IMPACT Modeling of Fruit & Vegetable Crops

Current status and future aspirations

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International Food Policy Research Institute

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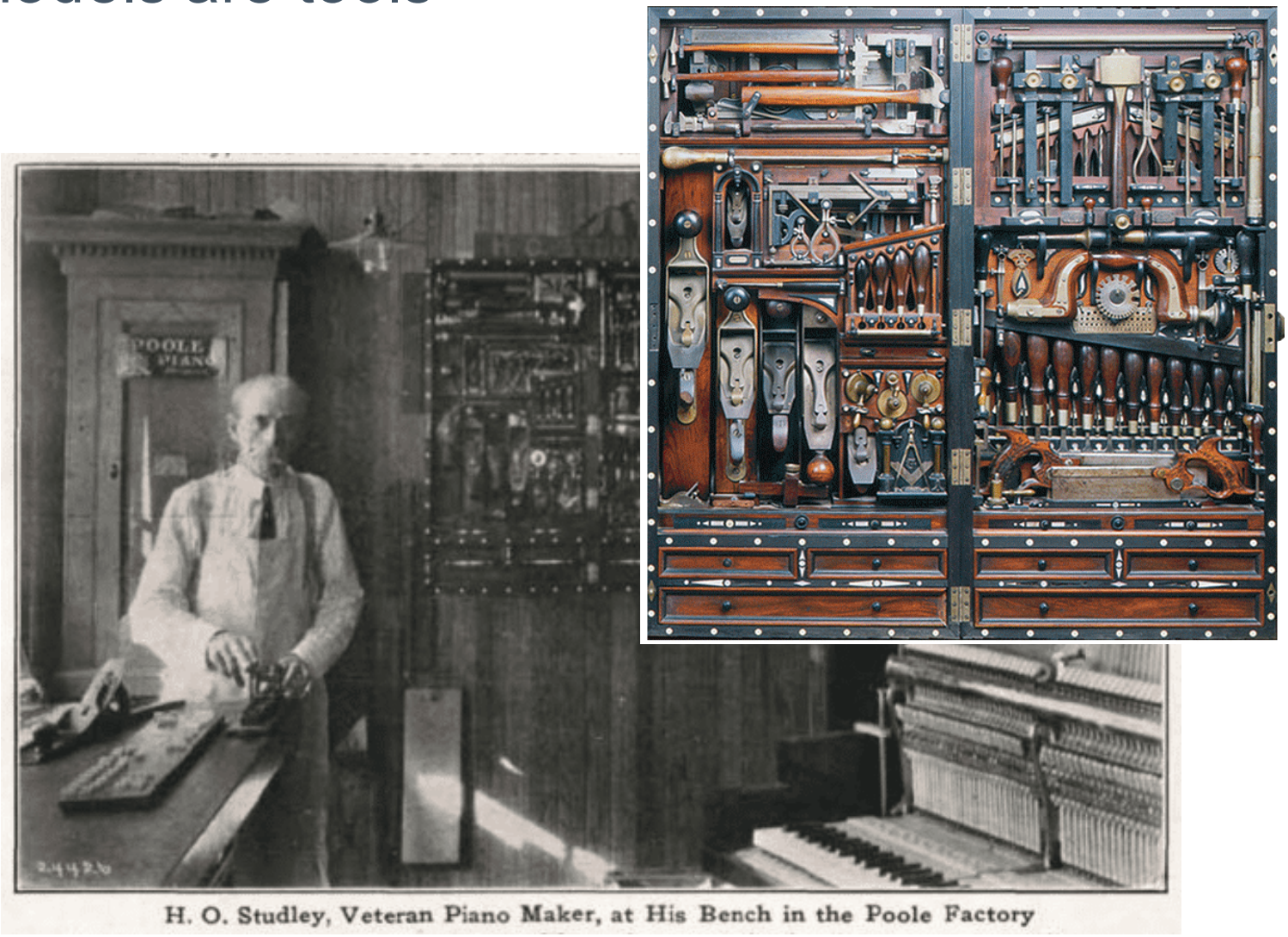
Keystone Policy Center, CO
1 August 2018

- What are models for?
- Exploring long-term challenges and opportunities
- A few results
- Future aspirations

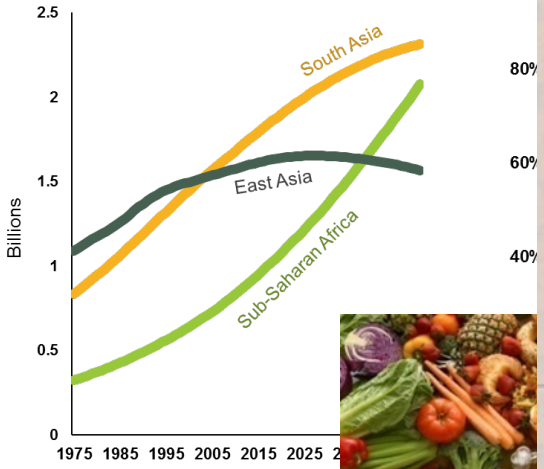
Models are simplifications of reality

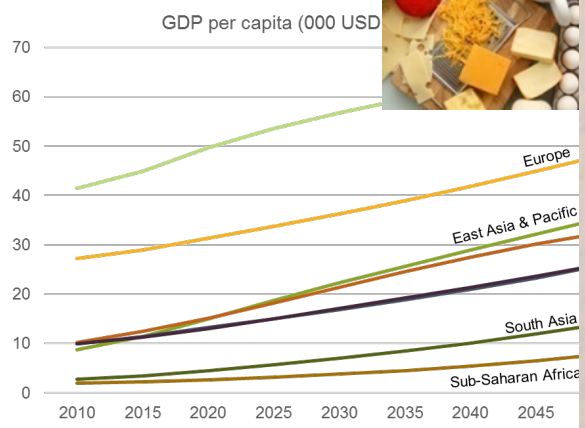
Models are tools

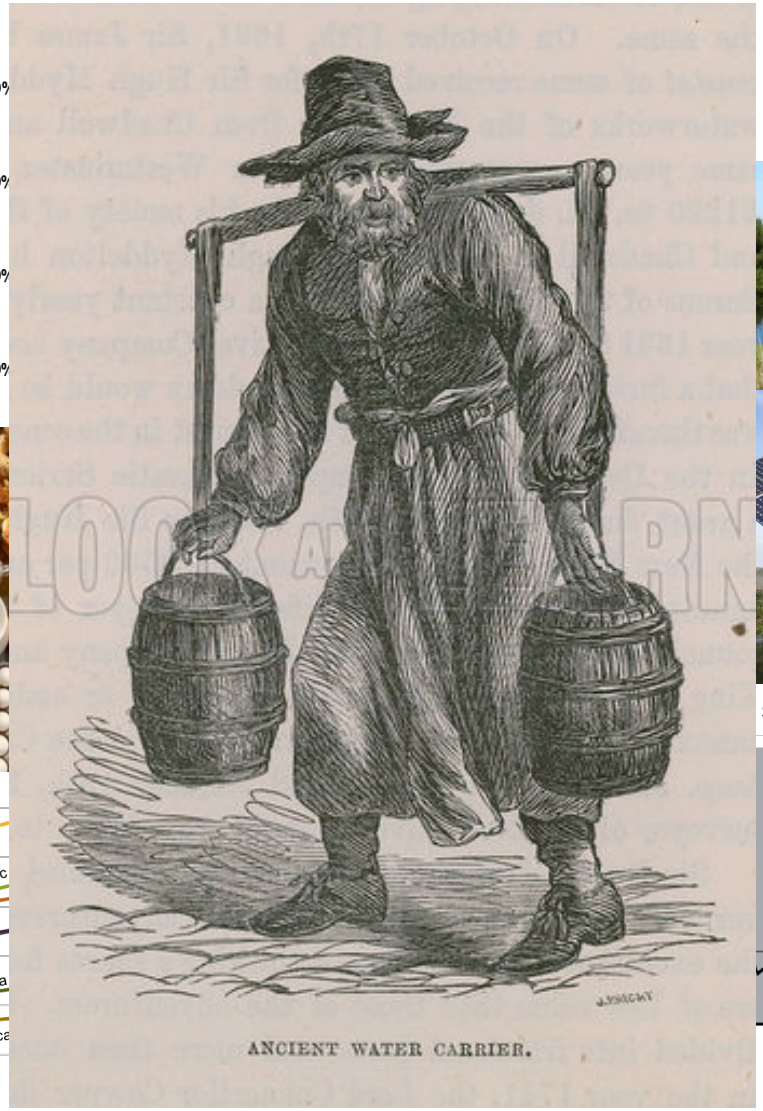


H. O. Studley, Veteran Piano Maker, at His Bench in the Poole Factory

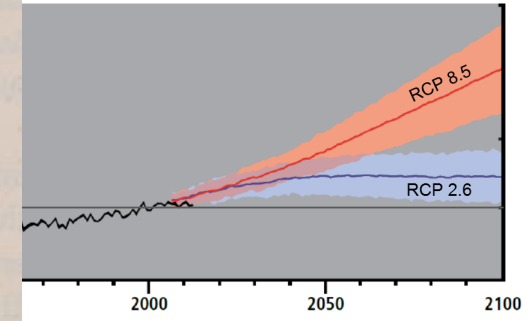
Balancing production and consumption



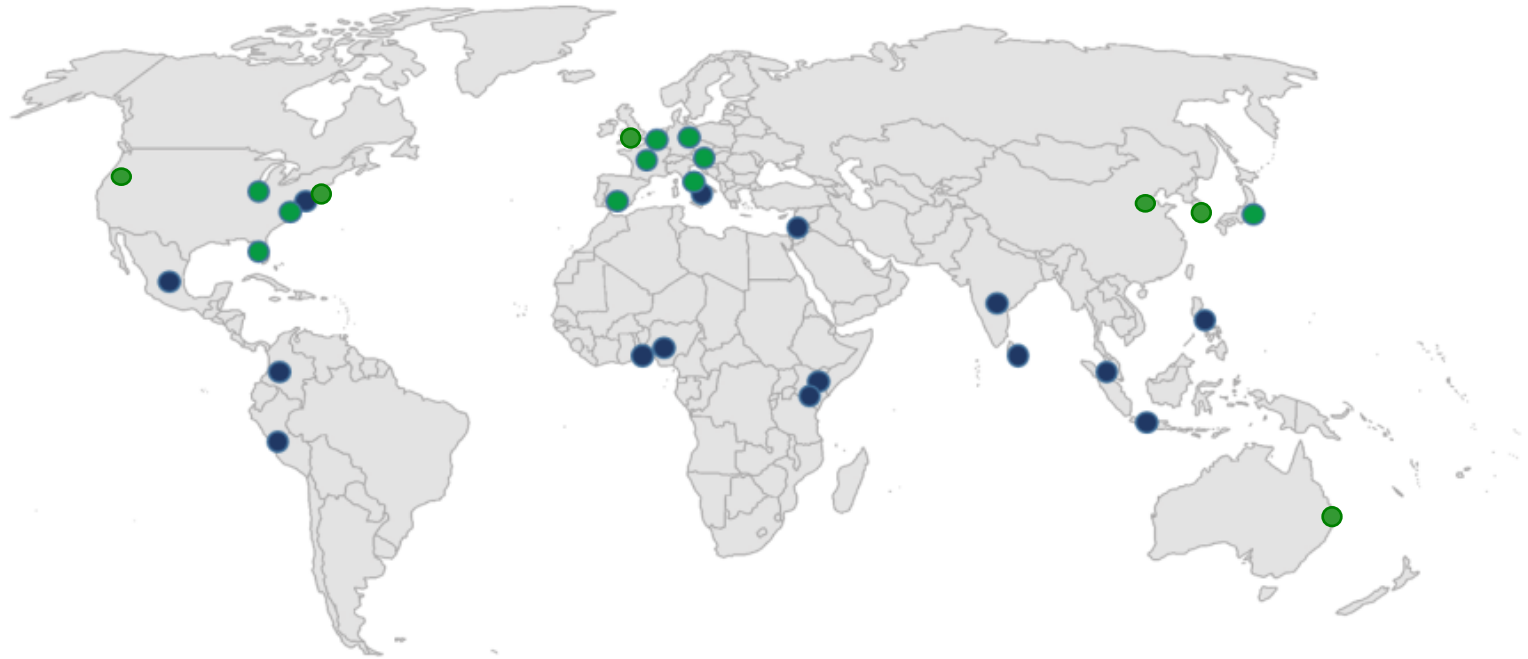




surface temperature



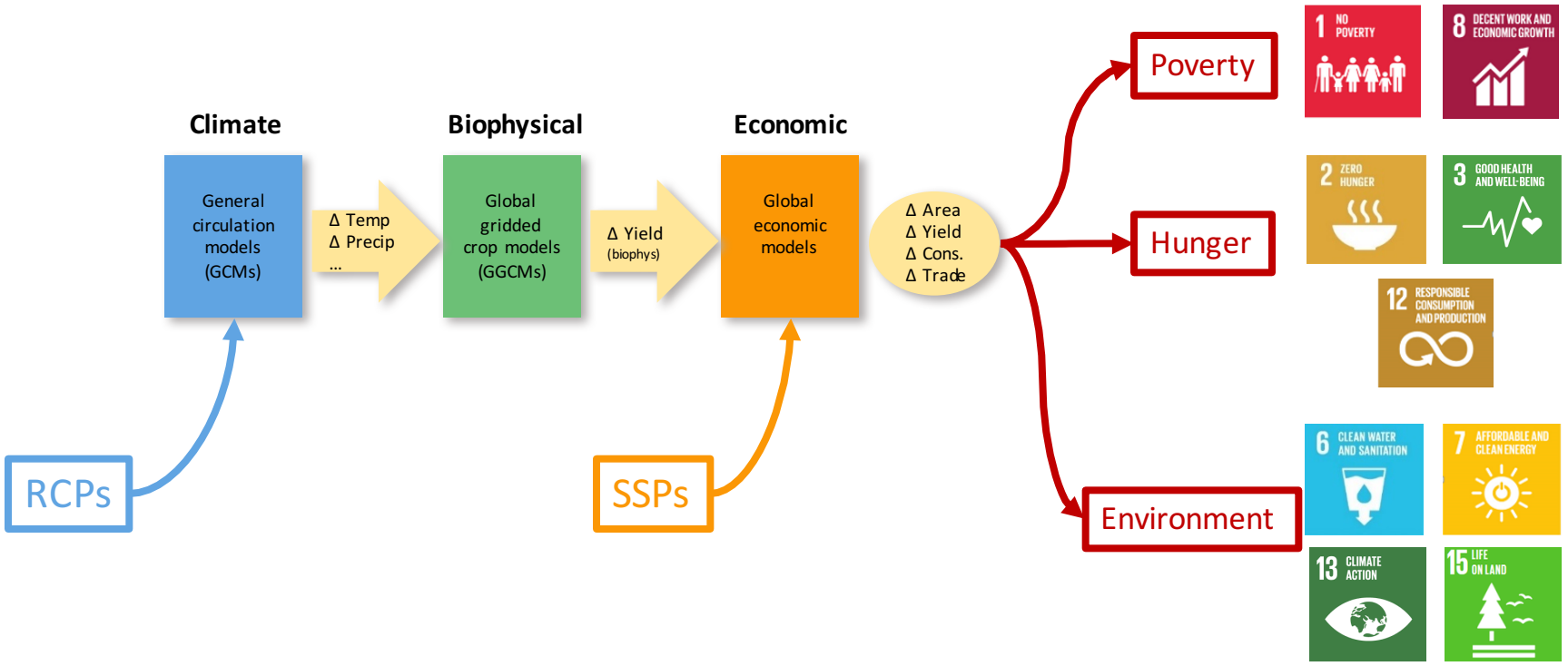
Partners in global analysis



GLOBAL FUTURES & Strategic Foresight
a CGIAR initiative led by IFPRI

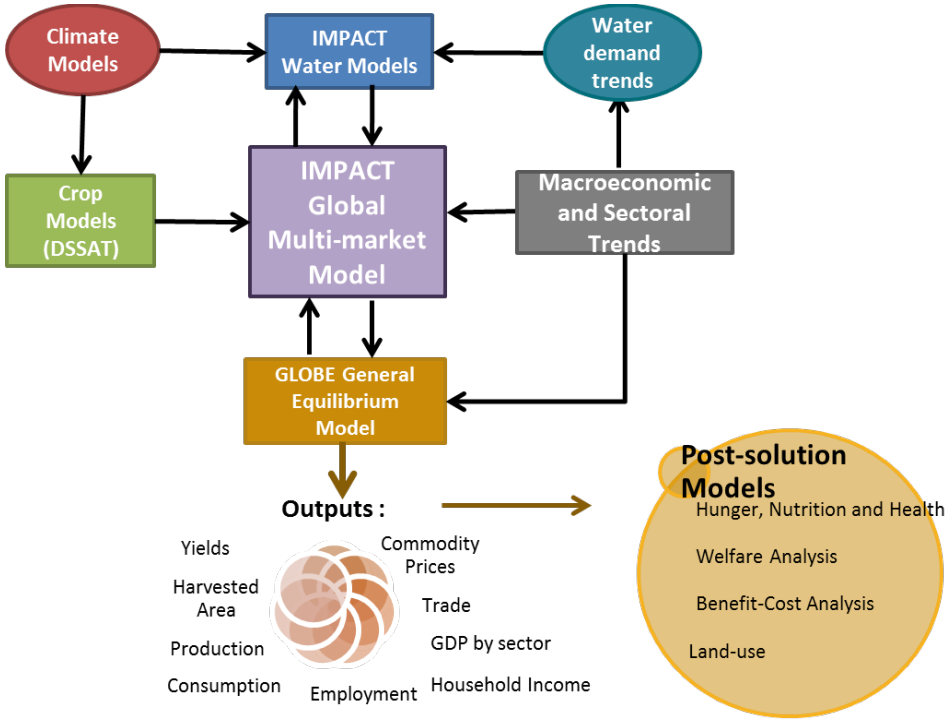
AgMIP The Agricultural Model Intercomparison and Improvement Project

Modeling alternative futures for agriculture:
biophysical and socioeconomic drivers and effects

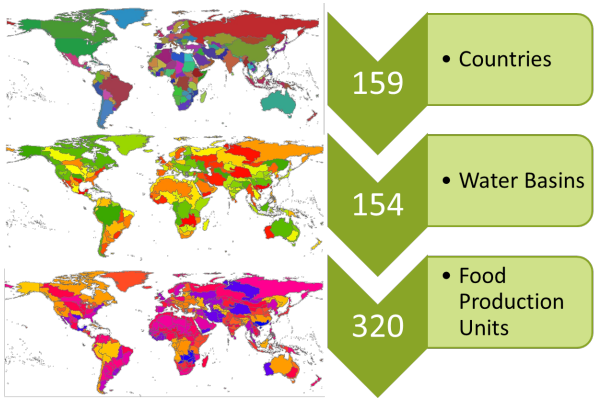


Source: Adapted from Nelson et al., *Proceedings of the National Academy of Sciences* (2014)

IFPRI's IMPACT system of models



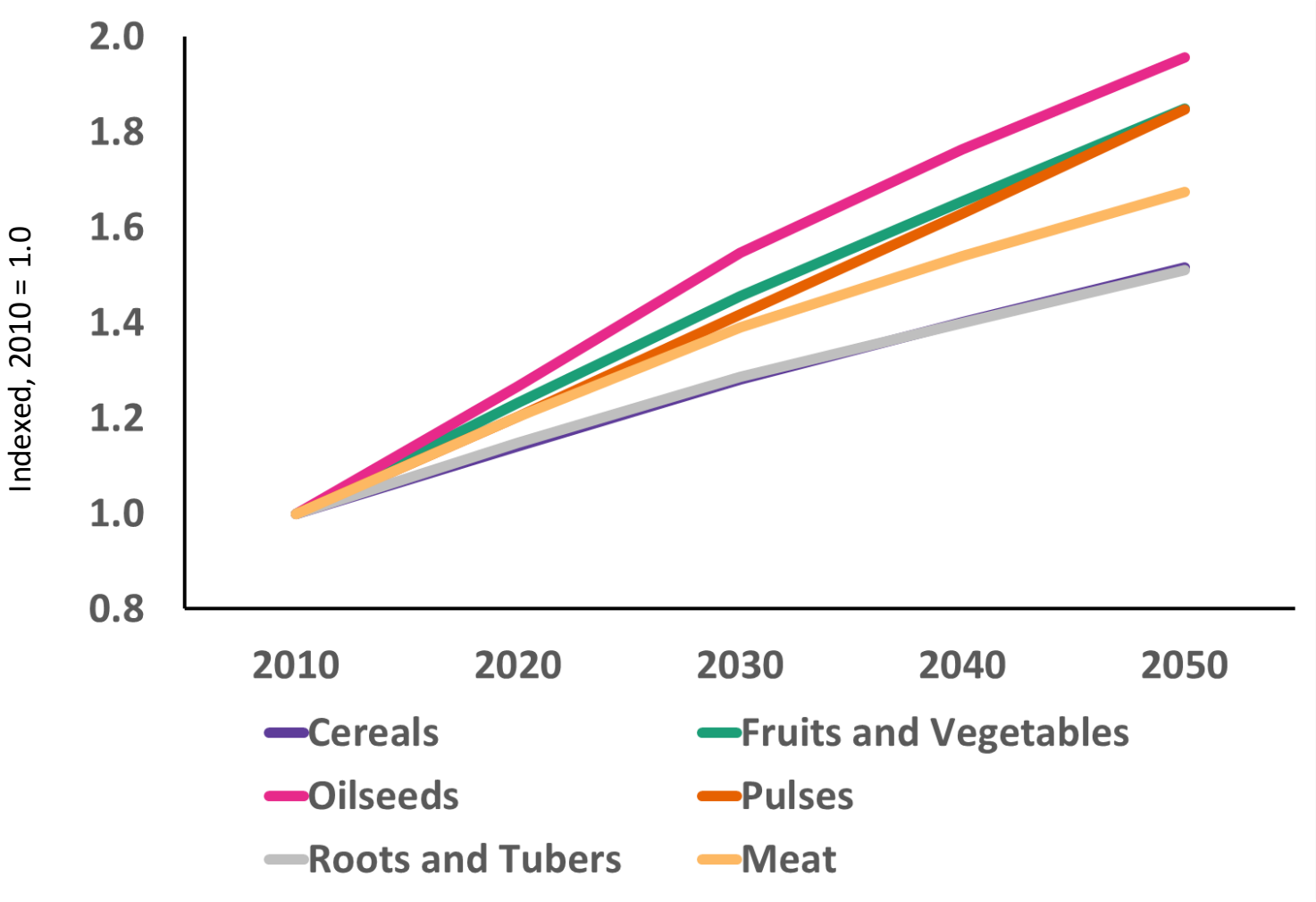
- Linked climate, water, crop and economic models



- 60+ commodities
- Estimates of production, consumption, hunger, and environmental impacts

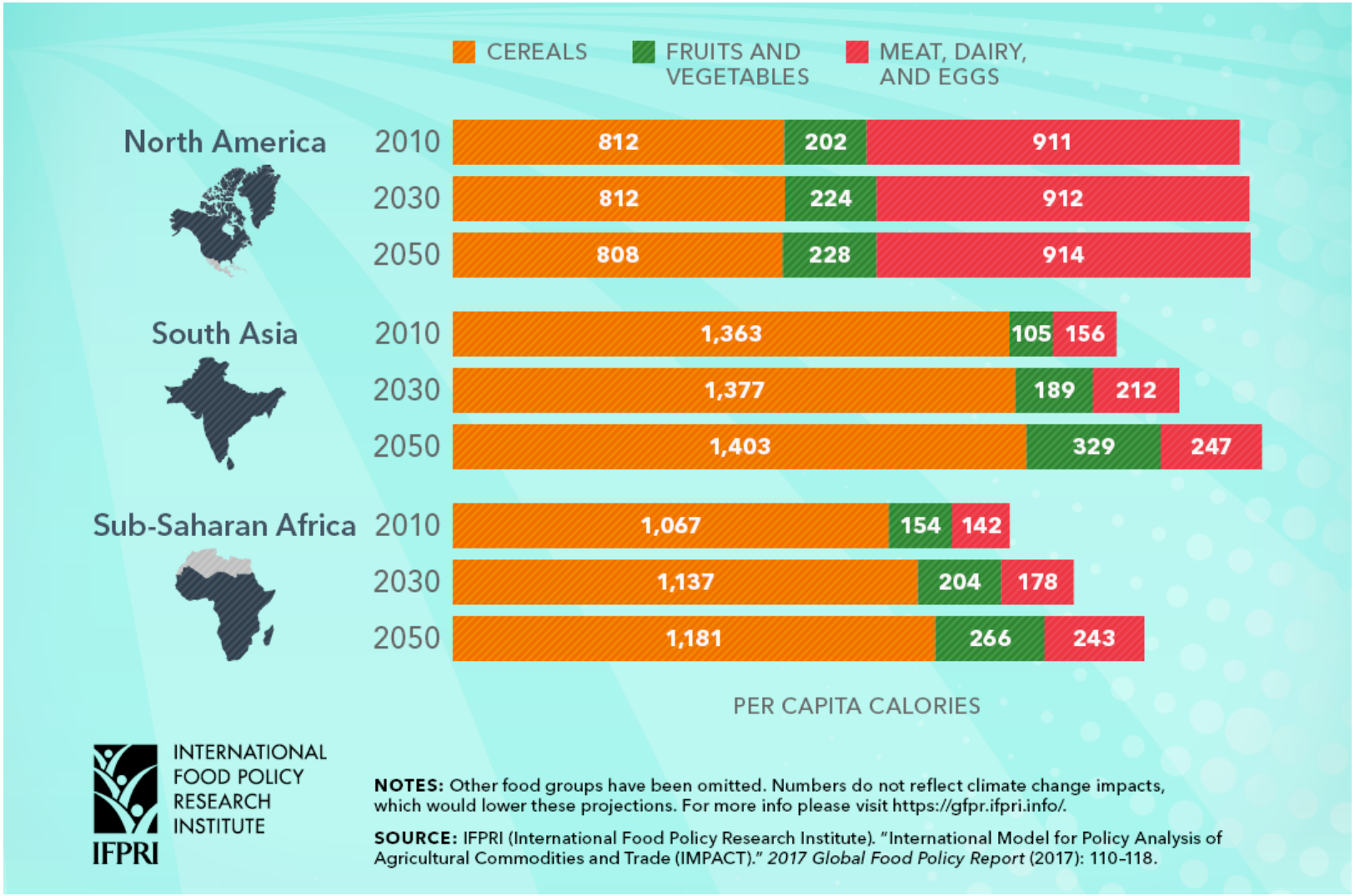
Source: Robinson et al. (IFPRI, 2015).

Growth in total global commodity demand



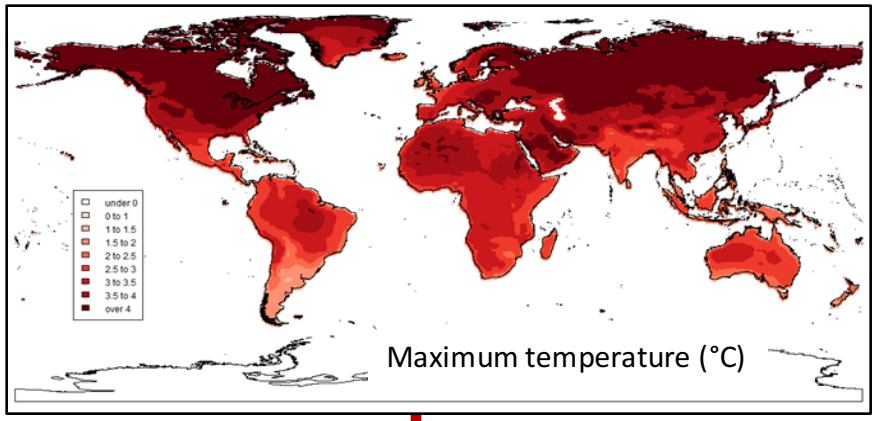
Source: IMPACT, June 2017

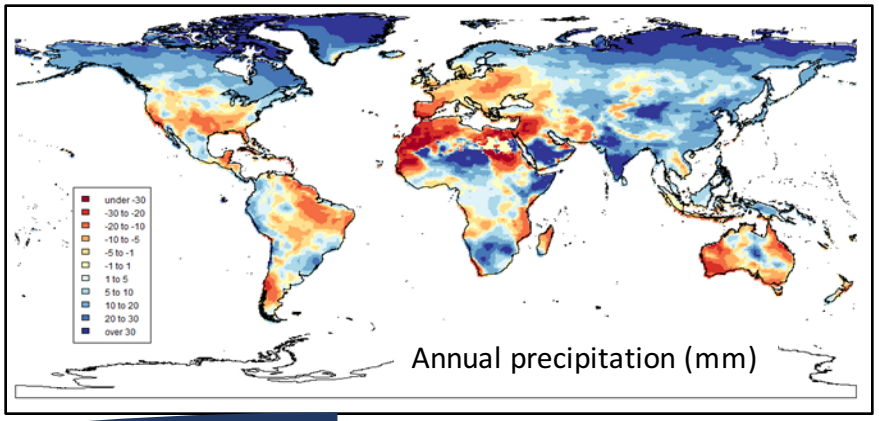
Changing diets by region

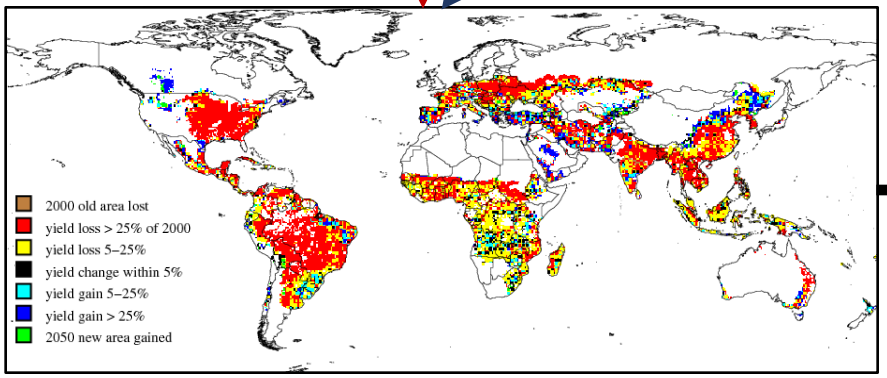


Climate change impacts on yields

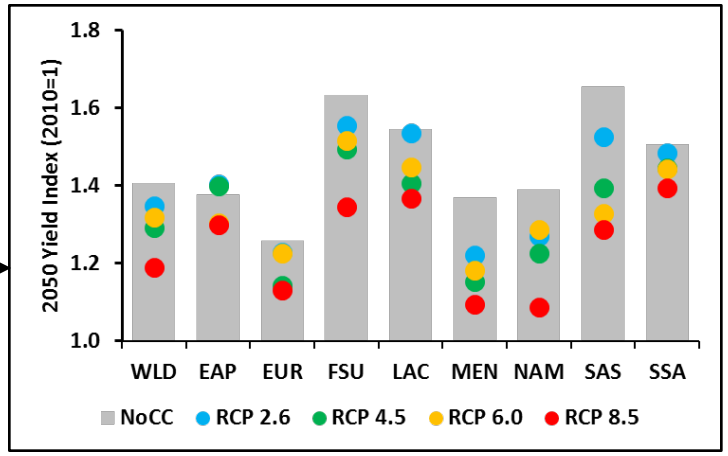
an example for rainfed maize in 2050







Change in rainfed maize yields *before* economic adjustments

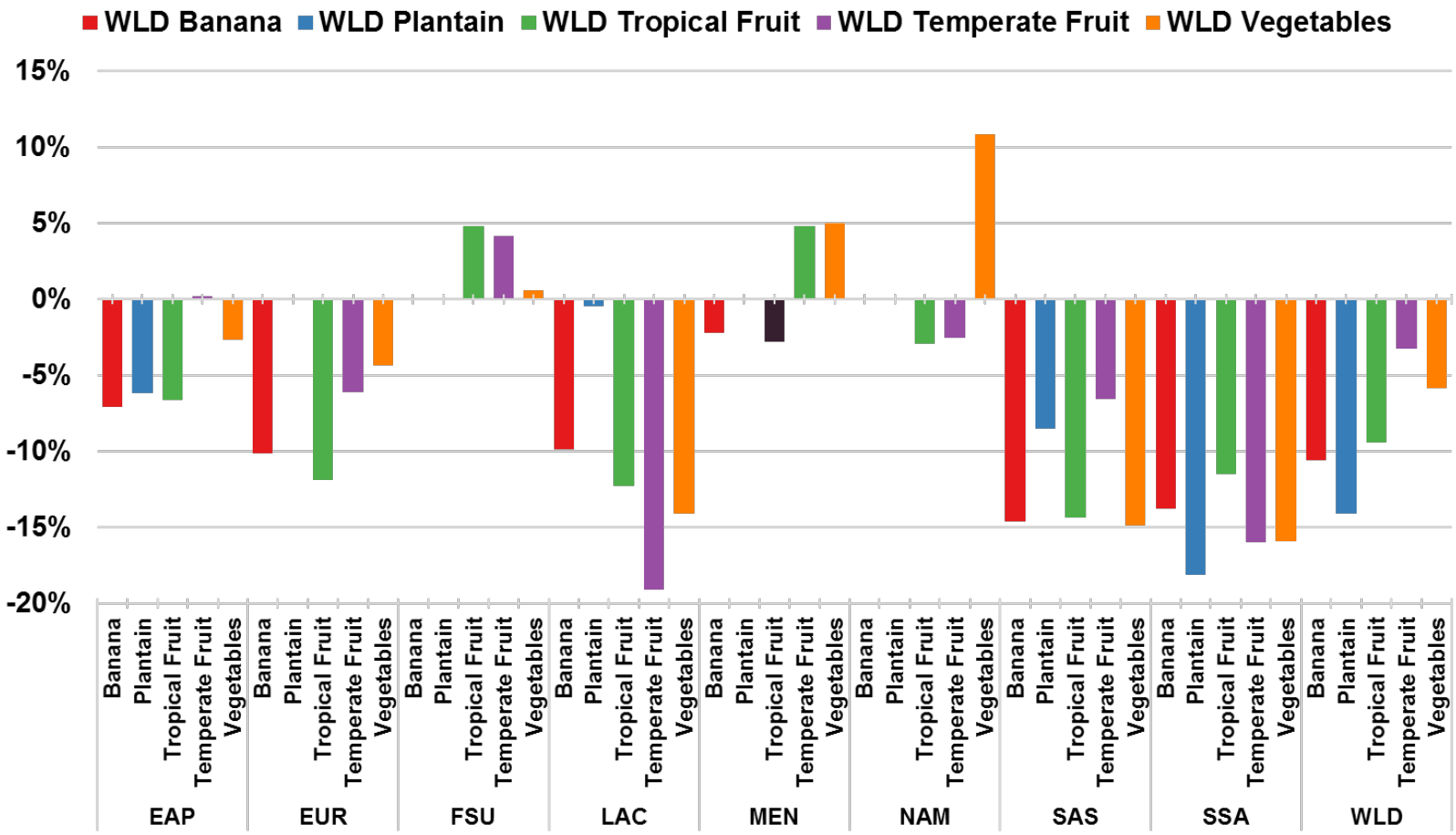


Change in rainfed maize yields *after* economic adjustments

Source: IFPRI (2015). Note: Results for rainfed maize using HadGEM, RCP 8.5, DSSAT, IMPACT version 3.2, and SSP 2.

Climate effects on rainfed F&V yields in 2050

RCP8.5 – HGEM compared to No Climate Change

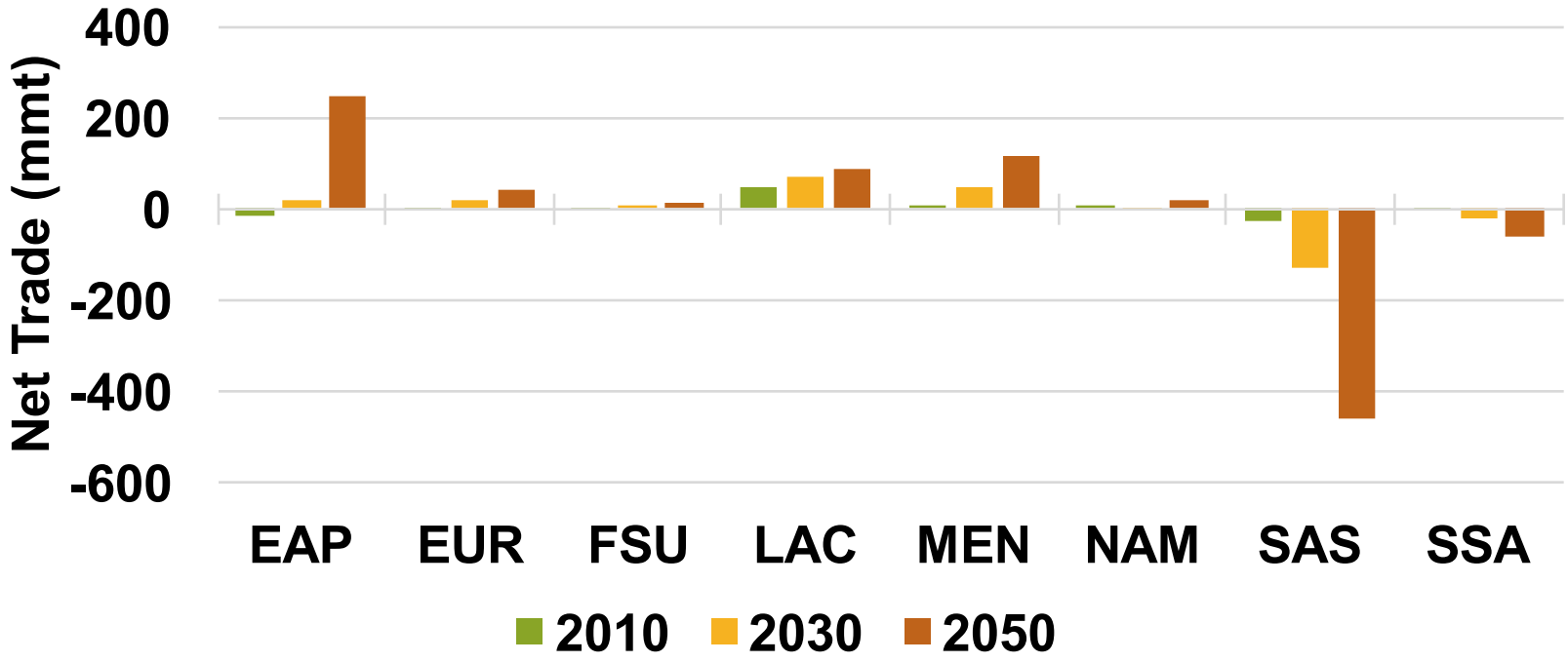


WLD = World; EAP = East Asia and Pacific; EUR = Europe; FSU = Former Soviet Union; LAC = Latin America and Caribbean; MEN = Middle East and North Africa; NAM = North America; SAS = South Asia; SSA = Sub-Saharan Africa;

Source: IFPRI, IMPACT version 3.2

Increasing trade movement of F&V

RCP8.5 – HGEM



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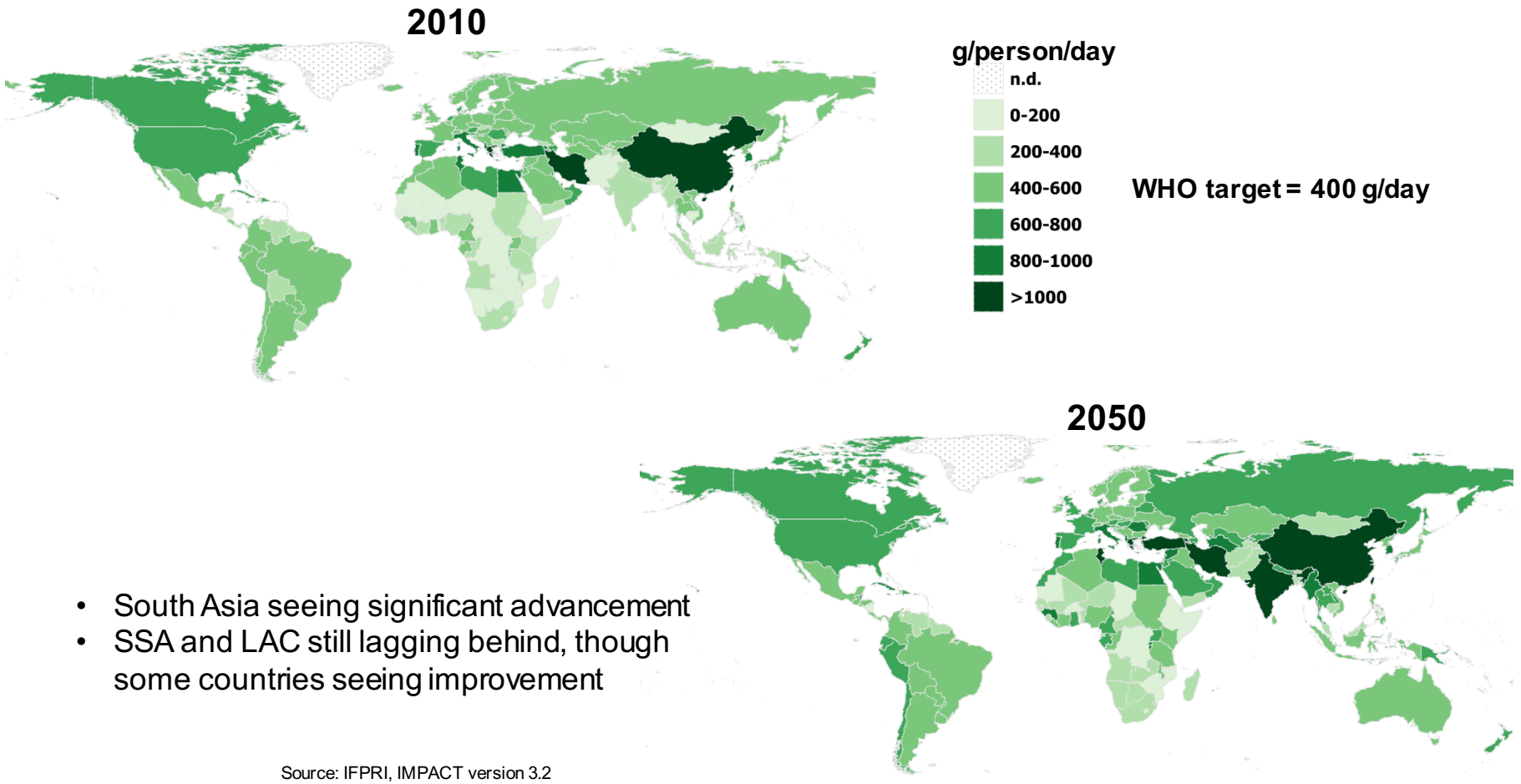
Source: IFPRI, IMPACT version 3.2

Per capita F&V consumption improving to 2050

RCP8.5 – HGEM

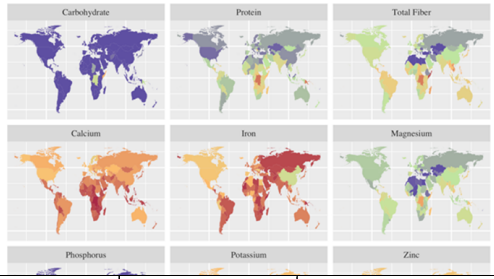


- South Asia seeing significant advancement
- SSA and LAC still lagging behind, though some countries seeing improvement

Source: IFPRI, IMPACT version 3.2

Current work related to F&V, diets and health

- Improved modeling of selected fruits and vegetables in the US (with WSU and others)
- Exploring nutrient availability and adequacy ratios (with Jerry Nelson and others)
- Exploring climate change effects on nutrient content (with ARS and others)
- Comparing F&V demand with WHO recommendations (with CSIRO)
- Exploring health implications of changing diets (with Oxford University)



Region	Food Demand (g/capita/day) 2010	2030	2050	Ratio to Recommended Consumption 2010	2030	2050	Waste 15% 2010	2030	2050	Waste 33% 2010	2030	2050
EAP	789	959	959	1.97	2.40	2.40	1.19	1.43	1.42	0.94	1.12	1.12
EUR	612	643	666	1.07	1.12	1.16	0.91	0.95	0.99	0.72	0.75	0.78
FSU	498	611	656	0.88	1.07	1.15	0.75	0.91	0.97	0.59	0.72	0.77
LAC	437	501	556	0.79	0.89	0.98	0.67	0.76	0.83	0.53	0.60	0.65
MEN	740	779	796	1.35	1.39	1.41	1.15	1.18	1.19	0.91	0.93	0.94
NAM	640	719	728	1.13	1.27	1.28	0.96	1.08	1.09	0.76	0.85	0.86
SAS	287	542	1005	0.53	0.97	1.78	0.45	0.83	1.51	0.35	0.65	1.19
SSA	261	328	411	0.50	0.61	0.75	0.42	0.52	0.64	0.33	0.41	0.50
DVG	524	657	796	0.95	1.17	1.41	0.81	1.00	1.20	0.64	0.79	0.94
DVD												
WLD												

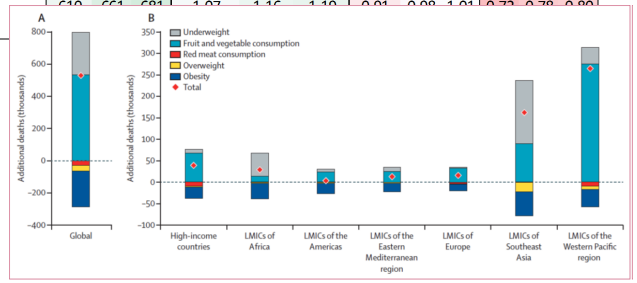


Figure 2: **Climate-related deaths (in thousands) in 2050 by risk factor**
(A) Climate-related deaths worldwide and (B) by region. The risk factors include changes in fruit and vegetable consumption, red meat consumption, and the prevalence of underweight, overweight, and obesity. The regional aggregates include all regions (global), high-income countries, and LMICs of Africa, the Americas, the Eastern Mediterranean region, Europe, Southeast Asia, and the Western Pacific Region. LMICs=low-income and middle-income countries. Confidence intervals are listed in appendix pp 67–70.

Future aspirations?

- Improved coverage of high-value foods
  - F&V
  - Animal-source foods
- Improved modeling of health and environmental impacts
- Expanded partnerships
  - Model improvement and linkages
  - Collaborative research
  - Informing decision-making

Thank you

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