



International Institute for
Applied Systems Analysis
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science for global insight

A graphical user interface for GLOBIOM

Introduction to the GAMS Graphical
Interface Generator (GGIG) as a tool to
transition from excel-based modeling to
PE modeling

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Introducing GGIG and its features

GGIG

- GGIG - GAMS Graphical Interface Generator
- A framework for adding a graphical user interface (GUI) to GAMS
- Developed by Institute for Food and Resource Economics (ILR), University Bonn.
 - Wolfgang Britz, Alexander Gocht, Torbjörn Jansson, others...
- Used by several models:
 - CAPRI, CGEBox, FarmDyn, Aglink-COSIMO, ...
- Rich feature set.
- Used GGIG to implement a GUI for GLOBIOM FABLE
- Makes it easier to use GLOBIOM, but is optional.

GGIG – What can it do?

- Analyze your own baseline
- Compare your baseline with FAO (eventually national) statistics
- Visualize and integrate calculator scenarios
- Run GLOBIOM, and analyze and compare scenario runs

Select and filter scenario results

The screenshot displays the GLOBIOM for FABLE software interface. The window title is "GLOBIOM for FABLE". The menu bar includes "File", "Utilities", "GUI", "Settings", and "Help".


Left Panel:

- Data:** Data
- Model:** Model
- Scenarios:** Scenarios
- Exploit results:** Exploit results

Tool Name tasks:

- No aggregation
- Items aggregated
- Regions aggregated
- Items and regions aggregated
- Spatially Explicit

GGIG:


GAMS Graphical User Interface Generator
ILR Institute for Food and Resource Economics, University Bonn
Wolfgang Britz
2013

Indicator selection:

- ANFD "Animal feed intake"
- Anim "Animal number"
- ARIR "Area cultivated - irrigated"
- ARRF "Area cultivated - rainfed"
- Area "Area cultivated"
- HARV "Area harvested"
- BIOU "Biofuel use"
- ECH4 "CH4 emissions"
- ECO2 "CO2 emissions"
- CTAX "Carbon tax"
- YIIR "Crop yield - irrigated"

Region selection:

- ArgentinaReg "Argentina"
- AustraliaReg "Australia"
- BrazilReg "Brazil"
- CanadaReg "Canada"
- ChinaReg "China"
- CongoBasin "Congo_Basin"
- EU_Baltic
- EU_CentralEast
- EU_MidWest
- EU_North
- EU_South

Scenario Selection:

Scenario	Selection
Scenario 1	baseline
Scenario 2	argentina
Scenario 3	
Scenario 4	
Scenario 5	
Scenario 6	
Scenario 7	
Scenario 8	
Scenario 9	
Scenario 10	
Scenario 11	
Scenario 12	
Scenario 13	
Scenario 14	
Scenario 15	
Scenario 16	

Status Bar:

Ini file : settings.ini | User name : Albert Brouwer | User type : runner | Exploit results: No aggregation

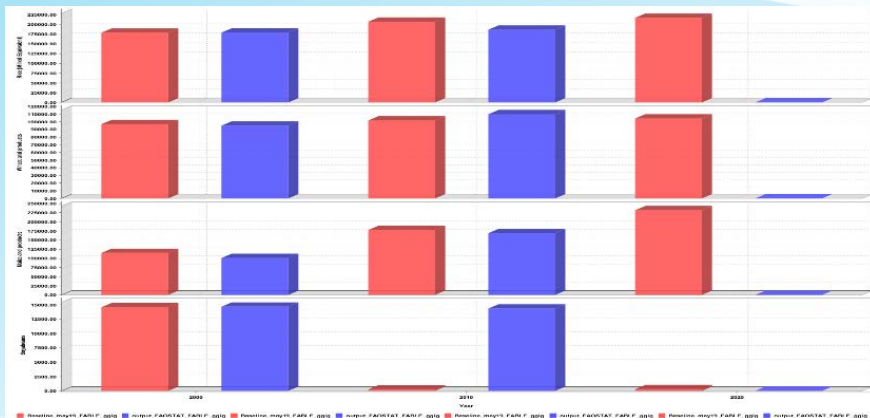
View and compare your results in an organized table format

Region								
AustraliaReg								
	2010 Baseline_may19_FABLE_g nin	2010 output_FAOSTAT_FABLE nnin	2020 Baseline_may19_FAB IF nnin	2030 Baseline_may19_FABLE_ggig	2030 output_FAOSTAT_FA RI F nnin	2040 Baseline_may19_FAB IF nnin	2050 Baseline_may19_FABLE_ggi n	2050 output_FAOSTAT_FABLE_ggig
Exports Soyabeans 1000 t	171.05 -40.64%	20.23 -51.65%	85.34 -70.38%	110.34 -61.71%			306.88 6.50%	408.88 41.90%
Production Cottonseed 1000 t	1533.67 47.32%	939.00 -47.45%	2272.92 118.33%	3183.97 205.85%			3026.21 190.69%	2684.90 157.91%
Area cultivated Soyabeans 1000 Ha	50.39 29.98%	31.30 -44.11%	64.65 66.77%	50.89 31.28%			26.40 -31.91%	18.54 -52.19%
Production Soyabeans 1000 t	106.70 40.06%	59.60 -43.13%	148.44 94.85%	153.14 101.02%			109.36 43.55%	64.34 -15.54%
p.c. calory availability Mutton & Goat Meat kcal/cap/d	92.33 -20.67%	68.00 -42.86%	89.66 -22.96%	88.54 -23.93%			88.40 -24.05%	87.88 -24.49%
Exports Milk - Excluding Butter + (Total) 1000 t	6306.12 8.25%	3893.53 -40.38%	6856.55 17.70%	7397.45 26.99%			7480.64 28.41%	7176.70 23.20%

- Organize the data in your preferred format
- Compare with FAO (national) statistics
- Filter desired elements
- Produce desired statistics on changes between years and scenarios.

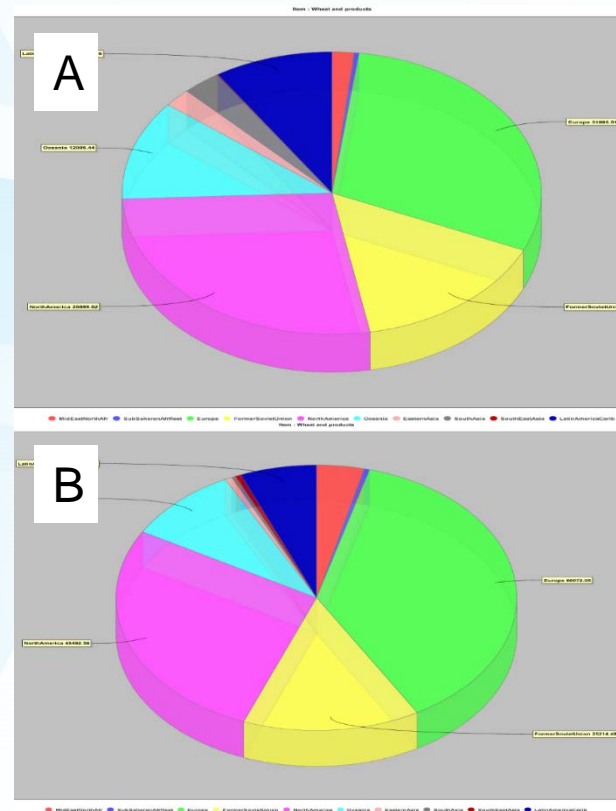
GGIG – Graphs

Different types of charts and graphs

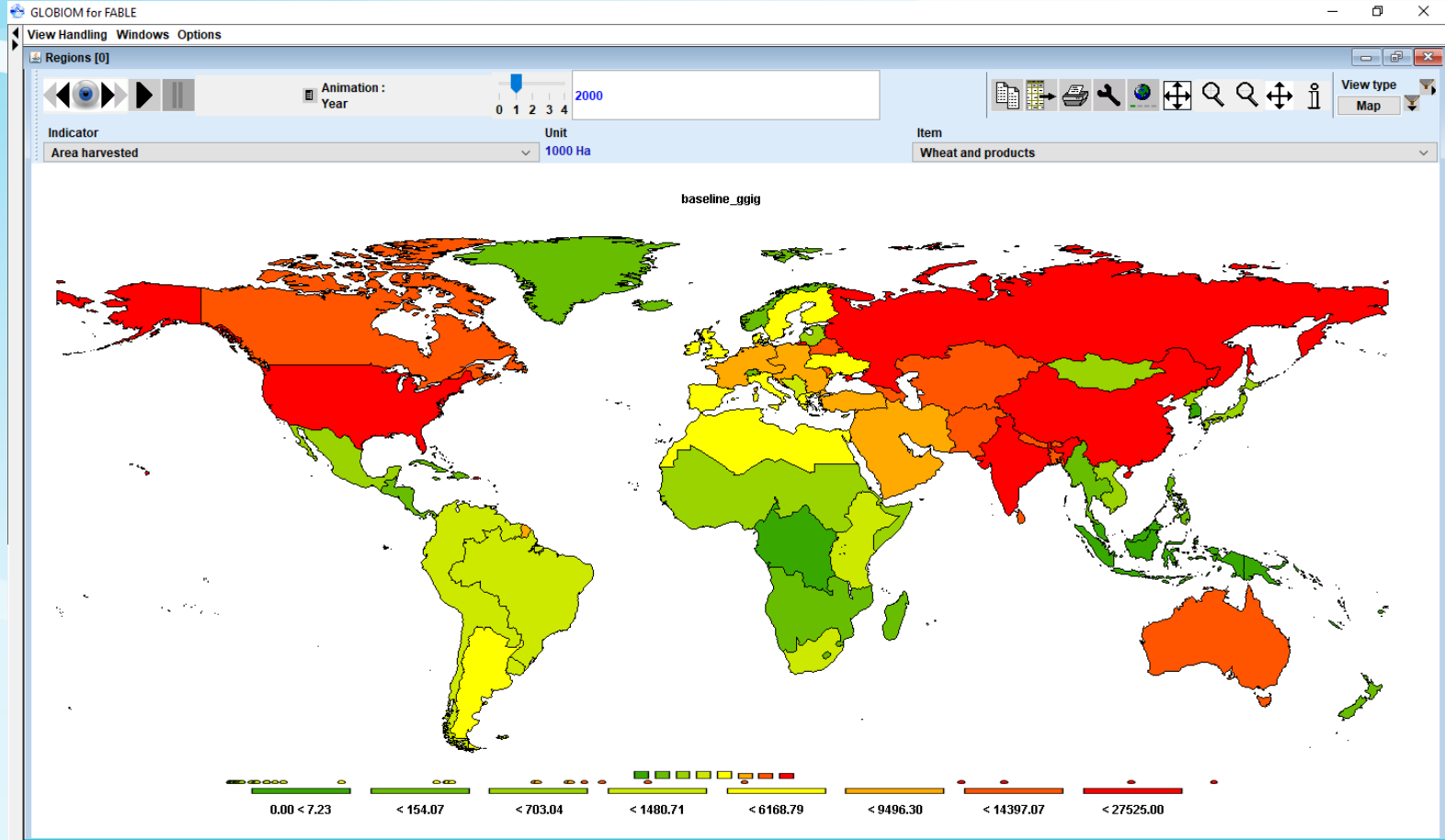


Production by main agricultural crops in China (FAOSTAT vs FABLE baseline)

Wheat exports by global region (2010)
 A – FABLE development branch
 B – FAO statistics



GGIG: maps



Run GLOBIOM

GLOBIOM for FABLE

File Utilities GUI Settings Help


Tool Name worksteps

- Data
- Model
- Scenarios
- Exploit results
- Exploit results GGIG

Tool Name tasks

- Import scenarios definition from calculator
- Run scenario and output results

GGIG



GAMS Graphical User Interface Generator
ILR Institute for Food and Resource Economics,
University Bonn
Wolfgang Britz

Scenario Settings

Tool Name Scenario Settings

Run label

5. Precompute scenario

Scenario 1

Scenario 2

Scenario 3

Scenario end year

6. Scenarios

Output name

Compile GAMS Start GAMS Stop GAMS Hide/Unhide controls Exploit results

C:\GAMS\win64\27.2\gams.exe "C:\work\GLO (3 min 30 sec)

```
GAMS 27.2.0 Copyright (C) 1987-2019 GAMS Development. All rights reserved
Licensee: GAMS Training License G190531/0001AD-GEN
IIASA, DCE49
License for teaching and research at degree granting institutions
License Admin: Albert Brouwer, brouwer@iiasa.ac.at
--- Starting compilation
```

Ini file : settings.ini User name : Albert Brouwer User type : runner

Installing and setting-up GGIG for GLOBIOM

Installing: brief

- Provided via a public **GitHub** repository:
https://github.com/iiasa/GLOBIOM_GUI
- Clone the GLOBIOM_GUI repository to a GUI subdirectory of your local GLOBIOM_FABLE repository.
- Read the repository [README](#) and [GUI Web Page](#) for details.

Detailed: GAMS

Most of you already have GAMS installed, and have a GAMS license, but if not...

- GLOBIOM is implemented in GAMS.
- GAMS can be downloaded from <https://gams.com>
- A GAMS license supporting the CONOPT and CPLEX solvers is required. Training licenses with time-limited validity are available on occasion for the purposes of FABLE trainings.

Detailed: Java

- Java 8 or higher required: GGIG is Java-based.
- Java 8 is recommended (tested).
- Often already installed.
- If not, Java can be downloaded here: <https://adoptopenjdk.net>
- If/once installed, determine the path to your java executable/binary, on Windows it can be something like `C:\Program Files\AdoptOpenJDK\jdk-8.0.212.03-hotspot\bin\java`

Detailed: R

Some of the scripts included with GLOBIOM are R scripts. A documentation page has been provided that explains how to install R and the required packages.

- See https://iiasa.github.io/GLOBIOM_FABLE/R.html

Detailed: Git and GitHub

The GLOBIOM repositories are hosted on GitHub (cloud platform), and require a Git (version control system on your pc) client to access.

- If you have none, create a GitHub account here:
<https://github.com/join>
- Install one of the many git clients. For example the “GitHub Desktop” client, or the more powerful but less user-friendly command line client.

Detailed: GLOBIOM Model

To clone the `development` branch of the model using the git command line client do:

- `cd <some empty directory>`
- `git clone https://github.com/iiasa/GLOBIOM_FABLE`
- `cd GLOBIOM_FABLE`
- `git checkout development`

This will create a `GLOBIOM_FABLE` directory containing the GUI-ready model.

If you do not have access to the repository, request it.

Detailed: GLOBIOM Data

To in addition install the `development` branch of the source data for GLOBIOM do:

- `cd GLOBIOM_FABLE`
- `git clone https://github.com/iiasa/GLOBIOM_FABLE_Data Data`
- `cd Data`
- `git checkout development`

This will create a Data directory holding the input data next to the Model directory.

If you do not have access to the repository, request it.

Detailed: GLOBIOM GUI

To in addition install the GGIG GUI for GLOBIOM do:

- `cd GLOBIOM_FABLE`
- `git clone https://github.com/iiasa/GLOBIOM_GUI GUI`

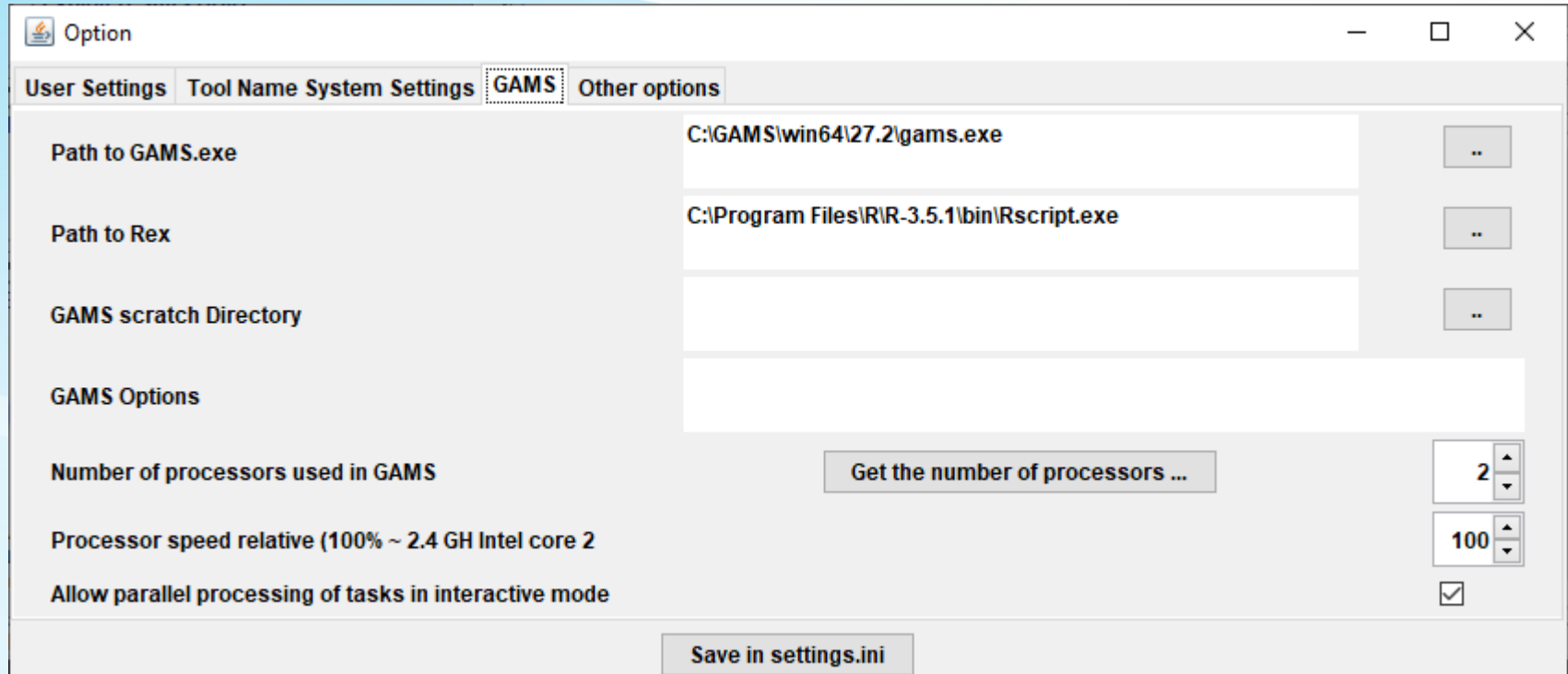
This will create a GUI directory next to the Model and Data directory.

Edit file `GUI/GGIG_java_path.txt` and there paste the earlier-determined path to the java binary/executable of your Java installation so that the GUI knows where to find Java.

Start the GLOBIOM GUI with `GUI/globiom.bat`

Detailed: GLOBIOM GUI Settings

When first starting the GUI, open the settings dialog via the **Settings → Edit settings** menu and customize for your machine



The screenshot shows the 'Option' dialog box with the 'GAMS' tab selected. The dialog has four tabs: 'User Settings', 'Tool Name System Settings', 'GAMS', and 'Other options'. The 'GAMS' tab contains the following settings:

- Path to GAMS.exe**: C:\GAMS\win64\27.2\gams.exe
- Path to Rex**: C:\Program Files\IR\IR-3.5.1\bin\IRscript.exe
- GAMS scratch Directory**: (empty)
- GAMS Options**: (empty)
- Number of processors used in GAMS**: 2 (with a 'Get the number of processors ...' button)
- Processor speed relative (100% ~ 2.4 GH Intel core 2)**: 100
- Allow parallel processing of tasks in interactive mode**:

A 'Save in settings.ini' button is located at the bottom of the dialog.

Closing remarks

- Thursday we will show how to work with the GLOBIOM GUI
- To make the most out of that, try to have the GUI installed before then.
- Install with a Git client so that you can pull in updates easily.
- As a further preparation for Thursday, try to run the model up to step 7 (output).
- Esther, Andre and I are available to support you with that.

Thank you!