

Coordinated Global and Regional Assessments Scoping



1. Principles and Processes
2. Major Assessment Questions
3. Strawman Core Framing
4. Building Blocks
5. Protocol Elements
6. Organization and Partners
7. Funding Strategy
8. Benefits to Participation

1. Scientific Integrity

- **AgMIP** projects and activities must have a primary public-good purpose. AgMIP endorses the use and development of open-source/open-access models, data and methods

2. Declaration of Conflict of Interest/Bias

- **AgMIP** operates with transparency, conducts activities objectively, and is accountable to all stakeholders

3. Advocacy for Science Only

- Advocacy of any kind by **AgMIP** is strictly limited to promotion of the use of the best science and methods for development, evaluation, and application of agricultural models.

4. Open Meetings and Fair and Full Attribution

- All **AgMIP** meetings are open and publications attribute all intellectual contributions, including data

5. Transdisciplinary Integration/Collaboration

- **AgMIP** methods and activities should facilitate transdisciplinary integration and collaboration.

6. Resilient but flexible AgMIP Structure

- **AgMIP** endeavors to retain a structure that increases recognition of its expertise and authority while retaining the greatest possible flexibility

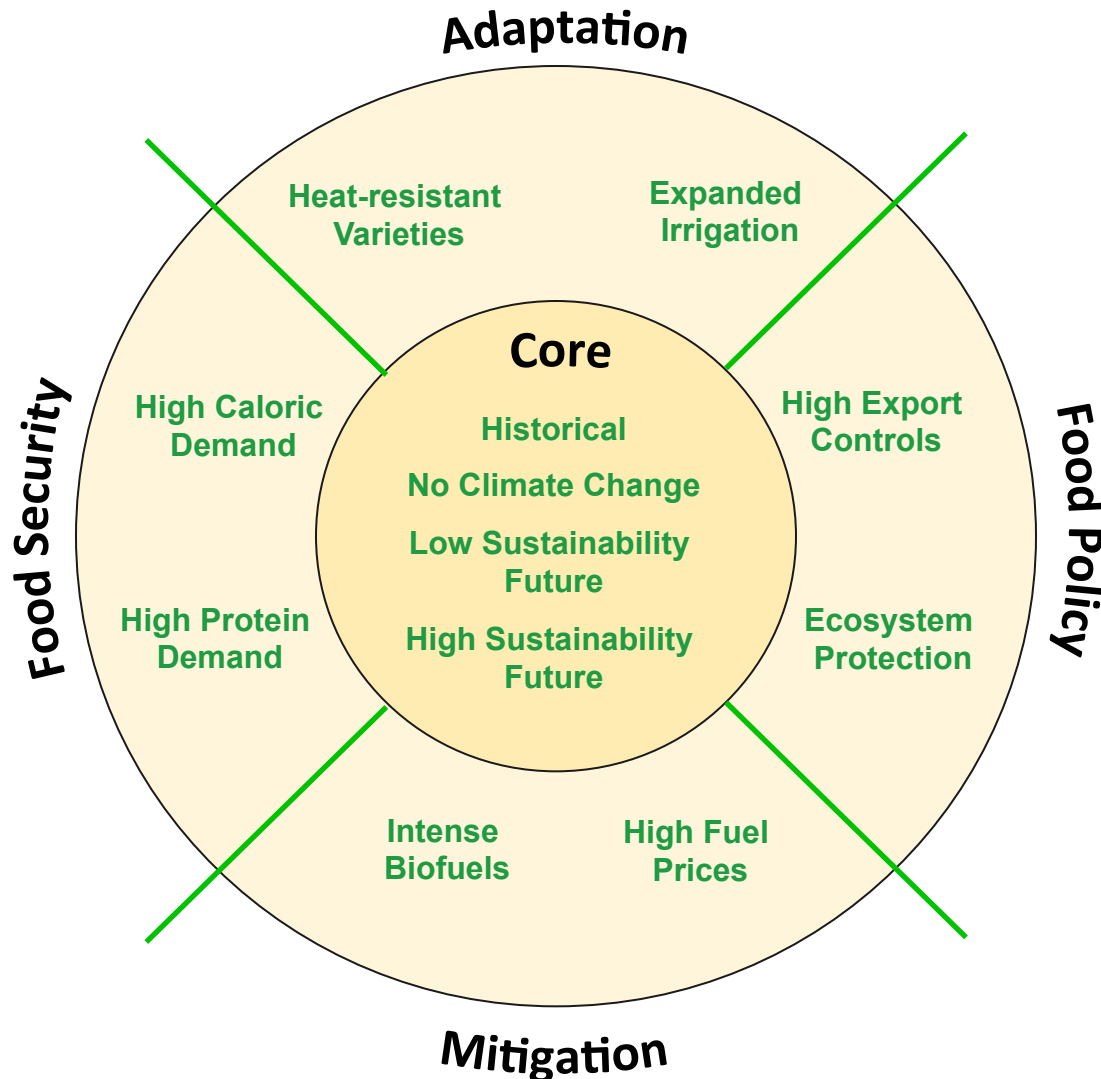
Core Question: How will climate change and climate change policies affect global and regional agricultural production and food security under low and high sustainability pathways?

• **Question (1):** What are the capabilities of and limits to adaptation? Key Topics: Technology trends vs specific adaptation strategies; Management; Genetics

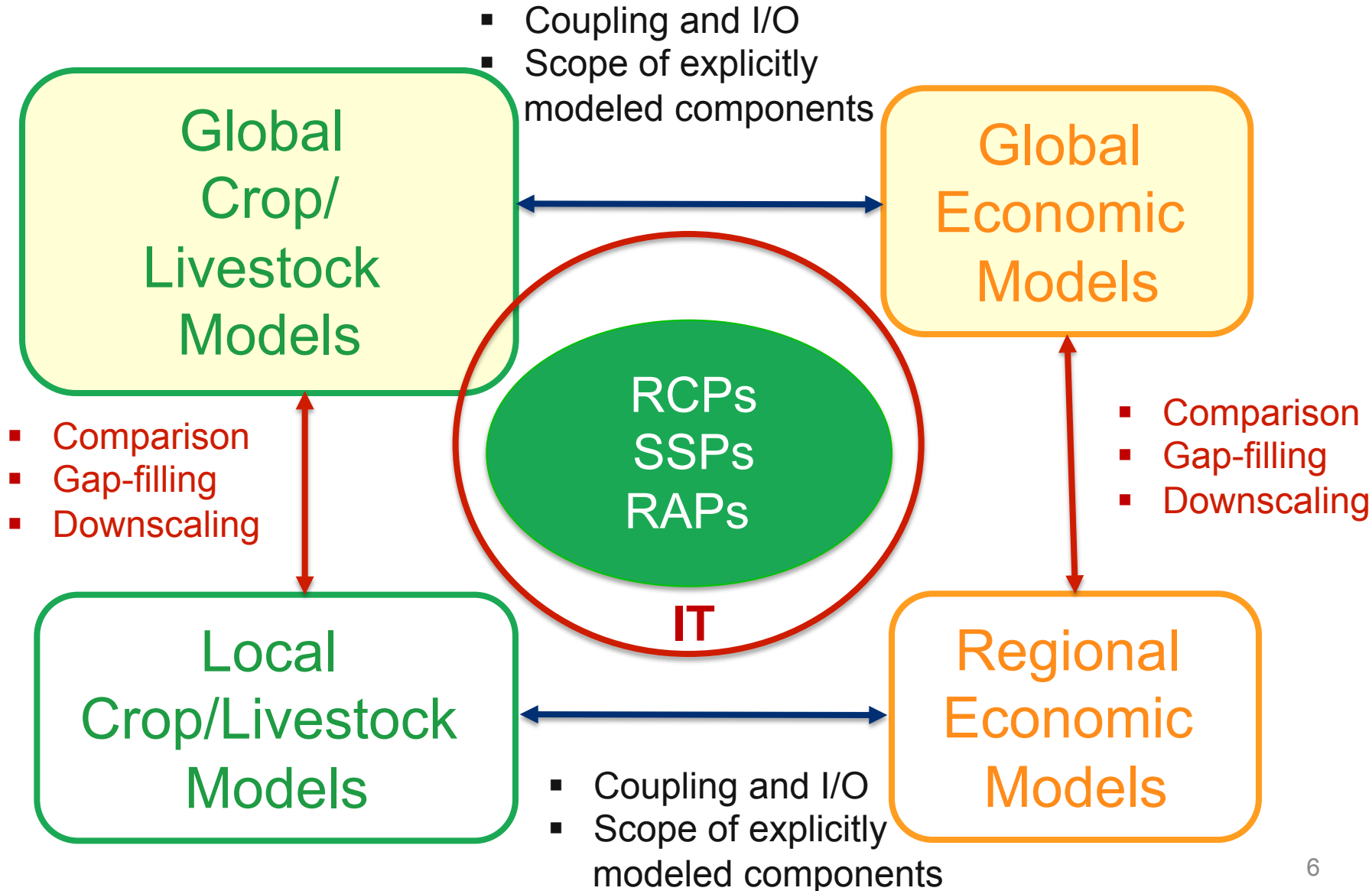
• **Question (2):** What are the effects of agricultural mitigation policies? Key Topics: Effects on land use and prices; Biofuels; Soil carbon

• **Question (3):** How will climate change affect food security and nutrition? Key Topics: Availability; Access; Utilization; Stability; Nutrition

• **Question (4):** How will food policies affect future agricultural production and food security? Key Topics: Trade; Ecosystem protection

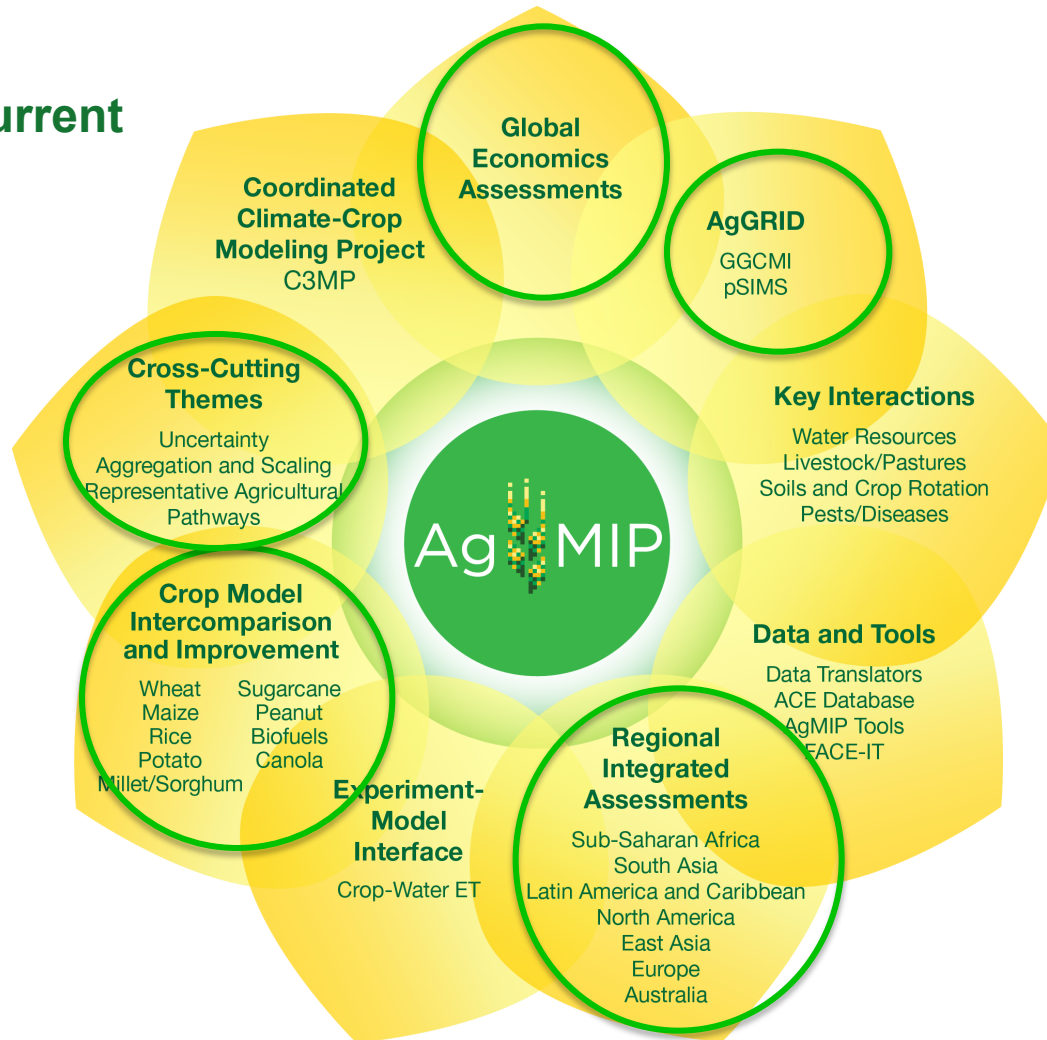


*Simulation sets designed to answer core questions
specify RCPs, SSPs, RAPs, Time Periods, and Output Variables*



AgMIP Contributions to CGRA Building Blocks (1)

Current



In Development

GEOGLAM
Sustainable Nutrition Security
Ozone
Natural Resources & Ecosystems
Statistical & Dynamic Approaches

Protocol Elements

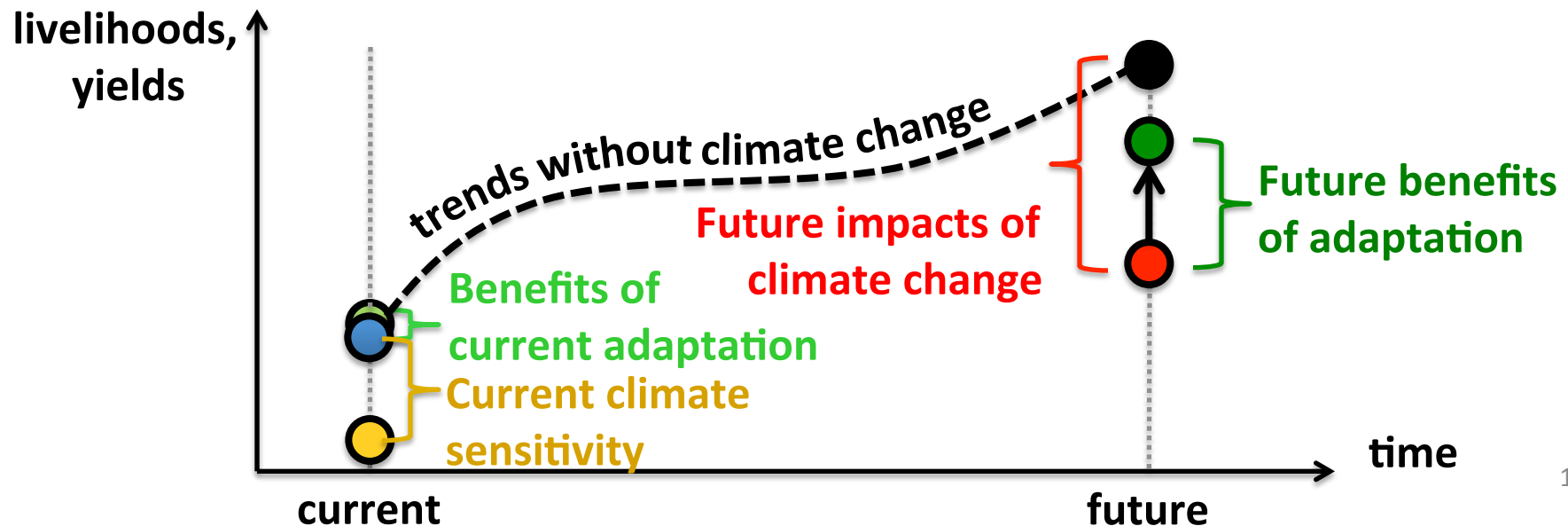
- Driving Questions
- RCPs, SSPs, and RAPs
- Simulation Sets
- Global and Regional Linkages
- Outputs and Outcomes

Protocol Elements

- **Driving Questions**
- RCPs, SSPs, and RAPs
- Simulation Sets
- Global and Regional Linkages
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Core questions help us separate impact of intertwined economic, climate, and adaptation pathways in coming decades:

- 1) What is the sensitivity of current agricultural production systems to climate change?
- 2) What are the benefits of adaptation in current agricultural systems?
- 3) What is the impact of climate change on future agricultural production systems?
- 4) What are the benefits of climate change adaptations?



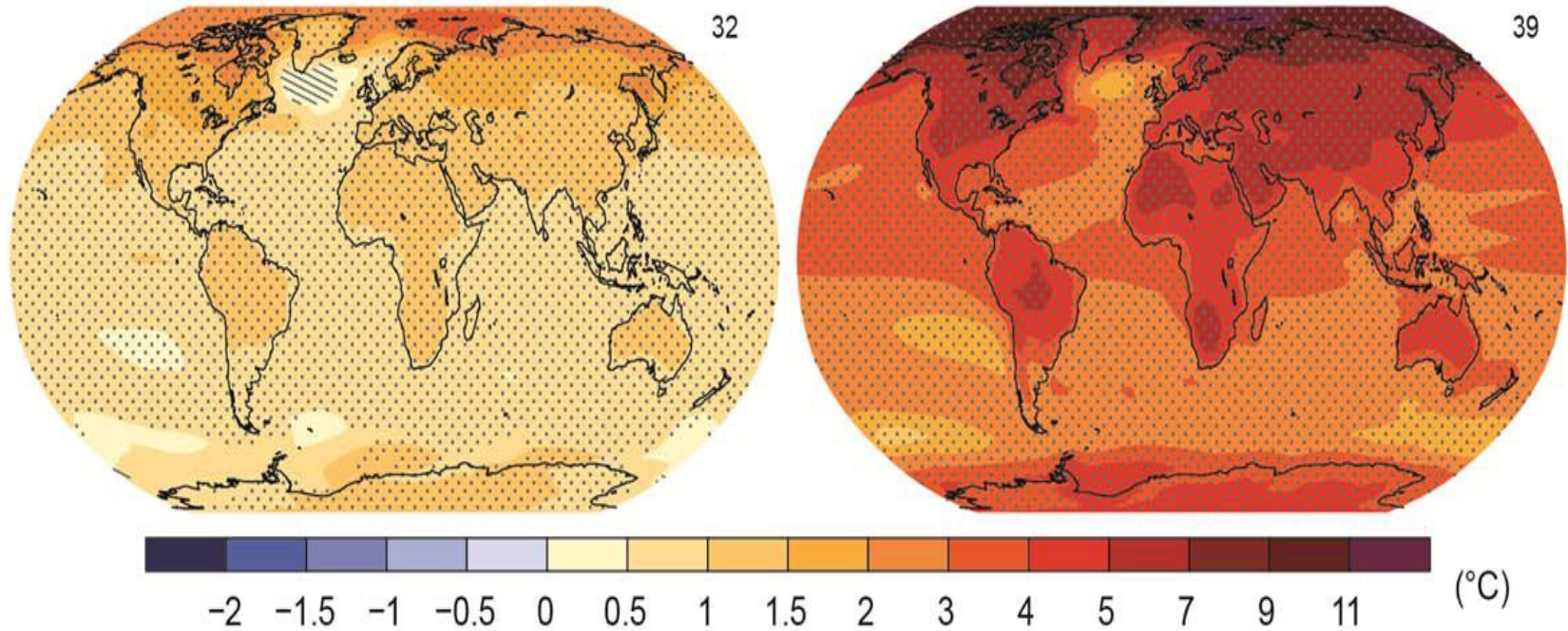
Protocol Elements

- Driving Questions
- **RCPs, SSPs, and RAPs**
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RCP 2.6

RCP 8.5

Change in average surface temperature (1986–2005 to 2081–2100)

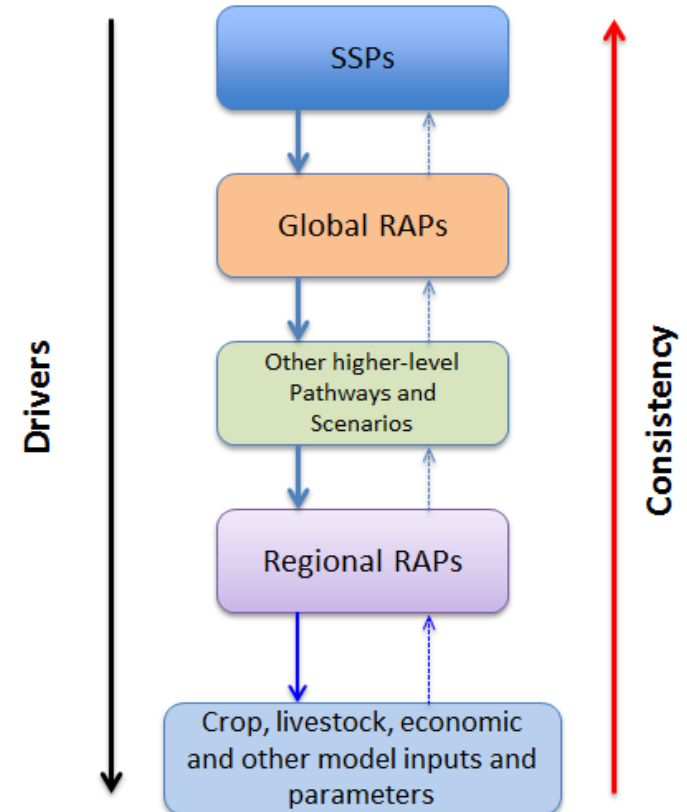
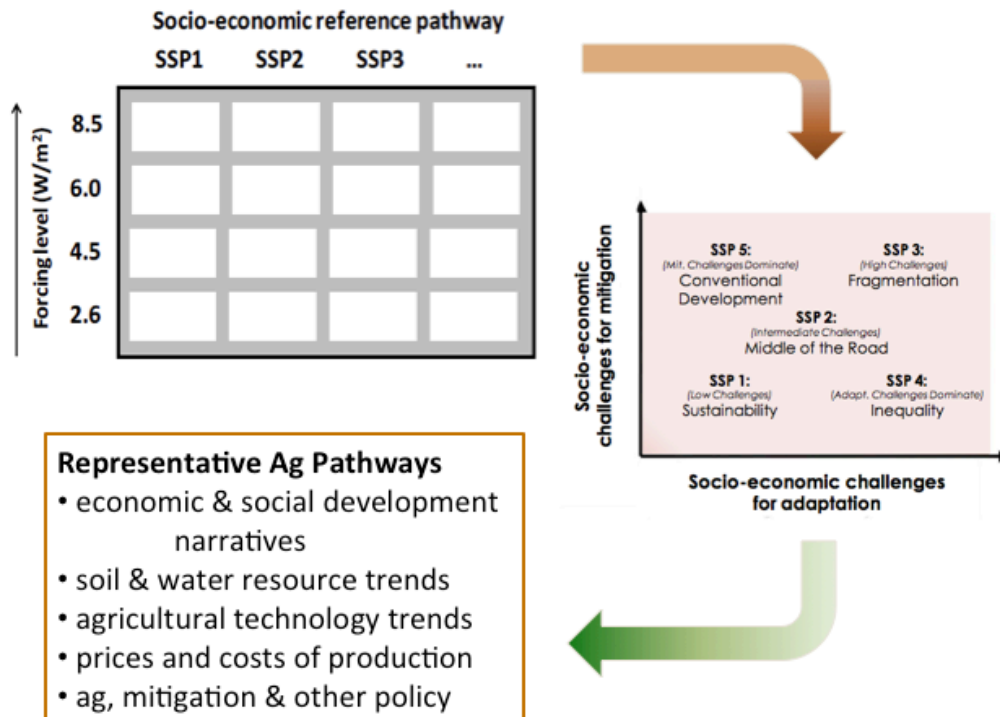


Hatching = Signal is small compared to noise

Stippling = Signal is large compared to noise and 90% of models agree

IPCC AR5 Temperature Projections

RCPs, SSPs and RAPs



Protocol Elements

- Driving Questions
- RCPs, SSPs, and RAPs
- **Simulation Sets**
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Prioritized Simulation Sets

Theme	Simulation Set	Storyline	RCP	SSP	RAP	Climate Adaptation	Time Period	Output Variables
Core	Historical	Evaluation period over recent historical conditions	---	---	---	---	1980-2010	Described in attached table
Core	No Climate Change	Economic development proceeds without climate change impacts	RCP 8.5	2	Low Sustainability	---	2010-2100	Described in attached table
Core	Low Sustainability	Economic development emphasizes growth over sustainability	RCP 8.5	5	Low Sustainability	High adaptation investment	2010-2100	Described in attached table
Core	High Sustainability	Economic development emphasizes sustainability over growth	RCP 4.5	1	High Sustainability	Moderate adaptation investment	2010-2100	Described in attached table
Adaptation	Heat-Resistant Varieties	Low sustainability path but with major investment in heat-resistant cultivars	RCP 8.5	5	Low Sustainability	Heat-resistant cultivars	2010-2100	Described in attached table
Mitigation	Intense Biofuels	Low sustainability path but with heavy reliance on biofuels for energy	RCP 8.5	5	Intense Biofuels	High adaptation investment	2005-2050	Described in attached table
Food Security	High Protein Demand	Low sustainability path but with increased dietary demand for protein	RCP 8.5	5	High Protein Demand	High adaptation investment	2005-2050	Described in attached table
Food Policy	High Export Controls	Low sustainability path but with more protective export controls	RCP 8.5	5	High Export Controls	High adaptation investment	2005-2050	Described in attached table
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For Demonstration: Not Comprehensive

Protocol Elements

- Driving Questions
- RCPs, SSPs, and RAPs
- Simulation Sets
- **Global and Regional Linkages**
- Outputs and Outcomes

Crop model pilots and integrated assessment regions

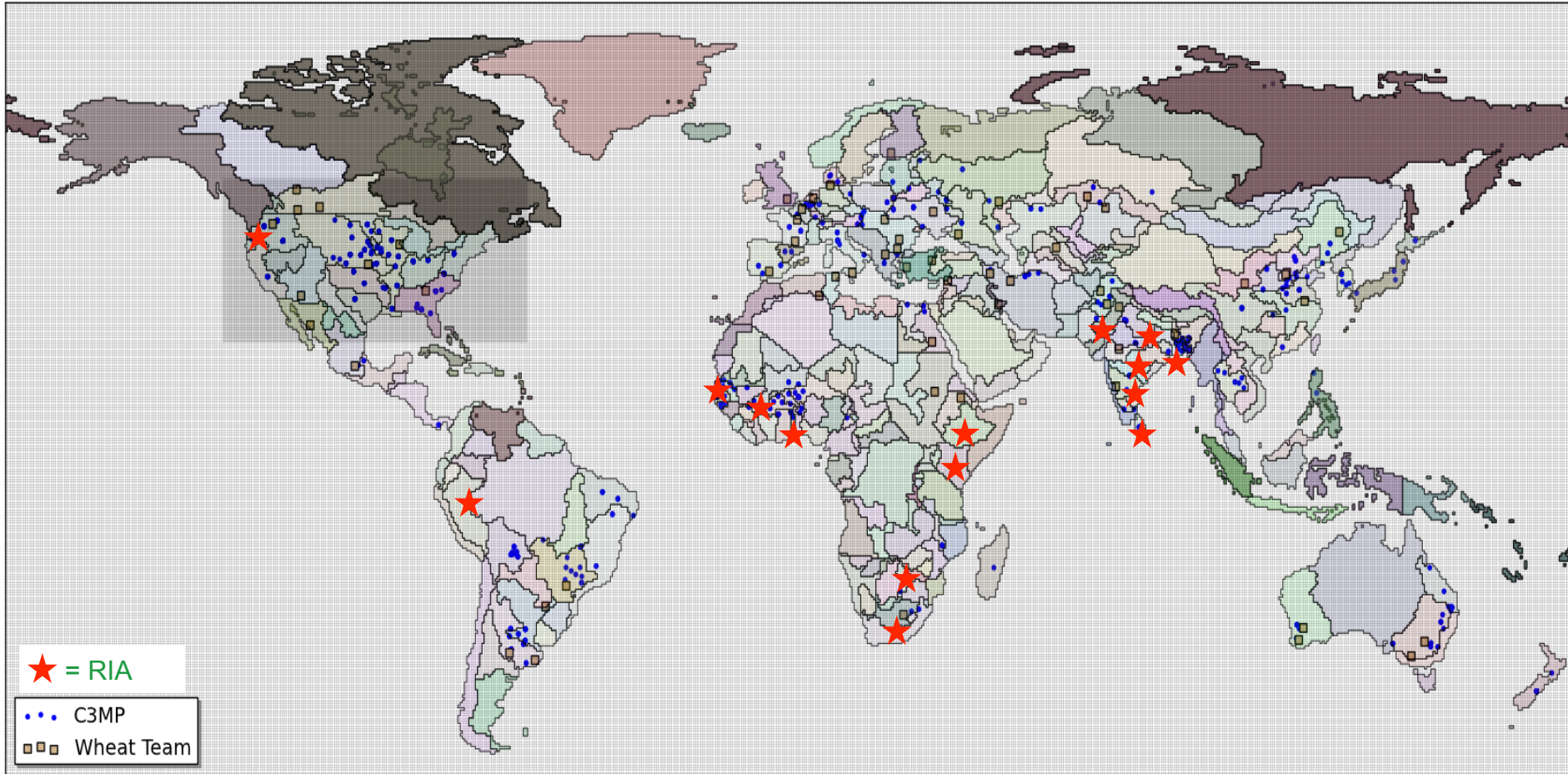


Others under development:

- sorghum/millet
- biofuels
- livestock/grasslands
- canola

16 crops included in C3MP:

- maize, rice, wheat, soybean
- millet, sorghum, barley, rye, chickpea
- peanut, cotton, Bambara groundnut
- canola, grapevine, sugarcane, pasture

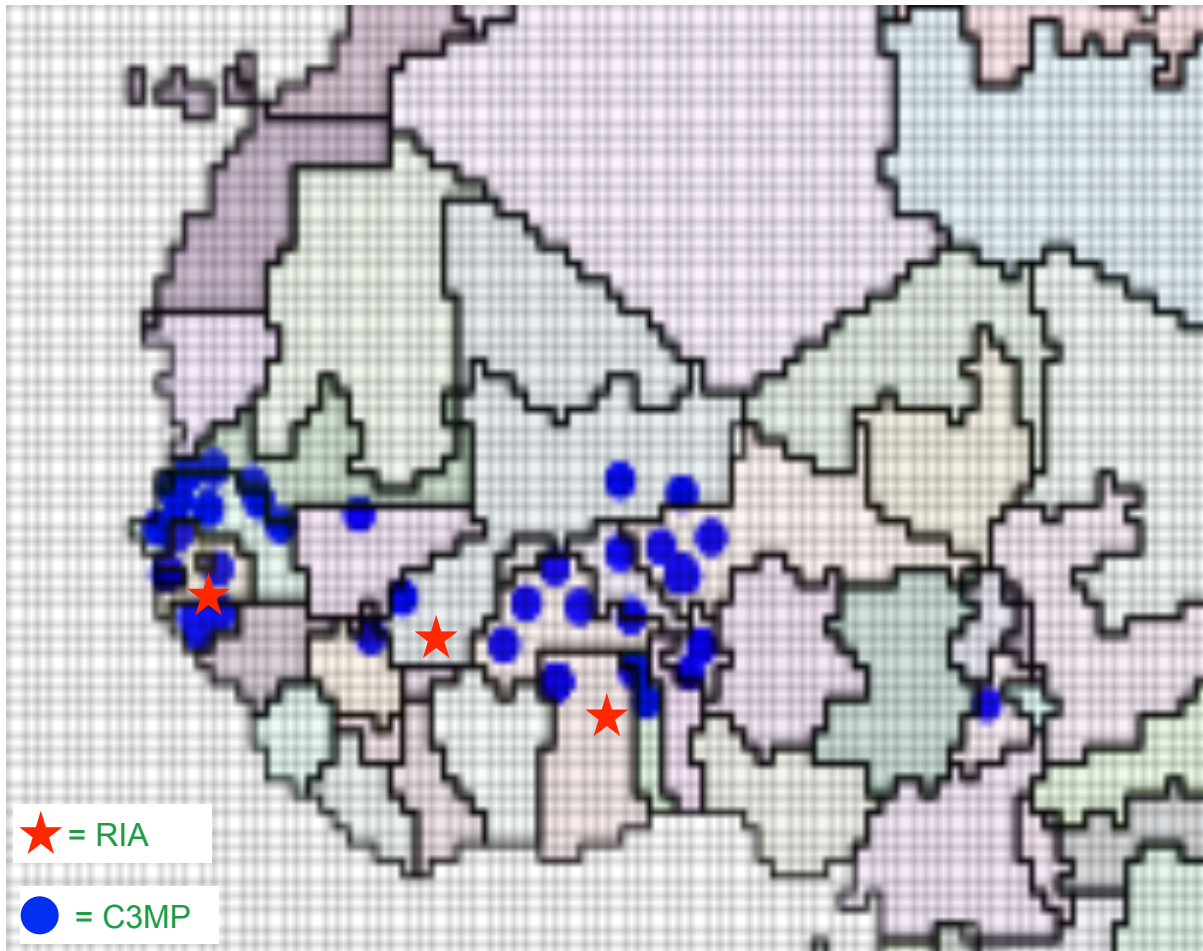


Grids = Global and regional crop models; Polygons = Food-producing units

TOA-MD has 100+ users around the world

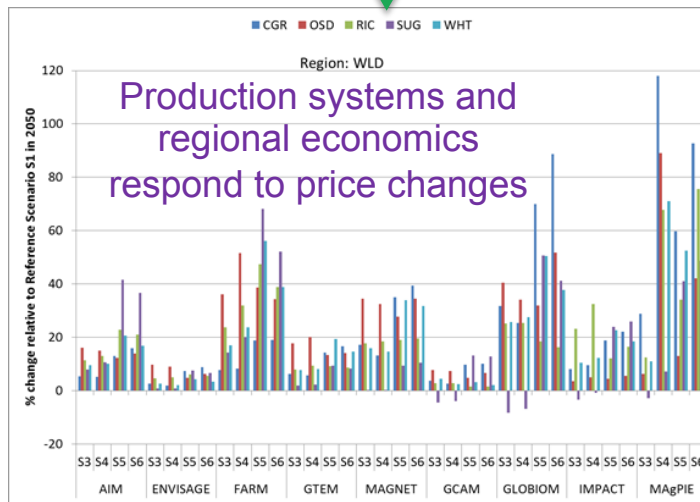
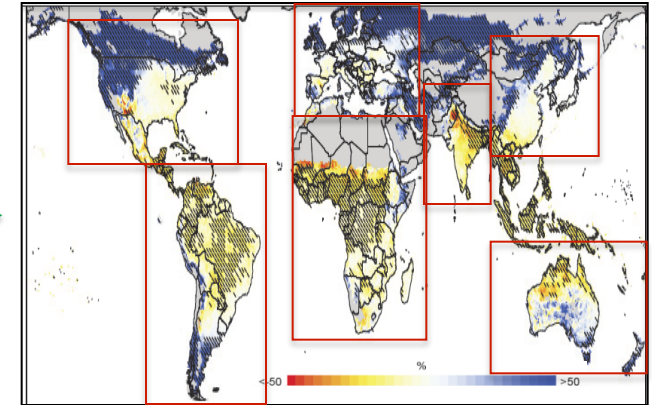
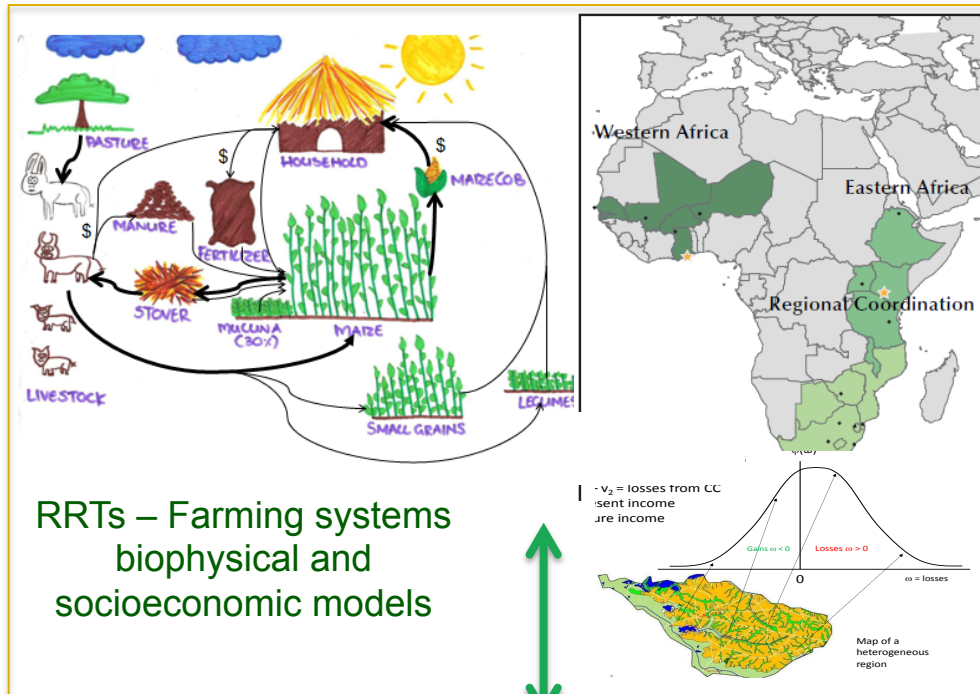
Linking network of crop modeling sites and global/regional crop modeling grids

West Africa



*Link network of carefully evaluated sites
with comprehensive grid coverage
for improved hybridized product*

AgMIP Contributions to CGRA Building Blocks (2)



Protocol Elements

- Driving Questions
- RCPs, SSPs, and RAPs
- Simulation Sets
- Global and Regional Linkages
- **Outputs and Outcomes**

Crops-Livestock

- Yield
- Nitrogen stress
- Water stress

Economics

- Prices
- Agricultural GDP
- Rural livelihoods
- Imports-Exports
- Land area

Nutrition

- Protein content
- % malnourished children

Water Resources

- ET
- Soil water
- Irrigation

Each variable defined as unit and time scale.

Core Outcome: How climate change and climate change policies will affect global and regional agricultural production and food security under low and high sustainability pathways

- **Outcome (1):** Capabilities of and limits to adaptation, with specific information regarding technology trends vs specific adaptation strategies, genetics, and management
- **Outcome (2):** Effects of agricultural mitigation policies, with specific information regarding greenhouse gas emissions and concentrations, prices, biofuels; land use, and soil carbon
- **Outcome (3):** How climate change will affect food security and nutrition, with specific information regarding availability, access, utilization, stability, and nutrition
- **Outcome (4):** How food policies will affect future agricultural production and food security in regard to trade and ecosystem protection

Organization and Partners

Funding Strategy

Benefits to Participation



- Building Block Leads and Teams
- Regional Leads and Teams
- IT Leads and Team
- Science Integration Team



Some of the many partners and donor institutions involved in AgMIP

Hybrid Project and Distributed Funding

- 1) Core Project Funding
- 2) Regional and National Agricultural Programs
- 3) Development Agencies
- 4) International Organizations
- 5) Partnerships

Benefits to Participation

- 1) Learning
- 2) Individual model improvement
- 3) New cross-scale/discipline methodologies
- 4) Opportunities for building block/regional leadership
- 5) Authorship on multiple papers

- ~2020: IPCC AR6 published**
- 2019: CGRA research published**
- 2018: CGRA conducted**
- 2017: Protocols finalized and CGRA begins**
- 2016: Prototype projects for connections and protocols**
- 2015: CGRA launch and coalition building**

Coordinated Global and Regional Assessments Scoping

