IMPACT Modeling of Fruit & Vegetable Crops
Current status and future aspirations

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• What are models for?

• Exploring long-term challenges and opportunities

• A few results

• Future aspirations
Models are simplifications of reality
Models are tools
Balancing production and consumption
Partners in global analysis
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

North America
- 2010: 812 (Cereals), 202 (Fruits and Vegetables), 911 (Meat, Dairy, and Eggs)
- 2030: 812 (Cereals), 224 (Fruits and Vegetables), 912 (Meat, Dairy, and Eggs)
- 2050: 808 (Cereals), 228 (Fruits and Vegetables), 914 (Meat, Dairy, and Eggs)

South Asia
- 2010: 1,363 (Cereals), 105 (Fruits and Vegetables), 156 (Meat, Dairy, and Eggs)
- 2030: 1,377 (Cereals), 189 (Fruits and Vegetables), 212 (Meat, Dairy, and Eggs)
- 2050: 1,403 (Cereals), 329 (Fruits and Vegetables), 247 (Meat, Dairy, and Eggs)

Sub-Saharan Africa
- 2010: 1,067 (Cereals), 154 (Fruits and Vegetables), 142 (Meat, Dairy, and Eggs)
- 2030: 1,137 (Cereals), 204 (Fruits and Vegetables), 178 (Meat, Dairy, and Eggs)
- 2050: 1,181 (Cereals), 266 (Fruits and Vegetables), 243 (Meat, Dairy, and Eggs)

PER CAPITA CALORIES

NOTES: Other food groups have been omitted. Numbers do not reflect climate change impacts, which would lower these projections. For more info please visit https://gfpr.ifpri.info/

Climate change impacts on yields
an example for rainfed maize in 2050

Maximum temperature (°C)

Annual precipitation (mm)

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

Net Trade (mmt)

Source: IFPRI, IMPACT version 3.2

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
Per capita F&V consumption improving to 2050

RCP8.5 – HGEM

2010

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

2050

WHO target = 400 g/day

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)
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