

What is CIMSANS?

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cimsans

Center for Integrated Modeling of
Sustainable Agriculture & Nutrition Security

ILSI Annual Meeting
Southampton, Bermuda
19 January 2014

Climate Change Impacts on Nutrition Security Have Become Front Page News



ILSI Research Foundation has launched a new Center to study climate change impacts on agriculture and nutrition security

- **Context of the Issue**: Three major megatrends are converging to threaten global nutrition security
 1. Global population growth and changing diets will increase food demand two-fold by 2050
 2. Current crop productivity gains and food storage losses barely keep pace with demand today
 3. Future climate change will differentially affect specific crops and regions – adaptation strategies are currently inadequate

The Central Problem

How can we proactively deal with the challenges of increased global food demand and regional impacts of climate change in a more informed, collaborative, and sustainable manner?

- **ILSI Research Foundation will foster scientific collaboration, new research, and data mining by leveraging a broader array of “tri-partite” scientists, resources, and new partnerships**

CIMSANS: Current Status

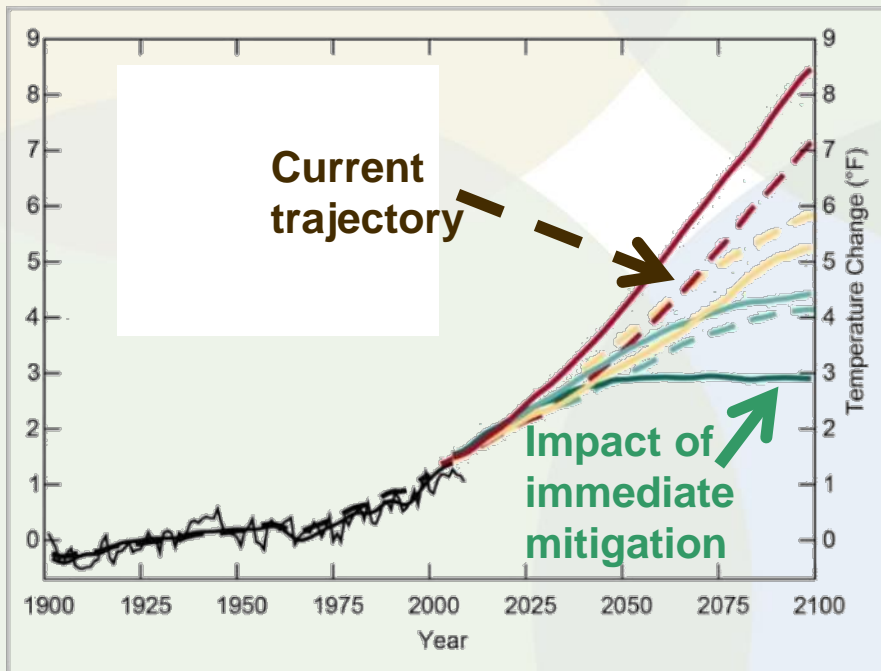
- **CIMSANS Advisory Council named, first met in October 2013**
 - Mark Rosegrant (IFPRI) – Chair; Swapan Datta (ICAR); Mark Howden (CSIRO); John Ingram (U Oxford); James Jones (U Florida)
- **Publications (three) appeared in peer-reviewed literature**
- **Successful round-table discussions co-hosted during FY2013**
 - Rome/FAO (October 2012); Dublin (April 2013); Tällberg (June 2013)
- **Conferences held and in planning for FY2014**
 - Korea (Sept-2013); India (Nov-2013); Purdue (Sept-2014); Atlanta?
- **Three Working Groups launched**
 - Open Ag Data WG – GEOSHARE pilot project in Ghana & India
 - Improved Modeling WG – maize, cassava modeling underway
 - Sustainable Nutrition Security WG – White Paper drafted
- **“Data Processing Service” under development**

CIMSANS Participants (“tri-partite”)

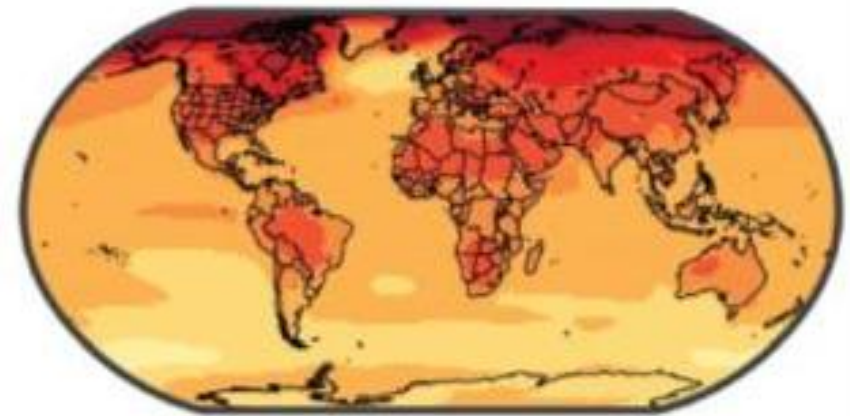


US National Climate Assessment: Adaptation in Ag is Essential

Average Global Temperature Projections



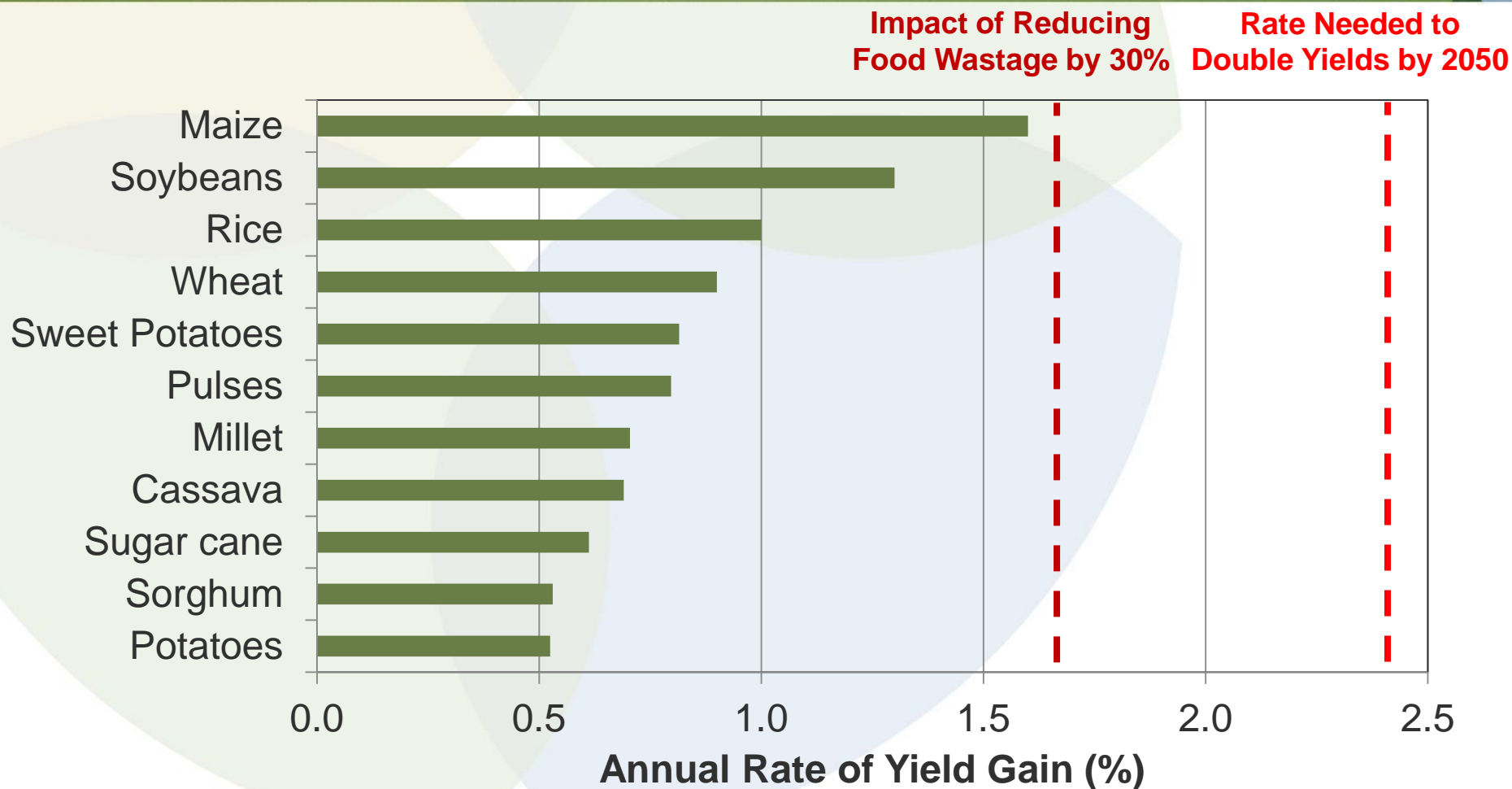
Small changes in Earth's average temperature have significant impact



Challenge of increasing yields of key crops to support global food demand becomes more difficult with climate change.

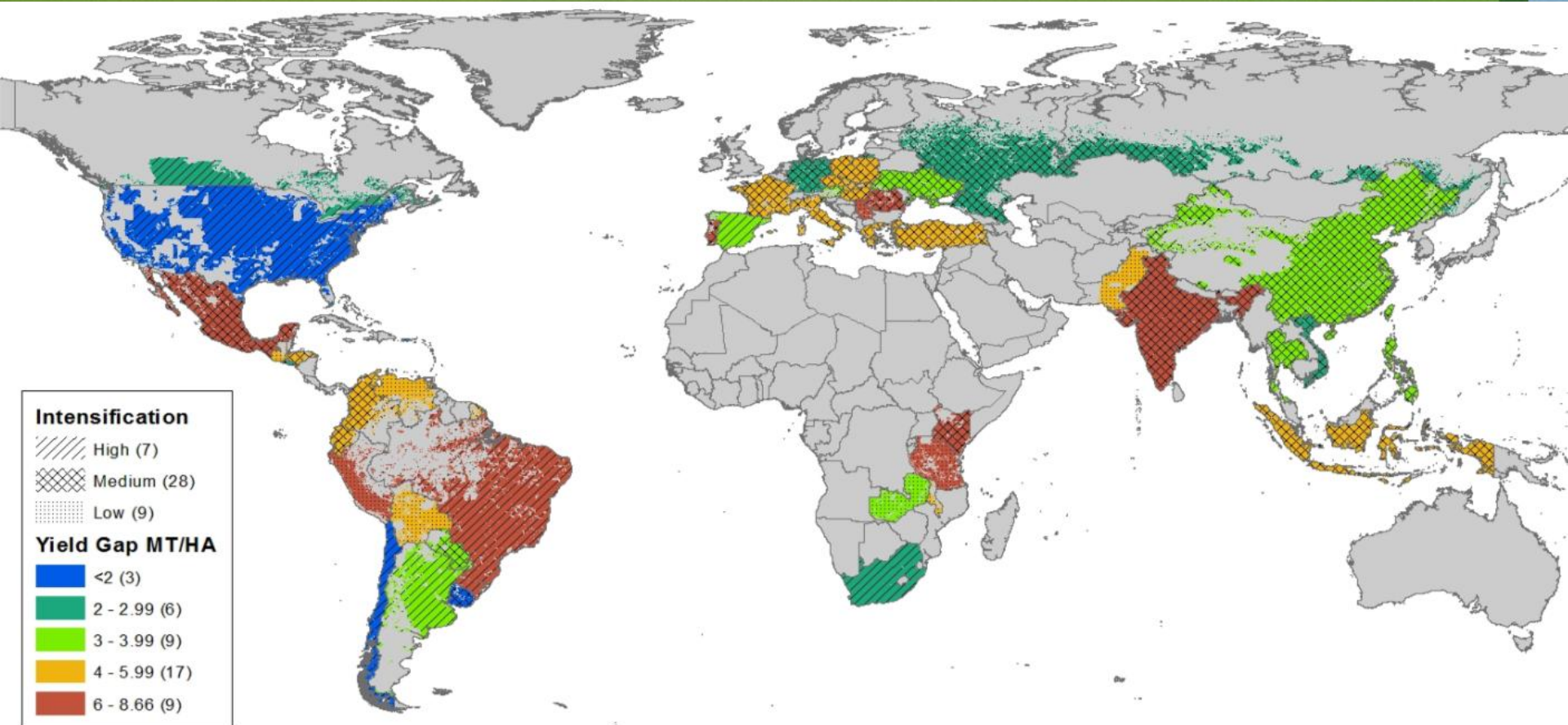
Significantly expanded research programs, as well as adoption of agriculture technology, are needed to drive yield gains in food crops.

Annual Rates of Yield Increases for Food Crops Vary with Technology Investment



Global rates of yield gain (1961-2011), based on data available from FAOSTAT

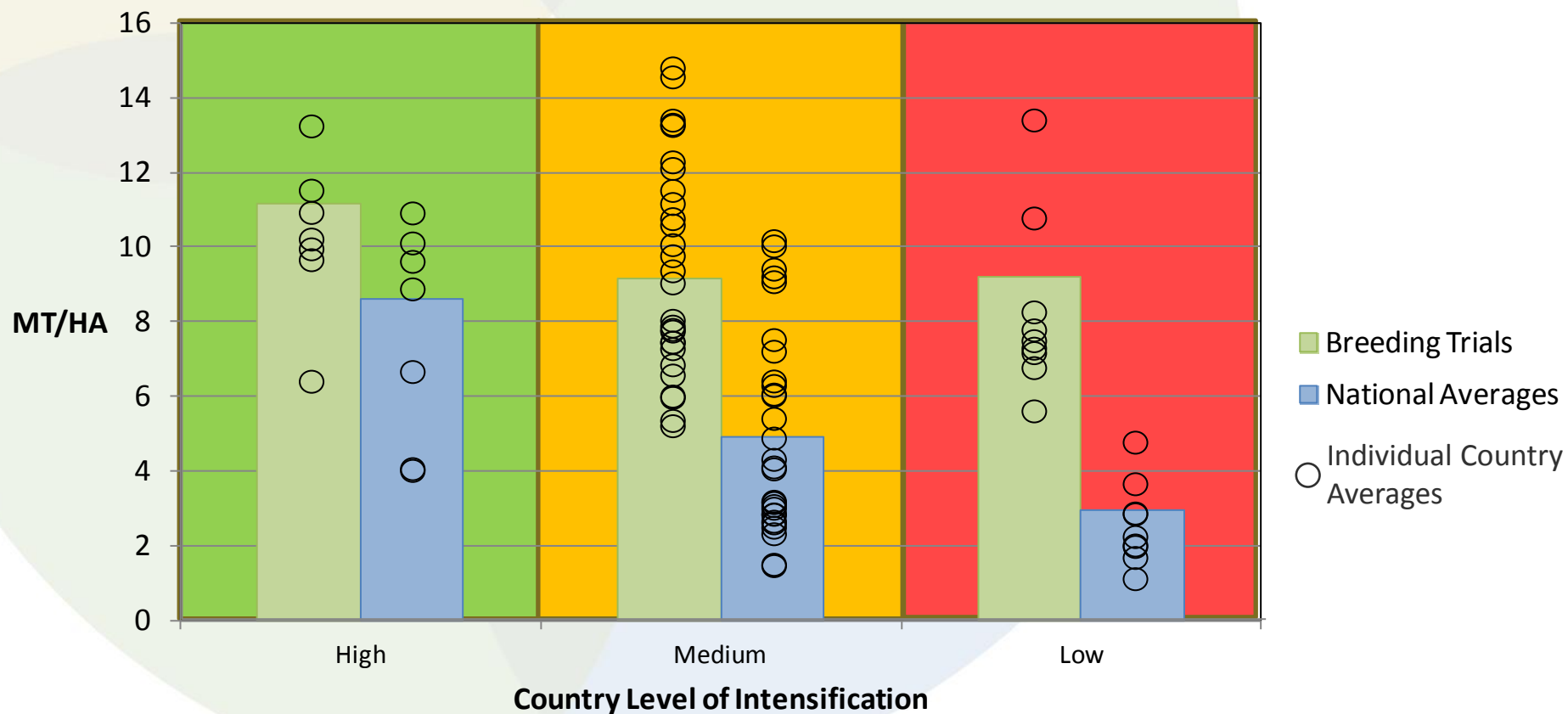
Maize Yield Gaps Vary with Level of Ag Intensification



source: Gustafson, et al., *Climate adaptation imperatives* (2014)

Data Sources: Country Boundaries: Esri; Maize Growing Areas: LUGE (Land Use and the Global Environment) Lab, McGill University

Ag Intensification Needed in More Regions to Reduce Maize Yield Gaps



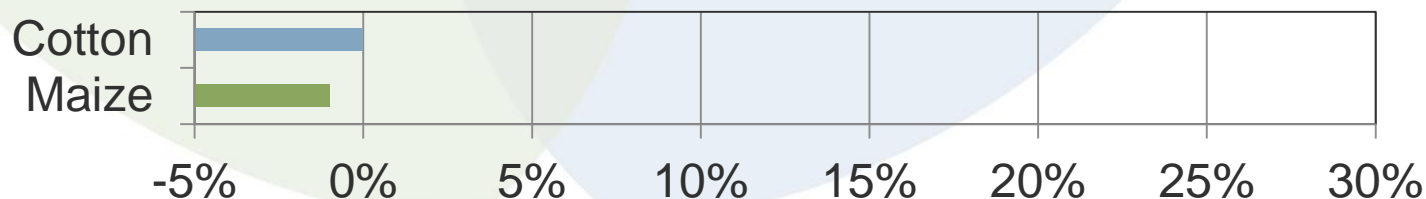
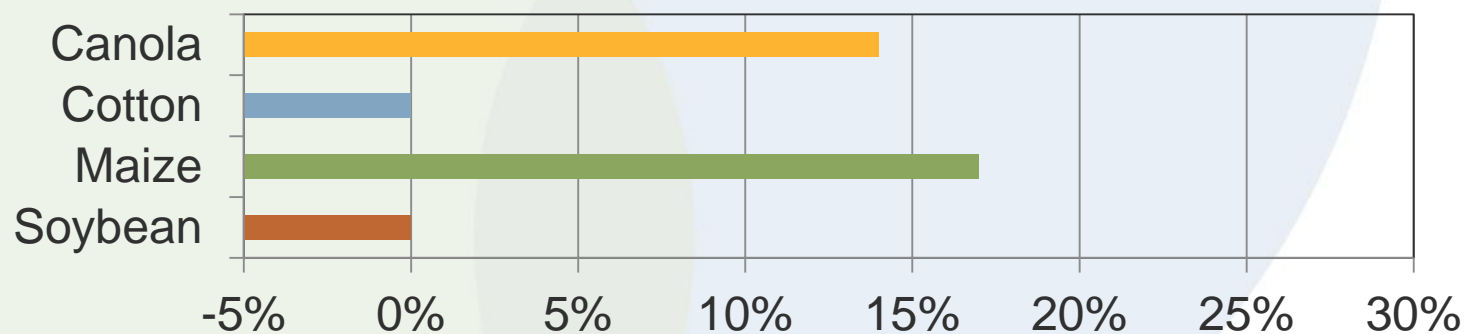
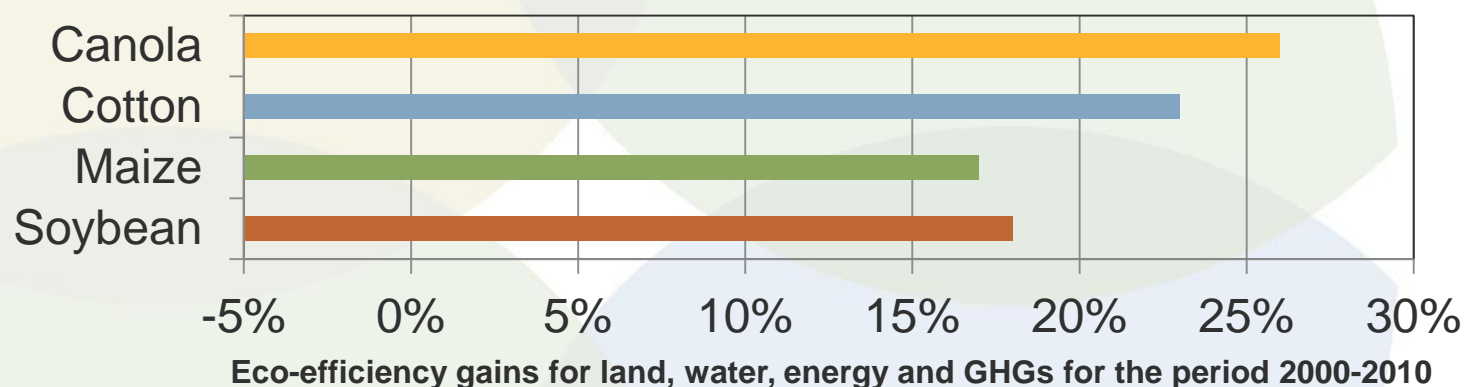
source: Gustafson, et al., *Climate adaptation imperatives* (2014)

Relating Ag Intensification to National Eco-Efficiency Metrics

	Intensification Category		
Crop	High	Medium	Low
Canola	Canada US	Australia	
Corn (maize)	Argentina Brazil South Africa US	China India Mexico	Ethiopia Nigeria Tanzania
Cotton	China India US	Argentina Pakistan	Uzbekistan
Soybeans	Brazil US	Argentina China India	

source: Gustafson, et al., *Climate adaptation imperatives* (2013)

Much Greater Eco-Efficiency Gains for High Intensification Countries (2000-2010)



source: Gustafson, et al., *Climate adaptation imperatives* (2013)

“Sustainable Nutrition Security: its fundamental role in food security”

- **White Paper drafted and under final review**
 - **Convening Lead Authors**
 - **Barbara Schneeman (UC Davis, ex-US FDA)**
 - **Jessica Fanzo (Columbia University)**
 - **Tara Acharya (Pepsi Co)**
 - **Twenty Lead Authors**
 - **Academia**
 - **CGIAR experts**
 - **Private sector**

Goal: Sustainable Nutrition Security

Insufficient cals
Insufficient nuts
~ 1 billion ↓

Sufficient cals
Insufficient nuts
~ 2 billion ↓

Sufficient cals
Sufficient nuts
~ 3 billion ↑

Excess cals + Excess nuts
Excess cals + Insufficient nuts
~ 1.5 billion ↓



Constraints on dietary choice and diversity
affordability, preference, allocation, convenience, cultural norms, ...
=> Consumption by Sub-populations and Sustainability Metrics

Others

Access: disposable income, allocation, health

Behaviour: education, preferences, waste

'Post-farm gate' Food System Activities
processing, packaging, shipping, storing, losses, advertising, preparing, consuming, ...
=> Final Nutrient Availability, Price and Sustainability Metrics



Local, Regional & Global Production Activities
farming, animal husbandry, aquaculture, fishing, hunting, gathering, ...
=> Basic Nutrient Availability, Price and Sustainability Metrics



Economic Models

Quantity

Quality

Crop , Livestock and Fisheries Models
Regional/global production

*Nutrient
Composition
Databases*

CIMSANS Growth Opportunities

- **Bill & Melinda Gates Foundation**
 - Have agreed to partner on a “Model Improvement Summit”
 - Conversations started on funding the proposed “Data Processing Service”
- **Horizon 2020 (EU Framework Programme for Research and Innovation)**
 - Collaborating through Oxford on large Wageningen proposal
- **Insurance Industry**
 - Lloyd’s of London is now estimating total cost (insured/noninsured) of 1-in-200-yr multiple breadbasket failure
 - Material impact on insurance industry likely to result, spurring keen interest in improving the underlying methodologies

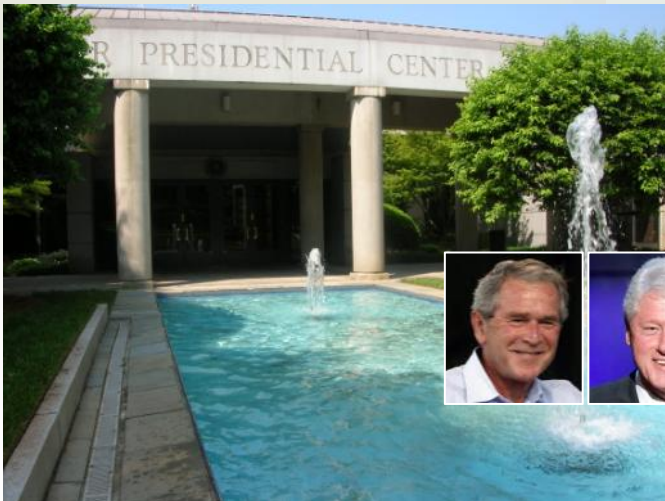
“Call to Action” on Climate and Food Security (Proposed)

Up to 200 stakeholders from around the world assemble to **create new partnerships** to help adapt to climate change and meet the world’s growing food and nutrition needs in more **sustainable ways**.

ILSI-RF partners with IFPRI and others to convene a Call to Action at The Carter Center in Atlanta kicked-off by former President Jimmy Carter, a farmer himself

Among those invited to attend would be former Presidents George W. Bush and Bill Clinton, former Prime Minister Tony Blair, Bill Gates, Howard Buffett, Ted Turner, Kofi Annan, Bono, George Clooney, and governmental leaders from around the world.

The event would leverage **strong media opportunities** in the home city of CNN in a **respected venue** attended by a **critical mass** of individuals and organizations that **can take** bold and meaningful **action**.



~~What is CIMSAANS??~~

- Anne Roulin (Nestlé)
- Jim Jones (U Florida, AgMIP)
- John Ingram (U Oxford)
- Paul Hendley (Phasera)