Darryl D'Monte Memorial Lecture

Forum of Environmental Journalists in India (FEJI)
Mumbai, 25th Feb 2023

The Hidden Economics of Nature

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UNEP Goodwill Ambassador


Courtesy : Yann-Arthus Bertrand

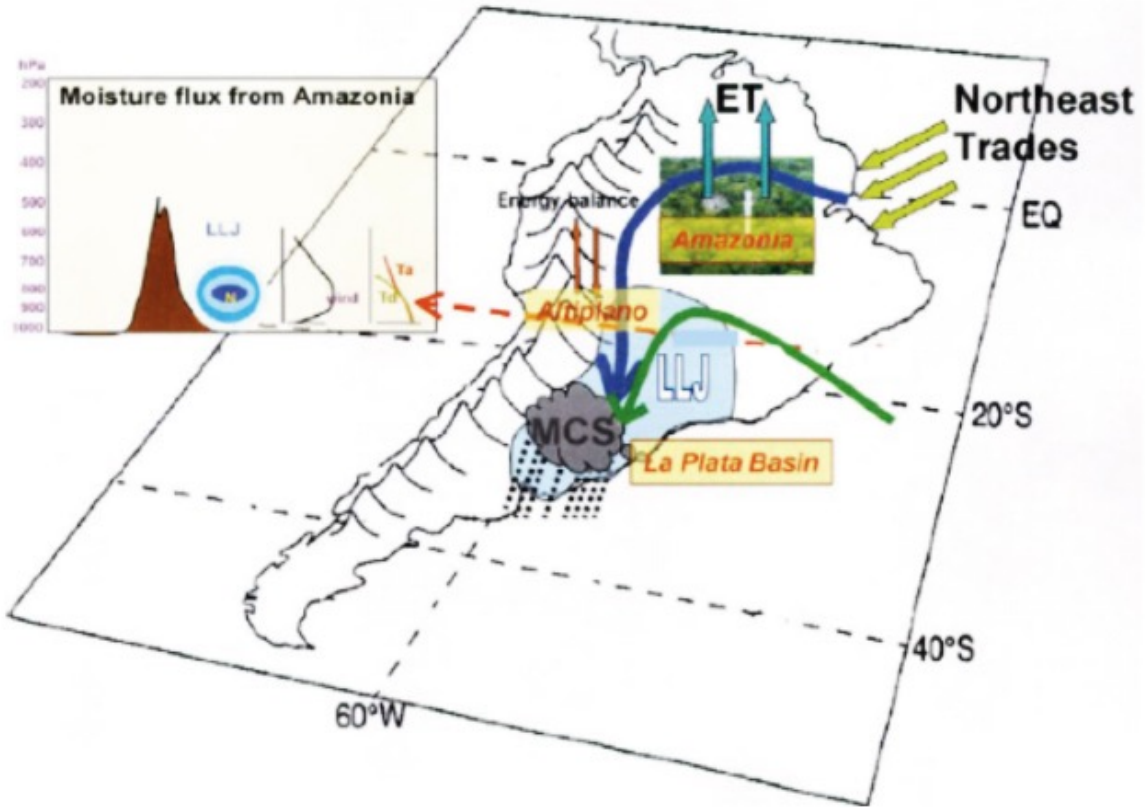
“Rainfall Factories” of the Planet..
… Amazonia, Congo, South-East Asia

https://www.youtube.com/watch?v=n0mupl4FZsQ

NCAR CCSM CAM3 T341 Cloud and Precipitation Simulation

* National Centre for Atmospheric Research, USA

What does the Granary of Latin America pay for its Freshwater?



Marengo et al. 2004, Journal of Climate

Amazon Rainforest "Water Pump"

Amazonia's evapo-transpiration puts 20 billion tonnes of water into the atmosphere daily, some of which falls as rain in the Rio Plata Basin…

(Global Canopy Programme & Canopy Capital Ltd, 2008)

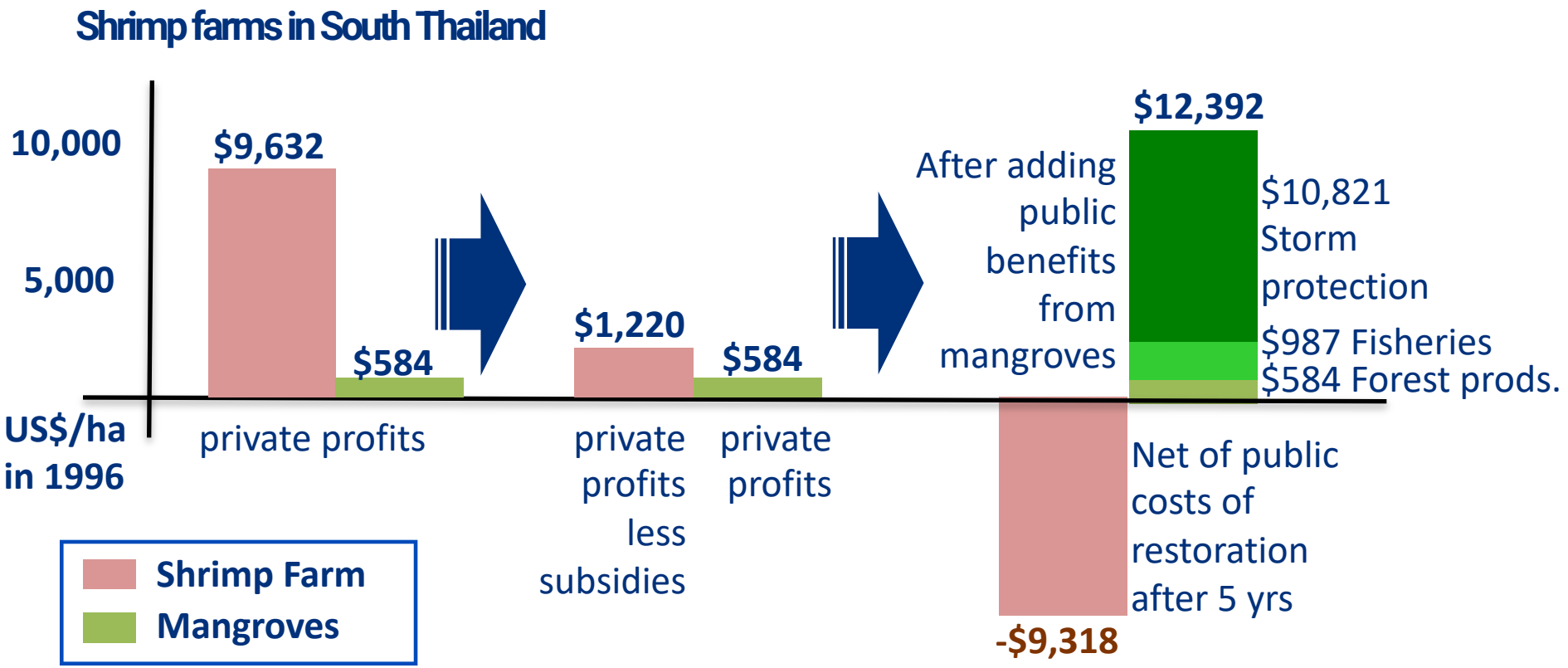
The Economics of Ecosystems & Biodiversity

- ***"Biodiversity" is the Living Fabric of this Planet***
- **Biodiversity's economic reflection is *"Natural Capital"***

Biodiversity Strata	**Quality dimensions**	**Quantity dimensions**	**Ecosystem Services *(some examples)***
Ecosystems	Variety	Extent	- Recreation - Water regulation - Carbon Storage
Species	Diversity	Abundance	- Food, fibre, fuelwood - Design inspiration - Pollination
Genes	Variability	Population	- Medicine discovery - Disease resistance - Adaptive capacity

"Private Profits, Public Losses"

Changing conclusions by making the invisible visible



Source: Data from Barbie, et al (2007)

All values in NPV over 9 yrs (1996-2004) at 10% discount rate

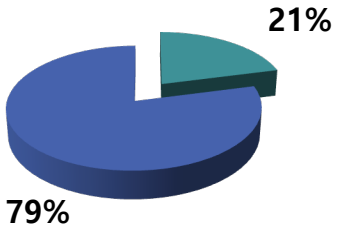
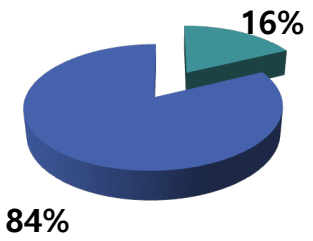
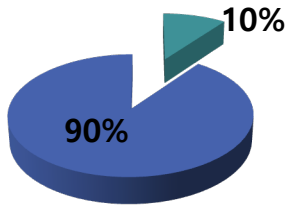
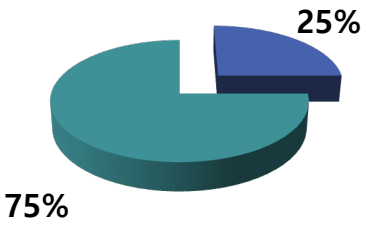
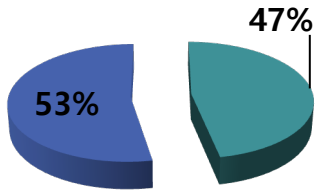
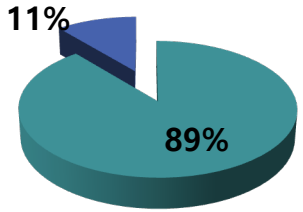
- ***What insights can we get by "making the invisible visible" ?***
- ***What actions can these insights inform, and by whom ?***

- *What insights can we get by "making the invisible visible" ?*
- *What actions can these insights inform, and by whom ?*

Contexts and case studies:

- ❑ **Nature's contribution to rural household incomes**
- ❑ **Ocean fisheries: problems and solutions**
- ❑ **Food systems: problems and solutions**
- ❑ **Mining: nature of contribution to GDP growth**

What is Nature's role in rural livelihoods?

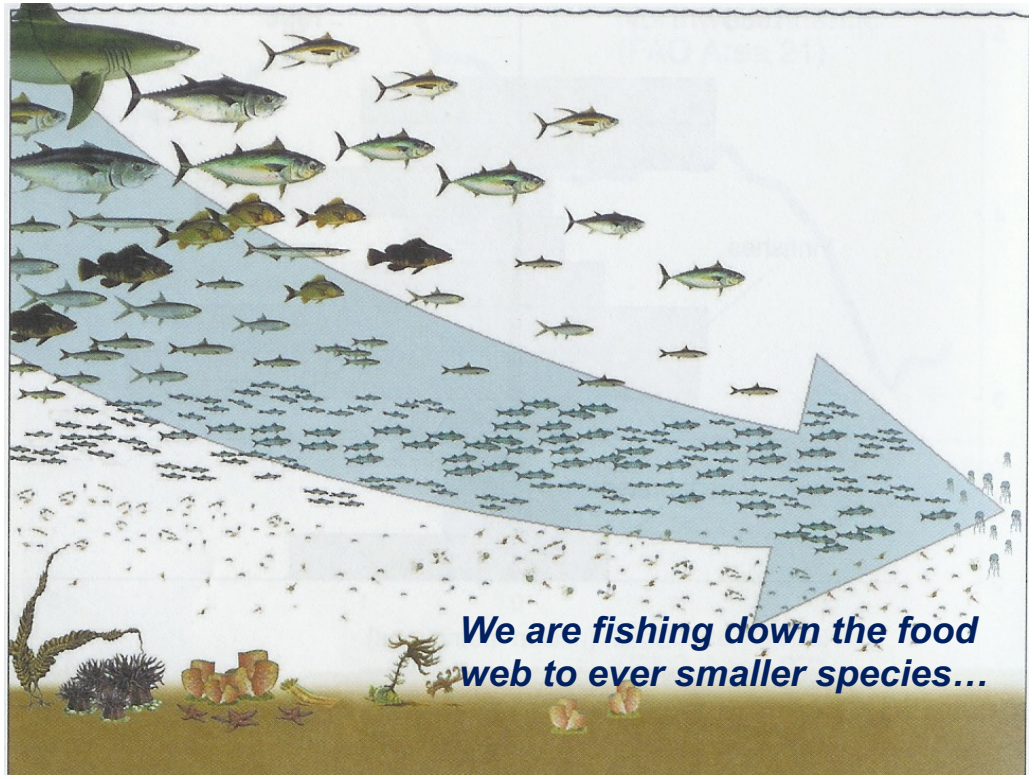
	Indonesia	India	Brazil
Agriculture, Forestry, Fisheries as a % of conventional GDP :			
"Ecosystem services dependent" population :	99 million	352 million	20 million
Ecosystem services as a % of "GDP of the Poor" :			

Ecosystem services

Source: Gundimeda & Sukhdev, Ch.3, The Economics of Ecosystems and Biodiversity (TEEB) for National and International Policy Makers (2009)

Can global fisheries losses be reversed?

"Commons Problem" with many dimensions..



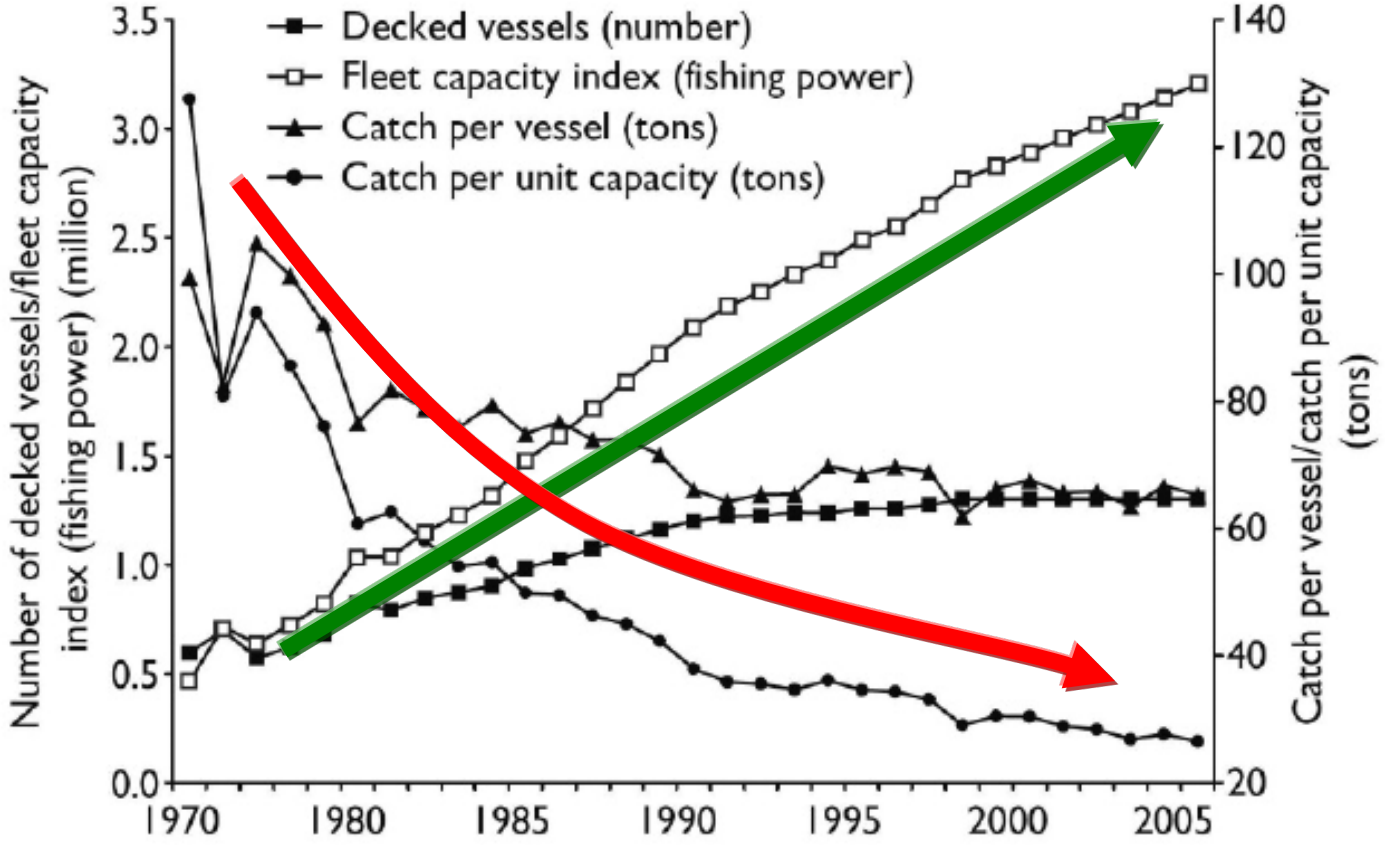
- ***Open Access system & Perverse Subsidies* : key drivers of the loss of fisheries**
- ***Challenge* : Half of wild marine fisheries are fully exploited, with a further quarter already over-exploited**
- ***lost productivity* : est. $ 50 billion**
- ***at risk* : $ 85 -100 billion landed catch from the sector**
- ***at risk* : est. 27 million jobs**
- ***but most important of all…..***

- ***at risk* : Health … over a billion people rely on fish as their main or sole source of animal protein, especially in developing countries**

Source: Ben ten Brink (MNP) presentation at the Workshop: ***The Economics of the Global Loss of Biological Diversity 5-6 March 2008, Brussels, Belgium. Original source: Pauly***

Global Fisheries Losses…

"Commons Problem" with Many Dimensions

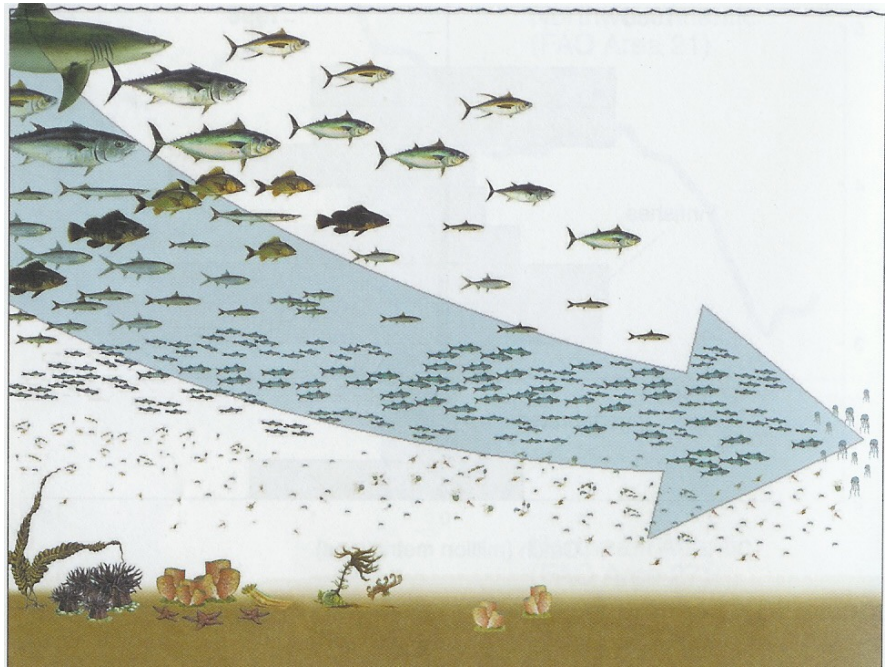


World Bank estimate: due to above, productivity losses from fisheries are 50 billion US$ per year

TEEB D1, Chap.10; World Bank & FAO 2008

"Commons" Problems Can be Solved
(Eg: Loss of Fisheries)

Open Access & Perverse Subsidies drive fisheries losses …



We are fishing down the food web to ever smaller species…

(Source : Prof. Callum Roberts, University of York)

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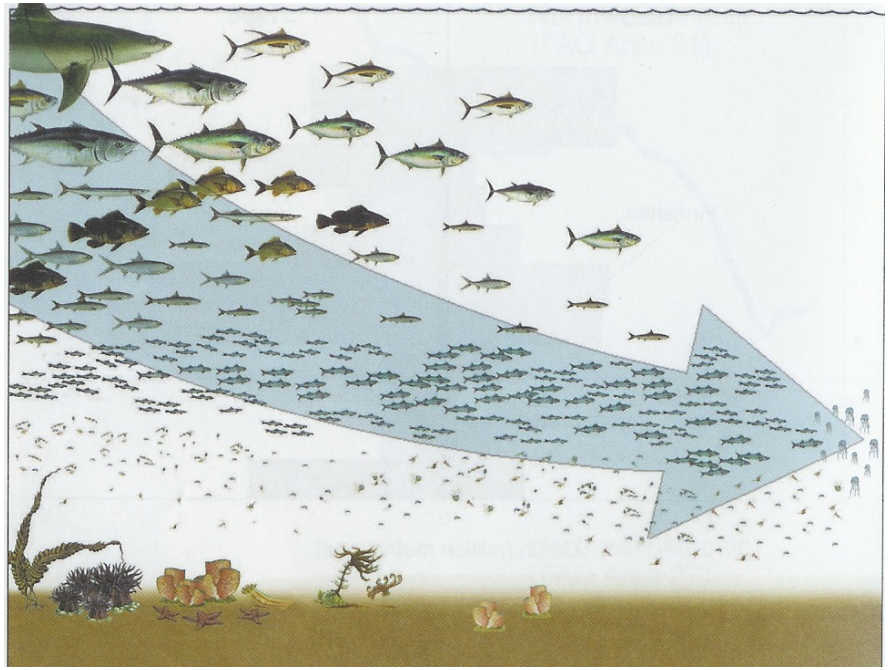


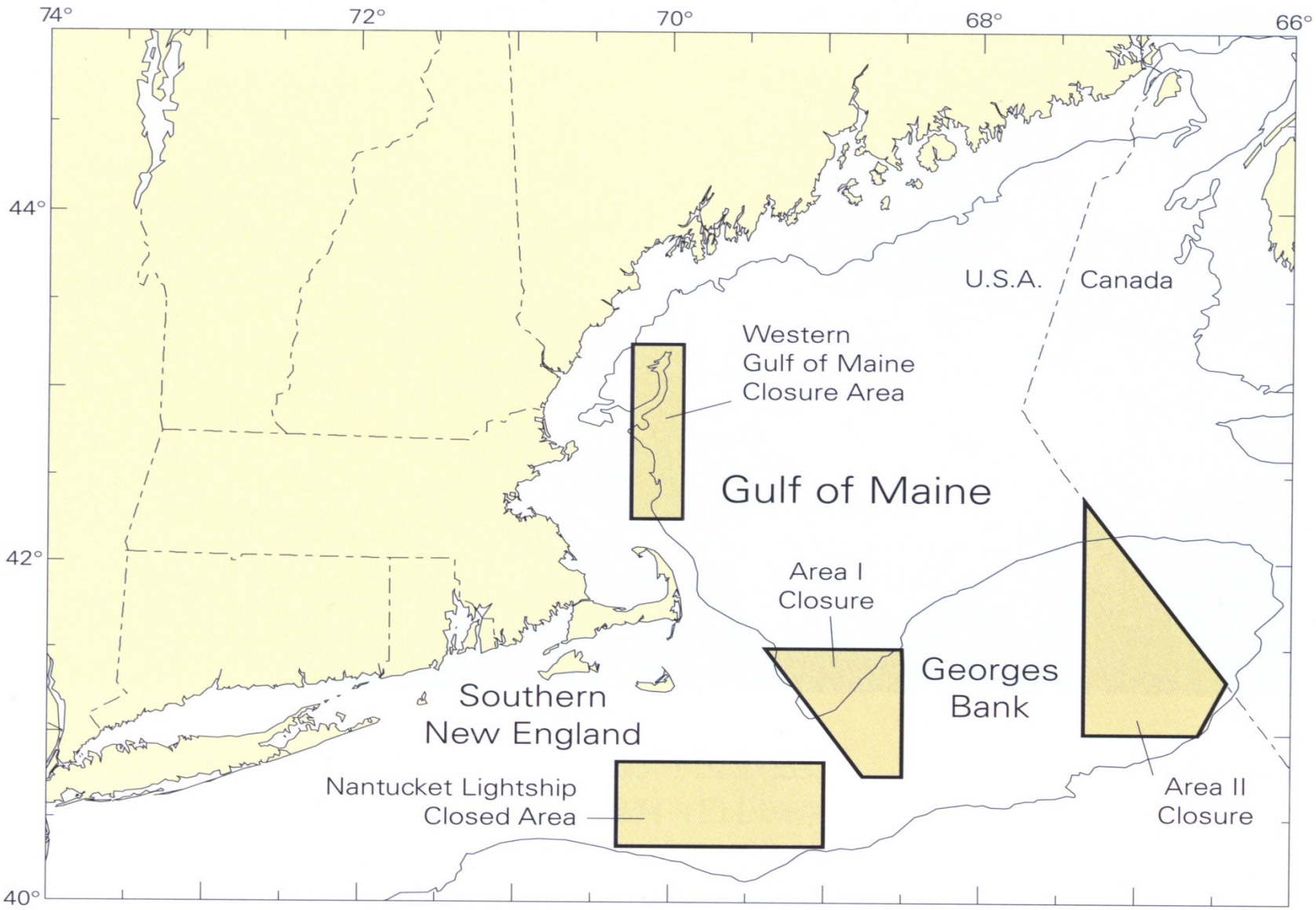
We are fishing down the food web to ever smaller species…

…. And do reserves work ?

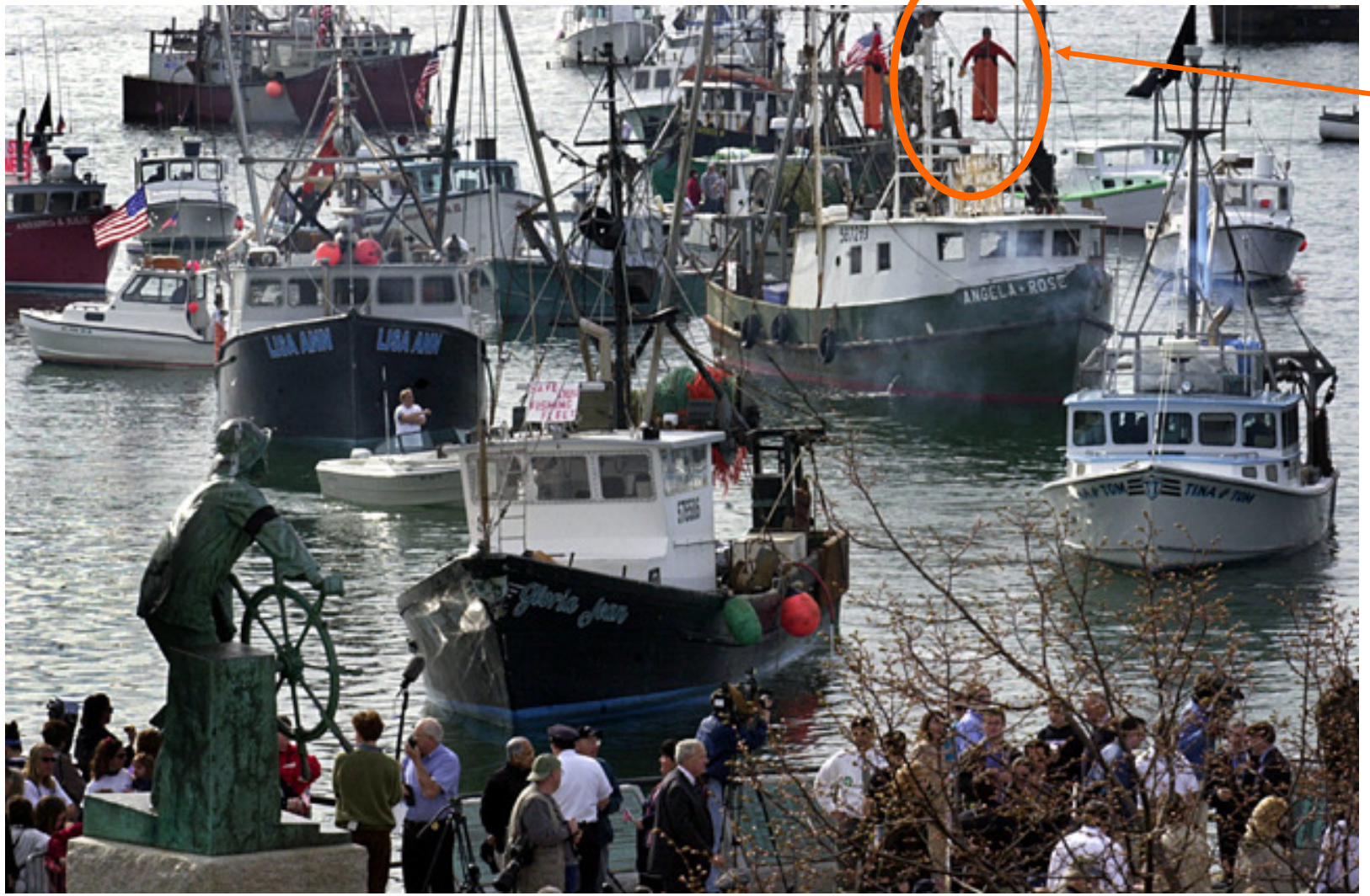
Reserves all over the world show large increases in spawning stocks

(Source : Prof. Callum Roberts, University of York)

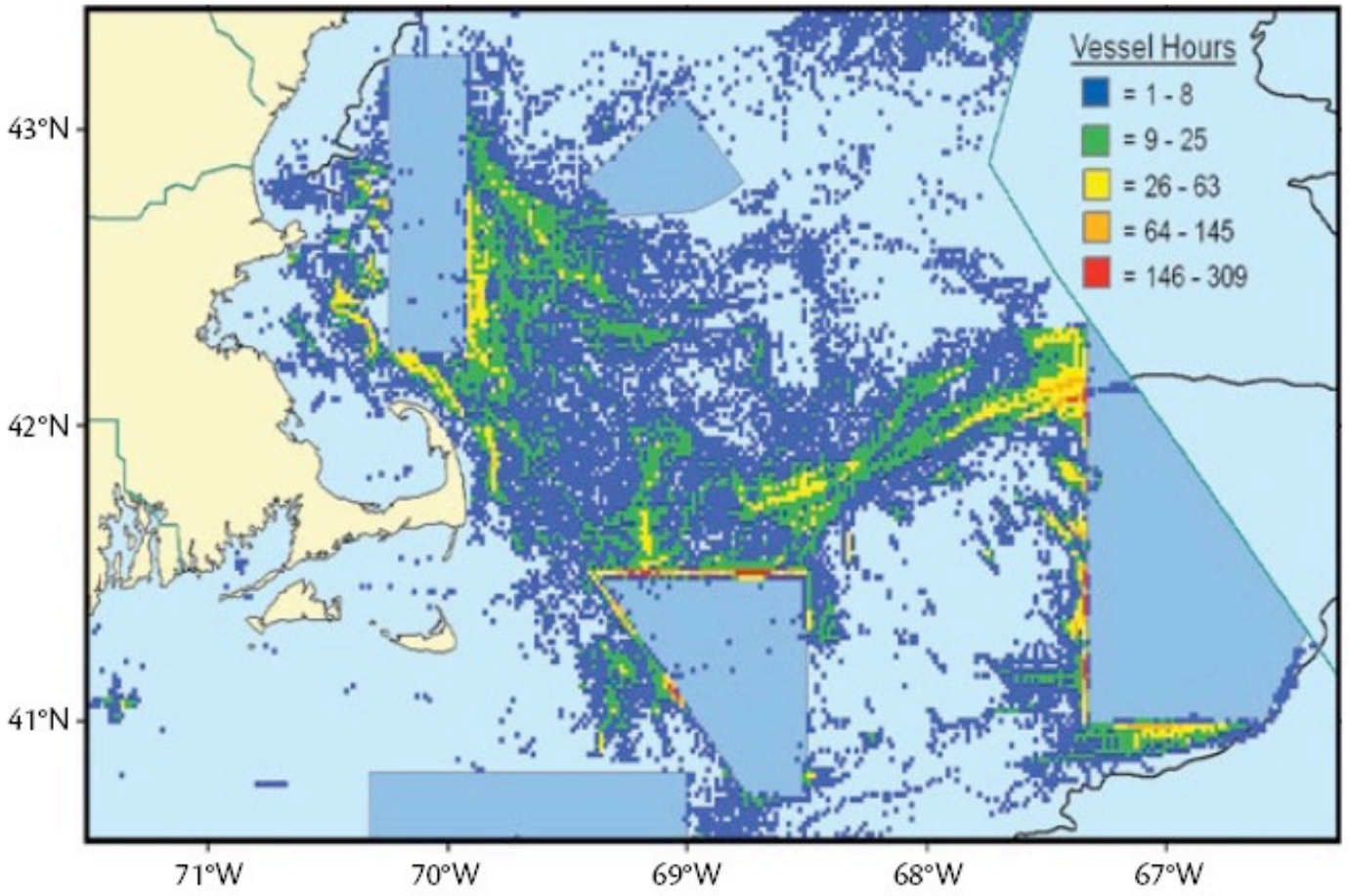
New England - Closed Areas Declared 1995



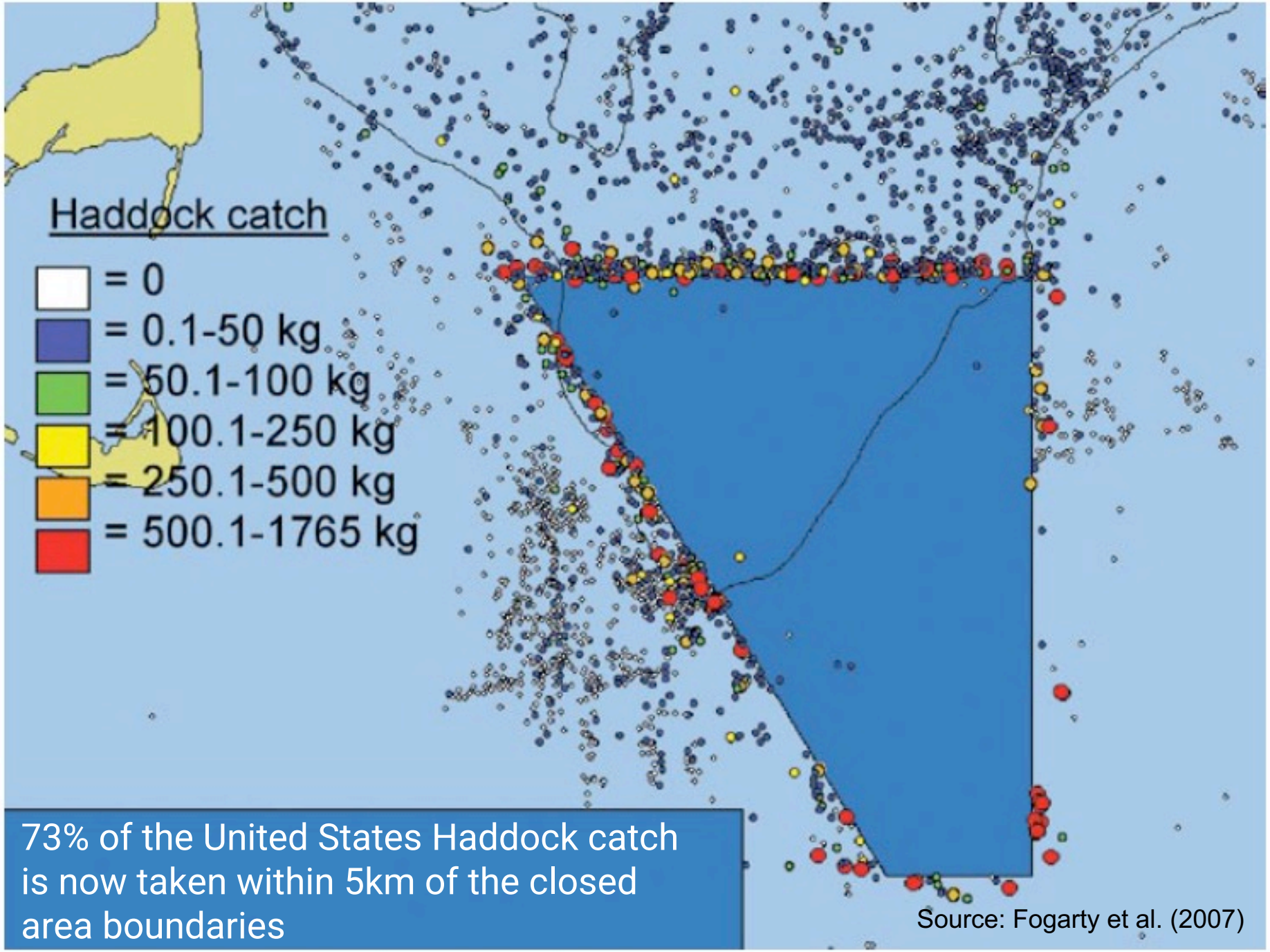
The Economics of Ecosystems & Biodiversity



Distribution of fishing effort around Georges Bank closed areas

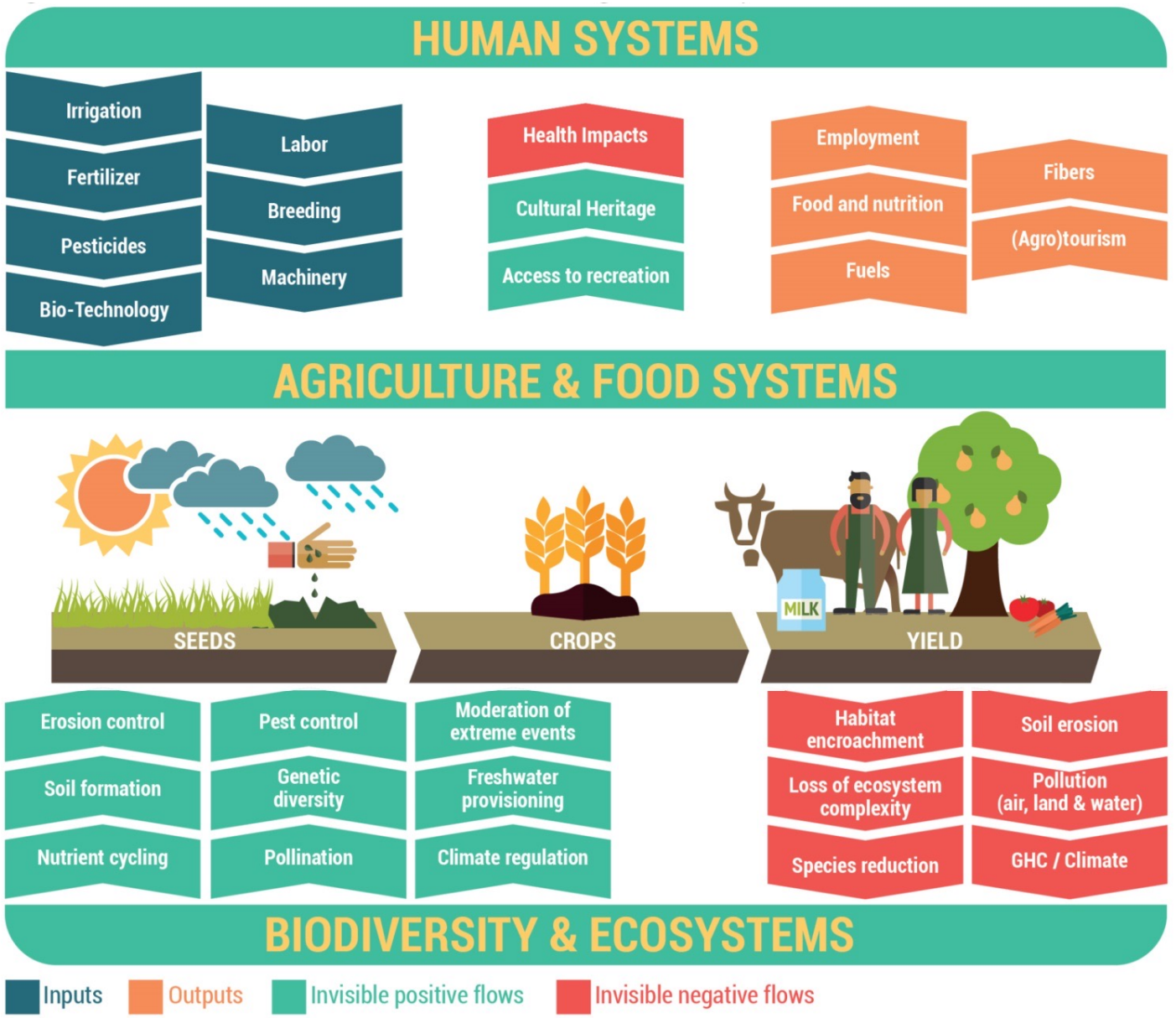


Source: Fogarty et al. (2007)

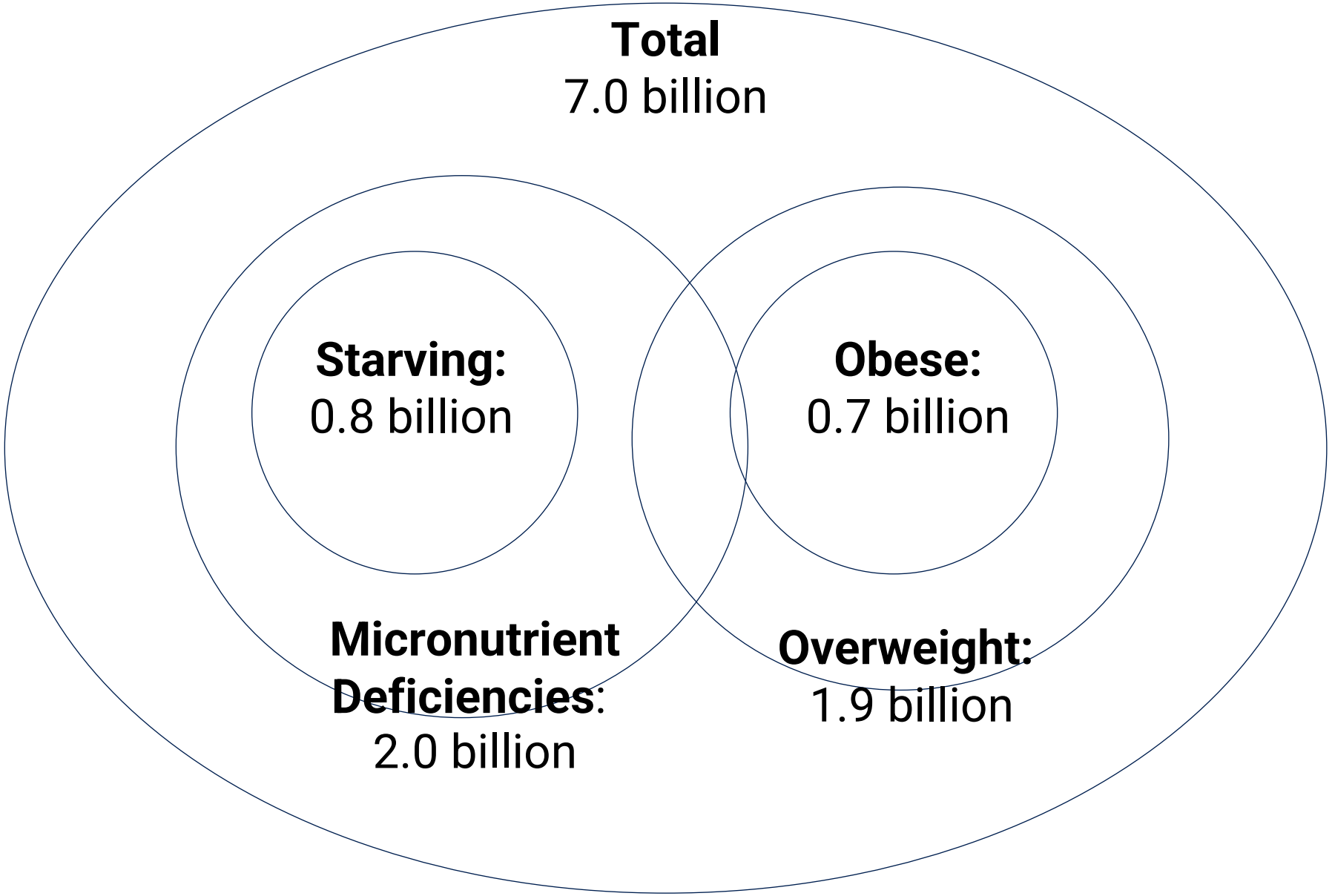

Haddock catch
= 0
= 0.1-50 kg
= 50.1-100 kg
= 100.1-250 kg
= 250.1-500 kg
= 500.1-1765 kg
73% of the United States Haddock catch is now taken within 5km of the closed area boundaries
Source: Fogarty et al. (2007)

“Food system”: what most people think

“Food system”: including invisibles…



Food Systems: Diets and Nutrition



Food Systems: Diet Related Diseases

- The Global Nutrition Report, 2016:
  "Diet is now the number-one risk factor for the global burden of disease."

- Diabetes:422 million suffering (2014)*
  - Four-fold increase from 1980 = 108 million
  - The global prevalence of diabetes among adults (>18 years) up from 4.7% in 1980 to 8.5% in 2014
  - Costs (2014) = USD 850 Billion p.a.

* World Health Organization, Global Report on Diabetes, 2016.

http://www.who.int/diabetes/global-report/en/

Food Systems: Input Related Diseases

- Livestock antibiotics - Antibiotic Resistance
- Herbicides - Cancer links
- Pesticides - Endocrine Disruption links

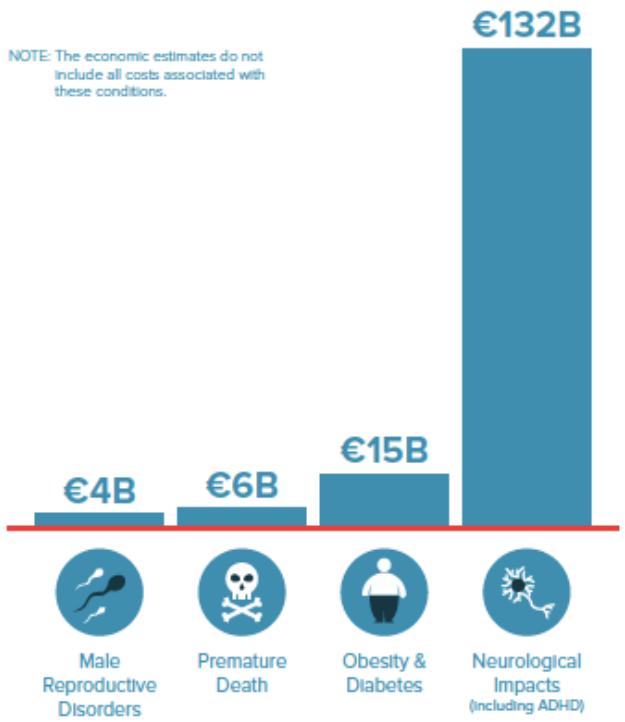
Food System: Pesticide Related Diseases & Costs

HEALTH EFFECTS FROM ENDOCRINE DISRUPTING CHEMICALS COST THE EU €157B EACH YEAR.

This is the tip of the iceberg: Costs may be as high as €270B.

€157B Cost by Health Effect

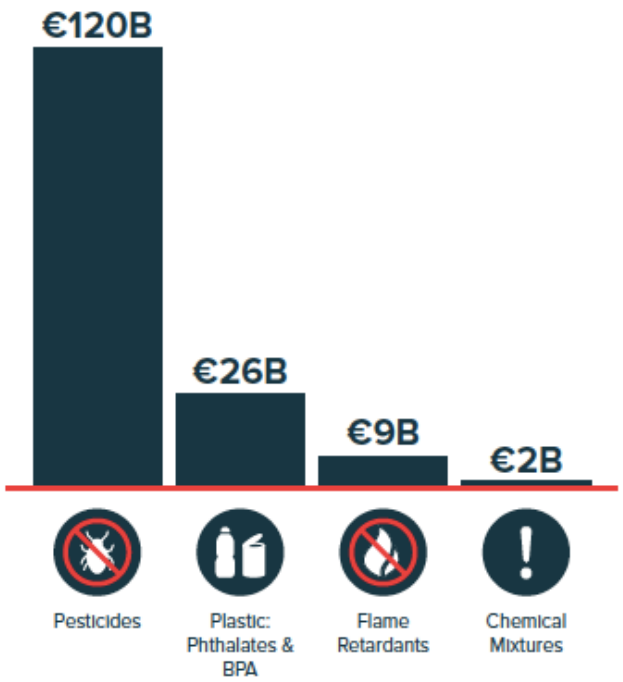
NOTE: The economic estimates do not include all costs associated with these conditions.



SOME EDC-RELATED HEALTH OUTCOMES NOT INCLUDED:

- Breast Cancer
- Prostate Cancer
- Immune Disorders
- Female Reproductive Disorders
- Liver Cancer
- Parkinson's Disease
- Osteoperosis
- Endometriosis
- Thyroid Disorders

€157B Cost by EDC Type



SOME EDCs NOT INCLUDED:

- Atrazine
- 2, 4-D
- Styrene
- Triclosan
- Nonylphenol
- Polycyclic Aromatic Hydrocarbons
- Bisphenol S
- Cadmium
- Arsenic
- Ethylene glycol

NYU School of Medicine
NYU LANGONE MEDICAL CENTER

Endocrine Disrupting Chemicals (EDCs) interfere with hormone action to cause adverse health effects in people.

"THE TIP OF THE ICEBERG"

The data shown to the left are based on fewer than 5% of likely EDCs. Many EDC health conditions were not included in this study because key data are lacking. Other health outcomes will be the focus of future research.

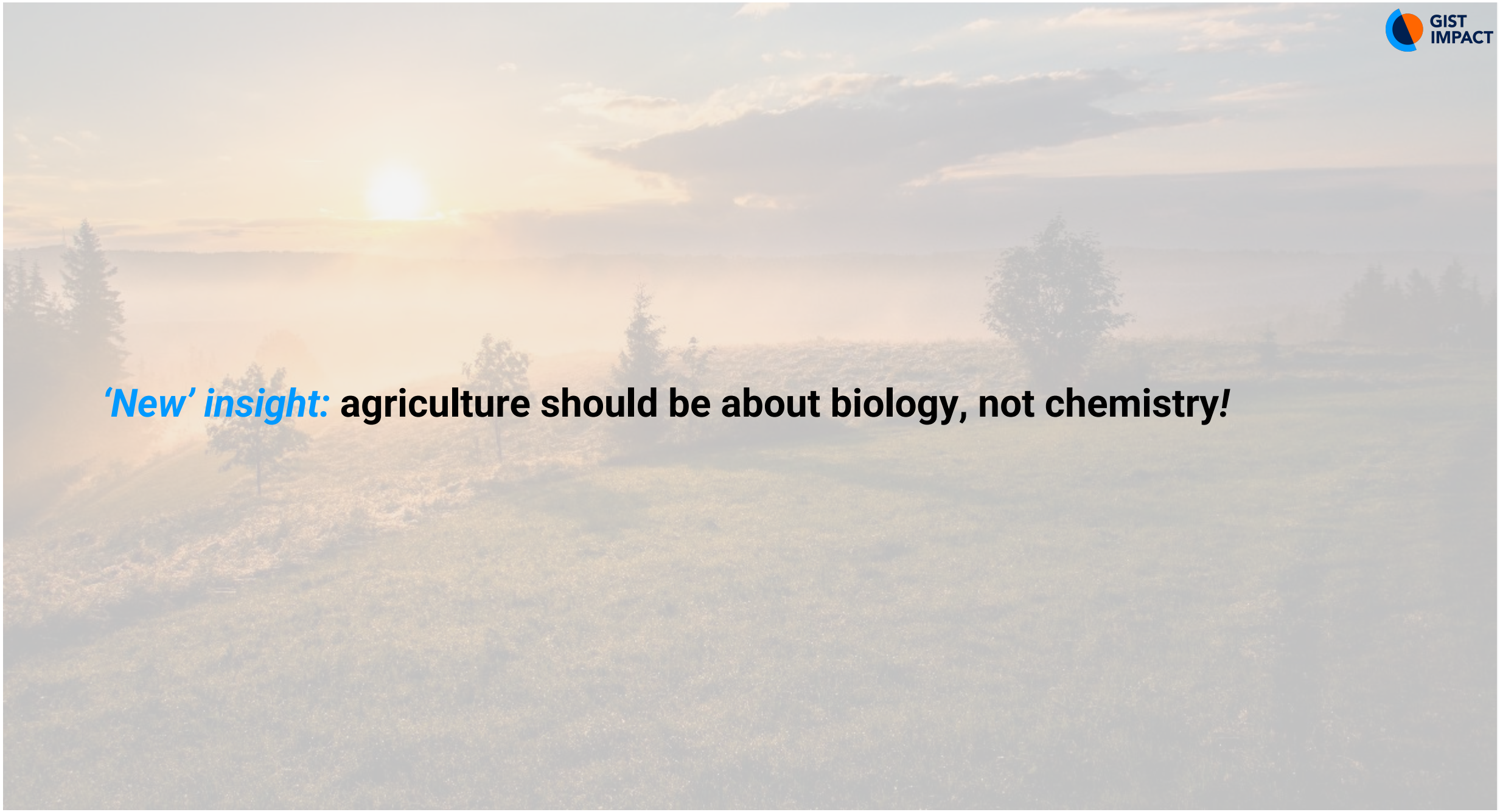
See Trasande et al. The Journal of Clinical Endocrinology & Metabolism **http://press.endocrine.org/edc**

Food Systems: Environmental Impacts

Food systems*are now the source of

- 60% of terrestrial biodiversity loss,
- 24% of green-house gas emissions,
- 33% of soil degradation and
- 61% of the depletion of commercial fish stocks

*_Food Systems and Natural Resources_ (UNEP, 2016)

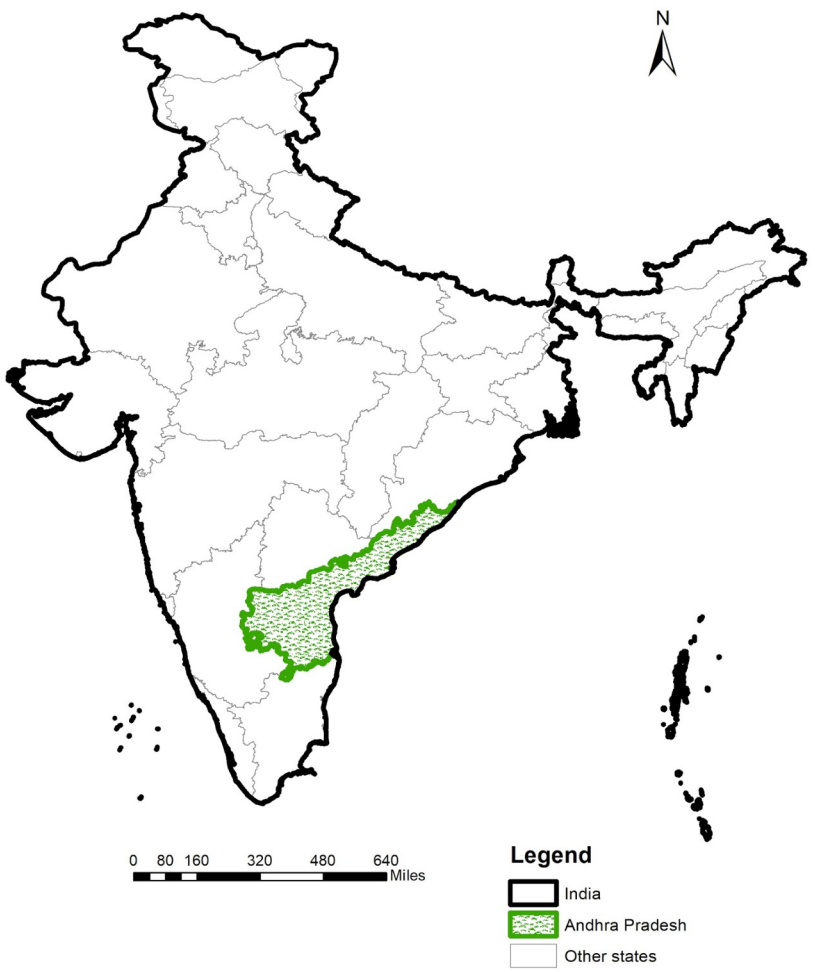


'New' insight: **agriculture should be about biology, not chemistry*!***

Bacterial soil inoculation and seed coating, and cyclical mulching

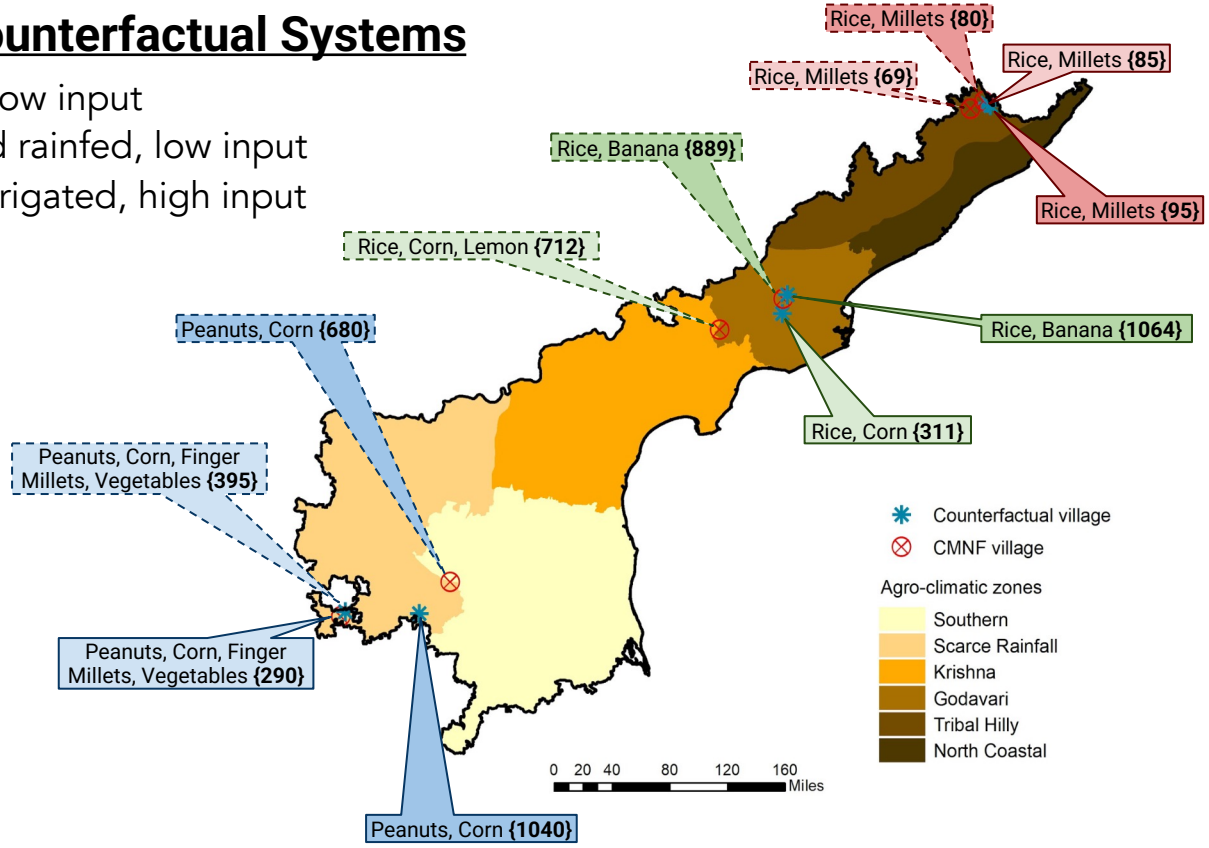
Including Invisibles: Research Area & Scope of Study

A total 480 farmer households were surveyed from 12 villages across 3 agroecological regions in Andhra Pradesh for the APCNF TEEBAgriFood study



Three Counterfactual Systems

- Tribal, low input
- Dryland rainfed, low input
- Delta irrigated, high input



Source: Government of India

Key Insights: Economic Impacts of APCNF & Counterfactual Practices

Chapter Authors - Prof. Jules Pretty and Dr. Zareen Bharucha

- After the adoption of APCNF, yields for 10 crops (cereals, fiber, vegetables, and fruit) increased in all districts and systems on average by 11% from *status quo ante*, and farmer net income rose by 49%
- APCNF farms demonstrate 88% higher diversity (particularly in tribal and low-input regimes). Adoption of APCNF resulted in an average increase from 2.1 crops to 4 crops
- APCNF farms demonstrate 20% higher labour use. Whilst adding costs, this dimension could be viewed as an advantage at community and regional level, allowing for increased employment in rural landscapes
- APCNF farms **demonstrate lower input use and input costs of production** (i.e., pesticide, fertilizer, machinery, seeds, etc.). The use of pesticides and fertilizers reduced by 56% to 73%
- Transitions to AP-CNF from all three agroecosystems (high-input chemical, low-input rainfed and tribal) generated benefits, even though APCNF farmers began adoption from different cultural and agricultural departure points.
- Hence one can conclude that **returns on public investment to support transitions towards APCNF are positive**

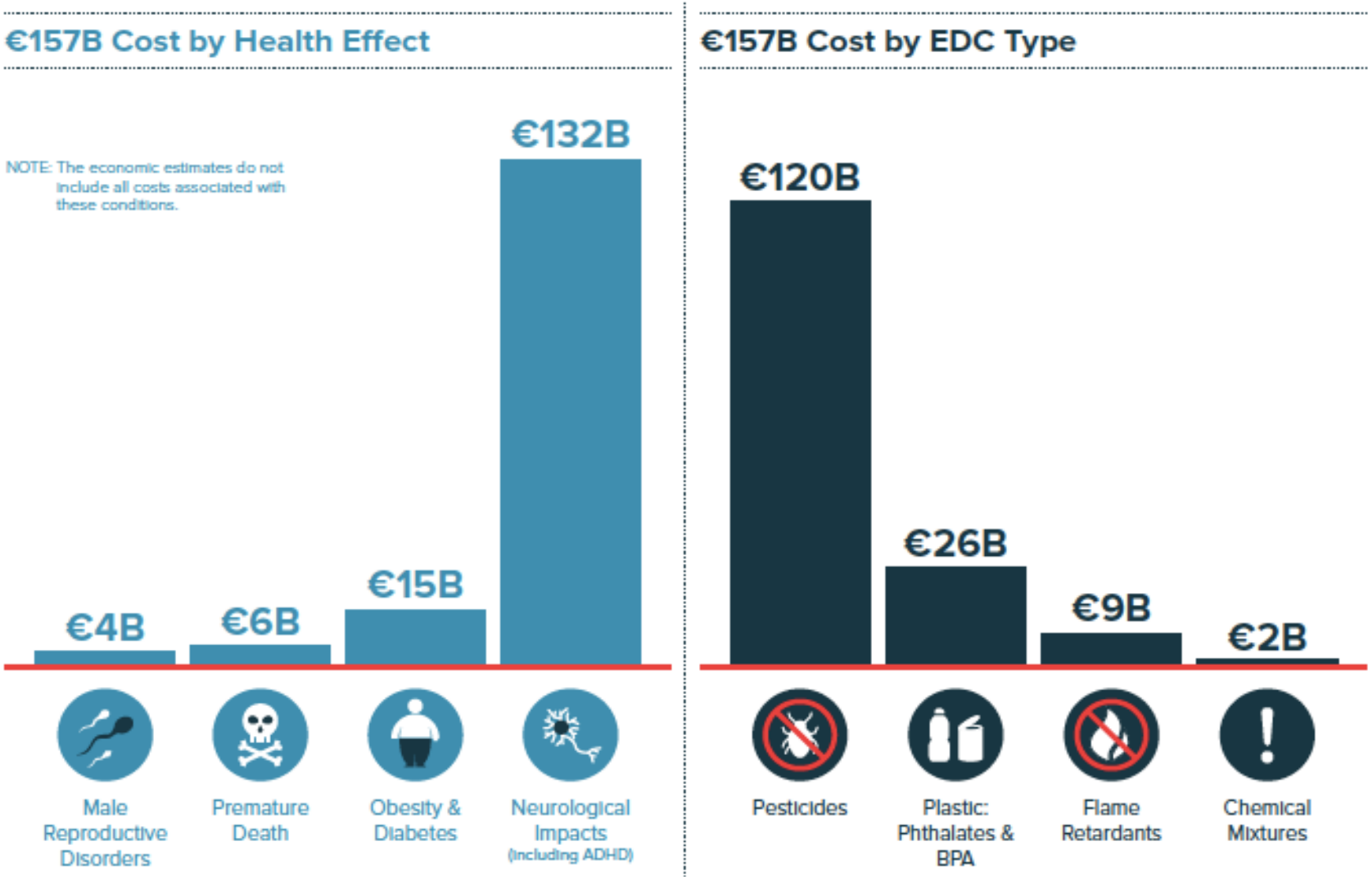
Invisible Benefits Gained

Beneficial Insects (secondary predators) in a single AP-CNF Turmeric Field

Invisible Benefits Gained

Where there are insects...

Invisible costs avoided
(eg: EU's annual cost of Endocrine Disrupting Chemicals EDCs)



A “CRP” (i.e. Master Farmer) narrates her success story to visitors & local audience in the heart of *West Godavari District...*

.... where the so-called 1970’s *“Green Revolution”* was born !

What kind of “GDP growth” does mining deliver?

GDP Growth from mining can be analysed (Income Method) as follows:-

	GDP Component (Income Method)	Who are the main beneficiaries?	Are there hidden economic costs ?
1.	Corporate Profits	Mostly Foreign (MNC) Mining Companies	Yes: Large Natural Capital Externalities
2.	Wages & Salaries	Largest packages are paid to Expats	Yes: Pre-emption of skilled labour away from Secondary/ Tertiary sectors
3.	Taxes net of Subsidies	Government (for taxes) & MNCs (for subsidies)	Yes: Opportunity cost of very low Resource Taxation
4.	Bank Interest	Large international banks	Yes: increasing External Debt, under-developed local markets
5.	Rentals & Depreciation	International providers of equipment and local providers of space	Yes: Negative Externalities

THANK YOU

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CEO – GIST Impact
UNEP Goodwill Ambasador

https://gistimpact.com/news-insights/against-all-odds-cbd-cop-15-and-its-implications-for-business-and-nature/