

## **GTAP-related activities at FAO-EST (Trade and Markets Division) for the period of July 2008 to June 2009.**

Aziz Elbehri, Senior Economist at FAO-EST, led a modeling effort to develop a new global CGE model, based on GTAP-E, that incorporate bioenergy. The new GLObal Model for Agriculture and Bioenergy (GLOMAB) features biomass and bioenergy sectors (1<sup>st</sup> and 2<sup>nd</sup> generation biofuels, biopower) and allows for different fuel-biomass substitution nesting structure on the production and consumption sides. First generation feedstocks modeled include starch ethanol (from maize and cassava), sugar ethanol from sugar cane, tropical biodiesel from palm oil and Jatropha, and temperate biodiesel from soybeans and rapeseed. Second generation bioenergy include cellulosic ethanol using agricultural residues and woody biomass. Cellulosic ethanol and biopower (treated separately from conventional electricity) also compete for the same biomass feedstock, i.e. agricultural residues and woody biomass. In the model, agricultural residues are by-products of maize (stover), wheat (straw), rice (straw) and sugarcane (bagasse). Another departure of GLOMAB from GTAP-E is the introduction of joint production to tie in agricultural residues (used for bioenergy) with their associated crops (maize, wheat, rice and sugarcane).

In addition to Aziz Elbehri, the model development also involved Robert McDougall, (GTAP Center/Purdue University) on model coding; and Mark Horridge, (Monash University) on database disaggregation and rebalancing. In addition, Piero Conforti (Economist, FAO-EST) and Massimo Iafrate (Statistics, FAO-EST) also assisted with external data collection and processing.

The model was applied to biofuel scenario analysis focusing on two countries: Tanzania and Peru, as part of the FAO *Bioenergy and Food Security Project*. The scenarios focus on sugar cane-ethanol, cassava-ethanol, palm oil-biodiesel (for Tanzania) and sugar-ethanol, palm oil-biodiesel and vegetable oil-biodiesel (for Peru). The analysis focuses on the income, price and trade effects due to biofuel supply shifts; biofuel supply shift scenarios were derived based on current and planned investments in biofuels in Tanzania; and on mandates for blending targets for ethanol and biodiesel in Peru.