

# 2023

CONGRESO INTERNACIONAL  
INTERNACIONAL CONGRESS

LOS SEGUROS AGRARIOS EN EL ACTUAL CONTEXTO  
CLIMÁTICO: SITUACIÓN Y PERSPECTIVAS

AGRICULTURAL INSURANCE IN THE CURRENT  
CLIMATE CONTEXT: SITUATION AND PROSPECTS

## *Resilience in food systems in the face of climate change*

Máximo Torero

Chief Economist, Food and Agriculture Organization of the United Nations (FAO)

# We are not on track to ending hunger, food insecurity and malnutrition – major drivers and underlying factors are challenging us

COVID-19  
pandemic



Economic  
slowdowns and  
downturns



Climate variability  
and extremes



Conflict/ War



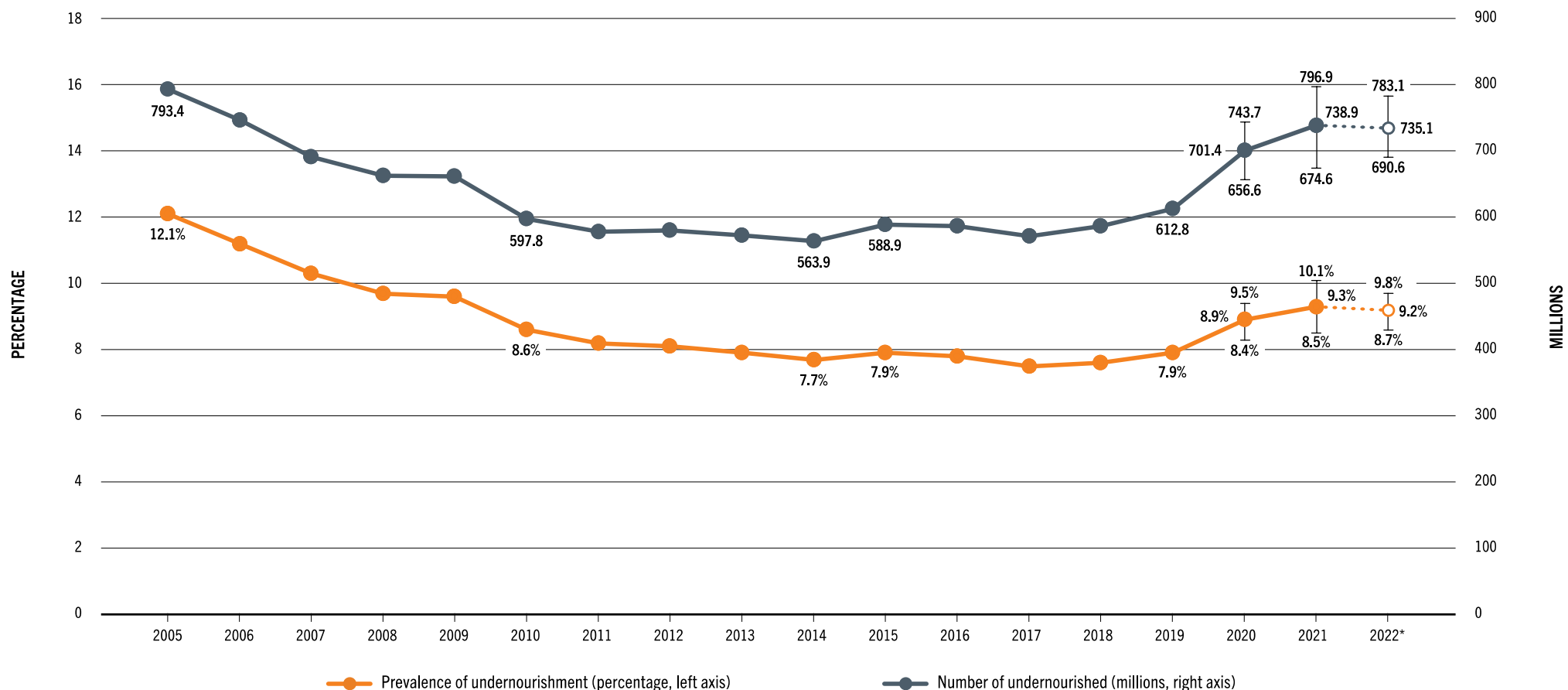
Cost and  
affordability  
of healthy diets



← **UNDERLYING CAUSES OF POVERTY & INEQUALITY** →

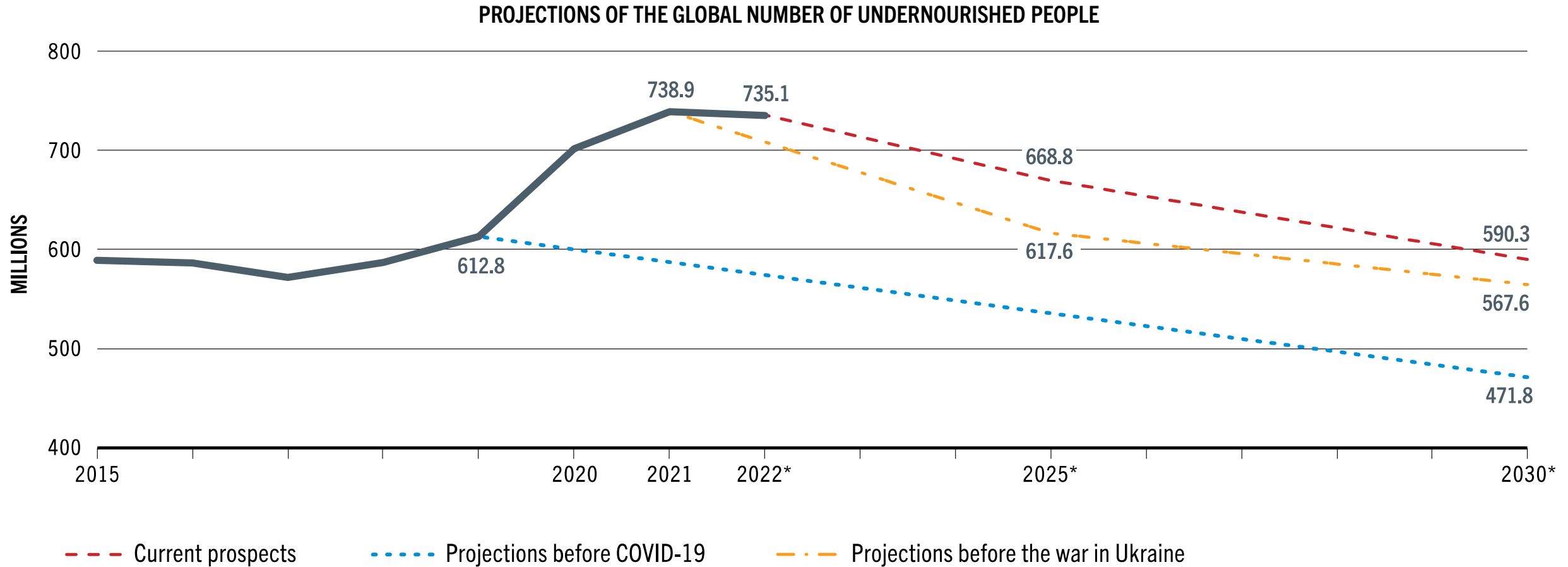
# Hunger at the global level remained relatively unchanged from 2021 to 2022 but is still far above pre-COVID-19-pandemic levels: 122 million more people were facing hunger in 2022 than in 2019

## WORLD PREVALENCE OF UNDERNOURISHMENT AND NUMBER OF UNDERNOURISHED PEOPLE



NOTES: \* Projections based on nowcasts for 2022 are illustrated by dotted lines. Bars show lower and upper bounds of the estimated range.

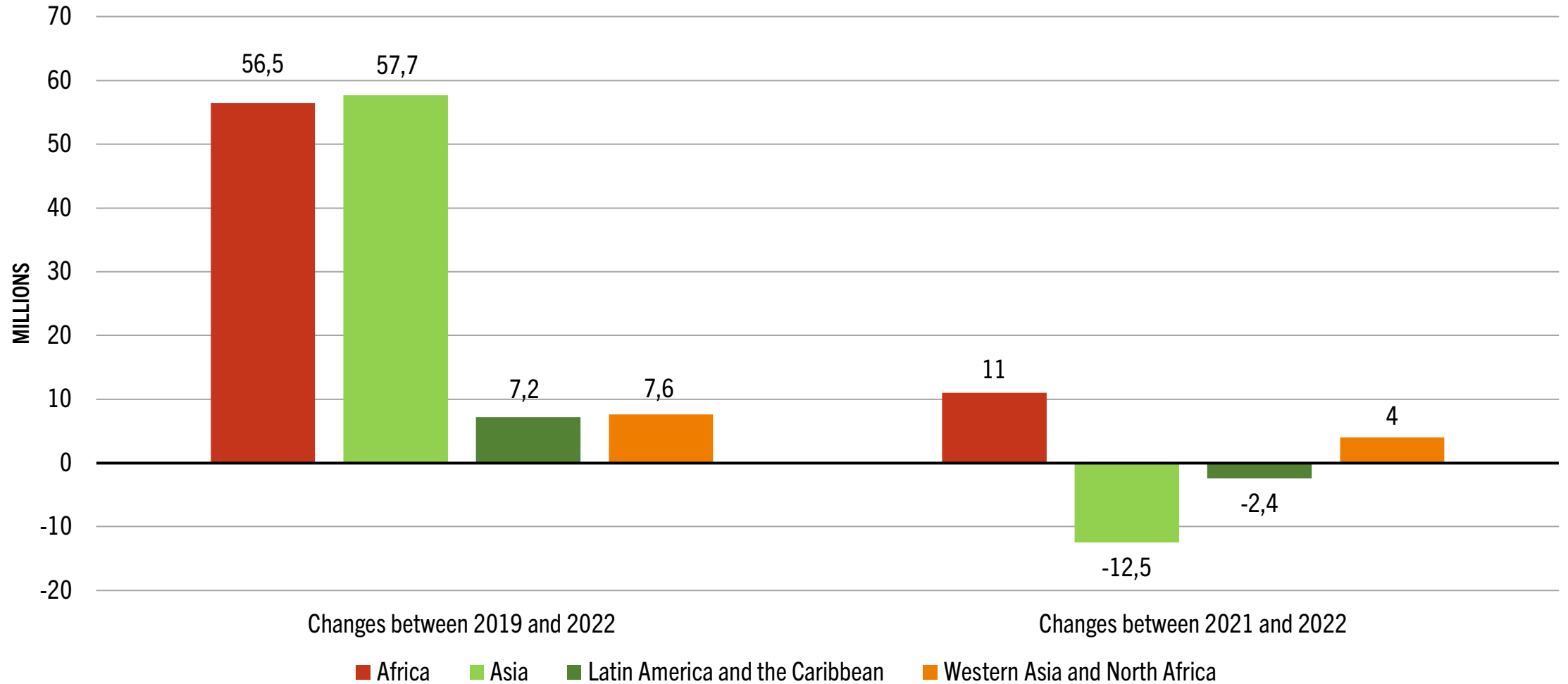
The pandemic provoked a tremendous setback. Projections show 119 million more people facing hunger in 2030 compared to a scenario in which the pandemic had not occurred, and around 23 million more than in a scenario where 2022 events had not happened



NOTES: \* Projected values. The 2020, 2021 and 2022 values are based on the middle of the projected ranges.  
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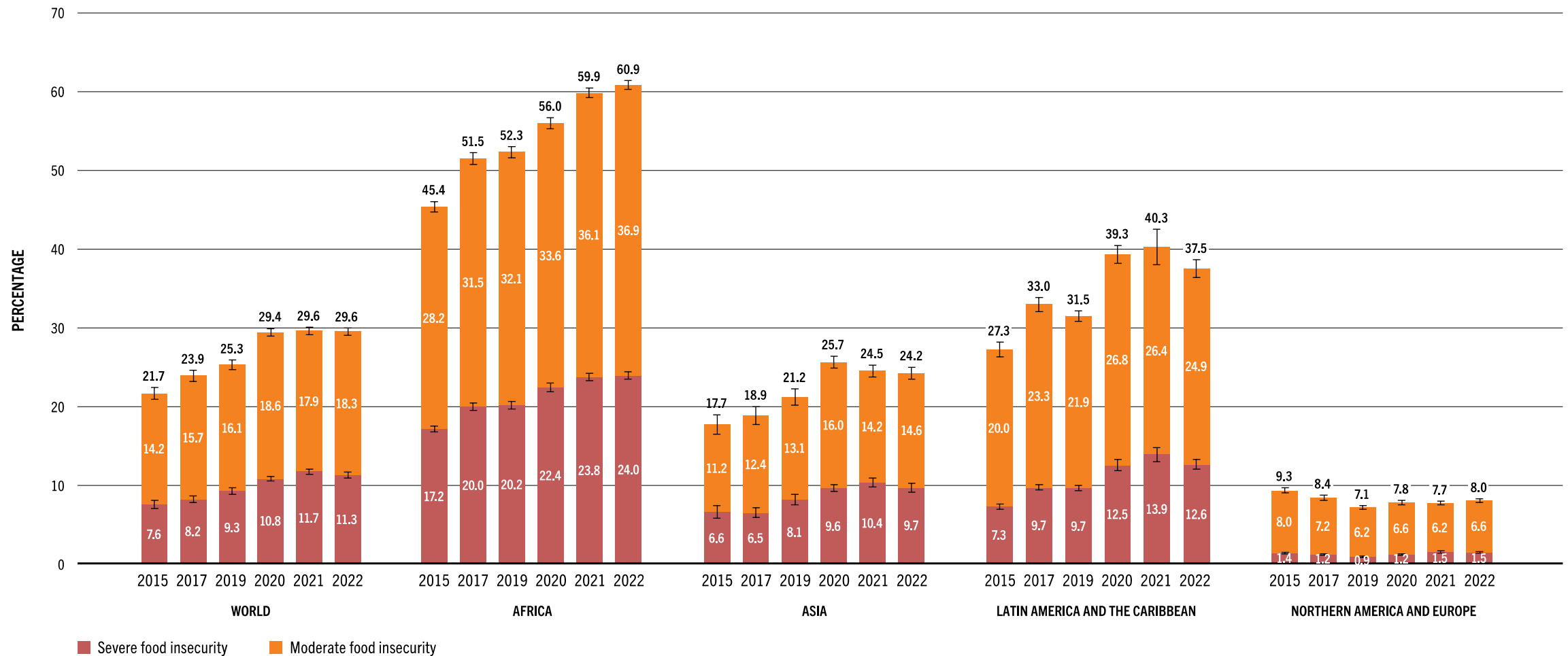
# Hunger was still on the rise in Western Asia, the Caribbean and all subregions of Africa from 2021 to 2022

## EVOLUTION IN THE NUMBER OF UNDERNOURISHED PEOPLE

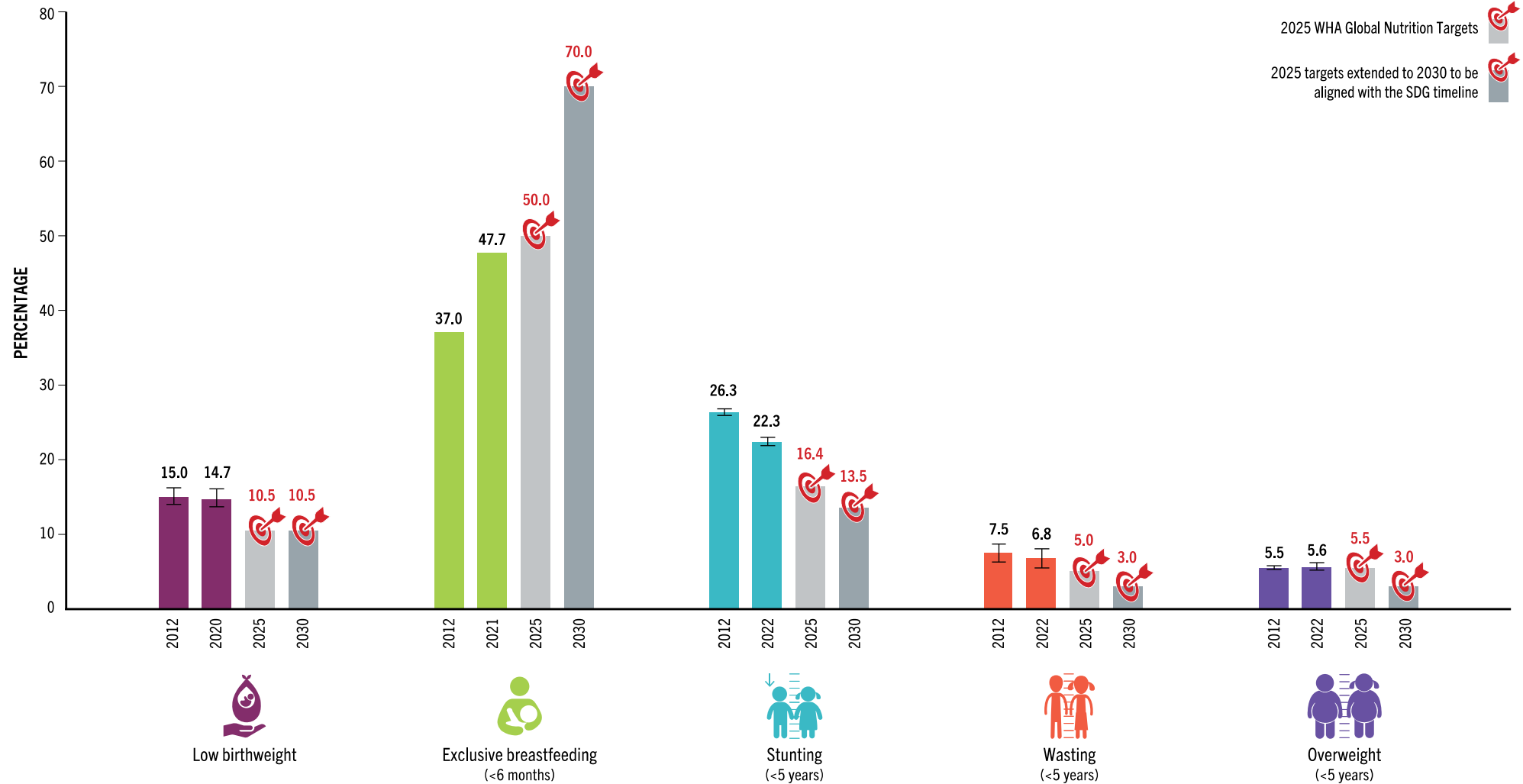


Following a sharp increase from 2019 to 2020, the prevalence of moderate or severe food insecurity at the global level remained unchanged for the second year in a row but was still far above pre-pandemic levels

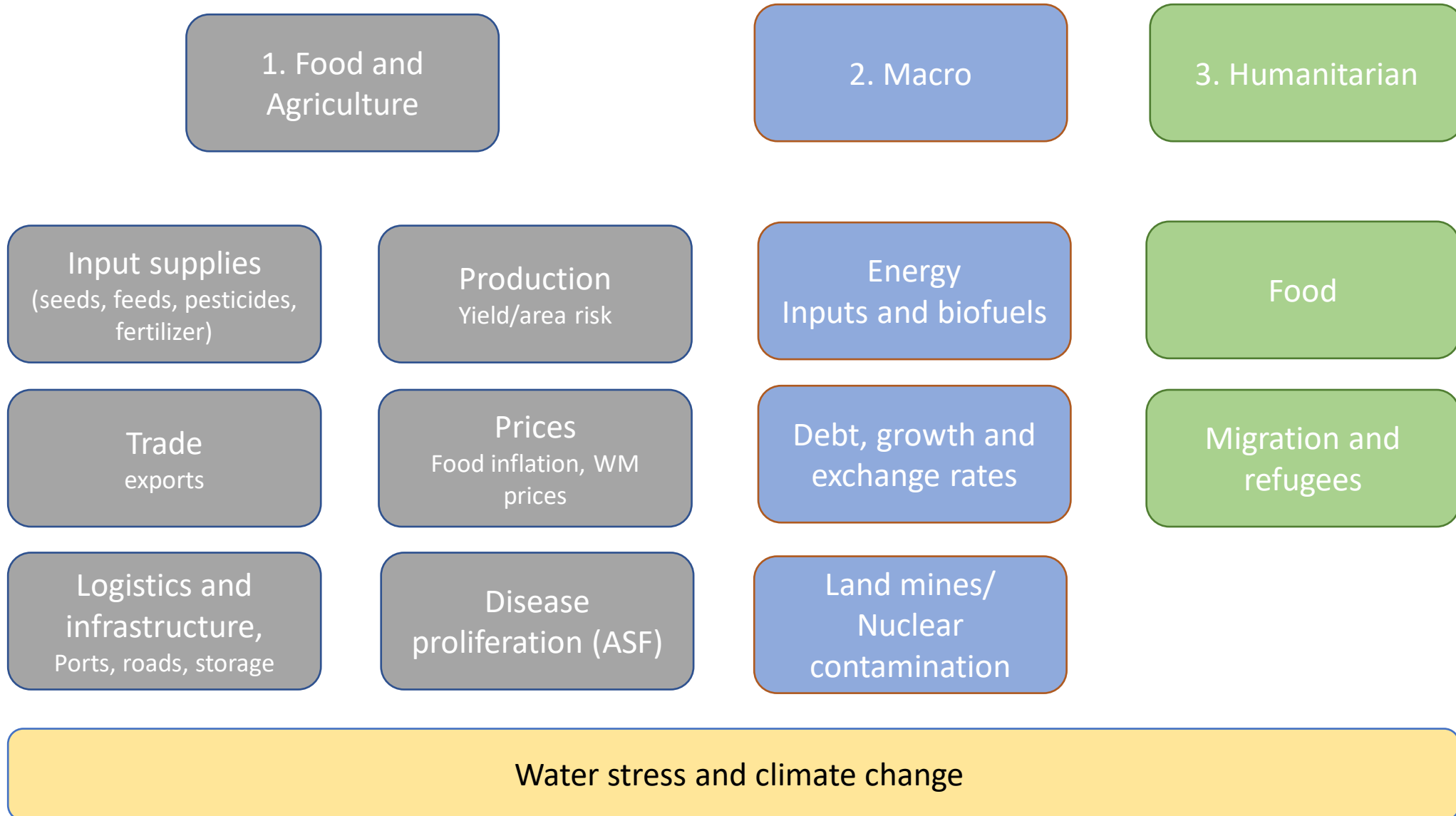
TRENDS IN THE PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY BY REGION



# Globally in 2022 among children under five years of age, an estimated 148.1 million (22.3 percent) were stunted, 45 million (6.8 percent) were wasted, and 37 million (5.6 percent) were overweight

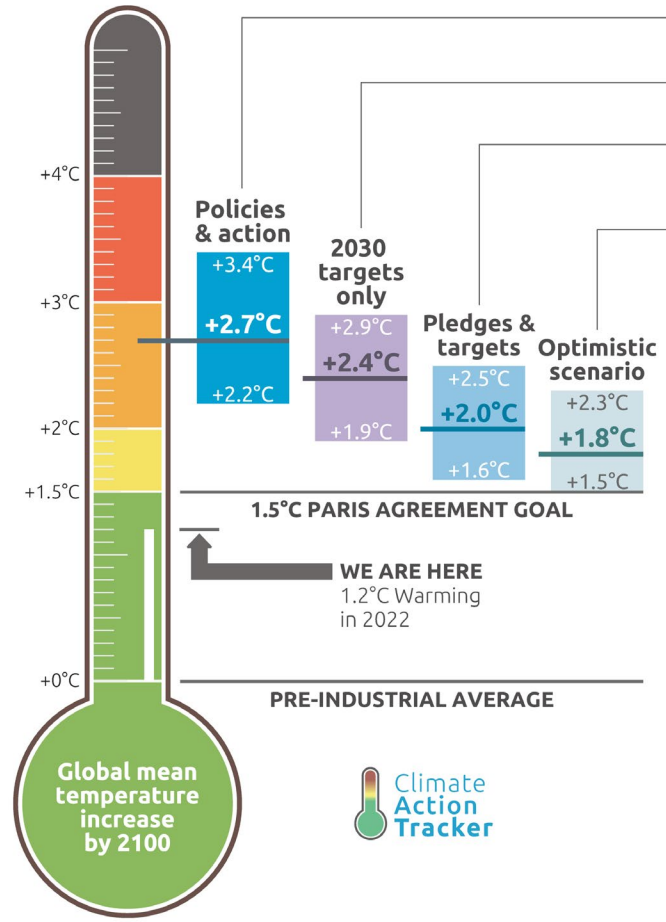
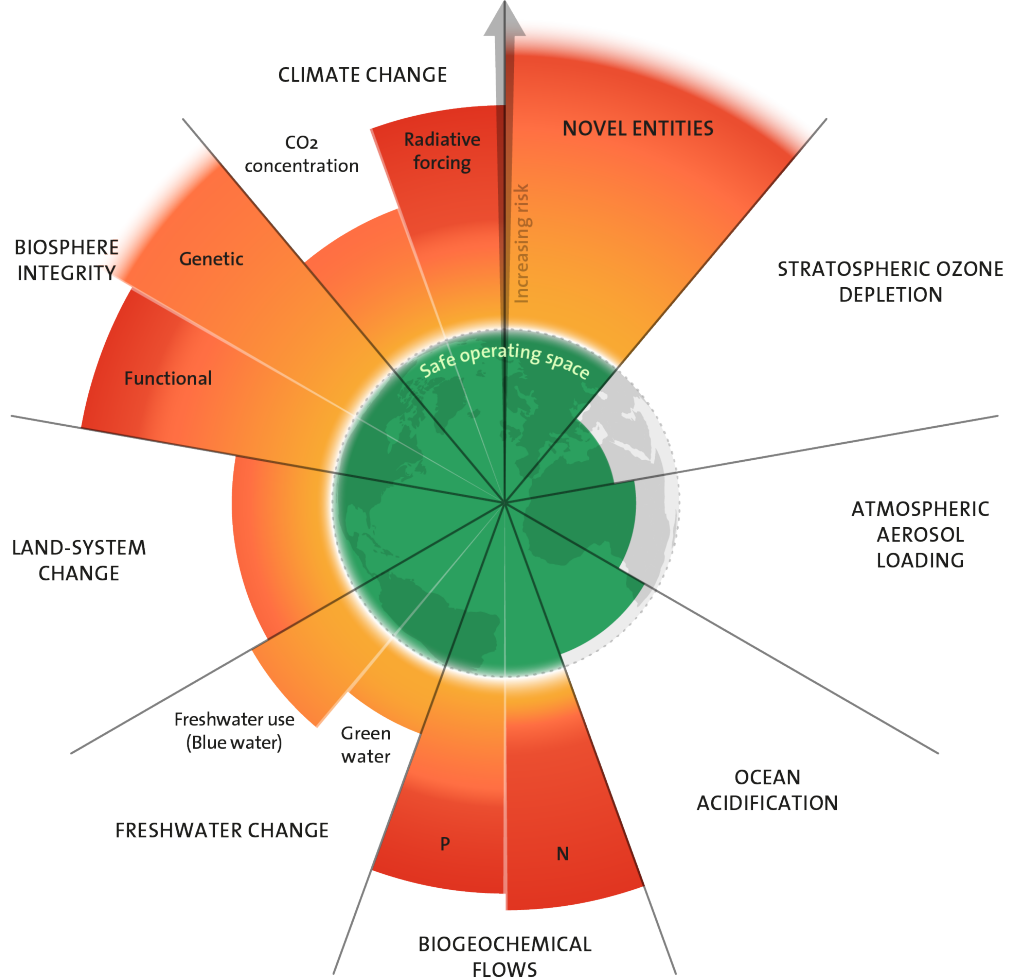


# The basic risks/uncertainties for the agrifood systems





# The 2023 update to the Planetary boundaries



- Policies & action**  
Real world action based on current policies †
- 2030 targets only**  
Based on 2030 NDC targets\* †
- Pledges & targets**  
Based on 2030 NDC targets\* and submitted and binding long-term targets
- Optimistic scenario**  
Best case scenario and assumes full implementation of all **announced** targets including net zero targets, LTSs and NDCs\*

† Temperatures continue to rise after 2100  
\* If 2030 NDC targets are weaker than projected emissions levels under policies & action, we use levels from policy & action

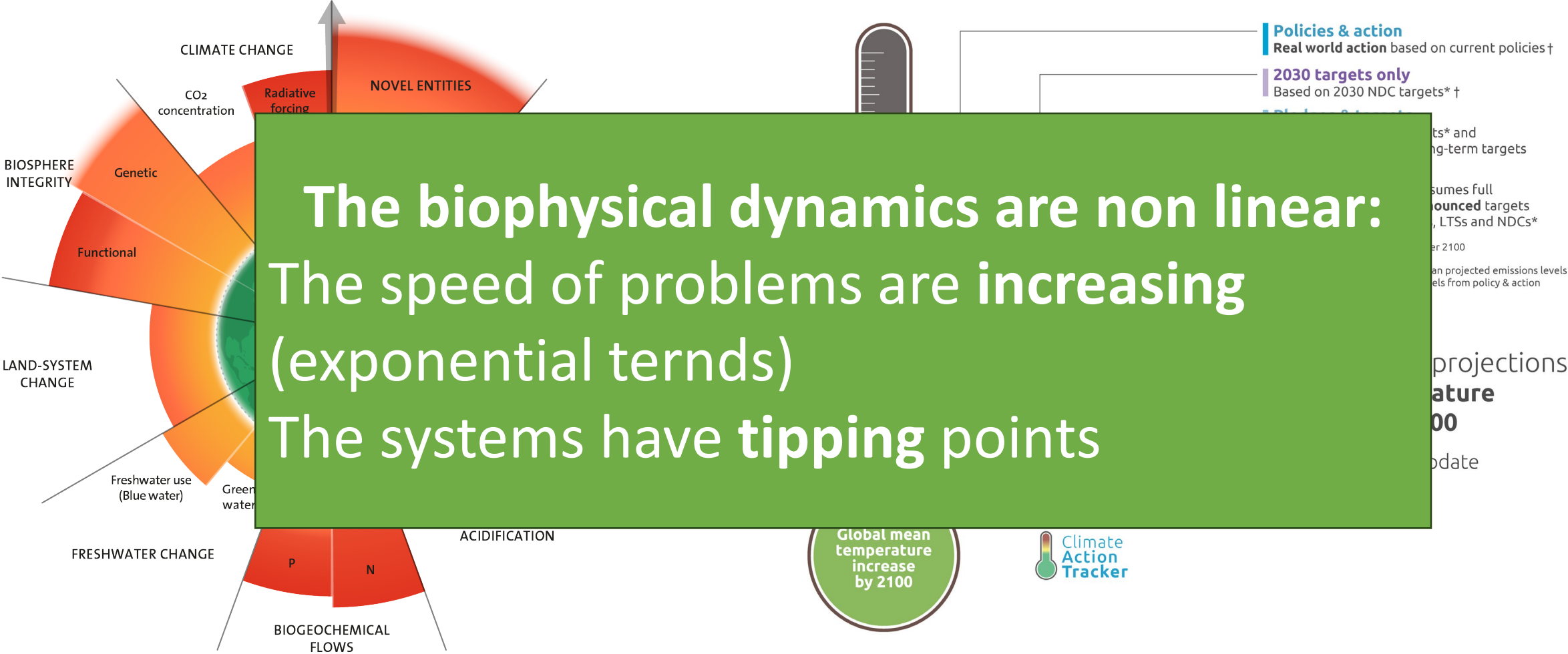
## CAT warming projections Global temperature increase by 2100

November 2022 Update



Source: "Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023".

# The 2023 update to the Planetary boundaries



Source: "Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023".

# Increasing resilience of the agrifood systems

MINIMIZE RISKS  
(VULNERABILITIES)

COPING WITH RISKS WHEN  
THEY OCCUR (CAPABILITIES)

- Increase investment in **early warning Systems** and the capacity to prevent those risks from occurring
- The **One health approach** has enormous potential to prevent the emergence of new zoonotic reservoirs.
- **Increase access to insurance**: catastrophic insurance and agricultural insurance combining index based with traditional insurance and Access to finance.

- **Increasing absorptive capacity**
- **Well targeted social protection** to support the most vulnerable but with clear timeline to graduation
- **Consumer centered model to reduce nutrition challenges**
- **Prioritize investments in interventions** with the maximum marginal returns and assuring minimizing tradeoffs (Road to SDG2 and 1.5 degrees)
- **Reducing food loss and Waste**
- **Align incentives** by redirection of subsidies on farm support.
- **Increasing trade** to boost farmers productivity, income, and increase access to healthy diets.

## Increase resilience of the agrifood systems

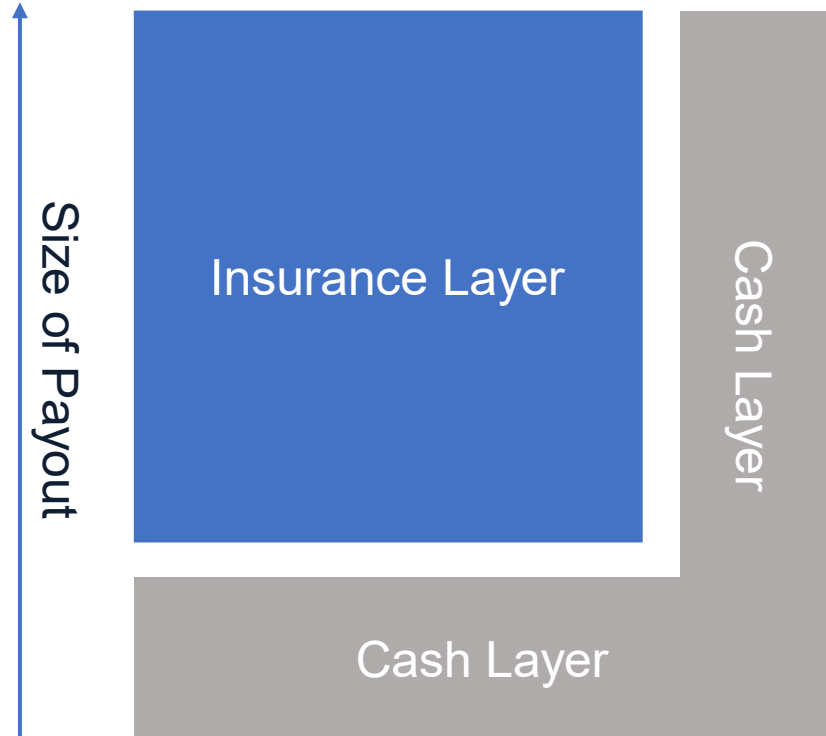
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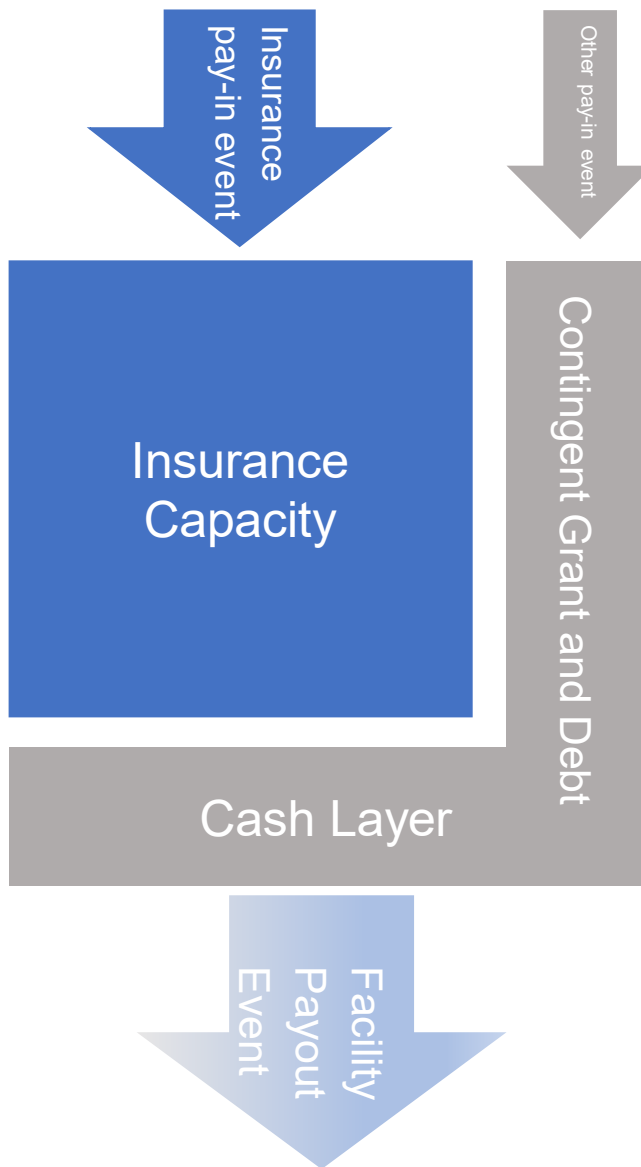
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## Idea of a risk financing facility for FAM 2.0



1. The risk financing facility has two/three windows:
  - Insurance layer → avoid capital market transaction
  - Cash layer / contingent debt and grant → to cater for basis risk
2. The combination of both enables to benefit from two effects:
  - Insurable risks are insured
  - Payout from insurance is pooled with available financing from the cash layer (paid-in, drawing rights)
  - “Claims” depending on achieved IPC level and future IPC outlook, are paid at first from the insurance layer and in case the payout doesn’t suffice from the resources of the cash layer

## Facility as transformer: Pay-in and Payout events



### 1. Pay-in events:

- Insurance pay-in upon triggering of thresholds for insurable risks (for each risk specific thresholds will be determined).
- Contingent financing upon triggering of thresholds for contingent financing (to be pre-agreed with donors).

### 2. Payout events:

- Upon breach of to be determined trigger thresholds (e.g. number of population > x in IPC 4 and above) the mechanism pays out / finances emergency response measures.

### 3. Balance between pay-in and payout over time will be necessary. Cash layer to be used as a buffer and for smaller events.

# Insurance module

Insurable exogenous variables  
(drought, flood, TC, epidemics, (domestic conflict))

Exposures  
(gridded population density in suitable resolution  
affected by drought food print, TC food print, or in a  
region subject to epidemic risk / conflict )

Vulnerability module driven by IPC  $_{t=0, t=-1}$

Determine size of insurance payout

- Only apply insurable risks for the insurance module.
- Avoid working with autoregressive components but use IPC levels for the vulnerability module.
- Develop parametric trigger mechanisms for insurable risks determining pay-in events from insurance (differing from those for non-insurable risks).
- We could also consider a double trigger mechanism: IPC expert judgement plus objective insurable variables. If there is consistency in the methodology applied for the IPC assessment than we could develop a kind of probability distribution for such a double trigger event to occur.

## Contingent module

Non-insurable exogenous variables (commodity food prices, international conflict)

Exposures  
(gridded population density in suitable resolution affected by drought food print, TC food print, or in a region subject to epidemic risk / conflict )

Vulnerability module driven by IPC  $_{t=0, t=-1}$

Determine size of contingent payout

- Only non-insurable exogenous factors to be subject to the contingent module.
- Avoid working with autoregressive components but use IPC levels for the vulnerability module.
- Develop a parametric trigger mechanism equally for the non-insurable risks for determining pay-in from contingent financing.
- We could also consider a double trigger mechanism: IPC expert judgement plus objective insurable variables. If there is consistency in the methodology applied for the IPC assessment than we could develop a kind of probability distribution for such a double trigger event to occur.



## Increasing resilience of the agrifood systems

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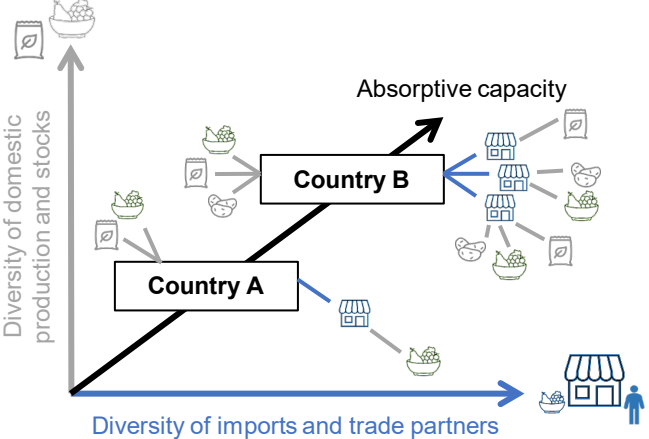
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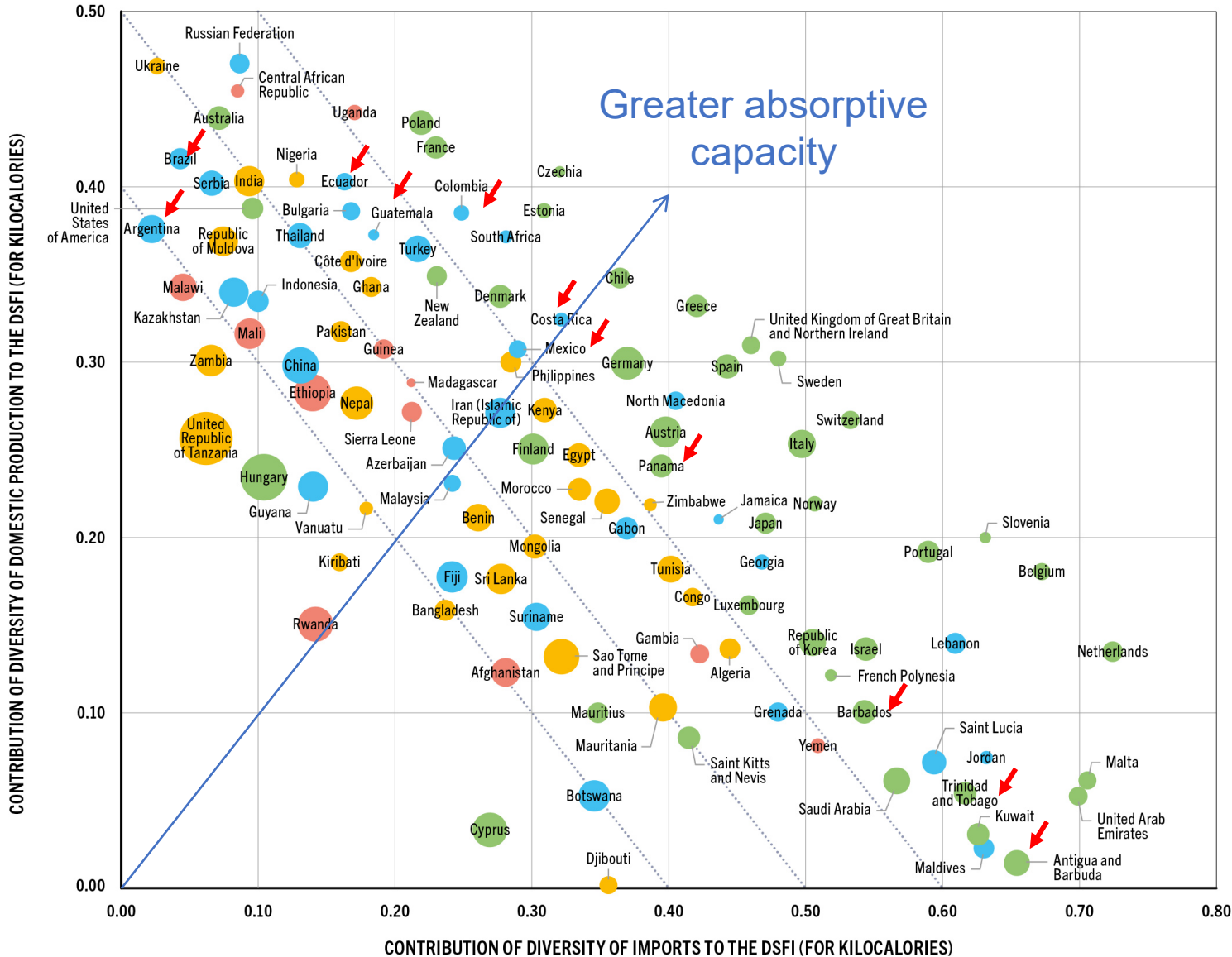
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# Resilience on food supply: Dietary Sourcing Flexibility Index (DSFI), for kilocalories

- Countries diversify food sources in different ways
- Effectiveness of diversification does not depend much on country size or income level



- High-income countries
- Upper-middle-income countries
- Lower-middle-income countries
- Low-income countries



# Increasing resilience of the agrifood systems

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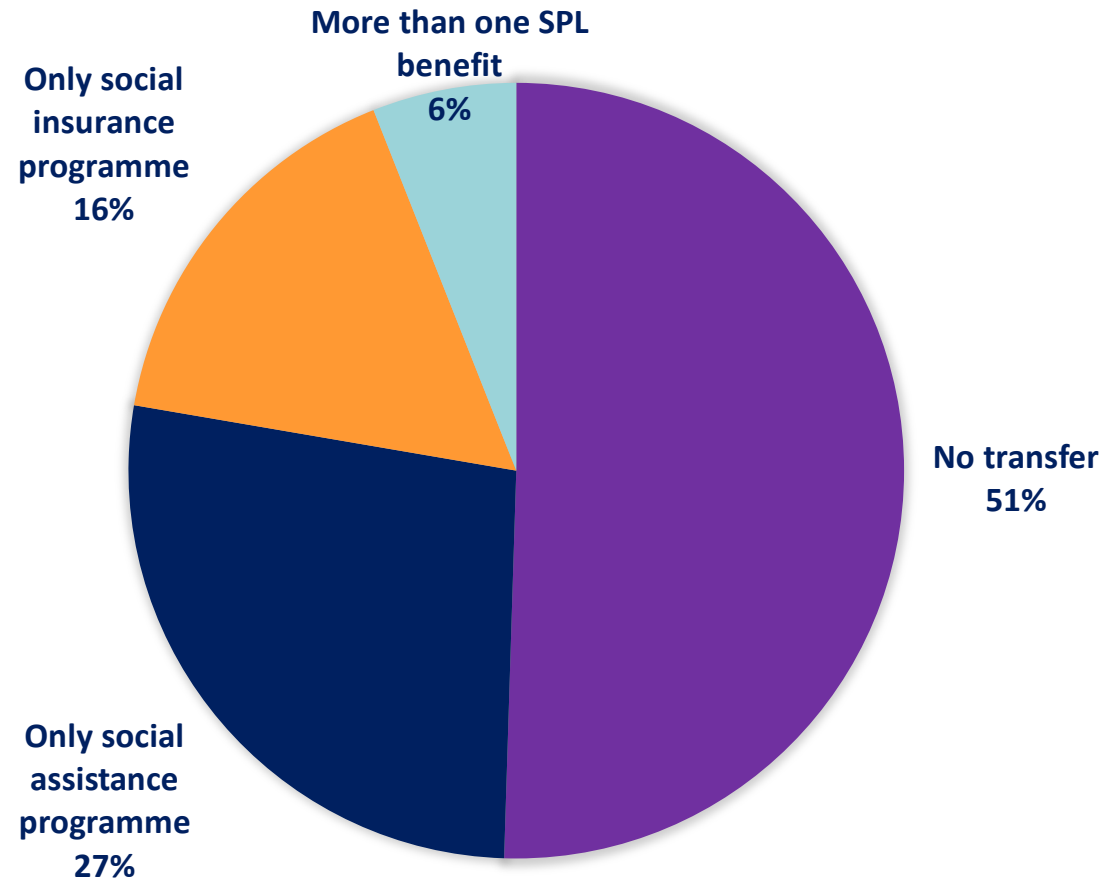
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# For example: Social protection in Latin America and the Caribbean: Challenges

- Low coverage
- High informality levels
- Low investment in social protection
- New challenge: climate change

**COVERAGE OF SOCIAL PROTECTION AND LABOR IN TOTAL POPULATION (%)**

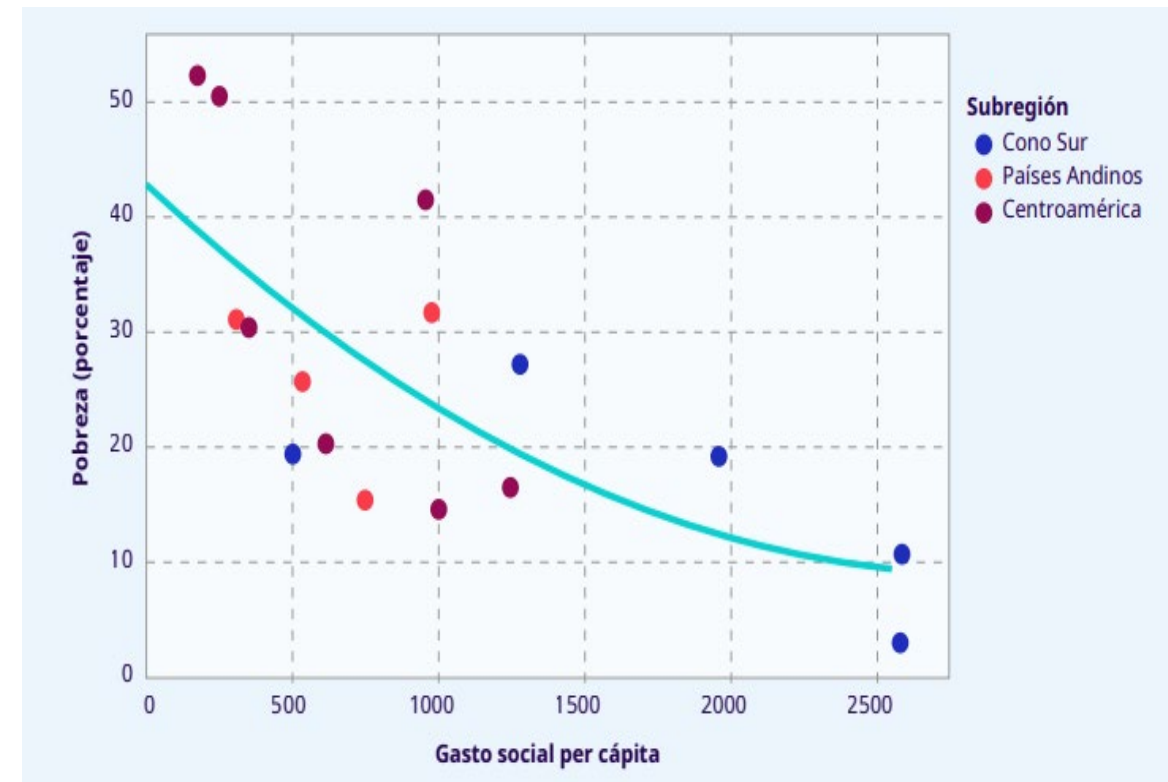


# For example: Social protection in Latin America and the Caribbean: Ways forward

## STRENGTHENING SOCIAL PROTECTION SYSTEMS WILL BE CRITICAL FOR A JUST TRANSITION

- Social protection has positive impacts in livelihoods on the short and long term...
- ... including in the context of climate change: Strengthening coherence between social protection programs and climate adaptation policies will increase climate adaptation (IPCC, 2022)
- Use extensive experience in the region and supports governments to (1) expand social protection coverage and (2) strengthen coherence with food security, agricultural and environmental policies.

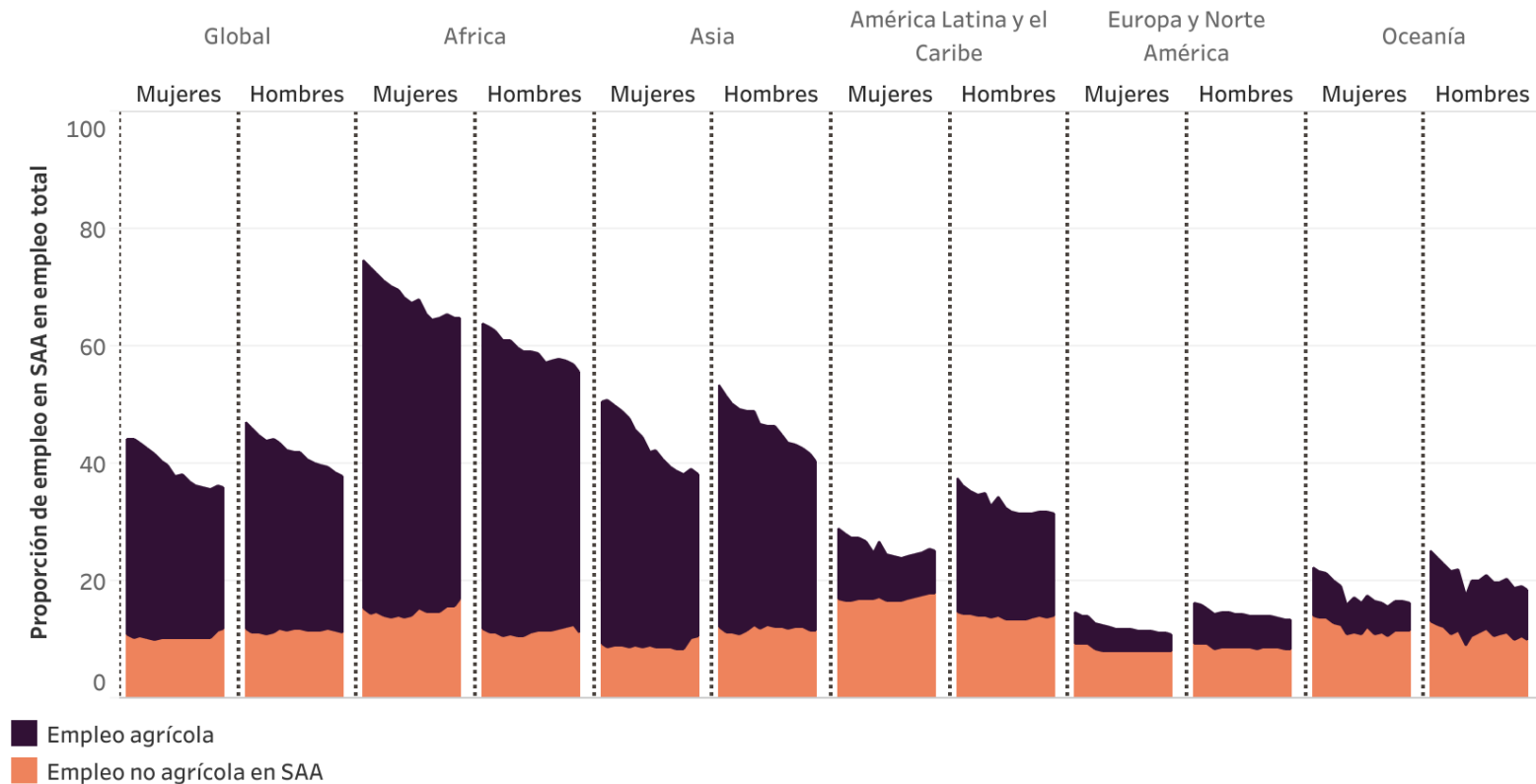
## SOCIAL PER CAPITA SPENDING HAS A DIRECT EFFECT ON POVERTY LEVELS



# Agrifood systems are a major employer of women and men

- Globally, 36% of working women are employed in agrifood systems, along with 38% of working men

- Agrifood systems are a greater source of livelihoods for women than for men in low- and middle-income countries



Source: Costa, V. et al (forthcoming). *Women's employment in agrifood systems*. Background paper for The Status of Women in Agrifood Systems report, 2023.

# Increasing resilience of the agrifood systems

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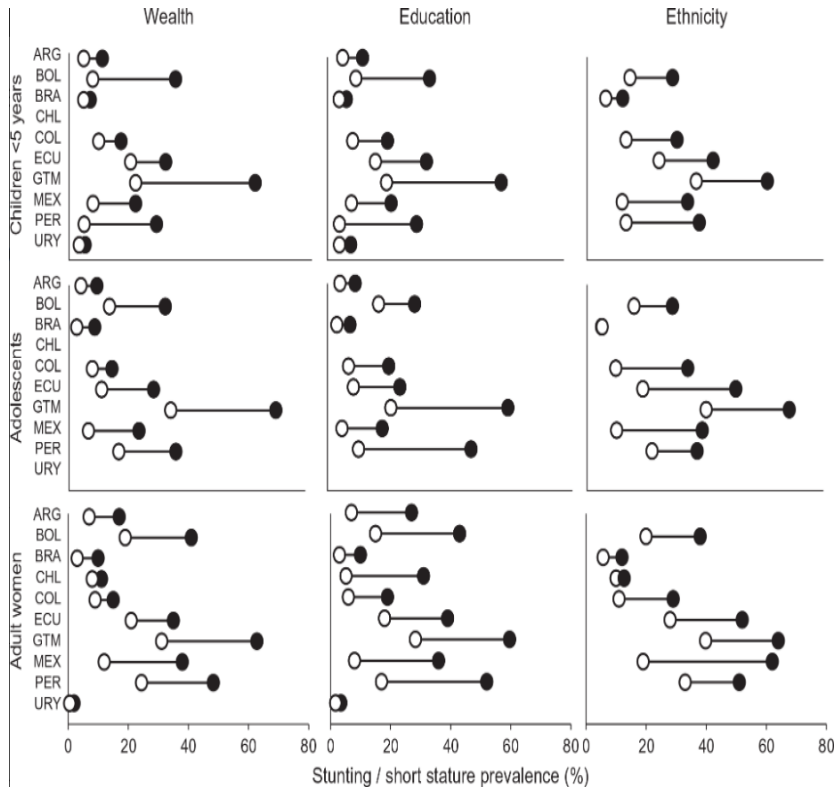
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# What are the big issues for nutrition?

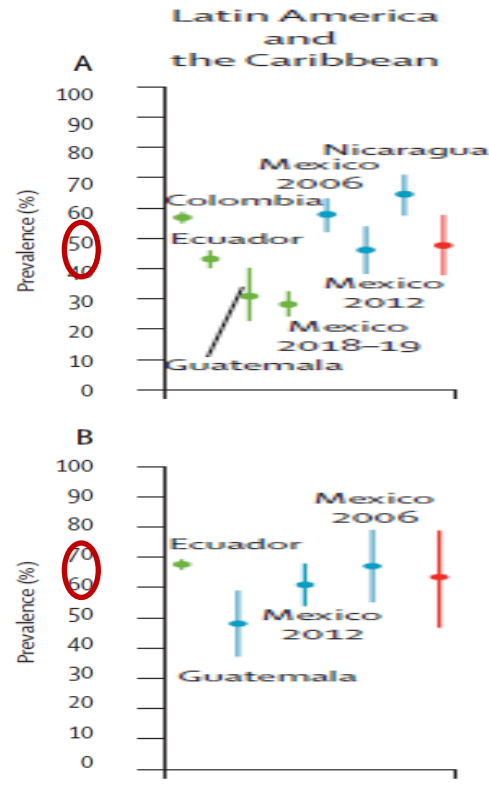
## Persistent undernutrition

- Micronutrient malnutrition affects all population groups
- Other forms of undernutrition (e.g., stunting) concentrated among the poor, less educated and indigenous population

## Inequities in stunting prevalence in LAC by wealth, education and ethnicity (Batis et al 2020)



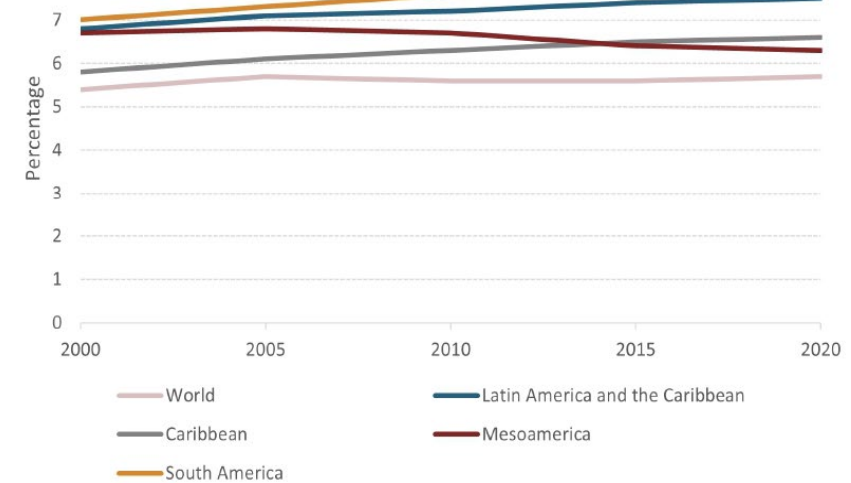
## Regional prevalence of deficiency of >1 micronutrients in children <5 y (A) and women 15-49 y (B) (Stevens et al 2022)



## Highest and fast growing rates of obesity & related NCDs (FAO et al 2023)

- Obesity major issue from very young age

## Trend in obesity prevalence among children <5 y of age by sub-region



Adult obesity order of magnitude higher than global average (13.1%)

**MESOAMERICA**  
27,3%

**CARIBBEAN**  
24,7%

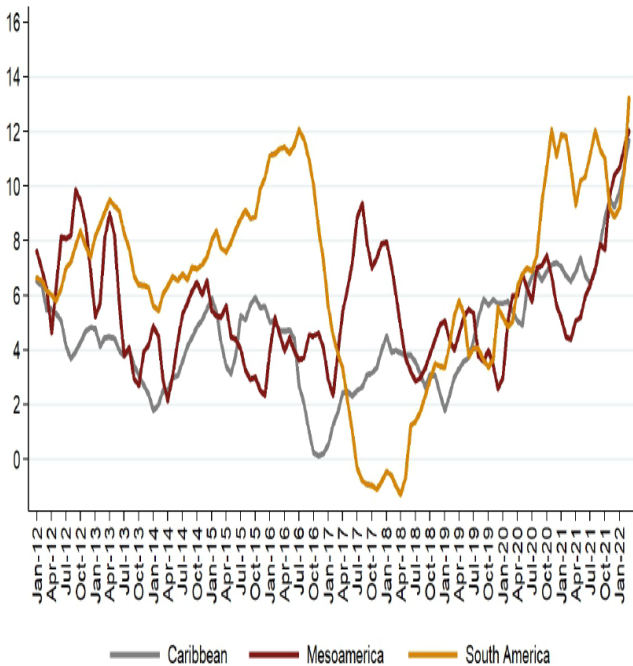
**SOUTH AMERICA**  
23%



# What factors underlie these issues?

**High and rising food prices (FAO et al. 2023)**

General and food inflation (percent) in LAC 2012-2022



**Inequalities of access and opportunity (e.g., health in Ecuador (Rios-Quituzaca et al. 2022); Mexico (Armenta-Paulino et al. 2022))**

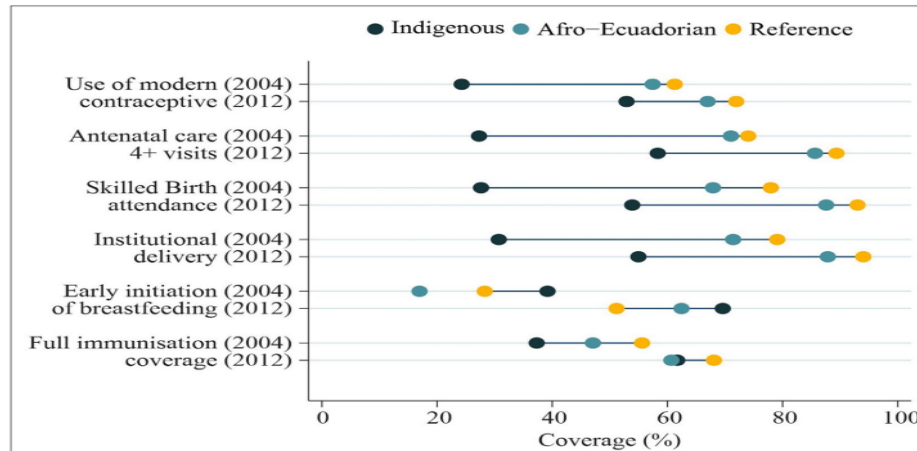
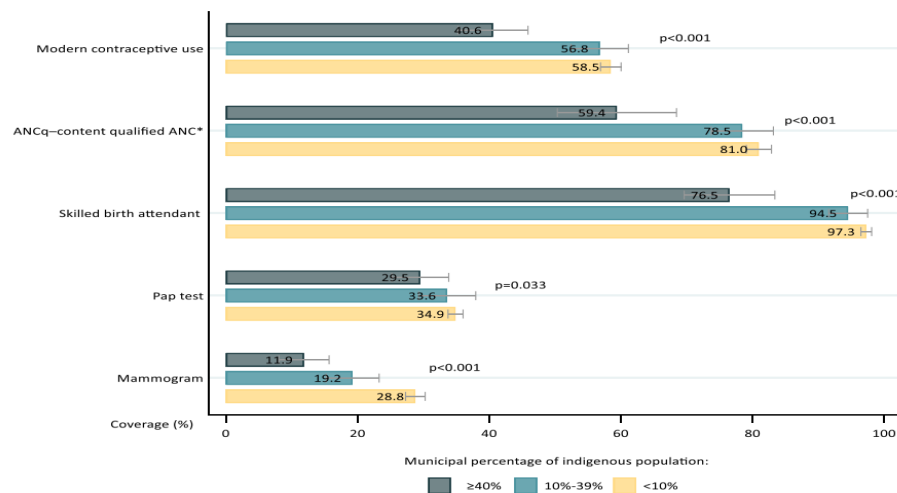
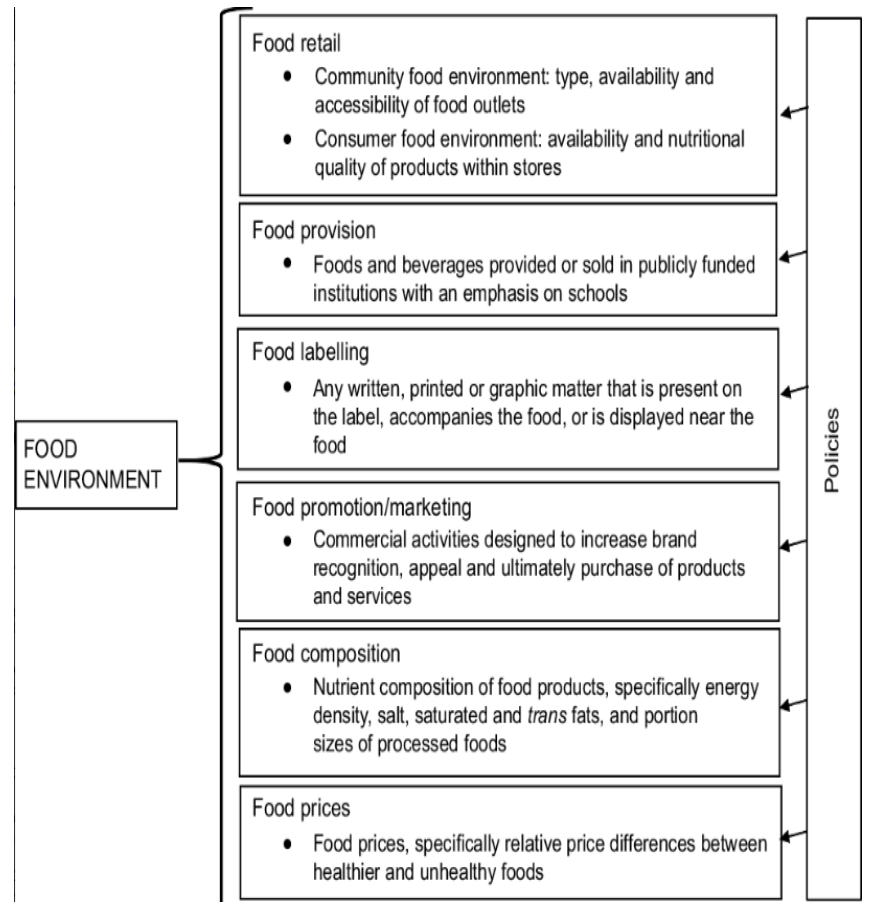


Figure 1. Coverage of RMNCH interventions by ethnic group. Ecuador, 2004 and 2012.

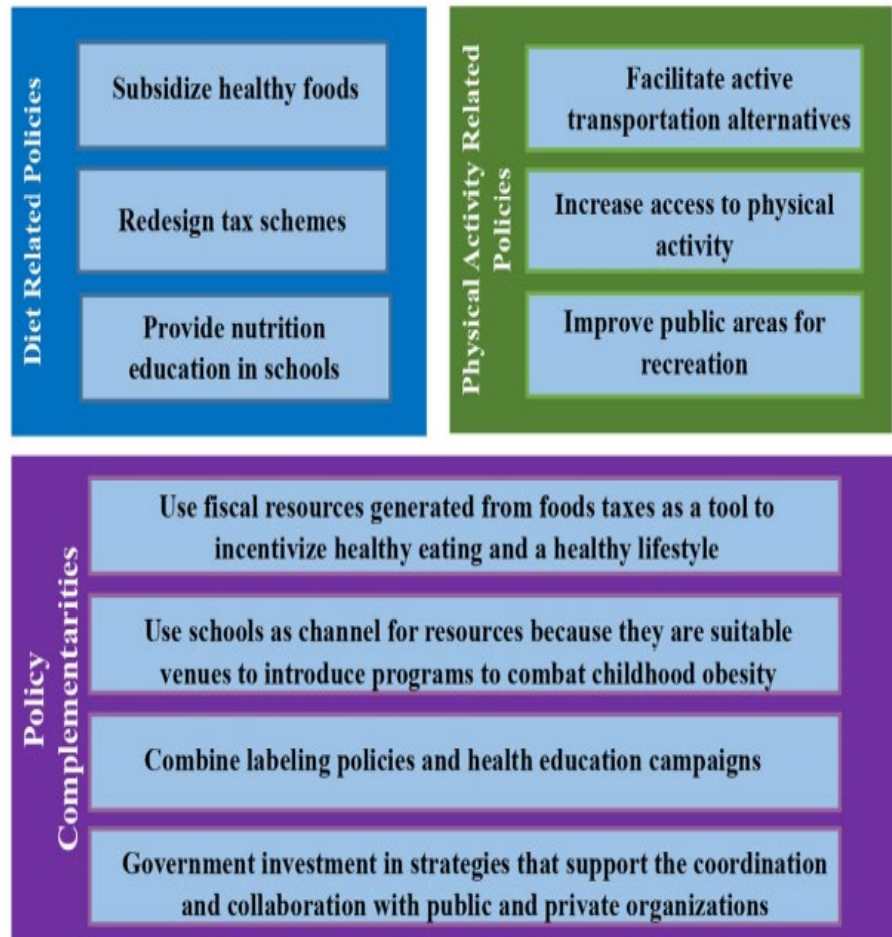


**Unhealthy food environments perpetuate all forms of malnutrition – but present enormous policy opportunities (Perez-Ferrer et al. 2019)**



# Many regional innovations, investments, and evidence of their impact, but...

Many regional, sub-regional and national reviews of the evidence and specific recommendations for action (e.g., Melo et al 2023)



Several impediments limit effective actions informed by this experience and evidence:

- **Lack of continuity** across political cycles for some **essential actions needed to address undernutrition**. Despite that fact that health, and sometimes food are constitutional rights in many countries in the region. And despite evidence that realizing these right may improve regional issues such as migration (Soto et al. 2021). And despite evidence that undernutrition undermine national development (Shekar et al. 2006)).
- Ineffective advocacy, processes, communication, and insufficient evidence to support the **balancing of food and nutrition vs. other priority outcomes of agriculture and trade**, and shifting priorities in this regard (e.g., environment, GDP)
- **Untethered commercial interests** interceding in political processes (e.g., delaying and distracting from tax, incentive, subsidy policies)

# Big changes needed

## **(sub) Regional commitment to continuity in equitable policies that guarantee the right to essential health and nutrition actions**

- Essential to eradicate undernutrition, break intergenerational cycle of malnutrition
- Undernutrition is concentrated in disenfranchised populations in the region
- Need new ways to assess progress and maintain focus (i.e., undernutrition will not be resolved in single political cycles)

## **(sub) Regional commitment and action to stem the interference of commercial interests in political processes in favour of healthy food environments and healthy diets**

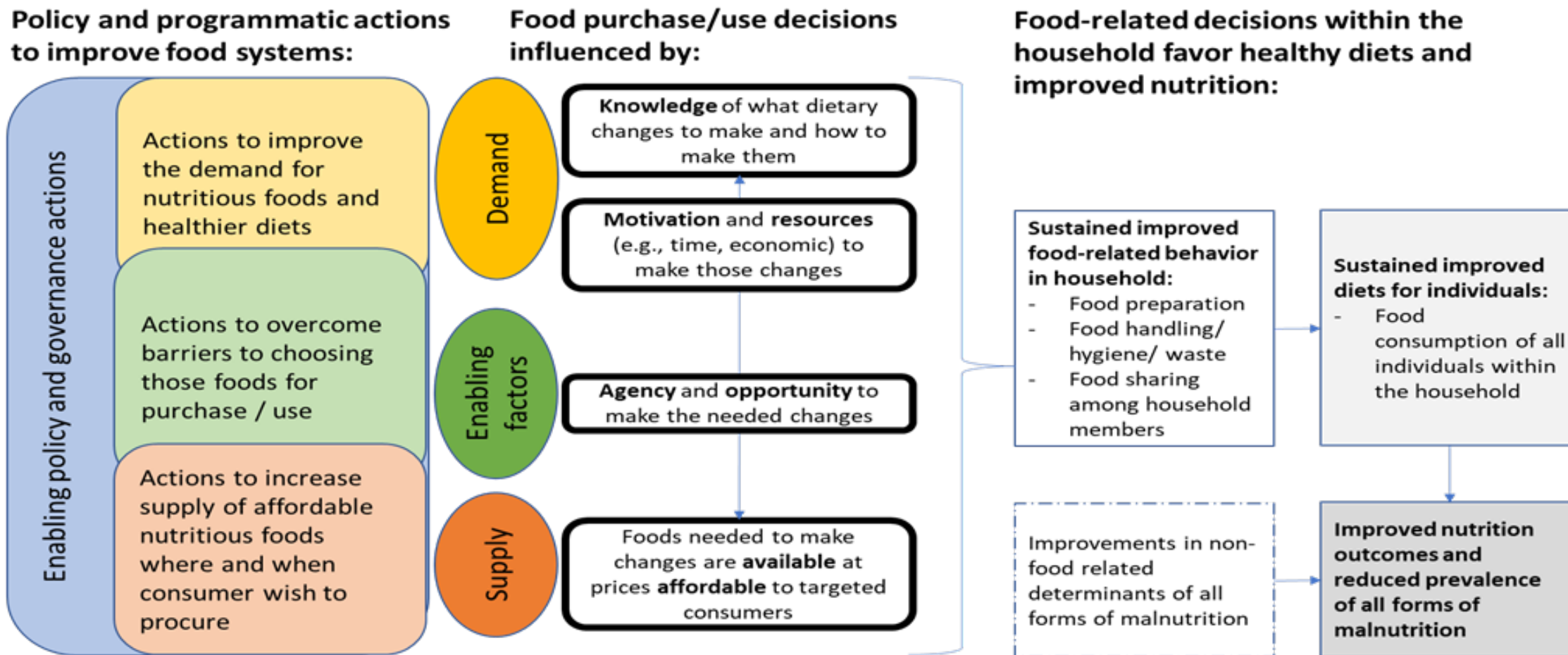
- Essential to prevent all forms of malnutrition through enabling affordable healthy diets
- Cripple and delays policy actions in legal battles

## **Facilitated cross-sectoral planning at (sub) national level, creating strategies that enable consumers to choose healthy diets. Requires coordinated actions across agriculture, trade, education, health, finance, social protection, and informed by contextual realities:**

- Building on experience and evidence in cross-sector collaboration from successful models across the region (e.g., CCTs, obesity strategy in Chile)
- Actions must simultaneously enable consumers to choose healthier diets, by ensure demand, supply, and enable factors coincide
- See details on next slide
  - KNOWLEDGE
  - MOTIVATION AND RESOURCES
  - AGENCY AND OPPORTUNITY
  - AVAILABLE AND AFFORDABLE NUTRITIOUS FOOD

# Consumer-centred model of actions required to enable better dietary choices

UNDER REVIEW: PLEASE DO NOT SHARE



**Figure 1. Food systems actions for dietary improvement and nutrition outcomes** (elaboration by the authors). Hashed bar indicates nutrition-outcome related factors that fall outside of the scope of food systems related policies and programs.

# Increasing resilience of the agrifood systems

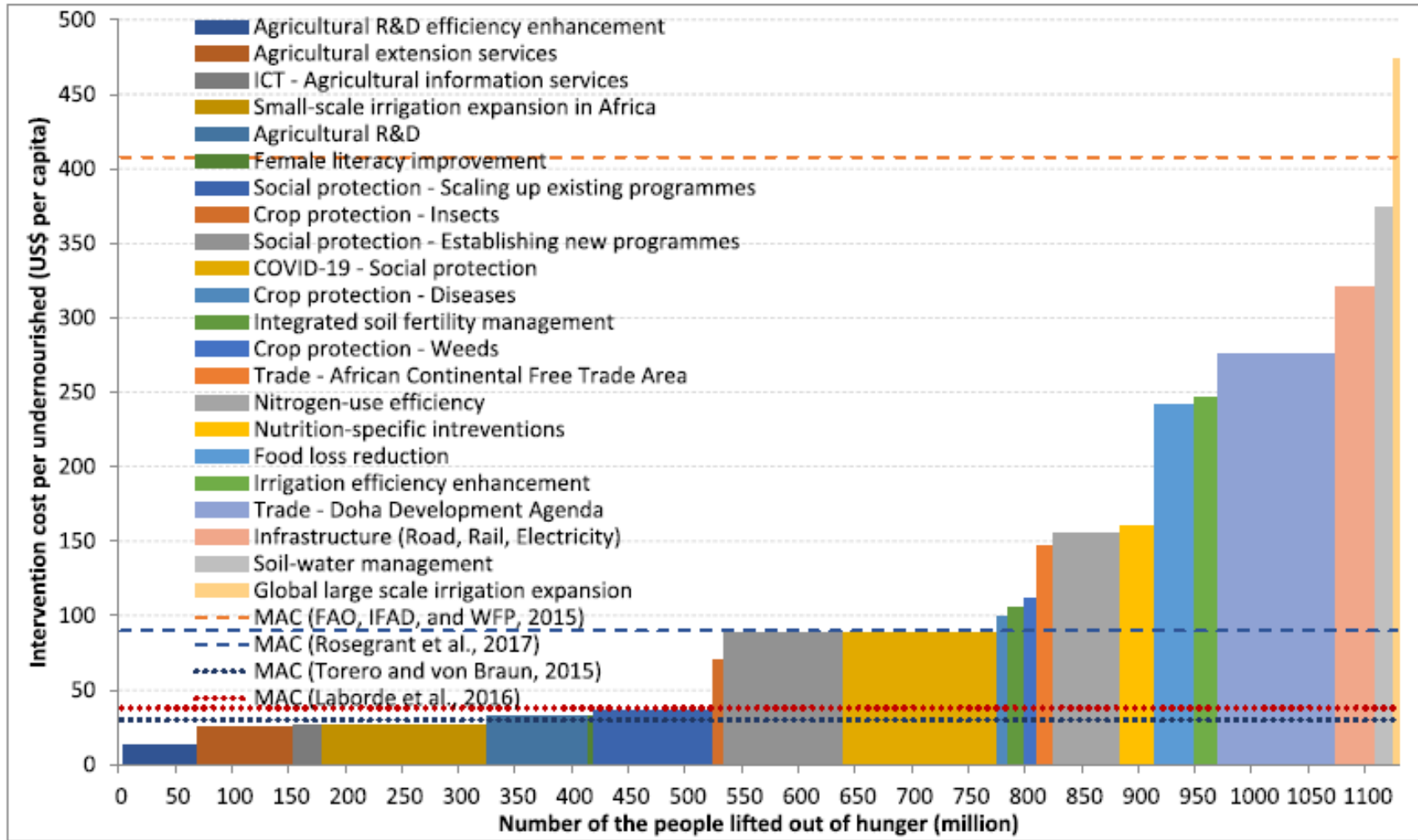
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# Marginal Cost Curves of suggested interventions to eradicate hunger



The global cost of reaching a world without hunger: Investment costs and policy action opportunities

Beawit Beyene Chichaibelu<sup>a,\*</sup>, Maksud Bekchanov<sup>b</sup>, Joachim von Braun<sup>c</sup>, Maximo Torero<sup>d</sup>

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<sup>b</sup> Research Unit Sustainability and Global Change, Center for Earth System Research and Sustainability, Universität Hamburg, Grindelberg 5, 20144 Hamburg, Germany  
<sup>c</sup> Center for Development Research, University of Bonn, Genscherallee 3, D-53113 Bonn, Germany  
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## ARTICLE INFO

**Keywords:**  
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 Undernourishment  
 SDG 2  
 Policy options  
 Investment cost  
 Marginal abatement cost curve

## ABSTRACT

This study developed a marginal abatement cost curve to identify a mix of least-cost investment options with the highest potential for hunger reduction, hunger here defined by the undernourishment concept of the Food and Agriculture Organization. Twenty-two different interventions are considered for reducing undernourishment relying on information drawn from best available evidence-based literature, including model- and large-scale intervention studies. Ending hunger by 2030 would require annual investments of about US\$ 39 to 50 billion until 2030 to lift about 840 to 909 million people out of hunger, which is the 2020 estimate of hunger projection in 2030, also considering the effects of COVID-19. Investing in agricultural R&D, agricultural extension services, ICT - Agricultural information systems, small-scale irrigation expansion in Africa and female literacy improvement are low cost options that have a relatively large hunger-reduction potential. To achieve the goal of ending hunger by 2030, not only is it urgent not to lose any more time, but also to optimally phase investments. Investments that have more long-term impacts should be frontloaded in the decade in order to reap their benefits soon before 2030. A balanced approach is needed to reach the hungry soon – including those adversely affected by COVID-19 with social protection and nutrition programs.

## 1. Introduction

At the heart of the 2030 Agenda<sup>1</sup> was a promise to prioritize two objectives: to eradicate poverty and end hunger in all their forms. Worldwide, over 650 million people are estimated to have been undernourished in 2019. World hunger increased further in 2020 to 720 – 811 million people, exacerbated by the impact of COVID-19 (FAO et al., 2021). Recent global projections of hunger show that the world is not on track to achieve Zero Hunger<sup>2</sup> by 2030. Estimates in 2020 projected that the number of people affected by hunger will surpass 840 million by 2030, or 10 percent of the global population (FAO et al., 2020). Updated estimates in 2021 projected lower, but still alarming levels of hunger that will affect about 660 million people by 2030 (FAO et al., 2021). The world is also not on track to achieve the 2025 and 2030 targets for child

malnutrition. In 2019, 21.3 percent of children under 5 years of age were stunted globally, or 144 million (UNICEF et al., 2020). In 2021, the number of children suffering from stunting increased further to 149.2 million. Although there has been some progress globally since 2000, rates of stunting reduction are far below what is needed to reach the targets of 40 percent reduction for 2025 and 50 percent reduction for (FAO et al., 2021).

COVID-19 is expected to further worsen the overall prospects for food security and nutrition. Food insecurity may appear in countries and population groups that were not previously affected. In 2020, the number of undernourished people increased by about 118 million people compared to the 2019 level as COVID-19 disrupted economies, job markets and supply chains, and inflated food prices. The pandemic is also expected to have a lasting effect beyond 2020, adding about 30

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<sup>1</sup> In 2015, all of the UN member states adopted 17 goals as part of the 2030 agenda for sustainable development which set out a 15-year plan to achieve the goals.

<sup>2</sup> Most studies define 'zero hunger target' as the reduction of hunger levels to less than the 5 or 9 percent of population. 'Absolute zero hunger target' is used throughout this manuscript to refer to a complete eradication of hunger.

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# Prioritization of investments using territorial approaches

Agriculture  
commercialization



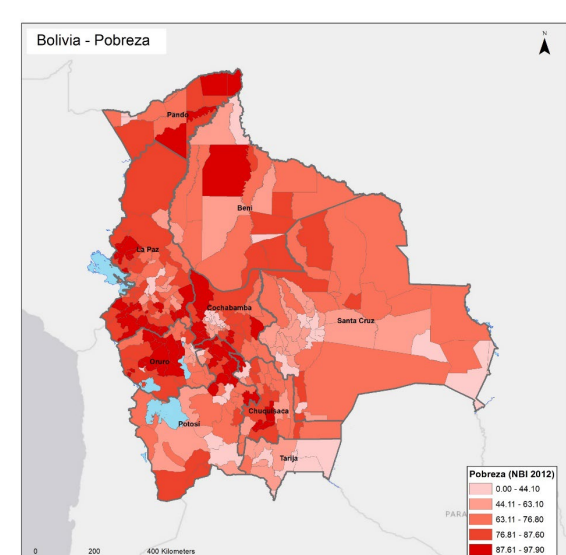
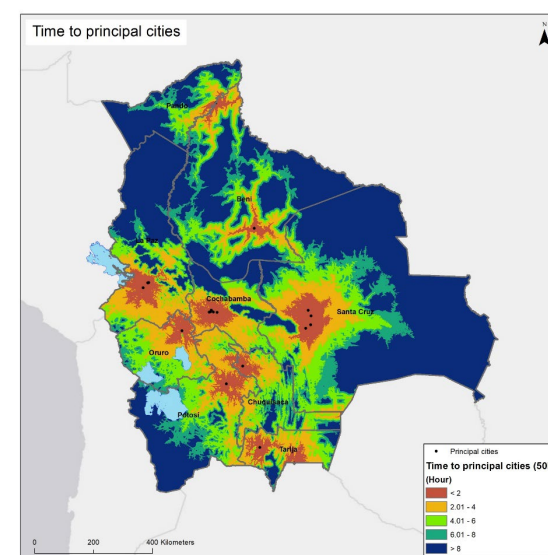
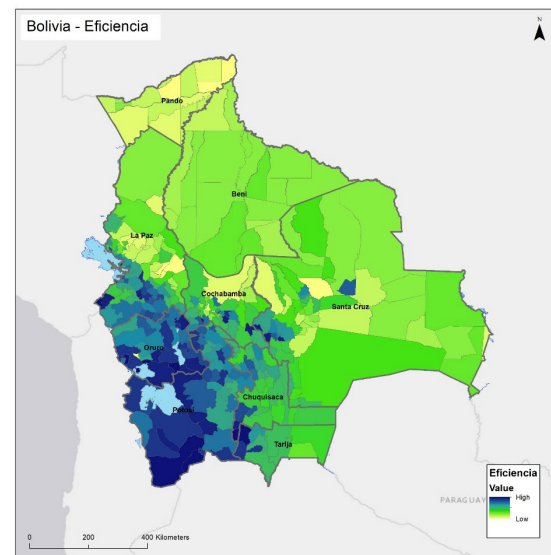
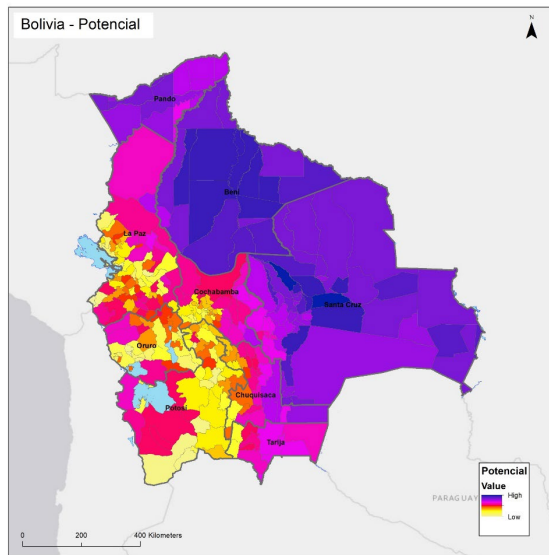
Capturing value  
while targeting the poorest

1. Potential value

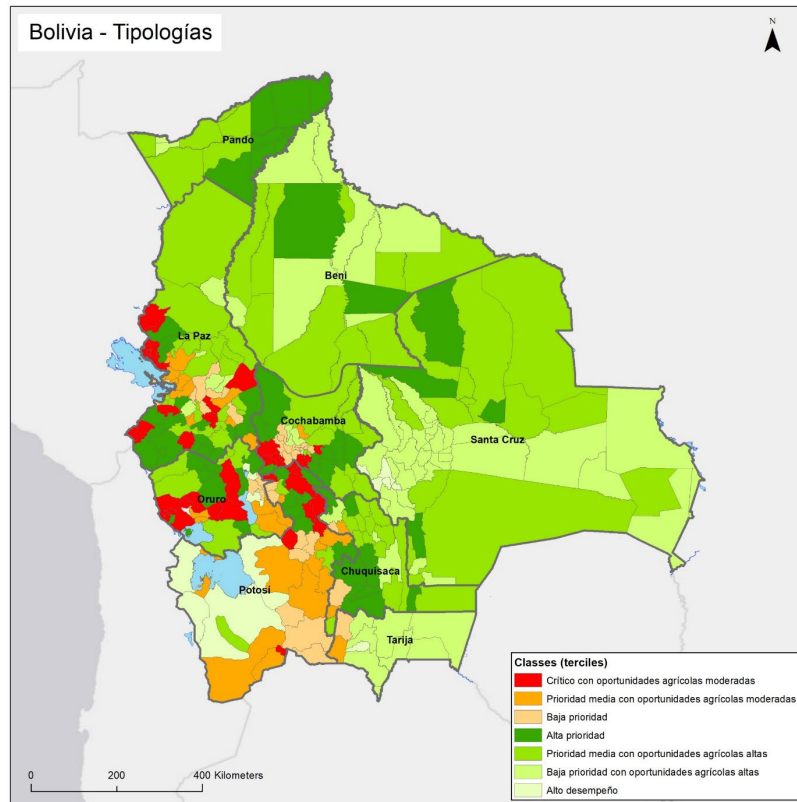
2. Efficiency Value

3. Access to market

4. Poverty



# Prioritization of investments using territorial approaches



Critical with moderate agricultural opportunities

Medium priority with moderate agricultural opportunities

Low priority

High Priority

Medium priority with high agricultural opportunities

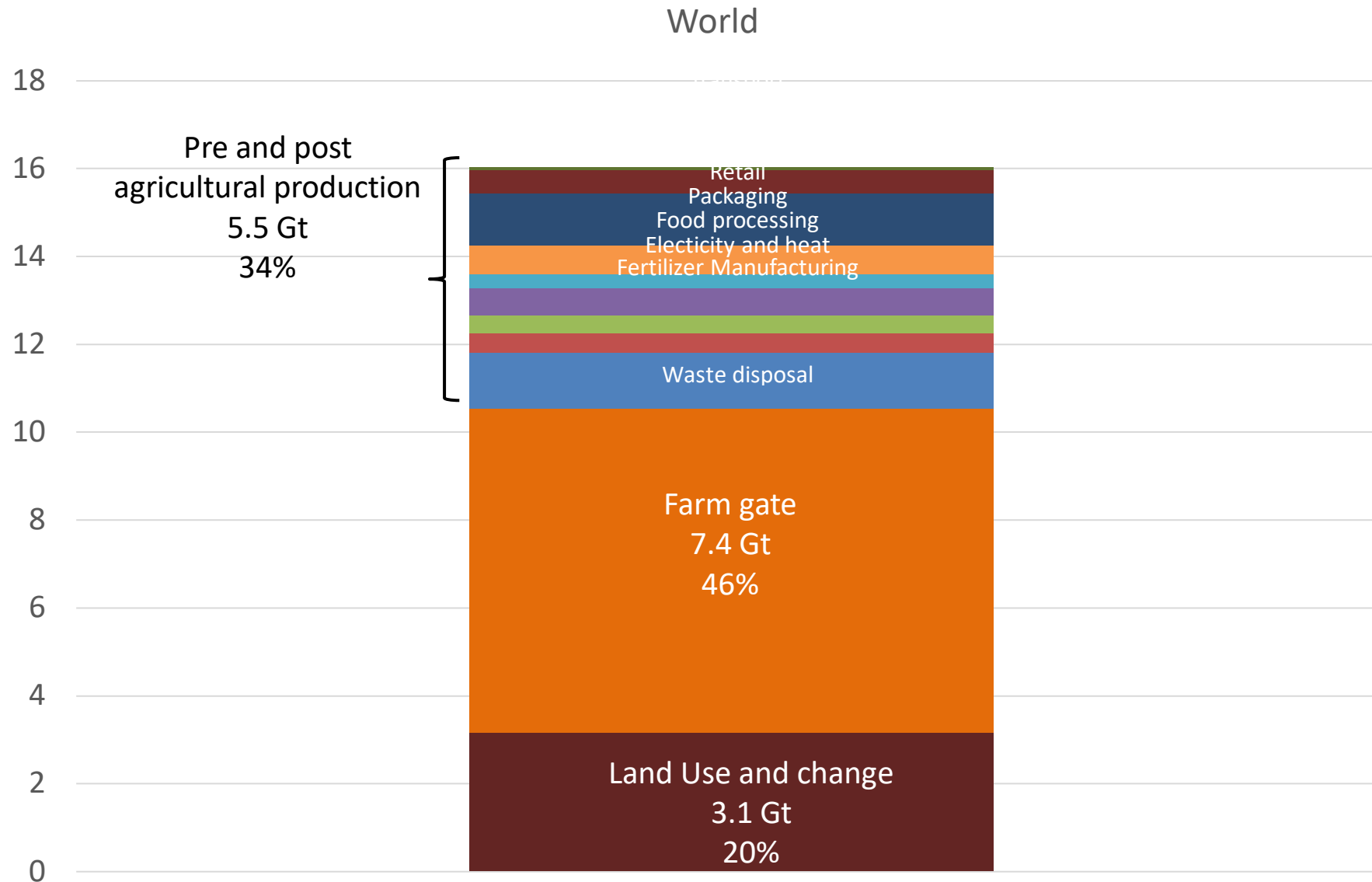
Low priority with high agricultural opportunities

High performance

**Typological Analysis:** The geographical critical analysis is obtained using FAO GIS system to identify the potential of the region based on its priority and its efficiency, reviewed with Government.



# GHG from agrifood systems 2020, World and Latin America and the Caribbean (Gigatonnes CO2 eq)



Source: FAOSTAT

## Increasing resilience of the agrifood systems

MINIMIZE RISKS  
(VULNERABILITIES)

COPING WITH RISKS WHEN  
THEY OCCUR (CAPABILITIES)

- Increase investment in **early warning Systems** and the capacity to prevent those risks from occurring
- The **One health approach** has enormous potential to prevent the emergence of new zoonotic reservoirs.
- **Increase access to insurance:** catastrophic insurance and agricultural insurance combining index based with traditional insurance and Access to finance.

- **Increasing absorptive capacity**
- **Well targeted social protection** to support the most vulnerable but with clear timeline to graduation
- **Consumer centered model to reduce nutrition challenges**
- **Prioritize investments in interventions** with the maximum marginal returns and assuring minimizing tradeoffs (Road to SDG2 and 1.5 degrees)
- **Reducing food loss and Waste**
- **Align incentives** by redirection of subsidies on farm support.
- **Increasing trade** to boost farmers productivity, income, and increase access to healthy diets.

# Increasing trade

Figure 4: Food Trade Balance

Different trade positions

- Deficit
- Surplus
- Large surplus

Source: World Integrated Trade Solution (<https://wits.world-bank.org/>).

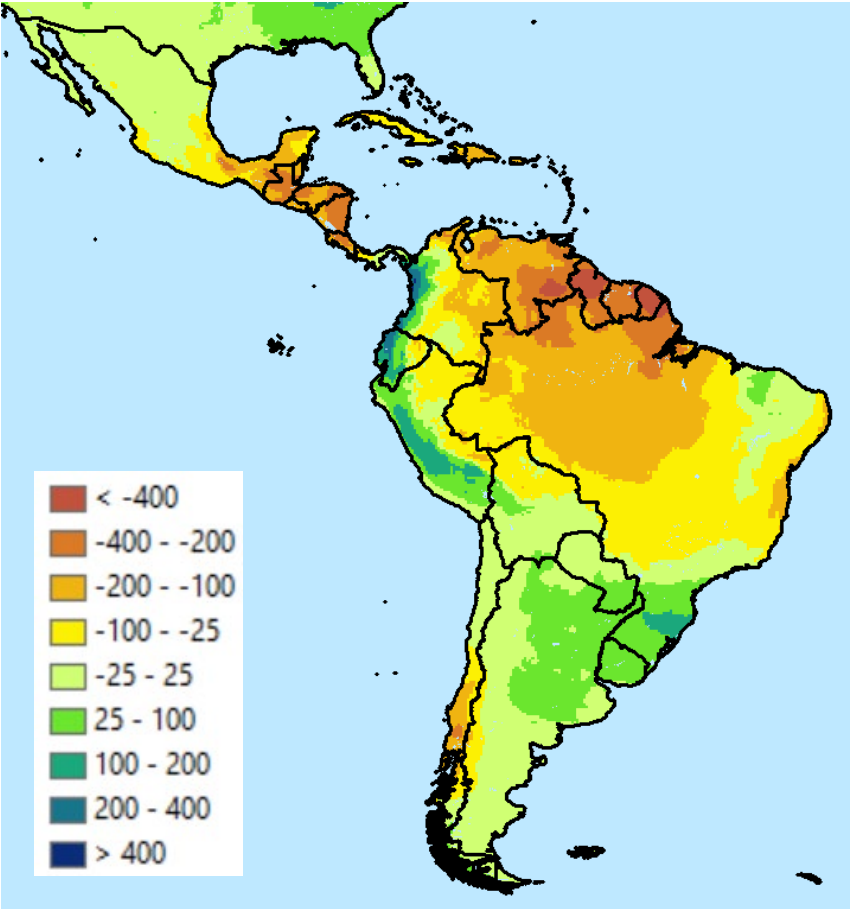
- Beans, wheat, salmon
- Apple, fish
- Wheat, palm oil, apple
- Apple, wheat
- Wheat, wheat
- Wheat, salmon

Source: World Integrated Trade Solution (<https://wits.world-bank.org/>).

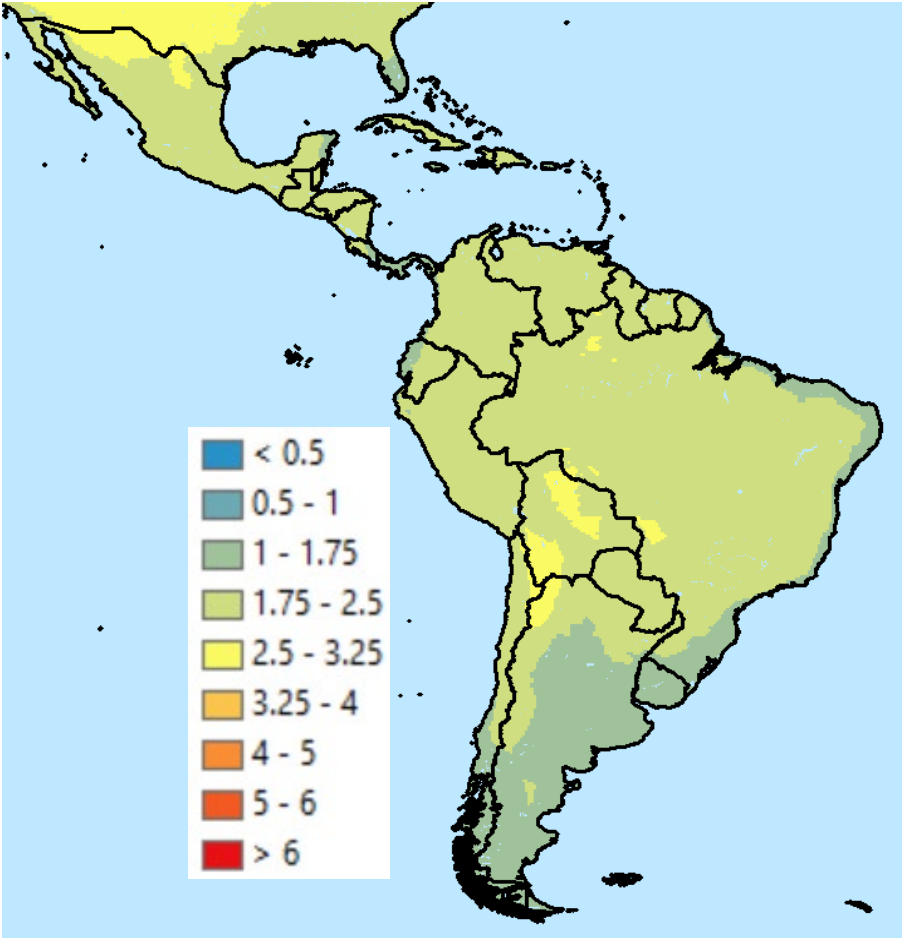
Different export structure

# Changes across 30 GCMs under SSP5-85 [high emissions scenarios], comparing 1991-2010 to 2041-2060

## Median of annual precipitation



## Median of temperature increase



Fuente: NASA (2022).

## Impact of climate change on crop productivity

- Impacts of climate change on productivity of **SOYBEANS** in 2050 under the SSP5-85, relative to climate of 2005

Region	Hectares (IR+RF) FAO, 2012-2016	No CO2 fertilization			With CO2 fertilization		
		Mini- mum	Median	Maxi- mum	Mini- mum	Median	Maxi- mum
Andes	1,359,011	-32.5	-7.3	15.3	-16.4	16.3	44.1
Brazil & Guyanas	28,834,246	-25.6	-21.9	-16.7	-8.7	-3.8	2.6
Central America	23,869	-40.8	-18.3	-15.4	-26.2	-0.8	2.9
Mexico	188,839	-44.0	-25.5	10.9	-30.4	-7.9	36.7
Southern Cone	23,303,178	-19.6	0.8	22.5	-1.4	24.0	49.5

*Fuente: Robertson y Thomas, IFPRI. próximamente.*

## Impact of climate change on crop productivity

- Impacts of climate change on productivity of **MAIZE** in 2050 under the SSP5-85, relative to climate of 2005

Region	Hectares (IR+RF) FAO, 2012-2016	No CO2 fertilization			With CO2 fertilization		
		Minimum	Med-ian	Maximum	Minimum	Med-ian	Maximum
Andes	2,544,797	-31.2	-18.0	-13.3	-29.2	-15.5	-10.6
Brazil & Guyanas	15,082,518	-34.3	-29.4	-17.0	-31.8	-26.7	-14.0
Caribbean	548,919	-31.6	-25.9	-16.1	-31.1	-25.3	-15.6
Central America	1,937,412	-34.0	-16.8	-14.6	-32.7	-15.7	-13.4
Mexico	7,044,882	-21.9	-10.8	-9.8	-19.3	-7.9	-6.9
Southern Cone	5,696,088	-23.0	-17.0	5.9	-19.4	-13.3	10.2

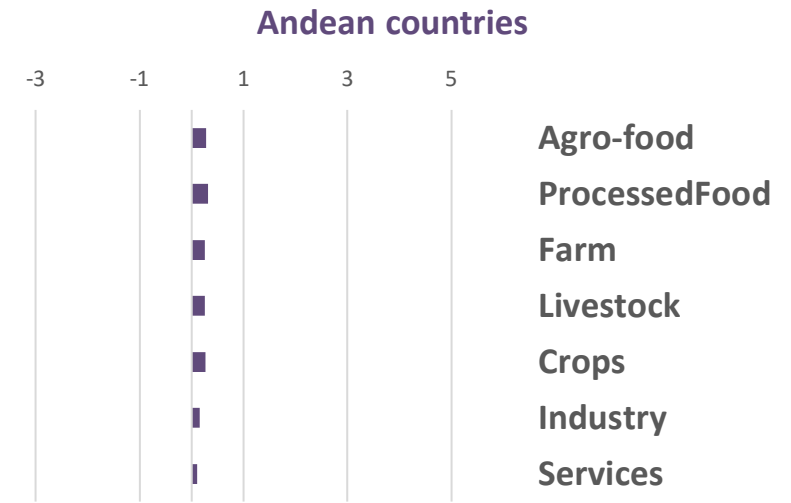
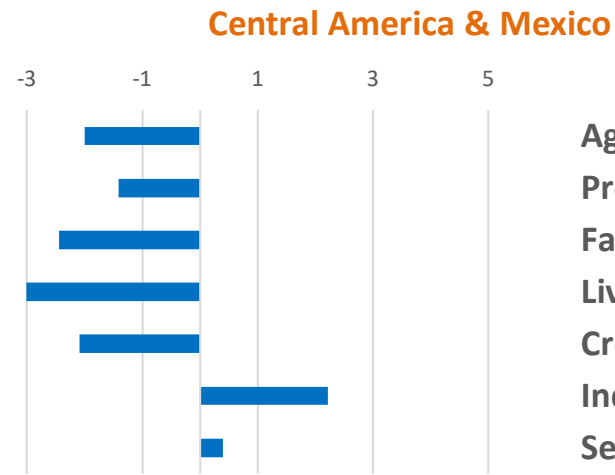
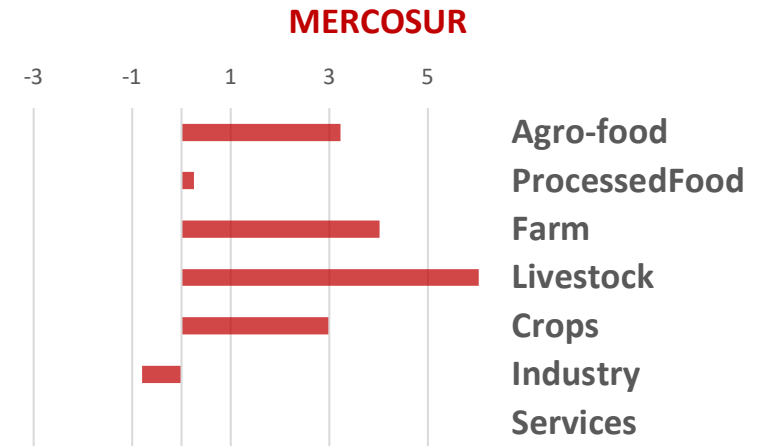
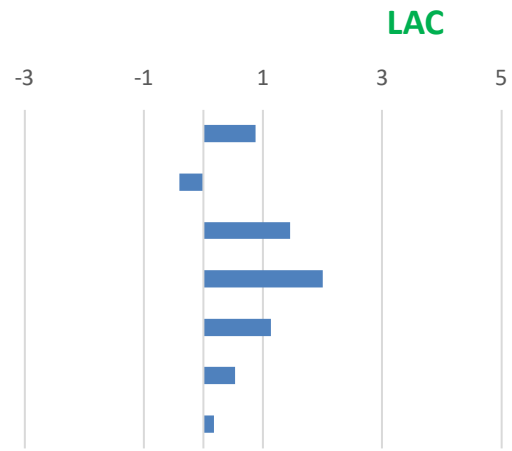
Fuente: Robertson y Thomas, IFPRI. próximamente.

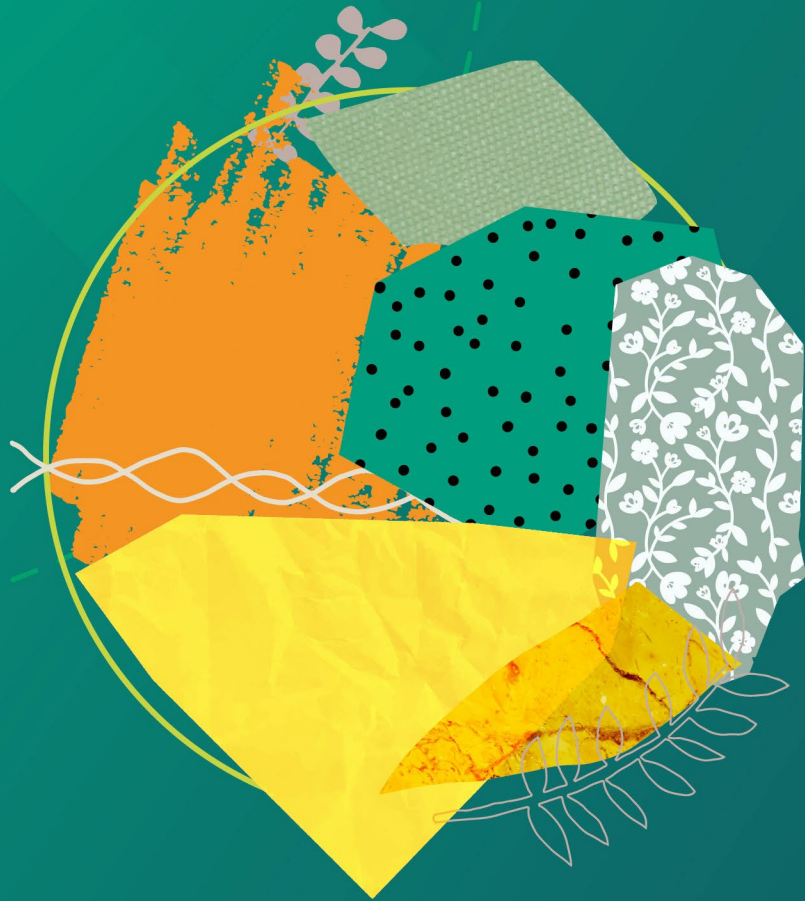
# Intra-regional trade integration

Reducing non-tariff barriers and trade costs among LAC countries.



Significant gains on percentage change in production but intra-regional trade integration would not have same impact everywhere





# 2023

CONGRESO INTERNACIONAL  
INTERNACIONAL CONGRESS

LOS SEGUROS AGRARIOS EN EL ACTUAL CONTEXTO  
CLIMÁTICO: SITUACIÓN Y PERSPECTIVAS

AGRICULTURAL INSURANCE IN THE CURRENT  
CLIMATE CONTEXT: SITUATION AND PROSPECTS

## GRACIAS

 @Seguro\_Agrario