Introducing True Cost Accounting and Its Uses

Rui Benfica
Senior Research Fellow
Agrifood Innovation and Resilience Unit
IFPRI

IFPRI Virtual Policy Seminar
Making Food System Costs Visible: A Policy Imperative for Multifunctional Landscapes
September 29, 2026

SCIENCE FOR A FOOD-SECURE FUTURE
MULTIFUNCTIONAL LANDSCAPES

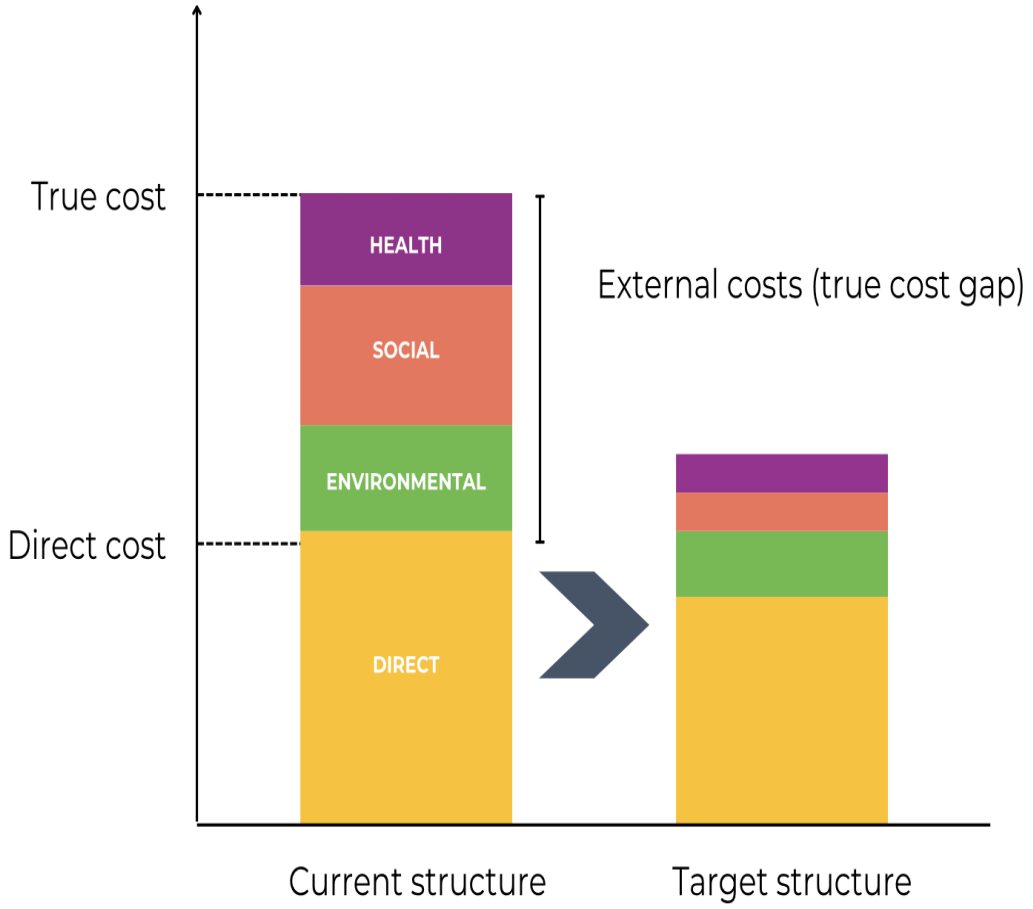
The Challenge

- **Agrifood systems carry major hidden costs**—over US$11 trillion annually—stemming from health harms, environmental degradation, and social and economic inequities that are not reflected in consumer prices.
- **Redesigning these systems requires making externalities visible**, so policies can balance food security, nutrition, climate, health, equity, and economic objectives using complete—not generalized—evidence.
- **True Cost Accounting (TCA) provides that visibility**, valuing environmental, health, and social impacts to guide more informed decisions by governments, businesses, farmers, financiers, donors, and consumers.

What is True Cost Accounting? [1]

- **A systems-based valuation framework** that identifies, measures, and monetizes the environmental, social, and health externalities generated across agrifood systems.
- **A method for revealing hidden costs and benefits** that are not reflected in market prices—such as pollution, climate impacts, labor conditions, gender gaps, and public-health burdens.
- **A decision-support tool for policymakers and market actors**, enabling more accurate, evidence-based choices that align food systems with climate, health, equity, and sustainability goals.

What is True Cost Accounting? [2]



Source: Adapted from True Price (2021c).

Externality Type	Impact Types
Health (Human health)	Antimicrobial
	Undernutrition
	Unhealthy diet composition
	Zoonoses (animal to human)
Social (Human & social)	Workplace health and safety
	Forced labour
	Child labour
	Gender wage gap
	Underpayment & insufficient income
Environmental (Natural)	Climate change
	Air pollution
	Water pollution
	Use of scarce water
	Fossil fuel depletion
	Material depletion
	Land occupation
	Soil degradation

Three Levels of Analysis

1. **Product**
   - Measures and monetizes the full environmental, health, and social externalities of specific products.
   - Produces a ***true price*** that reflects the real cost of production beyond the market price.
2. **Household / Local Agrifood Systems**
   - Assesses how local production and consumption patterns affect community wellbeing, nutrition, livelihoods, and ecosystems.
   - Reveals ***true costs*** borne by local households that are invisible in market transactions.
3. **National or Global Agrifood Systems**
   - Quantifies cumulative externalities across food systems, including climate, health, and equity impacts.
   - Supports system-wide policy design by exposing ***true costs*** at national or global scale.

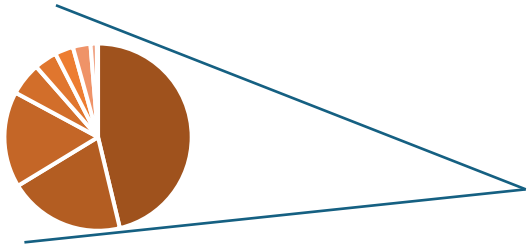
Our Empirical Applications

I. True price gap of Kenyan coffee



Key Finding: (1) The true price gap for the stages from cultivation to local processing of Kenyan coffee amounts to €21,09 per kg of coffee; (2) Social costs are predominant over environmental.

Total Social Cost
19,63 EUR/kg coffee

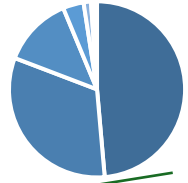


- € 9.08 Forced labour
- € 3.94 Occurrence of harassment
- € 3.25 Negative effects on employee health and safety
- € 1.11 Child labour
- € 0.78 Underpayment in the value chain
- € 0.62 Underearning in the value chain
- € 0.60 Lack of social security
- € 0.22 Gender discrimination
- € 0.03 Excessive and underpaid overtime
- € 0.01 Lack of freedom of association

True Price of coffee (EUR/kg)



Total Environmental Cost
1,46 EUR/kg coffee



- € 0.71 Water pollution
- € 0.47 Land use
- € 0.19 Air pollution
- € 0.05 Contribution to climate change
- € 0.02 Fossil fuel depletion
- € 0.01 Soil pollution
- € 0.01 Scarce water use

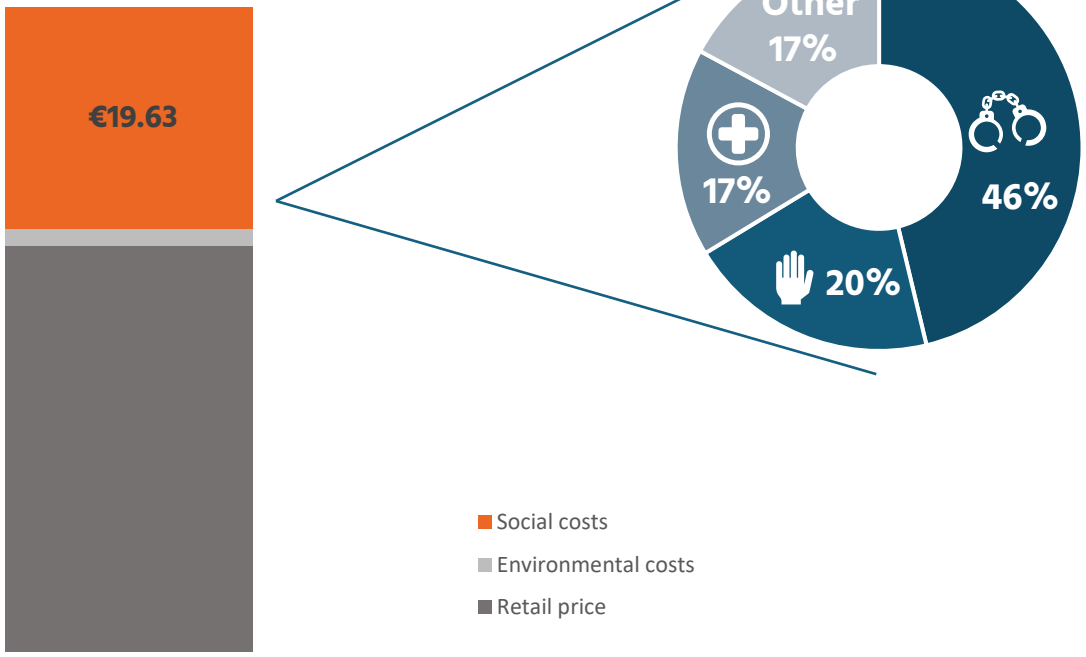


TOP THREE SOCIAL IMPACTS

Key Finding: The social cost is primarily driven by the impact of forced labor, negative effects on H&S and occurrence of harassment

Social Cost of Kenyan Coffee

(EUR/kg)



Forced labor — **46 % (9,08 EUR/kg)** of the total social impact

Occurrence of harassment — **20 % (3,94 EUR/kg)** of the total social impact

Negative effects on employee health and safety — **17 % (3,25 EUR/kg)** of the total social impact

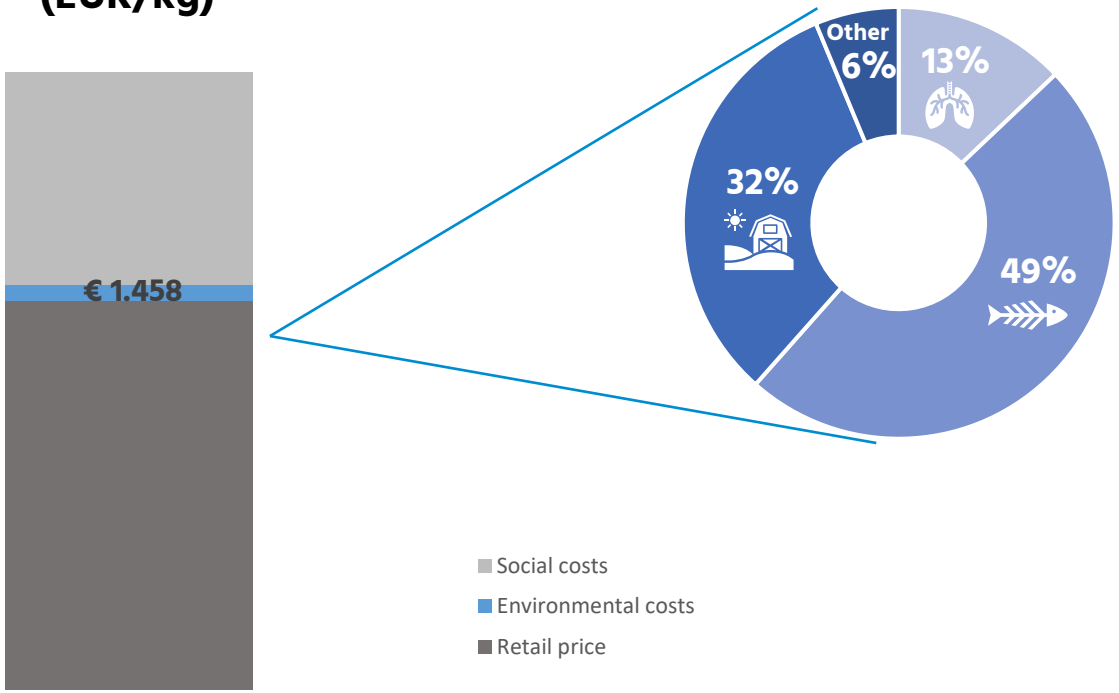
Social Impacts on people and communities caused by the production and consumption of coffee. In the context of a true price assessment, social impacts are unsustainable externalities related to breaches of human rights and labor rights

TOP THREE ENVIRONMENTAL IMPACTS

Key Finding: The environmental cost is primarily driven by the impact of water pollution, air pollution and land use

Environmental Cost of Kenyan coffee

(EUR/kg)



Water pollution **49% (0,71 EUR/kg)** of the total environmental impact

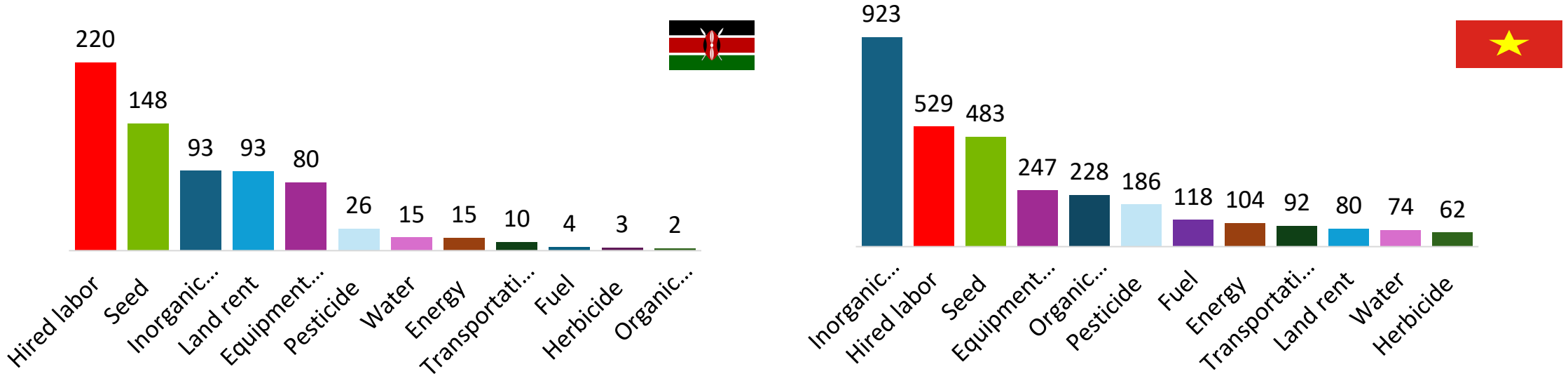
Land use **32% (0,47 EUR/kg)** of the total environmental impact

Air pollution **13% (0,19 EUR/kg)** of the total environmental impact

Environmental Impacts are impacts on the environment, and indirectly on people and communities, caused by the production and consumption of coffee. In the context of a true price assessment, environmental impacts are unsustainable externalities related to the breaches of environmental and human rights

II. True Costs of Food Production in Rural Kenya and Vietnam

Direct costs of crop production (USD PPP per household)

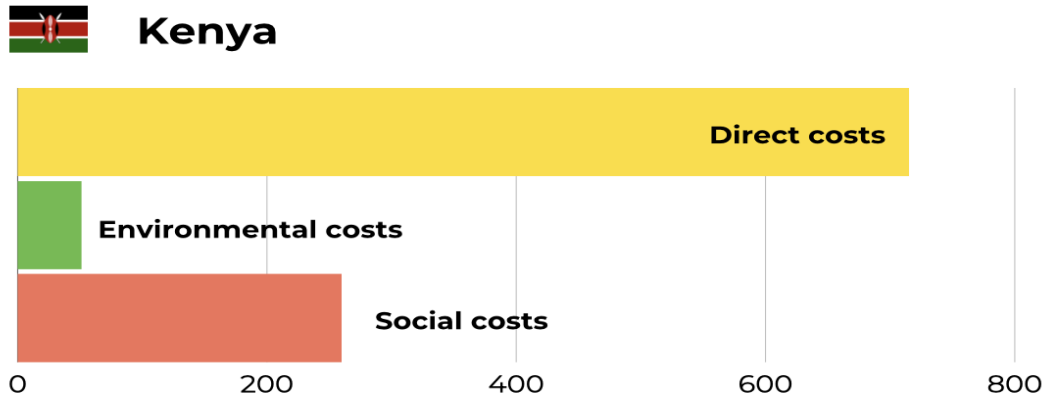


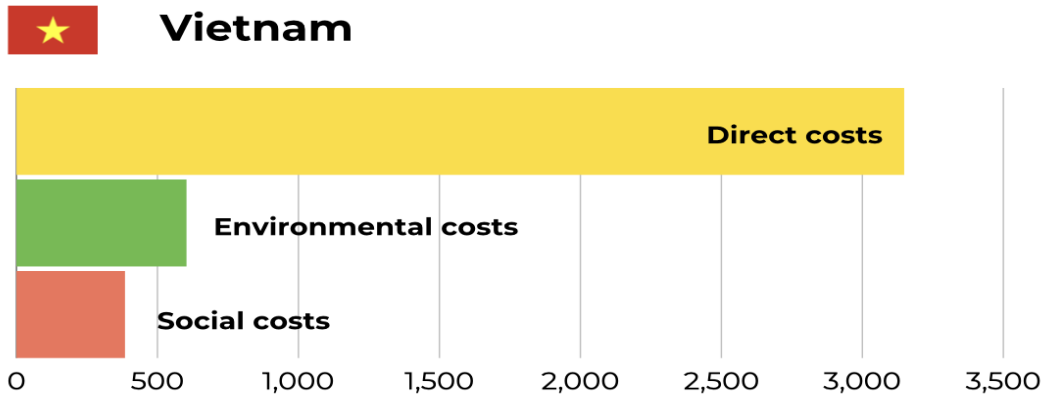
Direct crop production costs ($ PPP) are:

- ❑ **62%** of household gross crop income in **Kenya**
- ❑ **35%** of household gross crop income in **Vietnam**

Key Finding: Hired labor costs are dominant in Kenya (**extensive production**), while inorganic fertilizer costs are significant in Viet Nam (**input intensive systems**), reflecting social and environmental pressures, respectively.

TRUE COSTS OF CROP PRODUCTION
(USD PPP per household)





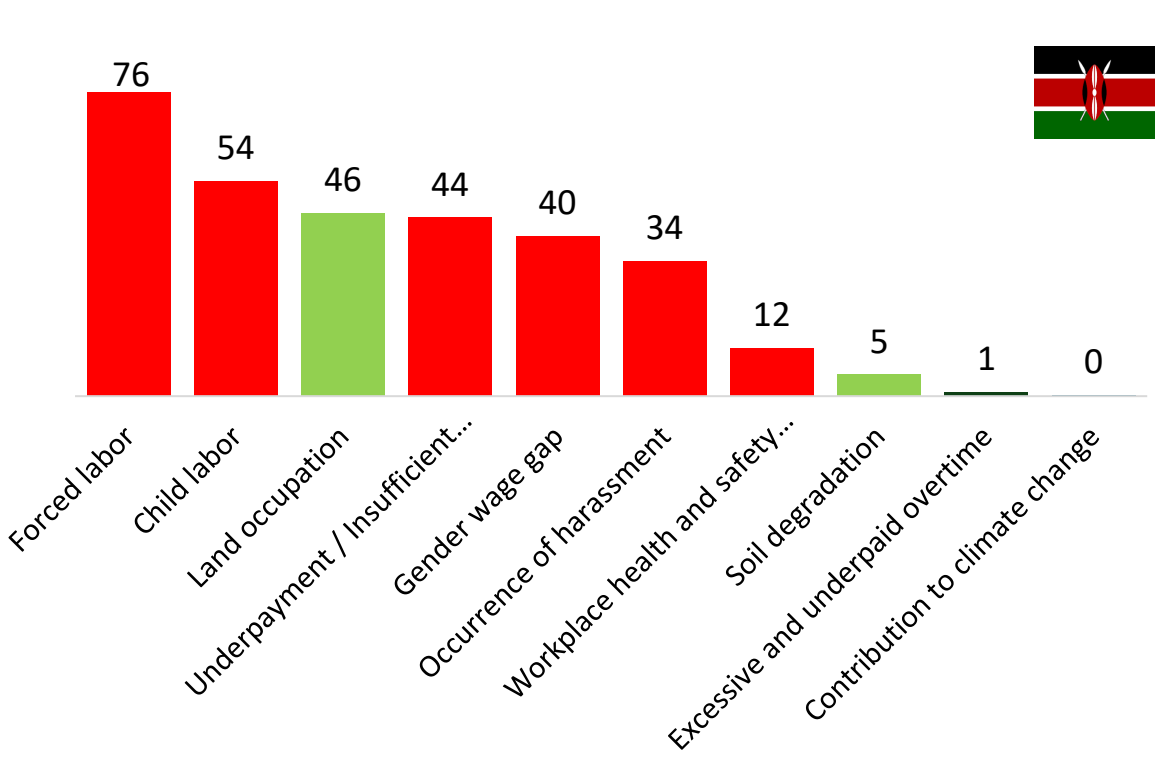
Structure of true costs of crop production	Kenya		Vietnam	
	Share of True Costs (%)	Share of External Costs (%)	Share of True Costs (%)	Share of External Costs (%)
Crop production costs (True Costs)	100		100	
Direct crop production costs	70		76	
External crop production costs (True cost Gap)	**30**	100	**24**	100
Environmental	5	16	**15**	**61**
Social	**25**	**84**	9	39

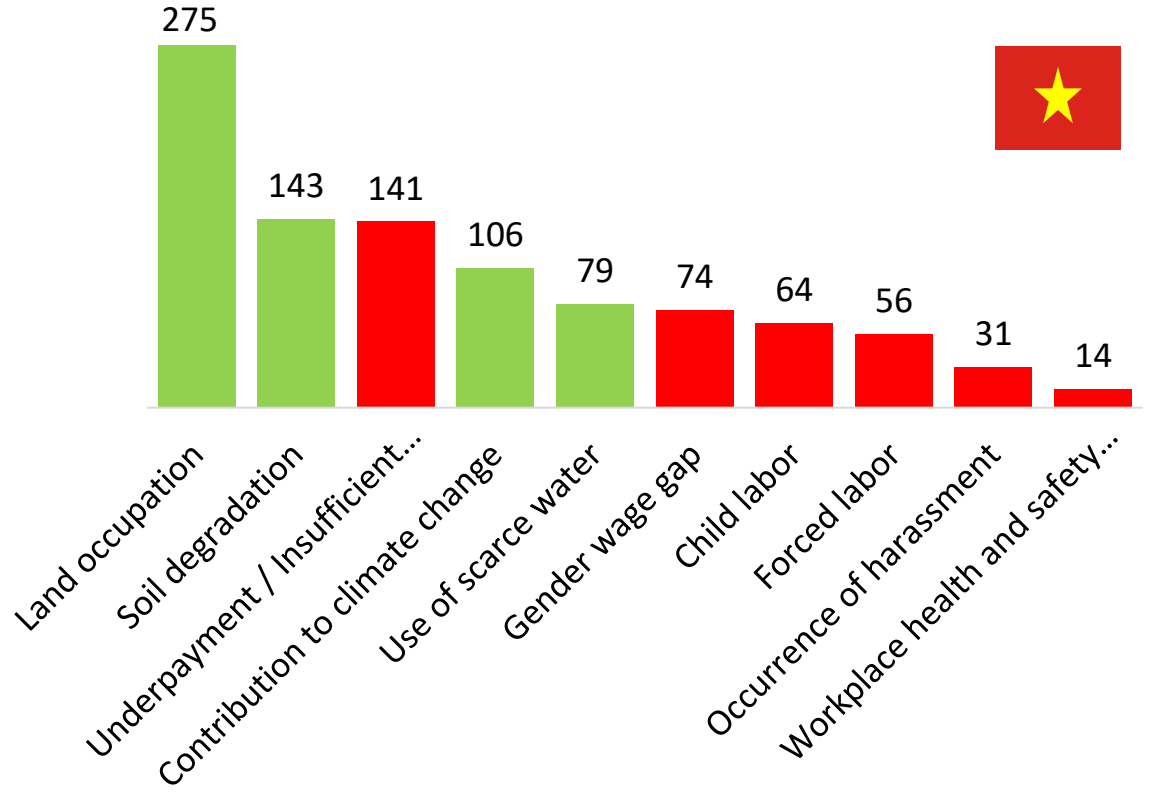
Key Findings: The **True Cost Gap** (share of total externalities in total cost) are **30% in Kenya**, dominated by **Social costs (84%)**, and **24% in Viet Nam**, dominated by **environmental costs (61%)**

UNPACKING THE SOURCES OF EXTERNAL COSTS

RANKING EXTERNAL IMPACTS

(USD PPP per household)





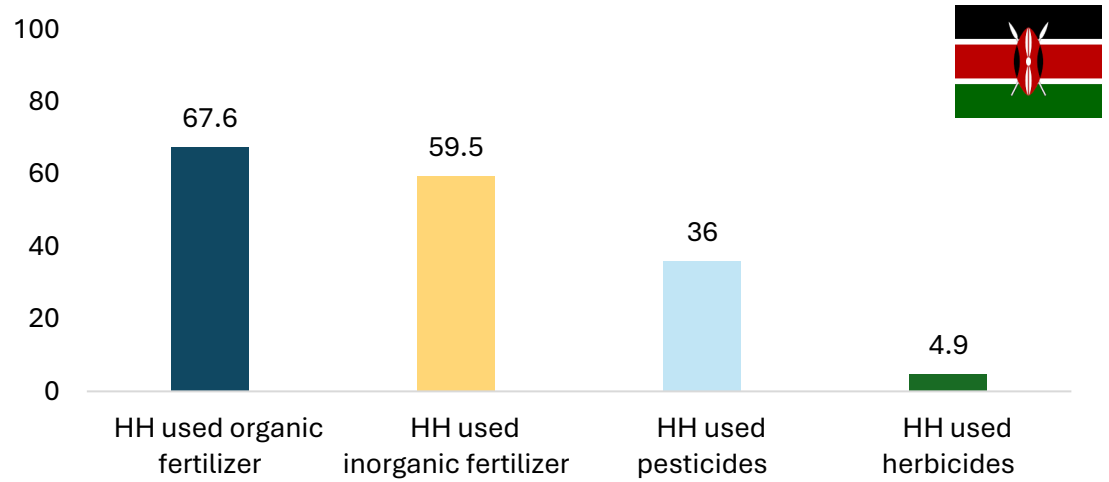
Key Findings: Dominant social impacts in **Kenya** include **forced labor, child labor, insufficient** income and gender gaps (but land occupation is also important). In Viet Nam, land occupation, soil degradation, and climate change are critical, (but insufficient income and the gender wage gap are also important)

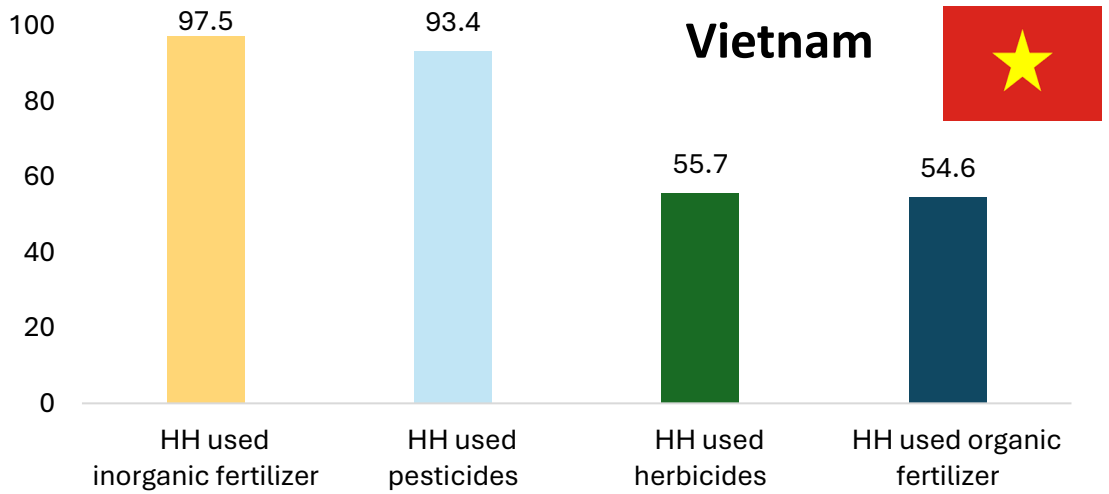
FACTORS ASSOCIATED WITH ENVIRONMENTAL EXTERNALITIES

A. Sources of water and prevalence of energy expenses

Source of water used on farm by households (%)	Kenya	Viet Nam
Rainwater (without reservoir)	96.9	67.8
Surface water	15.7	65.7
Groundwater	7.2	21.1
Rainwater (with reservoir)	6.4	12.6
Tap water	2.7	1.6
HHs w/expenses in elect., fuel, water, transport (%)		
HH has electricity expense	3.2	17.6
HH has fuel expense	3.8	60.9
HH has water expense	7.3	11.5
HH has transport expense	30.0	68.2

B. HH use of productivity enhancing inputs (%)



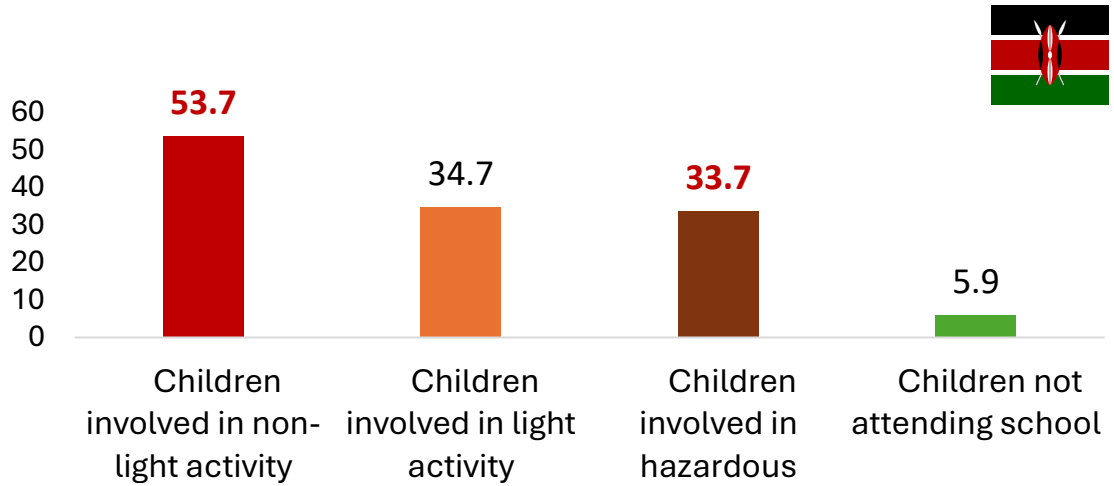


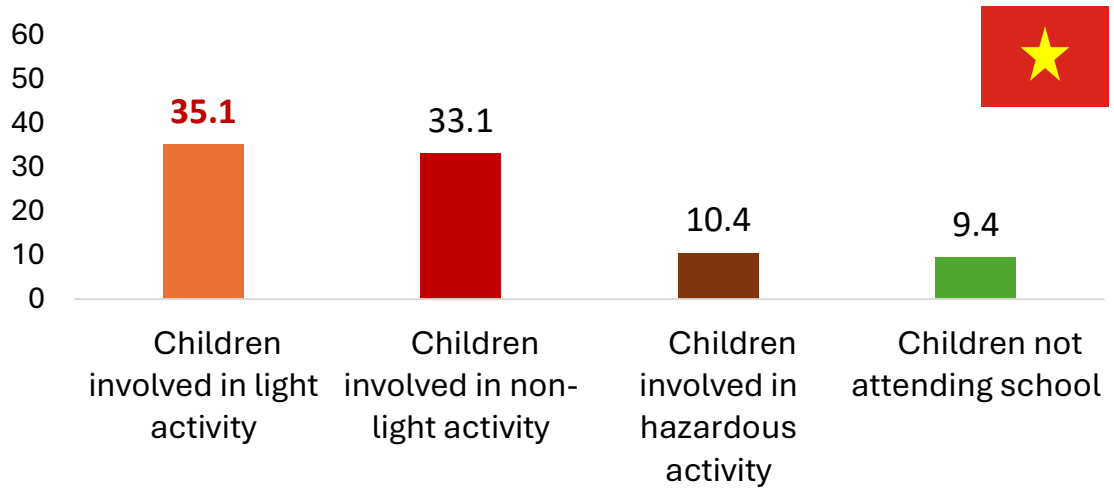
FACTORS ASSOCIATED WITH SOCIAL EXTERNALITIES

A. Hired labor, gender, harassment, and forced labor

Labor use	Kenya	Viet Nam
Household used hired labor (%)	**61.2**	33.8
Household has free labor (%)	20.0	**65.0**
Gender wage gap		
Male/female wage ratio	1.1	**1.2**
Proportion of female workers (%)	49.0	**59.9**
Harassment		
Experienced non-sexual/non-physical actions	**22.4**	3.0
Experienced non-sexual/physical actions	**7.8**	0.9
Experienced sexual/non-physical actions	**13.5**	1.5
Experienced sexual/physical less severe actions	**4.9**	0.0
Experienced sexual/physical severe actions	**2.3**	0.0
Forced Labor		
Least severe forced work (FTE)*	**13.8**	4.7
Medium severe forced work FTE)	**12.4**	3.9
High severe forced work (FTE)	**5.7**	0.1
Workers are in debt with employer	**6.3**	3.3

B. Children in economic activity (% of HHs)

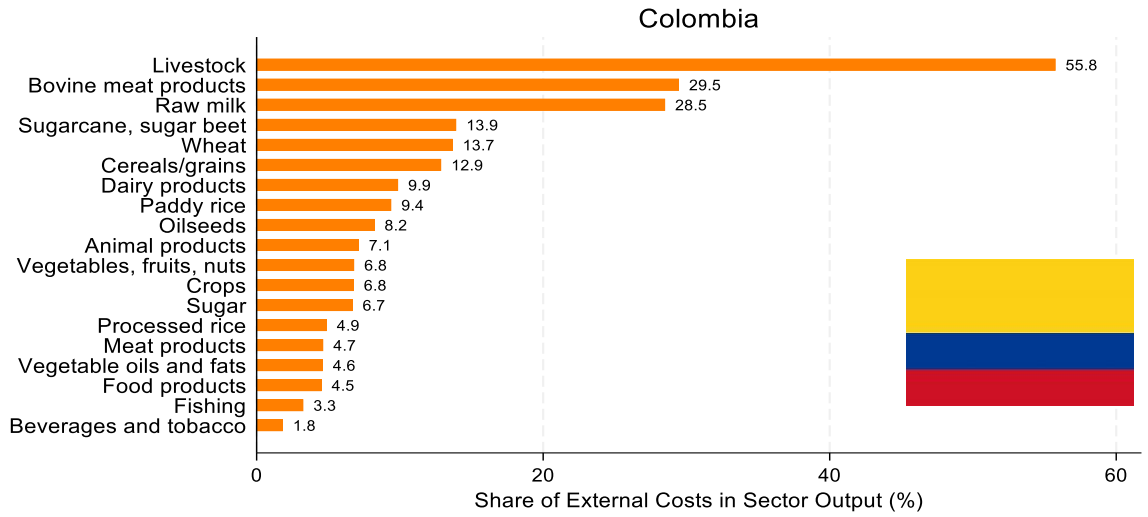


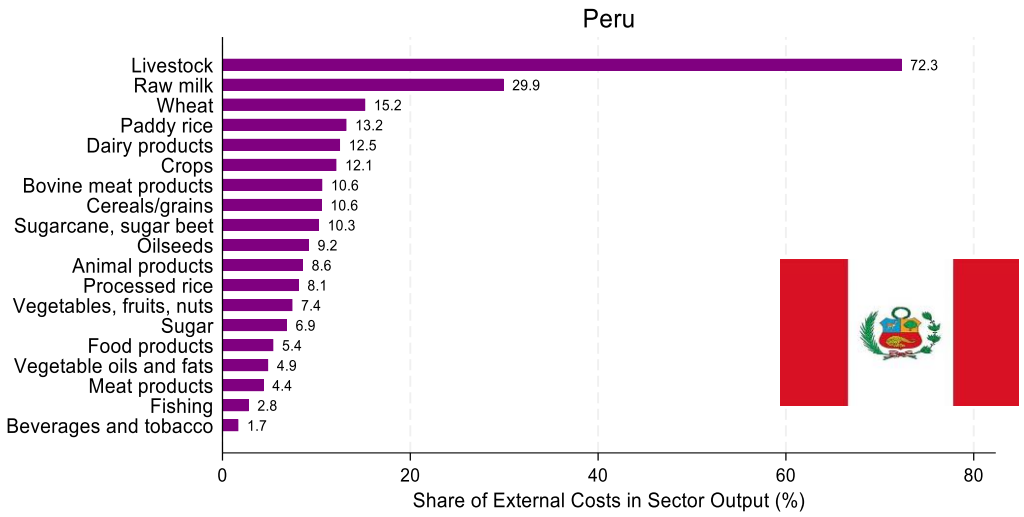


III. True Costs of Agrifood Systems in Colombia and Peru

Overall weight of externalities in AFS output

All Agri-Food System (AFS)	Share of External Costs in Output (%)			
	Colombia		Peru	
	All Sectors	Crops only	All Sectors	Crops only
	12.0	10.0	13.0	11.0



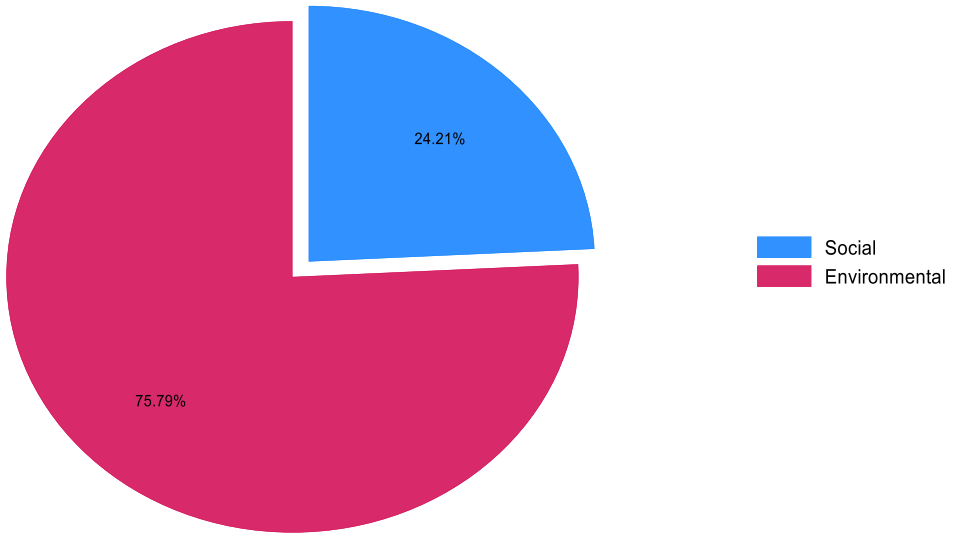


Key Findings:

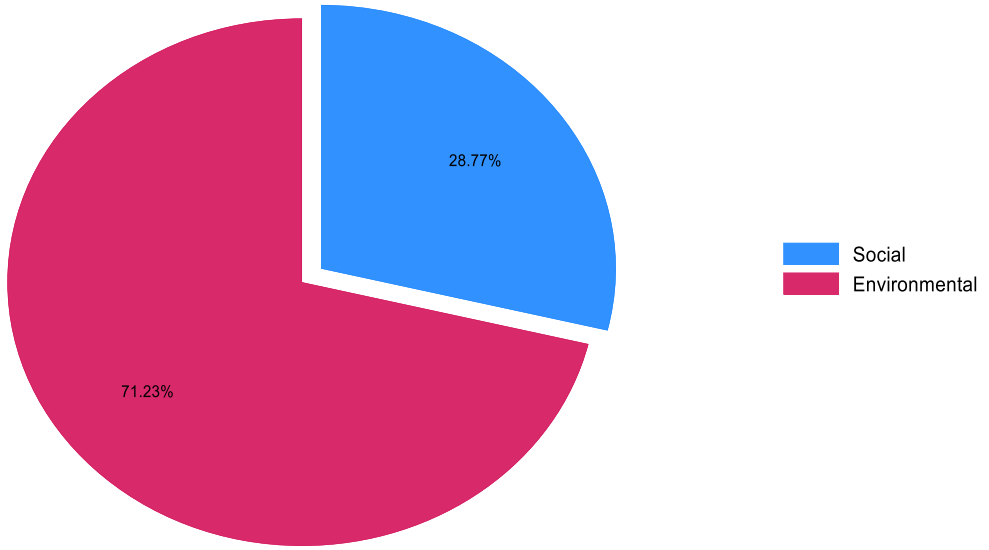
- In the aggregate externalities are 12% of AFS output value (Colombia) and 13% (Peru)
- Within each sector (regardless of relative sector size), **livestock** has the highest externalities in both countries

Structure of external costs: Environmental vs. Social







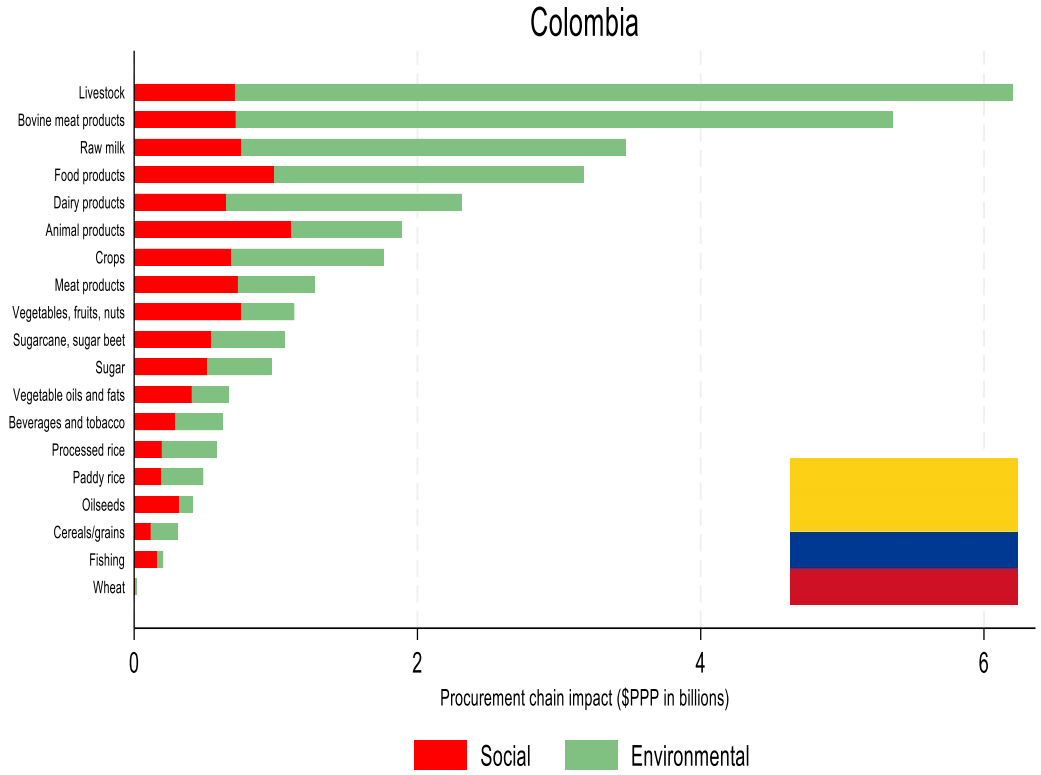


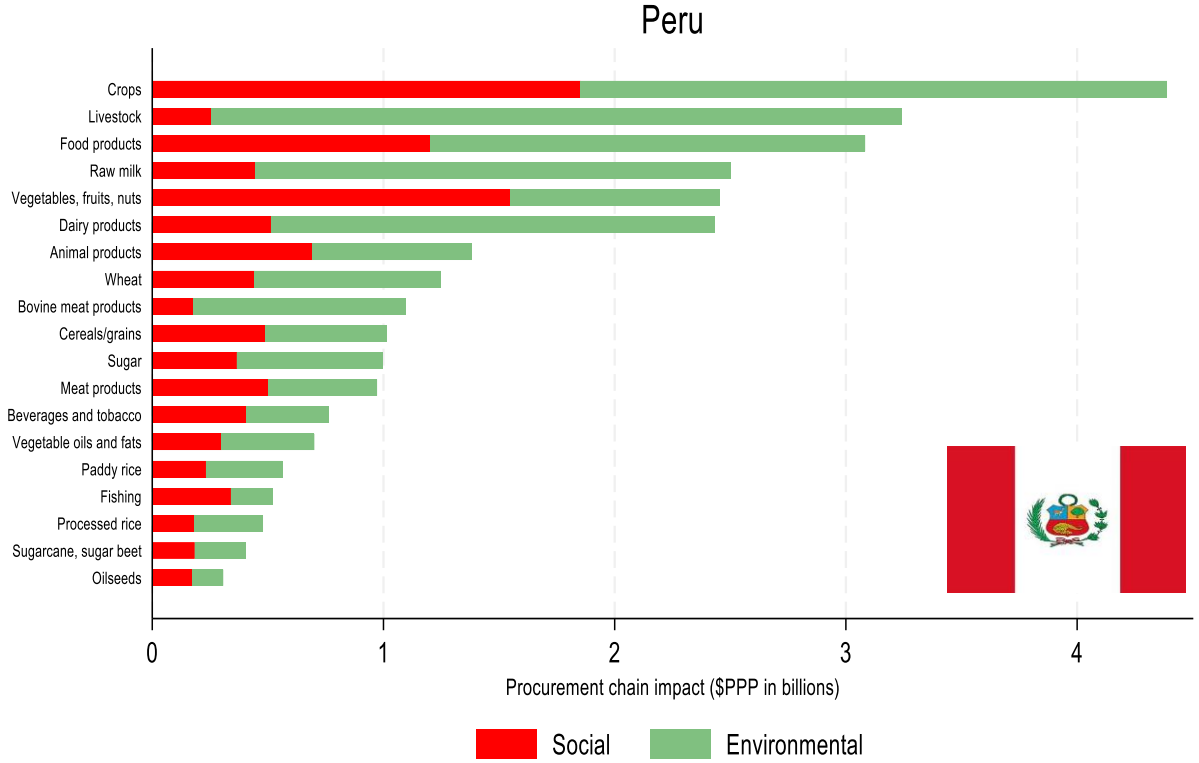
Key Findings: Overall, **environmental externalities** are dominant over **social costs** in both countries.

RANKING OF SECTORS AND COMPOSITION OF EXTERNALITIES

Composition of externalities

Total external costs (total footprint, $billions)



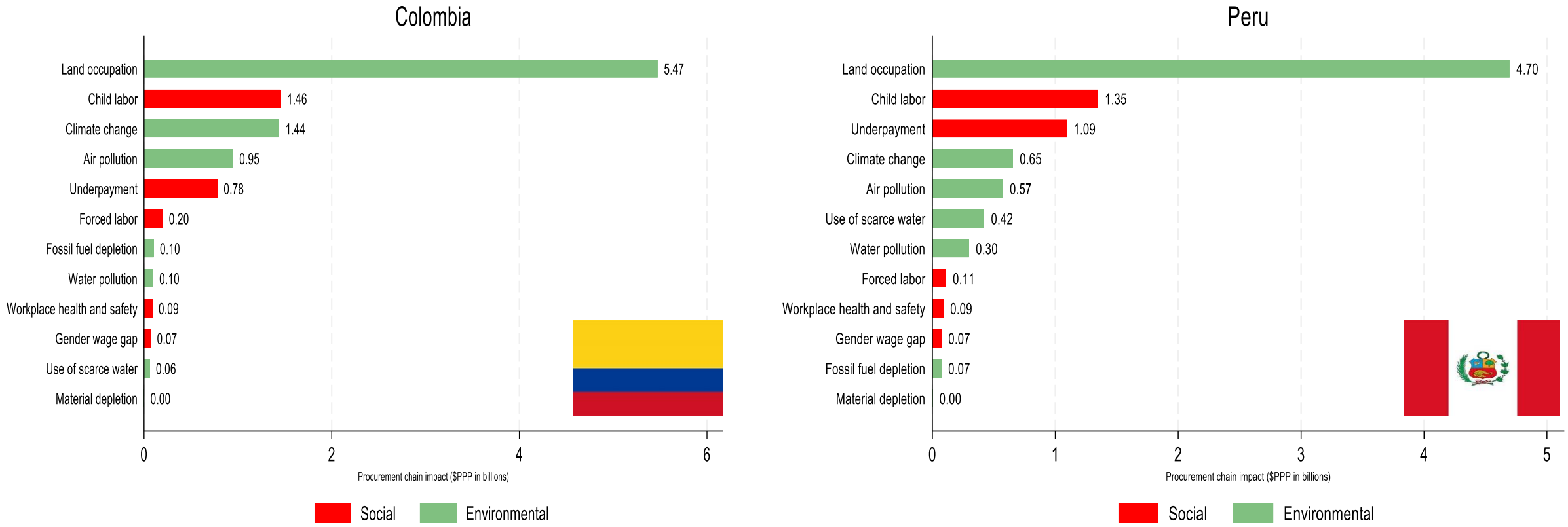


Key Findings:

- When accounting for total footprint (considering sector size) **livestock and bovine products** dominate in **Colombia**; while crops, livestock and food products are dominant in **Peru.**
- Overall, **environmental externalities** dominate, with some exceptions, e.g., animal products (Colombia) and vegetables/fruits/nuts (Peru)

RELATIVE IMPORTANCE OF EXTERNAL IMPACTS

Ranking of Absolute external costs, all sectors (total impacts), $ (billions)



Key Findings:

- **Land occupation** is the most significant individual impact in both Countries, followed by **child labor**.
- Othe important impacts are **climate change**, **air pollution**, and **underpayment.**

General Policy and Program Implications

- Policies/investments to minimize externalities are key for sustainable food systems.
  - Innovative '**land savings**' technologies that minimize costs and slow down the pace of occupation of new lands with higher biodiversity value.
  - **Sustainable agricultural practices** that minimize the excessive use of chemical inputs
  - Strengthening the **role of collective action** through farmer associations/cooperatives for better bargaining power in **labor (wages) and product markets (prices)**
  - Regulations to enforce **minimum wage laws**, & compliance of worker's rights.
  - Interventions to reduce the use of child labor, the incidence of forced labor, harassment and poor working conditions are needed.
- Countries will have to address **trade-offs between growth and external costs** by focusing on promoting social equity & environmental sustainability without compromising productivity growth.

Rui Benfica, PhD
Senior Research Fellow
International Food Policy Research Institute (IFPRI)
E-mail: r.benfica@cgiar.org

CGIAR MULTIFUNCTIONAL LANDSCAPES
SCIENCE FOR A FOOD-SECURE FUTURE

Thank You!

TCA Research Team

IFPRI

- Rui Benfica
- Kristin Davis
- Carlo Azzarri
- Sedi-Anne Boukaka
- Baragu Geoffrey

Alliance Bioversity-CIAT

- Carlo Fadda
- Celine Termote

CGIAR

MULTIFUNCTIONAL LANDSCAPES

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

IFPRI

POLICY IMPLICATIONS OF TRUE COST ACCOUNTING RESEARCH

MAKING FOOD SYSTEM COSTS VISIBLE: A POLICY IMPERATIVE FOR MULTIFUNCTIONAL LANDSCAPES

SEP 29, 2026



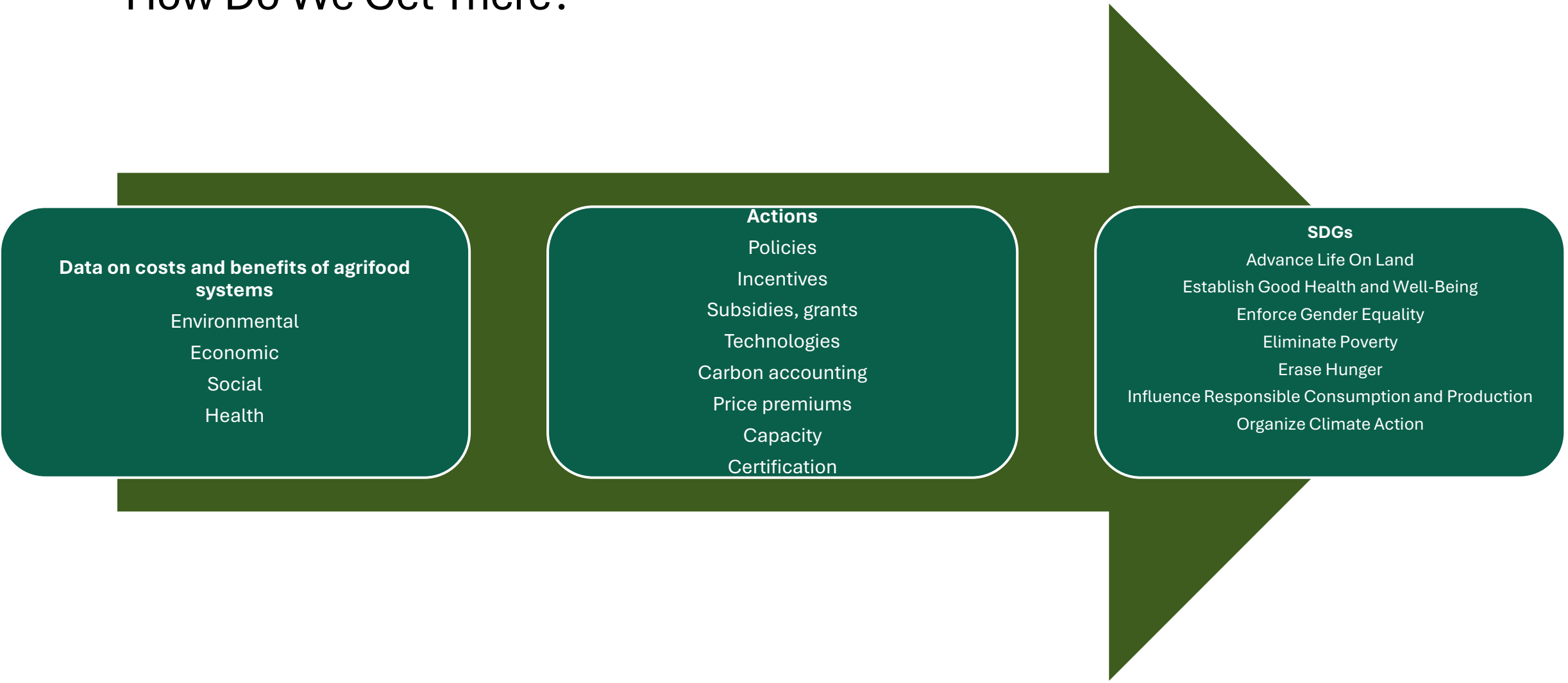
Multifunctional Landscapes Impact Targets

- **Nutrition, Health and Food Security**
- **Gender Equality, Youth and Social Inclusion**
- **Environmental Health and Biodiversity**
- **Poverty Reduction, Livelihoods and Jobs**
- **Climate Adaptation and Mitigation**

National and sub-national public actors, and private sector actors in Living Landscapes apply technological, socio-ecological, policy and/or institutional solutions and innovations that demonstrably improve landscape multifunctionality through restoration, conservation, inclusive livelihoods and healthy diets.



How Do We Get There?



Entry Points – Science Block

1. Agroecological + Solutions and Innovations
   - *Agroecological production systems*
2. Landscape Optimization and Inclusive Planning
   - *Conservation and restoration incentives*
3. Governance, Policy, Institutions, and Innovations
   - *Coherent and enabling policy design and implementation*
   - *Institutional transformation and behavioral change*
4. Performance Assessments and Evidence Generation
   - *Protocols and frameworks*



CGIAR

MULTIFUNCTIONAL LANDSCAPES

From Data Collection...



...To Policy Recommendations



What? Policy Levers for Reducing Hidden Costs

- Finance: Integrate TCA into national accounts, fiscal instruments, procurement policies (e.g. regenerative school meals); enable reforms that align food systems with climate, health, equity goals
- Science: Intervene to reduce effects of climate change and use of scarce water; use innovative ‘land savings’ technologies that slow down pace of occupation of new lands
- Markets: Provide higher-value alternative uses and high biodiversity value
- Labor: Regulate to enforce minimum wage laws and reduce forced labor
- Education: Promote investments in education and ‘labor savings’ technologies to reduce child labor
- Agriculture: Educate farmers and rural workers on rights

Who?

- Governments and policymakers can integrate TCA into national accounts, fiscal instruments, and procurement policies, enabling reforms that align food systems with climate, health, and equity goals.
- Businesses and agrifood companies can identify and mitigate harmful impacts while amplifying positive contributions across supply chains, strengthening sustainability credentials and consumer trust.
- Financial institutions and donors can use improved risk assessments and investment strategies that account for externalities, ensuring capital flows toward sustainable practices.
- Farmers and producers receive insights into the economic, environmental, and social implications of their practices, supporting transitions to more resilient and profitable systems.
- Consumers and civil society gain greater awareness of the hidden costs embedded in food choices, empowering more informed and responsible consumption.

How?

Policy Engagement Sharing

- Webinars
- Workshops
- Policy briefs
- Blogposts and social media
- Infographic: Link
- Data Dashboard: Link

Policy Capacity

- Science-policy roundtables
- South-South exchanges and learning
- True cost accounting starter kit with core principles, definitions, and communication tools
- Co-design policies, incentives and strategies for sustainable food systems

CGIAR MULTIFUNCTIONAL LANDSCAPES

Thank you!

k.davis@cgiar.org
r.Benfica@cgiar.org
https://www.ifpri.org/project/true-value-of-food/