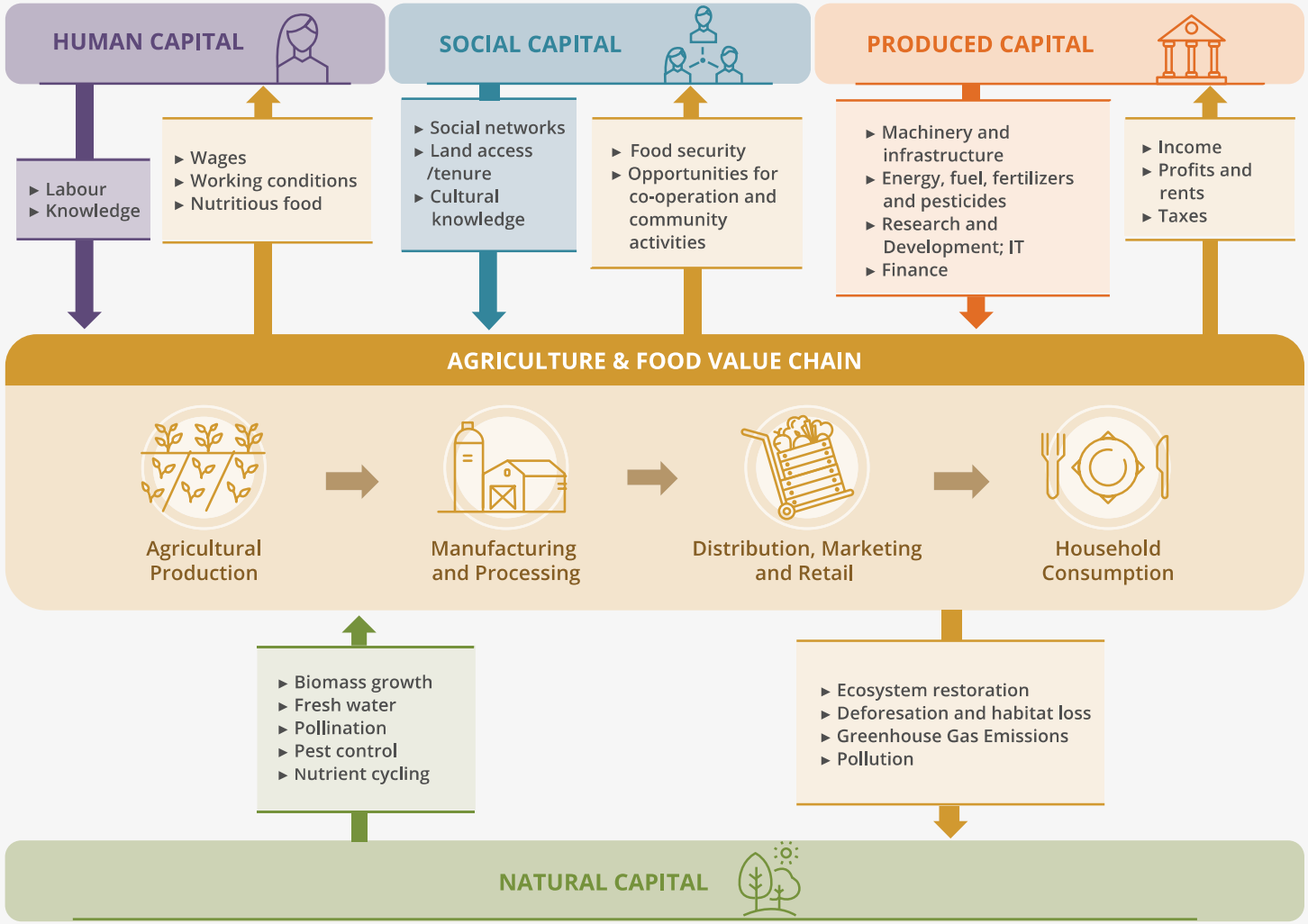
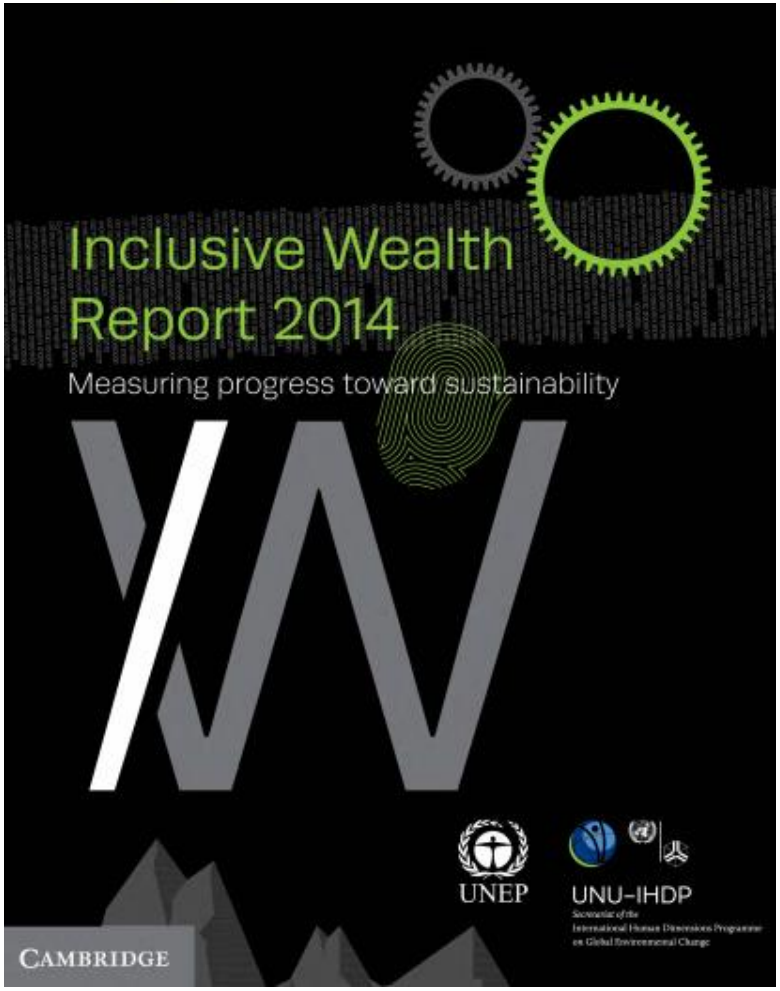


Figure 2.1 Capital stocks and value flows in eco-agri-food systems (Source: Hussain and Vause 2018)





From: ***Foreword, by Prof. Partha Dasgupta***

"Inclusive wealth is the social value of an economy's capital assets*. The assets comprise* ***(i) manufactured capital*** *(roads, buildings, machines, and equipment),* ***(ii) human capital*** *(skills, education, health), and* ***(iii) natural capital*** *(sub-soil resources, ecosystems, the atmosphere).*

Such other durable assets as knowledge, institutions, culture, religion – more broadly, ***social capital*** *– were taken to* ***be enabling assets****; that is, assets that enable the production and allocation of assets in categories (i)-(iii). The effectiveness of enabling assets in a country gets reflected in the shadow prices of assets in categories (i)-(iii)"*

Applying the TEEBAgriFood Framework

I. Evaluate the full value chain:
   - Production
   - Manufacturing / Processing
   - Distribution / Marketing
   - Household consumption

II. Measure stocks of all four capitals:
   - Natural capital
   - Produced capital
   - Human capital
   - Social capital

III. Measure all classes of flows or "impacts"
   - Ag, forest, livestock output
   - Purchased inputs
   - Ecosystem services
   - "Residuals" (Pollution and waste)

Four Capital Stocks

How have these stocks changed as a result of agriculture and food systems?

How do these stocks vary between plausible future scenarios?

	VALUE CHAIN CATEGORY			
	Agricultural Production	Manufacturing & Processing	Distribution & Marketing	Household Consumption
STOCKS / OUTCOMES (Change in capital)				
Natural capital				
Soil (type, structure)				
Vegetation cover				
Habitat (connectivity)				
Water (stock)				
Biodiversity				
Stored carbon				
Produced capital				
Infrastructure				
Research and development				
Technology, equipment				
Financial capital				
Human capital				
Education, skills				
Workforce				
Health				
Social Capital				
Rights and empowerment				
Social cooperation and governance				
Institutions and agencies				
Rule of law (e.g. land tenure)				

Four Classes of Flows

What are the benefits and costs along the value chain, including non-market ecosystem services and ecosystem damages?

	VALUE CHAIN CATEGORY			
	Agricultural Production	Manufacturing & Processing	Distribution & Marketing	Household Consumption
FLOWS / IMPACTS				
Agriculture, forest, or livestock outputs				
Food products				
Timber products				
Income (jobs)				
Profit (businesses)				
Purchased inputs				
Energy (fuel, electricity)				
Fertilizer, pesticides, tools				
Transportation				
Ecosystem services				
Water quality & quantity (seasonal)				
Soil fertility				
Pollination				
Climate regulation (GHG and local)				
Ecotourism				
Residuals				
Pollution				
Solid waste				
GHG Emissions				

Selecting and combining evaluation methods

- **Agronomic or soil models** (e.g. CROPWAT) - *What areas are most suitable for what crops? How do land use practices depend upon or impact soil?*
- **Hydrologic models** (e.g. SWAT) – Models of seasonal water budgets under different land use scenarios

Selecting and combining evaluation methods

- Agronomic or soil models
- Hydrologic models
- **Ecosystem services models** (e.g. InVEST) – Programs to model other services such as carbon sequestration, water pollution (siltation and nutrient loading), or habitat, or biodiversity
- **Ecosystem services valuation –** *Revealed preference, stated preference etc.*

Selecting and combining evaluation methods

- Agronomic or soil models
- Hydrologic models
- Ecosystem services models
- Ecosystem services valuation
- **Economic impact modelling or livelihoods analysis** (input/output, CGE, SLF)
- **Social and Human Capital impacts** (e.g. Network Analysis, health, education) –
  - Agriculture and environment research teams are traditionally biophysical scientists.
  - *Have the researchers conducted human or social capital analysis? How can we pair this with the biophysical analysis?*

Applications

1. Global Alliance for the Future of Food funding
   - Haripriya Gundimeda (Wheat value chain **North India**)
   - Peter May (Cattle and Soy in **Amazon**)
2. TEEBAgriFood DEVCO Africa
   - Livestock (**Tanzania**), cocoa (**Ghana**), coffee (**Ethiopia**), rice (**Senegal**)
3. IKI studies **Colombia:** Putumayo Department - includes Amazon lowlands, highland forests, Colombian plateau and several important water basins
   - **Kenya,** options are two upper Basin areas (Tana Basin and Ewaso Njiro Basin), the Mau catchment area/ Mara River Basin and the drainage basin from Mt Suswa to Lake Magadi
   - **Thailand** – organics production
   - **Tanzania** - Southern Highlands - upstream of the proposed Stiegler hydropower dam
4. EU Partnership Instrument
   - **Brazil, China, India, Indonesia, Malaysia, Mexico, Thailand**

Dr. Salman Hussain
salman.hussain@unep.org

UNEP TEEB Office