

# IMPACT v3.2 Projections

A selection of scenario results based on the IPCC's 5<sup>th</sup> Assessment report

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IFPRI



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



The Agricultural  
Model Intercomparison  
and Improvement Project

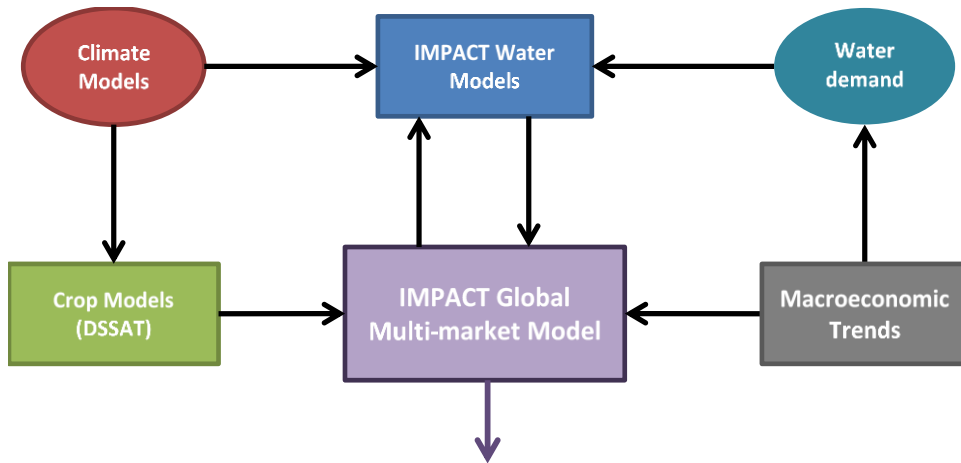


INTERNATIONAL  
FOOD POLICY  
RESEARCH  
INSTITUTE

A member of the CGIAR Consortium

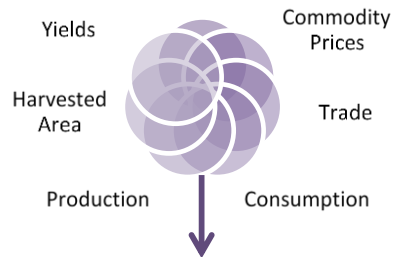


# The IMPACT system of models



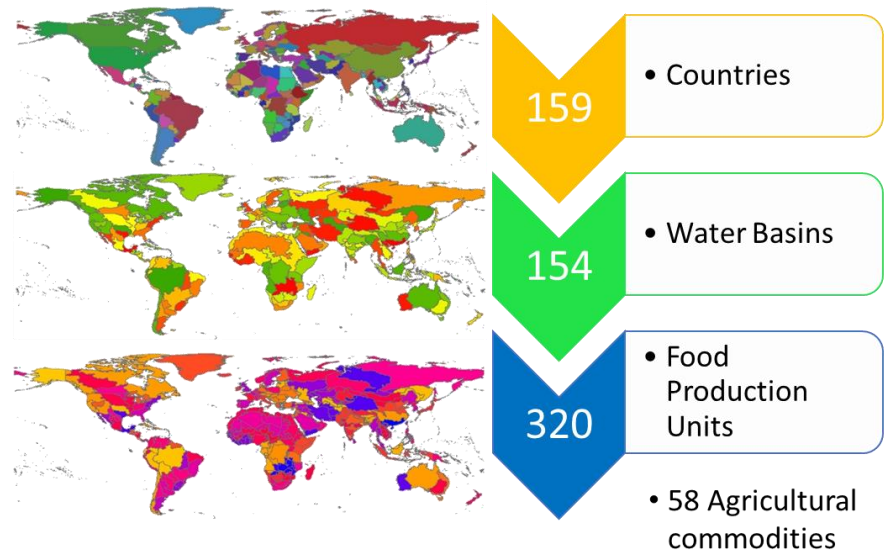
- Complete recoding of IMPACT
- Disaggregation geographically and by commodity
- Improved water & crop models
- New data management system
- Modular framework

Outputs :

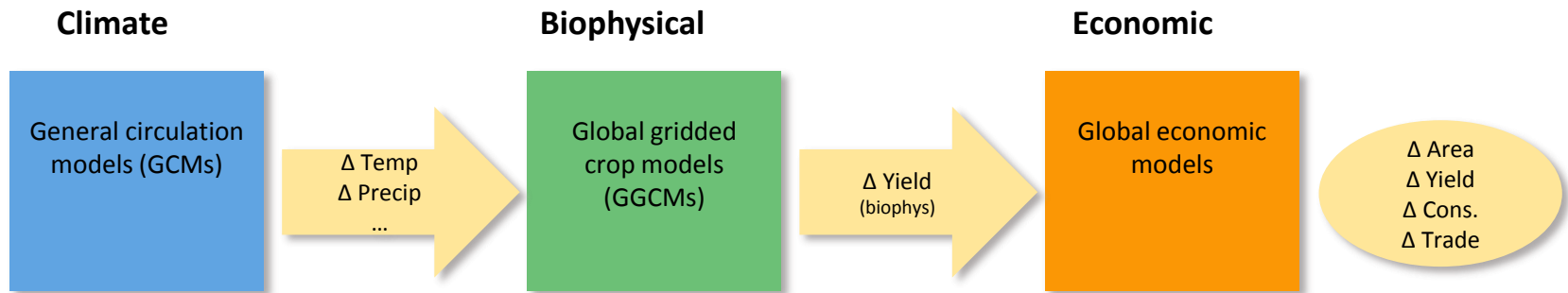


Post-solution Models

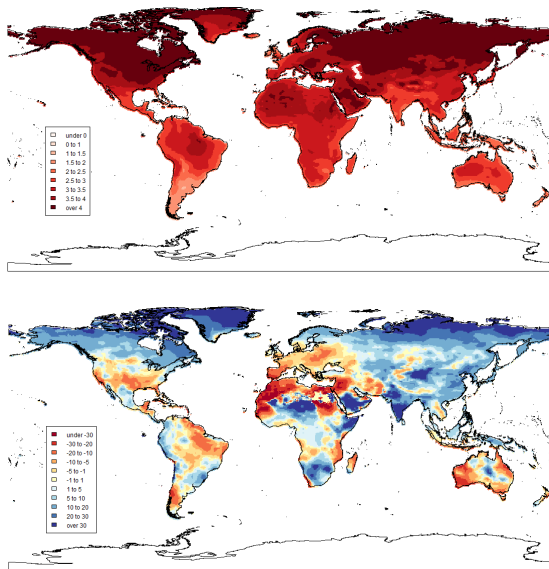
Nutrition and Health  
Welfare Analysis  
Benefit-Cost Analysis  
CGE Models  
Land-use



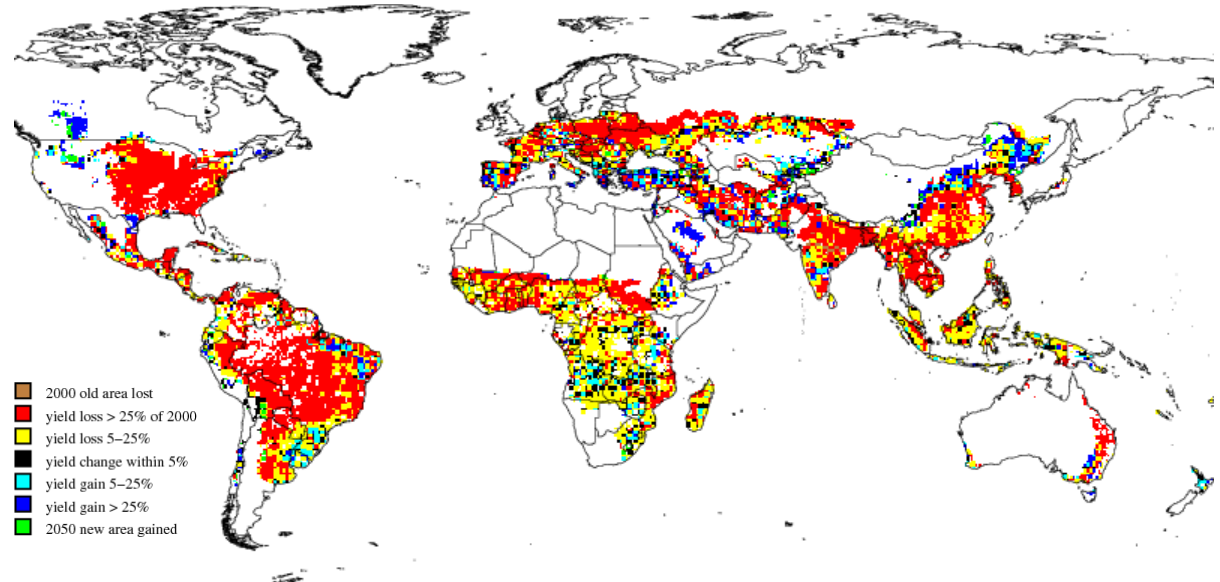
# Modeling climate impacts on agriculture: biophysical and economic effects



Source: Nelson et al., *PNAS* (2014)



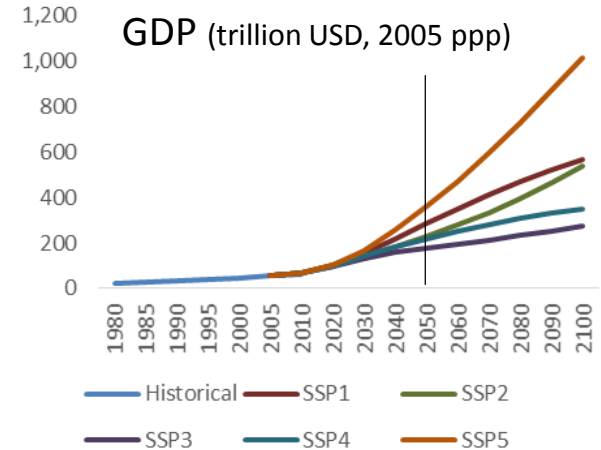
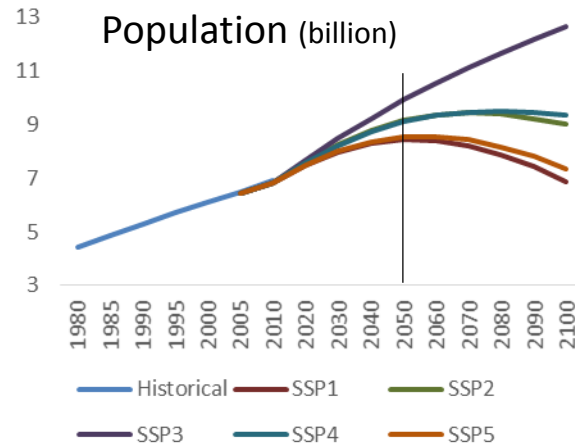
Source: HadGem RCP 8.5



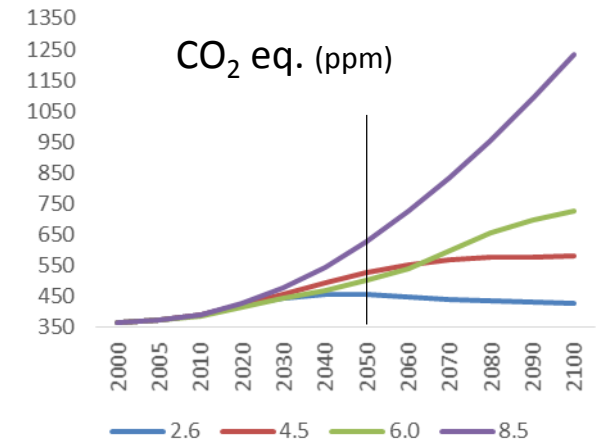
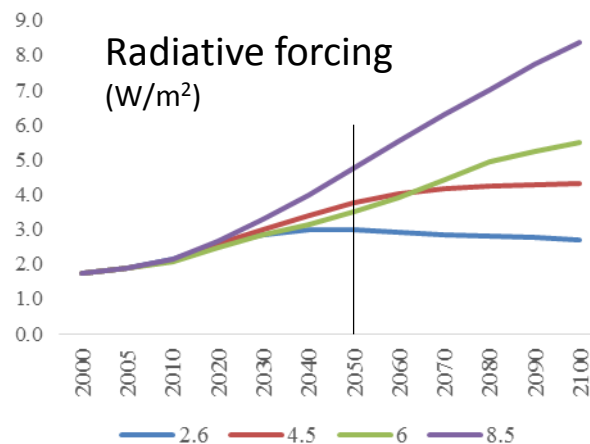
Source: IFPRI DSSAT Maize simulation

# Socioeconomic and climate drivers

Shared  
Socioeconomic  
Pathways (SSPs)



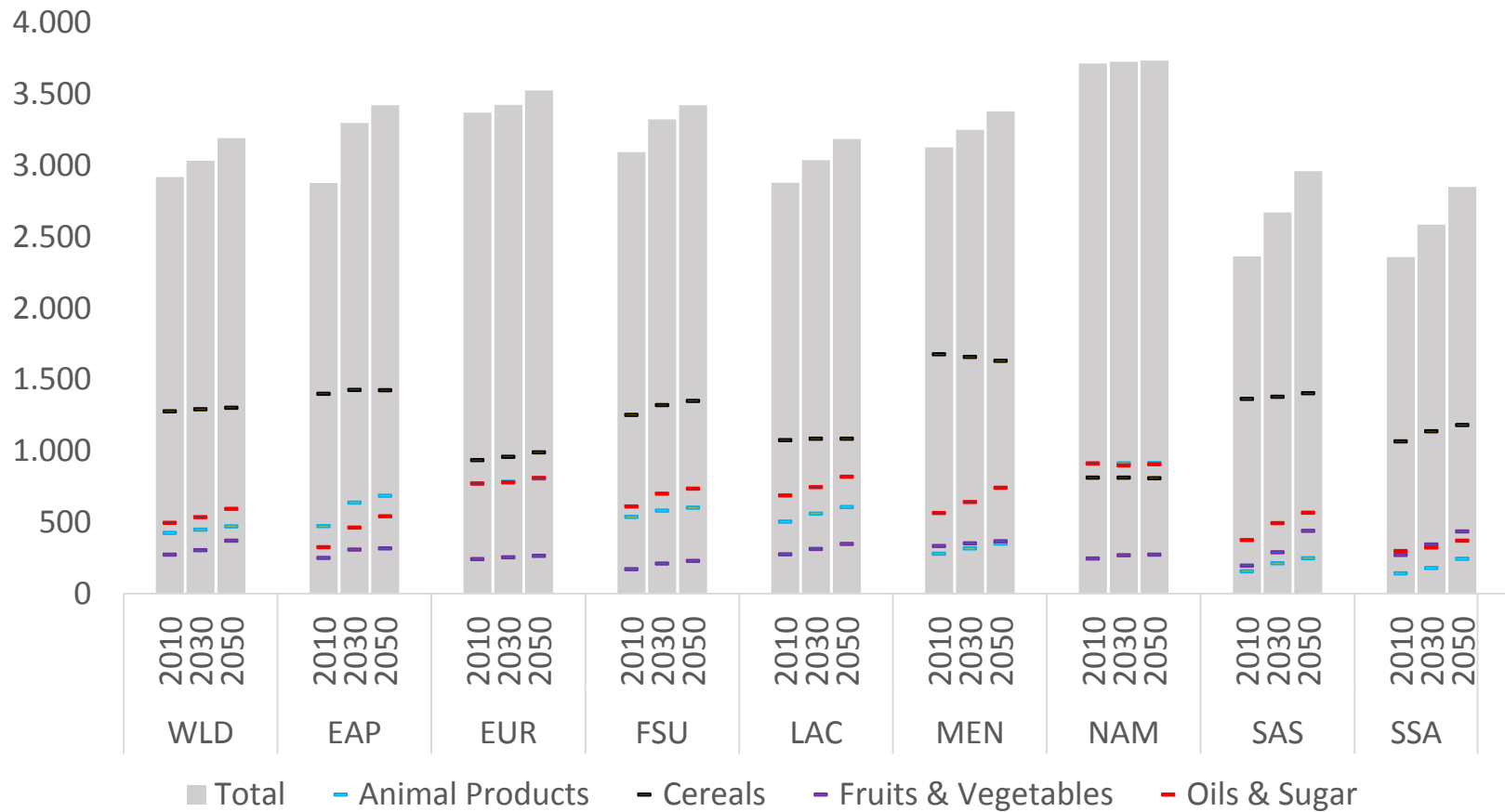
Representative  
Concentration  
Pathways (RCPs)



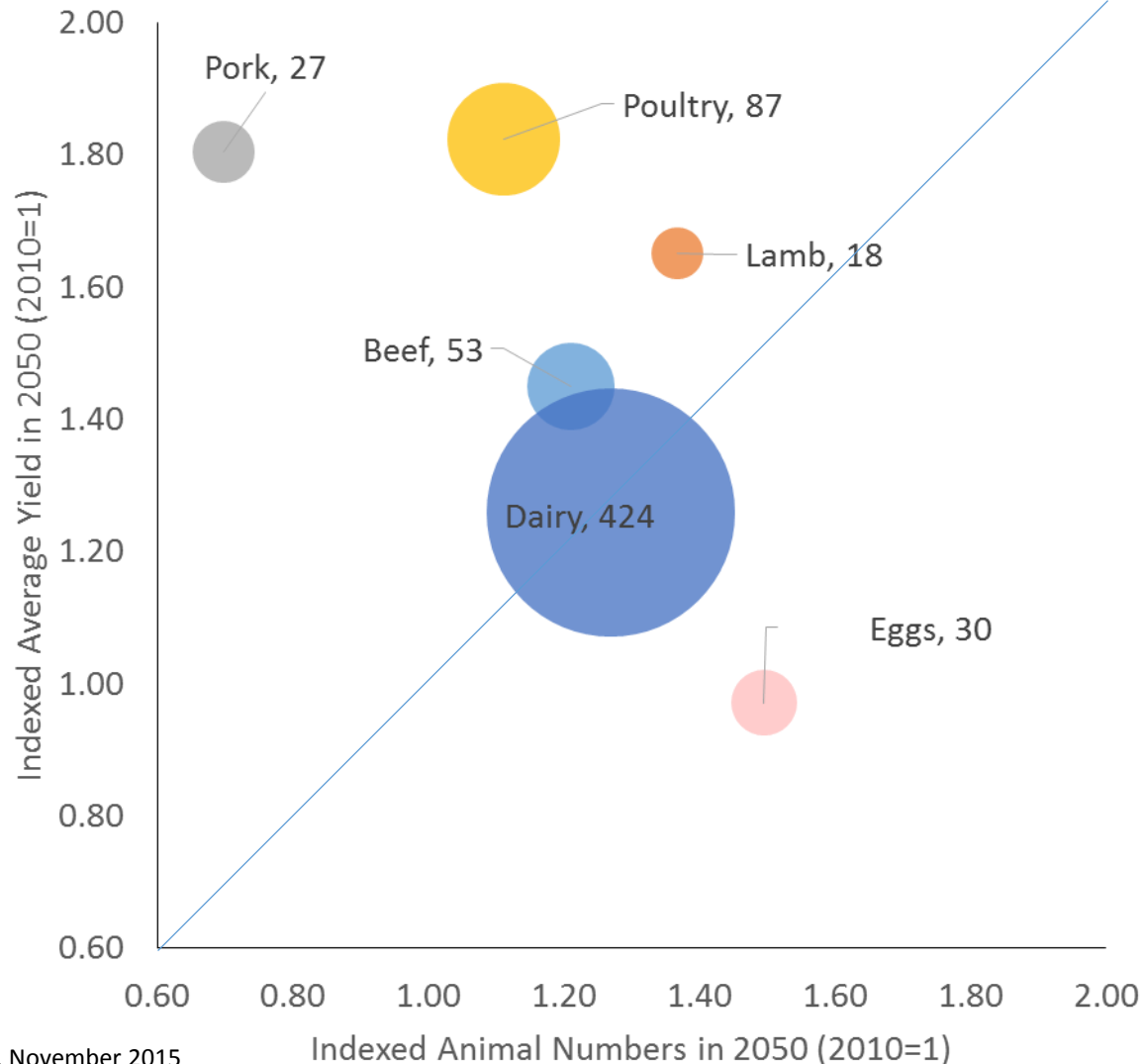
# IMPACT model results

- **Yields** – sources of growth, climate effects by commodity and region
- **Prices** – comparing socioeconomic and climate effects
- **Total demand** – comparing commodities
- **Per-capita food demand** – by commodity and region
- **Composition of demand** – by commodity and region
- **Net trade** – by commodity and region
- **Food security** – by region

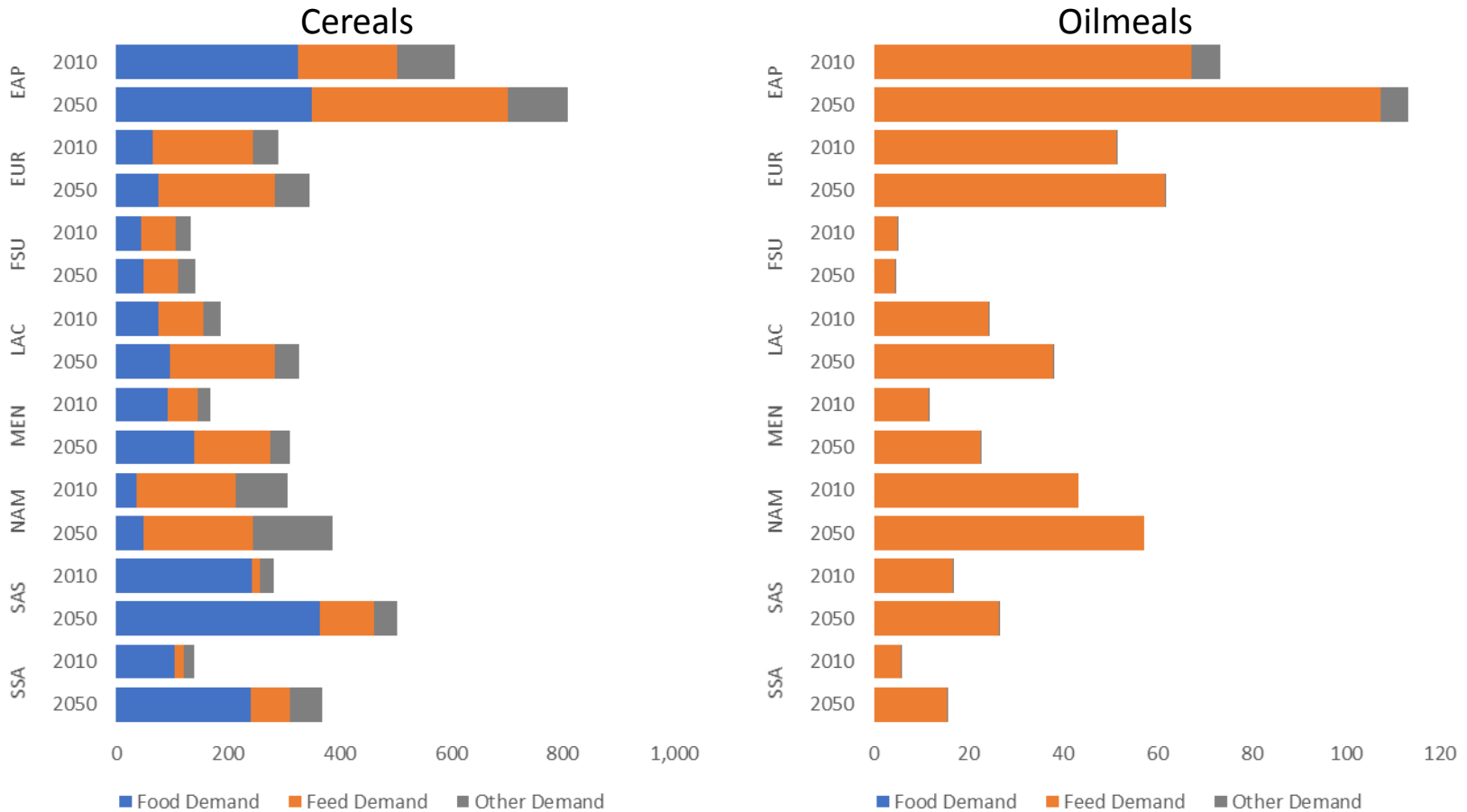
# Changing diets, by region (SSP2, kcal/person/day)



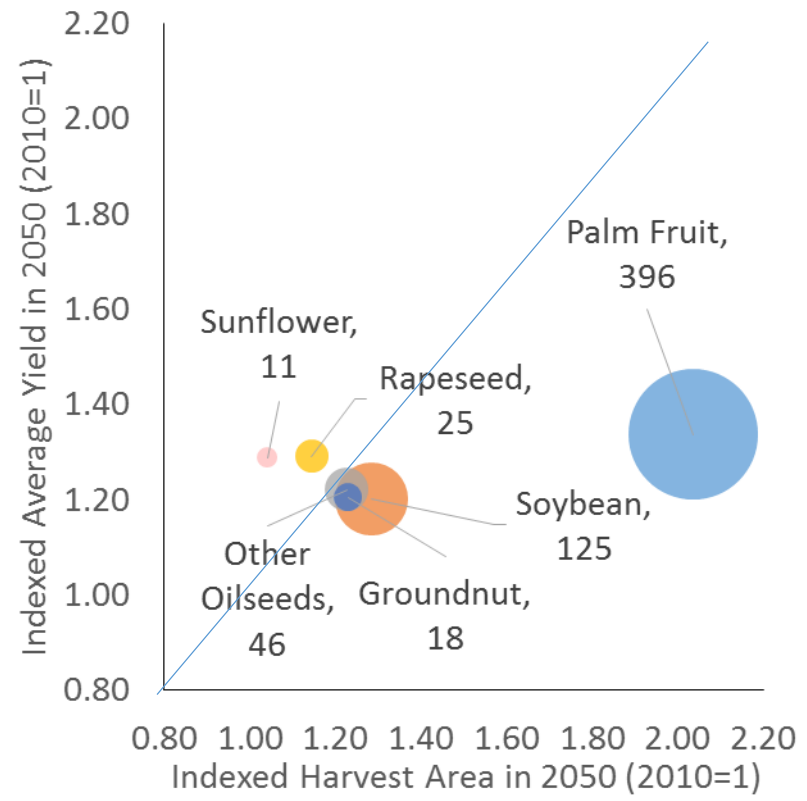
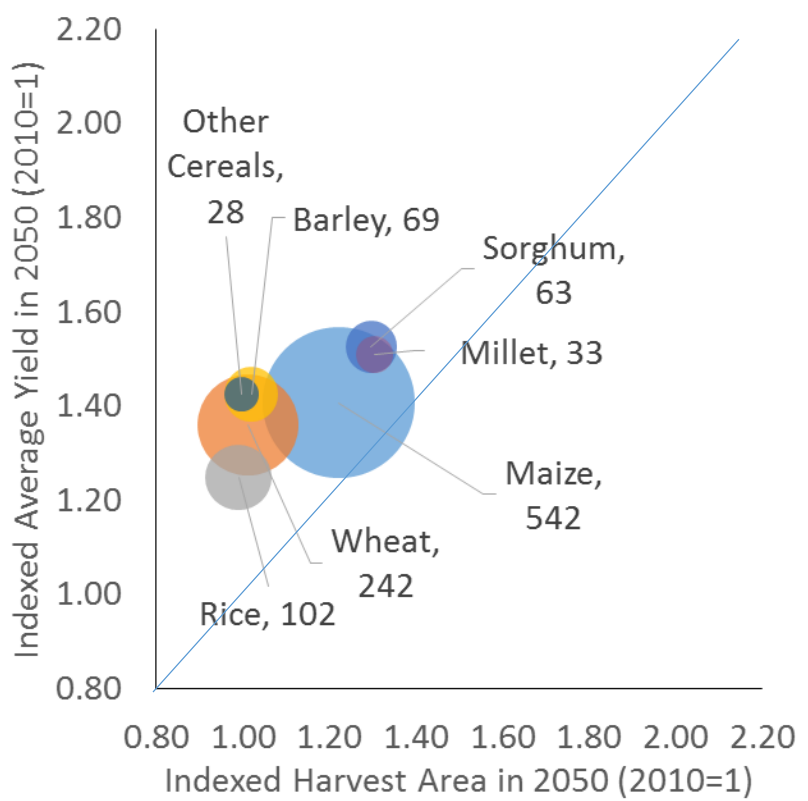
# Decomposition of global supply growth of animal products (SSP2, NoCC)



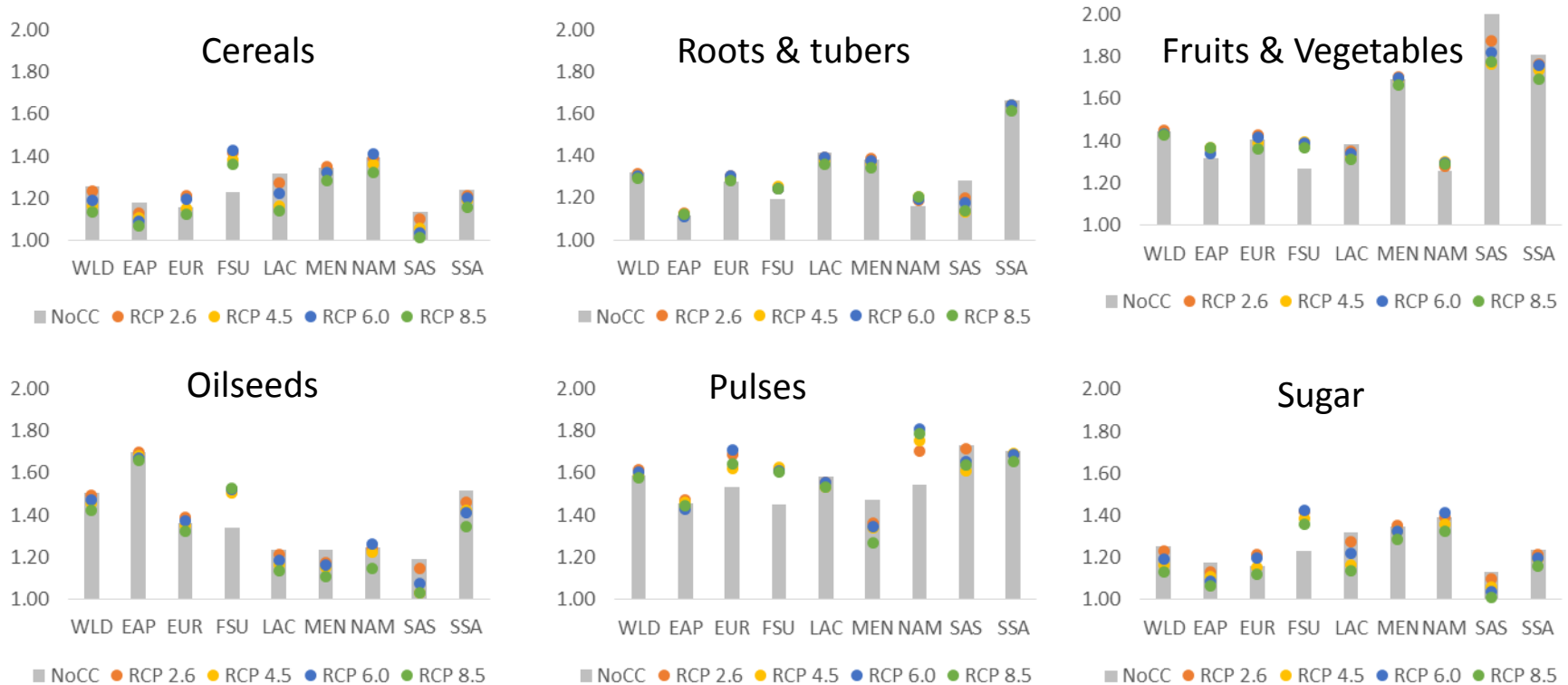
# Decomposition of changing demand for cereals and oilmeals (SSP2, NoCC)



# Decomposition of global supply growth in cereal and oilseeds (SSP2, NoCC)

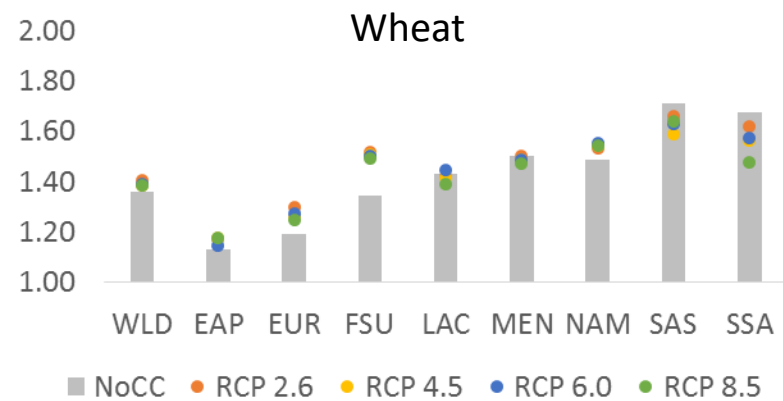
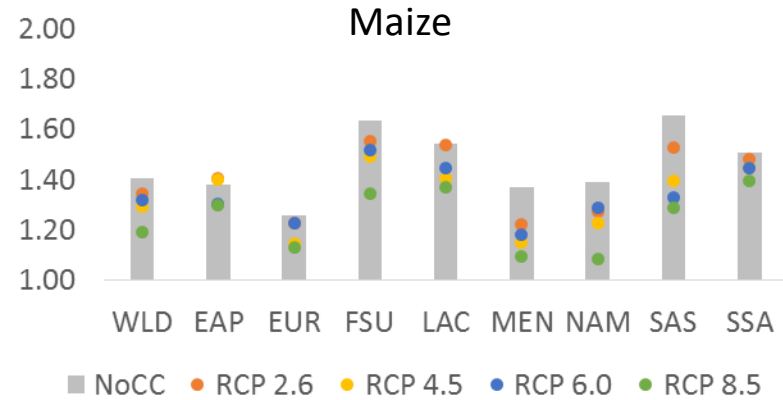
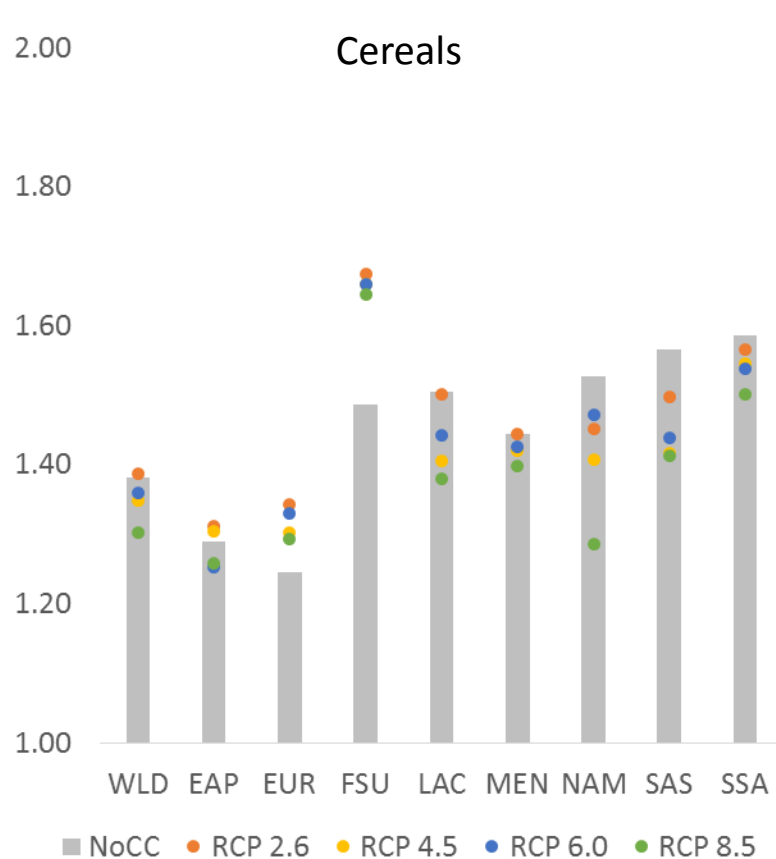


# Climate impacts on yield effect, by region (SSP2)



WLD = World; EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean; MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa;

# Comparing maize and wheat climate yield impacts, by region (SSP2)



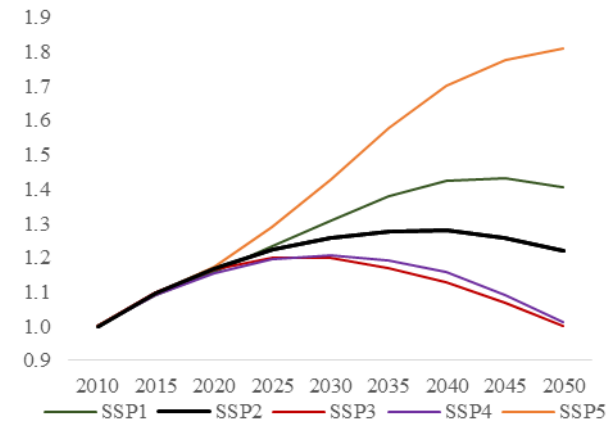
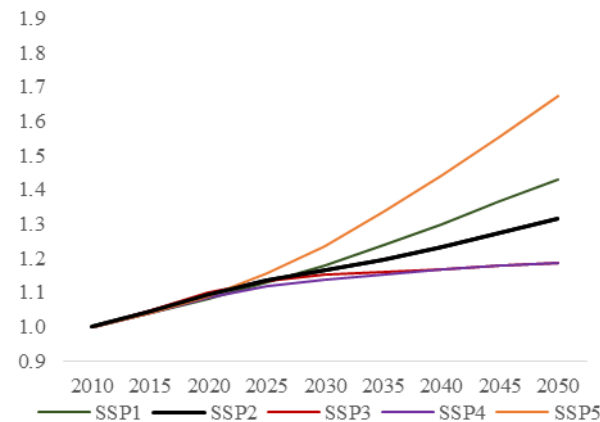
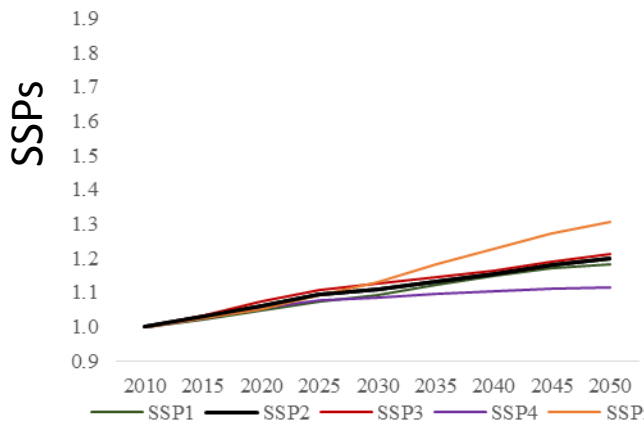
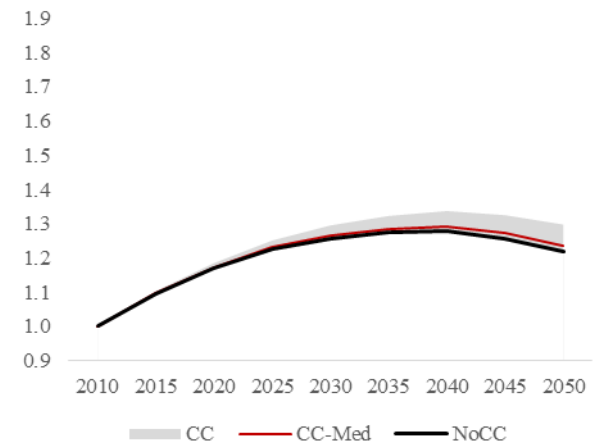
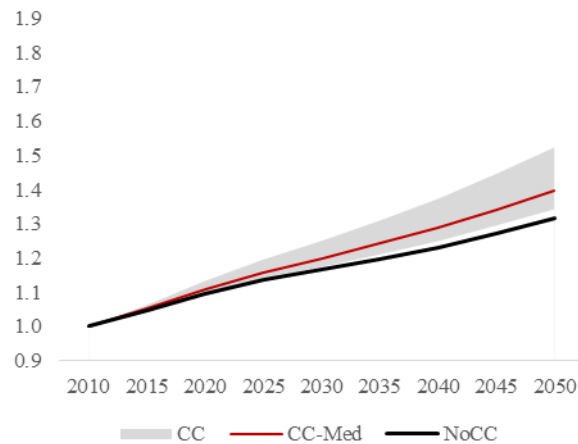
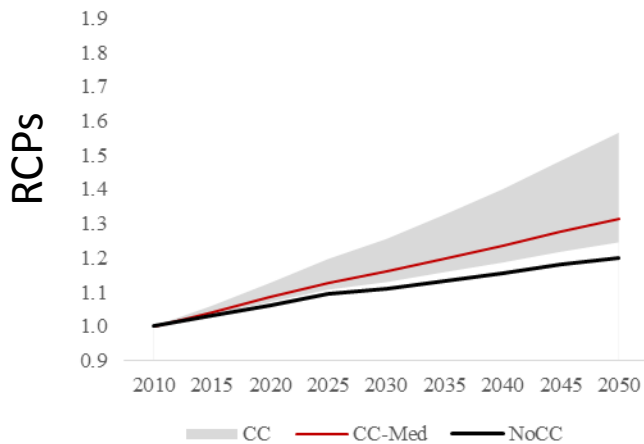
WLD = World; EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean; MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa;

# Price effects of socioeconomic and climate drivers

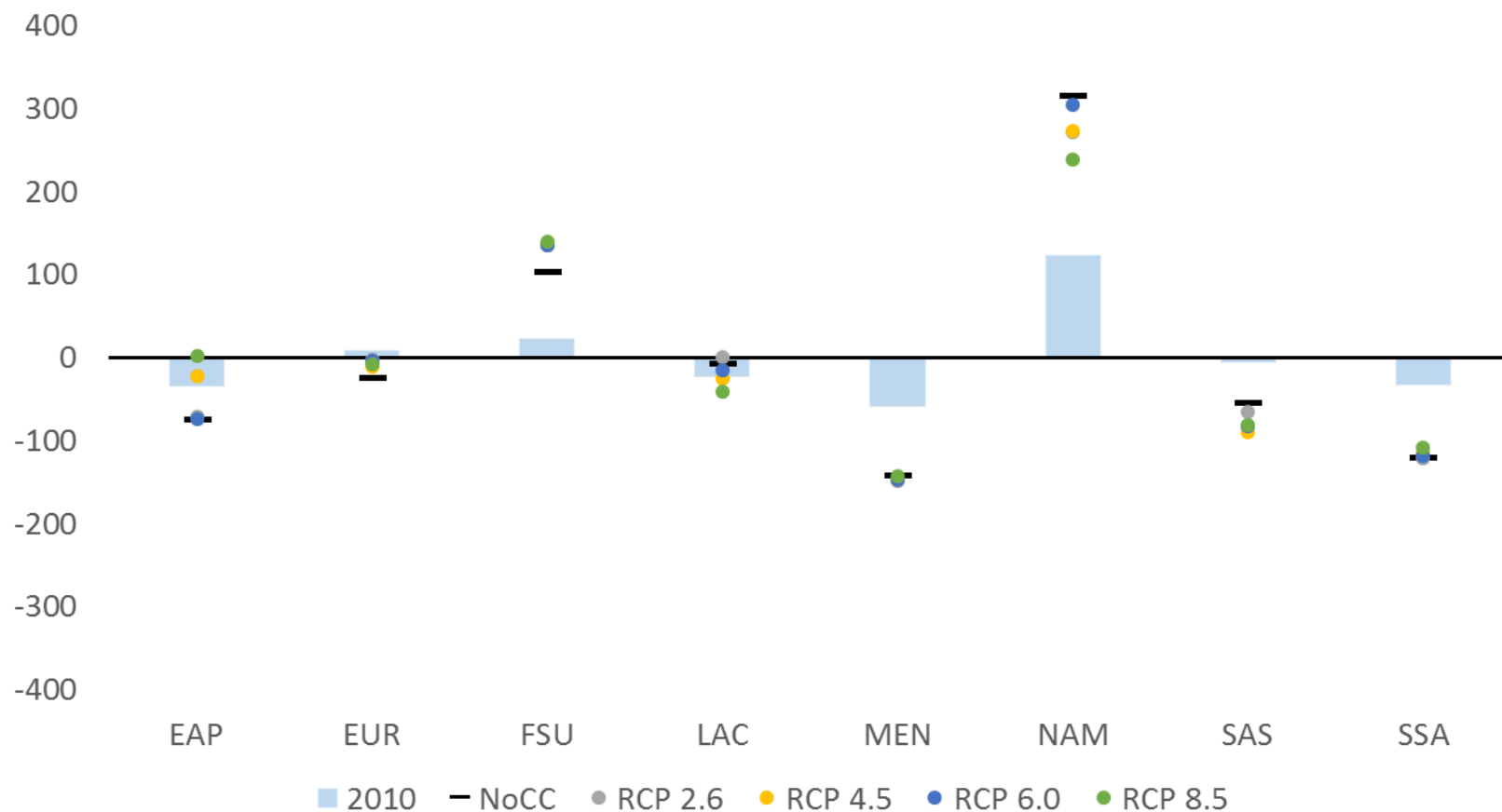
Cereals

Fruits & vegetables

Meat

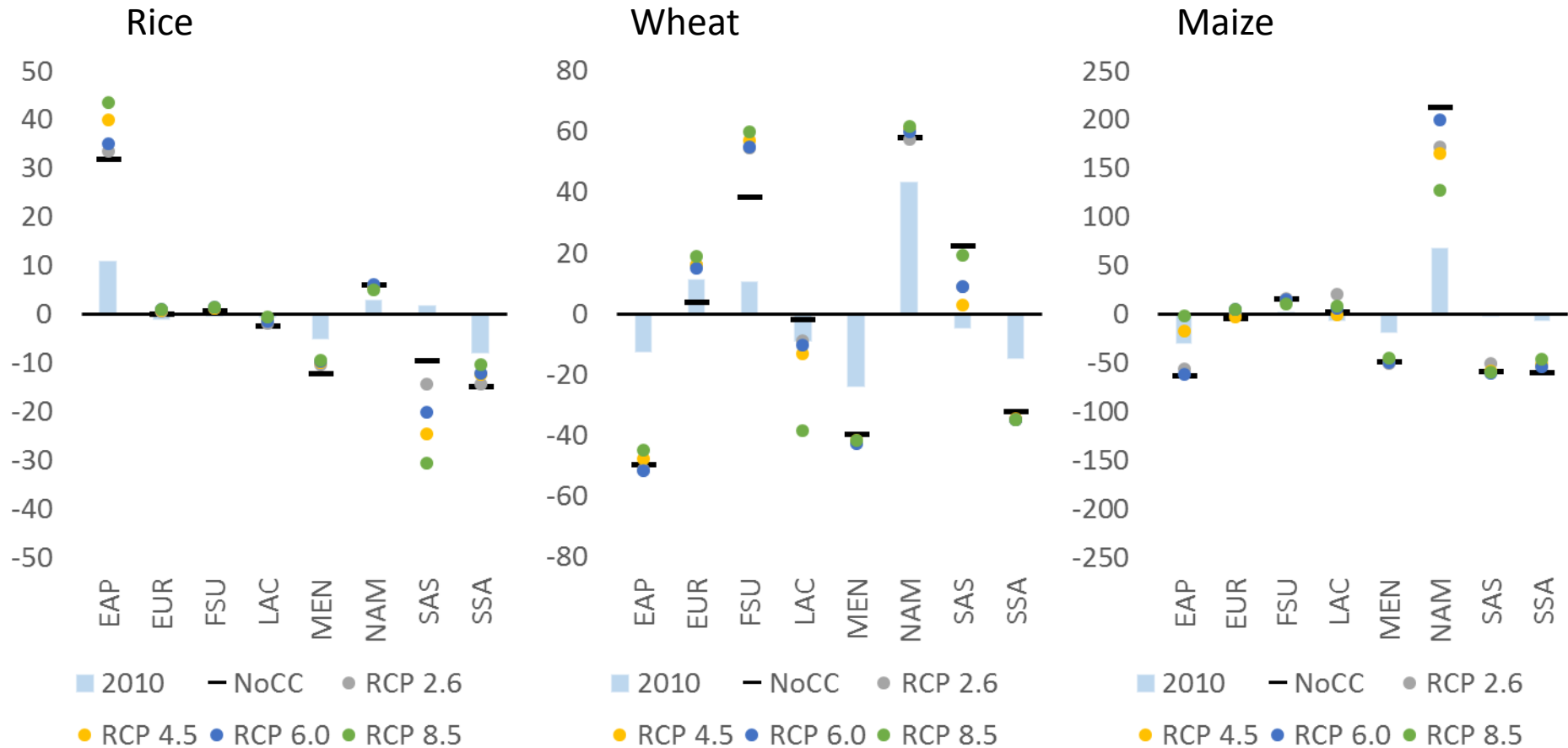


# Net trade in Cereals (mmt, SSP2)



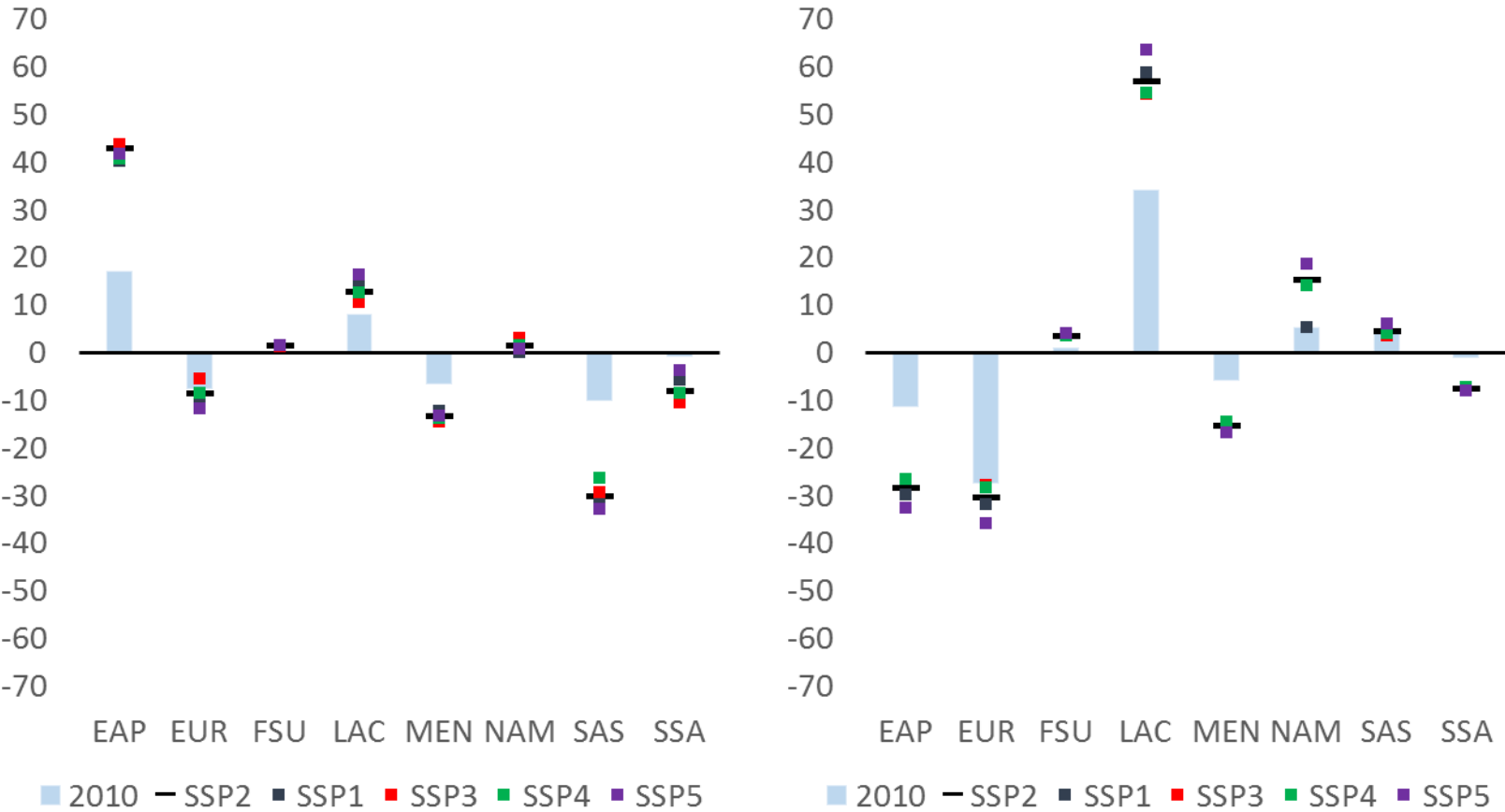
EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean  
 MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa

# Net trade in select cereals(mmt, SSP2)



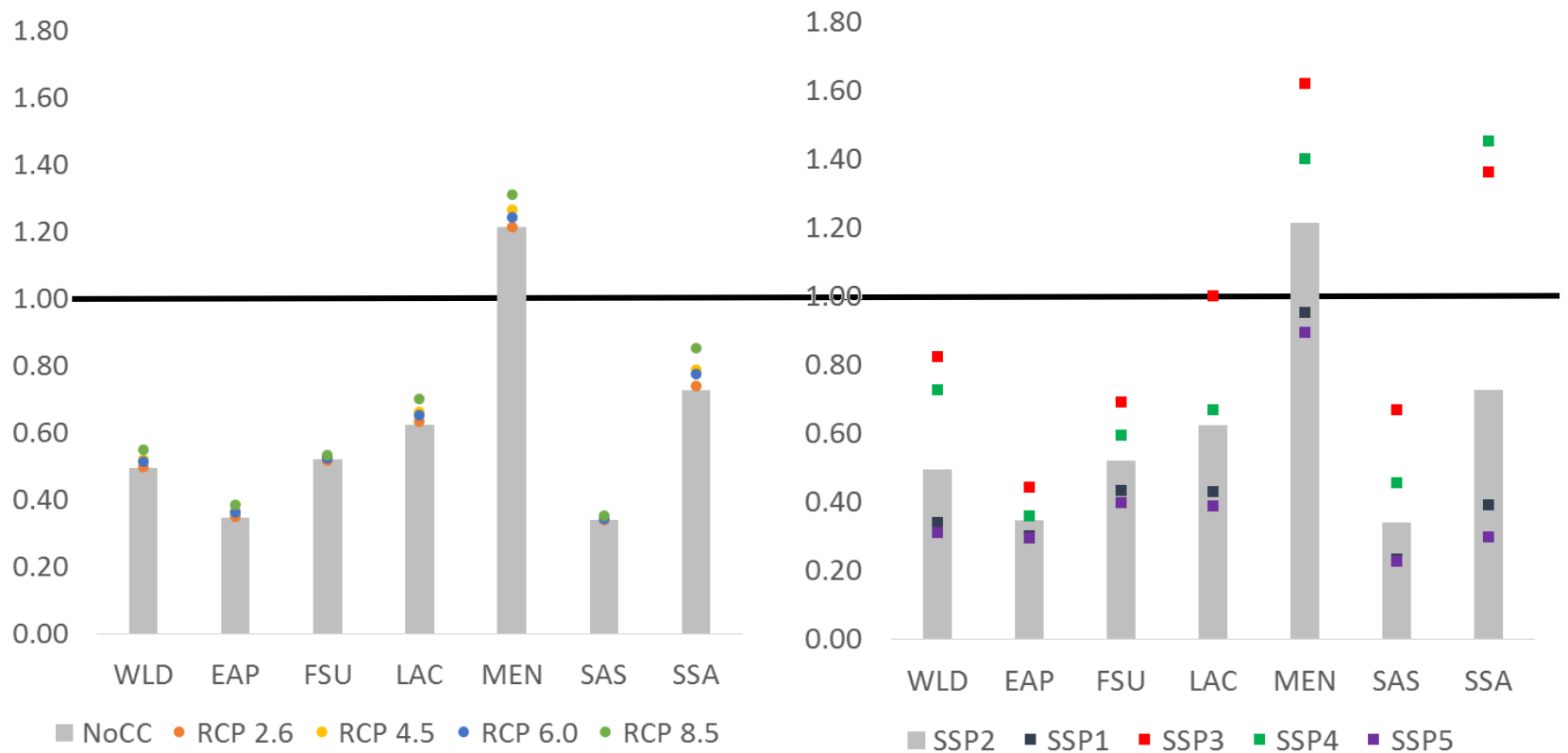
EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean  
 MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa

# Comparing trade in vegetable oils and oil meals (mmt, NoCC)



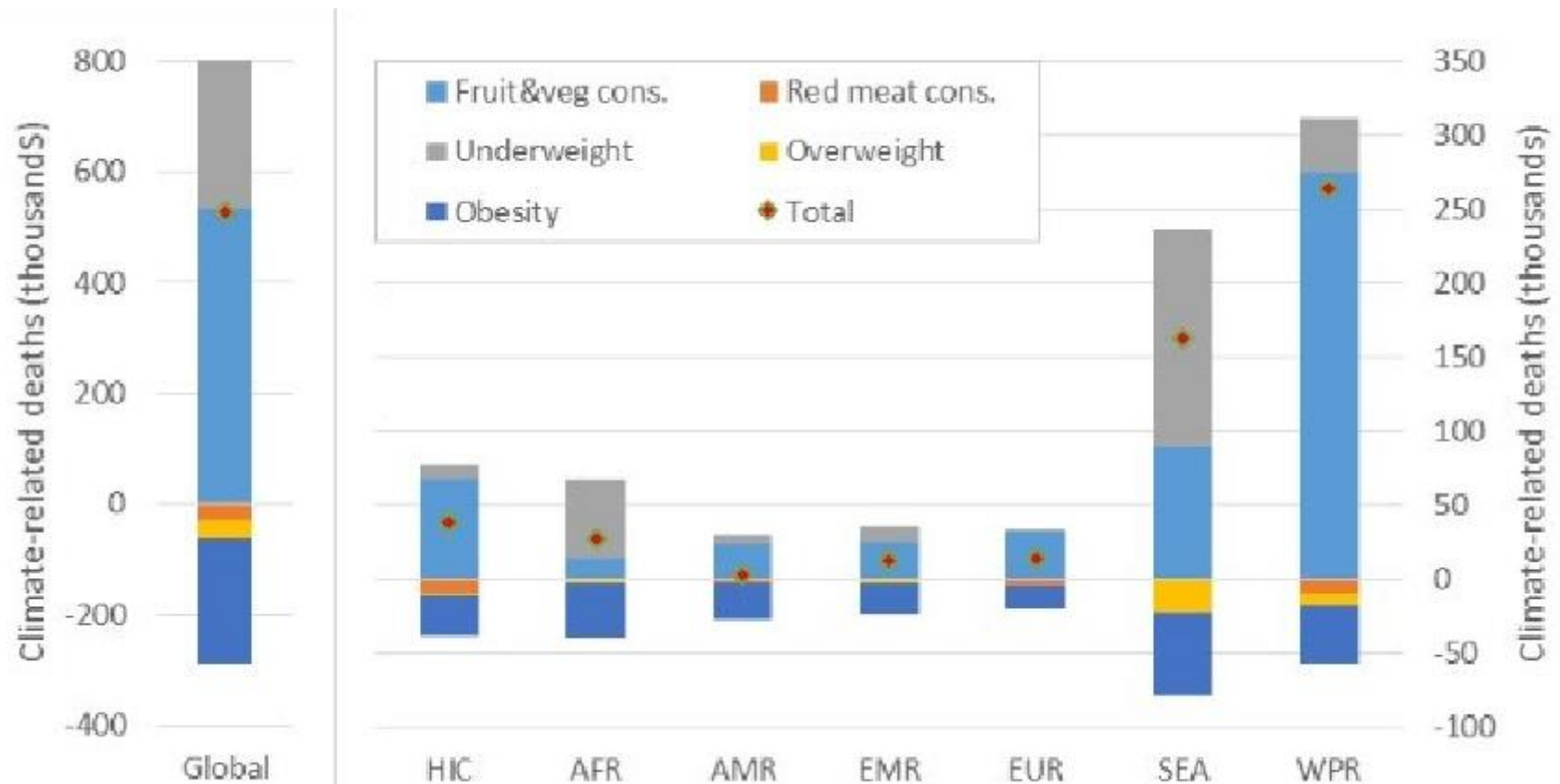
EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean  
 MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa

# Prevalence of hunger in 2050, by region



EAP = East Asia and Pacific; SAS = South Asia; FSU = Former Soviet Union;  
 MEN = Middle East and North Africa; SSA = Sub-Saharan Africa; LAC = Latin America and Caribbean

# Total number of climate-related deaths in 2050 by risk factor and region (SSP2 RCP 8.5)



HIC = High Income Country; AFR = Africa; AMR = Americas; EMR = Eastern Mediterranean;  
 EUR = Europe; SEA = South-East Asia; WPR = Western Pacific

Source: Springmann et al (2015)

# Thank you

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For more information:

<http://www.ifpri.org/program/impact-model>

<http://globalfutures.cigar.org>

<http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129825>



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INSTITUTE

A member of the CGIAR Consortium

**GLOBAL  
FUTURES**  
& Strategic Foresight  
a CGIAR initiative led by IFPRI