An open-source geospatial cyberinfrastructure for interdisciplinary collaboration and broader engagement

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PURDUE UNIVERSITY
GLASS
Global to Local Analysis of Systems Sustainability

G·A·B·B·S
geospatial data analysis building blocks

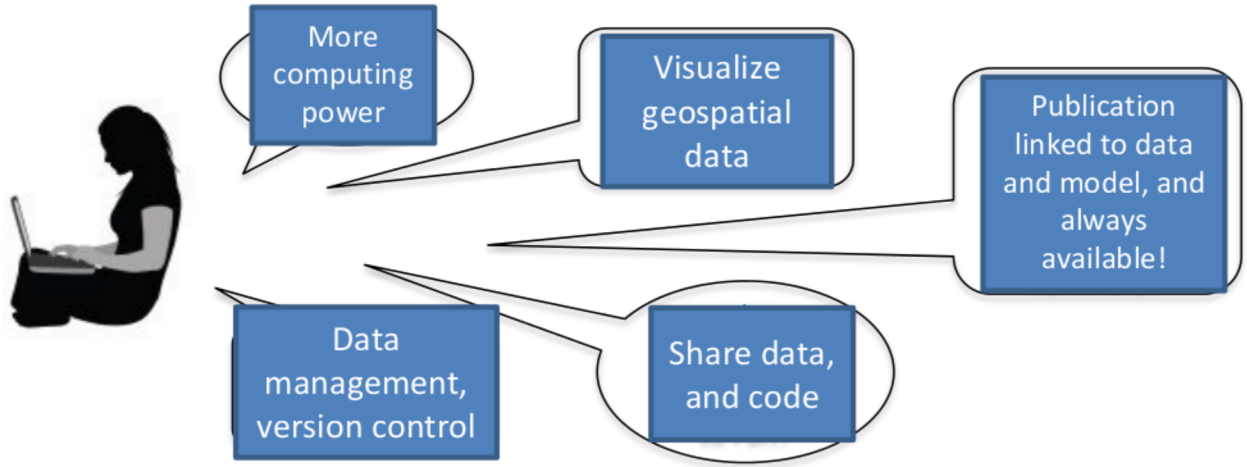
Award
ACI-1261727

Impacts World 2017, October 11-13, Potsdam, Germany

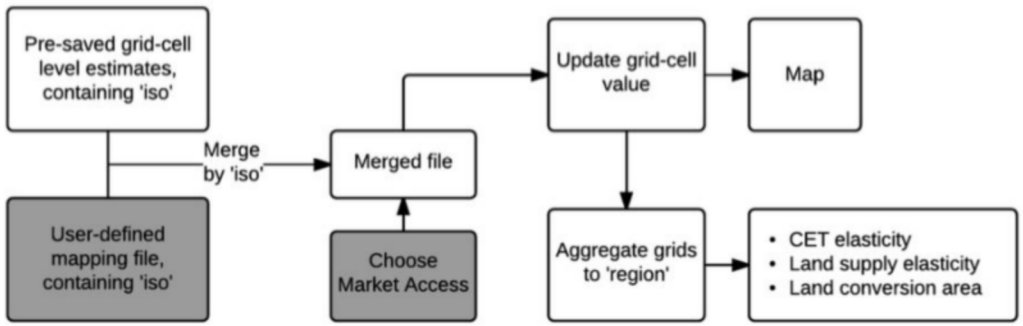
Universities

- Resources and expertise
  - + High performance computing
  - + Scientific data
  - + Scientific models
  - + Geospatial data processing, visualization
  - + Research on policy impacts
  - + Data curation
  - + … …
- These tend to be
  - – Developed in silos
  - – Do not play with each other
  - – Low usability (e.g., outside small groups)
  - – High learning curves
  - – Sustainability challenge (funding, etc)
  - – ….

Going beyond laptop computing

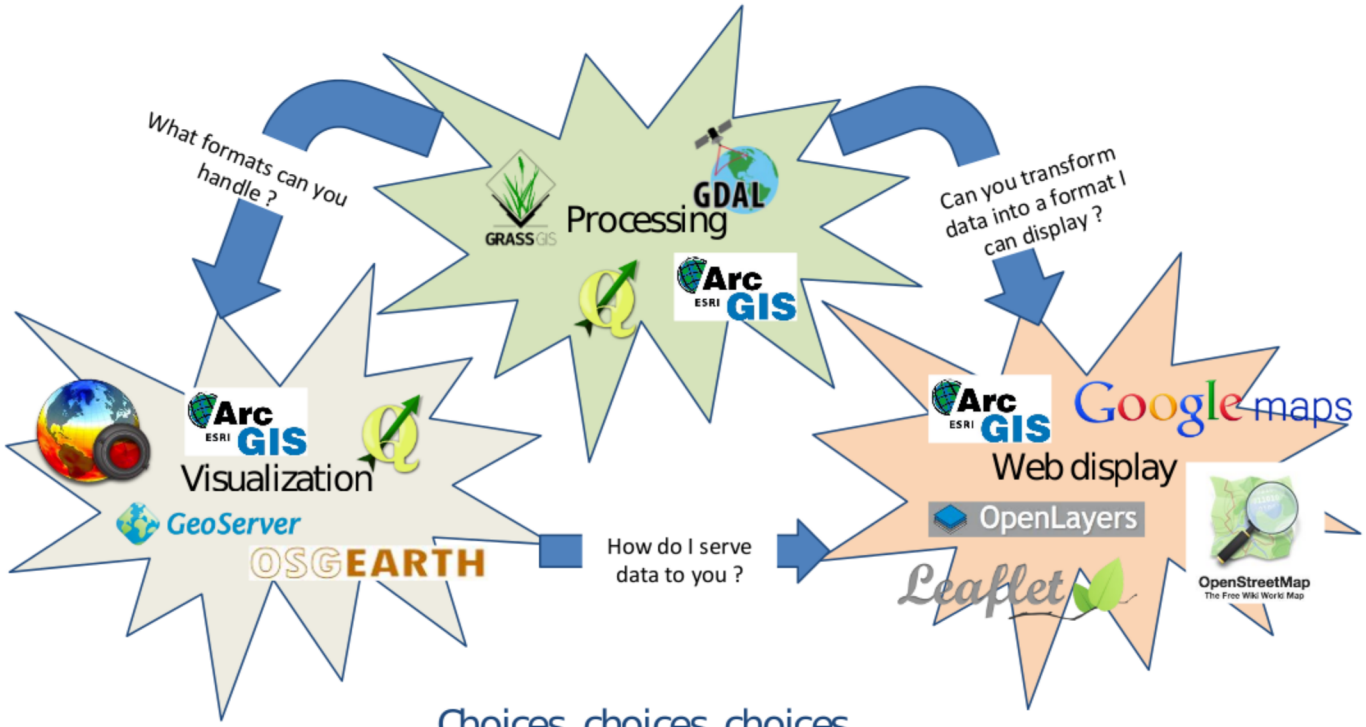


Ag economist studying cropland supply -> SIMPLE-G



Software stack for spatial data

It is definitely not trivial to deal with geospatial data (processing, displaying, exchange/sharing, etc)

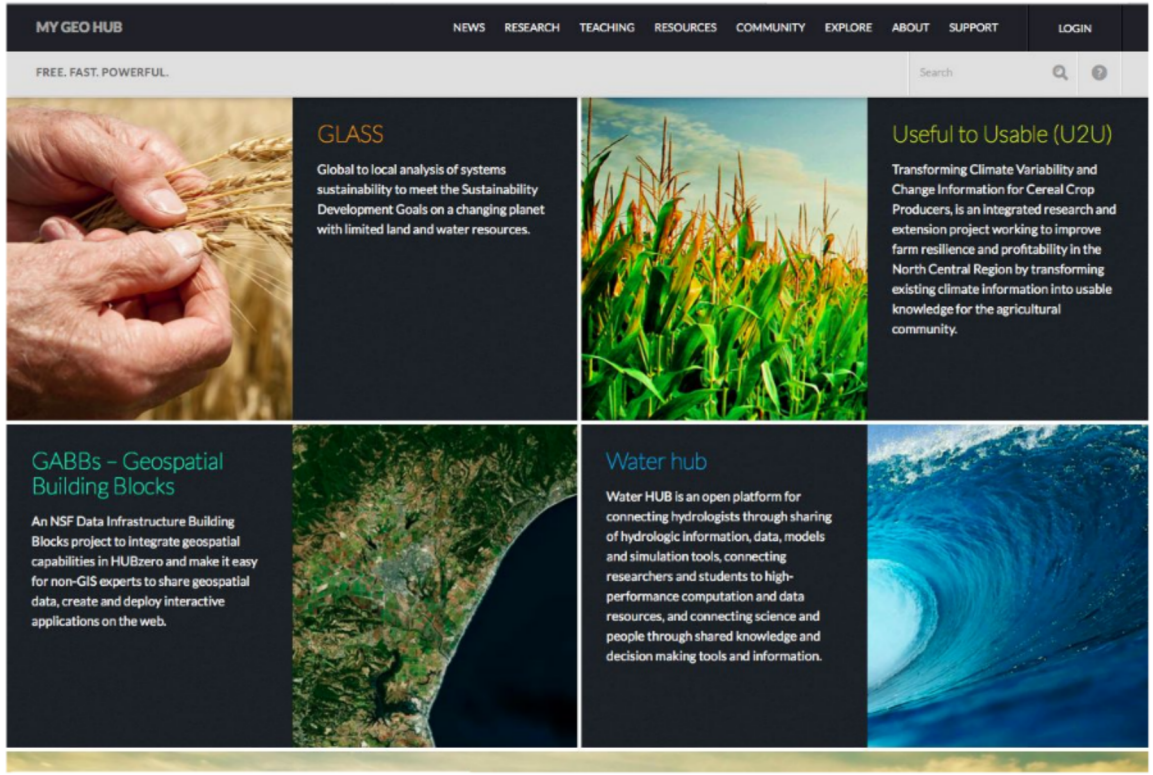


What we really need ....

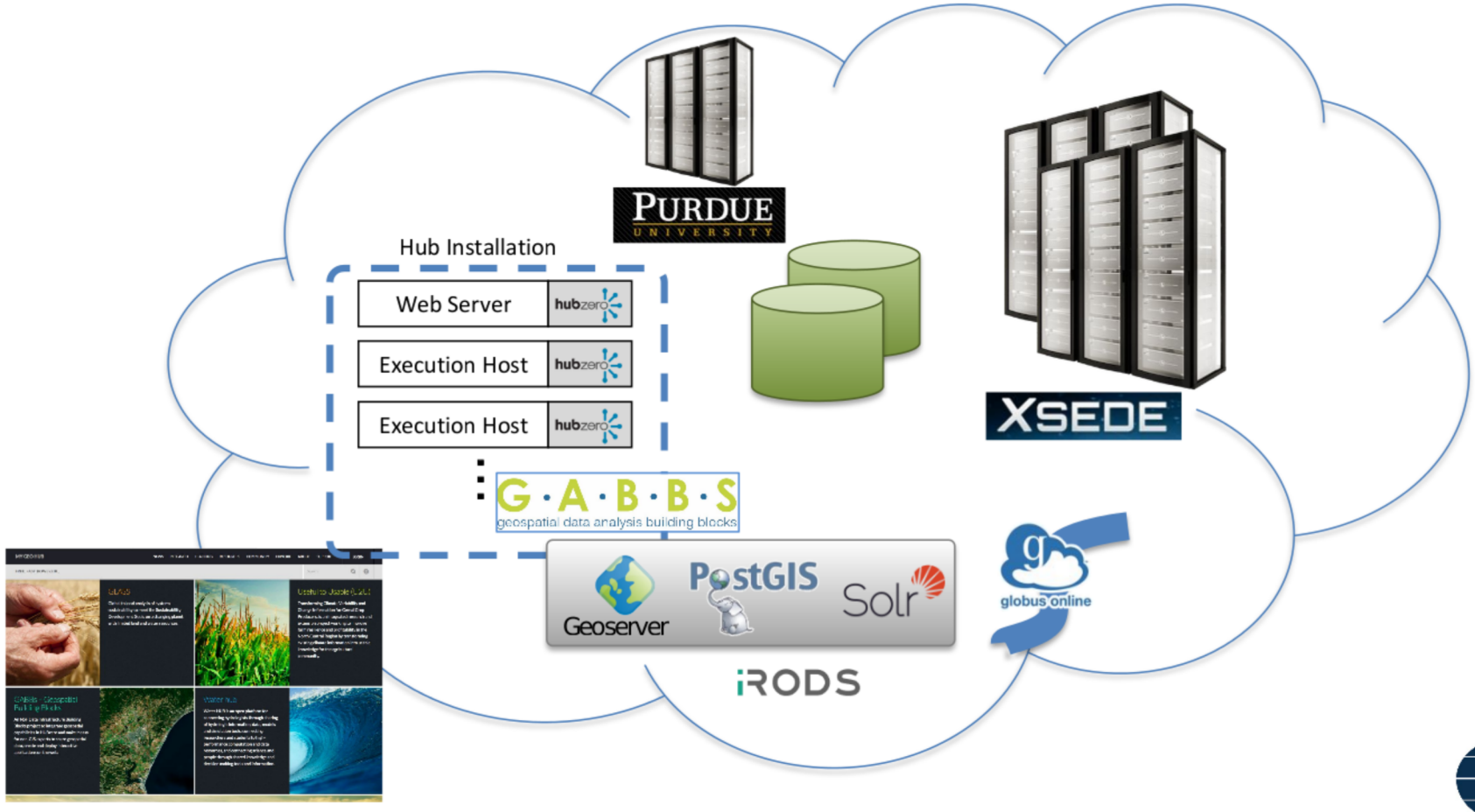
- A seamless cyberinfrastructure that encapsulates
  - High performance computing resources
  - Data management
  - Geospatial data capabilities
  - Multi-scale data transformation and models
  - Sharing and collaboration around data
- And also
  - Easy to use
  - Open access
  - “Lights on” all the time

What is GeoHub?

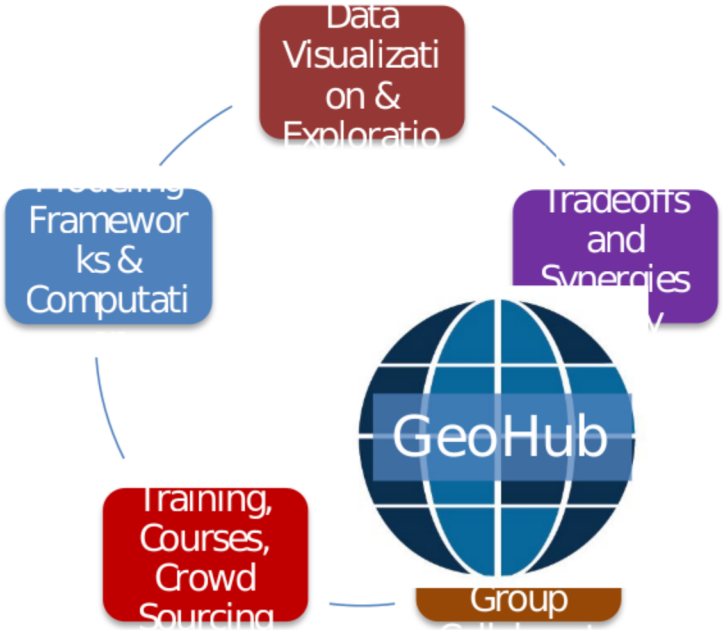
A web portal?



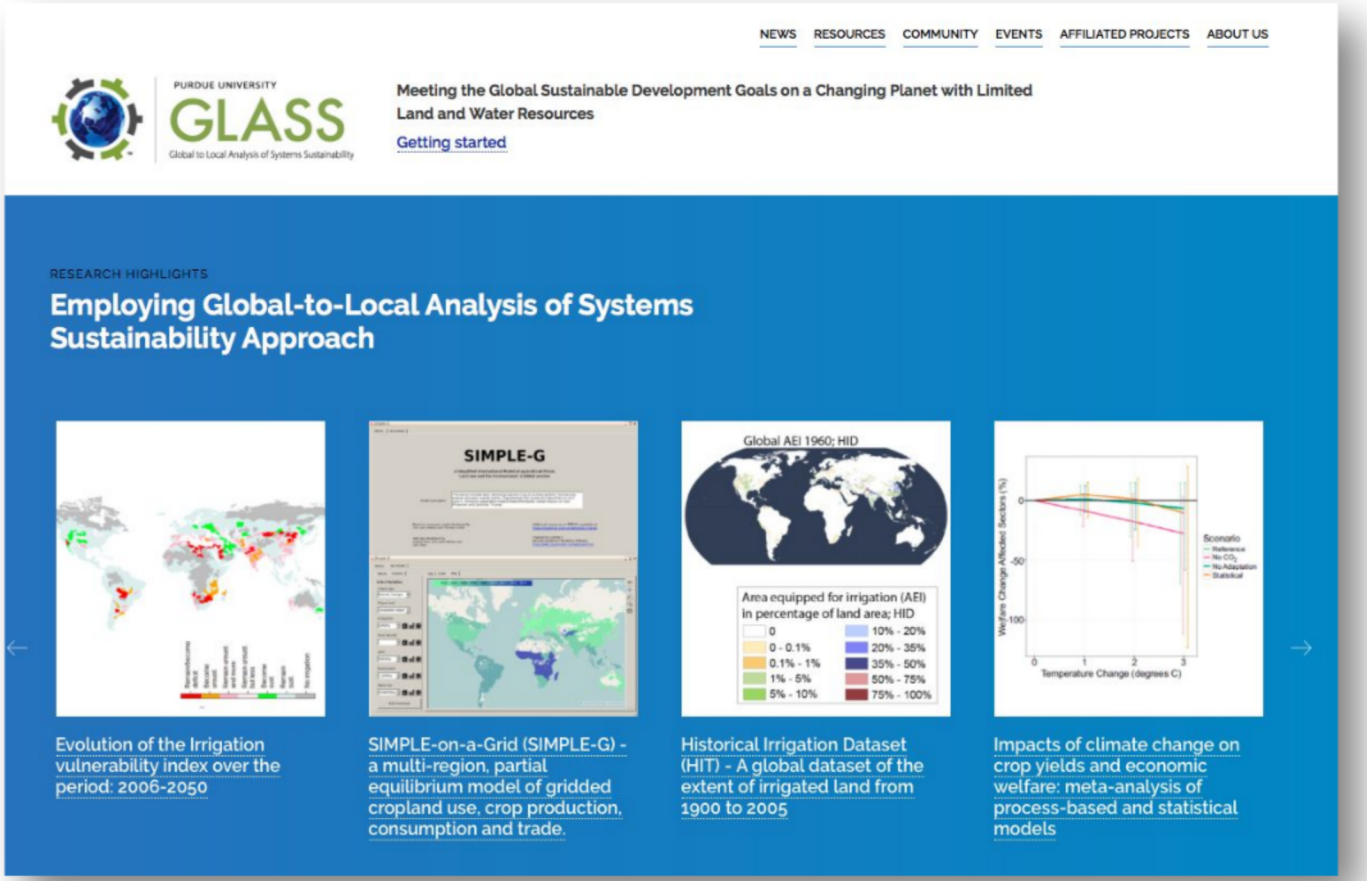
GeoHub


PURDUE
UNIVERSITY
Hub Installation
Web Server
hubzero
Execution Host
hubzero
Execution Host
hubzero
G·A·B·B·S
geospatial data analysis building blocks
Geoserver
PostGIS
Solr
iRODS
XSEDE
globus online

Role of GeoHub in GLASS



GLASS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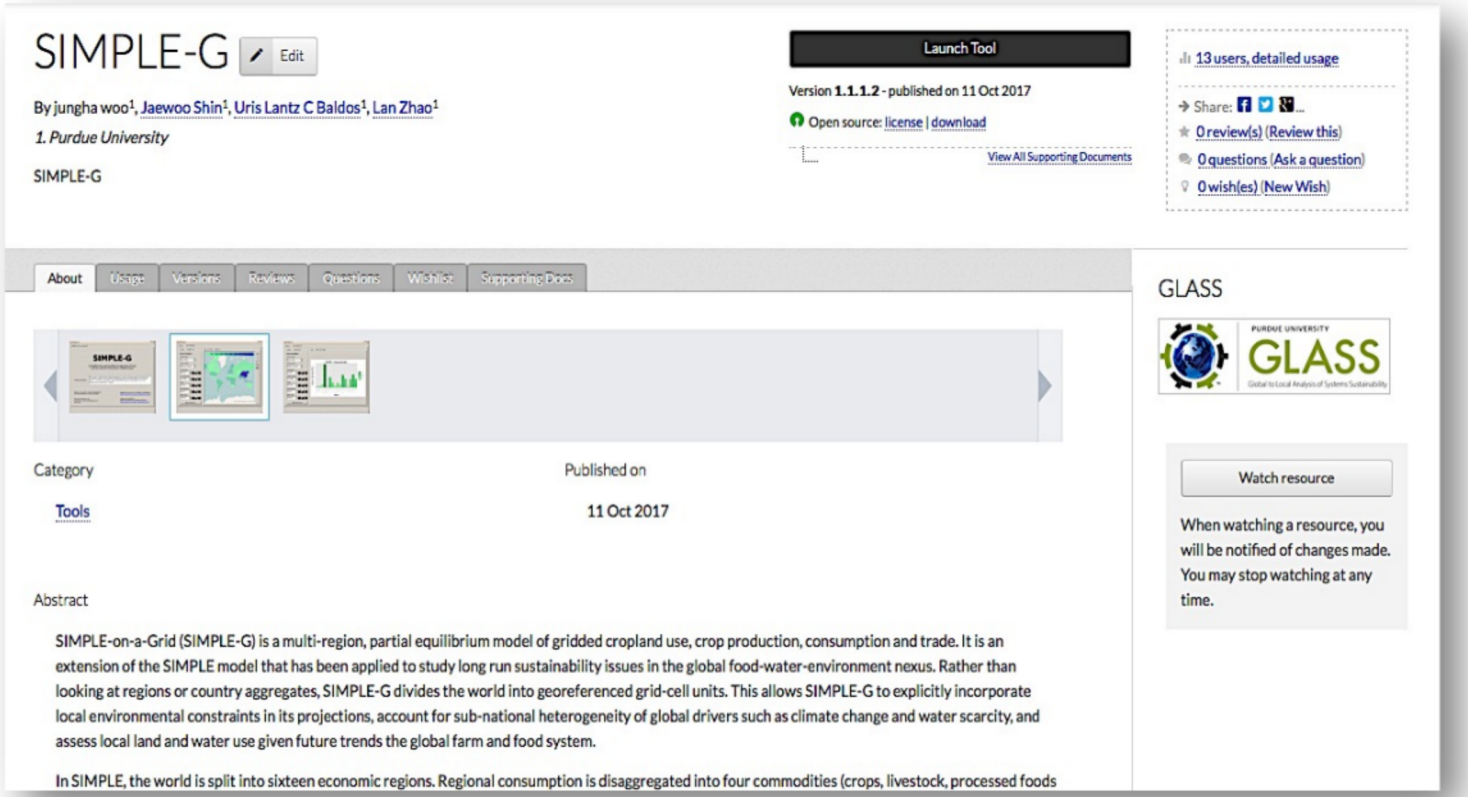
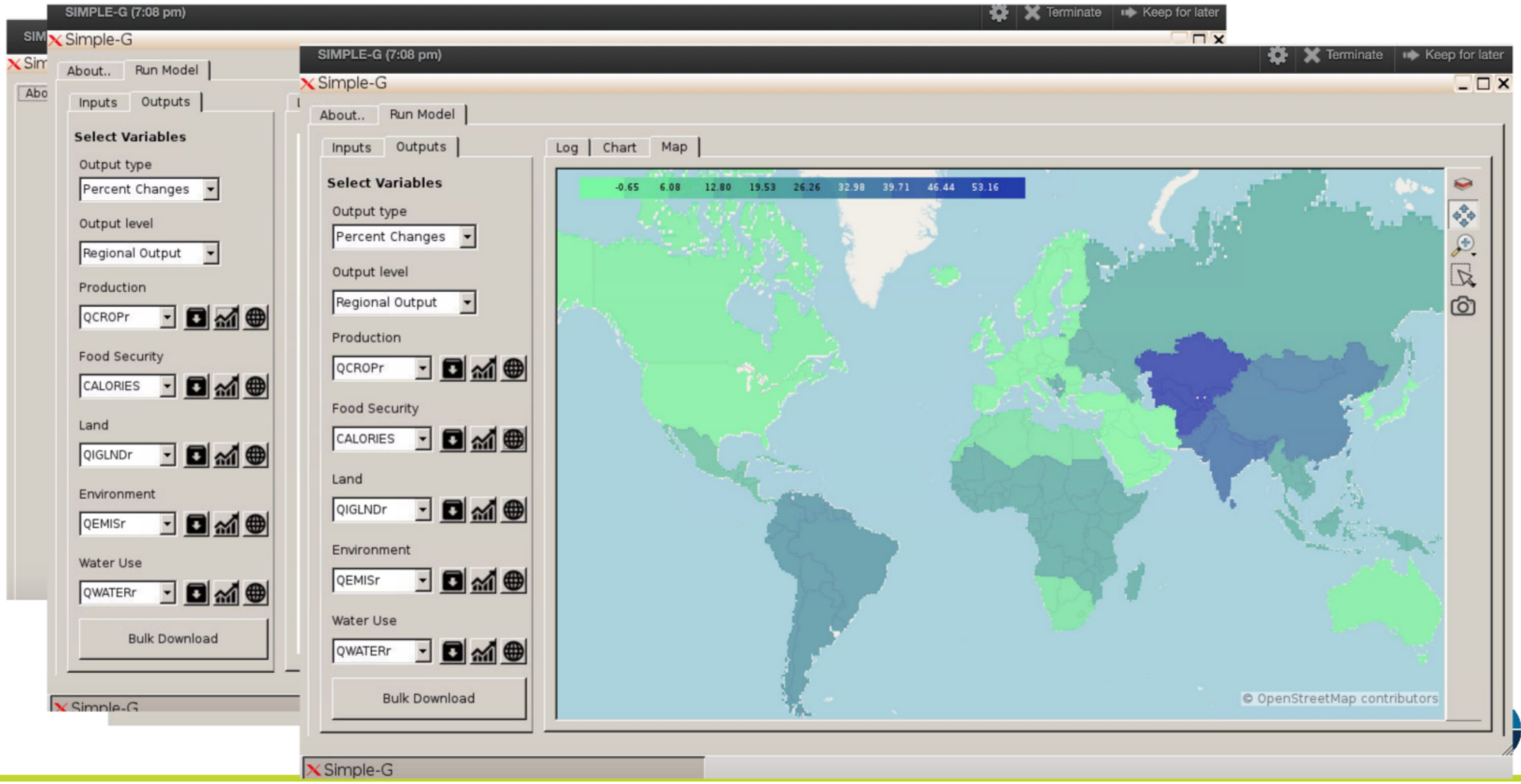
GLASS
Global to Local Analysis of Systems Sustainability
Meeting the Global Sustainable Development Goals on a Changing Planet with Limited Land and Water Resources
Getting started
RESEARCH HIGHLIGHTS
Employing Global-to-Local Analysis of Systems Sustainability Approach
SIMPLE-G
Global AEI 1960: HID
Area equipped for irrigation (AEI) in percentage of land area; HID
0
0 - 0.1%
0.1% - 1%
1% - 5%
5% - 10%
10% - 20%
20% - 35%
35% - 50%
50% - 75%
75% - 100%
Temperature Change (degrees C)
Evolution of the Irrigation vulnerability index over the period: 2006-2050
SIMPLE-on-a-Grid (SIMPLE-G) - a multi-region, partial equilibrium model of gridded cropland use, crop production, consumption and trade.
Historical Irrigation Dataset (HIT) - A global dataset of the extent of irrigated land from 1900 to 2005
Impacts of climate change on crop yields and economic welfare: meta-analysis of process-based and statistical models

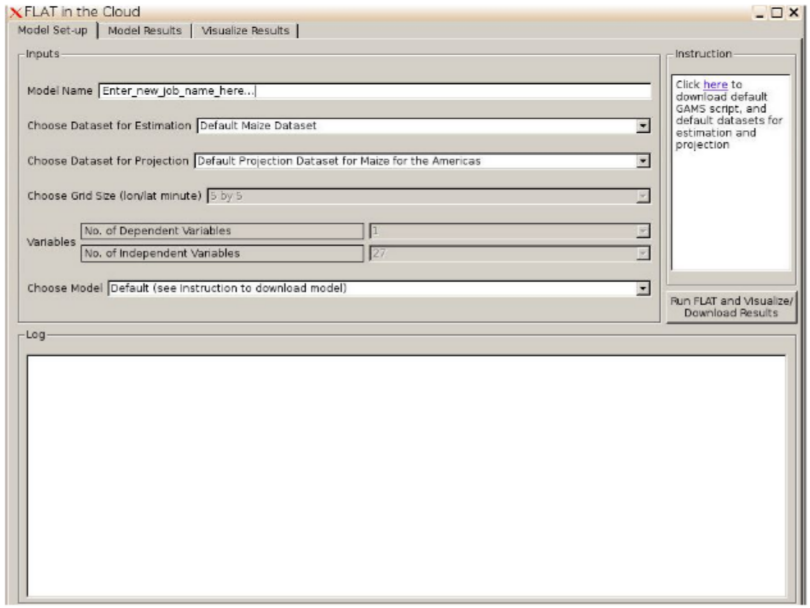
SIMPLE-G – SIMPLE on a grid

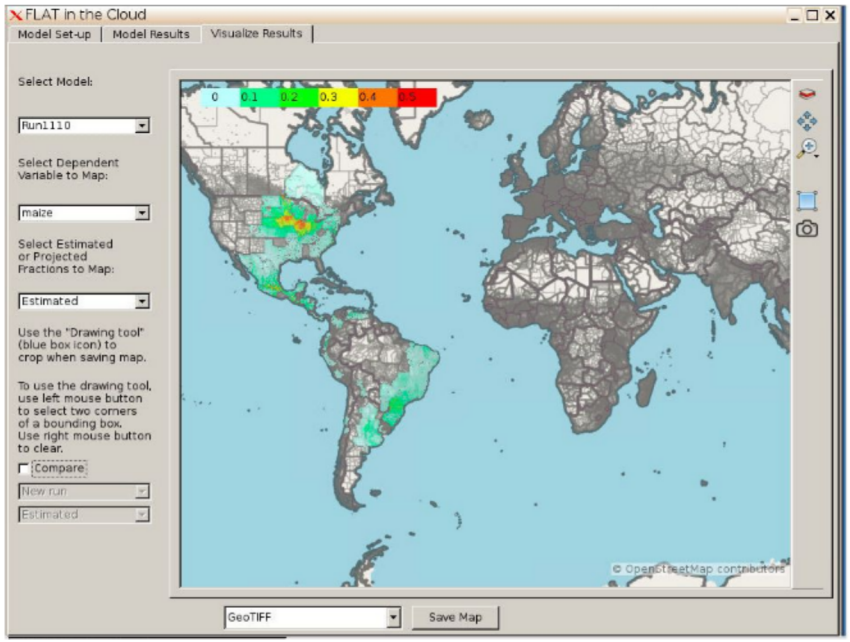


Set up, Run, & Visualize



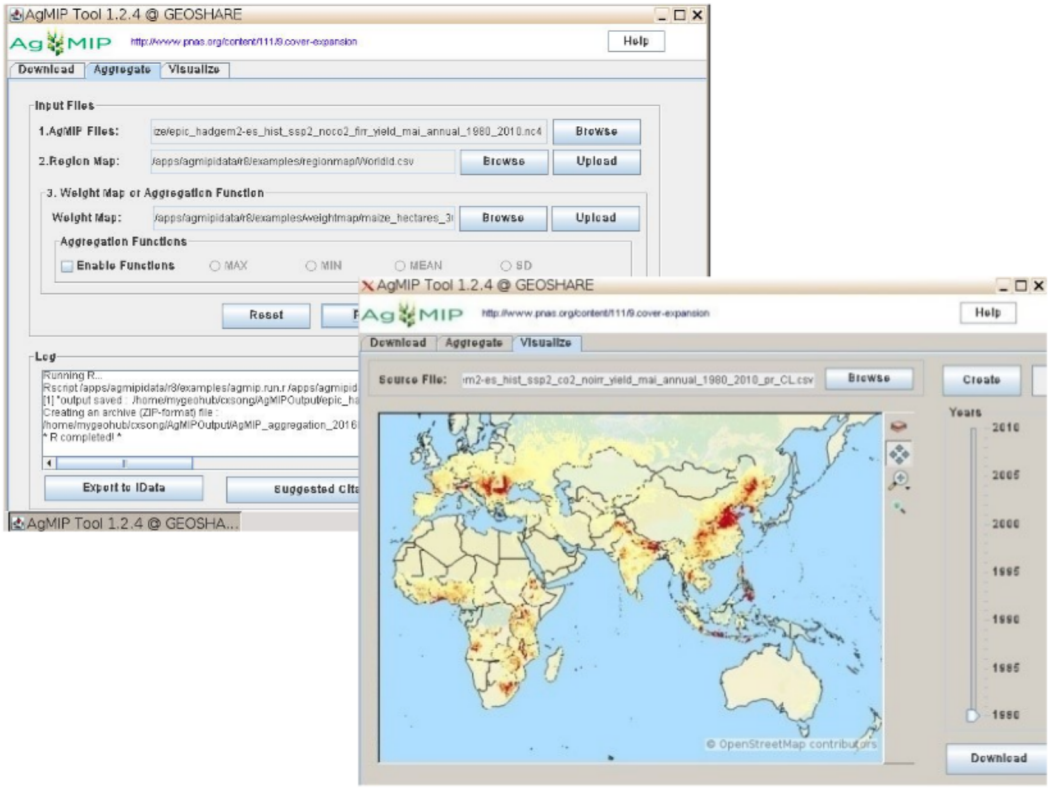
FLAT– Fine-scale Land Allocation Tool



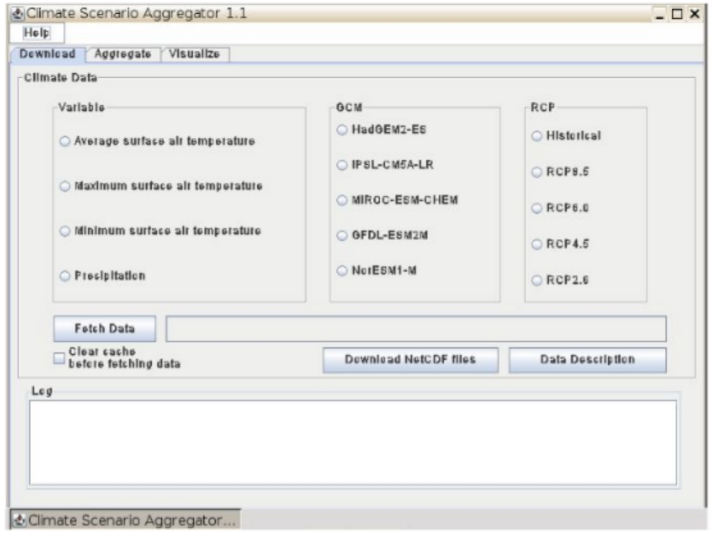


Other relevant tools

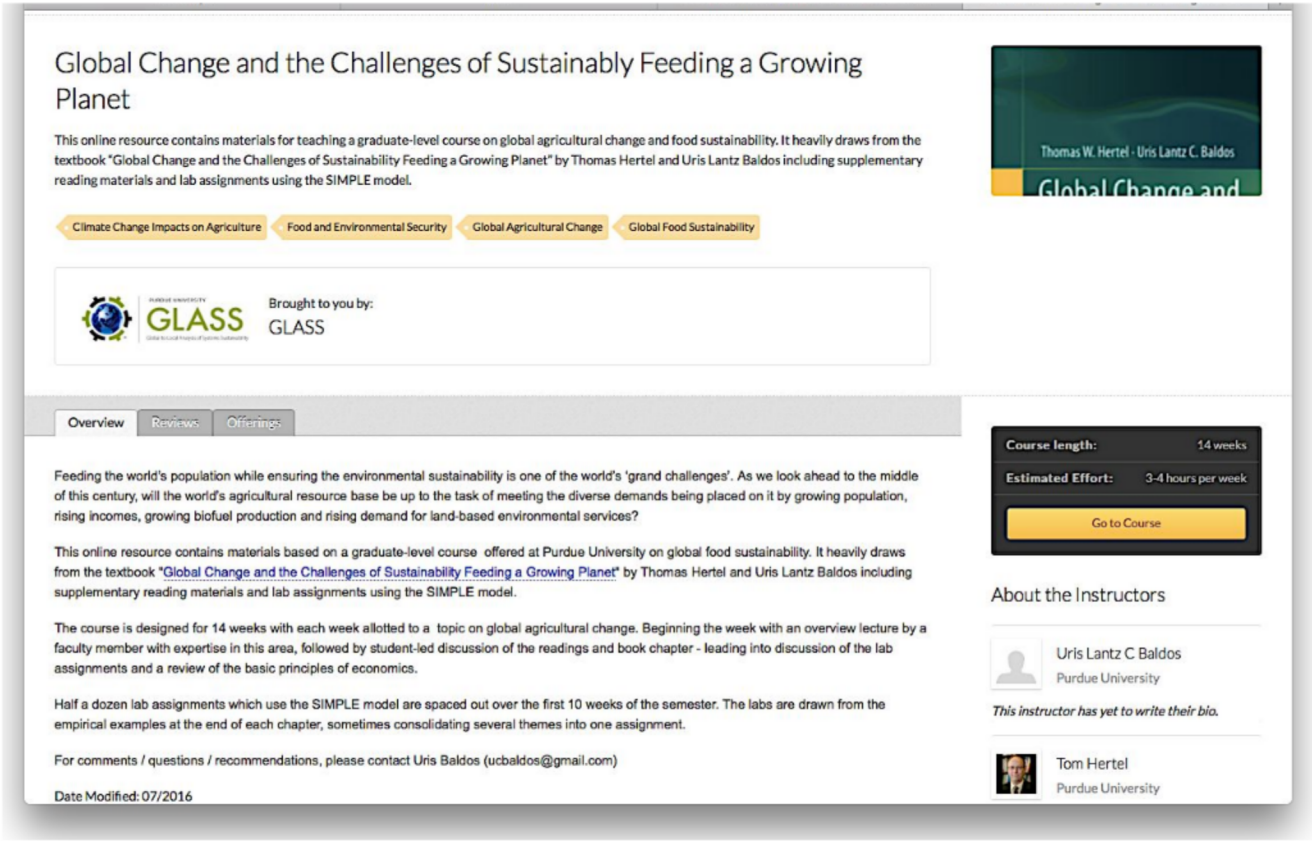
AgMIP Data Aggregator



Climate Scenario Aggregator (CMIP5 data)



Education mission



Global Change and the Challenges of Sustainably Feeding a Growing Planet

This online resource contains materials for teaching a graduate-level course on global agricultural change and food sustainability. It heavily draws from the textbook "Global Change and the Challenges of Sustainability Feeding a Growing Planet" by Thomas Hertel and Uris Lantz Baldos including supplementary reading materials and lab assignments using the SIMPLE model.

Climate Change Impacts on Agriculture | Food and Environmental Security | Global Agricultural Change | Global Food Sustainability

GLASS

Brought to you by:
GLASS

Thomas W. Hertel · Uris Lantz C. Baldos
Global Change and

Overview | Reviews | Offerings

Feeding the world's population while ensuring the environmental sustainability is one of the world's 'grand challenges'. As we look ahead to the middle of this century, will the world's agricultural resource base be up to the task of meeting the diverse demands being placed on it by growing population, rising incomes, growing biofuel production and rising demand for land-based environmental services?

This online resource contains materials based on a graduate-level course offered at Purdue University on global food sustainability. It heavily draws from the textbook "Global Change and the Challenges of Sustainability Feeding a Growing Planet" by Thomas Hertel and Uris Lantz Baldos including supplementary reading materials and lab assignments using the SIMPLE model.

The course is designed for 14 weeks with each week allotted to a topic on global agricultural change. Beginning the week with an overview lecture by a faculty member with expertise in this area, followed by student-led discussion of the readings and book chapter - leading into discussion of the lab assignments and a review of the basic principles of economics.

Half a dozen lab assignments which use the SIMPLE model are spaced out over the first 10 weeks of the semester. The labs are drawn from the empirical examples at the end of each chapter, sometimes consolidating several themes into one assignment.

For comments / questions / recommendations, please contact Uris Baldos (ucbaldos@gmail.com)

Date Modified: 07/2016

Course length: 14 weeks
Estimated Effort: 3-4 hours per week
Go to Course

About the Instructors

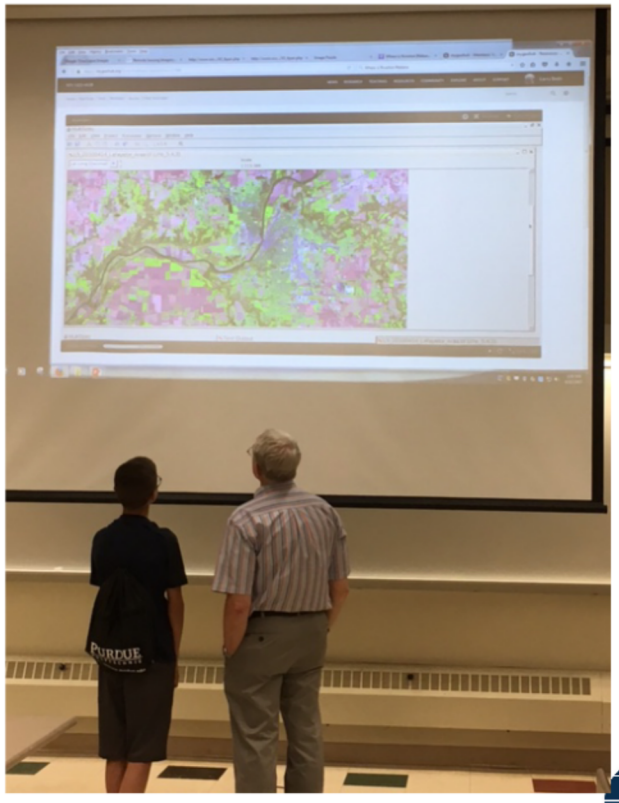
Uris Lantz C Baldos
Purdue University

This instructor has yet to write their bio.

Tom Hertel
Purdue University

Geospatial data is interesting!

Middle & high school students at summer camp



GeoHub – a science gateway

In addition to common science gateway functions:

- Integrated data management environment with built-in geospatial data support
- Toolkits for rapid application development, no GIS programming expertise required
- Data visualization builders and tools that require no programming
- Production system open to research and education use, 24x7 (all related servers, services)

GLASS: http://mygeohub.org/groups/glass