

Utilizing Scenarios in AgMIP

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AgMIP Overview

www.agmip.org

- “A distributed climate-scenario simulation exercise for historical ***model intercomparison*** and future climate change conditions with participation of multiple crop and agricultural economics modeling groups around the world”
- CMIP as model
- Four teams
 - Crop modeling, economic modeling, climate scenarios, IT

Crop models versus economic models

- Crop model <-> GCM
 - Process based, model (bio)physical interactions, laws of physics, chemistry, biology determine outcomes
 - Experimental data can be generated/collected
- Economic model
 - Reduced form of combinations of biophysical and socioeconomic interactions
 - *Many* (!) different variations (partial equilibrium, general equilibrium, integrated assessment, global, regional, local)
 - No experimental data

Lots of new acronyms

- In the AgMIP world
 - AgMIP – agricultural model intercomparison project
 - RAP – representative agricultural pathways
- In the SMA-SSP world
 - See my incomplete list
- “Is it worth my time to learn these?”

DIMENSIONALITY, CONSISTENCY AND PRESENTATION

SMA-SSP Dimensionality

- SMA diagram simplicity (2 dimensions) hides many more
 - SSPs have at least 8 – Demographics, Economic development, Welfare, Resources, Institutions and governance, Technological development, Broader societal factors, Policies
 - Climate policies
 - All of above could interact with multiple RCPs/GCM outputs
- Exogenous vs endogenous elements (e.g. rapid economic growth -> low population growth)

AgMIP dimensionality example

Input and output data for global model intercomparisons

- Inputs
 - Population, GDP, crude oil price, exogenous crop and livestock growth, income and price elasticities, climate change, policies
- Outputs (by country)
 - Yield, area, production, consumption, trade and prices for wheat, coarse grains (with maize broken out separately), rice, oilseeds, ruminant meat, non-ruminant meat, land use/cover by crops, pasture, others
- Curse of dimensionality 'solved' for model intercomparison
 - Limited reference scenarios – Common set of inputs for all modelers

Consistency and plausibility

- Van Vuuren et al (2010) – decoupling of climate forcings and socioeconomic scenarios justified by very low degree of correlation
- Plausibility still essential
- Plausible ...
 - individual drivers
 - combinations of drivers
 - outcomes

Presentation

Three global and regional GDP per-capita growth scenarios

Global growth rate assumptions, annual average 2010-2050 (%)

	Pessimistic	Baseline	Optimistic
Population	1.04	0.70	0.35
GDP	1.91	3.21	3.58
GDP per capita	0.86	2.49	3.22

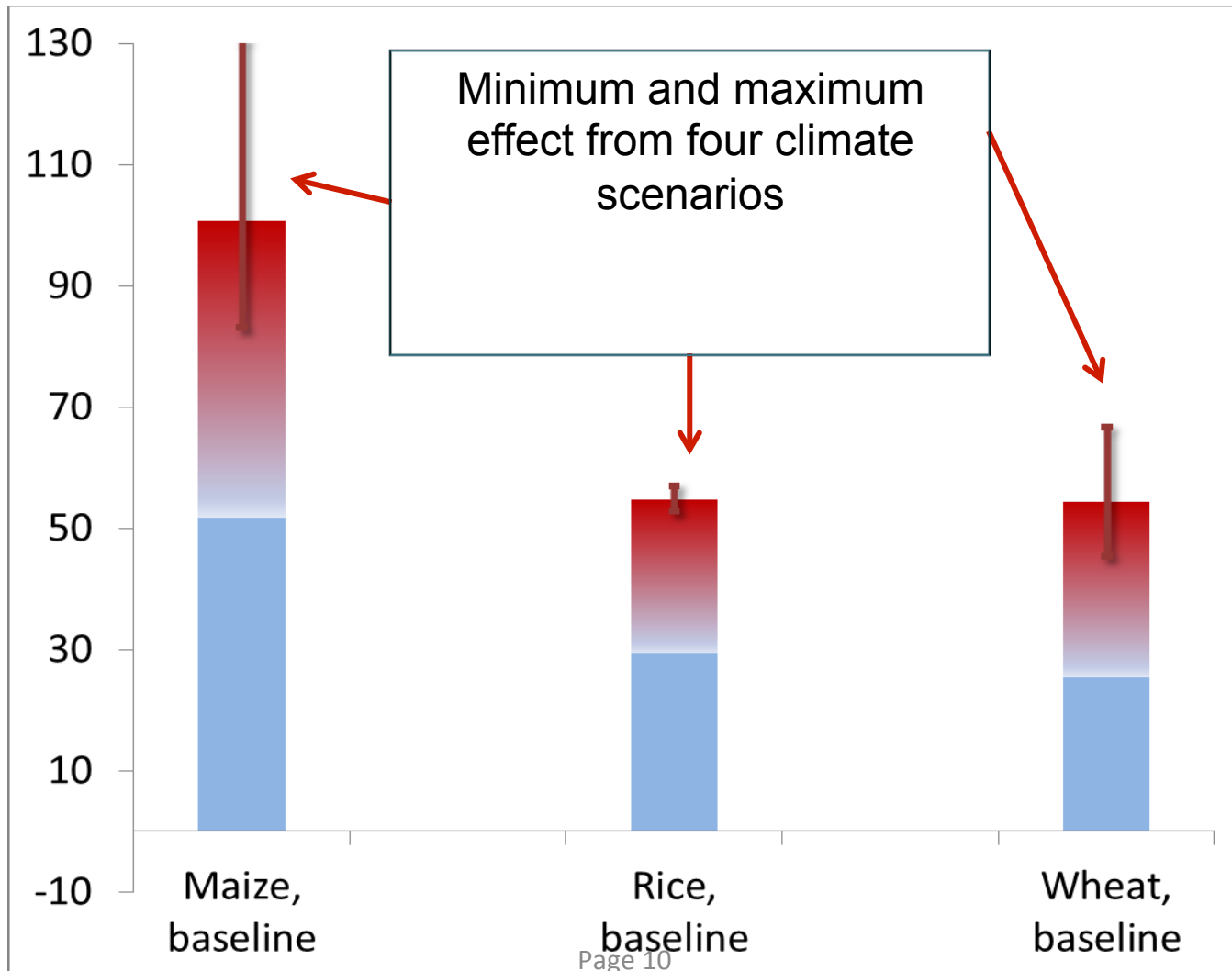
African GDP per capita growth rate assumptions, annual average 2010-2050 (%)

	Pessimistic	Baseline	Optimistic
Central Africa	2.42	3.92	4.85
Western Africa	2.04	3.63	4.03
Eastern Africa	2.72	4.18	4.97
Northern Africa	1.78	2.60	3.49
Southern Africa	0.55	2.98	3.44

Presentation

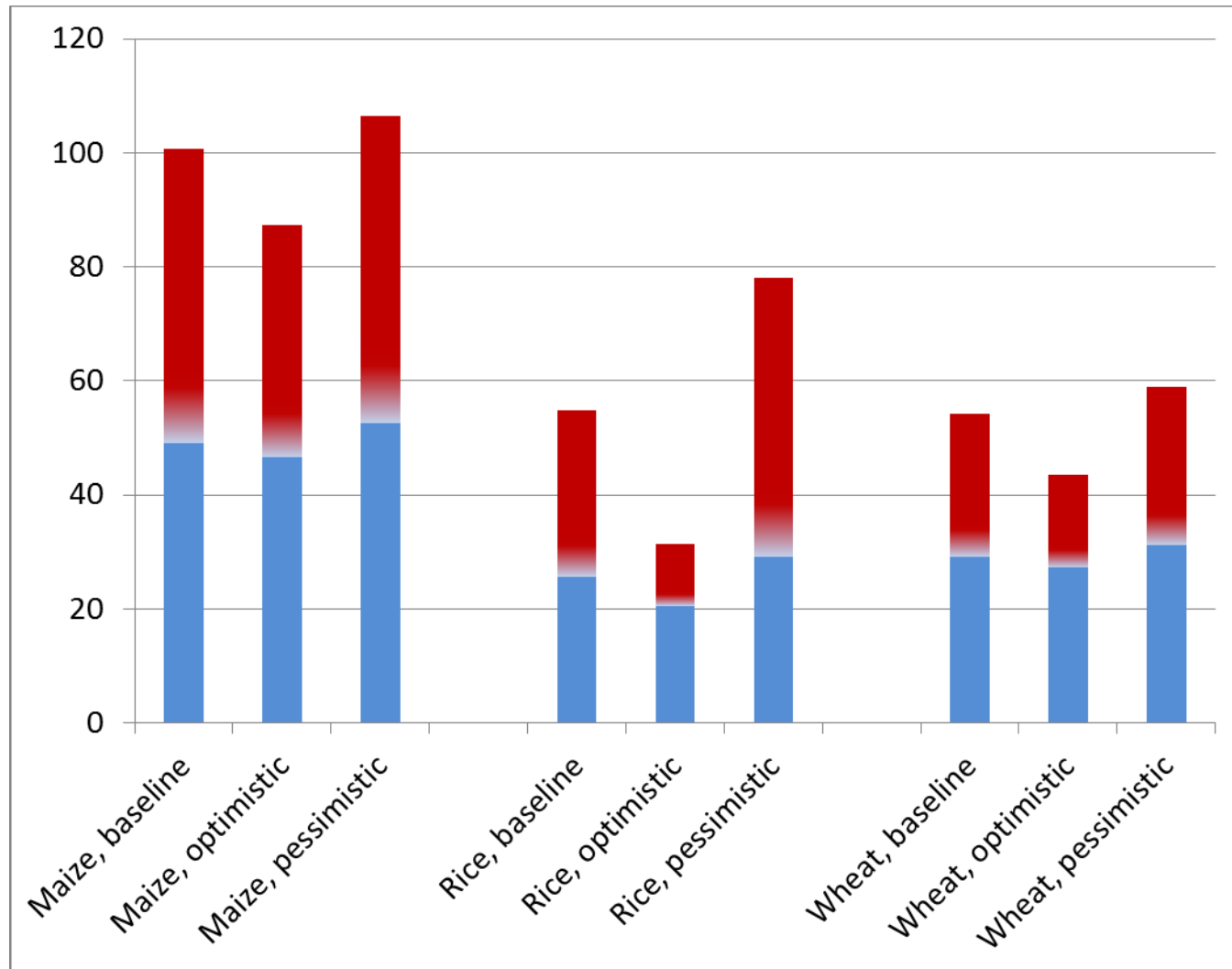
Climate change scenario effects differ

(price increase (%), 2010 – 2050, Baseline economy and demography)



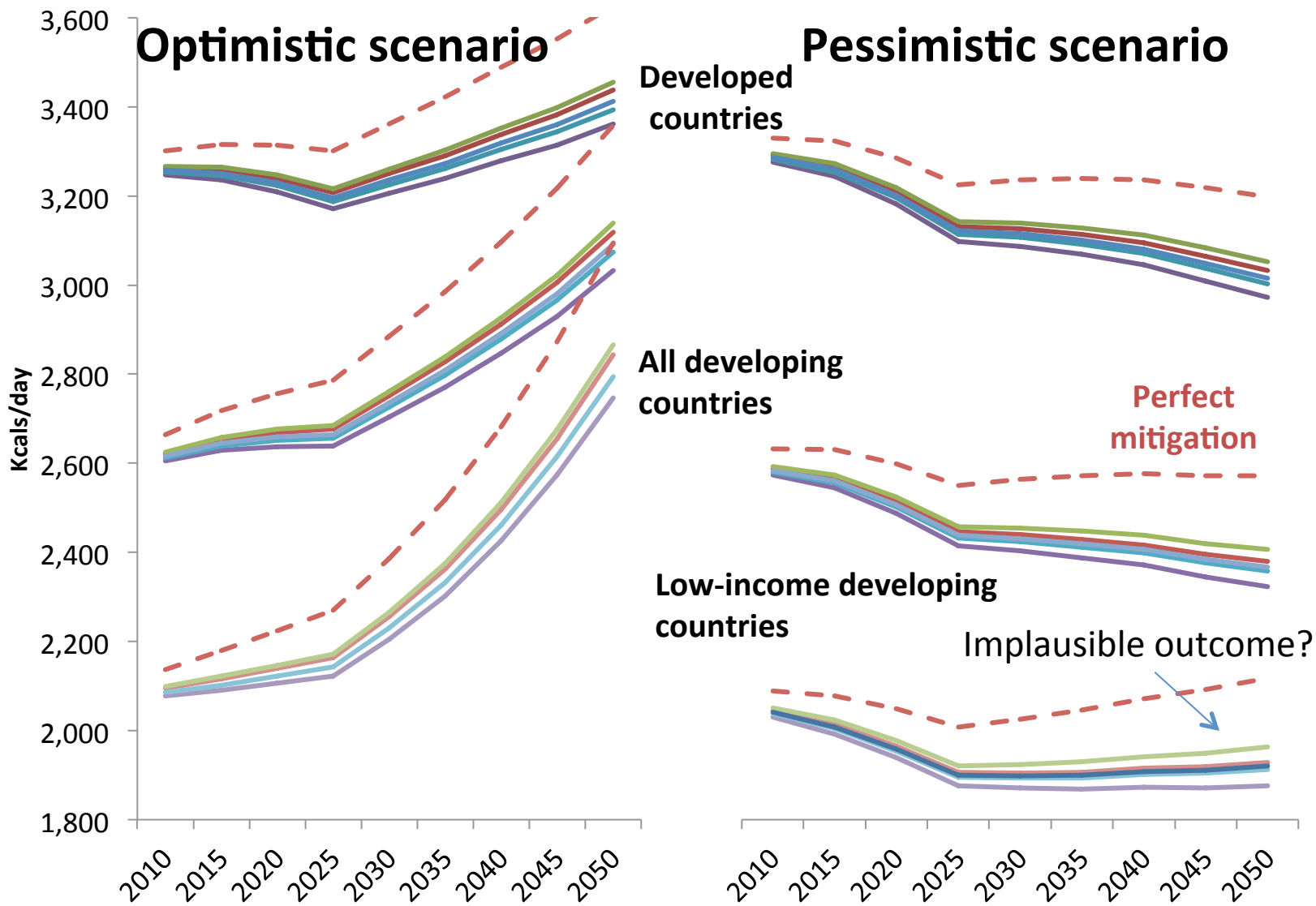
Presentation

Economy and population scenarios alter price outcomes
(price increase (%), 2010 – 2050, Changing economy and demography)



Presentation

Assessing food security and climate change outcomes



CREATE YOUR OWN SCENARIOS

Build Your Own Scenarios, 1

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Claudia Ringler

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This page allows you to configure and launch a new IMPACT job. Select a predefined scenario or construct your own.

Scenario Selection

Custom growth rates are defined as exceptions on one of the standard scenario rates (low,med,high).

Scenario Selection					
Scenario	Population	GDP	Yields	Description	
Base	med	med	NoCC	Baseline scenario	View
Optimistic	low	high	NoCC	From ClimateList.txt	View
Pessimistic	high	low	NoCC	Add text here	View
BaseNoCC	med	med	NoCC	Same as baseline	View
MIR_369_B1	med	med	MIR_369_B1	IPCC	View
MIR_369_A2	med	med	MIR_369_A2	IPCC	View
MIR_369_A1	med	med	MIR_369_A1	IPCC	View
ECH_369_A2	med	med	ECH_369_A2	IPCC	View
ECH_369_A1	med	med	ECH_369_A1	IPCC	View
CSI_369_B1	med	med	CSI_369_B1	IPCC	View
CSI_369_A2	med	med	CSI_369_A2	IPCC	View
CSI_369_A1	med	med	CSI_369_A1	IPCC	View
CNR_369_A2	med	med	CNR_369_A2	IPCC	View
CNR_369_A1	med	med	CNR_369_A1	IPCC	View

low



low



NoCC



Solve

Build Your Own Scenarios, 1

MIR_369_B1	med	med	MIR_369_B1	IPCC	View
MIR_369_A2	med	med	MIR_369_A2	IPCC	View
MIR_369_A1	med	med	MIR_369_A1	IPCC	View
ECH_369_A2	med	med	ECH_369_A2	IPCC	View
ECH_369_A1	med	med	ECH_369_A1	IPCC	View
CSI_369_B1	med	med	CSI_369_B1	IPCC	View
CSI_369_A2	med	med	CSI_369_A2	IPCC	View
CSI_369_A1	med	med	CSI_369_A1	IPCC	View
CNR_369_A2	med	med	CNR_369_A2	IPCC	View
CNR_369_A1	med	med	CNR_369_A1	IPCC	View

New test scenario:

Population Growth Rates (exceptions on low scenario)

Countries	y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
ADR CAU BAL CEU KAZ KYR POL RUS TAJ TKY TKM UKR UZB										

[select](#)

GDP Growth Rates (exceptions on low scenario)

Countries	y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
ANG BEN BOT BUF BUR CAM CAR CHA DRC CON ERI ETH EQG GAB GAM										

[select](#)

Yield Growth Rates (exceptions on MIR_369_B1 scenario)

Countries	y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
UNS CAN										

[select](#)