USDA Economic Research Service
GTAP Consortium Agency Report 2019-2020

1. **GTAP Model and Data Base Usage**

   USDA's Economic Research Service (ERS) uses resources from GTAP for both data and modeling purposes. The data support two computable general equilibrium (CGE) models used at ERS: MTED-GTAP is used for analysis of trade policy in the Market and Trade Economics Division; the Future Agricultural Resources Model (FARM) is used for long-term scenario analysis in the Resource and Rural Economics Division.

   The MTED-GTAP model is based on the GTAP model in GEMPACK. The FARM model is based on GTAPinGAMS software published by Tom Rutherford. Both models have been extended in many ways depending on questions that were addressed.

2. **Publications**

Fitton, N., P. Alexander, N. Arnell, B. Bajzelj, K. Calvin, J. Doelman, J. Gerber, P. Havlik, T. Hasegawa, M. Herrero, T. Krisztin, H. van Meijl, T. Powell, R. Sands, E. Stehfest, P. West, P. Smith. 2019. "The vulnerabilities of agricultural land and food production to future water scarcity," *Global Environmental Change*.

Hasegawa, Tomoko, Ronald D. Sands, Thierry Brunelle, Yiyun Cui, Stefan Frank, Shinichiro, Fujimori, Alexander Popp. 2020. "Food security under high bioenergy demand toward long-term climate goals," *Climatic Change* (forthcoming).

Beckman, Jayson and Angel Aguiar. 2020. "Chapter 10.D: Agricultural Export Subsidies."

3. **Presentations**

Sands, R.D. (November 2019) "Global Economics and Food Demand," 25th Asia-Pacific Integrated Modeling (AIM) International Workshop, National Institute for Environmental Studies, Tsukuba, Japan.

Chepeliev, Maksym, Alla Golub, Thomas Hertel, Wajiha Saeed and Jayson Beckman. 2020. "U. S. Trade Policies and Their Impact on Domestic Vegetables, Fruits and Nuts Sector: Application of the GTAP-HS Modelling Framework" 23rd Annual Conference on Global Economic Analysis.

Jafari, Yaghoob, Wolfgang Britz, Houssein Guimbard and Jayson Beckman. 2020. "Properly Capturing Trade Liberalization: Impacts of CETA". 23rd Annual Conference on Global Economic Analysis.

4. **Special Reports**

5. **Projects**

Scenarios of Global Diets and the Impact on Land and Water Resources: This project extends capabilities of the ERS FARM model to simulate long-run effects of alternative diets on land use and water resources globally. The study has three primary objectives: (1) improve the representation of consumer food demand in global economic models, especially in regions with rapidly increasing incomes; (2) better represent interindustry linkages from food consumed to derived demand for land; and (3) evaluate alternative frameworks for constraints imposed by water availability.

Agricultural Model Intercomparison and Improvement Project (AgMIP): The FARM model is used for ERS participation in the AgMIP global economics group. AgMIP multi-model comparisons typically simulate economic responses to multiple drivers such as growth in population, growth in per-capita incomes, dietary preference, and changes in agricultural productivity due to climate change.

This project involves work on the GTAP-HS model. We first construct the GTAP-HS database with GTAP vegetables, fruits and nuts sector disaggregated into 79 commodities. We apply this modelling framework to the assessment of the ongoing trade frictions between US and its trading partners with a specific focus on the vegetables, fruits and nuts sector. We also construct the database for dairy products, allocating them into eight products. This work, along with that of the vegetables, fruits and nuts sector is considered in a trade policy assessment for the US-Japan trade agreement, signed October 7, 2019. A number of "v_f" commodities (almonds, blueberries, cranberries, walnuts, broccoli, apples, etc) exported to Japan are facing tariff elimination, while tariff rate quotas for dairy are modified, so we utilize both "v_f" and dairy parts of GTAP-HS.

6. Other Activities