

1. Introduction

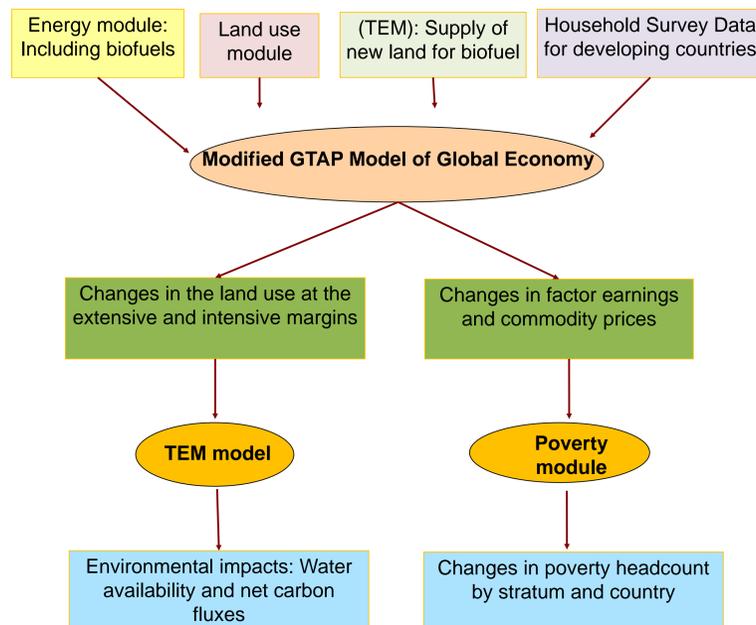
Biofuels have witnessed rapid increase in production in the high income countries particularly in the United States and the European Union, mainly due to growing concerns on energy security and climate change. Massive subsidies offered by these countries, have resulted in large-scale implementation of biofuels programs which have profound global economic, environmental, and social consequences. This project aims to develop a realistic assessment of the economic and environmental impacts of regional and global policies designed to stimulate biofuels production and use. The project builds on the unique strengths of the Global Trade Analysis Project (GTAP) based at Purdue University.

2. Objectives

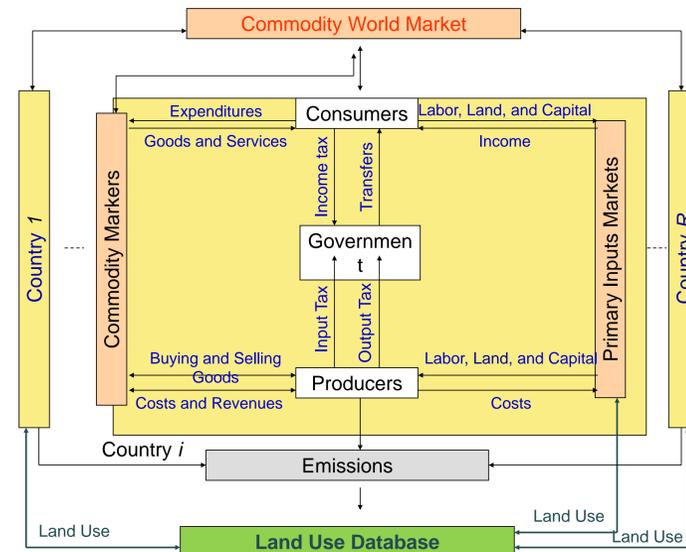
- To build and incorporate an explicit biomass energy sector within the GTAP analytical framework and data base.
- To provide an analysis of the impact of renewable fuel standards and other policies in the US and EU, as well as alternative biofuel policies in other parts of the world, on changes in production, prices, consumption, trade and poverty.
- To evaluate environmental impacts of alternative policies for bioenergy development focusing on:
 - the feasibility of alternative methods of producing bioenergy
 - the potential for new lands to contribute either to biofuels production, or to the production of displaced crop and forestry products
 - the environmental consequences of policy scenarios, with a particular emphasis on water availability and green house gas emissions

3. Analytical Framework

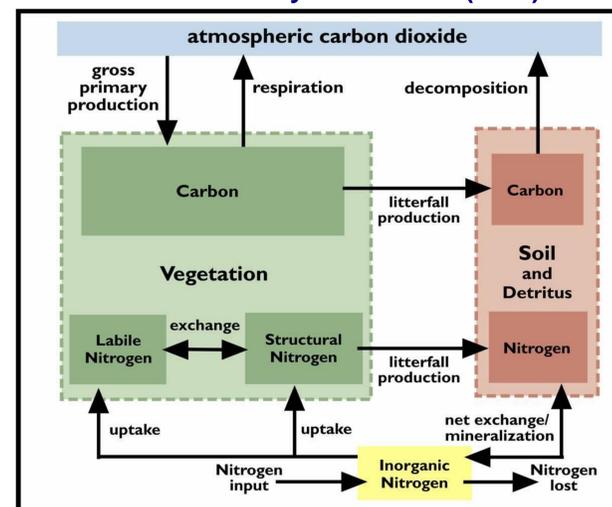
Large scale bioenergy production, by its very nature, has the potential to generate a wide range of economic and environmental consequences. To evaluate these consequences the following framework will be used.



Components of the GTAP General Equilibrium Model



Terrestrial Ecosystem Model (TEM)



4. Project Timetable

- Year 1:**
- Data collection and incorporating biofuels into the GTAP framework
 - Revise GTAP land use data base in light of needs of this project
- Year 2:**
- Test new models; validation against selected historical events
 - Development and analyses of policy alternatives
 - Analysis of poverty implication for developing countries
- Year 3:**
- Use TEM-GTAP framework for environmental impact assessment
 - Finalize poverty impact and biofuel policy analyses
 - Submit journal articles and conference papers each year

5. Project Progress

Database Revision:

- Using the International Energy Agency (IEA) database and according to several biofuel processing models the following three types of biofuels have been introduced into the GTAP database: (i) Ethanol from sugarcane, (ii) Ethanol from corn, (iii) Biodiesel from oilseeds.
- This database will be expanded to cover other types of liquid biofuels.

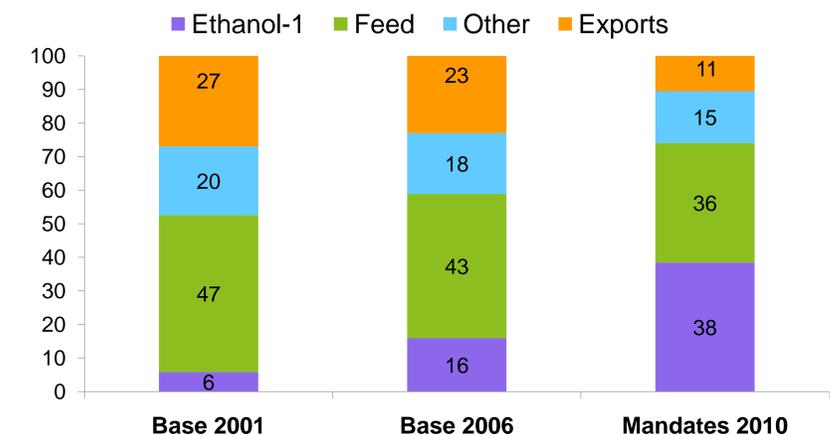
Model Revision:

- The GTAP-E model has been revised to incorporate production and consumption of biofuels. This model has been tested with the biofuel extended version of GTAP database.
- By-products of biofuel production will be introduced into the revised version of the GTAP-E. The model is under development. Its results will be presented at the 11th GTAP Annual Conference and the 2008 AAEA meetings.
- The TEM model has been tuned to calculate NPP for some alternatives land use management practices.
- A crop specific yield model is under construction to examine land availability across the world as a new component for the TEM model.

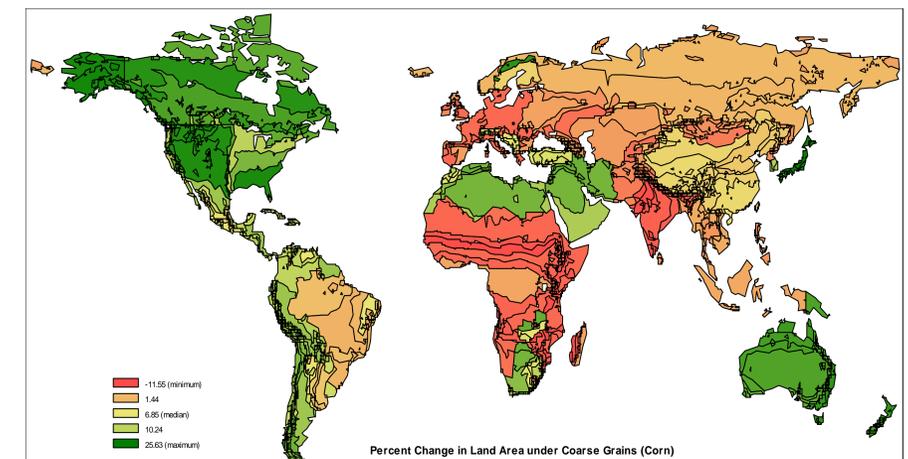
6. Preliminary Results

The US is considering a target to reach about 35 billion gallons of biofuels by 2017 and the EU has set the goal to reach a biofuel share of 5.75% in transportation fuels market by 2010. As an illustration we analyze the impact of implementation of these biofuel mandates for 2010 in the US and EU and some results are presented here.

Disposition of Coarse Grains in the US (%): 2006-2010



Change in Land Area under Coarse Grains: 2006-2010



Coarse Grains	USA	Canada	EU	Brazil	All Others
Aggregated Land use change (%)	11.2	11.7	0.5	3.7	4.7

Wallace E. Tyner, Thomas W. Hertel, Qianlai Zhuang, Farzad Taheripour*, and Dileep K. Birur
Department of Agricultural Economics, Purdue University, West Lafayette, IN 47906

1. Introduction

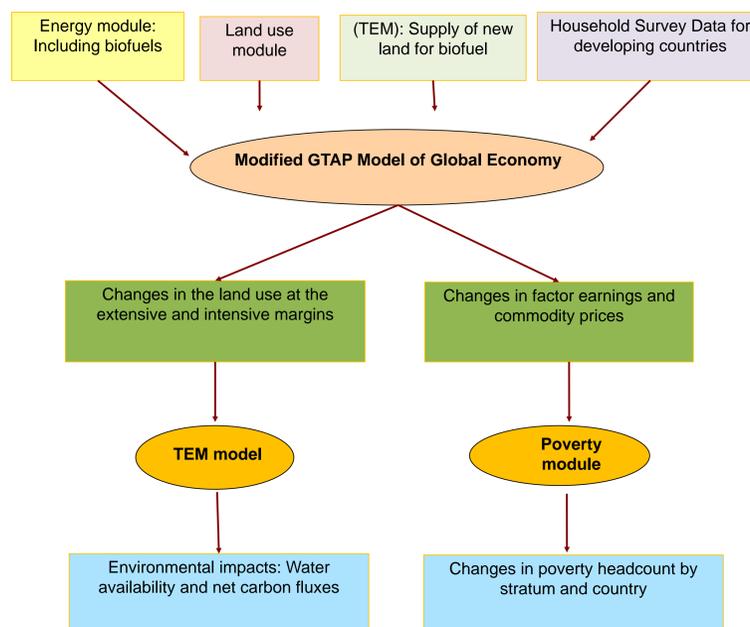
Biofuels have witnessed rapid increase in production in the high income countries particularly in the United States and the European Union, mainly due to growing concerns on energy security and climate change. Massive subsidies offered by these countries, have resulted in large-scale implementation of biofuels programs which have profound global economic, environmental, and social consequences. This project aims to develop a realistic assessment of the economic and environmental impacts of regional and global policies designed to stimulate biofuels production and use. The project builds on the unique strengths of the Global Trade Analysis Project (GTAP) based at Purdue University.

2. Objectives

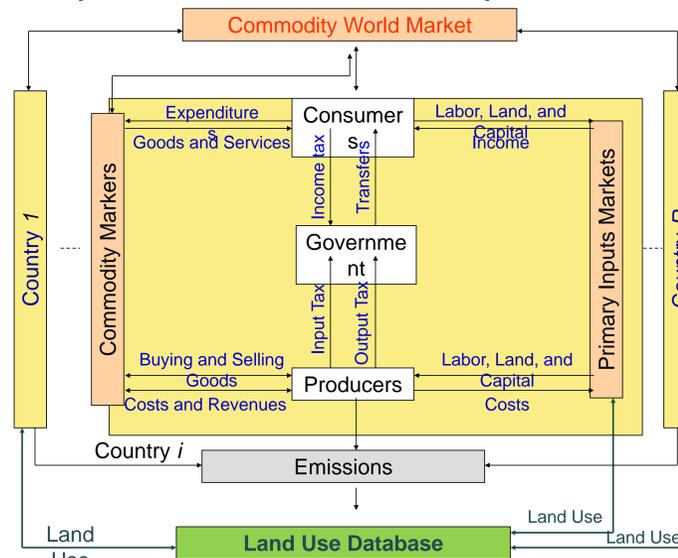
- To build and incorporate an explicit biomass energy sector within the GTAP analytical framework and data base.
- To provide an analysis of the impact of renewable fuel standards and other policies in the US and EU, as well as alternative biofuel policies in other parts of the world, on changes in production, prices, consumption, trade and poverty.
- To evaluate environmental impacts of alternative policies for bioenergy development focusing on:
 - the feasibility of alternative methods of producing bioenergy
 - the potential for new lands to contribute either to biofuels production, or to the production of displaced crop and forestry products
 - the environmental consequences of policy scenarios, with a particular emphasis on water availability and green house gas emissions

3. Analytical Framework

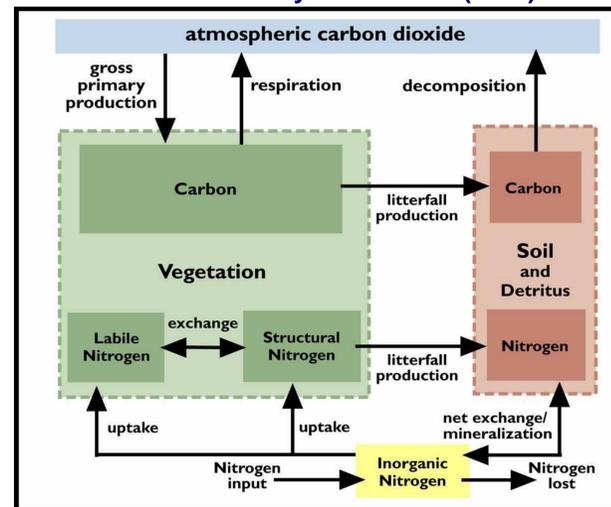
Large scale bioenergy production, by its very nature, has the potential to generate a wide range of economic and environmental consequences. To evaluate these consequences the following framework will be used.



Components of the GTAP General Equilibrium Model



Terrestrial Ecosystem Model (TEM)



4. Project Timetable

- Year 1:**
- Data collection, incorporation of biofuels into the GTAP model and database
 - Revise GTAP land use data base in light of needs of this project
 - Submit GTAP technical papers and conference papers
- Year 2:**
- Test new models; validation against selected historical events
 - Development and analyses of policy alternatives
 - Analysis of poverty implication for developing countries
- Year 3:**
- Use TEM for environmental impact assessment based on GTAP model simulation and iterated between GTAP and TEM
 - Finalize poverty impact and biofuel policy analyses
 - Submit journal articles and conference papers each year

5. Project Progress

Database Revision:

- Using the International Energy Agency (IEA) database and according to several biofuel processing models the following three types of biofuels have been introduced into the GTAP database: (i) Ethanol from sugarcane, (ii) Ethanol from corn, (iii) Biodiesel from oilseeds.
- This database will be expanded to cover other types of liquid biofuels.

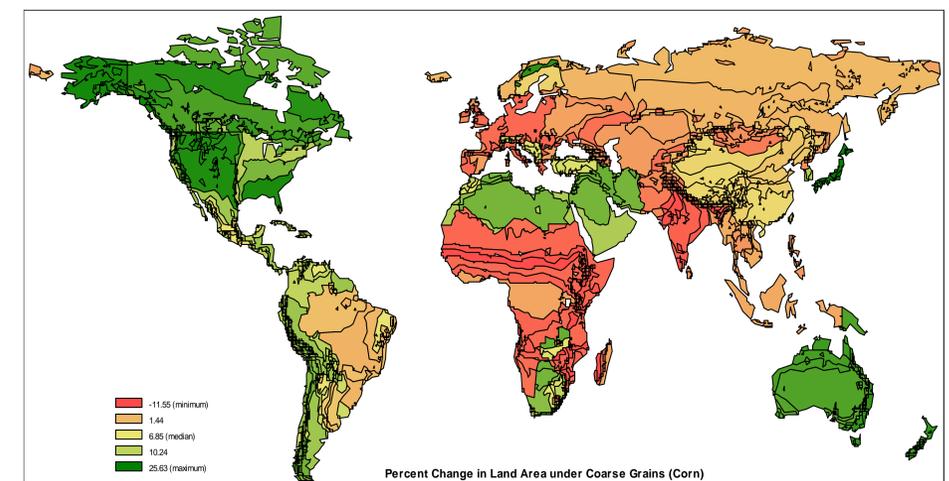
Model Revision:

- The GTAP-E model has been revised to incorporate production and consumption of biofuels. This model has been tested with the biofuel extended version of GTAP database.
- By-products of biofuel production will be introduced into the revised version of the GTAP-E. The model is under development. Its results will be presented at the 11th GTAP Annual Conference and the 2008 AAEA meetings.
- The TEM model has been tuned to calculate NPP for some alternative land use management practices.
- A crop specific yield model is under construction to examine land availability across the world as a new component for the TEM model.

6. Preliminary Results

The US is considering a target to reach about 35 billion gallons of biofuels by 2017 and the EU has set the goal to reach a biofuel share of 5.75% in transportation fuels market by 2010. As an illustration we analyze the impact of implementation of these biofuel mandates for 2010 in the US and EU and some results are presented here.

Change in Land Area under Coarse Grains: 2006-2010



Coarse Grains	USA	Canada	EU	Brazil	All Others
Aggregated Land use change (%)	11.2	11.7	0.5	3.7	4.7