



CONVEGNO INTERNAZIONALE
DARE VALORE ALLA NATURA
I Servizi ecosistemici per "nutrire il pianeta"
venerdì 12 giugno 2015
EXPO 2015 - MILANO

"TEEB for Agriculture and Food"

Kavita Sharma

UNEP

The Economics of Ecosystems and Biodiversity (TEEB)

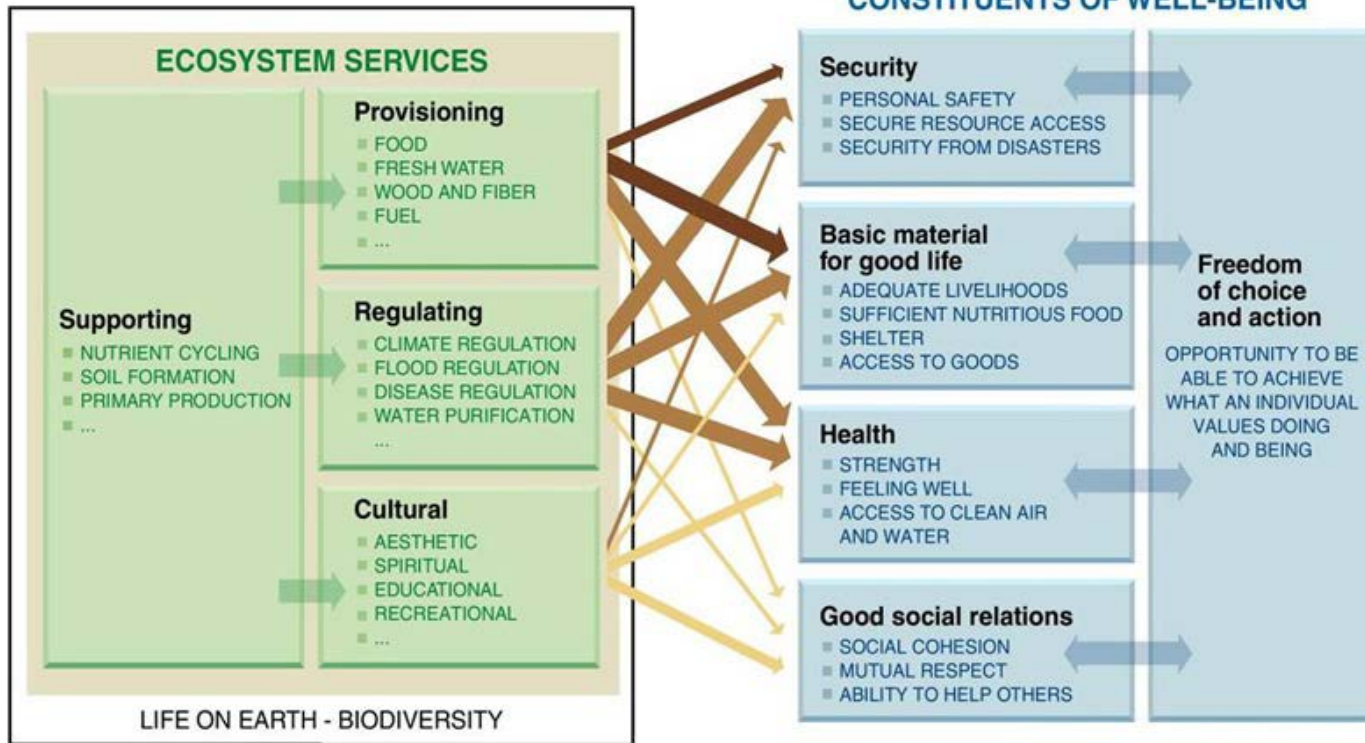


Agenda

- I. Introduction to TEEB**
- II. Why value nature in agricultural and food systems?**
- III. How to value?**
 - **TEEB Ag Food (sectoral)**
 - **TEEB Country studies (landscape)**
- IV. Conclusion**



Ecosystem Services



ARROW'S COLOR
Potential for mediation by socioeconomic factors

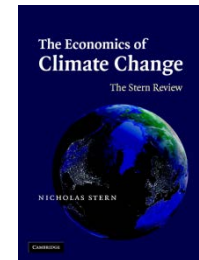
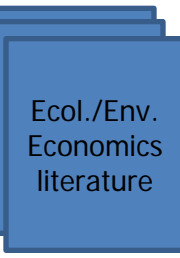
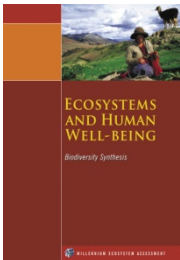
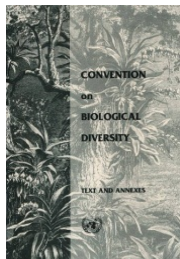
- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Source: MA (2005)

Background: 2008 to 2012

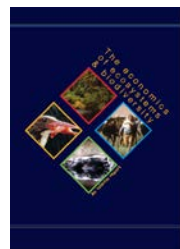


G8 2007
Environment Ministers Meeting
 Potsdam, 15-17 March 2007

“Potsdam Initiative – Biological Diversity 2010”
 The economic significance of the global loss of biological diversity....



Interim Report



CBD COP 9 Bonn 2008

Climate Issues Update



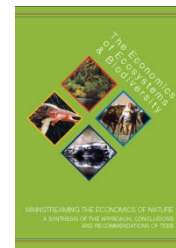
Input to UNFCCC 2009

TEEB End User Reports Brussels 2009, London 2010



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

TEEB Synthesis



BD COP 10 Nagoya, Oct 2010

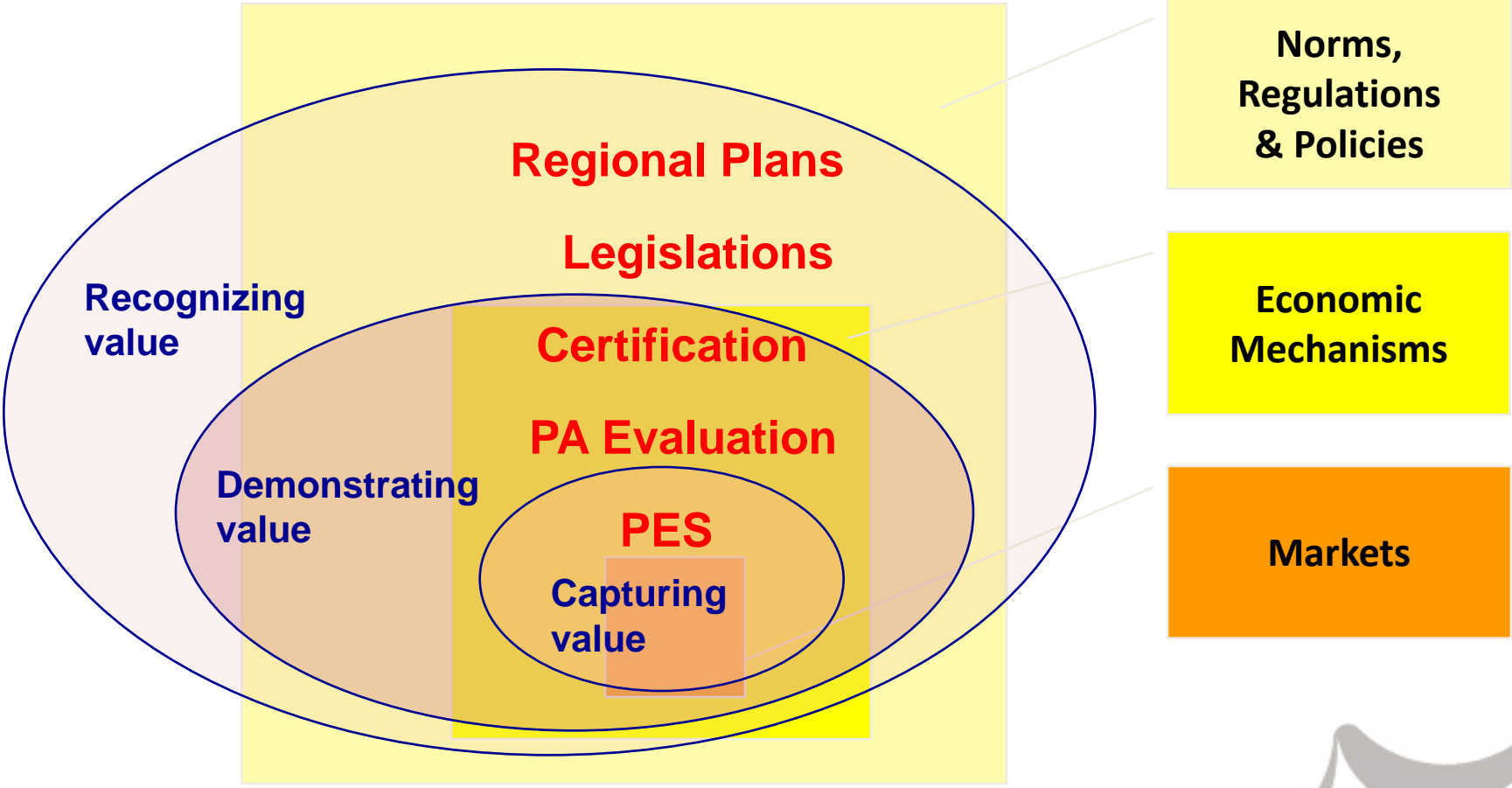
TEEB Books



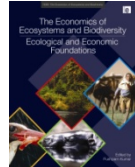
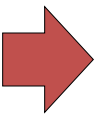
- CBD COP11 India**
- Country TEEB Programs**
- Sectoral TEEB Programs**
- Business Externalities Work**
- Rio+20 Brazil**



TEEB on Valuation



“Valuation is a *human Institution*”



Ch.4
Ch.5



Ch.4



Ch.3



Ch.3



TEEB Implementation: 2012 to present

1. Sectoral/ biome studies

- **TEEB Agriculture & Food**
- TEEB for the Arctic, TEEB Water and Wetlands, TEEB Oceans and Coasts

2. National Implementation

- ENRTP: **Tanzania** and Liberia (Africa), Bhutan and the Philippines (Asia), and Ecuador (Latin America)
- Other countries

3. Macro-level accounting (with UN Statistics Division)

- SEEA Experimental Ecosystem Accounts



Why Agriculture: The good

Agriculture employs 1 in 3 people of the world's economically active labour force, or about 1.3 billion people.

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

Women form half, if not more, of the agricultural labour force globally

Agriculture supplies the world with over 130 billion litres of bio-fuel every year, and other raw materials and natural fibres

Agriculture is an integral part of our cultural landscapes, and to cultural identity. It underpins community values, festivity, social cohesion, and tourism, and its landscapes are a location and source of recreation and mental/physical health, providing at times a spiritual experience and sense of place.

The Bad

Eighty per cent of new agricultural lands have replaced tropical forests since the 1980s, a trend resulting in significant biodiversity loss & ecosystem degradation.

Crop and livestock farming produce between five and six billion tons of CO₂ equivalent in greenhouse gas (GHG) emissions each year

Agriculture is a major contributor to the loss of genetic diversity in local varieties of crop or landraces of livestock. For the poorest farmers biological and crop diversity may be their best protection against diseases, pests and starvation.,

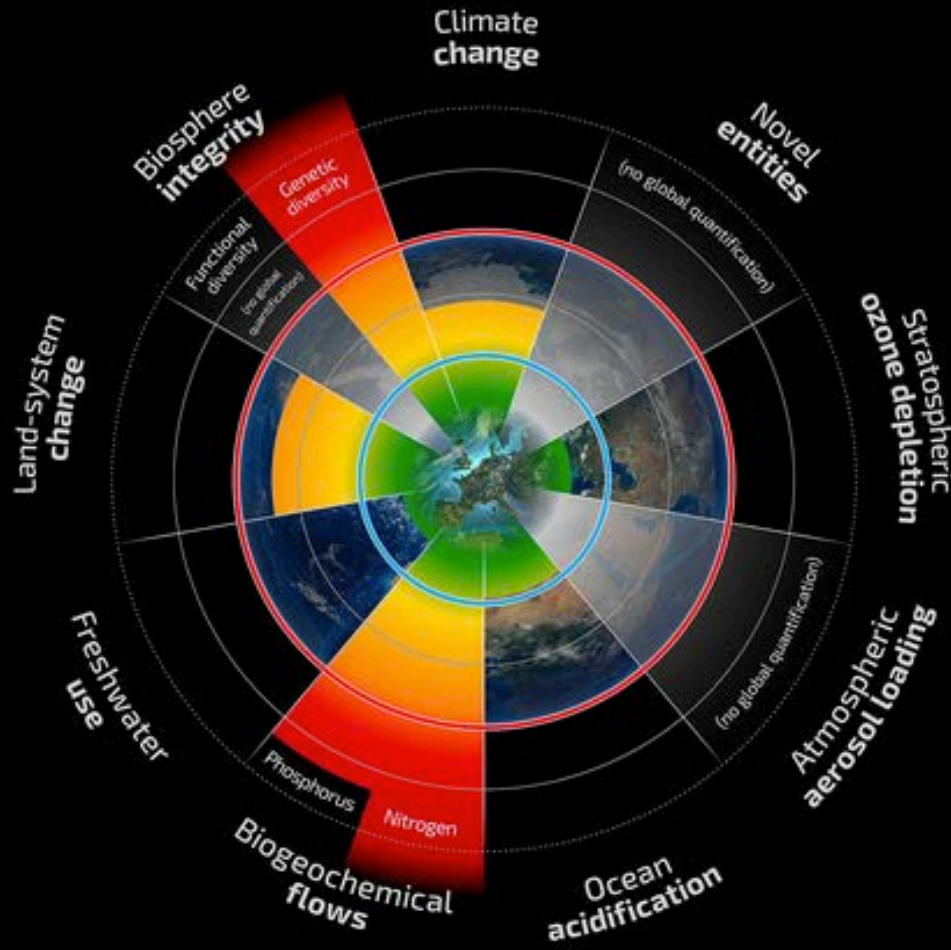
The agricultural sector is the world's largest user of antibiotics, using 70% of all that is manufactured. The use of antibiotics may create resistant strains of microbes in humans, posing serious threats to human health by decreasing our ability to treat various drug resistant microbes.

By concentrating a large number of animals within small areas, industrial meat production also poses risks to human health.

Degradation of ecosystems raises serious questions of food security for the future

Planetary Boundaries

A safe operating space for humanity



- Beyond zone of uncertainty (high risk)
- In zone of uncertainty (increasing risk)
- Below boundary (safe)
- Boundary not yet quantified

BAU is not sustainable

- Agricultural sector utilizes 70% of blue water (Clay 2004) and much of this is wasted via runoff or evapotranspiration
- It is estimated that 60% of the Nitrogen and 50% of the phosphorous applied to crops worldwide is in excess of what is required (West et al, 2014)

Beyond farmgate: Dead zone in the Gulf of Mexico

- Due to eutrophication, a dead zone forms around the mouth of the Mississippi river, resulting in declines in the shrimp fishery and other fishers in the gulf
- 1.6 million metric tons of Nitrogen enters the Gulf every year
- Agriculture (fertilizer and manure) accounts for 65%

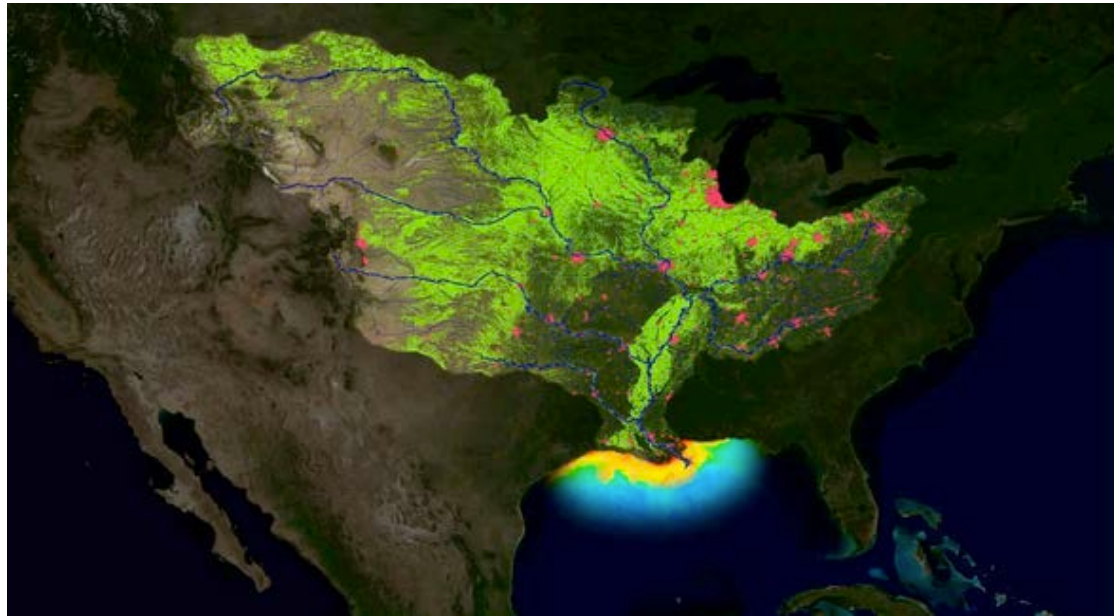


Image source: NOAA

Catskills and Delaware watershed

- 90% NYC's water supply
- Saving the city 10 billion USD in CAPEX
- Other services include –recreation, Carbon, soil fertility etc.
- USD 300 million set aside each year to improve upstream watershed health – reduce nutrient loading, turbidity - by implementing BMPs.
- (in-kind) PES to farmers upstream



TEEB for Agriculture and Food (2014 – 2017)

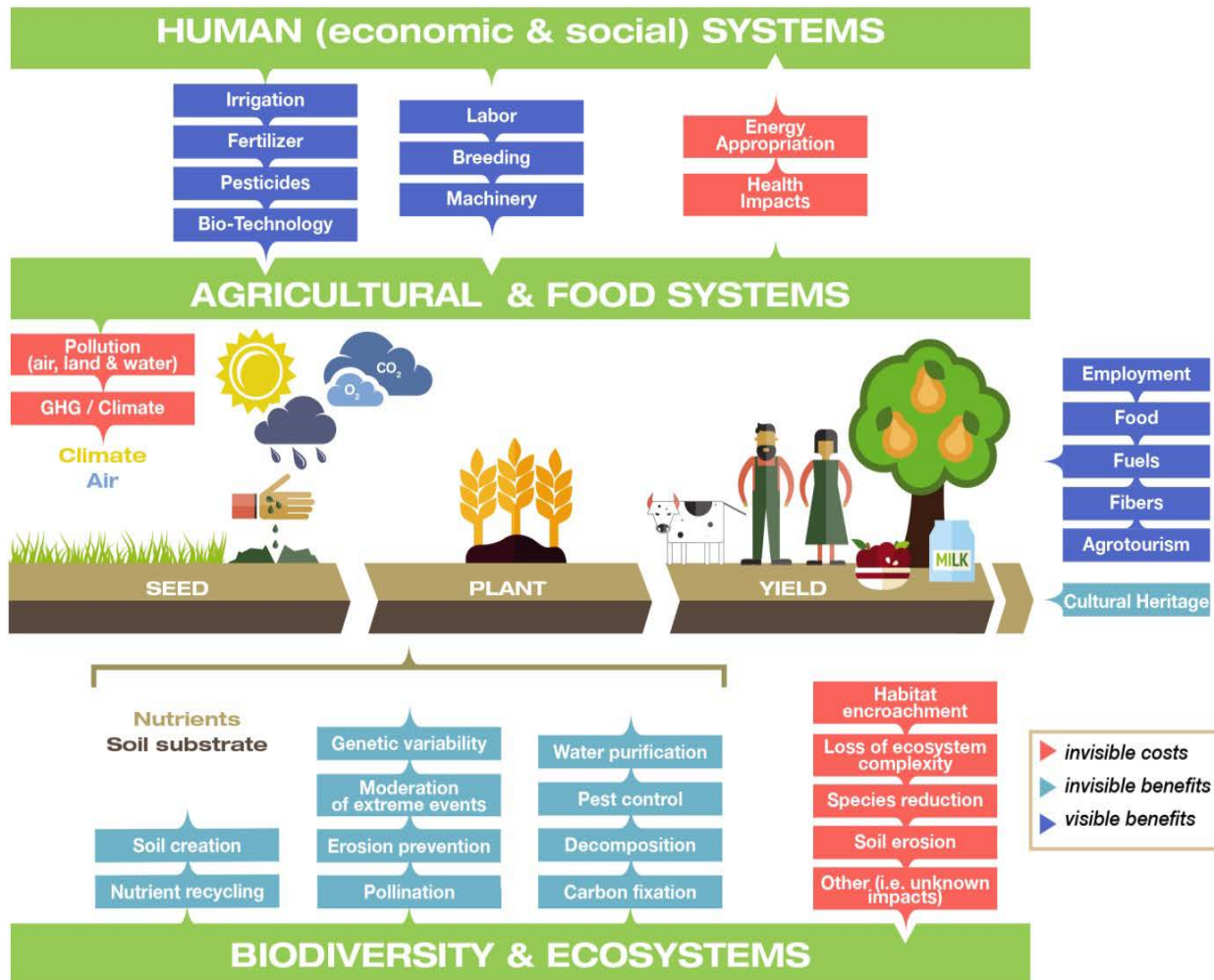
- BAU is not sustainable
- Distorted markets
 - Externalities
 - Subsidies
- Lack of incentives to protect and invest in public goods that provide key inputs to production
- Need for smarter land use planning



GLOBAL ALLIANCE FOR THE
FUTURE OF FOOD



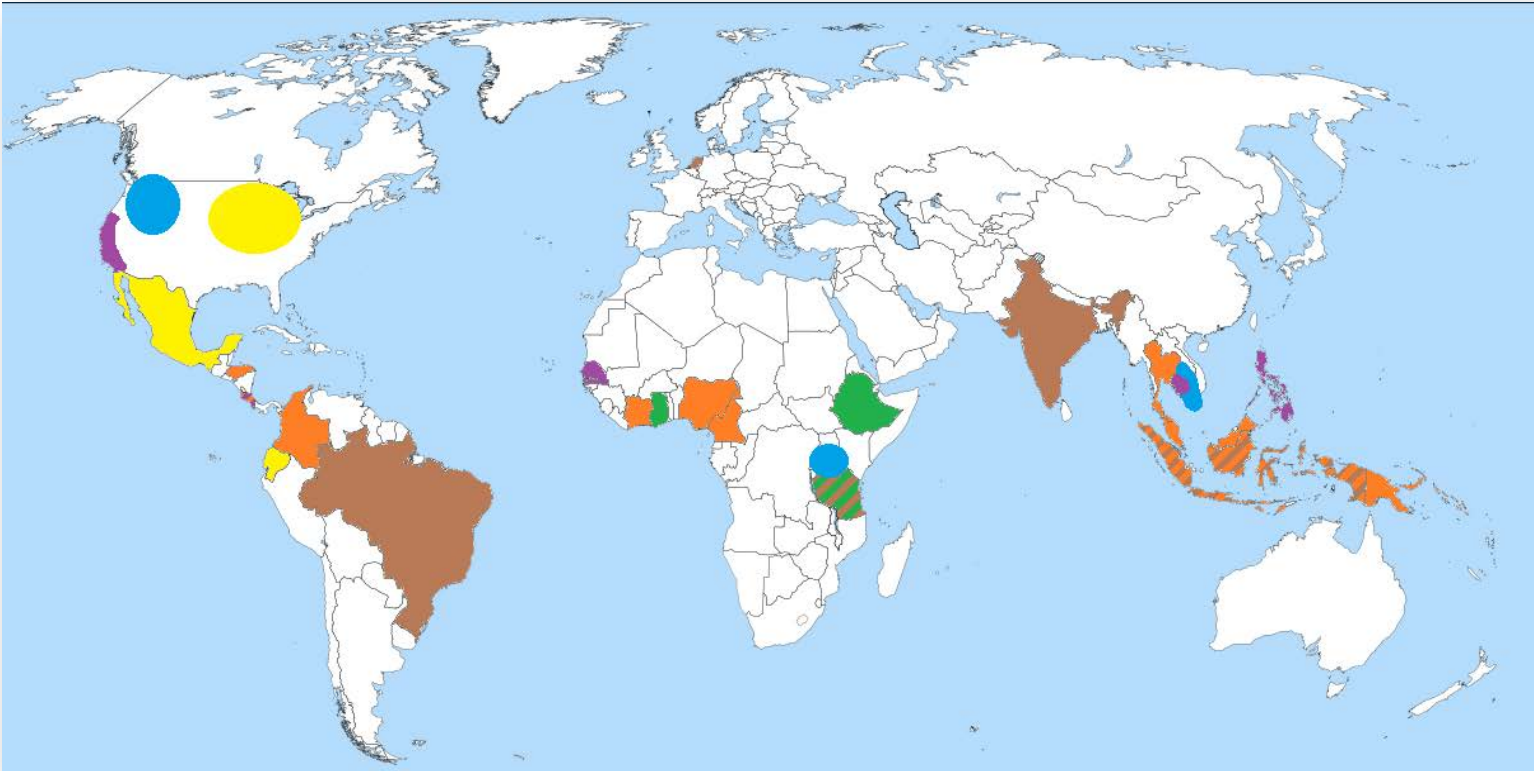
TEEB AgFood Framework



TEEB AgFood:

Geographical and technical scope

LEGEND		Rice		Livestock
		Palm oil		Agro-forestry
		Maize		Inland fisheries



TEEB AgFood: *Geographical and technical scope*

Systems	Geographical scope	Negative externalities and positive impacts to be measured	Partners
Cattle(Poultry, Beef, and Dairy) - Pastoral	Tanzania, Netherlands, Indonesia, India, and Brazil	Soil erosion, Eutrophication, Human health, and yield etc.	Wageningen University, TRUCOST and TRUEPRICE
Cattle(Poultry, Beef, and Dairy) - Intensive			
Cattle(Poultry, Beef, and Dairy) - Extensive			
Rice - Rainfed	California, Cambodia, Costa Rica, Philippines, and Senegal	Water quality, GHG emissions, Rice yield and fibre	FAO, TRUCOST, TRUEPRICE
Rice - Irrigated			
Agroforestry Coffee - Garden Coffee and Semi-forest Coffee	Ethiopia	Water quality, and Soil erosion, livestock, fodder, Coffee and Cocoa yields, other crops/ fruits	ICRAF, UNEP-WCMC
Agroforestry Cocoa - Home garden Cocoa and shade Cocoa	Ghana		
Agroforestry Ngitili	Tanzania		
Fisheries - artisanal	Lower Mekong Basin, Lake Victoria (E. Africa), and Columbia River (USA)	Eutrophication, Human health impacts, yields, and cultural benefits	FAO
Fisheries - cage aquaculture			
Fisheries - industrial			
Fisheries - recreational			

Interim Findings for Palm Oil (TRUCOST 2015)

- World's most consumed vegetable oil and demand is forecast to double over the next 40 years
- Generates natural and social capital costs of carbon emissions, fertilizer runoff, palm oil mill effluent emissions, through manufacturing of inputs, and pesticide application
- Production in top eleven producer countries generates natural and social capital costs of between US \$271/ ton and US \$1,300/ ton (market price around US \$ 600/ton for Palm Oil and US \$ 900/ ton for Crude palm Kernel Oil)



TEEB Country Studies (2013 – 2016)



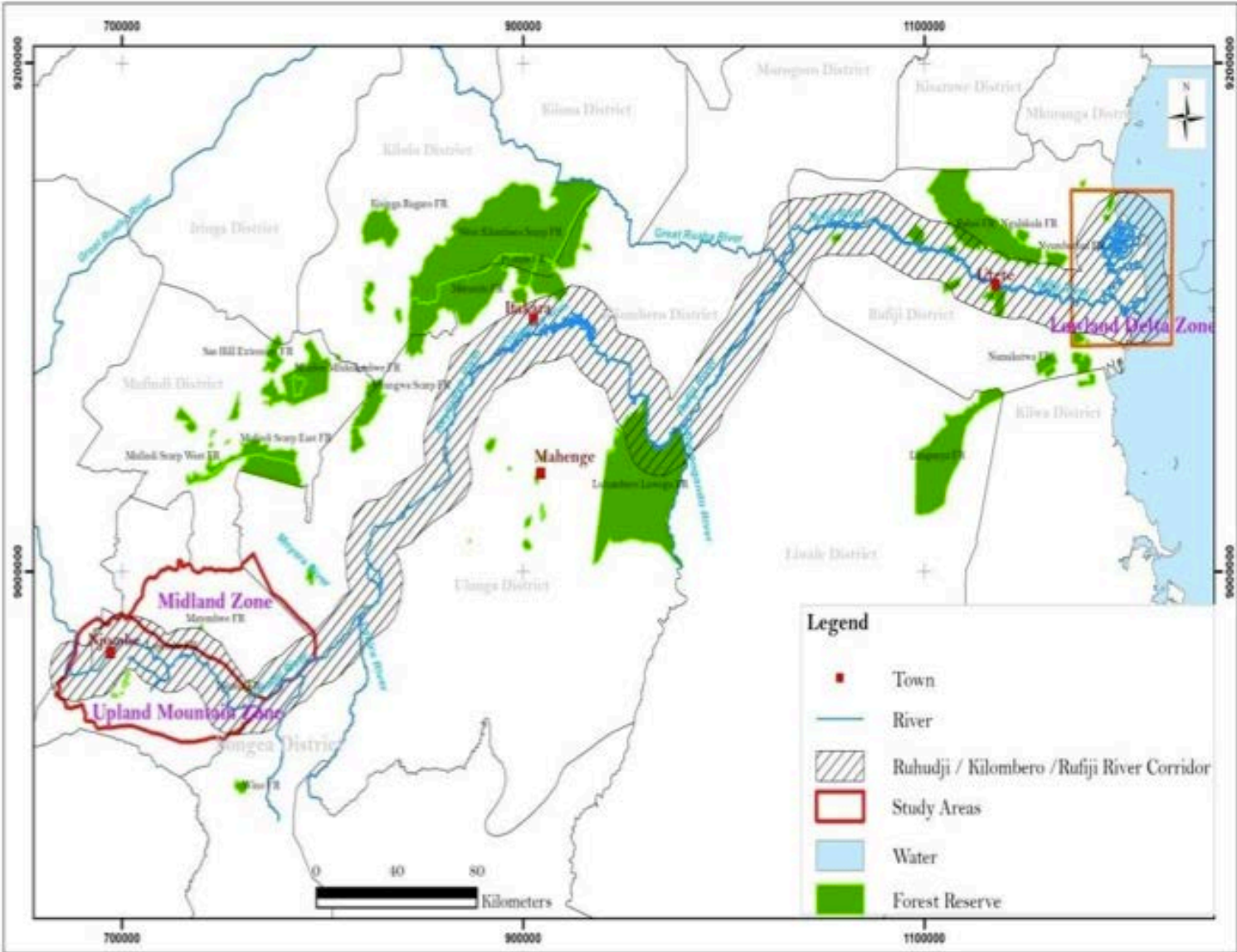
TEEB Tanzania

Inform Big Results Now (BRN) Initiative in the Rufiji river basin

- Competing water use and land use options in the basin:
 - Afforestation of mountain grasslands
 - Planned dam construction for irrigation and power
 - **Water-intensive farming practices**
 - Deforestation of mangroves for rice production



Study scope



Tanzania – Scenarios and Services

Watershed level scenario analyses of different land use

1. Dairy farming
2. Conversion of forests into tea and fruit plantations
3. Conversion of mangroves to traditional shifting paddy cultivation
4. Sugar cane plantations
5. Protection

Provisioning: Fuel, Water and food

Regulating: Carbon, Water quality (nutrient and sediment runoff), Soil stability and fertility; regulation of extreme events (delta)

Habitat for species: Qualitative

Aesthetic and cultural: Tourism Recreation

Methodology (Biophysical and Valuation)

- Aerial Photos
- Satellite imagery
- GIS maps
- Biodiversity surveys
- Modeling scenarios (SedNET, SWAT etc.)

Provisioning – market prices or production function

Regulating – replacement costs or production function

Cultural – Qualitative surveys, TCM (tourism)



Photos courtesy of University of Dar es Salaam

Conclusion

- Sense of urgency
- The Hopeful?
- Policy layer may determine the type of analysis
 - Externalities measuring and reporting
 - Subsidies reform to encourage improvements in resource efficiency, and investments in natural capital
 - Spatial Planning
 - Tools to make better land use decisions
 - Integrated watershed and land management



life+mgn
making good natura

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ministero delle
politiche agricole
alimentari e forestali

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FEEDING THE PLANET
SMOOTH FOR LIFE