EVALUATION AND DIAGNOSTICS SWG

Jae Edmonds, Chair

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Executive Members
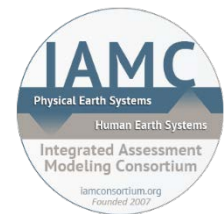
November 17, 2015

The E&D SWG Charter

The SWG on Evaluation and Diagnostics exists to foster activities that help describe, document and understand the performance of integrated assessment models so as to improve model performance and reliability and to make recommendations in the areas of priorities for community activities and standards of best practice.
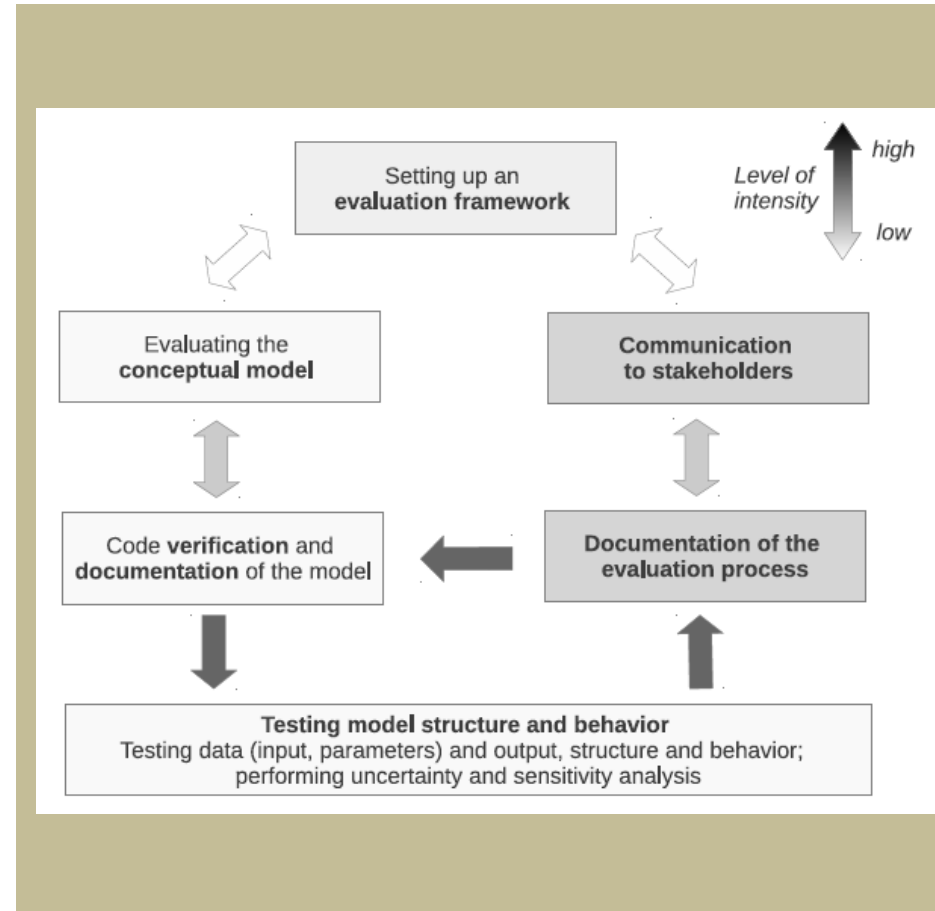
http://www.globalchange.umd.edu/iamc/scientific-working-groups/evaluation-and-diagnostics/

Evaluation & Diagnostics

Part of a larger process of model validation including:

- Documentation

- Intercomparison

- Evaluation & Diagnostics

- Behavior testing
  - Hindcasting
  - Stylized facts

- **Keynote by Charlie Wilson on IAM evaluation, follows in the session on IAM directions.**

Two E&D Activities In the Community

Advanced Model Development and **Validation** for the **Improved Analysis** of **Costs** and **Impacts** of **Mitigation Policies**
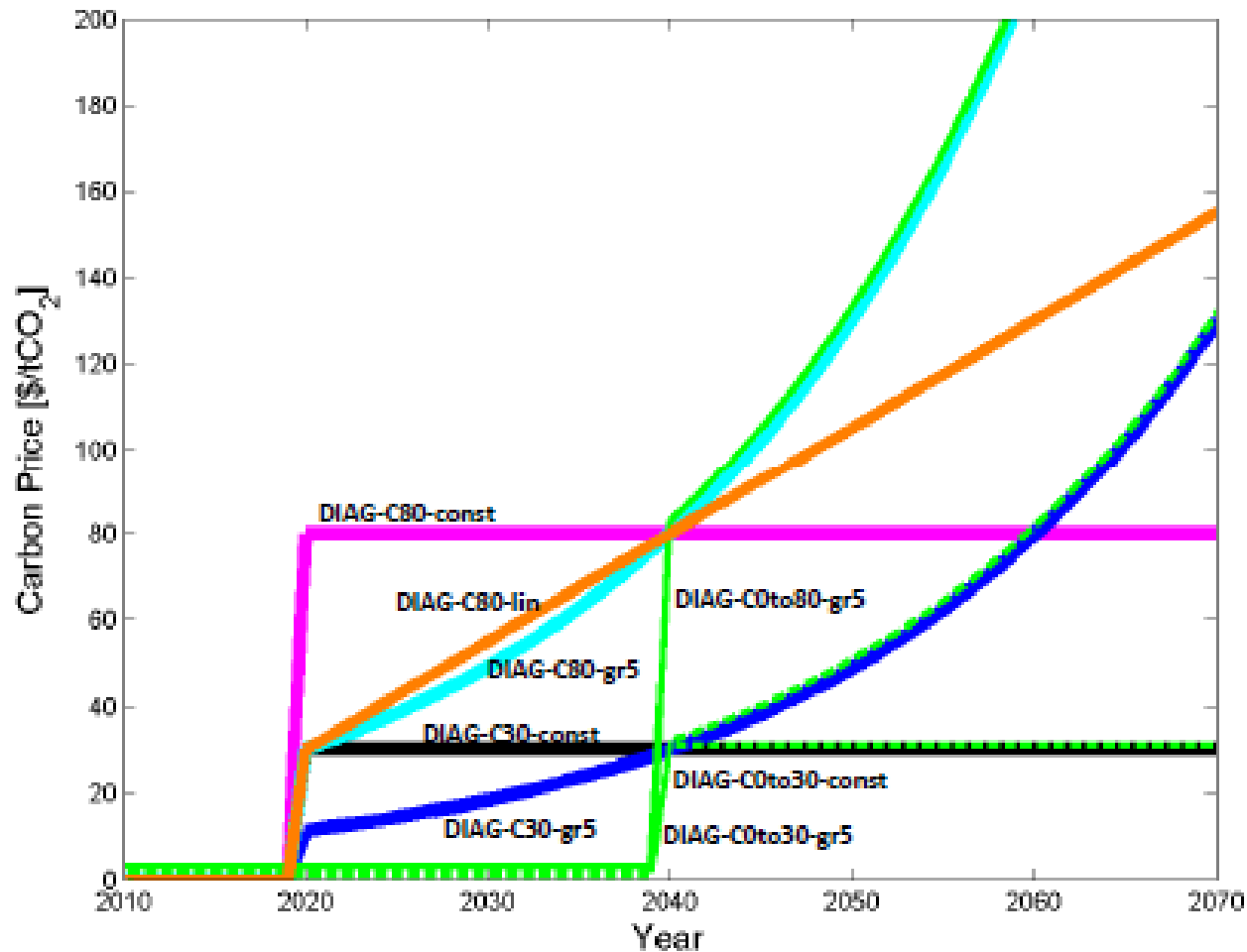
PIAMDDI

ADVANCE

Advanced Model Development and Validation for the Improved Analysis of Costs and Impacts of Mitigation Policies

- The E&D SWG recommended that members consider participating in the ADVANCE model diagnostics activity.

- *ADVANCE diagnostics aims to characterize, compare and classify the behavior of models for climate policy analysis.*
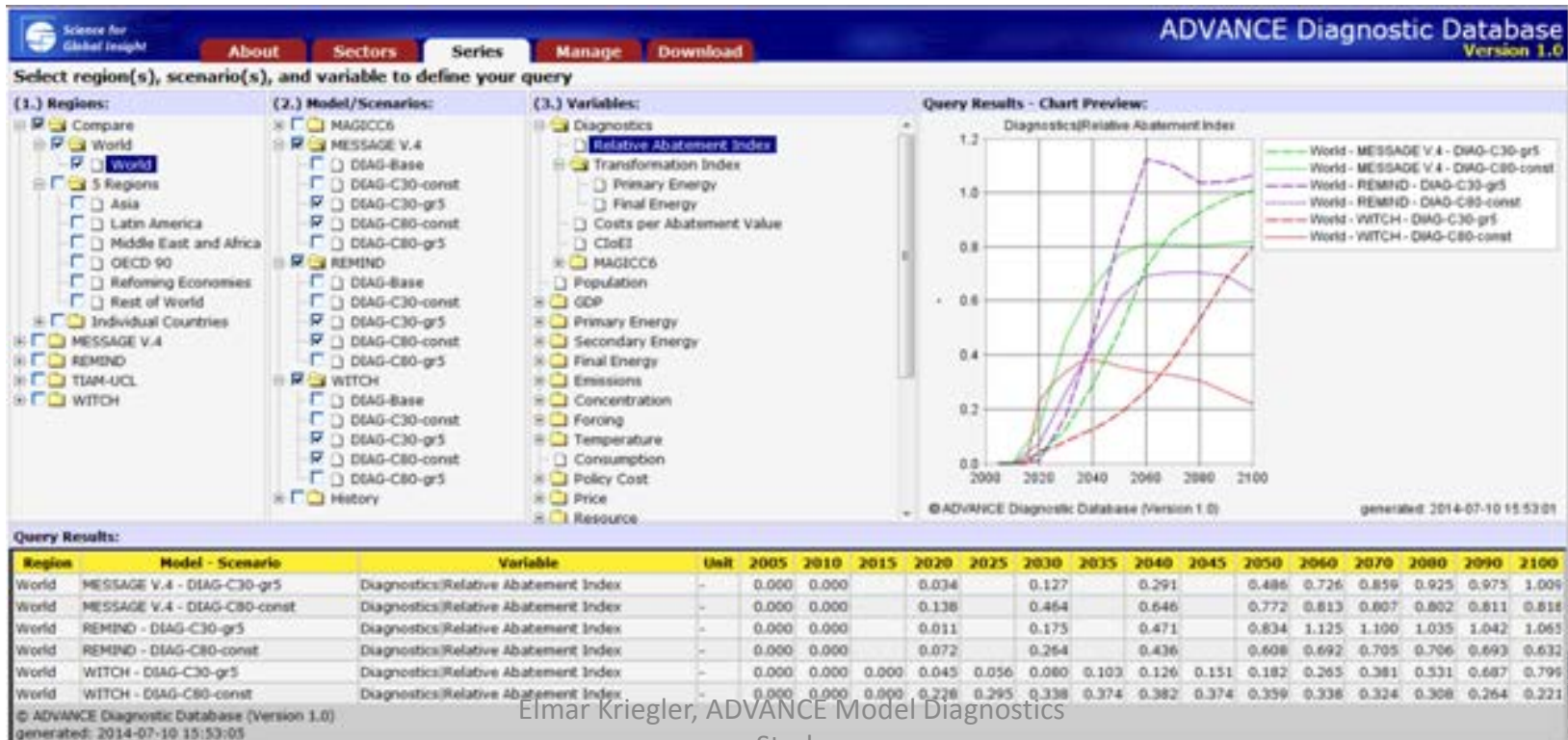
The ADVANCE Diagnostics Protocol

Participating models (open for newcomers)

	Solution Concept	Solution Method
AIM/CGE	GE (closed economy)	Recursive-dynamic (myopic)
DNE21+	PE	Inter-temporal (foresight)
EPPA	GE (closed economy)	Recursive-dynamic (myopic)
FARM	GE (global CGE)	Recursive-dynamic (myopic)
GEM-E3	GE (closed economy)	Recursive-dynamic (myopic)
IMACLIM	GE (closed economy)	Recursive-dynamic (myopic)
IMAGE	PE (price elastic demand)	Recursive-dynamic (myopic)
iPETS	GE (closed economy)	Inter-temporal (foresight)
KEI-Linkages	GE (closed economy)	Recursive-dynamic (myopic)
MESSAGE	GE (closed economy)	Inter-temporal (foresight)
POLES	PE (price elastic demand)	Recursive-dynamic (myopic)
REMIND	GE (closed economy)	Inter-temporal (foresight)
TIAM-UCL	PE (price elastic demand)	Inter-temporal (foresight)
TIAM-WORLD	PE (price elastic demand)	Inter-temporal (foresight)
WITCH	GE (closed economy)	Inter-temporal (foresight)

IAMC
Physical Earth Systems
Human Earth Systems
Integrated Assessment
Modeling Consortium
iamconsortium.org
Founded 2007

ADVANCE diagnostics infrastructure

- ADVANCE diagnostics database hosted by IIASA

- Includes automatic calculation of AMPERE diagnostic indicators and climate response (using the latest version of MAGICC)

- Graphical user interface allowing teams to compare results across models

Elmar Kriegler, ADVANCE Model Diagnostics Study

PIAMDDI

- Takes a different approach to model diagnostics and evaluation.
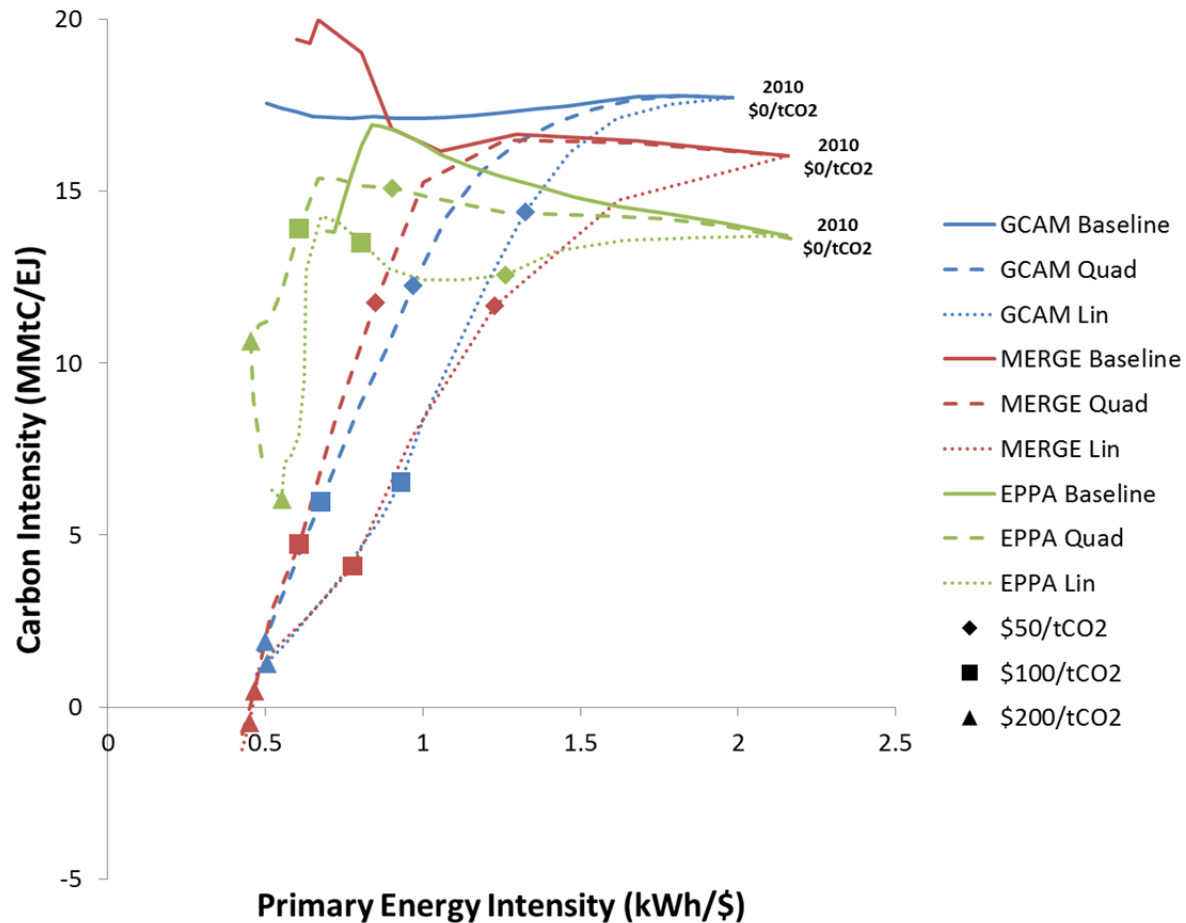
- Developing methods.

Levels of Diagnostics Being Explored in PIAMDDI

- Component module diagnostics
  - Socio-economic
  - Climate
  - Impact sectors
- Coupled system diagnostics
- Whole system diagnostics

PIAMDDI

- How do energy and carbon intensities in IAMs adjust to carbon constraints?
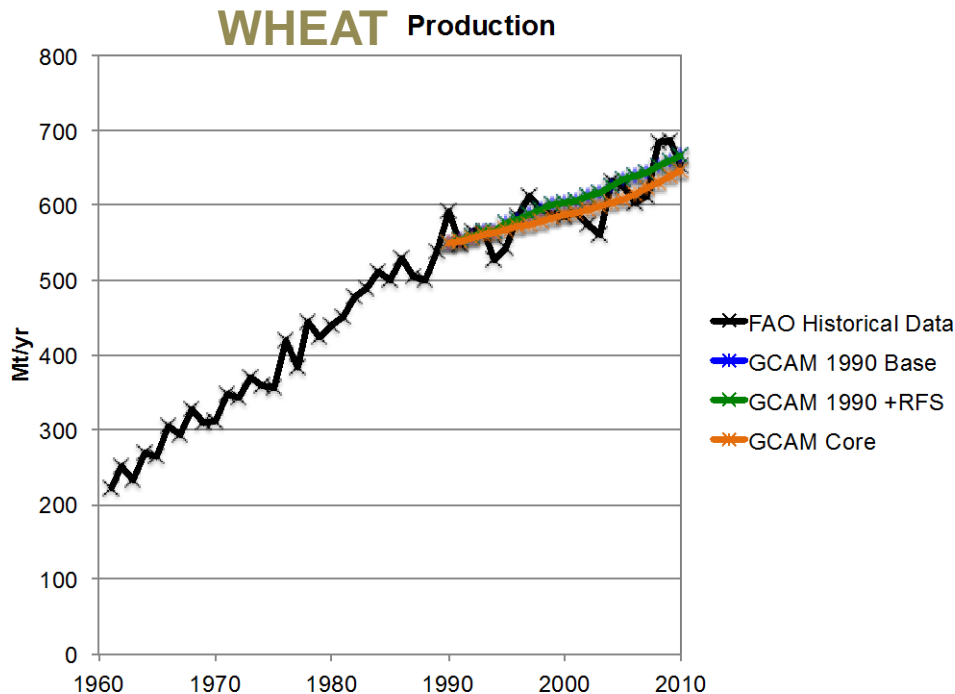
Potential Future Activities

- **Framing**

- **Information Exchange**

- **Model Validation Against Historical Data**

- **Model Evaluation Against Historical Patterns**

- **Developing Standards**

Potential Future Activities

- **Model Validation Against Historical Data:**
Model validation experiments using historical data (sometimes referred to as "hindcast" exercises) have been conducted by a number of teams (e.g. GCAM, IMAGE) to test IAM behavior against historical developments.
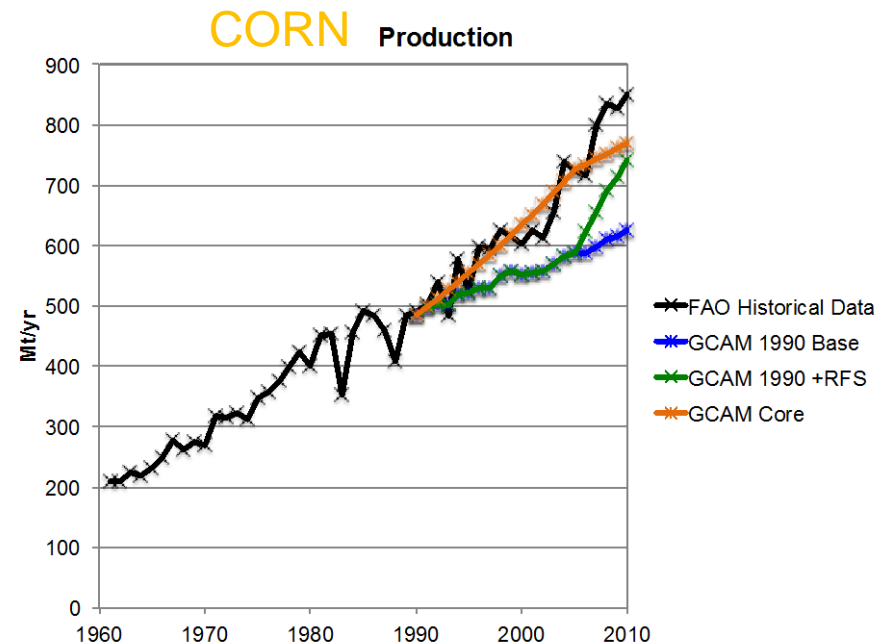
WHEAT Production

*GCAM hindcast out of 1990 base year looks pretty close to observed global **wheat** production.*

Potential Future Activities

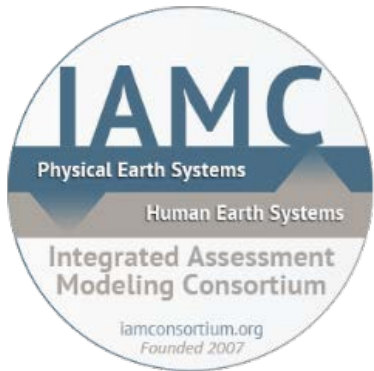- **Model Validation Against Historical Data:**
  Model validation experiments using historical data (sometimes referred to as "hindcast" exercises) have been conducted by a number of teams (e.g. GCAM, IMAGE) to test IAM behavior against historical developments.

*GCAM hindcast out of 1990 base year compared to observed global **corn** production looked less good.*

CORN Production

Mt/yr

—✕—	FAO Historical Data
—✳—	GCAM 1990 Base
—✳—	GCAM 1990 +RFS
—✕—	GCAM Core

Tomorrow's E&D SWG Breakout Group

- We will be soliciting ideas for future directions.

- As well as reviewing E&D activities in more detail.

- And membership is open.

- **Keynote by Charlie Wilson on IAM evaluation, follows in the session on IAM directions.**

DISCUSSION