Paris Workshop, 9th-10th May

Panel on TEEB-Agri-Food's Proposed Valuation Framework

Pavan Sukhdev

UNEP Goodwill Ambassador

& Special Adviser - TEEBAgriFood

Will big investors ever filter their debt and equity purchases through a ‘sustainability’ lens?

Will big investors ever filter their debt and equity purchases through a 'sustainability' lens?

- Global SRI/ESG rated assets went up 61% in just two years, from USD 13.3 trillion (2012) to USD 21.4 trillion (2014)

Figure: Proportion of Global SRI Assets by Region

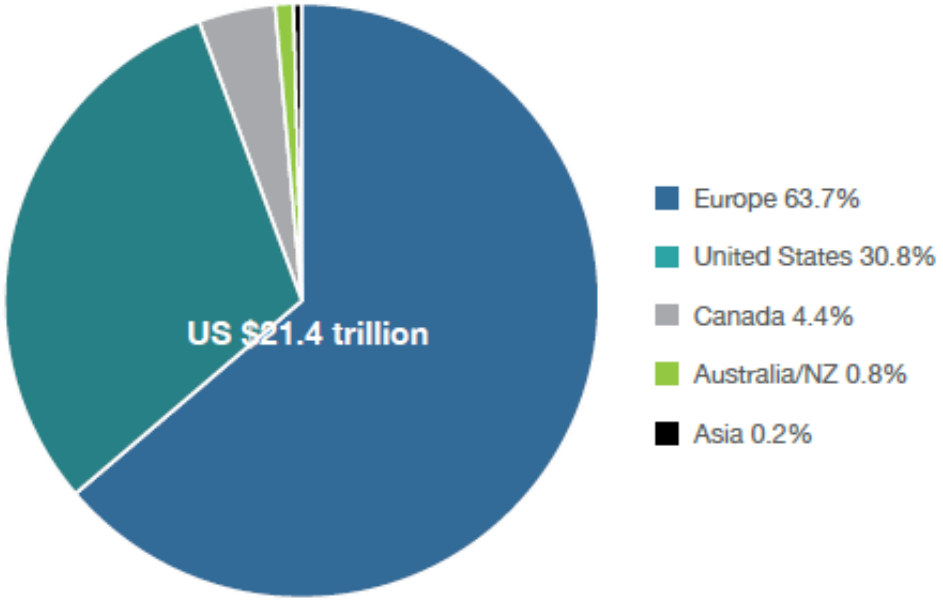

Table: Growth of SRI Assets by Region 2012–2014

USD Million	2012	2014
Europe	$8,758	$13,608
United States	$3,740	$6,572
Canada	$589	$945
Australia/NZ	$134	$180
Asia	$40	$53
Total	**$13,261**	**$21,358**

Source: Review Report by Global Sustainable Investment Alliance, 2014

Will developing countries ever develop policy responses to agri-chemical toxins?

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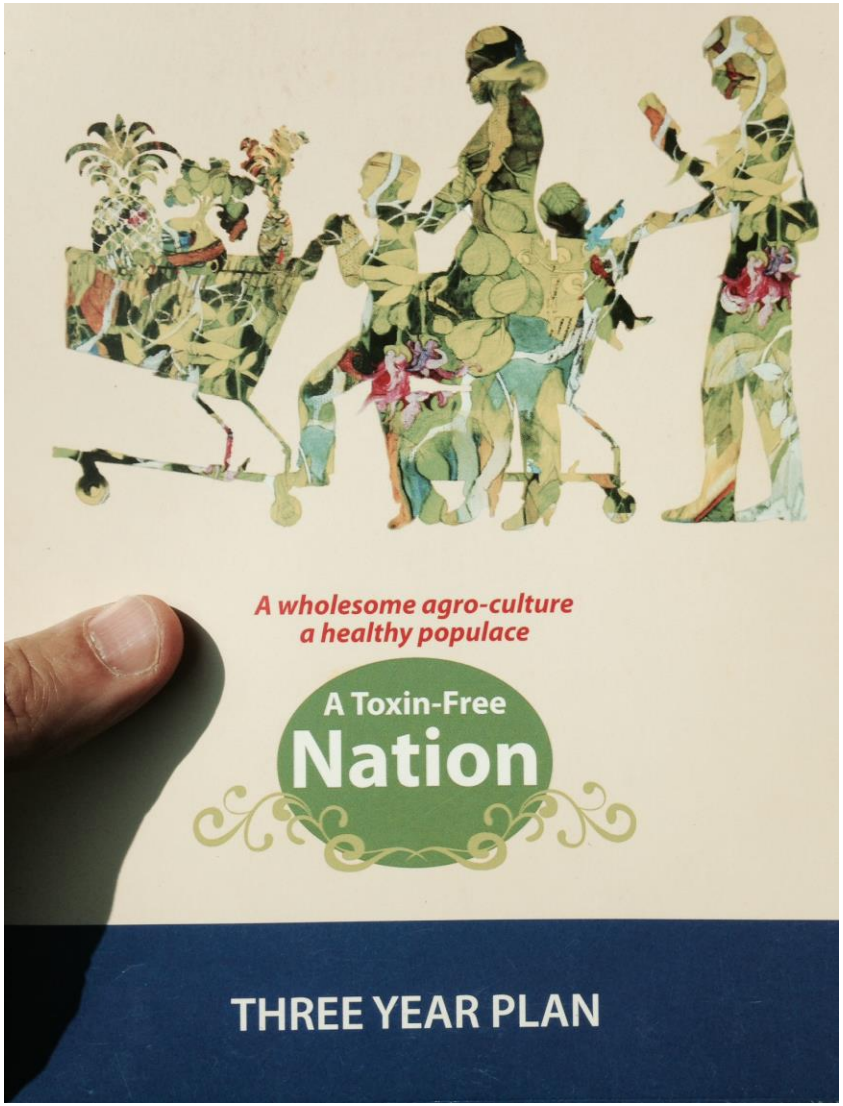


Sri Lanka has a 3-Year Plan
For a "toxin-free" nation and
has already banned Glyphosates

Will it ever be possible to quantify the public costs of health damage from agri-chemicals?

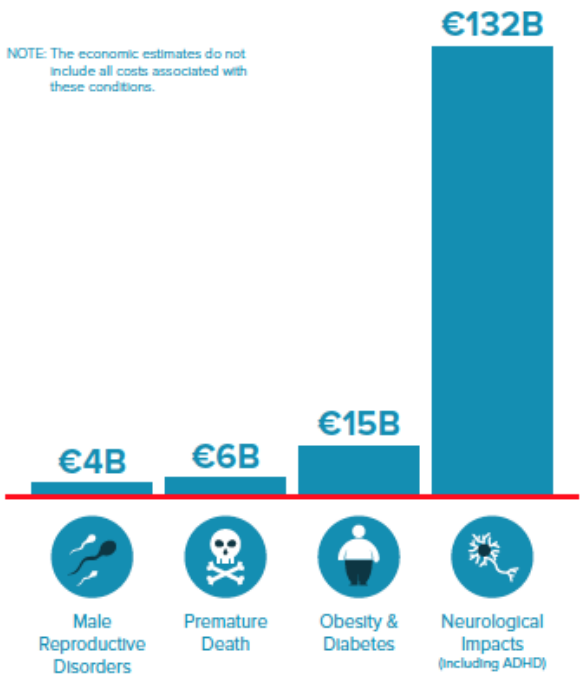
Will it ever be possible to quantify the public costs of health damage from agri-chemicals?

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

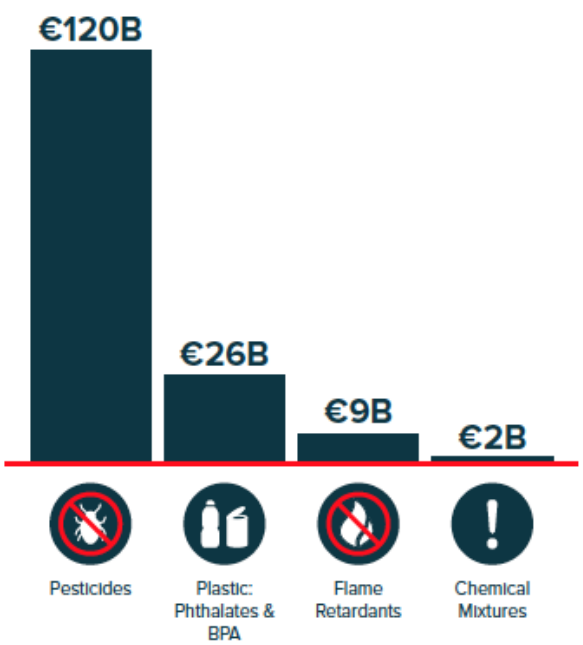
NOTE: The economic estimates do not include all costs associated with these conditions.



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

Why have one universal valuation framework for 'TEEBAgriFood' ?

Comparable questions …

- Why have one framework for ecosystem services? (CICES)
- Why have one framework for corporate financial accounts? (IFRS)
- Generally why not just encourage *laissez-faire,* creative licence, multiple lexicons, numerous black boxes, cherry-picked perspectives?

Benefits of one Universal Framework…

- Checklist for completeness & materiality of impacts and dependencies
- Defined Value Chain Boundaries for evaluation
- Defined Choices of Scale and Scope for evaluation
- Comparability across alternative systems
- Comparability across policy scenarios
- Comparability across alternative agri-food products

Applications of a Universal "Valuation Framework"

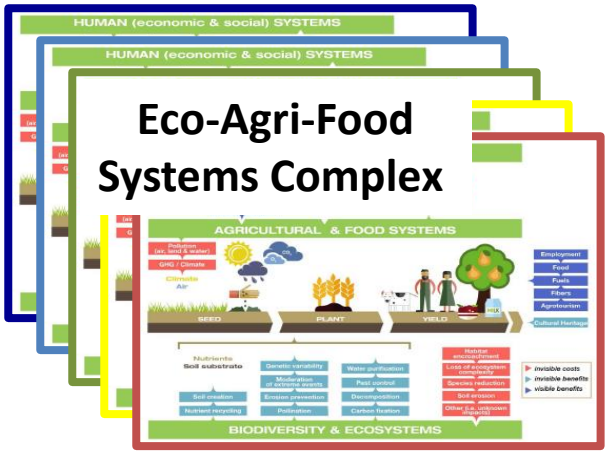
(i) Business Analysis
Product X
vs
Product Y

(ii) Typology Comparison
System A
vs
System B

(iii) Policy Evaluation
Policy Scenario 1
vs
Policy Scenario 2

(iii) National Accounting
Unadjusted GDP
vs
Environmentally Adjusted GDP

Valuation Framework



Parameters, Data, & Questions

Analysis, Valuations & Answers

Thank You !

and

Over to YOU!

Pavan Sukhdev
UNEP Goodwill Ambassador
& CEO- GIST Advisory

Introduction to TEEBAgriFood valuation framework

Kavita Sharma

9th May, 2016

Introduction/ context setting

- Mission statement – *the economic environment in which farmers and agricultural policy-makers operate today is distorted by significant **externalities**, both **negative and positive**. Indeed, most of the largest **impacts on the health of humans, ecosystems, agricultural lands, waters, and seas** arising from various different types of agricultural and food systems, are **economically invisible** and do not get the attention they deserve from decision makers. There is therefore a need to evaluate all significant externalities of eco-agri-food systems, to **better inform decision-makers** in governments, businesses, and farms. Furthermore, there is a need to **evaluate the eco-agri-food systems complex as a whole**, and not as a set of silos.*

- Recognize the role of agriculture in global economy, gender, culture, poverty reduction, and in environmental degradation (positive and negative flows)
  - 1 in 3 (economically active labor force employed)
  - Small holder farms represent over 475 million of the worlds' 570 million farms
  - 80% of new agricultural lands replaced tropical forests
  - World's largest user of antibiotics (70%)
  - Longer value chains

- "Farm to flush": entire value chain, so that above externalities AND consumption issues can also be included

Guiding Principles, Key Elements ….

Framework Principles

- Holistic View: Yields, employment, health, climate, biodiversity, ESS
- Anthropocentric: Human well-being
- Plurality of values: social, and resilience values (Development)
  - Recognizing all capitals: Natural, physical, social, and human
- Applicability to different types of Farming Systems and Practices

Framework Elements

- Visible and invisible flows from (and into) capital stocks
  - Accounted Economic flows (GDP components – SNA)
  - Unaccounted Economic flows (environmental and health externalities)
  - Social Values, Risks and Uncertainties
- Entire Value Chain
- Spatial Scale and Scope of Evaluation

TEEB AgriFood – Draft Valuation Framework

Value-Chain Stages / Visible and Invisible flows	Production			Processing and Distribution			Consumption	
	Landscape	Infrastructure and Manufacturing	Farm	Wholesale	Food and Beverage	Retail	Industry/ Household/ Hospitality	Waste
Captured by System of National Accounts (SNA) (Profits, Wages, Taxes net of Subsidies, etc.)								
Provisioning (Materials, Energy, etc.)								
Regulation and maintenance (Soil, Water, Habitat for biodiversity, etc.)								
Cultural (Heritage, Recreation, etc.)								
Health (Nutrition, Diseases, Antibiotic resistance, etc.)								
Pollution (Nitrates, Pesticides, Heavy metals, etc.)								
Emissions (CO_2, CH_4, etc.)								
Social values (Food security, Gender equality, etc.)								
Risks and uncertainties (Resilience, Health, etc.)								

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Way forward

- Framework in Foundations – looking at how comprehensive this is?
- Missing dimensions – ethical issues
- Zooming in (X and Y axis)
- Intermediate goods
- Measurement – Best practices etc., particularly for resilience, and risk
- Evidence of applications
- …

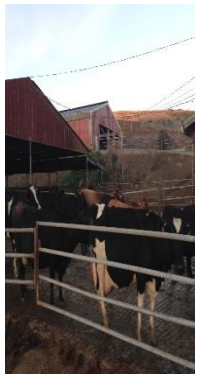
TEEBAgriFood Valuation Framework

Farm Sustainability Assessment Tool

Dr Harpinder Sandhu, Flinders University, Australia.
Harpinder.Sandhu@flinders.edu.au

Externalities Assessment of American Farms

- **Production value:**
- **Environmental benefits:** Water regulation, Carbon sequestration by soil and vegetation, Nitrogen fixation, Nutrient cycling, Soil erosion control, Biological control of pests/diseases.
- **Environmental costs:** Green house gas emissions, External costs of pesticides and fertilser
- **Social benefits:** Farm employment, Recreation, Education.


Benefit and costs associated with different farm types ($/acre/year)

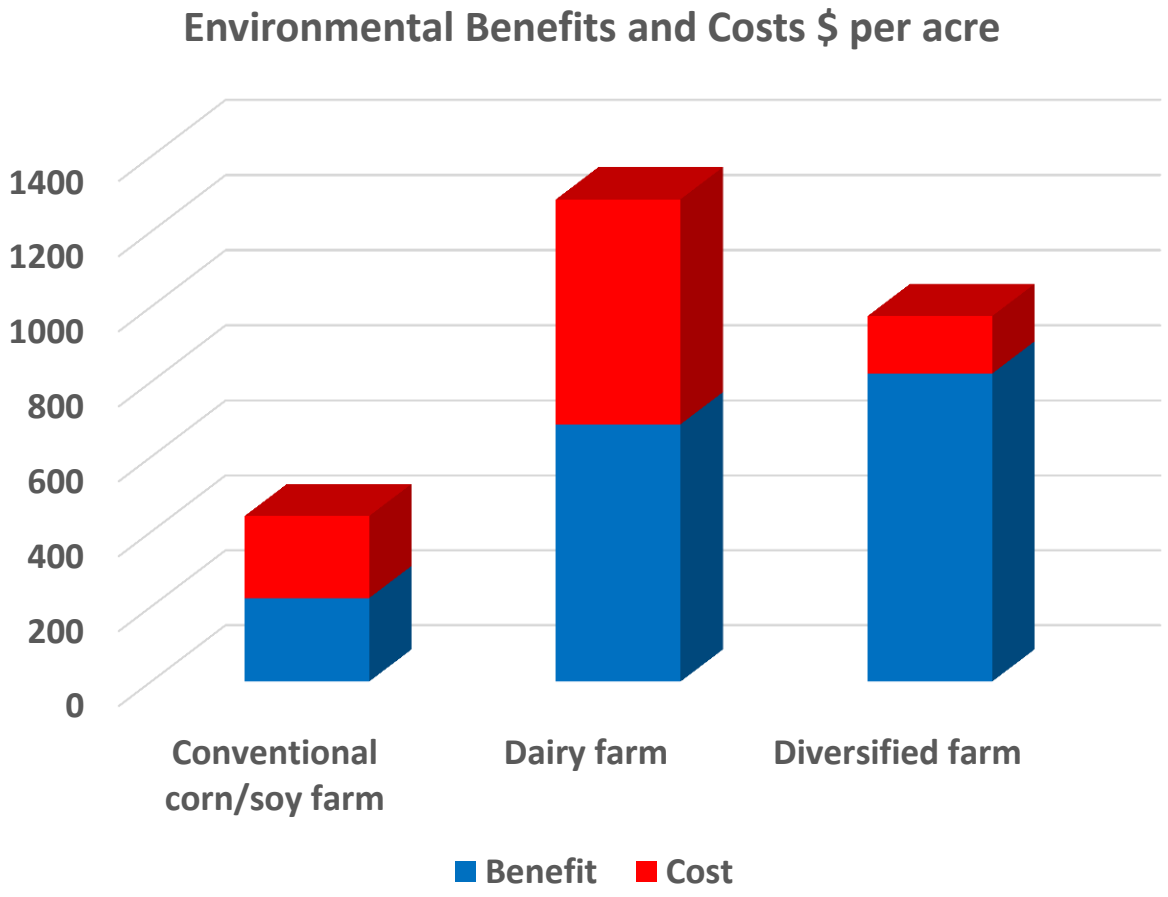
	Corn/Soy	Dairy	Diversified
Production value – Corn	884	8178	2015
Production value – Soybean	690		
Environmental benefits	89	193	172
Social benefits	134	494	650
Environmental cost	219	599	153
Net	1578	8266	2684

Corn $/bu

Milk $/gallon

Beef $/lb

Comparison of three farming systems



Way forward

- How this unified framework should be adopted for valuation of agriculture/farming systems worldwide?
- How to involve current agriculture R&D so that they can also use this framework to assess different systems more holistically and assess all externalities?
- Corporate involvement is also required as stakeholders may invest in organisations that are more transparent in sharing information and are moving towards minimising their impacts on natural and social resources in value addition/distribution/consumption of food.

Road-testing full cost accounting
Assessment and communication

TEEB FOR AGRICULTURE & FOOD

Writers workshop

Paris, May 9th 2016

Soil & More International

Synchronizing Metrics & Methodologies

Carbon/GHG

Tools:

- Cool Farm Tool/others

Outputs:

- GHG emissions/product or ha
- Carbon sequestration/product or ha
- Soil build-up

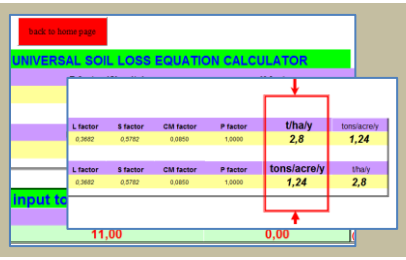
Erosion

Tool:

- Universal soil loss equation

Output:

- Erosion data



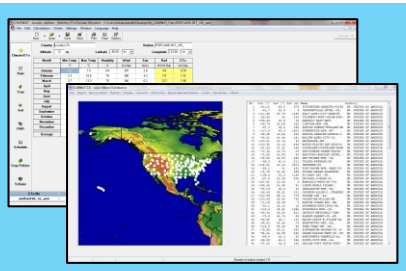
Water

Tools:

- ClimWat/CropWat/GreyWater

Outputs:

- Water use/product or ha
- Water pollution/product or ha



& more

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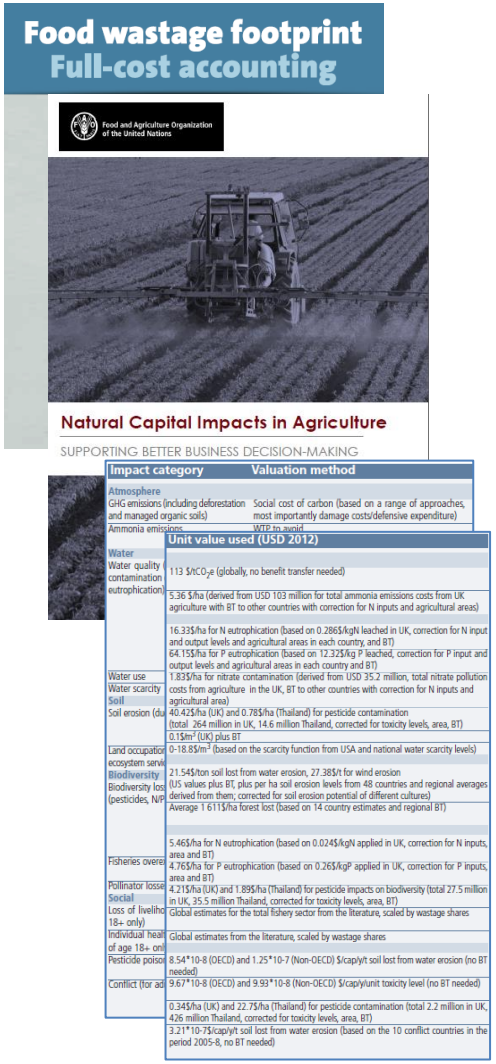

Results
Farming – wholesale level

FAO indicators	Reporting summary
Greenhouse gases	Greenhouse gas emissions
Ammonia emissions	Water quality
Water quality	Water use
Water use	Soil erosion (water/wind)
Water scarcity	Loss of biodiversity
Soil erosion	Loss of livelihood
Land occupation	Individual health damage
Biodiversity loss from pollutants	
Loss of livelihood (soil water erosion)	
Individual health damage	
Pesticide poisoning	
Conflict	

Product	Country
Apples	Argentina
Coffee	Mexico
Lemons	Chile
Milk	Germany
Organges	Egypt
Organges	South Africa
Pears	Argentina
Pineapple	Costa Rica
Tablegrapes	South Africa
Tea	India
Tomatoes	The Netherlands

All products/countries:
sustainable vs BAU

Full Cost Accounting Parameter	Cost/Benefit per hectare		
"external cost"	("-" means benefit)		
	Magrabi	BAU	Difference
Greenhouse gas emissions	- 758,29 €	372,34 €	1.130,63 €
Water quality	16,21 €	109,58 €	93,37 €
Water use	513,39 €	684,52 €	171,13 €
Soil erosion (wind)	- 291,03 €	1.222,32 €	1.513,35 €
Loss of biodiversity	4,88 €	12,88 €	8,01 €
Loss of livelihood	- €	0,003 €	0,00 €
Individual health damage	- €	0,30 €	0,30 €
External cost/benefit per kg citrus (€)	- 0,02 €	0,08 €	**0,11 €**
External cost/benefit per hectare (€)	- 515 €	2.402 €	**2.917 €**
External cost/benefit per 200 ha farm (€)	- 102.968 €	480.392 €	**583.359 €**
kg soil build-up/erosion	**Magrabi**	**BAU**	**Difference**
per kg citrus and year	- 0,56	1,75	2,31
per hectare and year	- 11.905	50.000	61.905
per 200 ha and year	- 2.380.952	10.000.000	12.380.952
kg CO2 sequest./emission	**Magrabi**	**BAU**	**Difference**
per kg citrus and year	- 0,35	0,13	0,48
per hectare and year	- 7.516	3.643	11.159
per 200 ha and year	- 1.503.162	728.603	2.231.765

Reporting, Communication & Marketing

Full Cost Accounting Parameter	Cost/Benefit per hectare			
"external cost"	("-" means benefit)			
	Organic	Conventional	Difference	
Greenhouse gas emissions	- 758,29 €	372,34 €	1.130,63 €	the negative value means CO2 sequestered
Water quality	16,21 €	109,58 €	93,37 €	
Water use	513,39 €	684,52 €	171,13 €	
Soil erosion (wind)	- 291,03 €	1.222,32 €	1.513,35 €	the negative value means build-up top soil
Loss of biodiversity	4,88 €	12,88 €	8,01 €	
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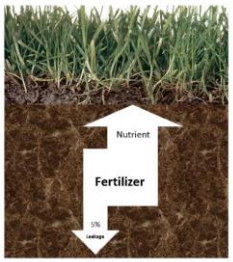
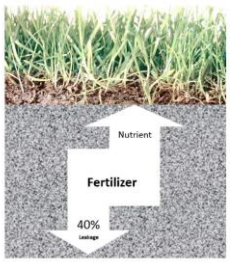


Good soil structure means low leakage loss



Bad soil structure means high leakage loss

Learnings

- We have more data/in common than we think
- Social/health remains tricky, especially on product level
- System/time approach is necessary to fully capitalize/account for benefits of e.g. crop rotation vs on-time peak productivity
- Define common framework, allowing flexibilty to customize for local circumstances

Your partner for sustainable development in agriculture:

- Soil fertility
- Footprinting
- Sustainability assessment

Thank You

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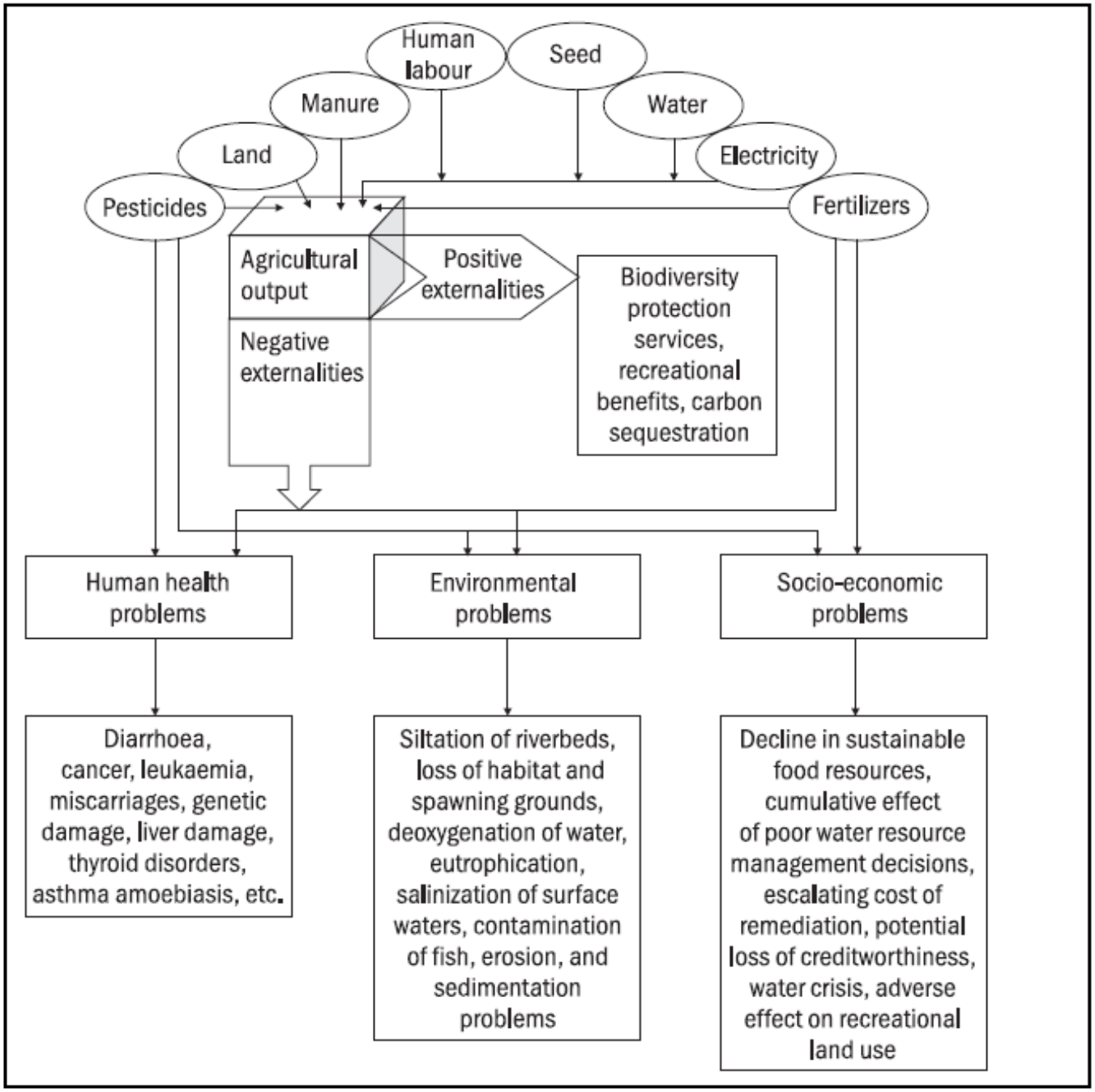
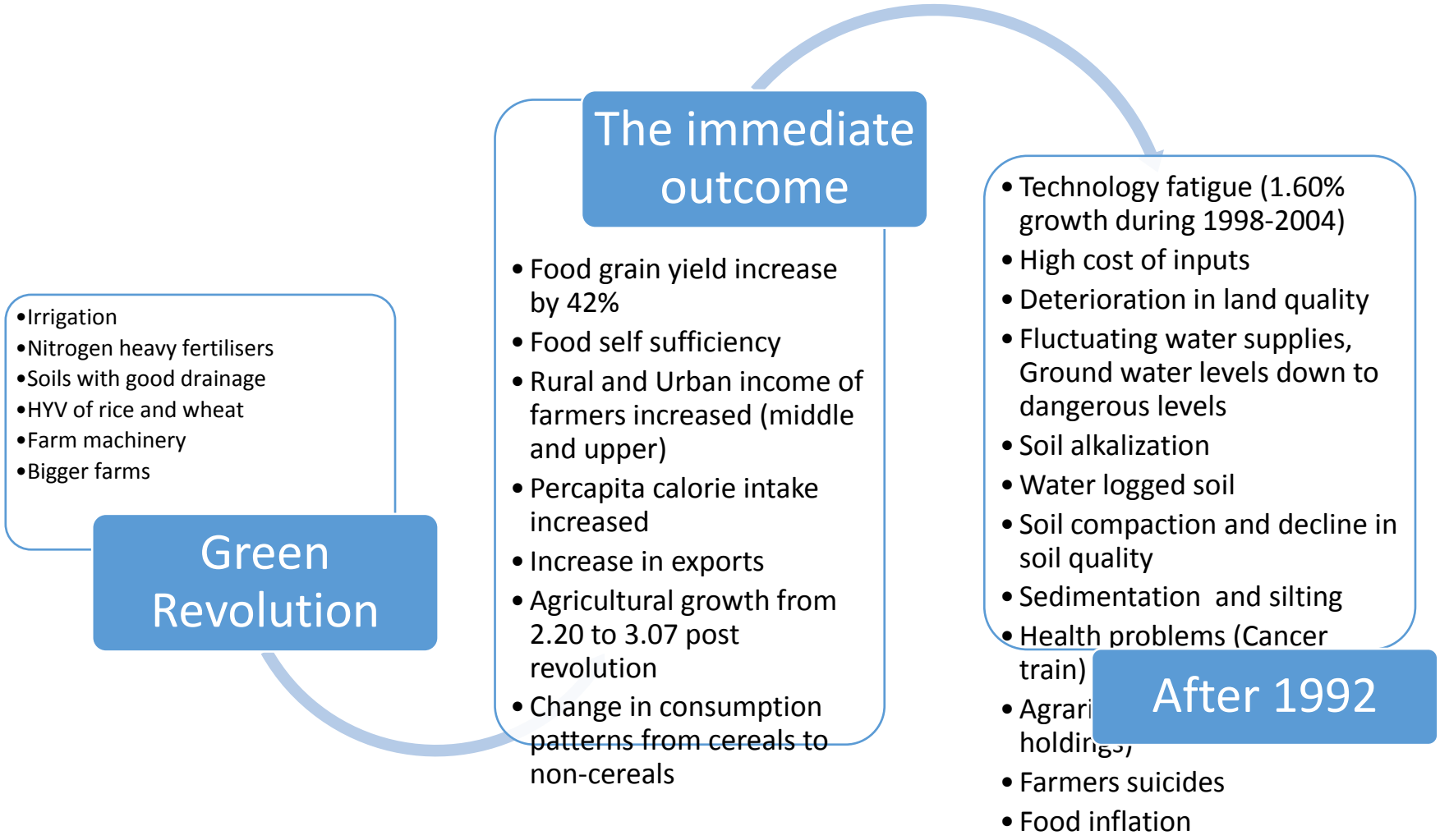
The Peril of being short-sighted in agriculture – Need for TEEBAg food framework

Haripriya Gundimeda
Professor
Department of Humanities and Social Sciences
Indian Institute of Technology Bombay

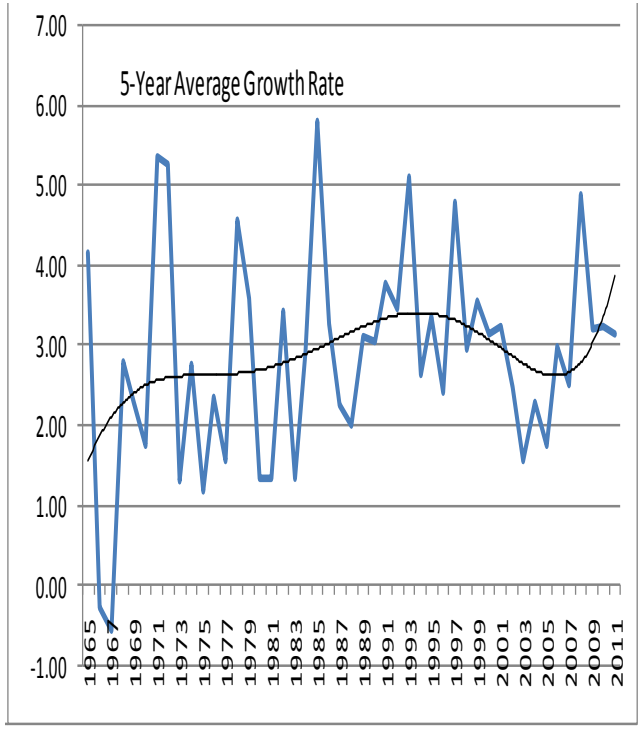

Human labour
Seed
Manure
Water
Land
Electricity
Pesticides
Fertilizers
Agricultural output
Positive externalities
Biodiversity protection services, recreational benefits, carbon sequestration
Negative externalities
Human health problems
Environmental problems
Socio-economic problems
Diarrhoea, cancer, leukaemia, miscarriages, genetic damage, liver damage, thyroid disorders, asthma amoebiasis, etc.
Siltation of riverbeds, loss of habitat and spawning grounds, deoxygenation of water, eutrophication, salinization of surface waters, contamination of fish, erosion, and sedimentation problems
Decline in sustainable food resources, cumulative effect of poor water resource management decisions, escalating cost of remediation, potential loss of creditworthiness, water crisis, adverse effect on recreational land use

Dangers of non-recognition



Non-recognition leads to short-sighted policies

Deciphering Growth



11th plan steering Group

- Public investment
- Private Investment
- Technology
- Diversification
- Fertilisers

- The only reason for growth in agriculture during 1997-2004 is due to credit growth

Agriculture from national accounting

- Growing of field crops, fruits, nuts, seeds and vegetables
- Management of tea, coffee and rubber plantations
- Agricultural and horticultural services
- Ancillary activities of cultivators, transportation of produce to primary markets and
- Activities yielding rental income from farm buildings and farm machinery and interest on agricultural loans

GM crops for food security – is it a good policy stand?

- Domination by small (1 to 2 ha) and marginal farmers (0.01 to 1ha) accounting for more than 80% of total farm hhs.
- The share in area is around 44%
- 121 million agricultural holdings (census, 2001) of which 99 million were small and marginal farmers
- BT cotton spread to over 85% of the cotton area covering 9.4 mha in 2010-11 since its introduction in 2002. However the cotton production only increased by 2% after 2004.
- The hidden costs – increased irrigation, higher cost of inputs, new pests, secondary pests, monopolistic control over seed markets, Health problems..
- Resistance from Locals against introduction
- Several livelihoods lost and increase in farmers suicides
- Credit and indebtedness

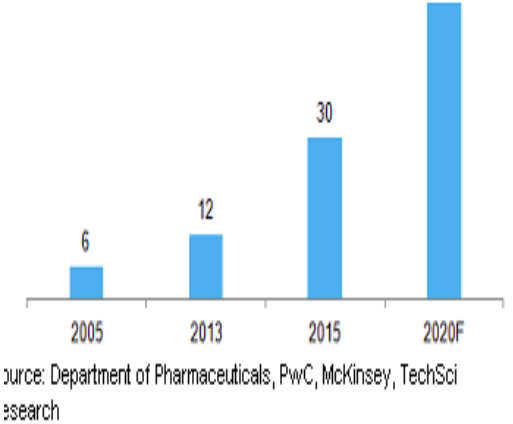
Unpacking agrifood at macro level

- Value added by agriculture in 2002 – 38,91,383 million Rupees (15% of GDP)
- 55% workers employed
- Extent of subsidies - 3,47,840 Million Rupees (9% of value added)
- Fertilisers (39.7%)
- Electricity (18.5%)
- Irrigation (39.3%)
- Others (2.4%)

- Cost of Land reclamation (1.4% of subsidy)
- Replacement cost of soil nutrients (77% of subsidy)
- Sedimentation (29% of

Source: Frost & Sullivan, LSI Financial Services, Deloitte, TechSci Research

Notes: E - Estimate, F - Forecast, CAGR - Compound Annual Growth Rate



ource: Department of Pharmaceuticals, PwC, McKinsey, TechSci esearch

otes: F - Forecast, CAGR - Compound Annual Growth Rate

Thank you

Time for Discussing your important views