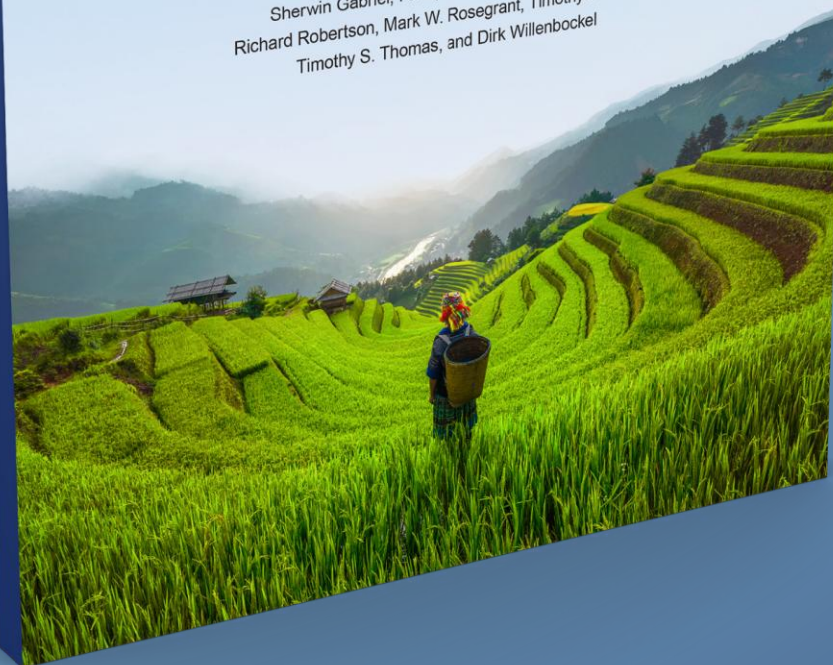




Global Agrifood Systems Outlook to 2050

Keith Wiebe, Nicola Cenacchi, Shahnaila Dunston,
Sherwin Gabriel, Faaiqa Hartley, Abhijeet Mishra,
Richard Robertson, Mark W. Rosegrant, Timothy B. Sulser,
Timothy S. Thomas, and Dirk Willenbockel



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GLOBAL AGRIFOOD SYSTEMS OUTLOOK TO 2050

Informing Decisions for
an Uncertain Future

September 10, 2026

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Evgeniya Anisimova

Media and Digital Engagement Manager, IFPRI

OPENING REMARKS

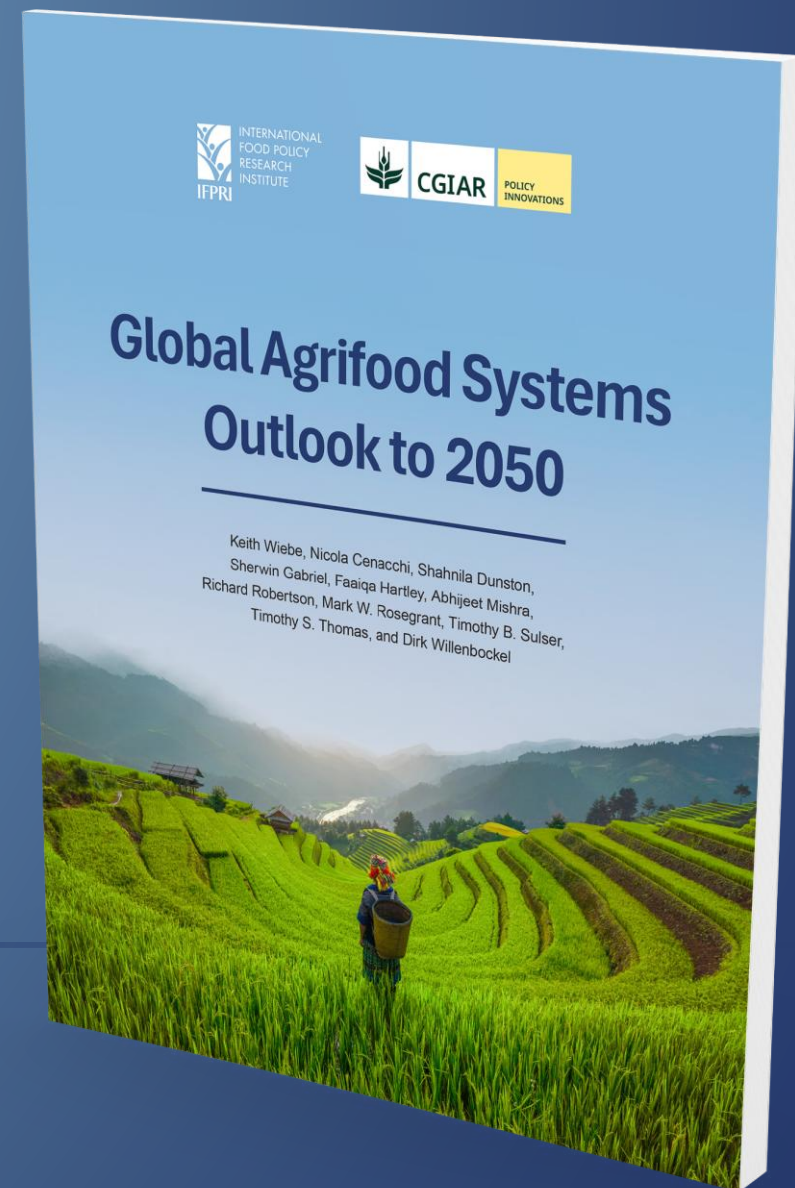
Clemens Breisinger

Director, CGIAR Policy Innovations Science Program

OVERVIEW

Keith Wiebe, Abhijeet Mishra, & Faaiga Hartley

International Food Policy Research Institute

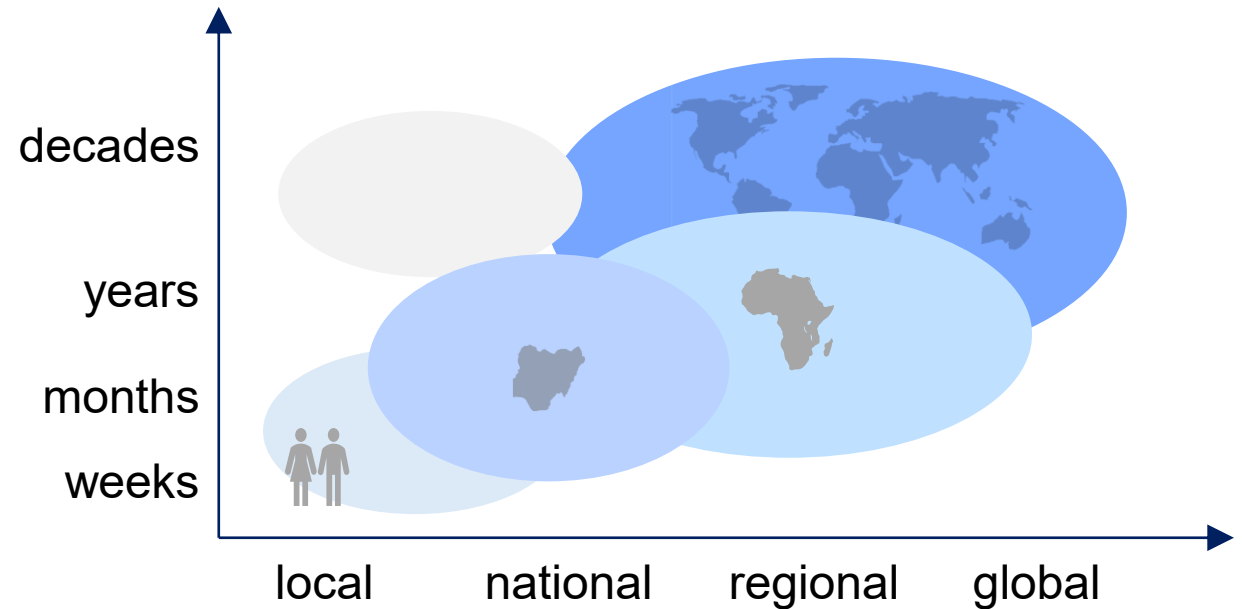


Acknowledgments

This report was prepared under the CGIAR Science Program on Policy Innovations. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund (www.cgiar.org/funders). The report also builds on previous work funded by the CGIAR Research Initiative on Foresight, including contributions and assistance from Tamunotonye Braide, Eleanor Jones, Sherman Robinson, Rowena Valmonte-Santos, and others from IFPRI's Foresight and Policy Modeling Unit. We greatly appreciate reviewer comments received from Arega Alene (IITA), Aminou Arouna (AfricaRice), Shyam Basnet (IRRI), Chin Yee Chan (WorldFish), Dolapo Enahoro (ILRI), Aymen Frija (ICARDA), Sika Gbegbelegbe (IITA), Evelyne Kihui (CIP), Athanasios Petsakos (Bioversity International), Kai Sonder (CIMMYT), Edgar Twine (AfricaRice), Davy Vanham (IWMI), and anonymous reviewers from IFPRI's Publications Review Committee, as well as assistance from Pamela Stedman-Edwards and Jason Chow of IFPRI's communications team in finalizing this report for publication.

Why look to 2050? And why globally?

- The world is complex and uncertain, and agrifood systems are no exception
- Choices we make today (or don't make) can have wide-ranging and long-lasting consequences
- Strategic planning to develop new technologies, build new infrastructure, and educate the next generation need to look beyond the next year, or even the next decade
- This is part of a larger set of analyses to inform policies and investments over a wide range of geographic and time scales



Other outlook reports

There are many sources of information on selected commodities, regions, and topics over the short- to medium-term

But limited information on longer-term agrifood systems concerns at scales relevant for low- and middle-income countries



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Grain freight markets	18
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Markets at a glance

Commodity	Unit	Price	% Chg
WHEAT	metric ton	21.4	18.7
COARSE GRAINS	metric ton	18.7	33.7
SOYBEANS	metric ton	34.1	40.8
CRUDE OIL	barrel	91.2	93.2

WHEAT-FUTURES - CHICAGO BOARD OF TRADE
OPTION AND FUTURES COMBINED POSITIONS AS OF 08/18/2023

Contract	Open Interest	Change
WHEAT	136,121	127,961
COARSE GRAINS	280,643	173,258
SOYBEANS	161,633	4

CHANGES FROM 08/18/26 (CHANGE IN OPEN INTEREST)

WHEAT	9,364	-2,438	-39,984	-38,933	-1,494
COARSE GRAINS	21.8	24.2	38.3	32.7	30.5
SOYBEANS	162	117	156	106	118

PERCENT OF OPEN INTEREST FOR EACH CATEGORY OF T

WHEAT	21.8	24.2	38.3	32.7	30.5
COARSE GRAINS	162	117	156	106	118
SOYBEANS	162	117	156	106	118

WHEAT-FUTURES - CHICAGO BOARD OF TRADE
OPTION AND FUTURES COMBINED POSITIONS AS OF 08/18/2023

Contract	Open Interest	Change
WHEAT	81,764	69,221
COARSE GRAINS	180,448	189,482
SOYBEANS	131,016	2

CHANGES FROM 08/18/26 (CHANGE IN OPEN INTEREST)

WHEAT	8,118	2,438	-22,138	-9,134	2,438
COARSE GRAINS	21.4	18.7	33.7	34.1	40.8
SOYBEANS	91.2	93.2	93.2	93.2	93.2

PERCENT OF OPEN INTEREST FOR EACH CATEGORY OF T

WHEAT	21.4	18.7	33.7	34.1	40.8
COARSE GRAINS	180,448	189,482	131,016	131,016	131,016
SOYBEANS	131,016	131,016	131,016	131,016	131,016

NUMBER OF TRADERS IN EACH CATEGORY (TOTAL TRADERS)

WHEAT	91	68	95	81	102
COARSE GRAINS	222	222	222	222	222
SOYBEANS	222	222	222	222	222

OECD-FAO Agricultural Outlook 2026-2035



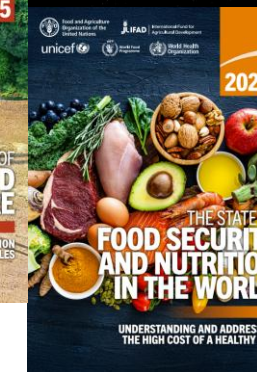
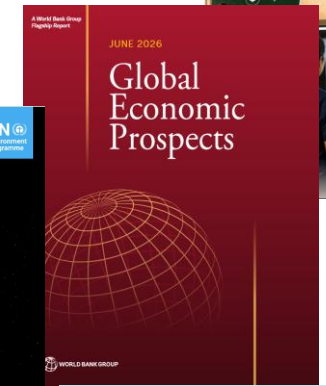
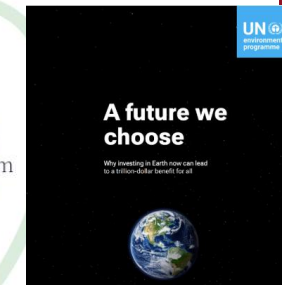
World Agricultural Supply and Demand Estimates

Office of the Chief Economist
Approved by the World Agricultural Outlook Board

WORLD AGRICULTURAL SUPPLY AND DEMAND ESTIMATES
Approved by the World Agricultural Outlook Board

WHEAT: The outlook for 2023/24 U.S. wheat the month for lower supplies, unchanged domestic use and exports, and smaller ending stocks. Supplies are reduced 22 million bushels on lower beginning stocks and production. Production is forecast at 1,206 million bushels, down 7 million bushels from last month. This is the lowest U.S. wheat production since 1970/71. The all wheat pool is at 8.8 bushels per acre, up 0.5 bushels from last month. Winter wheat production is forecast at 1,199 million bushels, down 7 million bushels from last month. The total 2023/24 wheat production forecast from USDA includes other spring wheat in new areas and 475 million bushels on lower harvested area and a decline in total wheat of 17 million bushels on reduced harvested area and yield. Projected 2023/24 ending stocks are reduced 22 million bushels to 722 million and are down 23 percent from last year. The projected 2023/24 average farm price (FAWP) is unchanged at \$6.00 per bushel, compared to last year's final FAWP of \$6.00.

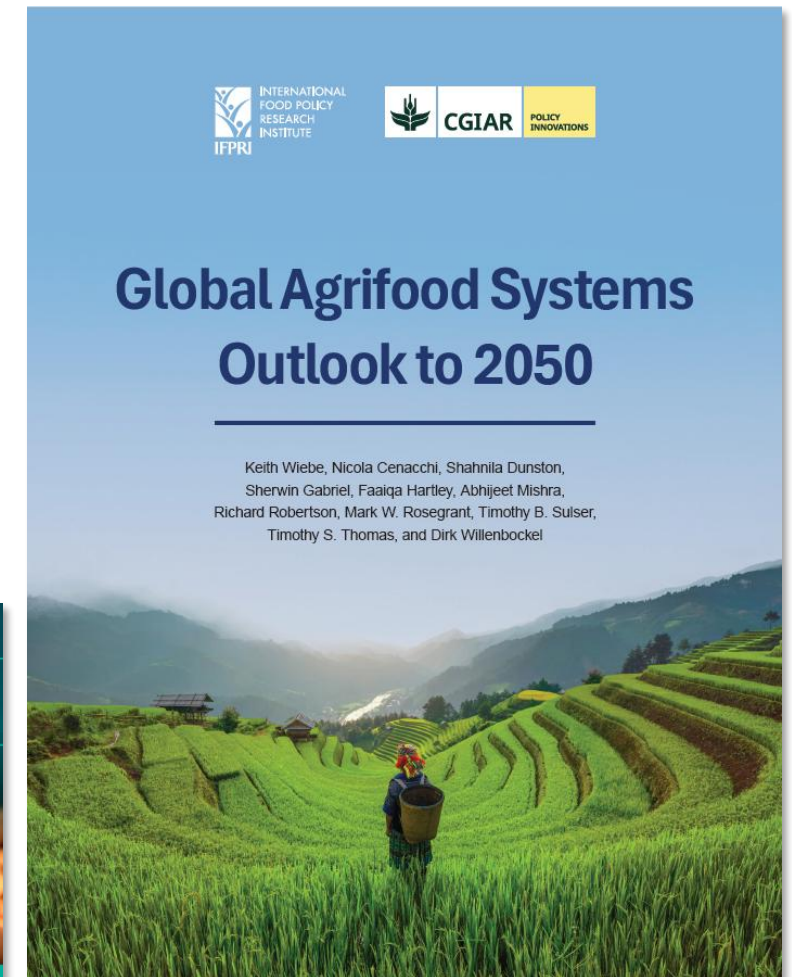
COARSE GRAINS: This month's 2023/24 U.S. corn outlook is for smaller supplies, greater exports, and reduced ending stocks. Supplies are projected down 14 million bushels to 1,081 million, primarily on reduced beginning stocks for smaller supplies and greater exports. Production is forecast for 2023/24 to be 1,081 million bushels, down 14 million bushels from last month. The total 2023/24 corn production forecast from USDA includes other spring wheat in new areas and 475 million bushels on lower harvested area and a decline in total wheat of 17 million bushels on reduced harvested area and yield. Projected 2023/24 ending stocks are reduced 22 million bushels to 722 million and are down 23 percent from last year. The projected 2023/24 average farm price (FAWP) is unchanged at \$6.00 per bushel, compared to last year's final FAWP of \$6.00.



Global Agrifood Systems Outlook to 2050

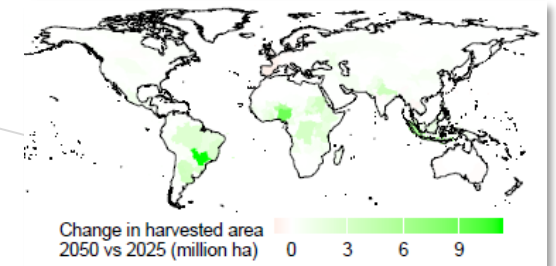
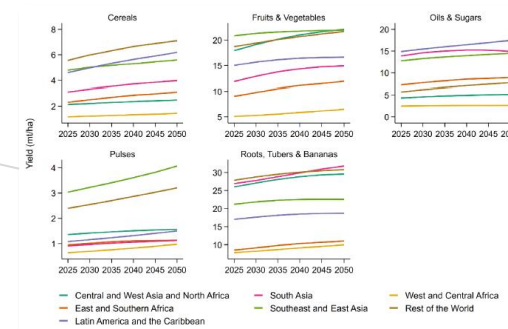
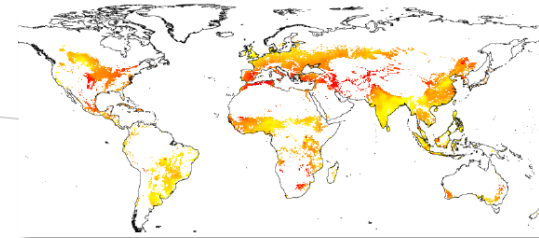
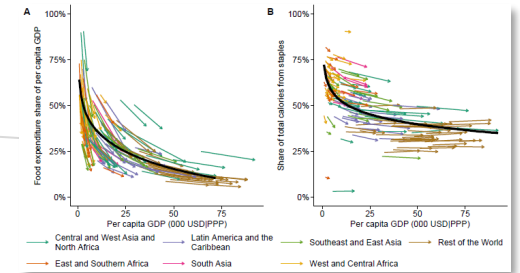
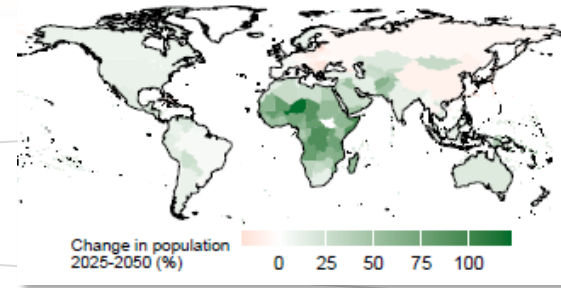


- 1 Introduction and overview: Why this report?
 - 2 Approach
 - 3 Recent agrifood systems trends and future drivers of change
 - 4 Global agrifood systems outlook to 2050 by key indicators
 - 5 Outlook by region
 - 6 Outlook by commodity group
 - 7 Discussion and conclusions
 - 8 References
- Annex** Supplementary information



Megatrends affecting agrifood systems

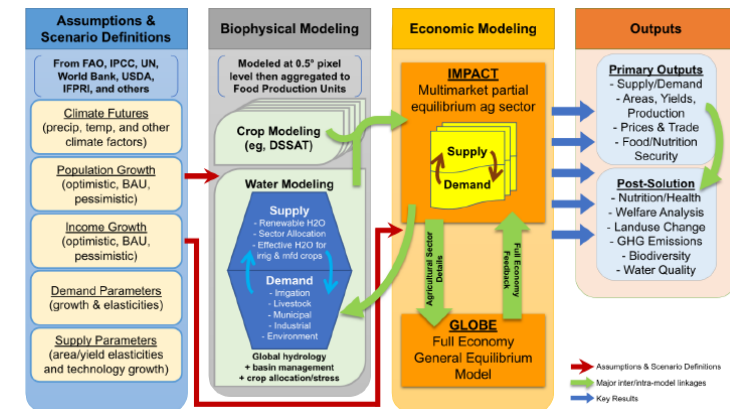
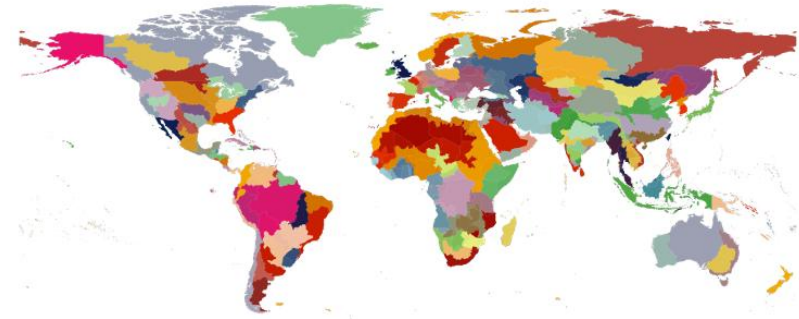
1. demographic trends
2. changing consumption patterns
3. market concentration
4. climate change
5. environmental degradation
6. shifting global health challenges
7. geopolitical instability
8. growing inequalities
9. new technologies and innovations



Source: ISDC 2023

Approach

- IMPACT-GLOBE modeling system
 - climate, water, crops, economics
 - 158 countries and regions
 - 161 water basins
 - 71 agricultural commodities
- 93 scenarios for this analysis
 - population, income, technology, and climate
 - focus on a business-as-usual baseline
 - results presented primarily at regional level
- Projections – not predictions or forecasts



Key findings

- Total global **demand** for food commodities is projected to grow by 25-50%
- Total global **production** will rise to meet demand

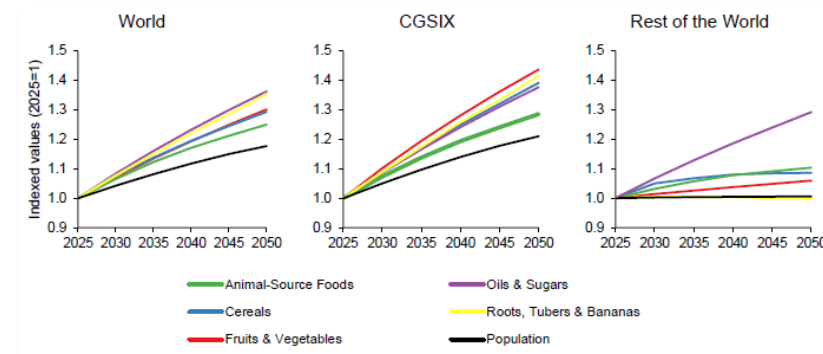
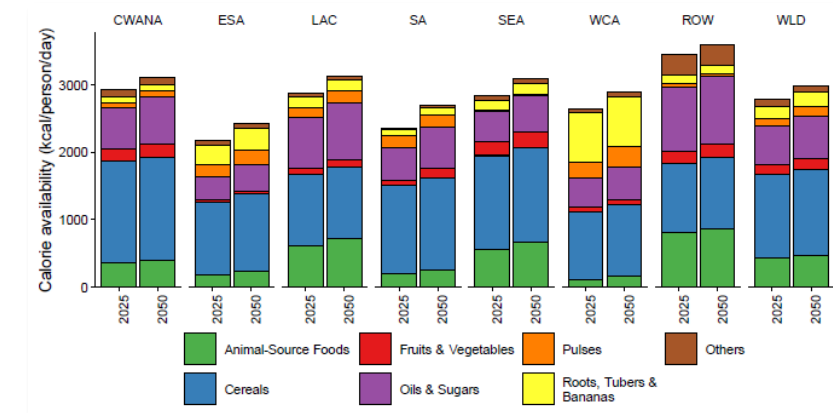
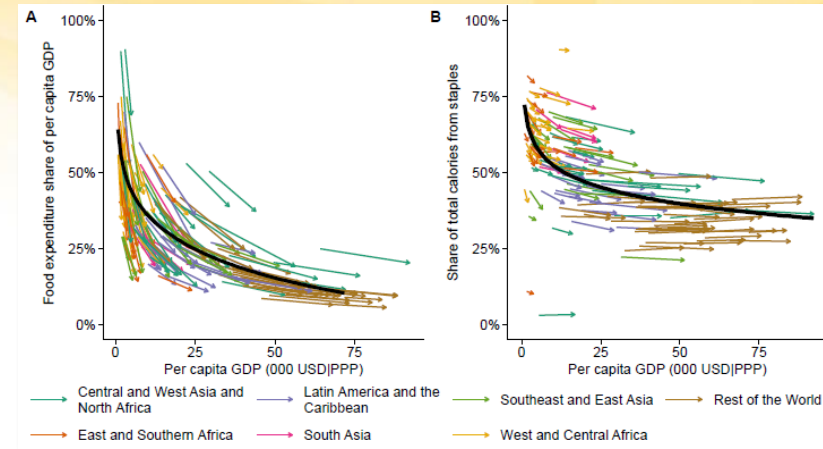
- **Productivity** growth will remain the major source of increased production
- **Climate change** will slow productivity growth
- **Harvested area** will increase most rapidly in Sub-Saharan Africa and Latin America

- Real **prices** of most food commodities are projected to rise
- The CGSIX regions as a group are projected to more than double their net **imports** of cereals, oils and sugars, and pulses
- The share of population at risk of **hunger** will decline

- These outcomes are **not pre-determined**; they depend on choices we make today

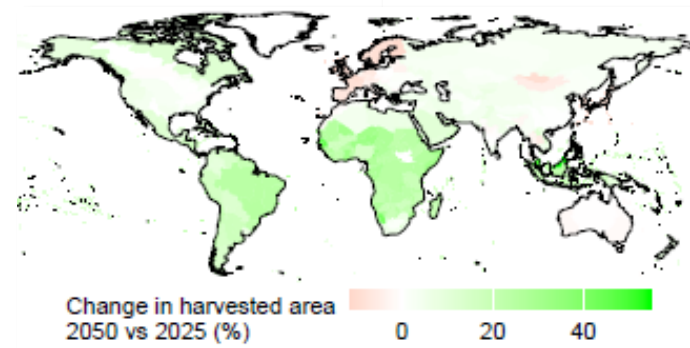
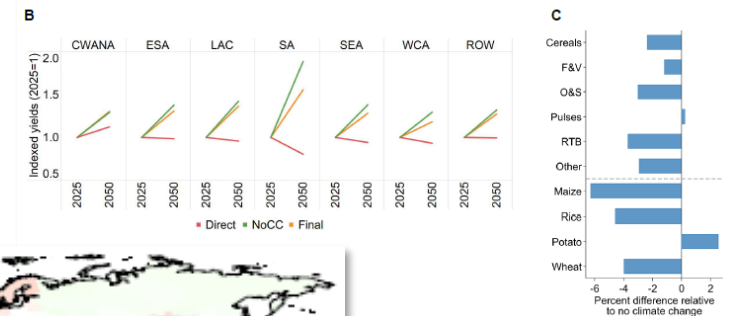
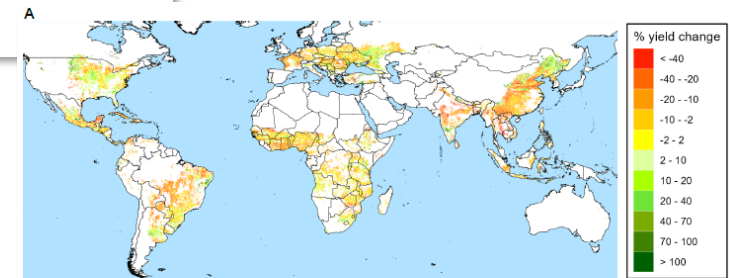
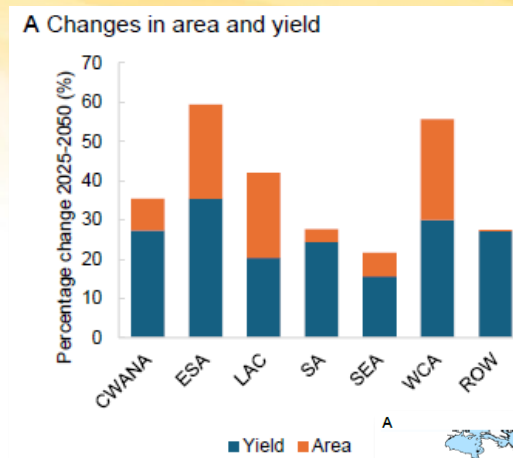
Key findings

- **Total global demand for food commodities is projected to grow by 25-50% over the next 25 years, but patterns vary by commodity and region**
 - Declining share of expenditures on food, and of calories from staples
 - Faster growth in demand for animal-source foods and fruits & vegetables
 - Faster growth in CGSIX regions, leveling off in ROW (except for oils & sugars)
- **Total global production will rise to meet demand, with more than 75% in CGSIX regions, but HICs leading in cereals**



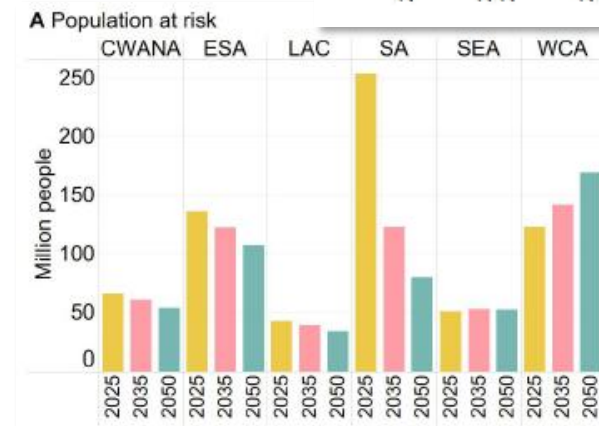
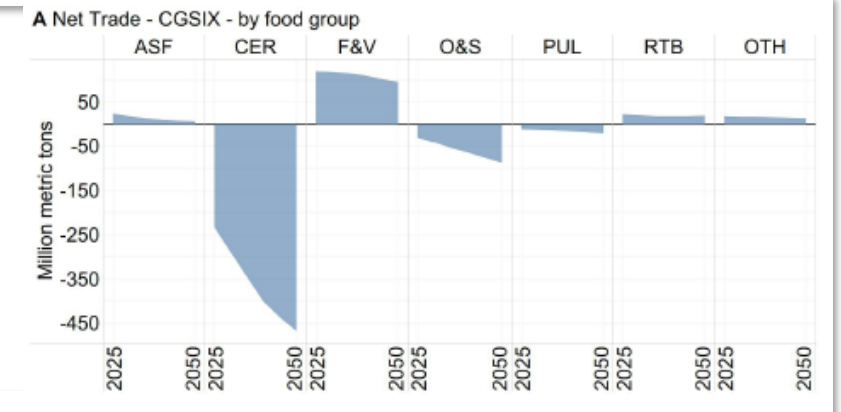
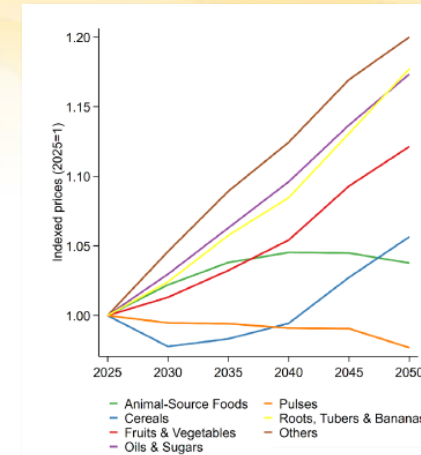
Key findings

- **Productivity growth will remain the major source of increased production** for most commodities and regions
 - Continued area expansion in LAC & SSA
- **Climate change will slow productivity growth** for most (but not all) commodities and regions
 - Widespread potential losses for maize in the absence of technological change
 - Gains for wheat in higher latitudes & elevations
 - Technological gains offset climate impacts to 2050
- **Harvested area will increase most rapidly in SSA and LAC**
 - **Water use** will also increase in most river basins in those regions



Key findings

- **Real prices of most food commodities are projected to rise between 2025 and 2050**
 - Following long-term declines over the past century
- **The CGSIX regions as a group are projected to more than double their net imports of cereals, oils and sugars, and pulses over the next 25 years**
 - Most rapidly in SSA & CWANA
 - LAC and ROW remain net exporters
- **The share of population at risk of hunger will decline, but not enough to meet SDG 2 targets, especially in SSA**
 - Number of hungry still projected to rise in WCA



Key message

- **These outcomes are not pre-determined; they depend on choices we make today**
 - by more than 8 billion consumers and hundreds of millions of producers, processors, traders, and other agrifood system actors
 - by **policymakers and investors**, both within and beyond agrifood systems, affecting R&D, innovation, resource use, markets, trade, diets, nutrition, and health

Thematic highlight: **Productivity and resources**

Abhijeet Mishra, IFPRI

Highlight: Productivity and resources

Production growth will be driven by yield gains

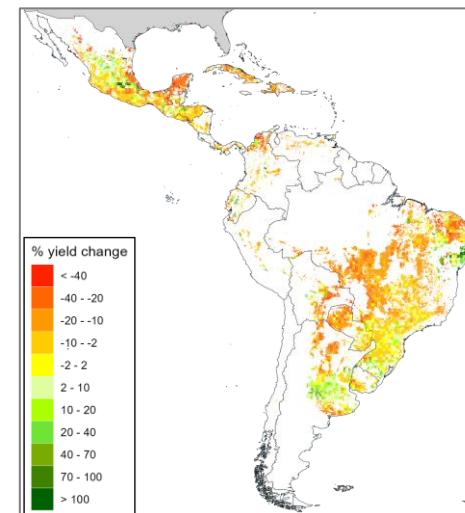
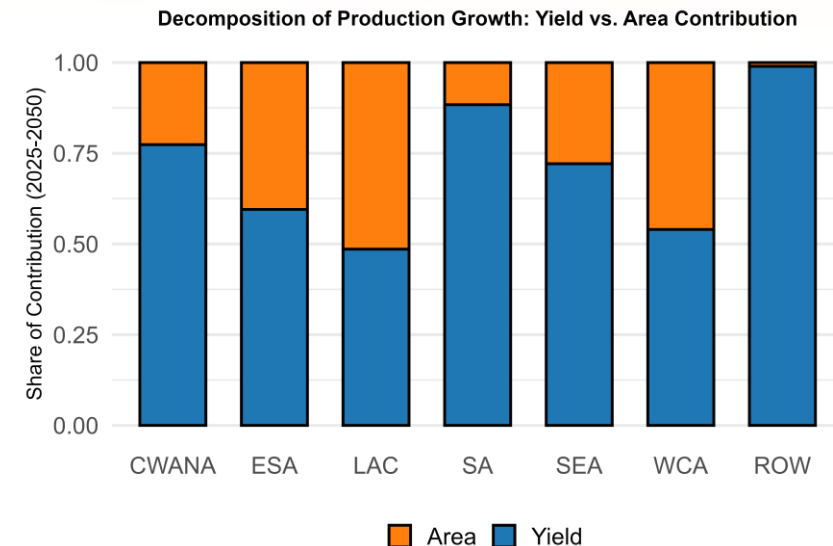
Productivity growth will be the main driver for future increases in production

- Investments in R&D, efficiency gains, soil fertility management
- Regional differences

In Latin America and Sub-Saharan Africa, area expansion will continue to play an important part in increasing production

Yield-driven production growth is generally associated with less pressure to convert new land

- But the 'land-sparing' effect is not automatic
- Complementary governance and land-use policy is needed



Potential impacts of climate change on yields (e.g. rainfed maize)

- Heterogenous
- Overall negative
- Partially offset by technology change & market adjustments

Projected yield growth to 2050

Yield growth rates are positive but expected to slow for most food groups

- Yields increase at a decreasing rate
- Differences across crops and regions

Yield projections are based on

- Expert knowledge of technological innovation
- Impacts of climate change
- Market adjustments to changes in supply & demand

Benefits from CGIAR's strength

- Informed by consultation across CGIAR centers
- Consolidates regional, scientific and commodity expertise
- Domain experts gain insight into how their innovations are likely to play out in the future

These efforts also contribute to leading global agrifood systems modeling, with CGIAR and IFPRI's participation in the Agricultural Model Intercomparison and Improvement Project (AgMIP)



Highlight: Productivity and resources

Pressure on natural resources

Harvested area increases most in Latin America and Sub-Saharan Africa, driven by increasing population, income, and demand

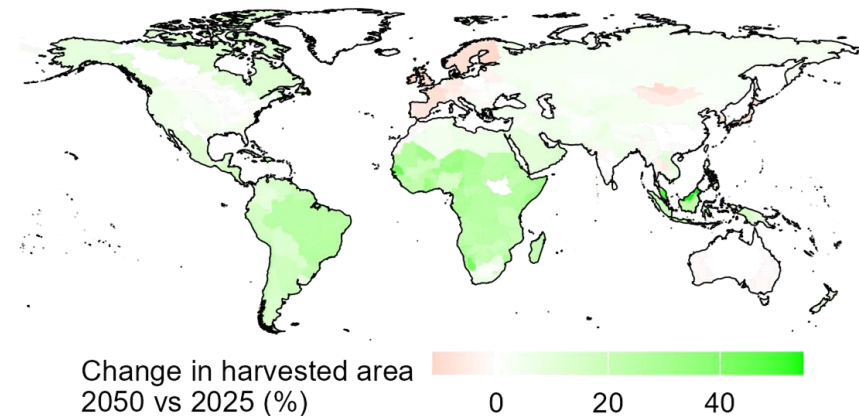
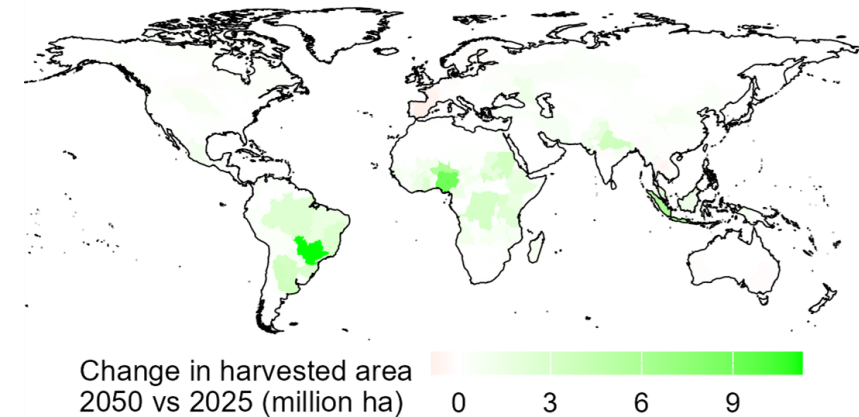
Expansion of cropland mainly driven by:

- *Oils & Sugars*: Latin America, South-East Asia
- *Cereals*: Latin America, Sub-Saharan Africa
- *Roots & Tubers*: West and Central Africa

Land-use pressures are highest in tropical regions, with likely adverse effects on:

- GHG emissions
- biodiversity
- carbon sequestration
- ecosystem services

Water use is also projected to rise in most river basins in these regions



Regional highlight: **Africa**

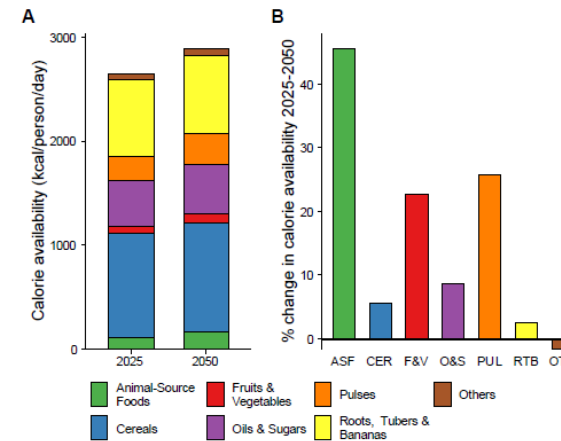
Faaqa Hartley, IFPRI

Progress, but slowed by climate change

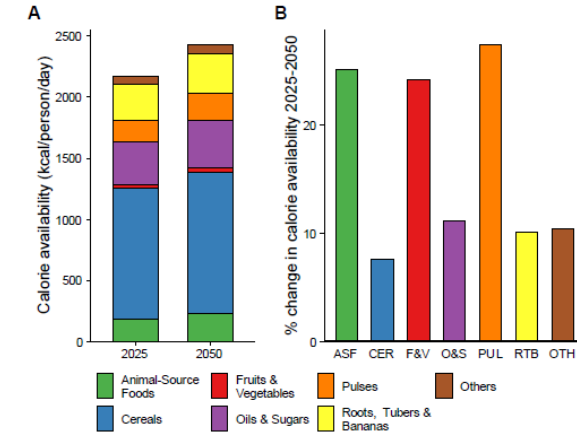
- **Increased diet diversification with share of population at risk of hunger decreasing by 2050**
 - Increased animal-sourced foods, pulses, and fruits and vegetables in diets
 - Number of people at risk of hunger increases, largely driven by WCA
- **Staples, including cereals, remain the largest source of calories**
 - Maize (ESA and WCA), rice (WCA), and wheat (ESA, WCA, and NA)
- **Progress slowed by climate change**
 - Climate change slows yield growth for most crops
 - Potential maize yield losses 20% or higher, reducing gains from technical innovation

West and Central Africa

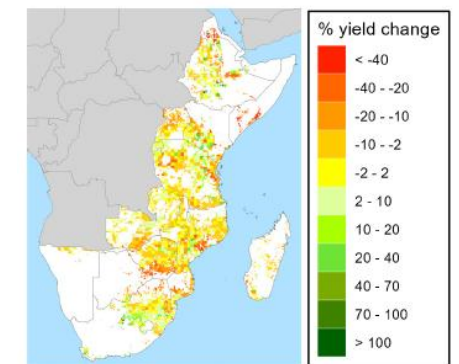
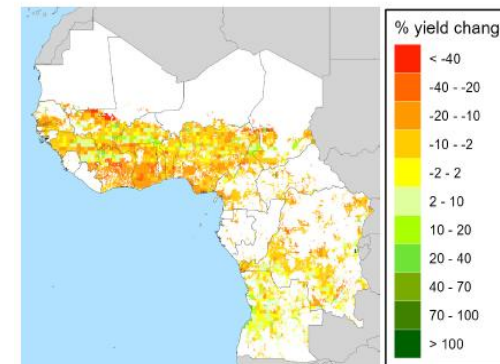
Calorie availability



East and Southern Africa



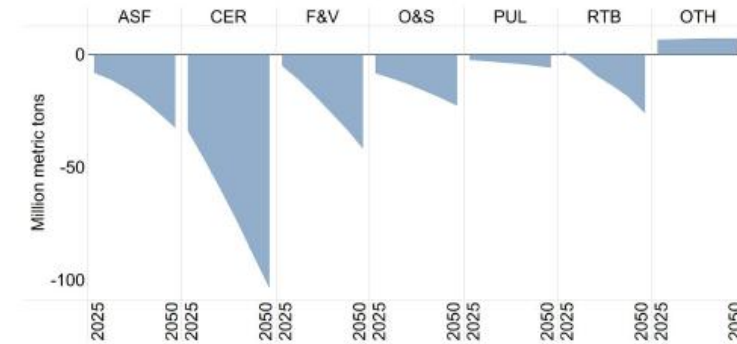
Climate impacts on rainfed maize yields in absence of changes in technology, management practices and market adjustments



Increasing dependence on imports

- **Growth in demand is, however, expected to exceed production...**
 - Demand driven by population and income
 - Production constrained by low yields, climate change, and water stress
- **... leading to increased import dependence and rising vulnerability to trade disruptions**
 - Net cereal import volumes ≥ 3 times higher by 2050
 - Value increases compounded by rising cereals prices driven by food and feed demand
- **Implications for policies and investment**
 - Investment in R&D to improve yields
 - Policies and infrastructure investments to facilitate trade (including intra-regional)
 - Increasing resilience in trade

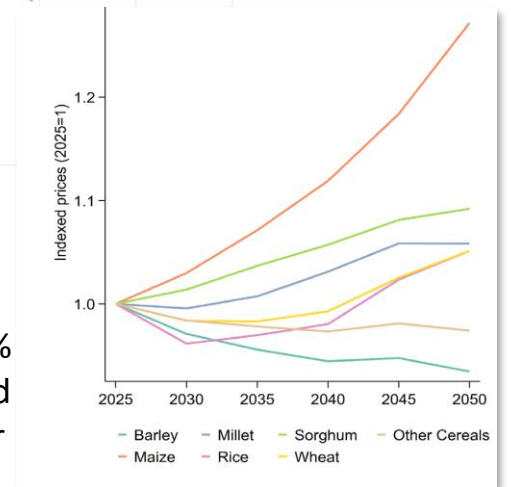
West and Central Africa



East and Southern Africa



Global maize prices 27% higher by 2050, rice and wheat prices 5% higher





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Caveats and future work

More work is needed to explore important aspects that could not be included in this report

These include other aspects of demographic change (such as aging and migration), technological change (including digital innovation and AI), economic well-being (including poverty and equity), nutrition (including overweight and obesity), social inclusion (including gender and youth), environment (including biodiversity, resource degradation, competition for land, and updated water data), climate change (including variability, extreme events, and impacts on livestock productivity), and geopolitical instability (including conflict and trade disruptions).

More work is needed to explore how agrifood systems outcomes might evolve under alternative policy and investment scenarios

Other work in progress in the Policy & Innovations Science Program and IFPRI's Foresight and Policy Modeling Unit includes country-level modeling, a report on R&D investments & opportunities, and a report on the outlook for animal-source foods

PANEL DISCUSSION

Rob Bertram

Chief Scientist, Food Security Leadership Council

Valeria Piñeiro

Director Technical Cooperation, Inter-American Institute for Cooperation on Agriculture (IICA)

Elisabetta Gotor

Director, Land Resource Economics Unit, and Program Leader, Performance, Innovation and Strategic Analysis for Impact, Alliance of Bioversity and CIAT

Q & A

CLOSING REMARKS

James Thurlow

Director, Foresight and Policy Modeling Unit, IFPRI

Thank you

For more information

<https://www.ifpri.org/ifpri-book/global-agrifood-systems-outlook-to-2050/>

<https://hdl.handle.net/10568/185223>

