# POTENTIALS IMPACTS OF REDUCING FOOD LOSS AND WASTE

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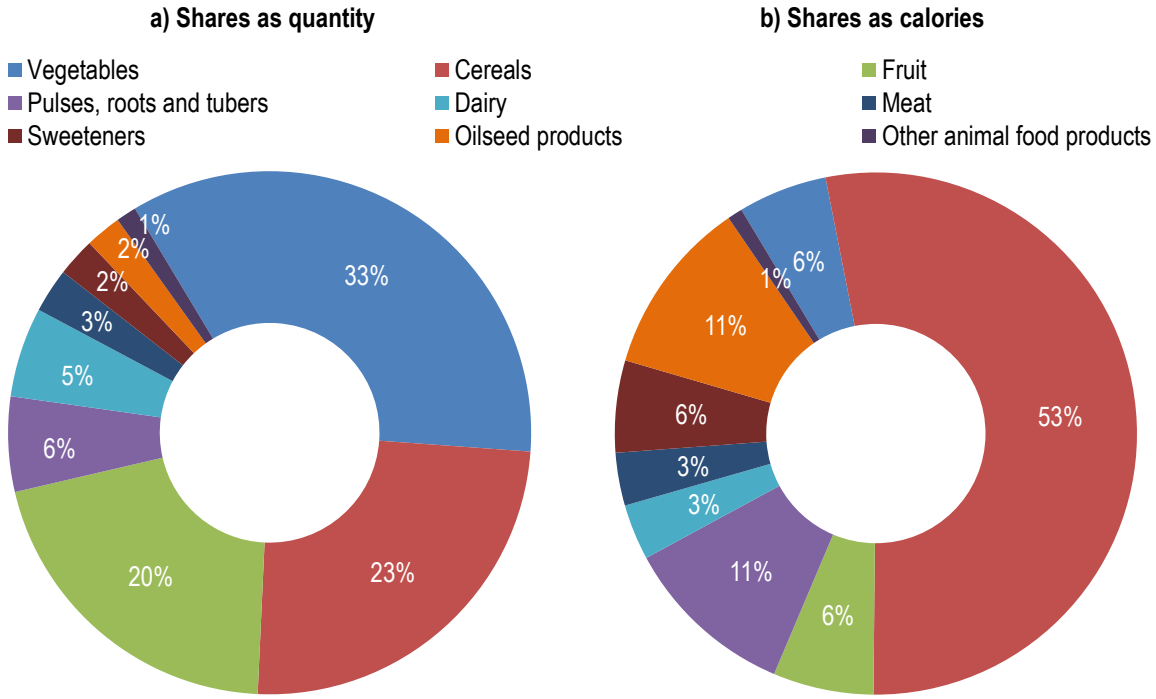
25-27 June 2025

BETTER POLICIES FOR BETTER LIVES

# 1. FOOD LOSS AND WASTE IN AGLINK-COSIMO

# The issue of Food Loss and Waste

- 13% of food produced is lost after harvesting and before reaching retail markets (FAO2019)
- 19% is wasted by households, food services and retail (UNEP 2024)



# The Aglink-Cosimo model characteristics

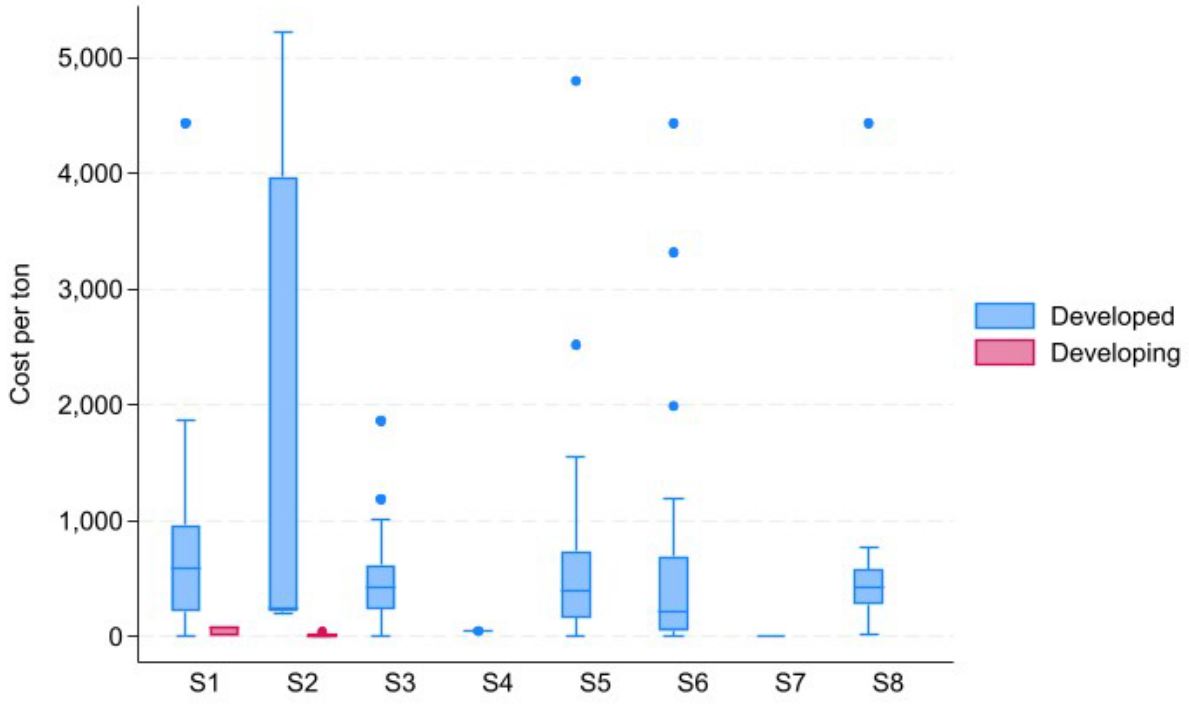
- Exogenous non-agricultural markets
  - partial equilibrium model for the main agricultural commodities, as well as biodiesel and bioethanol
- Competitive agricultural markets
- Non-spatial trade
- Recursive-dynamic markets
  - projection over ten years for purposes of forward-looking policy analysis and planning, but model projections are currently up to 2040 to assess long term implications

# FLW data incorporation in Aglink-Cosimo

- Value chain losses account for all losses occurred between the level at which production is recorded and retail (and not including retail).
  - Source: FAO Food Balance Sheets (FBS) from FAOSTAT and FAO Food Loss and Waste Database.
- Distribution waste accounts for all food lost at retail distribution level.
  - Source: caloric waste shares from FAOSTAT Food Security tables
- Household waste accounts for all food waste occurred at household level
  - Source: Post Harvest Loss Information System (SIPPOC) data and FAO Food Loss and Waste Database
  - rescaled to align with global estimates from UNEP

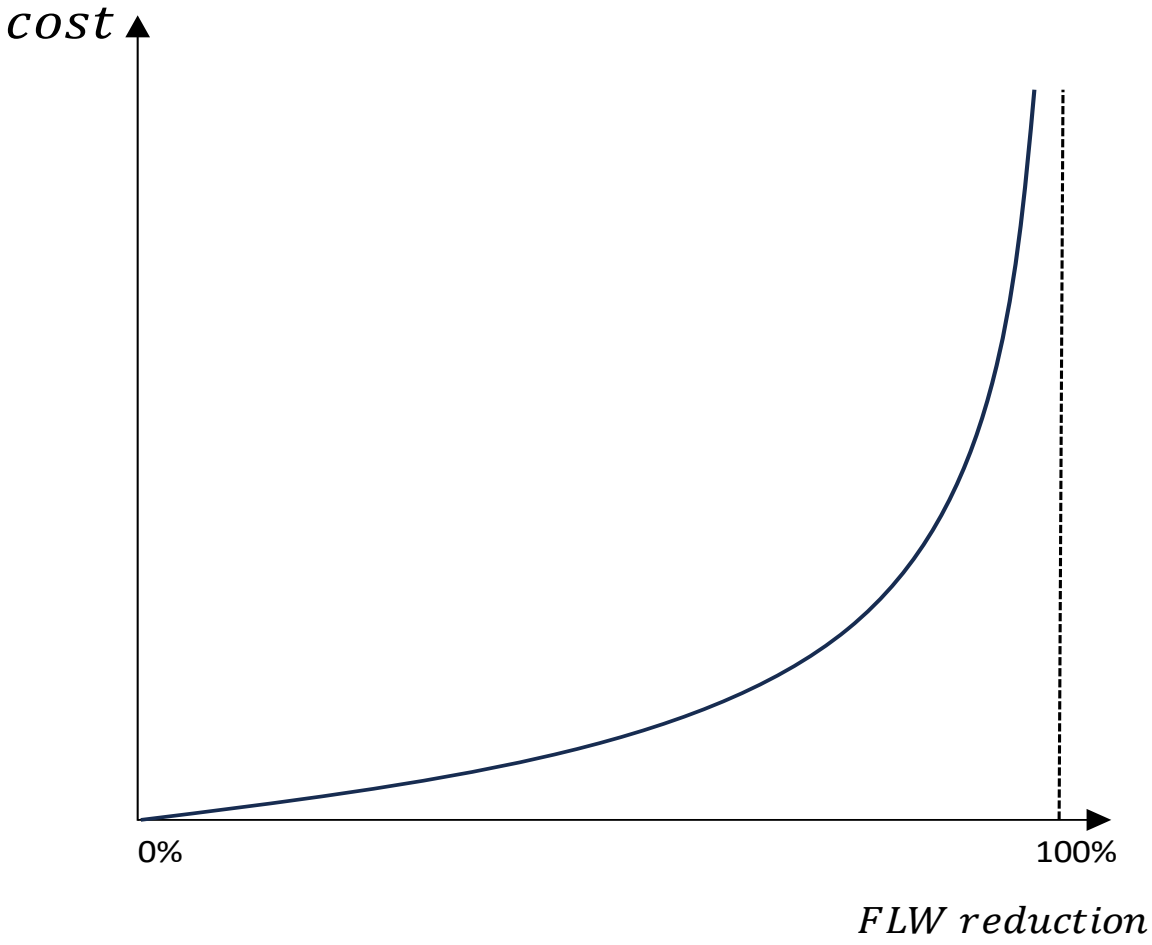
# 2. COSTS OF REDUCING FLW

# Literature review: costs of reducing FLW




| Food supply chain stages | | | | | | | |
|---|---|---|---|---|---|---|---|
| S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 |
| Primary agricultural (on farm) | Agricultural handling & storage | Food processing & packaging | Wholesale | Retail | Hospitality & food services | Public food procurement | Private households |
| Food Loss (Decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retail, food service providers and consumers) | | | | Food Waste (Decrease in the quantity or quality of food resulting from decisions and actions by retailers, food services and consumers) | | | |

# Do costs increase as FLW is reduced?




## Cost structure of public policies

# Do costs increase as FLW is reduced?

- We can test this econometrically taking advantage of the data collected in the lit review.

$$cost_{i,t} = \beta_0 + \beta_1 \log FLW_{i,t} + \gamma' X_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t}$$

- Where $\boldsymbol{cost_{i,t}}$ is the **cost of reducing a ton** of FLW (in USD) for country $i$ at year $t$; $\boldsymbol{FLW_{i,t}}$ is the **share of FLW**; $\boldsymbol{X_{i,t}}$ is a vector of **covariates** (stage-specific dummies, a private-driven initiative dummy, GDP per capita, and source-specific dummies); $\boldsymbol{\alpha_i}$ and $\boldsymbol{\tau_t}$ are **country** and **time fixed effects** (dummies specific for each year and country), respectively; and $\varepsilon_{i,t}$ is the error term.
- Finding evidence supporting $\boldsymbol{\beta_1 < 0}$ would validate the above functional form.

# Cost estimates for Aglink-Cosimo countries

- We estimate costs for reducing FLW (USD/ton) for each country by estimating a simpler regression using **GDP per capita**, a **development dummy**, and controlling for year and source fixed effects.
- Costs are estimated for the year 2023 and represent the **implicit cost** of reducing FLW (i.e., before any actual reduction is carried out).

# 3. SCENARIO DESCRIPTION AND METHODOLOGY

# Scenario description and methodology

- We compare **different FLW reduction** scenarios against the *Outlook* baseline: from 5% to 50% reduction.
- We assume **constant** future FLW **shares** in the **baseline**.
- We assume achieving FLW reductions by **2030** (linearly extrapolated).
- We assume **transmission** of food **waste** reduction to food **demand**.
  - **Exception** for countries with **high prevalence of undernourishment**, which may opt to **increase food intake** instead.
- We assume new implementation cost estimates

# Scenario description and methodology

- Introduction of our cost estimates into the model.
- We assume the effect of these costs to be like that of higher **taxes** faced by **consumers** to finance additional public spending.

$$CP_{r,c,t} = \left(PP_{r,c,t} + MAR_{r,c,t}\right) \times \left(1 + \frac{TAX^{rel}_{r,c,t}}{100}\right) + TAX^{add}_{r,c,t}$$

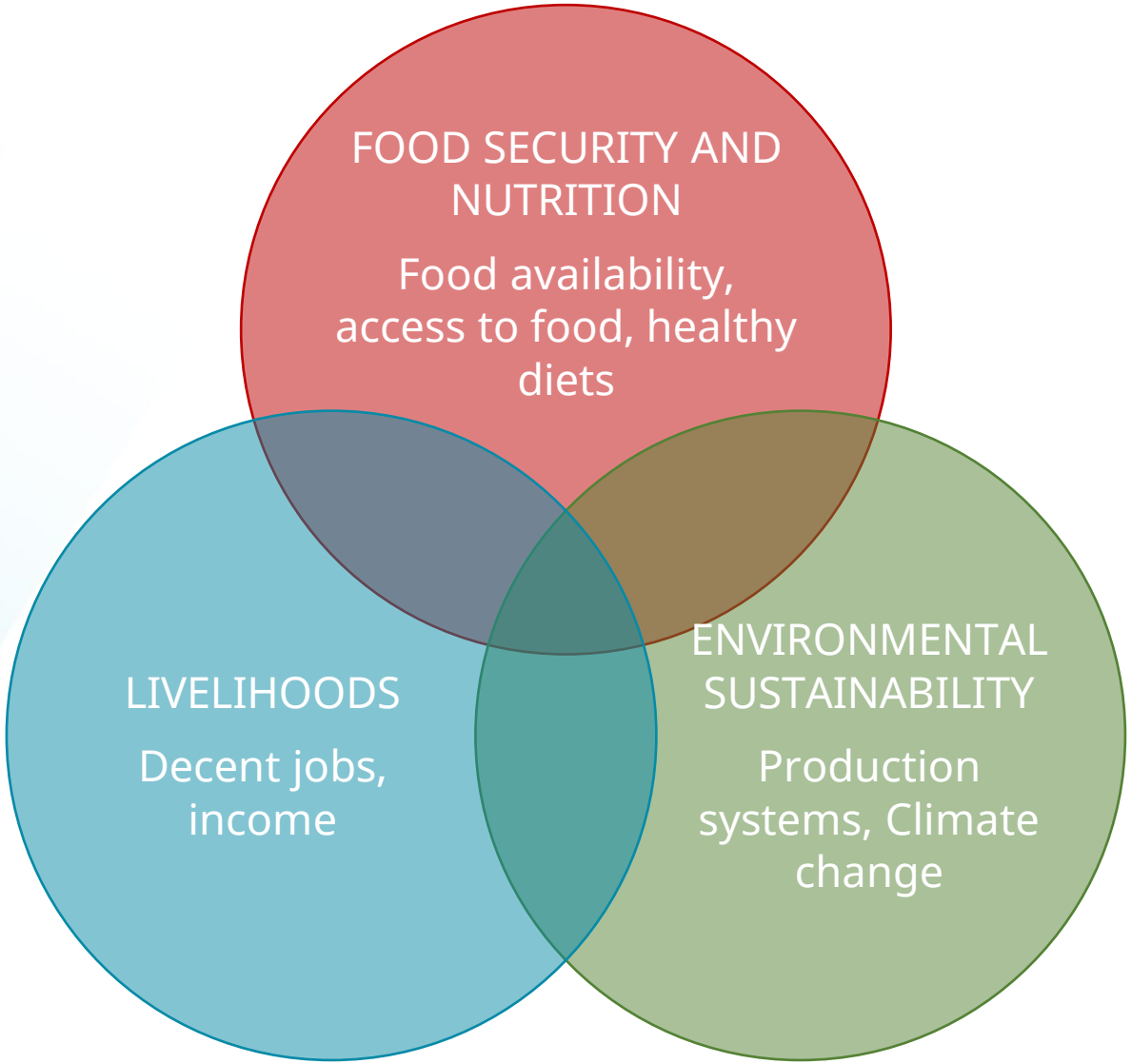
- Where ***CP*** is **consumer price** and ***TAX*** is an **additive tax** (both expressed in **local currency/ton**).
- We **adjust our costs** to be expressed in terms of **tons consumed** (not lost or wasted) and by **commodity**.

$$cost_{r,t} = cost_{r,t-1} + \hat{\beta}_1 \times \left(\frac{FLW_{r,t} - FLW_{r,t-1}}{FLW_{r,t-1}}\right) \times 100$$

$$TAX^{add}_{r,c,t} = cost_{r,t} \times \left(FLW_{r,2023} - FLW_{r,t}\right) \times \frac{CP_{r,c}}{\left(\frac{\sum_C FO_{r,c} \times CP_{r,c}}{\sum_C FO_{r,c}}\right)}$$

# 4. SCENARIOS RESULTS

# Food systems are facing a daunting triple challenge

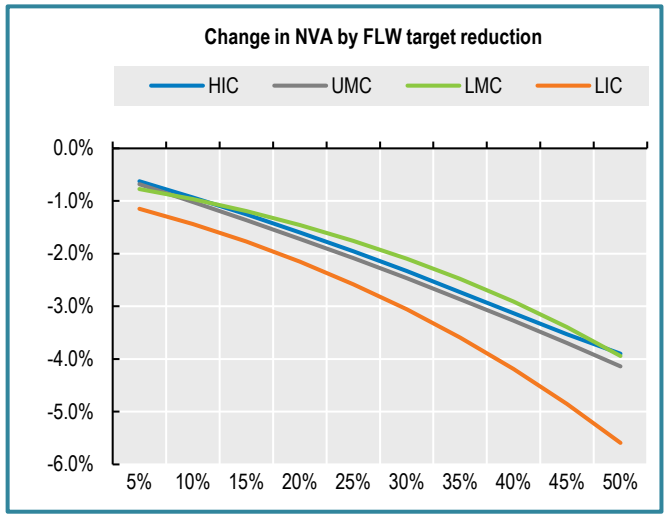


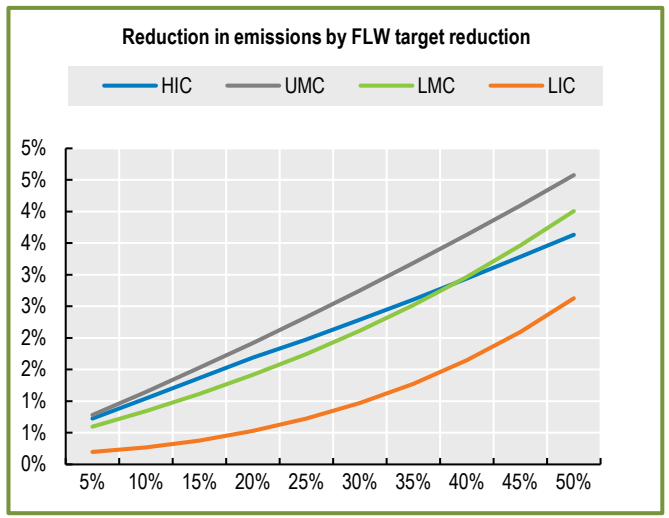

**Things are not black or white**

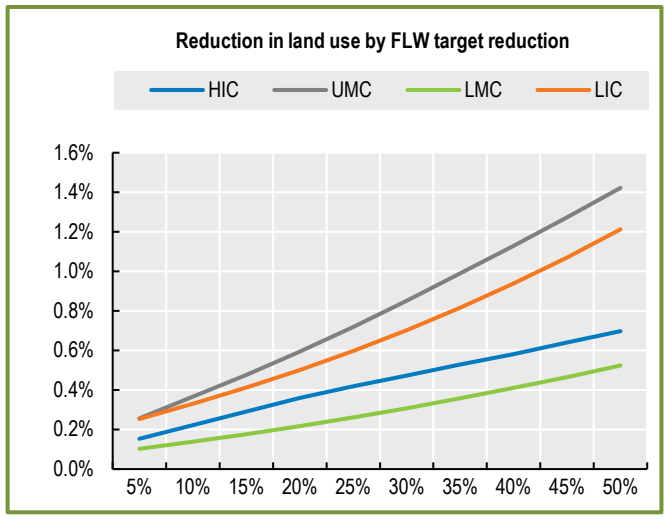
*Food systems have important achievements as well as serious shortcomings*

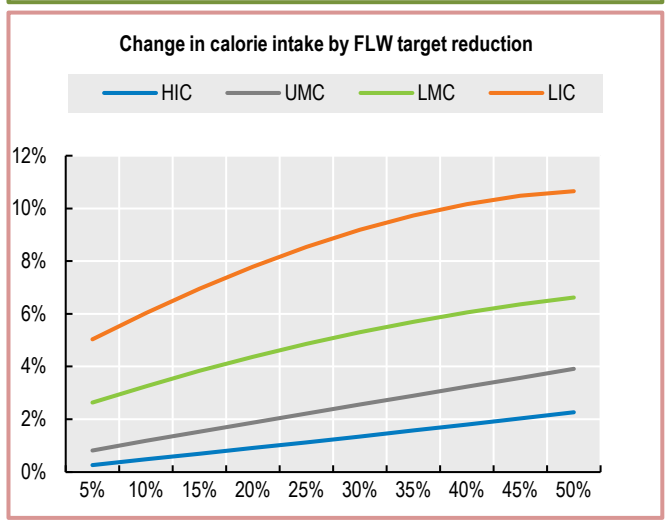
**Better policies can make a difference**

# Triple challenge impacts: per regions



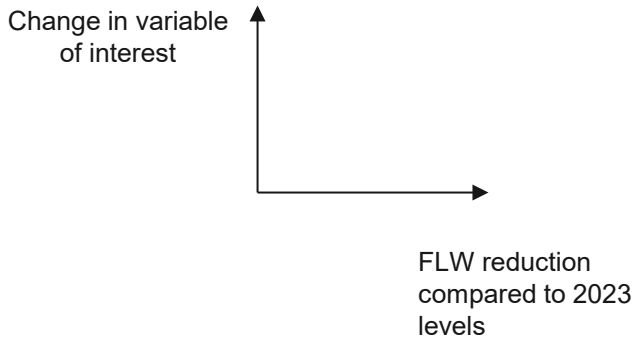



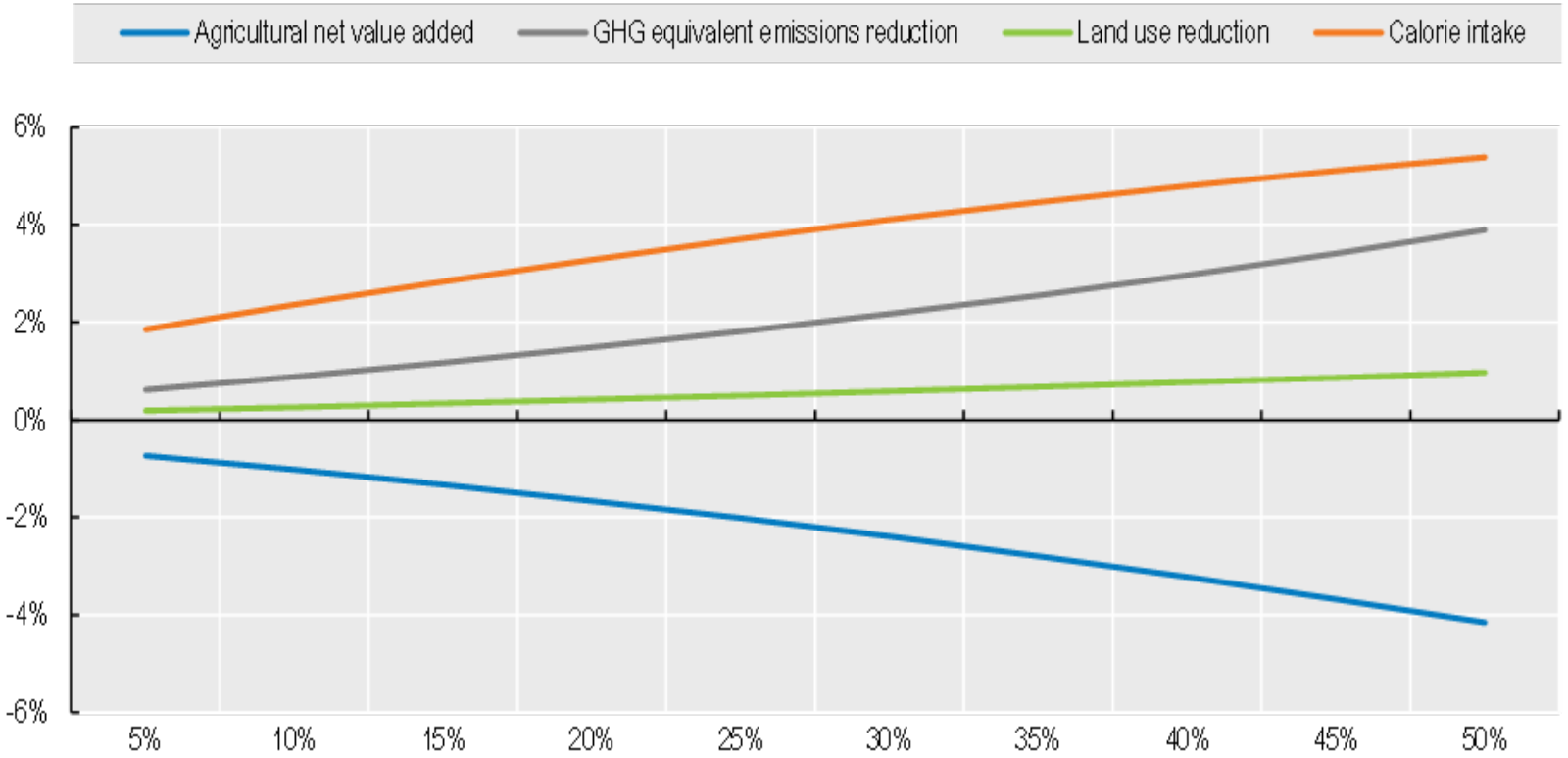

Livelihood challenge: Focus on agricultural income

Sustainability challenge: Focus on GHG emissions and land use

Food security challenge: Focus on calorie intake



# Triple challenge impacts: worldwide

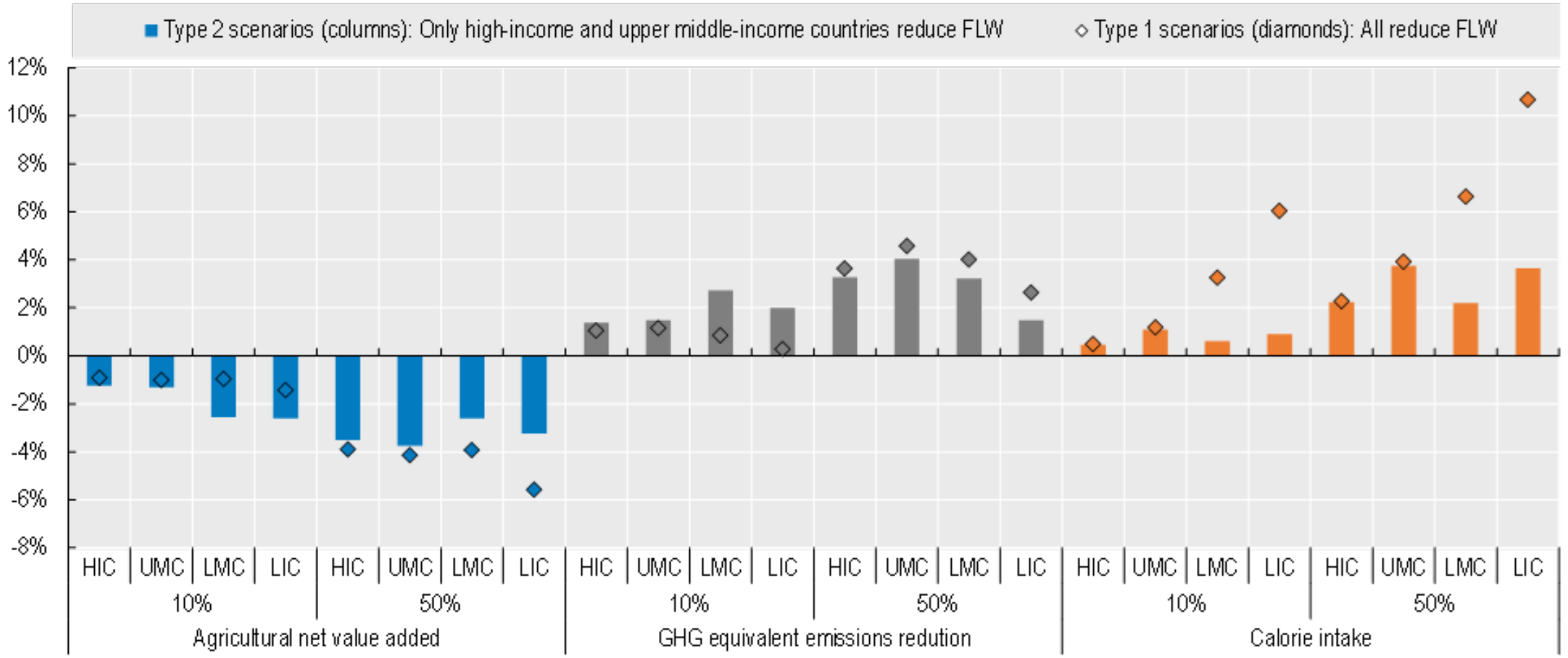



FLW reduction
compared to 2023 levels

Effects on **undernourishment**:

- **10%** FLW reduction → raise **78 million** people out of hunger.
- **50%** FLW reduction → raise **137 million** people out of hunger.

# Triple challenge impacts: only HIC and UMC reduce



# THANK YOU FOR YOUR ATTENTION