**A brief summary of set-up and functions of the GLOBIOM model.**

**For more details please consult IIASA’s webpage:**

[**http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM.en.html**](http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM.en.html)

IIASA's Global Biosphere Management Model (GLOBIOM) is used to analyze the competition for land use between agriculture, forestry, and bioenergy, which are the main land-based production sectors. As such, the model can provide scientists and policymakers with the means to assess, on a global basis, the rational production of food, forest fiber, and bioenergy, all of which contribute to human welfare.

**FAST FACTS**

* The 18 globally most important crops covered in GLOBIOM are barley, dry beans, cassava, chick peas, corn, cotton, groundnut, millet, potatoes, rapeseed, rice, soybeans, sorghum, sugarcane, sunflower, sweet potatoes, wheat, and oil palm. The GLOBIOM-EU version extends this to 27 crops.
* Analyses with GLOBIOM's new livestock production module show that improving breeding and feed types would help meet the world's future protein demands with considerably fewer livestock resources, freeing up land for other food production.
* GLOBIOM includes water as a resource, making it a strong tool for analyzing the water-related impacts of different development scenarios.

**About GLOBIOM**

The GLOBIOM model has global coverage, with [30 world regions](http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM-Regions.en.html) currently represented in the global version.

Regional versions of the model, such as GLOBIOM-BRAZIL and GLOBIOM-EU, have been designed with national and regional institutes. These versions provide more detailed spatial representation of land use changes to assess the impact of specific regional policies.

The GLOBIOM approach is strongly grounded in the idea that the production of food, forest fiber, and bioenergy, must be analyzed and planned in an integrated way across agriculture and forestry, forestry, and bioenergy sectors. GLOBIOM can be used to explore the various trade-offs and synergies around land use and ecosystem services, and helps scientists and policymakers understand and minimize land use and resource competition through more holistic thinking.

GLOBIOM can advise on a number of questions, for example:

* Capability of the agricultural system to supply future food demand and other societal services
* Future agricultural land requirements and other pressures of the agricultural system on the environment (water needs, nitrogen)
* Trends in future deforestation and the impact of measures to reduce deforestation and forest degradation (REDD: [read more](http://www.iiasa.ac.at/Admin/INF/feature_articles/Options/2009/deforestation.html))
* Future greenhouse gas emissions from the agricultural sector and from land use change
* The potential contribution of bioenergy to climate change mitigation
* Assess the current and future demand and supply of water for irrigation
* The relative costs and benefits of importing or exporting food and raw materials
* The profitability, incentives, and impacts of changing agricultural management practices
* Adaptation of agriculture to future climate change



GLOBIOM's new livestock production model shows that some regions, such as many grasslands in Africa, will not sustain crops, and should be simply left for livestock grazing.



In 2010, the GLOBIOM model was specially adapted to the Congo Basin context to provide estimates of future deforestation and support national REDD strategies in the region. Since 2012, the model has been used to study deforestation patterns in the Amazon.

**How GLOBIOM works**

GLOBIOM's analytical process captures the multiple interrelationships between the different systems involved in provision of agricultural and forestry products, for example, population dynamics, ecosystems, technology, and climate.

GLOBIOM is a global, recursively dynamic, and partial equilibrium model. It integrates the [agricultural, bioenergy, and forestry sectors](http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM-Sectors.en.html) and draws on comprehensive socioeconomic and [geospatial data](http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM-Spatial-Resolution.en.html).  It accounts for the 18 most globally important crops, a range of livestock production activities, forestry commodities, first- and second-generation bioenergy, and water. Production is spatially explicit and takes into account land, management, and weather characteristics.

The market equilibrium is solved by maximizing the sum of producer and consumer surplus subject to resource, technological, and political constraints. Using the year 2000 as the baseline, GLOBIOM simulates demand and supply quantities, bilateral trade flows, and prices for commodities and natural resources at 10-year-step intervals up to 2050. This gives planners a basis for setting future land use and, more importantly, for identifying possible shortfalls in food and biomass supplies.